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104th Congress, 2d Session – – – – – – – – – – – House Document 104–257

ANACOSTIA RIVER AND TRIBUTARIES, DISTRICT OF COLUMBIA AND MARYLAND

COMMUNICATION

FROM

THE ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS)

TRANSMITTING

A LETTER FROM THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY DATED NOVEMBER 15, 1994, SUBMITTING A REPORT WITH ACCOMPANYING PAPERS AND ILLUSTRATIONS

SEPTEMBER 4, 1996.—Referred to the Committee on Transportation and Infrastructure and ordered to be printed

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LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

REPLY TO
ATTENTION OF

16 AUG 1996

Honorable Newt Gingrich
Speaker of the House
of Representatives
Washington, D. C. 20515

Dear Mr. Speaker:

In partial response to a resolution adopted by the House Committee on Public Works and Transportation on September 8, 1988, the Secretary of the Army recommends authorization of a fish and wildlife restoration project along the Anacostia River and Tributaries in Montgomery and Prince George's Counties, Maryland, and the District of Columbia. The proposal is described in the report of the Chief of Engineers dated November 15, 1994, which includes other pertinent reports and comments.

The views of the State of Maryland and the District of Columbia, the Departments of the Interior and Transportation, and the Environmental Protection Agency are set forth in the enclosed communications.

The recommended plan consists of 13 separate restoration projects located in three communities. Within the District of Columbia, the plan would involve the restoration of 75 acres of freshwater tidal wetlands and reforestation of 5.6 acres of bottomland hardwoods at two sites. Within Prince George's County, Maryland, the plan would include the restoration of 1.5 miles of stream and 2.2 acres of non-tidal wetlands, and reforestation of 15.8 acres of bottom-land hardwoods at two sites. Within Montgomery County, Maryland, the plan would involve the restoration of 3.6 miles of stream and 2 acres of non-tidal wetlands, and reforestation of 11.5 acres of bottomland hardwoods at nine different sites. The restored and reforested areas will provide fish and wildlife habitat, reduce soil erosion and sedimentation, improve water quality, and in some cases, reduce flooding. The recommended plan will have no adverse environmental impacts, will not reduce the effect of existing flood control projects, and will have no adverse effect on navigation on the Anacostia River.

Project outputs would be the restoration of fish and wildlife habitats which are not amenable to measurement using monetary values. However, to assure that efficient plans were developed, incremental analysis techniques were

utilized to evaluate alternative restoration plans. For the most part the recommended plan at each site provides for the greatest habitat values at the least cost. However, at some locations, other factors such as site constraints, and the desire to provide a mix of habitat types and minimize impacts to existing habitats, required that a higher cost alternative be selected.

Based on October 1995 price levels, the total first cost of the recommended plan is about $17,145,000, of which about $8,410,000 would be for restoration of sites in the District of Columbia, $3,065,000 for sites in Prince George's County, and $5,670,000 for sites in Montgomery County. The recommended plan will result in the restoration of about 605 annual fish and wildlife habitat units, which justifies the average annual cost of about $1,378,000.

The project is recommended for authorization subject to cost sharing that is consistent with Administration policy. The Administration has proposed that non-Federal interests provide 50 percent of the cost of environmental protection and restoration measures. In addition, non-Federal interests would provide all lands, easements, and rights-of-way, and perform all necessary relocations, the value of which will be credited against the 50 percent non-Federal share. Non-Federal interests would also be responsible for operation, maintenance, repair, replacement and rehabilitation of the project after construction. Under this policy, about $8,572,500 of the total first cost of about $17,145,000 would be Federal, and about $8,572,500 would be non-Federal.

The Office of Management and Budget advises that there is no objection to the submission of the report to the Congress. A copy of its letter is enclosed in the report.

Sincerely,

H. Martin Lancaster
Assistant Secretary of the Army
(Civil Works)

Enclosure

COMMENTS OF THE OFFICE OF MANAGEMENT AND BUDGET

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

Honorable H. Martin Lancaster
Assistant Secretary of the
Army for Civil Works
Pentagon - Room 2E570
Washington, D.C. 20310-0108

Dear Mr. Lancaster:

As required by Executive Order 12322, we have completed our review of the Anacostia River and Tributaries project enclosed with your letter of December 16, 1994.

The Administration supports authorization of this project and the Office of Management and Budget does not object to your submitting this report to Congress.

Sincerely,

T.J. Glauthier
Associate Director
Natural Resources,
Energy and Science

COMMENTS OF THE MARYLAND DEPARTMENT OF NATURAL RESOURCES

William Donald Schaefer
Governor

Maryland Department of Natural Resources
Water Resources Administration
Tawes State Office Building
Annapolis, Maryland 21401

Torrey C. Brown, M.D.
Secretary

Robert D. Miller, Esquire
Director

"A Commitment to Excellence in Managing Maryland's Water Resources"

October 3, 1994

Mr. Donald A. Banashek
Director, Washington Level Review Center
Corps of Engineers, Water Resources Support Center
7701 Telegraph Road
Alexandria, Virginia 22315-3861

RE: Anacostia River and Tributaries , District of Columbia and Maryland Integrated Feasibility Report and Final Environmental Impact Statement (July, 1994)

Dear Mr. Banashek:

The Department of Natural Resources has reviewed the referenced document based on our previous comments dated July 1, 1994, on the draft report. The Department's comments on the draft report are included in the final document.

The Department strongly supports the general purpose and goals of the proposed water quality and habitat improvement projects to be conducted in the Anacostia watershed. However, as previously noted, potential thermal impacts in the watershed's Use III and Use IV waters continue to be a concern. Also, our review has identified several outstanding concerns related to monitoring and the list of proposed species for use in the restoration activities.

Based on these concerns, the following comments are provided on the final report.

1. As discussed in our previous comments, we still have concerns regarding potential thermal impacts associated with shallow marsh stormwater management (SWM) facilities placed on Use III and Use IV streams. Based on the preliminary information on existing water quality problems at the proposed sites for these facilities, we have agreed to the continued consideration of shallow marsh facilities. However, we believe certain design features require further consideration and that review of more detailed information will facilitate the fine tuning of the project plans to minimize thermal

Telephone: (410) 974-2156
DNR TTY for the Deaf: 301-974-3683

impacts and other impacts associated with the facilities. During the upcoming State permitting process for these facilities, information on design justification, potential design alternatives, and existing site conditions will be requested. If wet ponds are to be permitted by the State in these sensitive watersheds, it will be necessary to determine through the examination of detailed and site specific information that the projects will not cause significant additional thermal impacts.

2. We recommend that efforts be made to collect additional field data on the existing water temperature regimes as well as other conditions at the project sites that are in Use III and Use IV watersheds. Also, information regarding the thermal regimes of discharges from existing shallow marsh facilities at other locations would be extremely useful, and should be collected if possible. Based on our existing pond data, we feel it is appropriate to have strong concerns for significant heating and thermal discharge from ponds with depths similar to those proposed in the shallow marsh facilities.

3. Given the somewhat limited temperature data available for these sites and for existing shallow marsh SWM facilities, we are uncomfortable with the use of the following phrase: "During runoff events, the project is not likely to cause higher thermal loading than occurs under the existing conditions" (Section 1, pages 5-36, 5-49, 5-55 and Annex C, page 5-5).

   The thermal regimes of discharges from permanent pools on streams can be very complex. During the summer, light rainfall occurring during prolonged periods of cloud cover, at night, and during other cool periods will cause spillover of heated pond water, when overland runoff and stream flow would otherwise be cooler. Also, during a wet pond's detention period following storms, when overland runoff has ended, the pond will continue to discharge heated water to the stream. We believe that these variable conditions demonstrate that thermal regimes of pond spillover in the summer cannot be equated with overland runoff from developed areas. Therefore, a determination that a wet pond will not cause higher thermal loading cannot be made without indepth study of the project site and the stream system. As stated in the report, it may be possible that the project benefits will outweigh the ponds' adverse thermal discharges, but this can only be validated with additional temperature data.

4. In the final report, the phrase, "Reduction of thermal impacts in the Northwest Branch is not a goal..." has reappeared (page 5-42). We objected to this incorrect statement in the January 1994 draft report, and it was removed from the May 1994 draft report. Thermal concerns do exist in Northwest Branch, a Use IV stream, and reduction of thermal impacts is a goal. However, the presence of the Burnt Mills Reservoir largely overshadows the thermal issues at the Lockridge site. This was adequately explained in the May 1994 draft in wording that was apparently removed from the final report.

5. In Section 7.12, we are pleased to see that the monitoring period has been extended to five years. However, details of the monitoring effort are not provided. For example, there is no mention of vegetation management. Monitoring is of limited value unless provisions are made for management intervention. Provisions for the control of specific invading exotic plants must be part of the monitoring program.

6. The planting species list has been improved but still contains unacceptable species such as the State threatened Ilex decidua and many inappropriate species, including species not native to this continent, (Salix purpurea, Lolium multiflorum, and Lotus corniculatus); species not native to the restoration area (Sparganium emerson and Cornus alternifolia); and horticultural species of mixed European and American origin (Festuca rubra and Festuca arundinacea). We request that these species be removed from the list and eliminated from consideration.

   The planting list is indicative of a horticultural approach rather than an ecological approach to restoration. Site specific planting lists should be developed based upon knowledge of the local flora (and specifically, knowledge of the vegetative composition of the habitats that are similar to the type planned for restoration) and surveys of nearby benchmark habitat examples. Appropriate species should be selected and planting stock should be propagated from local wild collections of these species.

   The Anacostia Watershed restoration project provides a unique opportunity to improve the practice of "restoration" by restricting planting to stock propagated from local sources. Gene Cooley of the Department's Natural Heritage Program (410/974-2870) can provide technical assistance on selecting the appropriate species for restoration work and developing local sources for plants.

Thank you for the opportunity to provide comments on the proposed report. If you have any questions, please contact me at (410) 974-2156.

Sincerely,

Elder A. Ghigiarelli, Jr.
Chief, Coastal Zone Consistency

EAGJr:cma

cc: Dr. James Johnson, COE
Gary Setzer, WRA
Bill Jenkins, WRA
Ray Dintaman, TID
Janet McKegg, FHW

COMMENTS OF THE DISTRICT OF COLUMBIA

GOVERNMENT OF THE DISTRICT OF COLUMBIA
DEPARTMENT OF PUBLIC WORKS
2000 14TH STREET, N.W.
6TH FLOOR
WASHINGTON, D.C. 20009

OFFICE OF THE DIRECTOR
(202) 939-8000

August 24, 1994

Washington Level Review Center
ATTN: CEWRC-WLR-E (SA)
7701 Telegraph Road
Alexandria, Va. 22315-3861

Dear Sirs:

Thank you for the opportunity to review the Anacostia River and Tributaries Integrated Feasibility Report and Final Environmental Impact Statement. I congratulate the Corps on preparing a thorough and professional study of habitat restoration needs in the Anacostia River Basin.

I agree with the technical recommendations contained in the report as they relate to the two proposed projects in the District of Columbia. It has been our understanding that since the proposed projects would be located on federal land, that the District of Columbia would not be required to participate financially in these projects. The District will work with the National Park Service to develop an arrangement for the maintenance of the projects after they are completed.

Thank you again for your agency's support of the Anacostia River restoration effort.

Sincerely,

Betty Hager Francis
Director of Public Works

COMMENTS OF THE DEPARTMENT OF THE INTERIOR

United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, D.C. 20240

OCT 3 1994

ER 94/642

Mr. Donald A. Banashek
Director
Washington Level Review Center
ATTN: CEWRC-WLR-E (SA)
7701 Telegraph Road
Alexandria, Virginia 22315-3861

Dear Mr. Banashek:

The Department of the Interior has completed its review of the proposed Chief of Engineers report and other pertinent reports for the Anacostia River and Tributaries, Maryland and the District of Columbia.

We have no objection to the project and have no further comments to offer.

Sincerely,

Willie R. Taylor
Acting Director
Office of Environmental
Policy and Compliance

COMMENTS OF THE ENVIRONMENTAL PROTECTION AGENCY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

September 27, 1994

Mr. Donald A. Banashek
Director, Washington Level
Review Center
U.S. Army Corps of Engineers
ATTN: CEWRC-WLR-E (SA)
7701 Telegraph Road
Alexandria, Virginia 22315-3861

Dear Mr. Banashek:

In accordance with the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, EPA has reviewed the Anacostia River and Tributaries Final Environmental Impact Assessment (EIS).

EPA has no comments on the above mentioned document at this time. However, we would like to be kept informed of the progress of this project as it develops. We would specifically be interested in the communication between the Corps and other agencies that are involved in projects that are located in the vicinity of the proposed restoration project sites that may result in impacts to the proposed restoration. These sites were mentioned in the Final EIS in section 5 in the cumulative impacts discussion.

Thank you for the opportunity to review and comment on this project. An further correspondence concerning this matter should be directed to Danielle Algazi (215-597-1168) of my staff.

Sincerely,

Roy E. Denmark, Jr.
Acting Chief
Environmental Planning and
Assessment Section

COMMENTS OF THE DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
United States Coast Guard

Commandant
U.S. Coast Guard

2100 Second St. S.W.
Washington, DC 20593-0001
Staff Symbol: G-MEP-3
Phone: (202) 267-0500

16452

SEP 22 1994

Mr. Donald A. Banashek
Director
Washington Level Review Center
ATTN: CEWRC-WLR-E (SA)
7701 Telegraph Road
Alexandria, Virginia 22060-5576

Dear Mr. Banashek:

This is in response to your letter of August 5, 1994, transmitting the proposed report of the Chief of Engineers, the district engineer's report, and the final environment impact statement on Anacostia River and Tributaries, Maryland and District of Columbia. We have reviewed the reports and have no comments to offer.

Thank you for the opportunity to review this project.

Sincerely,

J. C. Jackson
for T. R. REILLY
Commander, U.S. Coast Guard
Chief, Environmental Coord. Br.
By direction of the Commandant

ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUBMIA AND MARYLAND

REPORT OF THE CHIEF OF ENGINEERS, DEPARTMENT OF THE ARMY

DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314-1000

REPLY TO
ATTENTION OF:

15 NOV 1994

CECW-PM (10-1-7a)

SUBJECT: Anacostia River and Tributaries, Maryland and District of Columbia

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on environmental restoration measures for the Anacostia River watershed in Montgomery and Prince George's Counties, Maryland, and the District of Columbia. It is accompanied by the report of the district and division engineers. These reports are in partial response to a resolution by the Committee on Public Works and Transportation of the United States House of Representatives dated 8 September 1988. The study resolution requested review of the reports on the Anacostia River an Tributaries, District of Columbia and Maryland, contained in House Document 202, 81st Congress, with a view to determining if further improvements in the Anacostia River basin for flood control, navigation, erosion, sedimentation, water quality, and other related water resources needs are advisable at this time.

2. The reporting officers considered the multiple opportunities to address water resources problems and, in particular, to restore fish and wildlife habitat throughout the Anacostia basin. They recommend thirteen separable, ecologically and geographically distinct projects for implementation, consisting of multiple improvements in each of the three independent political jurisdictions. Within the District of Columbia, two wetland sites are recommended for restoration. A stream restoration and a wetland construction proposal are recommended for Prince George's County. Within Montgomery County, four stream restoration sites and five stormwater wetland sites are recommended for retrofitting or new construction. Together, these separable projects will restore 80 acres of tidal and nontidal freshwater wetlands, 5 miles of piedmont stream, and 33 acres of bottomland hardwood forests. The restored areas will provide habitat for waterfowl, anadromous and resident fishes, and other significant wildlife resources. The identified measures will improve fish and wildlife habitat, reduce erosion and sedimentation, improve water quality and offer slight improvement for flood control. They will have no effect on navigation within the Anacostia River basin.

3. The recommended plan provides fish and wildlife habitat improvements and the outputs of these project purposes cannot be expressed in monetary units. Project outputs are improvements to tidal and nontidal freshwater wetlands, streams, anadromous and resident fishes, waterfowl, and other significant wildlife resources. Total first cost of the recommended plan based on December 1993 price levels is $16,329,000 ($18,820,000 fully funded). Average annual costs are estimated at $1,474,000. The recommended projects shall be subject to cost sharing, financing and other requirements of the Water Resources Development Act of 1986 (Public Law 99-662). Applying these cost-sharing policies, the estimated Federal first cost (75 percent of the total project cost) is $12,247,000, and the estimated non-Federal cost (25 percent) is $4,082,000. The non-Federal costs are divided among the three local sponsors as follows: $2,003,000 for the District of Columbia, $729,000 for Prince George's County, and $1,350,000 for Montgomery County.

4. Washington level review indicates that the proposed plan for environmental restoration is technically sound and environmentally acceptable. The plan complies with applicable U.S. Army Corps of Engineers planning procedures and regulations. Also, the views of interested parties, including Federal, State, and local agencies have been considered.

5. Accordingly, I recommend that the proposed environmental restoration elements be constructed in accordance with the reporting officers' recommended plan, with such modifications as in the discretion of the Chief of Engineers may be advisable. My recommendation is subject to the non-Federal sponsors agreeing to comply with all applicable Federal laws and policies and other requirements, including but not limited to:

a. Provide all lands, easements, and rights-of-way including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined to be necessary for the construction, operation, and maintenance of the project.

b. Provide, or pay to the Federal Government the cost of, all retaining dikes, wasteweirs, bulkheads and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project.

c. Provide any additional amounts as are necessary to make their total contribution equal to 25 percent of total project costs assigned to restoration of fish and wildlife resources.

d. For so long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project, or functional portion of the project, at no cost to the Federal Government, in a manner compatible with the project's State laws and any specific directions prescribed by the Federal Government.

e. Grant the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

f. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for the damages due to fault or negligence of the United States or its contractors.

g. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 C.F.R Section 33.20.

h. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction, operation, and maintenance of the project, except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Federal Government determines to be subject to the navigation servitude without prior specific written direction by the Federal Government.

i. Assume complete financial responsibility, as between the Federal Government and the non-Federal sponsor, for all necessary cleanup and response costs of any CERCLA-regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines necessary for the construction, operation and maintenance of the project.

j. To the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

k. Comply with applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, required for the construction, operation, and maintenance of the project, including those necessary for the relocations, borrow materials, and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

l. Comply with all applicable Federal and State laws and regulations, including, but not limited to, section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and the Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

m. Provide 25 percent of that portion of total historic preservation, mitigation, and data recovery costs attributable to restoration of fish and wildlife resources that are in excess of 1 percent of the total amount authorized to be appropriated for restoration of fish and wildlife resources.

6. The recommendation contained herein reflects information available at this time and current departmental policies governing formulation of individual projects. It does not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program nor the perspective of higher review levels within the executive branch. Consequently, the recommendation may be modified before it is transmitted to the Congress as a proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the sponsors, the State of Maryland, the District of Columbia, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

Arthur E. Williams

ARTHUR E. WILLIAMS
Lieutenant General, USA
Chief of Engineers

Anacostia River and Tributaries
District of Columbia and Maryland

Integrated Final Feasibility Report and Final Environmental Impact Statement (FEIS)

July 1994

NOTE TO READER: The FEIS for this project has been integrated into this feasibility report in accordance with Engineer Regulation 1105-2-100 (December 28, 1990). Paragraphs required for compliance with the National Environmental Policy Act (NEPA) are noted by an asterisk (*) in the table of contents.

LEAD AGENCY: Baltimore District, U.S. Army Corps of Engineers

COOPERATING AGENCIES:
- Montgomery County Department of Environmental Protection, Rockville, Maryland
- Prince George's County Department of Environmental Resources, Landover, Maryland
- District of Columbia, Department of Consumer and Regulatory Affairs and Department of Public Works, Washington, D.C.
- Maryland Department of Natural Resources and Department of the Environment, Annapolis and Baltimore, Maryland
- Interstate Commission on the Potomac River Basin, Rockville, Maryland
- Metropolitan Washington Council of Governments, Washington, D.C.
- U.S. Department of Interior, National Park Service, Washington, D.C.
- Maryland - National Capital Park and Planning Commission, Silver Spring and Riverdale, Maryland

TITLE OF PROPOSED ACTION: Anacostia River and Tributaries, District of Columbia and Maryland Feasibility Study

LOCATION: Prince George's and Montgomery Counties, Maryland, and the District of Columbia

DISTRICT CONTACT: Mr. Mark E. McKevitt
U.S. Army Engineer District, Baltimore
P.O. Box 1715 ATTN: CENAB-PL-PR
Baltimore, Maryland 21203-1715
(410) 962-2650

LOCAL SPONSOR CONTACTS:

Ms. Ferial Bishop
Administrator
Environmental Regulation Administration
District of Columbia
Department of Consumer and
Regulatory Affairs
1200 Martin Luther King Jr. Boulevard, SE
Washington, D.C. 20001

Mr. Herbert Sachs
Executive Director
Interstate Commission on the Potomac
River Basin
6110 Executive Boulevard Suite 300
Rockville, Maryland 20852-3903

Dr. Edward U. Graham
Director
Montgomery County
Department of Environmental Protection
101 Monroe Street
Rockville, Maryland 20850

Mr. Robert D. Miller
Director
Water Resources Administration
Maryland Department of Natural Resources
Tawes State Office Building, D-3
Annapolis, Maryland 21401-9974

Mr. Kenneth Laden
Chief, Environmental Policy Branch
District of Columbia
Department of Public Works
2000 14th Street, NW
Washington, D.C. 20009

Ms. Ruth Crone
Executive Director
Metropolitan Washington Council
of Governments
777 North Capitol Street, NE
Washington, D.C. 20002-4201

Mr. Eugene Lauer
Director
Prince George's County
Department of Environmental
Resources
9400 Peppercorn Place
Landover, Maryland 20785

Mr. Peter S. Tinsley
Deputy Director
Chesapeake Bay Watershed
Management Administration
Maryland Department of the
Environment
2500 Broening Highway
Baltimore, Maryland 21224

ABSTRACT: This report/FEIS presents the findings of a feasibility study to evaluate alternative solutions for restoring fish and wildlife habitat in the Anacostia River and its Tributaries, located within the District of Columbia and Maryland. The report documents the results of numerous engineering, environmental, economic and social analyses which were used to select the recommended plan of action proposed in the report. The selected plan would provide for the restoration of 80 acres of tidal and non-tidal freshwater wetlands, 5 miles of piedmont streams, and 33 acres of bottomland hardwood forests. Impacts to environmental and cultural resources have been evaluated and are documented herein as required by the National Environmental Policy Act of 1969 (NEPA) and Section 106 of the National Historic Preservation Act of 1966.

It should be noted that the feasibility study and environmental analyses were undertaken for the entire Anacostia River basin as a complete watershed. The selected plan has been sub-divided based on jurisdictional boundaries. This was done to facilitate negotiations for the Local Cooperation Agreements (LCAs) for the range of construction actions located throughout the Anacostia River basin. Construction of the fish and wildlife habitat recommended in this report will make a significant contribution to the goal of restoring the Anacostia River basin. Complete restoration of the basin to its ultimate potential will require the continued cooperation of Federal, state, regional, and local agencies, private organizations and the citizens of the basin.

SYLLABUS: The Anacostia River basin is a 170-square mile sub-basin of the Potomac River. The headwaters originate in the piedmont and coastal plain areas of Montgomery and Prince George's Counties, Maryland, and it joins with the Potomac River within the District of Columbia. The entire river system is freshwater; however, tidal influence extends for approximately 9 miles above the confluence with the Potomac River. The Anacostia River basin had a 1990 population of over 800,000 people. As a result of urbanization and the previous construction of Federal projects for navigation, flood control and recreation, the fish and wildlife habitat of this ecologically diverse region has been severely degraded.

The current study resulted from a reconnaissance study, which was completed in December 1990 and concluded that there was a likelihood of a Federal interest in restoration of fish and wildlife habitat in the Anacostia River basin. To further develop and evaluate such possible measures, a cost shared feasibility study was initiated in January 1992. The six non-Federal sponsors for this study are Prince George's County and Montgomery County, Maryland, the District of Columbia, the Metropolitan Washington Council of Governments, the Interstate Commission on the Potomac River Basin, and the State of Maryland. Measures considered were wetland, bottomland and aquatic habitat restoration. Several of the proposals included in the reconnaissance study were separately developed for construction under the authorization of Section 1135 of the Water Resources Development Act of 1986 (Public Law 99-662). Section 2.9 gives a brief outline of this separate action in the Anacostia River basin.

During the initial plan formulation stage, approximately 120 sites were considered for restoration. Through a preliminary site screening process, 13 ecologically and geographically distinct areas were considered for formulation and evaluation of alternatives and detailed engineering analyses. Costs, benefits, environmental impacts and cultural resources impacts were evaluated for each alternative. Alternatives were selected which were incrementally justified for restoration of fish and wildlife habitat and supported by the non-Federal sponsors for the study.

The District Engineer recommends the selected plan for restoration of fish and wildlife habitat in the Anacostia River and Tributaries, District of Columbia and Maryland. The plan would provide for the construction of 80 acres of tidal and non-tidal freshwater wetlands, the restoration of 5 miles of piedmont streams, and the planting of 33 acres of bottomland hardwood forest within this highly urbanized area. A Section 404 (b)(1) evaluation shows that these projects meet all guidelines under the Clean Water Act, and an exemption under Section 404 (r) of Public Law 92-500, as amended, is therefore requested.

Because the proposed restoration sites are located in three independent political jurisdictions, three projects, consisting of multiple improvements in each jurisdiction, are recommended for implementation. Within the District of Columbia, two wetland sites are recommended for restoration. Stream restoration and wetland construction proposals are recommended for Prince George's County. Within Montgomery County, four stream restoration sites and five stormwater wetland sites are recommended for retrofitting or new construction. The restored areas would provide habitat for waterfowl, anadromous and resident fishes, and other significant wildlife resources.

Within the District of Columbia, wetland restoration is proposed for 75 acres of freshwater tidal wetlands within Kingman Lake and along the river between Benning Road and New York Avenue. Reforestation is also proposed for an additional 6 acres in the vicinity of Kingman Lake. The area to be restored is the property of the U.S. Department of Interior, National Park Service. The total project cost estimate is $9,250,000. The National Park Service and the District of Columbia government both support this project.

Within Prince George's County, the construction of a 2-acre wetland (Fordham Street), restoration of 8,000 feet of the Northwest Branch, and reforestation of 16 acres of riparian area are proposed to restore fish and wildlife habitat. The total project cost estimate is $3,330,000. The Prince George's County Department of Environmental Resources and the Maryland-National Capital Park and Planning Commission both support this project.

Within Montgomery County, the retrofitting of three existing stormwater management ponds (Snowden's Mill I, Snowden's Mill II and Tanglewood), the construction of two new stormwater management wetlands (Lockridge Drive and Stewart/April Lane) and the restoration of 17,000 feet of Sligo Creek, Paint Branch and Northwest Branch are proposed

to restore fish and wildlife habitat. A total of 2 acres of wetlands will be constructed along with 12 acres of reforestation. The total project cost estimate is $6,240,000. The Montgomery County Department of Environmental Protection and the Maryland-National Capital Park and Planning Commission both support this project.

The projects shall be subject to cost sharing, financing and other requirements of the Water Resources Development Act of 1986 (Public Law 99-662). The total first cost for the three recommended projects, including future price escalation through project completion, is estimated at $18,820,000. Applying the cost sharing policies outlined in Public Law 99-662, the Federal first cost (75 percent of the total project cost) is $14,120,000, and the estimated non-Federal first cost (25 percent) is $4,700,000. An additional non-Federal responsibility is operation, maintenance, repair, replacement and rehabilitation (OMRR&R) for the projects, costing an estimated $38,000 annually.

The recommended plan is also the plan that maximizes the Environmental Quality (EQ) attributes. Because the outcome of the construction actions recommended by this study will be fish and wildlife habitat benefits which are not amenable to monetary benefit analyses, no National Economic Development (NED) plan is presented. The recommended plan will restore 604 fish and wildlife habitat units annually over the estimated 50-year life of the project. The average annual costs are estimated at $1,330,000. There will be no significant adverse environmental impacts and the recommended plan will not reduce the NED benefits of the existing flood control and navigation projects.

Approximately two years of preconstruction engineering and design (PED), are required prior to construction. During this time, LCAs will be negotiated with the non-Federal sponsors to specify cost sharing and other requirements in accordance with the Water Resources Development Act of 1986. A major effort during PED will be the preparation of construction plans and specifications. Following PED, project construction, which would begin in 1997, would require an additional two years.

All of the non-Federal sponsors for the feasibility study have been extensively involved throughout the study process and are very supportive of the selected plan. The restoration of the Anacostia River basin has been a priority for the non-Federal sponsors since the Anacostia Watershed Restoration Agreements were signed in 1984 and 1987. These agreements formed the Anacostia Watershed Restoration Committee (AWRC) which has provided leadership and focus to the restoration efforts. Construction of the fish and wildlife habitat recommended in this report will make a significant contribution to the goal of restoring the Anacostia River basin. Complete restoration of the basin to its ultimate potential will require the continued cooperation of Federal, state, regional, and local agencies, private organizations and the citizens of the basin.

Anacostia River and Tributaries Feasibility Study

Final Feasibility Report and EIS

Section 1

Introduction

This draft-integrated feasibility report and environmental impact statement (EIS) summarizes the efforts of the Anacostia River and Tributaries Feasibility Study which was initiated in January 1992. This section provides background information on the study.

1.1 PURPOSE OF STUDY

The purposes of this study were to examine and evaluate the problems and opportunities related to restoration of fish and wildlife habitat in the Anacostia River basin; formulate plans to address those problems and opportunities; and recommend cost effective solutions for implementation. This report documents the plan formulation, engineering and design, cost and benefit analyses and the National Environmental Policy Act (NEPA) evaluation processes for alternatives which were considered in the feasibility study. The feasibility report and the EIS have been integrated into a single document in order to avoid repetition. The detailed recommended plan is summarized in Section 7 and fully documented in Appendix A.

1.2 STUDY AUTHORITY

The Anacostia River and Tributaries Feasibility Study is in response to the September 8, 1988 resolution of the Committee on Public Works and Transportation, U.S. House of Representatives which stated:

> *"Resolved by the Committee on Public Works and Transportation of the United States House of Representatives, that the Board of Engineers for Rivers and Harbors is hereby requested to review the report of the Chief of Engineers on the Anacostia River and Tributaries, District of Columbia and Maryland, published as House Document No. 202, 81st Congress, 1st Session, with a view to determining if further improvements for flood control, navigation, erosion,*

sedimentation, water quality and other related water resources needs are advisable at this time."

Further authorization for this study was contained in the June 25, 1990 *Statement of New Environmental Approaches* by the Assistant Secretary of the Army (Civil Works) which gave fish and wildlife restoration the status of a priority project output.

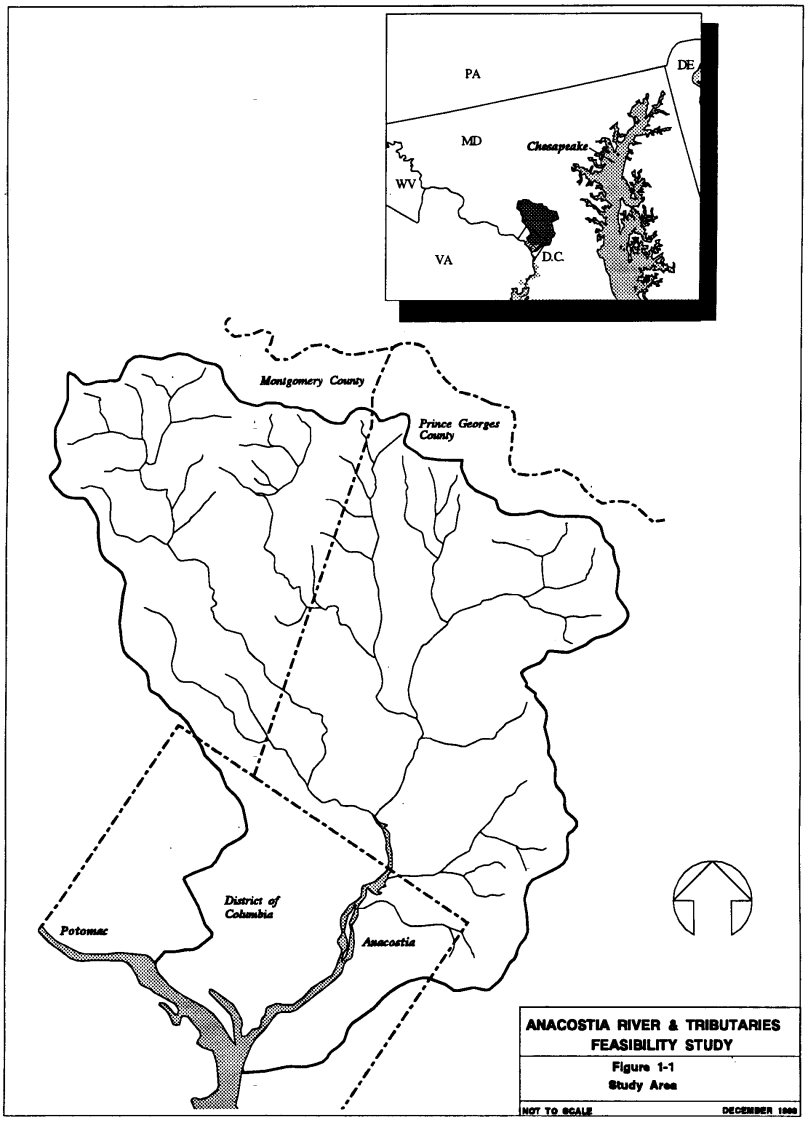
As a result of this study, recommendations are made to higher authority in response to the Committee resolution. This report constitutes an interim response to the Committee resolution because the full range of environmental restoration opportunities could not be evaluated and included in the report recommendations within the schedule and funding of the negotiated study agreement.

1.3 STUDY AREA

The Anacostia River basin encompasses approximately 145 square miles in Montgomery and Prince George's Counties, Maryland, and 25 square miles within the District of Columbia (Figure 1-1). The entire watershed is freshwater, although the river is tidally influenced for approximately nine miles above the confluence with the Potomac River. At Bladensburg, Maryland, the Anacostia River is formed by the junction of the Northeast and the Northwest Branches. The major tributaries to the Northeast Branch are Paint Branch, Little Paint Branch, Indian Creek and Beaverdam Creek. The primary tributaries to the Northwest Branch are Sligo Creek and Bel Pre Creek. The dividing line between Montgomery and Prince George's Counties very nearly follows the physical boundary (Fall Line) between the piedmont plateau and the coastal plain. The boundary between the District of Columbia and Prince George's County approximates the tidal portion of the river.

1.4 SCOPE OF STUDY

This report documents the results of the screening of environmental restoration alternatives for the Anacostia River basin. The evaluations were based on site-specific technical information developed during the course of the study. This included new surveys and mapping, hydraulic and hydrologic evaluations, geotechnical investigations, natural and cultural resources inventories, and site-specific project designs. Alternatives considered varied among sites but were all focused toward the restoration of fish and/or wildlife habitat.


PA
DE
MD
Chesapeake
WV
VA
D.C.
Montgomery County
Prince Georges County
District of Columbia
Potomac
Anacostia
ANACOSTIA RIVER & TRIBUTARIES
FEASIBILITY STUDY
Figure 1-1
Study Area
NOT TO SCALE
DECEMBER 1998

1.5 STUDY AND REPORT PROCESS

The Water Resources Development Act of 1986 (P.L. 99-662) directs the Corps of Engineers to conduct water resources studies in two phases: reconnaissance and feasibility. Reconnaissance studies are conducted at full Federal expense and are usually completed in 12 months. The purposes of a reconnaissance study are to evaluate water resources related problems and opportunities, formulate cost effective alternatives, determine if a Federal interest exists in the implementation of solution, estimate the time and effort required to conduct a feasibility study, and identify a non-Federal public agency willing to share in 50 percent of the feasibility study cost.

Feasibility studies are undertaken to develop detailed, site-specific solutions to the identified problems and opportunities. The majority of the necessary engineering investigations required to design and estimate the cost of recommended alternatives are completed as part of a feasibility study.

1.5.1 Reconnaissance Results

The reconnaissance report, dated December 1990, identified the problems and opportunities in the basin with a primary focus on fish and wildlife habitat restoration. Potentially feasible measures were proposed which would ameliorate habitat destruction related to previous Corps of Engineers activities in the basin. It was also determined that a Federal and a non-Federal interest existed in further developing restoration alternatives through a cost shared feasibility study. The District Engineer recommended that a feasibility study for environmental restoration be conducted under the study authority.

The Reconnaissance Review Conference was held on March 6, 1991 in the Baltimore District. The meeting was attended by representatives for the Assistant Secretary of the Army for Civil Works, the Office of the Chief of Engineers, the North Atlantic Division, the Baltimore District, and the U.S. Fish and Wildlife Service (FWS). The Metropolitan Washington Council of Governments (MWCOG) participated in the meeting as a representative of the potential non-Federal sponsors. The reconnaissance report was approved as written with several significant clarifications:

> *1) Projects are to be justified based on their contribution to restoration of fish and wildlife habitat.*
>
> *2) A quantitative and qualitative methodology must be used to evaluate the most technically sound and cost-effective ways to provide varying levels of fish and wildlife habitat-related outputs.*

3) The significance of the restored resources will be determined based on public, scientific and institutional considerations and the cost-effectiveness of implementation.

4) The linkage between previous Corps of Engineers activities and the proposed projects will be clearly established.

1.5.2 Feasibility Study Cost Sharing Agreement (FCSA)

The FCSA was negotiated with six non-Federal sponsors during 1991. The six non-Federal sponsors are the District of Columbia; Montgomery County, Maryland; Prince George's County, Maryland; the State of Maryland; the Interstate Commission on the Potomac River Basin (ICPRB); and the Metropolitan Washington Council of Governments (MWCOG). The total feasibility study cost is $2,450,000 which is divided equally between the Federal and non-Federal sponsors. The non-Federal sponsors are providing 16 percent of the total study cost as in-kind services.

The non-Federal sponsors include two counties, one state, two regional agencies, and the District of Columbia. In order to equitably distribute the financial and in-kind service contributions of the regional agencies (ICPRB and MWCOG) and the State of Maryland, study efforts were apportioned to the appropriate jurisdictions. ICPRB and MWCOG contributions were divided equally between the District of Columbia, Prince George's County and Montgomery County. The State of Maryland's financial and in-kind service credits were applied to work in Montgomery and Prince George's Counties only.

The Initial Project Management Plan (IPMP) was included as an appendix to the FCSA. The IPMP outlined work tasks required to evaluate the restoration needs of the basin, identified the in-kind services of the sponsors, and detailed the costs for the study. The scope of the feasibility study as defined by the FCSA and the IPMP did not encompass a complete review of all potential environmental restoration alternatives in the basin. The study was limited by the non-Federal sponsors' financial contributions to the feasibility study rather than by the potential scope of work for restoration of the Anacostia River basin.

1.6 ASSOCIATED ENVIRONMENTAL RESTORATION EFFORTS

There have been a number of efforts over the past 25 years to evaluate the Anacostia River basin to determine how the responsible agencies could best carry out their respective stewardship roles. Formal coordination was initiated in 1984 when the State of Maryland and the District of Columbia signed an agreement to combine efforts to control pollution sources to the system and implement measures to improve water quality and restore a balanced aquatic community. The 1984 Anacostia watershed Restoration Agreement

resulted in an extensive program by the District of Columbia and the U.S. Environmental Protection Agency (EPA) to evaluate and control point source discharges of untreated sewage to the tidal Anacostia River from the combined stormwater/sanitary sewer system. The State of Maryland developed and implemented a program to reduce sediment loading by reclaiming lands which had been used for sand and gravel mining. In 1987, the State of Maryland, the District of Columbia, Prince George's County and Montgomery County signed the Anacostia Watershed Restoration Agreement. The 1987 agreement expanded the scope of the previous agreement and included the county governments responsible for the majority of the non-tidal portion of the basin.

1.6.1 Anacostia Watershed Restoration Committee (AWRC)

The 1987 agreement also formalized the Anacostia Watershed Restoration Committee (AWRC) which is composed of the chief administrators of the natural resources, environmental regulation and/or public works agencies from the State of Maryland, the District of Columbia, Prince George's County and Montgomery County. The MWCOG was designated as the agency to provide administrative support and other services as requested by the signatories to facilitate the activities of the AWRC. The ICPRB was designated as the agency to implement public participation activities and to develop living resources proposals. The AWRC members as well as MWCOG and ICPRB are all non-Federal sponsors for the feasibility study. The Baltimore District Corps of Engineers accepted an invitation in 1991 to become a member of the AWRC, and in this capacity, coordinates and promotes Federal restoration activities. The accomplishments of the AWRC since 1987 have been extensive. Approximately 25 percent of the identified restoration projects have been implemented. In addition, ICPRB, MWCOG and many other local, state and Federal agencies have conducted research projects and collected monitoring data to evaluate restoration progress and needs.

1.6.2 Six Point Action Plan

The AWRC provides a coordinated focus and strategy to restoration efforts throughout the entire watershed. MWCOG's Anacostia Restoration Team has developed implementation strategy documents and five annual work plans under the direction of the AWRC. The primary strategy of the restoration efforts is outlined in *A Commitment to Restore Our Home River: A Six-Point Action Plan* (MWCOG, 1991).

This plan was endorsed by Federal, state and local elected officials and regional agencies in November 1991. The six goals of the plan are:

> *1. Dramatically reduce pollutant loads delivered to the tidal estuary to improve water quality conditions by the turn of the century.*

2. Protect and restore the ecological integrity of urban Anacostia streams to enhance aquatic diversity and provide for a quality urban fishery.

3. Restore the spawning range of anadromous fish to historical limits.

4. Increase natural filtering capacity of the watershed by sharply increasing the acreage and quality of tidal and non-tidal wetlands.

5. Expand forest cover throughout the watershed and create a contiguous corridor of forest along the margins of its streams and rivers.

6. Make the public aware of its key role in the cleanup of the river, and increase volunteer participation in watershed restoration activities.

1.7 STRATEGY FOR RESTORATION OF THE ANACOSTIA RIVER BASIN

The Baltimore District has pursued a strategy of blending the Corps of Engineers restoration policy with the goals of the AWRC. Working with the Committee and all of the associated agencies and organizations in the basin resulted in access to an extensive array of information and expertise. The focus of the Corps of Engineers involvement in the Anacostia basin is the restoration of fish and wildlife habitat. The Baltimore District utilized existing Corps of Engineers authority to develop feasibility study recommendations which would restore fish and wildlife habitat and at the same time partially address the goals of the *Six Point Action Plan.*

The Anacostia River and Tributaries Feasibility Study is significantly different from previous Corps of Engineers cost shared feasibility studies in two ways. This is the first Corps study to proceed from the reconnaissance phase to the feasibility phase with the expressed single purpose of fish and wildlife habitat restoration. The developing Corps policy in this area has been helpful in defining the Corps role in environmental restoration. Second, unlike traditional studies where the flood control or navigation opportunities are limited, potential restoration actions for this study were distributed throughout the basin. As such, the previous efforts of the sponsors were critical to the plan formulation process.

1.8 FEASIBILITY STUDY SPONSORS AND COOPERATING AGENCIES

The six non-Federal sponsors for the study represent a diversified range of agencies with dissimilar mission areas. In addition to the sponsors, the Maryland-National Capital Park and Planning Commission (M-NCPPC) and the National Park Service (NPS) are major

contributors to this feasibility study. In order to better understand the relationship of these agencies, the following descriptions of the agency functions are provided.

1.8.1 District of Columbia Sponsoring Agencies

District of Columbia Department of Public Works. The mission of the Department of Public Works (DPW) is to improve the overall quality of life in the District of Columbia by delivering services and maintaining infrastructure. DPW combines a range of regulatory, operational and planning responsibilities that include the distribution of water, collection and disposal of wastewater and solid waste, management of public landscapes, and the planning, design and construction of infrastructure.

District of Columbia Environmental Regulation Administration. The District of Columbia Department of Consumer and Regulatory Affairs (DCRA), Environmental Regulation Administration, administers District and Federal laws, regulations and mayoral initiatives governing the environment and natural resources of the District of Columbia in order to protect human health and the environment as they relate to pesticides, hazardous waste underground storage tanks, water, air, soils and fisheries programs.

1.8.2 Regional Sponsoring Agencies

Metropolitan Washington Council of Governments. The Metropolitan Washington Council of Governments (MWCOG) is the regional planning organization of the major local governments and their governing officials within the metropolitan Washington area. MWCOG works towards solutions to such regional problems as energy shortages, traffic congestion, inadequate housing, and air and water pollution. Under the Anacostia Watershed Restoration Agreement, MWCOG is responsible for providing administrative and technical support to facilitate the restoration activities of the AWRC.

Interstate Commission on the Potomac River Basin. The Interstate Commission on the Potomac River Basin (ICPRB) was established under interstate compact and by an act of Congress in 1940. All members of the commission (Maryland, Virginia, West Virginia, Pennsylvania, the District of Columbia, and the Federal government) with the exception of the Federal government are signatories to the compact. ICPRB's mission was expanded in 1970 to include all water-related land resources as well as water quality in the basin. ICPRB's roles and functions include coordination of interstate and basinwide activities and studies, monitoring of water quality, and dissemination of information to citizens and government groups.

1.8.3 State Sponsoring Agencies

Maryland Department of Natural Resources. The Maryland Department of Natural Resources (DNR) is responsible for the administration, management, research and development, and comprehensive planning in the area of natural resources.

Maryland Department of the Environment. The Maryland Department of the Environment (MDE) directs programs to protect and restore the quality of the land, air and water resources of the State of Maryland for the benefit of present and future generations.

1.8.4 Local/County Sponsoring Agencies

Montgomery County Department of Environmental Protection. The Department of Environmental Protection (DEP) is the principal County agency responsible for protecting water quality as it is affected by peak urban stormwater runoff flows, sediment loadings and other pollutants in stormwater. DEP carries out these responsibilities through its authority to review, approve, inspect and enforce implementation of facility construction and operational procedures specified in sediment control and stormwater management plans. DEP manages programs which are designed to maintain and restore the chemical, physical and biological integrity of the County's water resources. These programs include a capital improvements program to restore watersheds which have been impacted by development through the implementation of projects to control peak runoff flows and remove pollution in runoff and stream restoration projects to control stream bank erosion and habitat losses in urban streams. DEP also manages the County's solid waste and enforces air, noise and building code regulations.

Prince George's Department of Environmental Resources. DER responds to the needs of the public by improving the quality of life through the enforcement and cultivation of the natural and created environment. The Environmental Management Division directs the County's consolidated planning, policy-making and program implementation functions for a wide variety of environmental programs including the ten-year water and sewerage plan, solid waste disposal and recycling, sludge management, water quality and wetland protection, tree preservation, environmental public education and stormwater management. The Watershed Protection Branch has the primary responsibility for overseeing the stormwater management functions including policy formulation, planning, engineering, construction, permit regulation and enforcement in the areas of flood control and water quality. The goal of the Watershed Protection Branch is to minimize flooding, maintain water quality and protect natural resources by controlling and managing stormwater runoff associated with urban development and land use activities.

1.8.5 Cooperating Landowning Agencies

National Park Service. The National Park Service (NPS), part of the U.S. Department of the Interior, has the mission to conserve the scenery, the natural and historic objects, and the wildlife of park lands. In addition, recreational opportunities are provided for the visitors of Anacostia Park.

Maryland-National Capital Park and Planning Commission. The Maryland-National Capital Park and Planning Commission (M-NCPPC) is a body corporate of the State of Maryland, established by the Maryland General Assembly in 1927. The Commission is a bi-county agency, empowered to acquire, develop, maintain and administer a regional system of parks in Montgomery and Prince George's Counties. Two regional offices are maintained, one in each county. The Commission administers a park system which currently contains over 43,000 acres. It is composed of stream valley, regional and neighborhood parks, and park-school recreational areas. Its staff consists of over 2,000 employees - planners, park and recreation administrators, park police and administrative staff.

National Capital Planning Commission. Although it is not a landowning agency, the National Capital Planning Commission (NCPC) reviews Federal and District of Columbia master plans and project plans in preliminary and successive stages. The Capper-Cramton Act (P.L. 284, 71st Congress, 1st Session) provided funding for a portion of the stream valley park system in Maryland. Modifications to the approved plans for these lands must be approved by the NCPC.

1.9 PRIOR STUDIES AND REPORTS

The Corps of Engineers has been involved in the Anacostia River basin for more than 115 years with construction of improvements for navigation and flood control. Additionally, projects have been justified on the basis of improving public health conditions at the Washington Barracks and for the construction of a recreational park for the eastern portion of the City of Washington. Table 1-1 lists the prior reports prepared by the Corps of Engineers for the Anacostia River basin. Reports prepared since the Corps of Engineers disbanded the Washington District in 1961 have been prepared by the Baltimore District.

1.10 EXISTING WATER RESOURCE PROJECTS

The Corps of Engineers has been involved in the Anacostia River basin since 1876. Initial studies were related to evaluating the potential for using the river as part of a canal system from Washington to Baltimore. In 1891, an additional study was undertaken to evaluate

TABLE 1-1

PREVIOUS REPORTS ON THE ANACOSTIA RIVER BASIN

Date	Document or Annual Report Reference	Subject	Recommendation or Action
1876	H. Exec. 94-44/1	Survey of Eastern Branch (Anacostia River).	Describes waterway and estimates cost of channel between Navy Yard and Bladensburg.
1888	1889 Annual Report page 993.	Preliminary Examination of the Eastern Branch of Potomac River (Anacostia River)	Opinion of Lt. Col Hains on improvement of Eastern Branch to Bladensburg. Unfavorable - not worthy of improvement.
1890	H.Exec 347-51/1	Channel improvement -mouth to Navy Yard.	Requests from the Navy Department to deepen channel to Navy Yard.
1891	H.Exec. 30-52/1	Preliminary Examination and Survey, Bladensburg.	Recommends channel from mouth and Navy Yard 20 feet deep, 200 feet wide; reclamation of adjacent marshes.
1898	H.Doc. 87-55/3	Plans for reclamation of marshes.	Submits plans and costs for reclamation of flats between mouth and District Line.
1903	H.Doc. 194-59/1	Title to lands embracing Anacostia River Flats, mouth to District Line.	Describes U.S. properties bordering on Anacostia River. Opinions as to title of lands.
1910	S.Doc. 462-61/2	Ownership of land and riparian rights along Anacostia River.	Opinions of Special Counsel to District of Columbia on ownership of lands and riparian rights.
1911	S.Doc. 19-63/1	Public and private rights.	Supplement to Report of 1910.
1916	H.Doc. 1357-64/1	Report of Board of Engineers proposing a modification of the project for the reclamation & development of the Anacostia River & Flats, D.C.	Features of report include dam across river at Massachusetts Ave. forming a lake extending upstream to District line; construction of river walls from dam downstream to Anacostia Bridge.

TABLE 1-1

PREVIOUS REPORTS ON THE ANACOSTIA RIVER BASIN
(Continued)

Date	Document or Annual Report	Subject	Recommendations or Action
1923	S.Doc. 37-68/1	Report and recommendations on the Reclamation and Development of the Anacostia River & Flats.	Determined the desirability of continuing park project with same features as outlined in H.Doc. 1357-64/1
1934	H Doc. 101-73/1	Flood control measures protection of Bladensburg Bolling Field and Naval Air Station.	Concurred in general with improvement desired.
1935	H Doc. 22-74/1	Washington Harbor project including Anacostia River channel to 2,100 feet above Anacostia Bridge.	Concurred and recommended combining Anacostia River and Potomac River project at Washington, D.C. into Washington Harbor project.
1949	H.Doc. 202-81/1	Review of Report on Preliminary Examination & Surveys of Anacostia River & Tributaries, D.C. & Md., for flood control and navigation.	Recommended adoption of project for improvement of Anacostia River Basin to provide for channel, levees, boat basin, etc.
1968	Detailed Project Report	Anacostia River & Tributaries, Prince George's County, Maryland Local Flood Protection Protection Project	Recommended construction of channel modification
1990	Reconnaissance Report	Review of water resources related problems and opportunities	Recommended cost shared feasibility study for fish and wildlife habitat restoration
1992	Section 1135 Report	Anadromous Fisheries Restoration	Requested Authorization to Modify Existing Corps Project
1993	Section 1135 Report	Habitat Restoration	Requested Authorization to Modify Existing Corps Project

the navigation channel from the Potomac River to the Naval Gun Factory (present site of the Washington Navy Yard). By 1904, a channel 20 feet deep and 200 feet wide was dredged through the shoals opposite the Washington Barracks (present site of Fort McNair) up to the lower end of the Navy Yard. Studies have resulted in Congressional authorization and appropriations for five additional construction projects within the Anacostia River basin. The five project locations are shown on Figure 1-2.

1.10.1 Reclamation of Anacostia Flats

At the turn of the century, soldiers stationed at the Washington Barracks suffered from high rates of malaria. In addition, sewage from the Washington neighborhoods near the Capitol flowed directly to the Anacostia River through the James Creek canal. Public health concerns led to a plan to fill the low lying wetlands and mud flats at the mouth of the river with material dredged from the navigation channel. The reclamation of Anacostia Flats continued until World War II. The original purpose of the project was navigation; however, after the publication of the McMillan Commission Report in 1906 (Senate Report No. 166, 57th Congress, 1st Session), justification for the work gradually turned towards providing a river park for the eastern portion of the city. The reclamation work eventually extended all the way to the border of the District of Columbia and Prince George's County.

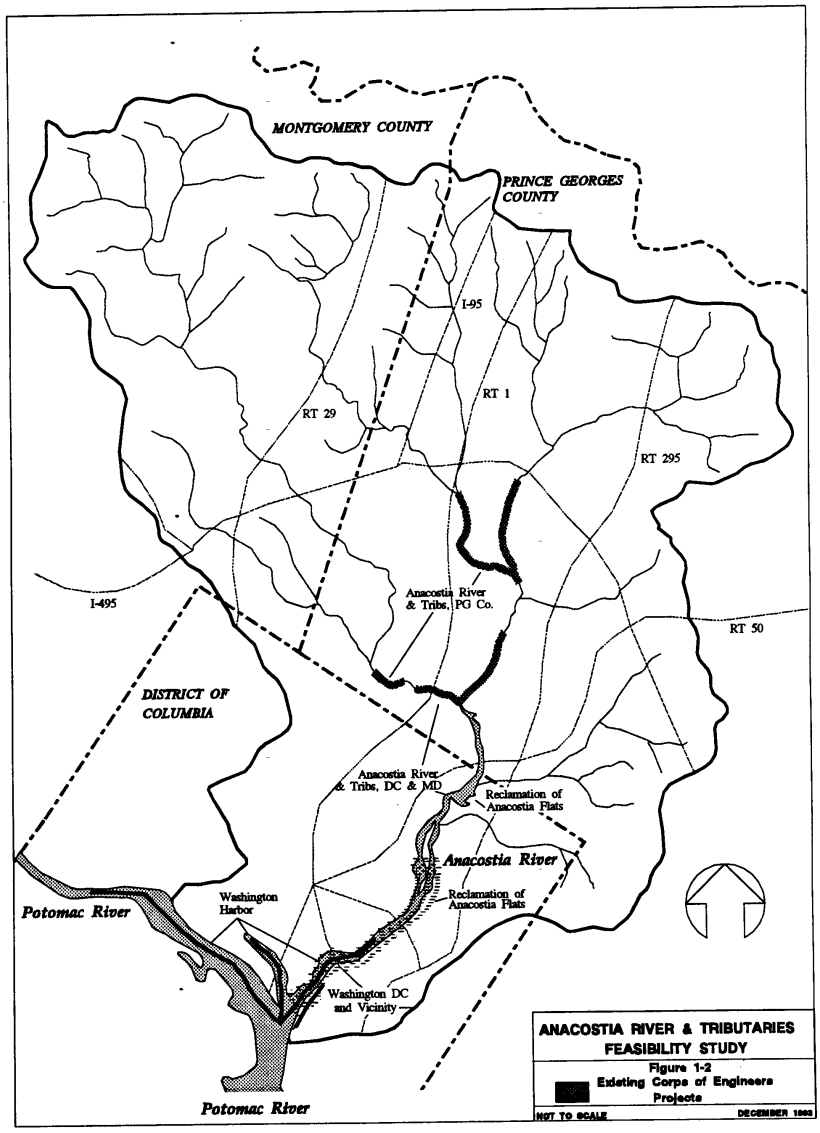
Anacostia Park included Kingman Lake and East Lake. Both of these areas were designed not only as recreational lakes but also as tidal lakes to help remove sediments from the river. The water control structures were intended to accelerate the ebb tide to reduce sedimentation. The pipes and valve structures were installed by 1941; however, no additional work was undertaken on the lakes after World War II. In 1993, East Lake, now known as Kenilworth Marsh, was restored. As a result of the Water Resources Development Act of 1986, this project is now de-authorized.

1.10.2 Washington Harbor

The Washington Harbor Project includes a Federal navigation channel in the Anacostia River from the confluence with the Potomac River to the foot of 15th Street, S.E. The authorized dimensions of the channel are 400 feet in width and 24 feet in depth. Two turning basins are also included in the project.

1.10.3 Washington D.C. and Vicinity

The Anacostia portion of the flood control project consists of an earthen levee and flood wall on the southeast bank of the river in the vicinity of the Naval Air Station and Bolling Air Force Base.


MONTGOMERY COUNTY
PRINCE GEORGES COUNTY
I-95
RT 1
RT 29
RT 295
I-495
Anacostia River & Tribs, PG Co.
RT 50
DISTRICT OF COLUMBIA
Anacostia River & Tribs, DC & MD
Reclamation of Anacostia Flats
Anacostia River
Potomac River
Washington Harbor
Reclamation of Anacostia Flats
Washington DC and Vicinity
Potomac River
ANACOSTIA RIVER & TRIBUTARIES
FEASIBILITY STUDY
Figure 1-2
Existing Corps of Engineers Projects
NOT TO SCALE
DECEMBER 1998

1.10.4 Anacostia River and Tributaries, District of Columbia and Maryland

Flood protection is provided for the towns of Bladensburg, Edmonston, Riverdale, Hyattsville, Brentwood, Cottage City and Colmar Manor. Flood control works include 14,400 feet of channels and 28,100 feet of levees along the Anacostia River and the Northeast and Northwest Branches, a pressure conduit and four pumping stations for interior drainage. In addition, a navigation and flood control channel is authorized to a depth of eight feet from the foot of 15th Street, S.E., to the Bladensburg Marina.

1.10.5 Anacostia River and Tributaries, Prince George's County, Maryland

The project provided for channel improvement by realigning, widening and deepening the Northwest Branch for approximately 2,500 feet both upstream and downstream of the Queens Chapel Road bridge; realigning, widening and deepening 7,200 feet of channel of Northeast Branch and Paint Branch starting 540 feet upstream from the new Calvert Road Bridge and extending up Paint Branch to Baltimore Avenue Bridge with overbank clearing to provide a 500-foot floodway; and realigning, widening and deepening Indian Creek from its junction with Paint Branch 7,600 feet upstream to Greenbelt Road.

1.11 REPORT ORGANIZATION

The main feasibility report and the EIS are integrated into one document. The portions of this report which are required by NEPA are marked with an asterisk in the table of contents. Bound with the main report are Annexes A through E which are all required by NEPA or the Fish and Wildlife Coordination Act of 1958, as amended. The main report (Volume I) describes the existing conditions in the basin, the plan formulation process, the range of alternatives considered, and the recommended plan. The future actions required for plan implementation and the public coordination efforts are also outlined.

An inventory and analysis of the water and related land resource conditions is presented in Section 2. Section 3 describes the problems and opportunities associated with environmental restoration in the basin. The plan formulation process is detailed in Section 4. Section 5 evaluates the environmental impacts of the various alternatives considered during the study. Section 6 contains incremental analysis summary and decision matrices for the alternative plans, and Section 7 describes the recommended plan. Information related to implementation of the recommended plan is contained in Section 8; the public involvement process is documented in Section 9; the summary and conclusions are located in Section 10; and the recommendations of the District Engineer are contained in Section 11.

Volume II contains the Engineering, Real Estate, Cultural Resources, Natural Resources and Hazardous, Toxic and Radioactive Waste (HTRW) Appendices. The Engineering Appendix documents the detailed engineering analyses and the environmental design criteria for each proposed restoration site. The Engineering Appendix (Appendix A) was organized such that all of the information for each site is contained within a unique section of the document. The Real Estate Appendix (Appendix B) contains all of the information related to the lands, easements, rights-of-way and relocations required for project implementation. The Cultural (Appendix C) and Natural Resources (Appendix D) Appendices document the existing cultural and natural resources conditions and the habitat evaluations for the selected sites. Appendix E summarizes the HTRW investigations.

Volume III of the report contains the Detailed Cost Estimate (Appendix F), the Incremental Analysis (Appendix G) and the Project Management Plans (PMPs). The PMPs (Appendix H) detail plans for implementation of the report recommendations. Volume IV is the Plate Portfolio (Appendix I) with all of the Engineering, Landscaping and Real Estate plans organized by site.

1.12 ABBREVIATIONS AND ACRONYMS

The Anacostia River and Tributaries feasibility study has benefitted from the collective knowledge and agency expertise of our non-Federal sponsors and the contributing agencies. References to these partners are contained throughout this report. Because of the number of agencies and organizations involved in the Anacostia River basin, it can be difficult to keep track of the various acronyms used in this report. Table 1-2 contains a listing of the acronyms used for the organizations and agencies which assisted in the feasibility study effort.

TABLE 1-2

AGENCIES AND ACRONYM USED IN THIS REPORT

Jurisdiction	Agency	Acronym
Federal	National Park Service	NPS
	Fish and Wildlife Service	FWS
	Environmental Protection Agency	EPA
	National Capital Planning Commission	NCPC
Regional	Metropolitan Washington Council of Governments	MWCOG
	Interstate Commission on the Potomac River Basin	ICPRB
State	Maryland Department of Natural Resources	DNR
	Maryland Department of the Environment	MDE
State/County	Maryland-National Capital Park and Planning Commission (Montgomery County and Prince George's County)	M-NCPPC
District of Columbia	Department of Public Works	DPW
	Department of Comsumer and Regulatory Affairs, Environmental Regulation Administration	DCRA
County	Montgomery County Department of Environmental Protection	DEP
	Prince George's County Department of Environmental Resources	DER

SPONSORS: DNR, ICPRB, MWCOG, DEP, DER, DCRA, DPW, MDE

COOPERATING AGENCIES: NPS, FWS, M-NCPPC

Anacostia River and Tributaries Feasibility Study

Draft Feasibility Report and EIS

Section 2

Baseline Conditions and Affected Environment

This section is broken into two major parts. The first part describes the general baseline conditions for the Anacostia River watershed. These conditions are present in the watershed as a whole and are also found in every sub-watershed. The second portion focuses the description on the five sub-watersheds where project sites are proposed.

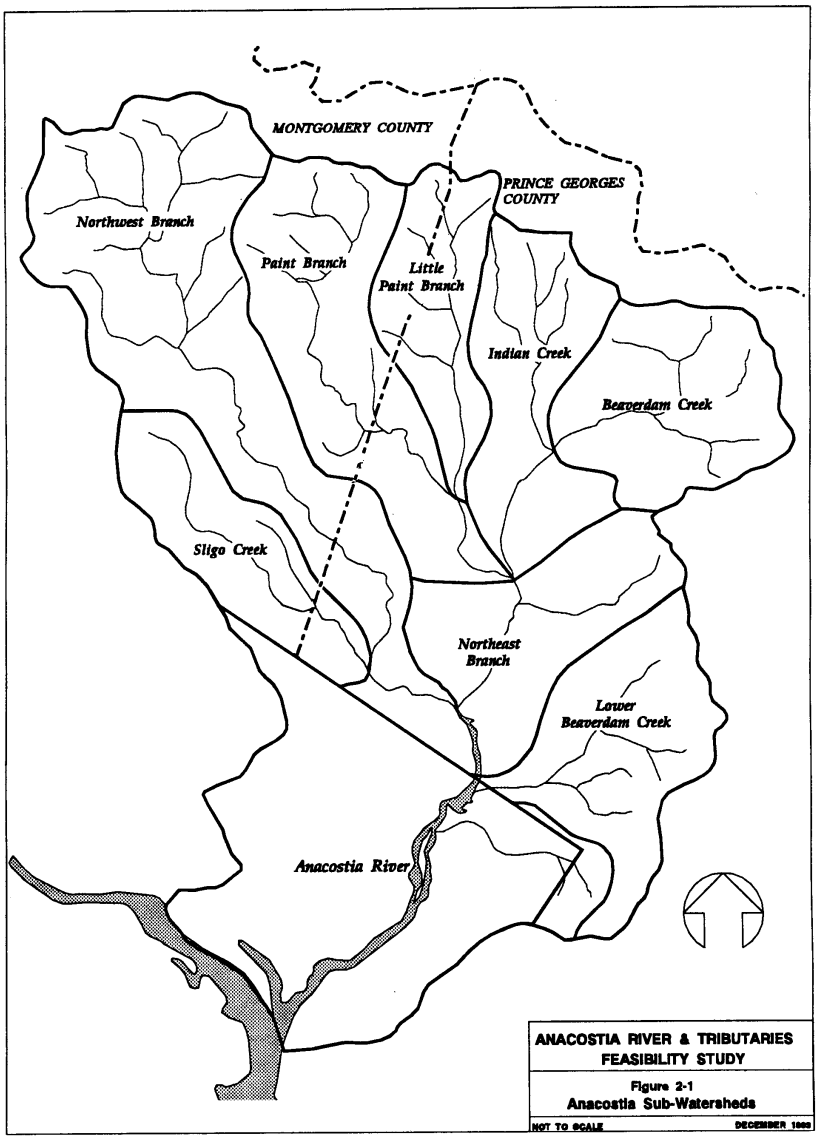
2.1 GENERAL DESCRIPTION OF THE ANACOSTIA RIVER BASIN

2.1.1 Physical Setting

2.1.1.a Physiography. The Anacostia River basin is located in the Atlantic Coastal Plain and Piedmont Plateau physiographic provinces. The physiographic boundary roughly corresponds to the boundary between Montgomery and Prince George's Counties. The Anacostia River drains 170 square miles of land within the District of Columbia, and Montgomery and Prince George's Counties in Maryland. Of the total drainage area, 25 square miles are within the District of Columbia, 58 square miles are in Montgomery County, and 87 square miles are in Prince George's County. The Anacostia watershed measures approximately 14 miles from east to west and 20 miles from north to south.

Elevation in the Coastal Plain ranges from 0 to 200 feet National Geodetic Vertical Datum (NGVD). Coastal Plain topography exhibits rolling hills and broad, open valleys with streams that have low gradients and shallow channels. The streams are characteristically sluggish and meander slowly; however, most have been channelized to reduce flooding and erosion. The majority of the Northeast Branch sub-watershed (Figure 2-1) and all of the Anacostia river are located in the Coastal Plain.

Relief in the Piedmont region ranges from 200 to 570 feet NGVD. The topography is characterized by ridges and deep, narrow stream valleys. Streams typically have moderate gradients and flow at moderate to high velocities, creating narrow floodplains and stream channels. The majority of the Montgomery County portion of the Anacostia River basin is located in the Piedmont Plateau.


MONTGOMERY COUNTY
PRINCE GEORGES COUNTY
Northwest Branch
Paint Branch
Little Paint Branch
Indian Creek
Beaverdam Creek
Sligo Creek
Northeast Branch
Lower Beaverdam Creek
Anacostia River
ANACOSTIA RIVER & TRIBUTARIES
FEASIBILITY STUDY
Figure 2-1
Anacostia Sub-Watersheds
NOT TO SCALE
DECEMBER 1998

The geology of the Coastal Plain consists of a metamorphic rock basement overlain with several hundred feet of sedimentary terraces of fluvial and marine origin. The unconsolidated (sedimentary) material consists of gravels, sands, silts, marls, and clays belonging to the Potomac Group. They range from the Cretaceous Age to Quaternary, and are superimposed upon the crystalline rocks of the Piedmont Plateau that extend eastward. These sedimentary rocks form a wedge-shaped mass which becomes progressively flatter and thicker as it tilts in a southeastward direction.

The geology of the Piedmont Plateau consists of a crystalline, metamorphic rock with intrusions of igneous rock. The metamorphic rock is composed of granite, gneiss, schist and other crystalline rocks that range in age from the Precambrian to the late Paleozoic. The geology forms a complex structure of tilted, folded and faulted rocks that are deeply weathered and overlain with a residual layer of saprolite (unconsolidated sedimentary rock) approximately 45 feet thick. Soils within the Piedmont Plateau consist of the Glenelg-Manor-Chester association. These soil series are classified as moderately deep to deep and are comprised of well drained, strongly sloping, micaceous soils.

Coastal Plain soils of the basin belong to three major soil associations. The Christiana-Sunnyside-Beltsville association is predominant. Soils are described as deep, well-drained to moderately well-drained sandy and clay soils. The Beltsville-Leonardtown-Chillum association is located around the Fall Line and consists of deep, well-drained to poorly drained soils with a compact subsoil. The Bibb-Tidal Marsh association is found along the floodplains and marshes of the river systems. These soils are poorly drained and are subject to tidal flooding in some locations.

In the Coastal Plain of the watershed, the unconsolidated materials belong to the Potomac Group, which consists of the Patuxent formation (sand), Arundel Clay (clay), and the Patapsco formation (interbedded sand, clay, and sandy clay). The Patuxent formation constitutes the basin's most important aquifer.

2.1.1.b Hydrology.

Watershed. The Anacostia is formed by the confluence of the Northeast and Northwest Branches at Bladensburg, Maryland. Tidal influence in the Anacostia extends to approximately 1000 feet above this confluence along both branches. Below Bladensburg, the Anacostia River flows in a southwesterly direction for 2.0 miles within Maryland and 6.7 miles through the eastern section of Washington, D.C. It joins the Potomac River 108 miles above the Chesapeake Bay. The tidal amplitude is about three feet.

The headwaters of the basin are in northwestern Prince George's County and southeastern Montgomery County. The Northeast Branch drains four major tributaries: Paint Branch, Little Paint Branch, Indian Creek, and Beaverdam Creek. The Northwest Branch drains two

main tributaries: Sligo Creek and Bel Pre Creek. Other major tributaries of the Anacostia River are Lower Beaverdam Creek, Watts Branch, and Hickey Run.

The Anacostia River flows through a drowned river valley, characteristic of the Chesapeake Bay region and the east coast of the United States. The upstream tributaries deliver freshwater and sediment from surface runoff to the river system. In the tidal portion of the river, water movement is slowed considerably.

Flows in the Anacostia's tributaries tend to be flashy, causing dramatic rises or falls in stream water levels. The relatively steep gradients found in the Piedmont portion of the Anacostia watershed and the large amount of the watershed that is impervious due to nonabsorbent clay soils, and urbanization of adjacent lands contribute to this flashiness and have radically altered the hydrology of the river.

Groundwater. Due to the increased amount of impervious surface associated with development, urbanization tends to reduce the total amount of rainfall which infiltrates into the ground. The impacts of reduced infiltration are lowered groundwater levels and diminished base flows in perennial streams.

In the Coastal Plain of the watershed, the unconsolidated materials belong to the Potomac Group, which consists of the Patuxent formation (sand), Arundel Clay and the Patapsco formation (interbedded sand, clay and sandy clay). The Patuxent constitutes the basin's most important aquifer. The coefficients of transmissivity range from 600 to 10,000 gallons per day per foot (gpd/ft). The recharge occurs through a four to five-mile wide strip located between the Fall Line and the Northeast Branch.

Surface Water. The USGS maintains stream gages on the Northeast Branch at Riverdale Road and the Northwest Branch at Queens Chapel Road. The average annual discharges for the Northeast and Northwest Branches are 84 cubic feet per second (cfs) and 47 cfs, respectively, with a combined average annual discharge rate of 131 cfs (USGS, 1989). Discharge rates generally exceed the average in the winter and spring seasons and are below the average in the summer and fall. Maximum and minimum discharges for the Northeast Branch are 12,000 cfs and 1.4 cfs; for the Northwest Branch they are 18,000 cfs and 0.2 cfs. The flood of record occurred June 22, 1972 when Tropical Storm Agnes dropped an average of approximately 6 inches of rain in the Northeast Branch drainage and more than 8 inches in some areas of the Northwest Branch drainage over a three-day period. The resulting discharges were 18,000 cfs on the Northwest Branch and 12,000 cfs on the Northeast Branch.

2.1.1.c Land Use. Land uses within the upper half of the watershed can be characterized as predominantly suburban (up to 30 percent impervious surfaces) with some rural areas remaining. In the lower half of the watershed, land use is predominantly urban (greater than 60 percent impervious surfaces).

In the Maryland portion of the watershed, forested areas and wetlands comprise approximately 27 percent of the watershed. Agriculture occupies approximately 10 percent. Industrial land use, approximately two percent of the watershed, is largely devoted to sand and gravel surface mining operations in the vicinity of Indian Creek. There is little industrial development in the Montgomery County portion of the watershed. Most of the riparian lands in the Maryland portion of the watershed are parklands owned and controlled by M-NCPPC. Exceptions to this are the Upper Beaverdam Creek sub-watershed, where the Department of Agriculture (USDA) is responsible for the 7,500-acre Beltsville Agricultural Research Center, and the Lower Beaverdam Creek sub-watershed which is privately owned.

The riparian lands within the District of Columbia are primarily owned by the National Park Service. These parklands represent 23 percent with urban uses comprising 76 percent of the land use in the District of Columbia portion of the watershed. Thirty percent of watershed within the District of Columbia is Federally owned.

2.1.1.d Climate. The climate of the watershed is temperate and humid. Winter and summer temperatures are moderated somewhat by the proximity of the basin to the Chesapeake Bay. The average annual temperature is 55 degrees Fahrenheit (F) with maximum and minimum temperatures of 107 degrees F and -26 degrees F, respectively. January is the coldest month with an average temperature of 35 degrees F; July is the warmest month with an average of 76 degrees F.

Annual precipitation ranges from 42 to 44 inches with 2 to 4 inches per month in the winter and 4 inches per month during the spring and summer. During the summer, precipitation occurs mainly as thunderstorms, which produce flashy and sometimes heavy rainfall. Average annual snowfall in the basin is about 20 inches, and usually occurs in December, January and February.

2.1.2 Environmental Resources

2.1.2.a Aquatic Resources. Historically, fishery resources provided the region with a profitable industry and highly valued recreation. Populations of American and hickory shad, white and yellow perch, red-breasted sunfish, striped bass, catfish and herring were abundant before water quality became problematic. Prior to barriers to fish passage, anadromous and catadromous fish utilized the Anacostia River during their reproductive stages. With the removal of these barriers, anadromous fish species could once again populate the waters. Aquatic surveys performed by ICPRB identified brown trout, chain pickerel, bullhead catfish, largemouth bass, and four species of sunfish. However, their populations are sparse due to the poor water quality and lack of suitable habitat due to inadequately controlled stormwater runoff, channelization and barriers to fish migration. Despite recent efforts to restore water quality, fishery resources of the Anacostia offer meager commercial value. A naturally reproducing population of brown trout occurs in the

headwaters of Paint Branch. Other resident fish species in the basin include largemouth bass, yellow perch, sunfish, catfish, carp and some pickerel.

The character of the basin varies between rural-suburban, suburban and urban throughout each of the drainage areas. Rural-suburban streams typically have experienced little or no direct alterations (channelization, gabions, riprap, storm drain outfalls, utility crossings, etc.) and tend to flow through and/or have access to a functional floodplain. Riparian vegetation is often present along the channel. Habitat for aquatic species is usually available. Suburban streams are likely to have experienced some degree of alteration; often these alterations are associated with utility installation, storm drain outfalls, and structural bank stabilization. Aquatic habitat may become increasingly absent. Urban streams have typically experienced the greatest degree of structural alteration. Floodplain access, riparian vegetation, and aquatic habitat are usually absent.

2.1.2.b Wetlands. Prior to the urbanization of the Anacostia River basin, the river and tributaries were bordered by tidal wetlands. Historical literature citations refer to the "extensive marshes dominated by wild rice bordering the East Branch of the Potomac" (i.e. the Anacostia River). The Anacostia River basin once contained extensive tidal and non-tidal freshwater wetlands. Approximately 2,600 acres of emergent tidal wetlands occupied the river as far upstream as Bladensburg, Maryland. Today it is estimated that there are less than 100 acres of emergent tidal wetlands within the tidal portion of the river.

The largest remaining emergent tidal wetland in the basin is the Kenilworth Marsh, located on the east bank six miles upstream from the confluence with the Potomac River. A modest forest buffer surrounds the marsh and together the marsh and forest provide a variety of habitat including mud flats, emergent marsh, scrub-shrub wetlands and bottomland hardwood forest. The Corps of Engineers dredged the open marsh to a depth of 6 feet in the 1930's in order to build what was then referred to as "East Lake". In the spring of 1993, approximately 32 acres of wetlands were restored within Kenilworth Marsh by the Corps, NPS, DPW, MWCOG, DCRA and EPA.

The National Wetlands Inventory (NWI) map for the study area identifies additional wetlands on or adjacent to the river, primarily between the East Capitol Street bridge and Bladensburg. Wetland types include: riverine tidal emergent persistent; riverine beach bar seasonal tidal; palustrine emergent persistent; palustrine forested; palustrine scrub-shrub; and palustrine aquatic bed semi-permanent (non-tidal). Although the size of most of these wetlands is on the order of 10 acres or less, they represent a significant portion of the ecological diversity found in the tidal river. These small wetlands along with the restored wetlands in Kenilworth Marsh are all that remain of the tidal freshwater system.

2.1.2.c Terrestrial Resources. Land use activities have directly influenced the patterns and composition of plant communities in the study area. The forest and forest buffer area in the District of Columbia are composed primarily of urban tolerant and invasive species. The

bottomland hardwood community has been influenced and replaced by many Eurasian woody and herbaceous species. Clearing in the basin has allowed for the introduction and successful establishment of non-native plant species.

The native vegetation of the Coastal Plain are stands of hardwoods with scattered softwoods. Dominant native tree species on well drained upland soils are chestnut oak, white oak, black oak, blackjack oak, sassafras and Virginia pine. In upland depressions where soils are not drained as well, predominant tree species are sweet gum, ash, elm, birch, sycamore, black gum, hickory and willow oak. Sandy, loamy upland soils support mainly oak species with chestnut and hickory. Beech and yellow poplar are common in low-lying, poorly drained sandy, loamy soils. On the dry, gravelly soils, tree species include oaks, Virginia pine, black locust and red cedar. Understory vegetation in the uplands consist of holly, dogwood, laurel, red cedar, persimmon, sassafras and sumac. The dominant flood plain species are birch, elm, alder, willow, red maple, sycamore and beech.

The dominant native vegetation on excessively drained soils of the Piedmont Plateau is deciduous forest, comprised of chestnut, black oak, white oak, chestnut oak, scarlet oak, mockernut hickory and pignut hickory. The moderately drained soils of depressions and foothills support beech, red maple, bitternut hickory, yellow poplar, black walnut and black gum. Small stands of Virginia pine are common on the nearly level to gently sloping areas, and probably represent the earliest stage of reforestation of areas formerly occupied by deciduous forest. Understory vegetation consists of dogwoods and evergreens such as holly, laurel and rhododendron species. Dominant species on the flood plains are swamp oak, river birch, white ash, white willow and hornbeam.

Virtually all of the virgin deciduous forests that occupied the Anacostia watershed were harvested 200 to 300 years ago. Present day forests still retain many of the original tree species, with exception where disease has eliminated a species (e.g., chestnuts). Pine species may be more prevalent today in regions that have been continually timbered, compared to the virgin hardwood stands. Where the watershed has been developed and urbanized, native species are intermingled with ornamental species and grassy lawns, primarily due to the extensive landscaping that accompanies building construction.

2.1.2.d Rare, Threatened and Endangered Species. Except for the occasional transient individuals, no Federally listed or proposed endangered or threatened species under the jurisdiction of the United States Fish and Wildlife Service (FWS) are known to exist in the basin. A pair of bald eagles is known to have nested at the National Arboretum prior to 1960, and during the later part of 1993 the NPS staff has reported an increase in bald eagle sightings in the vicinity of Kingman Lake and Kenilworth Marsh. The sensitive joint vetch (Aeschynomene virginica), a candidate for listing, has the potential for occurrence in the study area. Although the FWS does not know of any specific records from the Anacostia, this plant is known to occur at other Prince George's County locations on tidal shores and river banks.

According to the National Marine Fisheries Service (NMFS), a small commercial fishery for Atlantic sturgeon (*Acipenser oxyrhynchus*), a state-listed rare species, existed as recently as the 1970's in the Potomac, and this potentially valuable fishery resource could be restored to the Anacostia. In addition, the short-nosed sturgeon (*Acipenser breviostrum*), a Federally listed endangered species, once inhabited the Anacostia River and might be restored to it.

2.1.2.e Water Quality. Water quality in the Anacostia River watershed varies greatly due to changes in land use between the headwaters of the tributaries and the tidal river. The headwaters region is still relatively undeveloped, due in part to government ownership of large parcels of open space. In general, water quality is very good in the headwaters and severely degraded in the tidal river. Water quality recovers at the confluence of the Anacostia and Potomac Rivers, probably due to mixing. Severe sedimentation and high bacteria levels are common throughout the basin. The average annual sediment load in the watershed is roughly 1,000 tons per square mile, with approximately 132,000 tons per year delivered to the tidal river (Scatina, 1987). In the tidal river, low levels of dissolved oxygen are a major concern. Several trace elements including cadmium, copper, iron, lead and zinc have been found to be in excess of water quality standards or recommended aquatic life criteria in various parts of the watershed. The major pollutants affecting water quality are sediment, nutrients, elevated temperatures from surface runoff and high levels of coliform bacteria. Contamination by polynuclear aromatic hydrocarbons, pesticides, polychlorinated biphenyls (PCBs) and heavy metals (lead, zinc, copper, cadmium, chromium) is also present.

Coastal Plain rivers by nature exhibit sluggish flows which serve to exacerbate the impacts of pollutant loading. The tributaries deliver many of the pollutants which converge on the tidal river. Flushing is estimated to occur on the order of every 35 days under normal flow conditions and during periods of drought this may be prolonged up to 100 days.

There are very few point source discharges in the Anacostia River basin. The primary mode of transport of pollutants into streams is via surface runoff from rainfall events. Urbanized watersheds have a higher percentage of impervious surface compared to forested or agricultural watersheds. Impervious surfaces are any covering which prevents rainfall from percolating into the soil including roads, parking lots, roof tops and driveways. As a result of urbanization, the surface runoff volume increases and the time it takes for runoff to reach the stream channel decreases. Although stormwater management has been required for new development for approximately 15 years, much of the Anacostia basin was developed prior to stormwater regulations.

2.1.2.f Air Quality. Periodically, air in the District of Columbia does not meet the EPA air quality standards (NPS, 1993). As the character of Prince George's and Montgomery County changes from urban to rural the air quality changes from fair to good.

2.1.2.g Hazardous, Toxic and Radioactive Waste (HTRW). A preliminary HTRW assessment was completed for the proposed restoration sites. The methodology used in the assessment involved collection of data on the project sites and potential HTRW sources, and a qualitative evaluation of the risk each potential HTRW source presented to the proposed restoration activities.

A total of 81 potential HTRW sources were identified within a one mile radius of the restoration sites. Seventy-seven of the identified sources were judged to require no further action before proceeding with the proposed projects because of either the nature of the source or the distance of the source from the proposed projects. Three identified sources were CERCLA sites, which were at least 0.5 miles away from the proposed project sites. The remaining source, located in the Kingman Lake reforestation area, has been recommended for further study. Detailed information on the locations and impacts to the proposed actions are discussed in Section 5.1, District of Columbia.

Dredged material and sediments beneath navigable waters proposed for dredging qualify as HTRW only if thery are withing the boundaries of a site designated by the EPA or a state for a response action under CERCLA or if they are a part of a NPL site under CERCLA. The areas within the Anacostia River and Kingman Lake that are to be dredged do not fall in a designated CERCLA site, therefore, additional testing is not necessary. Refer to Appendix E for further information.

2.1.3 Aesthetic and Recreational Resources

As the nation's government developed in the District of Columbia during the nineteenth and twentieth centuries, population, housing and transportation systems increased within the basin. Presently, agricultural land represents only a small portion of the basin since most of the land has been converted to urban and suburban development. The Anacostia River and tributaries are a focus for recreation in this urbanized watershed. Much of the parkland was publicly acquired for the purposes of providing resource conservation and recreational opportunity adjacent to the water.

Some of the NPS areas are managed by the District of Columbia government or by private companies under cooperative agreements and leases for recreational use. The more intensely developed recreational facilities include a recreation center, swimming pool, skating rink, event area and an outdoor stage. Less intensely developed areas include ballfields, lawns and open spaces. Langston Public Golf Course and Robert F. Kennedy Stadium are located just downstream of the National Arboretum near Kingman Lake. The Kenilworth Park and Aquatic Garden are located on the east bank of the river, directly across from the National Arboretum. The NPS also owns Greenbelt National Park in Prince George's County and the Baltimore-Washington Parkway in the Maryland portion of the watershed. Marinas and private boat clubs located on the lower tidal Anacostia River provide docks for recreational boating that venture into the Potomac River. The

Bladensburg marina provides access for recreational boating in the upper tidal river. Water contact recreation such as swimming is prohibited in the tidal Anacostia due to the poor water quality and the associated potential health risks.

The parklands in the Maryland portion of the basin are generally less developed than those in the District of Columbia. The M-NCPPC was established in 1927 to protect, through acquisition, the stream valleys leading out of the District of Columbia. The Capper-Cramton Act (P.L. 284, 71st Congress, 1st Session) authorized loans for the acquisition of land within selected stream valleys in the Washington metropolitan area. This act assisted the M-NCPPC in the development of an extensive stream valley park system in Montgomery and Prince George's Counties. The parklands in the Maryland portion of the basin are generally less developed than those in the District of Columbia. The present land holdings provide extensive opportunities for recreation adjacent to the water. The stream valley parks, of which many are wooded, include both intensely developed recreational facilities and preserved undeveloped natural areas. Roadways or residential developments abut most of the parkland. The parks are heavily used for both active and passive recreation. Recreational facilities include picnic areas, ballfields, tennis courts, playgrounds, hiking trails and some campgrounds. The average widths of the parkland varies from 300 to 2000 feet.

DCRA and EPA have issued a health advisory on consumption of fish from the tidal river due to chlordane and PCB levels which exceed the Food and Drug Administration's limits. Elsewhere in the tributaries, recreational fishing is somewhat limited due to poor water quality and limited fisheries habitat.

2.1.4 Cultural Resources

Federal and state legislation require that a Phase I cultural resource survey be conducted for this study. This Phase I survey was designed to identify both architectural and archeological resources that could be affected by the study recommendations. The survey is specifically required under terms of Section 106 of the Historic Preservation Act of 1966 (P.L. 89-665), as implemented under terms of Executive Order 11593. The legislation described above requires Federal agencies, or project sponsors seeking Federal funding and/or permits to conduct cultural resources surveys, to locate, identify and evaluate historic and prehistoric resources in advance of project approval. This section describes the settlement of the Anacostia River Basin from the early 1600s through the present. Detailed information on cultural resources locations and impacts to resources by the study actions are discussed in Section 5.

In 1632, Sir George Calvert, the first Lord Baltimore, was granted by King Charles I of England a charter to start a proprietary colony in the New World. The boundaries of the land granted to Calvert are approximately the same as those of present Maryland: the southern boundary followed the Potomac River from its fountainhead eastward to its mouth

on the Chesapeake Bay, then due east to the Atlantic Ocean. Maryland's northern boundary ran along the 14th parallel from the Atlantic Ocean westward. This line paralleled the present northern border of the state and once included all of Delaware. The first group of colonists landed on St. Clement's Island (now Blakiston) in March of 1634, moving to the site of St. Mary's City a few days later. There were numerous traders already living within the colony, but the group at St. Mary's City was the first official attempt at settlement.

The first land patents and settlements in Maryland were located along the southern coastal waterways. Gradually, settlement extended northwards up the Chesapeake Bay and along the inland waterways. Initial settlements were situated along rivers and streams because the drainages offered the most effective avenue for the transportation of merchandise. The lack of inland roads during the time restricted the intensity of settlement to the interior sections of the country.

The earliest European settlements of the Anacostia River basin seem to have consisted of plantations stemming from land grants of this type and other acquisitions; trading posts, later to develop into small, commercial communities; and specialized industrial complexes such as grist mills, iron furnaces, and foundries. The early industries were founded largely to support the plantation economy. The plantations were generally tobacco-producing estates, situated on navigable waterways (Payne and Baumgardt, 1990).

In 1742, the Maryland General Assembly ordered that a town be established at Garrison's Landing, on the Anacostia River, just below the junction of the Northeast and Northwest Branches. This town was named Bladensburg, after then-governor Thomas Bladen. Sixty-one acre lots were sold by March 5, 1743, with stipulations that the owner would construct a "good substantial house covering 400 square feet of ground with one stone or brick chimney." Through the eighteenth century, Bladensburg became a valuable port for the shipping of tobacco from the interior region of Maryland, as well as a site for offloading commodities for the local residents.

The period between 1750 and 1860 was one of general stasis of development, due to the relative stability of tobacco as a cash crop and the hold on the land by established families. As late as 1840, Prince George's County still had a one-crop economy, producing 37 percent of the tobacco grown in Maryland (Payne and Baumgardt, 1990). However, following the Civil War, the abandonment of slavery and the development of the City of Washington, D.C., led the region to shift to truck farming. Late nineteenth century maps illustrate that the Anacostia River basin was characterized by farms, mills, and small farming communities.

During the modern era, 1920 to the present, the Anacostia River basin has experienced exponential population growth and development. This growth is attributed to the expansion of the Federal government during the post-World War I period, and the need for a large population base to serve the increasing size of the Federal government. This rapid and

dramatic increase in the population density of the region suggests that the modern era for the Anacostia River is characterized by a number of trends: construction of large tract communities; establishment of numerous centers for commerce; development of infrastructure; and the disappearance of greenspace, natural resources, rural lands and cultural resources.

2.1.5 Social and Economic Setting

The Anacostia River basin environmental restoration project sites are located throughout most of the drainage area. The source of population, employment and household data presented in this report is MWCOG statistical data. MWCOG data were segmented by sub-watershed. There are 10 sub-watersheds in the District of Columbia, 10 in Prince George's County and 4 in Montgomery County used by MWCOG Population, employment and household data from 1985 through 2010 are included for both counties and the District of Columbia.

2.1.5.a Population. Table 2-1 presents historical and projected population data from 1985 to 2010 for the Anacostia River watershed portion of the two Maryland counties in the study area and the District of Columbia. National, State of Maryland, and District of Columbia population data are provided in Table 2-2 for comparison purposes. Tables 2-3, 2-4 and 2-5 are project specific population tables by watershed within each of the political jurisdictions in the basin. Population projections were made by M-NCPPC for Montgomery and Prince George's Counties, and by the District of Columbia Office of Planning for Washington, D.C. The data were compiled by MWCOG.

The population data covering the 10-year period from 1985 to 1995 establish a baseline for the Anacostia River basin. During that period, population in the District of Columbia and Prince George's County portions of the watershed edged upward by 0.6 percent. Over the same period, the Montgomery County watershed population grew by 16.8 percent. For the projected planning period from 1995 to 2010, Montgomery County population in the Anacostia watershed is expected to continue to grow by 10 percent. Prince George's County projected growth rate is 3.7 percent while population in the District of Columbia within the watershed is expected to remain flat. The overall trend in the watershed over the 15-year period of analysis is upward by 3.7 percent.

2.1.5.b Employment. Table 2-6 presents the number of persons employed in all sectors of employment in the Maryland counties and the District of Columbia in the the Anacostia River watershed. The data represent aggregate historical and projected employment totals for industrial, retail, office, institutional and all other sectors. The data account for workers with a place of work within the watershed, not the number of employed persons living in that county or the District. The data indicate a projected increase in total employment in the sub-watersheds in the Anacostia basin of almost 23 percent over the 15-year period from 1995 to 2010.

TABLE 2-1

ANACOSTIA RIVER WATERSHED POPULATION TRENDS BY JURISDICTION (1985-2010) (000's)

JURISDICTION	1985	1990	1995	2000	2005	2010	Percent Change (1995-2010)
DISTRICT OF COLUMBIA	310	308	312	314	314	311	- 0.2%
MONTGOMERY COUNTY	181	204	211	223	229	232	+ 10.0%
PRINCE GEORGE'S COUNTY	289	291	291	291	290	301	+ 3.7%
TOTAL	780	803	814	828	833	844	+ 3.7%

Source: Metropolitan Washington Council of Governments Statistical Data, 1993.

TABLE 2-2

COMPARATIVE POPULATION DATA
(000'S)

JURISDICTION	1985	1990	1995	2000	2005	2010	Percent Change (1995-2010)
UNITED STATES	238,000	249,000	260,000	268,000	275,000	282,000	+ 8.5%
STATE OF MARYLAND	4,414	4,781	4,958	5,148	5,320	5,469	+10.3%
DISTRICT OF COLUMBIA	622	617	617	625	633	643	+ 4.2%

Source: United States Department of Commerce, 1990 BEA Regional Projections, Volume 1: States.

TABLE 2–3

DISTRICT OF COLUMBIA POPULATION DATA BY SUBWATERSHED WITHIN THE ANACOSTIA WATERSHED

	YEAR					
SUBWATERSHED	**1985**	**1990**	**1995**	**2000**	**2005**	**2010**
NORTHWEST BRANCH OF ANACOSTIA RIVER	34035	34593	35202	35805	35799	35437
NORTHEAST BOUNDARY	83946	82738	81719	80612	80615	79811
SOUTH CENTRAL CITY CORE	34651	36181	37818	39458	39477	39057
NORTHEAST BRANCH OF ANACOSTIA RIVER	3671	4112	4571	5047	5048	4994
HICKEY RUN	10166	11103	12088	13104	13107	12970
LANGSTON	6780	6681	6609	6541	6544	6473
BARNEY CREEK TO 6TH STREET	17716	17564	17444	17280	17286	17122
WATTS BRANCH AND NASH RUN	31599	31755	32041	32359	32372	32021
CLAY STREET AND PINEY RUN	33592	29304	29431	28457	28468	28158
LOWER ANACOSTIA	53809	54274	54942	55677	55699	55118
TOTAL	**309965**	**308305**	**311865**	**314340**	**314415**	**311161**

TABLE 2–4

MONTGOMERY COUNTY POPULATION DATA BY SUBWATERSHED WITHIN THE ANACOSTIA WATERSHED

	YEAR					
SUBWATERSHED	**1985**	**1990**	**1995**	**2000**	**2005**	**2010**
SLIGO CREEK	69154	67970	67764	73034	79409	79795
NORTHWEST BRANCH OF ANACOSTIA RIVER	68964	79915	86677	86470	86104	86993
PAINT BRANCH	30889	31183	31556	32782	33167	33440
LITTLE PAINT BRANCH	11609	24434	24972	30401	30790	31871
TOTAL	180616	203502	210969	222687	229470	232099

TABLE 2–5

PRINCE GEORGE'S COUNTY POPULATION DATA WITHIN THE ANACOSTIA WATERSHED

	YEAR					
SUBWATERSHED	**1985**	**1990**	**1995**	**2000**	**2005**	**2010**
SLIGO CREEK	19517	18534	18463	18079	17585	18576
NORTHWEST BRANCH ANACOSTIA RIVER	49325	48135	47339	46532	45746	45597
PAINT BRANCH	10228	10318	10345	10397	10418	10693
LITTLE PAINT BRANCH	14365	14899	16061	15882	15863	16865
INDIAN CREEK	39041	40669	41448	43186	42987	45521
UPPER BEAVERDAM CREEK	5254	5831	5722	5669	5653	6037
NORTHEAST BRANCH ANACOSTIA RIVER	36693	36911	36184	35752	35439	37483
BRIAR DITCH	21782	21297	20953	20630	20340	20894
LOWER BEAVERDAM CREEK	67274	68805	69515	69965	71641	74811
LOWER ANACOSTIA RIVER	25532	25241	24728	24591	23933	24962
TOTAL	**289011**	**290640**	**290758**	**290683**	**289605**	**301439**

TABLE 2-6

ANACOSTIA RIVER EMPLOYMENT DATA
TOTAL PERSONS EMPLOYED BY JURISDICTION (1985-2010)
(000'S)

JURISDICTION	1985	1990	1995	2000	2005	2010
DISTRICT OF COLUMBIA	358	368	407	431	458	488
MONTGOMERY COUNTY	66	80	91	101	108	115
PRINCE GEORGE'S COUNTY	137	152	165	179	194	210
TOTAL	561	600	663	711	760	813

Source: Metropolitan Washington Council of Government Statistical Data, 1993.

TABLE 2-7

ANACOSTIA RIVER HOUSEHOLD DATA
TOTAL HOUSEHOLDS BY JURISDICTION (1985-2010)
(000'S)

JURISDICTION	1985	1990	1995	2000	2005	2010
DISTRICT OF COLUMBIA	114	114	114	119	121	119
MONTGOMERY COUNTY	70	79	87	98	102	105
PRINCE GEORGE'S COUNTY	107	111	113	116	119	127
TOTAL	291	304	314	333	342	351

Source: Metropolitan Washington Council of Government Statistical Data, 1993.

2.1.5.c Households. Table 2-7 shows the historical and projected total households in the sub-watersheds located in the project area of the Anacostia River watershed by jurisdiction. The data forecast a 16-percent increase in the number of households in the Maryland counties over the 15-year period from 1995 to 2010. Over the same time span, the projected rate of growth in the District of Columbia within the Anacostia watershed is 4.4 percent.

One factor influencing household growth is increased housing development due to demand as a result of economic expansion. This factor could be present in each of the three jurisdictions in the project area, although its effect seems more pronounced in the Maryland counties than in the District. Another factor influencing housing trends is changes in the composition of households. Examples of the latter would be more households due to more single person or female head-of-household families. These factors have been a prominent trend on the national level in the past decade and could be operating in the basin.

2.1.5.d Land Use. Land use in the Anacostia River watershed under existing conditions is predominated by intensive, urban activities, including residential, commercial and industrial development and the infrastructure to support these activities. Urban usage in the Maryland counties is estimated at 54 percent of total land and 76 percent in the District of Columbia. The next most intensive land use category in the Maryland counties is wetland/forest cover. About 27 percent of land in the Maryland counties is wetland/forest cover type. Only 1.5 percent of District of Columbia land is currently in the wetland/forest cover use category.

2.2 TIDAL ANACOSTIA RIVER

2.2.1 Physical Setting

2.2.1.a Location. Tidal influence in the Anacostia River extends for approximately nine miles from the confluence with the Potomac River to slightly above the confluence of the Northeast and Northwest Branches. The entire tidal river has been channelized. Kingman Lake plays a key role in the ecological function of the tidal section of the river. Kingman Lake functions as a large open space in relation to the surrounding urban areas. The lake is connected spatially to the Anacostia Park, Langston Golf Course, the National Arboretum and Kenilworth Marsh.

Kingman Lake is located in Anacostia Park along the western edge of the Anacostia River in the vicinity of Robert F. Kennedy (RFK) Memorial Stadium. The lake measures approximately 110 acres and is separated from the Anacostia River by a 94-acre island known as the Burnham Barrier or Kingman Island. The lower and upper portions of the lake are connected by a 30-foot culvert under the Benning Road bridge. The upper portion of the lake above Benning Road is surrounded by the Langston Golf Course; below Benning Road, the lake is bounded on the western shore by the parking lots of RFK Stadium and on the east side by Children's Island.

The lake was dredged from upland and tidal wetlands during the 1920's and 1930's with the original intention of providing a recreation lake for the growing city population. Water control structures were designed for both the upstream and downstream openings for the purpose of maintaining a constant water elevation in the lake. Kingman Lake and East Lake were also designed to flush sediments from the tidal river in much the same way as the Tidal Basin functions for the Washington Channel. These structures were never completed due to the advent of World War II. Sediment deposition in the lake over the past 50 years has limited opportunities for recreational fishing or boating.

2.2.1.b Hydrology. In the tidal Anacostia River, the bottom of the channel is heavily silted and deposits of gravel, sand and silt are common. The tidal portion of the Anacostia River is highly turbid and slow-moving.

Kingman Lake is hydrologically connected to the Anacostia River by two inlets located at the northern and southern ends of the lake. The lake has a tidal range of approximately 2.8 feet. The northern and southern inlets to Kingman Lake are 135 feet and 100 feet wide, respectively. A box culvert 30 feet in width, installed during the Benning Road bridge construction in 1929, restricts the flow between the upper and lower lake.

Water sources for Kingman Lake include tidal flow, stormwater runoff, and storm drain outfalls located on the western edge of the lake. The majority of water enters the lake during tidal events through the southern inlet. Water in Kingman Lake has a residence time of approximately 35 to 40 days, indicating a potential for high sedimentation rates. Sediments are primarily delivered and deposited into the upper portion of the lake through the tidal surge from the southern inlet.

General hydrologic patterns in Kingman Lake alternate between high water velocities through constricted areas and low velocities in the remainder of the lake. The high water velocities result in the formation of deepwater channels adjacent to the Benning Road bridge and the southern inlet. Low water velocities result in increased sedimentation creating extensive mud flats and shallow water, as evidenced in the upper portion of the lake (north of the Benning Road bridge). The upper portion of the lake is characterized by a dendritic tidal gut system and exposed mud flats. The lower section of the lake has a greater average water depth than the upper section, lacks a tidal gut system, and has fewer mud flats.

2.2.2 Environmental Resources

2.2.2.a Aquatic Resources. Generally, optimal habitat for most warmwater fish species consists of both shallow and deep water, rooted vegetation, and submerged structures. The results of a 1990 survey of submerged aquatic vegetation (SAV) in the Chesapeake Bay drainage area identified no SAVs in Kingman Lake (Orth, 1991). Prior to 1993 the closest SAV beds were located at the mouth of the Anacostia River and consisted of hydrilla.

However, in 1993, rooted hydrilla were observed as far up-river as the boat ramp at the Conrail bridge. Rooted vegetation in the form of submerged aquatics provide food and cover for fish, wildlife and invertebrate species, improve water quality and retard current flow, and stabilize bottom sediments. Roots and overhanging branches also provide food and cover for fish. Roots and overhanging branches are prevalent along the shorelines of the tidal river and the islands associated with Kingman Lake.

Natural and artificial structures submerged in the water provide escape cover for many fish species. Structural cover within the lake is limited to the structural supports for Benning Road and East Capitol Street bridges, structural supports for boardwalks located at the northern mouth and connecting Heritage Island to Children's Island and the western shoreline, and riprap along the shorelines of the lake and islands.

The location in a heavily urbanized watershed, the scarcity of rooted vegetation and structural cover, the lack of SAVs, and the silty composition of the substrate limits species diversity and population size of the fisheries. These low quality physical habitat factors in combination with existing poor water quality further reduce the optimal conditions for sustained fisheries.

In 1984, a survey of the fish in the Potomac and Anacostia Rivers found 23 different species of fish at the mouth of Kingman Lake (Cummins, 1984). The majority of the fish sampled during the Cummins study were predominantly pollution-tollenart species of little commercial value.

Kingman Lake provides tidally influenced, shallow and deep water habitat for warmwater fish species. The majority of the lake consists of shallow water habitat where open water areas have an average depth of three feet during low tide. During low tide, the shallow water habitat consists of a few isolated areas of vegetated wetlands and extensive revegetated mud flats in the upper portion of the lake. Deeper water habitat located near the southern inlet of the lake and near the culvert at Benning Road provides cool areas in the summer for fish species less tolerant of high water temperatures.

2.2.2.b Wetlands. One reason that wetland vegetation is not prevalent along the fringe areas of the tidal river and in Kingman Lake is the elevation of the existing mud flats. The existing substrate is inundated for too long a period during the semi-diurnal high tides to support emergent wetland vegetation. In addition, the extensive amount of debris in the system can abrade and smother the vegetation, making natural colonization difficult.

Four wetland classes of the Riverine System are identified in the tidal river area (Cowardin et al., 1979). These classes are unconsolidated bottom, unconsolidated shore, aquatic bed, and emergent non-persistent wetland. Palustrine scrub-shrub wetlands are also present in the upper portion of Kingman Lake. No vegetative growth was evident in either the unconsolidated bottom or the unconsolidated shore wetland classes. Together these two

classes account for approximately 97 acres of the 110 acres of Kingman Lake. The emergent wetland classes of riverine wetland systems are classified into three zones: low, middle, and high marsh. Low marsh zones are synonymous with the wetland classification of aquatic beds. Yellow pond lily (Nuphar luteum) is the dominant species found in the aquatic bed wetlands which cover a total of 0.5 acres. Water smartweed (Polygonum punctatum) was found in this wetland class to a lesser degree.

Field studies have identified only a few areas of emergent wetlands, all of which are less than 0.5 acres in size. Middle marsh zones, typically dominated by pickerelweed and arrow arum, are absent throughout the lake. Sparse populations of these plant species were found in the high marsh zones.

The scrub-shrub wetlands are limited to the western shore of the upper portion of Kingman Lake. The dominant species include silky dogwood (Cornus amomum), elderberry (Sambucus canadensis), button bush (Cephalanthus occidentalis), and smooth alder (Alnus serrulata). Total area is approximately 0.5 acres.

2.2.2.c Terrestrial Resources. A significant loss of wildlife habitat has occurred within the tidal Anacostia River due to the removal of riparian vegetation for urban development and for flood control. Wildlife habitat includes both upland and wetland habitat. The upland habitat surrounding the tidal Anacostia River consists of fields, a narrow forest buffer along the shorelines, some forest stands on islands and in the National Arboretum, Kenilworth Aquatic Garden, Kenilworth Marsh, and urban and industrial development. The area below the Conrail bridge consists of developed parkland, military facilities on the eastern shore, and urban and industrial development on the western shore.

Kingman Lake is located at the southern end of a vegetated corridor that connects with the forested and open areas of the National Arboretum and Kenilworth Marsh. Wildlife habitat at Kingman Lake includes both upland and wetland habitat. The upland habitat consists of managed grasses of the golf course, a narrow forest buffer along the shorelines of much of the lake, and forest stands on Children's Island, Heritage Island, and three of the smaller islands in the upper portion of the lake.

The Kenilworth Marsh Restoration Study identified a variety of wildlife species that may inhabit the Anacostia region (Appendix D). Permanent and summer resident birds, winter visitors, and spring and fall migratory birds documented in the area include species of waterfowl, gulls, wading birds, upland gamebirds, birds of prey, non-passerine land birds, and passerine or perching birds.

Habitat availability is limited on the tidal river and in Kingman Lake due to their current physical structure. Adequate food sources escape cover and breeding habitats are minimal or non-existent for many species of wildlife. The location of the tidal river in a highly urbanized area reduces habitat suitability for secretive or interior dwelling species.

The forest and forest buffer that surround Kingman Lake and the islands above and below Benning Road consist of urban tolerant, invasive, and/or bottomland hardwood species. The native trees are a remnant of a river birch/sycamore forest association. The dominant canopy species include black locust (Robinia pseudo-acacia), tree of heaven (Ailanthus altissima), red maple (Acer rubrum), white mulberry (Morus alba), black willow (Salix nigra), and silver maple (Acer saccharinum). Common shrub and herbaceous species include common privet (Ligustrum vulgare), Japanese honeysuckle (Lonicera japonica), oriental bittersweet (Celastrus orbiculatus), tartarian honeysuckle (Lonicera tatarica), and dwarf sumac (Rhus copallina). For a listing of plant types in and around Kingman Lake, their benefits, and tolerances refer to Appendix D.

2.2.2.d Rare, Threatened and Endangered Species. Information regarding rare, threatened and endangered species in the tidal Anacostia River is discussed in Section 2.1.2.d.

2.2.2.e Water Quality. Water quality conditions in the tidal Anacostia River, including the section of river in the vicinity of Kingman Lake, have consistently been poor. Low dissolved oxygen concentration, sedimentation and high fecal coliform counts are the major problems in the tidal Anacostia. Suspended sediment also continues to be a severe water quality problem. Many of the water quality components continue to violate District of Columbia water quality standards for support of aquatic life.

The substrate of Kingman Lake is primarily silt and mud. A review of the chemical composition of the substrate can be found in Appendix D. The chemical constituents of the sediments showed evidence of pollution typical of urban areas.

The FWS conducted bioassays for the Anacostia River and Kingman Lake sediments. The bioassays concluded that there were no statistically significant differences between the control sites in the Potomac River and the reference sediment samples.

The District's combined sewer system is a major contributor to the tidal river's low dissolved oxygen and high bacterial levels. However, the construction and operation of a swirl concentrator has eliminated the combined outfalls into Kingman Lake. The operation of the swirl concentrator will continue to improve water conditions in the tidal Anacostia River. Appendix D contains information on the water quality parameters in the Kingman Lake area of the tidal Anacostia River for years 1984 through 1989 and 1993.

The investigation indicates a stressed and degraded ecosystem. Heavy sedimentation has occurred throughout the tidal Anacostia River. Mudflats are a dominant feature throughout Kingman Lake, and as a result, fish movement is restricted. Other factors that potentially limit the ecological function of both the study area and the lower Anacostia basin include the development of further urban structures in the immediate area. Proposed projects may include building a new football stadium on existing parking lots, expansion of the Barney

Circle traffic system, and the development of the Children's Island recreational park. Each project would require stormwater controls to improve the quality of runoff into the tidal Anacostia River.

2.2.2.f Air Quality. Periodically, air in the District of Columbia does not meet EPA air quality standards (NPS, 1993).

2.2.3 Aesthetic and Recreational Resources

Recreational fishing in the tidal Anacostia is severely limited due to poor water quality and degraded fish habitat. Water contact recreation such as swimming is also severely limited in the tidal Anacostia due to poor water quality and the associated potential health risks. The tidal Anacostia River has three boat ramps and two marinas and provides opportunities for non-contact water recreation. The river offers an opportunity as a scenic aquatic retreat between the marina at Bladensburg, Maryland, and the boat ramp at Anacostia Park.

2.3 NORTHWEST BRANCH SUB-WATERSHED

2.3.1 Physical Setting

2.3.1.a Location. In the upper portion of the its watershed, Northwest Branch travels through extensive stretches of undeveloped woods and agricultural and low density residential areas. As it approaches the Capital Beltway (I-495 and I-95), the land bordering the stream valley becomes increasingly suburban. Downstream from East-West Highway to its confluence with the Northeast Branch, the stream is highly urbanized and has been adversely affected by channelization.

2.3.1.b Physiography. The majority of the Northwest Branch sub-watershed is located in the piedmont plateau. Relief in the piedmont region ranges from 200 to 570 feet above sea level. The topography is characterized by ridges and deep, narrow stream valleys. Stream gradients are typically moderate and flow at moderate to high velocities, creating narrow floodplains and stream channels. Depositional materials are in the medium to fine sand particle size. Bed materials in the active channel are primarily coarse, medium and fine gravels.

2.3.1.c Hydrology. The lower portion of the Northwest Branch was developed as a suburban community in the 1950's prior to implementation of regional stormwater management controls. This sub-watershed is considered to be urban in its present day use. The Northwest Branch drains an area of 53.2 square miles. In the Northwest Branch sub-watershed, suburban land use is interspersed with large areas of open space. Imperviousness in the upper half of the sub-watershed ranges between 0 and 15 percent, while imperviousness in the lower half of the sub-watershed ranges between 15 and 30

percent. Storm runoff is conveyed to the streams through closed and open section storm drain systems. In the newer subdivisions, two-year stormwater management controls are in use.

Approximately 3700 feet of stream were inventoried in the area of Old Randolph Road bridge. The stream has an irregular meander pattern and extensive bar building has occurred along the channel. There are point bars on the inside of most meanders, and extensive mid-channel bars in several locations. Almost all outside meanders are extensively undercut, and in many areas, both the right and left banks of the straightaways are also undercut. The bank slopes are essentially vertical. Extensive lateral erosion of both banks is evident from the exposed roots and scour behind live trees. Active channel widening is also evident.

Large amounts of woody debris have formed dams in numerous locations in the channel. These debris dams have offset meander patterns, induced bar building, and caused extensive bank erosion. The extensive in-channel depositional features indicate that the channel is not in a stable energy state. The channel is actively adjusting its morphology to accommodate changes in base and storm flow regimes caused by watershed development. It has been downcut in the past 25 to 40 years to the extent that low to moderate storm flows cannot reach the adjacent floodplain.

2.3.2 Environmental Resources

2.3.2.a Aquatic Resources. Water quality varies in this long tributary, but it is generally better in the upper, less-stressed watershed. Here a healthy variety of aquatic life is supported in clear streams well-shaded by vegetation. Higher oxygen levels are possible in the faster moving streams. The Northwest Branch, upstream from New Hampshire Avenue, ranges from a gorge with stable channel banks and rapidly rushing water which is highly aerated and of good water quality to a pool and riffle stream with natural channels and suburban surroundings.

Downstream of New Hampshire Avenue, the banks of the Northwest branch are covered with riprap and the channel has a uniform width with shallow flow. Downstream of the East-West Highway the Northwest Branch is highly urbanized. Unstable conditions, including severe erosion and channel widening, and sedimentation have degraded the aquatic habitat. Little high-quality aquatic life is possible in the lower, slower, and unshaded man-made channels where streambank vegetation has been removed. The lower Northwest Branch historically has been an important spawning area for anadromous fish (shad, herring, and yellow perch), but is now constrained by flood control barriers.

According to Maryland State Water Use designations, Northwest Branch is a Use IV stream (above East-West Highway), capable of supporting stocked populations of trout. Trout are stocked on a put-and-take basis. A majority of the fish species found in Northwest Branch

exhibit two or more of the following characteristics: tolerance of lower water quality or low flows; pioneer species; and species with spawning habitats which minimize the probability of silt coming into contact with eggs.

Anadromous fishes enter the lower reaches of the Northwest Branch during the spring spawning run. The main species involved are white perch, alewife and blueback herring. In recent years the anadromous fish spawning run in the Anacostia River basin has not involved large numbers of fish (Cummins, 1989). The herring species, particularly alewife, are prevented from fully exploiting the available spawning habitat by the presence of man-made stream barriers. The Anacostia River 1135 projects propose to remove two of these stream barriers. Construction of these projects is scheduled for the spring of 1995.

2.3.2.b Wetlands. Wetlands in the Northwest Branch sub-watershed are relatively small and scarce.

2.3.2.c Terrestrial Resources. Vegetative cover along the Northwest Branch consists of mature bottomland hardwood forest. Species diversity and density are high and forest strata are well developed. Vegetation on the banks is moderate and consists of sapling and understory size species of green ash (Fraxinus pennsylvanica), mulberry (Morus rubra) red maple (Acer rubrum), river birch (Betula nigra), and mimosa (Albizzia julibrissin). Shrubs are very sparse, consisting predominantly of spicebush (Lieder benzoin) or multiflora rose (Rosa multiflora). There is little or no herbaceous vegetation on the banks; species observed include ground ivy (Glaucoma hederacea), poison ivy (Toxicodendron radicans), christmas fern (Polystichum acrostichroides), and violets (Viola spp.). Mature canopy specimens are located to the adjacent floodplains and consist of sycamore (Platanus occidentalis), walnut (Juglans nigra) river birch (Betula nigra), red oak (Quercus rubra), and tulip poplar (Liridendron tulipifera).

2.3.2.d Rare, Threatened, and Endangered Species. Information regarding rare, threatened, and endangered species in the Northwest Branch watershed is discussed in Section 2.1.2.d.

2.3.2.e Water Quality. Water quality varies in this long tributary but it is generally better in the upper, less-stressed watershed. Higher oxygen levels are possible in the faster moving streams. Existing data on the Northwest Branch indicate that water-quality criteria for temperature and dissolved oxygen seldom or never exceeded, but fecal coliform bacteria counts have occasionally exceeded, state standards (Ackerman et al., 1991).

2.3.2.f Air Quality. Air quality is rated from fair to good, depending upon what time of year measurements are taken in the basin.

2.3.3 Aesthetic and Recreational Resources

The Northwest Branch has the highest diversity of riverscapes and some of the most scenic areas in the Anacostia River basin. The study area is located in a suburban area and parkland surrounds the stream on both sides. The area is a combination of wooded areas and open parklands.

Northwest Branch is located within a stream valley park operated by M-NCPPC. The Northwest Branch Park has an average minimum width of 500 to 2000 feet, with significantly larger areas associated with local community and regional parks, golf courses, etc. Single family residential development is the predominant land use adjacent to the park. This sub-watershed has been undergoing residential and commercial development for the past 60 years. The population is projected to increase by 9 percent over the next 20 years.

Recreational fishing is somewhat limited due to the small size of the stream, poor water quality and limited fisheries habitat. DNR stocks the Northwest Branch as a put-and-take trout fishery.

2.4 SLIGO CREEK SUB-WATERSHED

2.4.1 Physical Setting

2.4.1.a Location. Sligo Creek descends from an altitude of 400 feet above sea level near Wheaton Regional Park in the rolling Piedmont Plateau through one of the most heavily urbanized sub-watersheds in the Anacostia River basin. It flows southeast, intersecting with the Northwest Branch at Hyattsville in the Coastal Plain.

2.4.1.b Physiography. The geology of the Piedmont Plateau is discussed in Section 2.1.1.a. The area is underlain by soft micaceous schists that contribute to the parent material for the Manor, Chester, Glenelg, Glenville and Worshams soil series (USDA, 1961). Depositional material on the bars, banks, and overwash berms consist of fine gravels through medium and fine sands. Bed materials in the active channel are primarily coarse, medium, and fine gravel.

2.4.1.c Hydrology. Sligo Creek has a drainage area of 13.3 square miles. In the Sligo Creek sub-watershed, commercial and suburban land uses predominate, and overall imperviousness is estimated at 26 percent. Storm runoff is conveyed to the streams typically through closed-section road and storm drain systems which discharge directly to streams.

Approximately 2500 feet of Sligo Creek from Piney Branch Road to Wayne Avenue were inventoried. The stream has an irregular meander pattern and side bars have formed on many of the channel straightaways; point bars on the inside meanders are less frequent. Woody debris in the channel is essentially absent. Other instream features include several utility crossings where the pipe has become exposed through downcutting of the stream. Storm drains and other point discharges occur frequently along the channel. The channel geometry appears to be in stable equilibrium with base and storm flows and there is little toe erosion of the banks.

Storm runoff is conveyed to the streams of this sub-watershed through closed sections, woods, and storm drain systems which discharge directly to Sligo Creek. The majority of this area appears to have been developed between the 1950's and the 1970's prior to implementation of regional stormwater management controls. Excessive storm water runoff can significantly affect the flow of Sligo Creek, causing undesirable physical, chemical, and biological fluctuations. Sligo Creek is measured against Use I water-quality standards for human contact and recreation. A 1986-87 assessment of water quality rated Sligo Creek waters "fair to good" overall.

The channel geometry appears to be stable in equilibrium with base storm flows. Most of the right and left channel banks have been riprapped with large boulders for the entire length of the channel. There is little erosion on the banks. In the years since the bank armoring has occurred, point and side bar depositional features have formed, in some cases almost completely covering the riprap.

2.4.2 Environmental Resources

2.4.2.a Aquatic Resources. Based on stream order and location within the transporting subsystem, Sligo Creek can function as juvenile and adult fish rearing habitat. Spawning functions may also be provided, especially in the upper portion of the watershed. An evaluation of aquatic habitat conditions revealed a combination of both suitable and degraded reaches. Portions of Sligo Creek contain an adequate number of pools, riffles, undercut banks and cobble structures, indicating the potential for diverse fish communities. In other places, unstable conditions (including severe erosion and channel widening) and sedimentation have created degraded reaches. Very few macroinvertebrates or aquatic plants were observed.

Sligo Creek has minimal species assemblages. The few species that do occur exhibited two or more of the following characteristics: tolerance of lower water quality or low flows; pioneer species; and species with spawning habits which minimize the probability of silt coming into contact with eggs.

Historically, Sligo Creek was considered to be the worst tributary in the Anacostia River basin in terms of impacted fish populations. It has recently been transformed into a relatively high quality stream for aquatic life. In 1988, only two species, black nose dace and creek chub were found living in the upstream parts of Sligo Creek. Black nose dace were represented by a single individual and creek chubs were observed with eroded fins and ulcerated sores, an indication of a severe decline in water quality. Goldfish were found in a subsequent survey.

The Montgomery County Department of Environmental Protection has constructed four major retrofit projects in the upper Sligo Creek watershed to help restore the system through stormwater containment and treatment with urban best management practices, and stream restoration. According to Maryland State Water Use designations, Sligo Creek is a Use I stream, capable of supporting cool and warmwater fisheries. Species monitoring in Fall 1992 found the following: swallowtail shiner, spottail shiner, spotfin shiner, brown bullhead, green sunfish, golden shiner, largemouth bass and the redbreast sunfish.

2.4.2.b Wetlands. The stream appears to have downcut to a point in many places where storm flows cannot reach the adjacent floodplain. An historical evaluation of soil horizon, combined with the present high water, suggests that the entire project is located within historically natural wetlands.

2.4.2.c Terrestrial Resources. Within the parkland along Sligo Creek, much of vegetation consists of maintained turf grass with randomly spaced mature deciduous trees without shrub and understory layers. Approximately 30 percent of the wooded areas are not maintained and have higher diversity and density of the herbaceous, shrub and understory layers.

Vegetation on the banks of Sligo Creek is sparse to moderate and consists of sapling and understory size species of green ash (Fraxinus pennsylvanica), mulberry (Morcus rubra) red maple (Acer rubrum), river birch (Betula nigra), and mimosa (Albizzia julibrissin). Shrubs are very sparse, consisting predominantly of spicebush (Lindera benzoin) or multiflora rose (Rosa multiflora). Although there is little herbaceous vegetation on the banks, species observed include ground ivy (Glechoma hederacea), poison ivy (Toxicodendron radicans), christmas fern (Polystichum acrostichroides), and violets (Viola spp.). Mature canopy specimens are located in the adjacent flood plains and consist of sycamore (Platanus occidentalis), walnut (Juglans nigra), red oak (Querus rubra), and tulip poplar (Liriodendron tulipifera).

2.4.2.d Rare, Threatened, and Endangered Species. Information regarding rare, threatened, and endangered species in the Sligo Creek watershed is discussed in Section 2.1.2.d.

rated "fair to good" overall. While temperature, turbidity and dissolved oxygen levels have not exceeded water quality standards, federal coliform bacteria counts have been consistently high, particularly during high flows (Ackerman and Sullivan, 1990).

2.4.3 Aesthetic and Recreational Resources

As stated earlier in this section, the Anacostia River and tributaries are the focus for recreation in this urbanized watershed. The creek is bordered by public parks operated by M-NCPPC. The park is easily accessible, and many people use it throughout the year.

2.5 PAINT BRANCH SUB-WATERSHED

2.5.1 Physical Setting

2.5.1.a Location. Paint Branch originates in eastern Montgomery County. Approximately one-half of the stream length is in the Piedmont Plateau with the remaining portion in the Coastal Plain of Prince George's County. The upper section of the stream passes through low-density residential areas and consists of pools and riffles. Below the confluence with the Little Paint Branch the stream has been channelized and flows through urban areas as well as parkland.

2.5.1.b Physiography. Soils within this sub-watershed consist of the Glenelg-Manor-Chester Association. The Glenelg soils are shallow to moderately deep, well-drained soils that are developed from materials weathered from mica schist, granitized schist or gneiss. The soils have well-developed, textured subsoil that is substantially finer than the surface soil. Some of the severely eroded channery silt loams have lost most to all original surface soil, and bedrock is often exposed in gullies. All Glenelg soils are considered highly erodible. Paint Branch contains two distinct substrate types: predominantly cobble/gravel in the coastal plain, and bedrock bottom in the piedmont plateau.

2.5.1.c Hydrology. Paint Branch has a drainage area of 31.5 square miles. Land use within this sub-watershed is predominantly suburban interspersed with large areas of open space. Overall imperviousness is close to 15 percent. The sub-watershed is currently undergoing expanded residential and commercial development.

Approximately 11,000 feet of Paint Branch were inventoried between U.S. Route 29 and Fairland Road. The stream has an irregular meander pattern and bar building has occurred along the channel. The channel has gone through a downcutting and channel widening process similar to Northwest Branch though less in depth and width. Many outside meanders and straightaways are eroded and/or undercut. Some sections of the channel have a step-pool sequence of pools and riffles.

There is woody debris in the channel in a number of places. In places it has formed large debris dams that offset meander patterns, induce bar building, and cause bank erosion. Other instream features include utility pipes exposed through downcutting of the stream. Storm drain discharges are present along the channel.

Imperviousness in the upper half of the sub-watershed ranges between 0 and 15 percent, while imperviousness immediately above and adjacent to the study area ranges between 15 and 30 percent (MWCOG, 1988). Storm runoff is conveyed to the streams through closed and open section roads and storm drain systems. In newer subdivisions, stormwater management controls are in use.

2.5.2 Environmental Resources.

2.5.2.a Aquatic Resources. A few portions of Paint Branch contain an adequate number of pools, riffles, undercut banks and cobble substrate to potentially support diverse fish communities. In other places, unstable conditions, including erosion and channel widening, and sedimentation have created degraded reaches. Very few aquatic plants were observed. Substrate embeddedness is in the 50 percent range for Gum Springs, rendering the bed materials impaired for spawning.

According to Maryland State Water Use designations, Paint Branch is a Use III stream, capable of supporting naturally reproducing populations of brown trout. A majority of the fish species found in Paint Branch are tolerant of low water quality or low flows, pioneer species, and/or species with spawning habits which minimize the probability of silt coming into contact with eggs.

A naturally reproducing population of brown trout exists from the headwaters of Paint Branch, including Good Hope Branch, Gum Springs Branch, and the Right Fork, to just below Interstate 495. The upper Paint Branch is the only remaining self-sustaining trout stream in the metropolitan Washington area. Brown trout require a relatively stable streamflow of sufficient velocity to prevent siltation, a water temperature under 70 degrees F, and dissolved oxygen generally in excess of 5 mg/l. The trout are indicators of good water quality. The sections of Paint Branch that contain breeding populations of brown trout probably represent the currently optimal conditions for freshwater fish in the Anacostia River system. The following is a list of the most recent fish species found in this stream: silverjaw minnow, cutlips minnow, river chub, golden shiner, rosyside dace, swallowtail shiner, spotfin shiner, satinfin shiner, common shiner, spottail shiner, Eastern silvery minnow, black nose dace, Northern creek chub, fallfish, white sucker, margined madtom, bluegill sunfish, red breast sunfish, longear sunfish, largemouth bass and tessellated darter.

2.5.2.c Terrestrial Resources. Vegetative cover in Paint Branch Park consists of mature bottomland hardwood forest. Species diversity and density is high, and forest strata are well developed. Vegetation on the banks is similar to that of Northwest Branch, although more dense.

Paint Branch and Gum Spring's vegetation on the banks is sparse to moderate and consists of sapling and understory size species of green ash (Fraxinus pennsylvanica), mulberry (Morus rubra), red maple (Acer rubrum), river birch (Betula nigra), and mimosa (Albizzia julibrissin). Shrubs are very sparse, consisting predominantly of spicebush (Lindera benzoin) or multiflora rose (Rosa multiflora). Herbaceous vegetation on the banks include ground ivy (Glechoma hederacea), poison ivy (Toxicodendron radicans), christmas fern (Polystichum acrostichroides), and violets (Viola spp.). Mature canopy specimens are located on the adjacent floodplains and consists of sycamore (Platanus occidentalis), walnut (Juglans nigra), river birch (Betula nigra), red oak (Quercus rubra), and tulip poplar (Liriodendron tulipifera).

2.5.2.d Rare, Threatened, and Endangered Species. Information regarding rare, threatened, and endangered species in the Paint Branch watershed is discussed in Section 2.1.2.d.

2.5.2.e Water Quality. Water quality varies in this sub-watershed, but it is generally better in the upper, less stressed portion. Here a healthy variety of aquatic life is supported in clear streams well-shaded by vegetation. Higher oxygen levels are possible in faster moving upstream waters. Little high-quality aquatic life is possible in the lower, slower and unshaded man-made channels where streambank vegetation has been removed. The lower Paint Branch historically has been an important spawning area for anadromous fish (shad, herring and yellow perch). In the upper reaches of Paint Branch, water quality is rated as good, with consistent dissolved oxygen levels of over 5 mg/l (Ackerman et al, 1992).

2.5.2.f Air Quality. Air quality is rated from fair to good depending upon what time of year measurements are taken in the basin.

2.5.3 Aesthetic and Recreational Resources

The entire stream winds through a very scenic area. The upper and middle sections of the stream are heavily forested and receive only moderate recreational use. The upper reaches of the sub-watershed contain a reproducing brown trout population. The lower section runs through suburban developments and the adjacent parklands to the stream are heavily used.

2.6 LITTLE PAINT BRANCH SUB-WATERSHED

2.6.1 Physical Setting

2.6.1.a Location. The Little Paint Branch runs through the center of Beltsville Community Park on the Montgomery/Prince George's County border. The park is owned by M-NCPPC. Little Paint Branch flows for approximately 6.4 miles southeast. Its several headwater streams originate at points along Route 29 (Columbia Pike) in Montgomery County. The mainstream flows through Prince George's County and its waters cut through steep slopes in the upper reaches. The slopes are gentle by the time the stream reaches its confluence with the Paint Branch.

Please refer to section 2.1.1 for a detailed analysis of the Physiographic characteristics of the basin.

2.6.1.b Hydrology. The sub-watershed for the Little Paint Branch consists of 10.8 square miles. Most of its sub-watershed is suburban development with Beltsville Agricultural Research Center (BARC) and Fairland Regional Park providing open space within the drainage area. The stream has been channelized between I-95 and Briggs Chaney Road and also within the BARC property.

Surface Water. Over half of the Little Paint Branch watershed has very highly erodible soil. Imperviousness is rated at 13 percent. The Little Paint Branch sub-watershed produces an estimated 25,300 tons of sediment annually. Of the sediment reaching Bladensburg Marina, it has been calculated that Little Paint Branch delivers 18.4 percent. Some erosion takes place along the banks of the Little Paint Branch. However, sections of the stream which are located near abandoned surface mines are the areas affected by sedimentation and erosion. These stretches of the stream are in the vicinity of and below I-95. Severe erosion has occurred during high stormwater flows, particularly in the Beltsville Community Park.

2.6.2 Environmental Resources

2.6.2.a Aquatic Resources. Sedimentation and lack of shade has been particularly severe in the lowest reaches of Little Paint Branch. The sedimentation problem is exacerbated by the illegal all-terrain vehicle use along the streambanks.

Obstructions in the stream and its tributaries trap substantial amounts of litter, and fish migration is blocked. The chemistry of the water is not constant and balanced. Dissolved oxygen, carbon dioxide, nutrients such as phosphorus and nitrogen, and bacteria, among other constituents, do not exist in desirable amounts. Excessive amounts of suspended material reduce water clarity, adversely effecting aquatic life.

Woody vegetation on the streambanks within the Beltsville Agricultural Research Center has recently been allowed to become established after streambank maintenance was eliminated. This has resulted in improved habitat along this stretch of the Little Paint Branch.

2.6.2.b Wetlands. The Little Paint Branch stream valley runs through the center of Beltsville Community Park. The valley is narrow and is dotted with fragile wetlands.

2.6.2.c Terrestrial Resources. Vegetation on the banks is sparse to moderate and consists of sapling, understory, and mature size of species of sycamore, river birch, American hornbeam, elm, flowering dogwood, and tulip poplar. Shrubs are sparse or absent, with spicebush or multiflora rose as the common species. There is little or no herbaceous vegetation on the banks; species observed include ground ivy, poison ivy, Christmas fern, etc. The adjacent floodplains are more densely vegetated and the herbaceous, shrub, and understory layers are slightly developed. Woodlands form the largest land cover, even though Little Paint Branch has very little parkland.

2.6.2.d Rare, Threatened and Endangered Species.

Information regarding this resource is discussed in Section 2.1.2.d.

2.6.2.e Water Quality. Generally, the water quality in Little Paint Branch is rated as fair (Ackerman et al., 1992). Presently, there is no systematic water-quality monitoring program for the Little Paint Branch, but the water quality in the upper portions of the stream is characterized as better than in the lower portions.

2.6.2.f Air Quality. Air quality in the basin is rated from poor to good in the basin depending upon what time of year measurements are taken. Generally speaking, higher air quality levels are experienced during the spring and fall. Unacceptable levels of air quality occur during winter and summer when air in the basin has a tendency to stagnate.

2.6.3 Aesthetic and Recreational Resources

The Little Paint Branch is the focus for recreation in this somewhat urbanized watershed. Much of the parkland in the watershed was publicly acquired for the purpose of providing recreational opportunity adjacent to the water. In this tributary of the Anacostia River, recreational fishing is somewhat limited due to the small size of the streams, poor water quality and limited fish habitat.

2.7 MOST PROBABLE FUTURE CONDITIONS

The Anacostia River basin will continue to be an attractive part of the Washington metropolitan area. As such, continued growth, estimated to average approximately four percent by 2010, will increase the overall urban and suburban characteristics of the basin. The existing Federal, state and local environmental regulations will prevent the general degradation which occurred as a result of previous development. However, the overall trend of loss of fish and wildlife habitat will continue without the continued efforts of Federal, state and local government.

The local governments and the State of Maryland will continue to implement the overall goals of the basinwide restoration through the AWRC. Available funding for the restoration will limit the implementation of the basinwide plan and the realization of the benefits to the environment. In order for the restoration of the Anacostia River basin to the modern historic condition to occur, continued cooperation and investment by all levels of government must continue. Because of the large landholdings of the Federal government in the basin, Federal cooperation is especially important.

In the absence of restoration efforts, the Anacostia river basin will continue to function as a degraded system. Water quality and water quantity problems will continue. Stream channels which have become enlarged will have a paucity of aquatic life. Sediments will continue to move rapidly through the system to the tidal river where they will clog the channel and degrade the habitat. The lack of forested buffer areas will continue to deprive the necessary riparian habitat which is critical to a functioning aquatic ecosystem. Wetlands and their associated functions and values will not be returned to the basin.

2.8 LAND IN FEDERAL OWNERSHIP

Of the 170 square mile drainage area of the Anacostia River, approximately 25 square miles are Federally owned. This land represents approximately 15 percent of the entire Anacostia River basin. Table 2-8 lists the Federal agency and the acreage owned within the basin.

Land use among these Federal facilities varies from undeveloped parkland to highly developed government complexes. For instance, much of the land that the National Park Service (NPS) manages is undeveloped, as is the land owned by the Beltsville Agriculture Research Center (BARC). The Washington Navy Yard and the Southeast Federal Center are examples of the highly developed areas.

TABLE 2-8

FEDERALLY OWNED LANDS IN THE ANACOSTIA RIVER BASIN

Ownership	Acres
Treasury Department	
U.S. Secret Service	
James J. Rowley Training Center	496
Department of Agriculture	
Beltsville Agriculture Research Center	7,000
National Arboretum	444
Department of the Interior	
National Park Service	4,097
Department of Defense	
U.S. Army	
Adelphi Laboratory Center	137
Army Reserve Center Riverdale	5
Fort McNair	98
Beltsville Agricultural Reserve Site	218
Laurel National Guard Site	23
U.S. Navy	
Naval Surface Warfare Center	732
Anacostia Naval Station	300
Navy Yard	68
U.S. Marine Corps	
Marine Barracks	4
U.S. Air Force	
Bolling Air Force Base (partly in basin)	605
National Aeronautics and Space Administration	
Goddard Space Flight Center	1,276
U.S. Soldiers Home	302
General Services Administration	
Southeast Federal Center	55
TOTAL	15,860

2.9 RELATED CORPS OF ENGINEERS RESTORATION ACTIVITIES

In addition to the feasibility study and the ongoing work of the AWRC which is proceeding outside of this study, a number of other efforts have taken place which contribute to the restoration of the basin.

2.9.1 Section 1135 WRDA 1986 Reports

The Energy and Water Development Appropriations Act of 1992 (P.L. 102-104) contained a separate appropriation for construction of environmental modifications to the Anacostia River and Tributaries Flood Control and Navigation Project in Prince George's County. Because of this Congressional appropriation, the feasibility study tasks which had been included in the FCSA for work on removal of three barriers to migratory fish, and the installation of terrestrial habitat, riparian habitat and fisheries habitat were submitted in the Section 1135 reports titled, *Anacostia River and Tributaries, Prince George's County Maryland, Anadromous Fish Passage, Section 1135 Project Modification Report* (December 1992) and *Anacostia River and Tributaries, Prince George's County, Habitat Improvement, Section 1135 Project Modification Report* (April 1993). This work is currently scheduled for construction in the spring of 1995.

2.9.2 Beneficial Uses of Dredged Material

Maintenance dredging of the Anacostia River and Tributaries Flood Control and Navigation Project has been performed periodically with placement of material in upland sites. The Baltimore District has prepared two reports for the District of Columbia Department of Public Works through the planning assistance program which evaluated beneficial uses of dredged material in the Anacostia basin. During coordination for normal maintenance dredging in 1992, an opportunity for beneficial use of dredged material was identified. At the request of NPS, the Baltimore District and the appropriate agencies discussed the possibility of coordinating the marsh restoration and maintenance dredging.

The NPS and the local sponsor for the Federal project, Prince George's County, agreed that the Kenilworth Marsh was the best placement area for a portion of the dredged material. Baltimore District did a comparative assessment of the environmental and economic impacts of using Kenilworth Marsh versus complete placement of dredged material at an upland site. The District concluded that both the environmental benefits of restoring 32 acres of wetlands and the economic benefits of reduced costs for maintenance dredging justified the use of Kenilworth Marsh. The total cost of the dredging project was $2.1 million, which included dredging and wetlands planting. This work was completed in July 1993 and resulted in the restoration of 32 acres of freshwater tidal wetlands.

Anacostia River and Tributaries Feasibility Study

Draft Feasibility Report and EIS

Section 3

Problem Identification

The focus of the Anacostia River and Tributaries feasibility study has been to investigate problems and recommend solutions to restore fish and wildlife habitat in the basin. Neither flood control nor navigation problems have been examined in any detail. This section provides an overview of the problems, needs and opportunities for environmental restoration in the Anacostia River basin.

3.1 PROBLEMS, NEEDS AND OPPORTUNITIES

3.1.1 Problems

During the reconnaissance phase, a number of problems and opportunities were evaluated. Flood control, flood warning, navigation, and emergency streambank erosion problems were considered. Feasibility studies for these purposes were not recommended. However, the reconnaissance report recommended a cost shared feasibility study for the expressed single purpose of environmental restoration (restoration of fish and wildlife habitat).

The primary water resources related problem in the basin is the loss of fish and wildlife habitat. The two major causes of habitat loss have been urbanization, and the construction of Federal projects for navigation and flood control. As a result of urbanization and the construction of Federal projects, fish and wildlife habitat has been eliminated or degraded and the overall condition of the basin's water resources has been severely impacted.

Urbanization was initially concentrated in the District of Columbia and later radiated into the surrounding Prince George's and Montgomery Counties. The 170-square mile Anacostia basin has an estimated population of 800,000 or approximately 7 people per acre. Almost all wastewater from the basin is treated and discharged into the Potomac River.

Direct losses of both terrestrial and aquatic habitat occurred as a result of the construction of houses, roads, schools, commercial industries and Federal facilities when forests and fields were developed. The secondary impact of these buildings and the associated infrastructure was large areas which are impervious to rainfall.

As a result of the significant increases in impervious surfaces, changes in the hydrology of the basin streams occurred. The increased runoff reaches stream channels in a shorter period of time. As a result of the increased frequency and volume of the relatively small storm events, stream channels were enlarged. The process of expansion of stream channels caused the destruction of habitat in a number of ways.

First, riparian forest cover was lost when trees were undermined as the stream banks were eroded. As a result, streams received additional solar radiation, and debris dams formed which accelerated erosion. In addition, instream habitat was destroyed due to the formation of wide, shallow reaches during low-flow periods after the channels expanded to accommodate the increased runoff. Often, the depths of these reaches limited the upstream and downstream movements of fish.

The temperature of the water increased to further restrict the habitat value of the system. Sedimentation in pool reaches and on spawning habitat also occurred as the streams widened to accept the increased runoff. The turbidity of the water increased with a resultant decrease in light penetration into the water column. Suspended sediments eliminated habitat for many species of fish through detrimental effects on gill structures. During drought periods, stream volumes were further reduced due to the lack of groundwater recharge which resulted from the increases in impervious surface.

The aquatic habitat of the streams was also affected by the water quality of the stormwater entering streams. Urban stormwater has been shown to contain sediment, nutrients, bacteria, biochemical oxygen demand, elevated temperatures, oil and grease, trace metals and xenobiotic substances.

Navigation and flood control projects destroyed tidal and non-tidal wetlands, bottomland hardwoods and aquatic habitat. Areas affected by Corps projects are specifically described in Sections 1.10 and 3.1.5.

3.1.2 Needs

The needs of the Anacostia basin have been summarized in the *Six Point Action Plan* which is listed in Section 1.6.2. Although these goals have been specifically tailored to the needs of the Anacostia River basin, they follow the outline of the Chesapeake Bay Agreement goals and implement the 1992 amendments to the Bay Agreement which emphasize the importance of the tributaries to the Chesapeake Bay.

The degraded state of the Anacostia basin has been recognized for more than 25 years. The Maryland General Assembly enacted the Scenic and Wild Rivers Act in 1968, which directed DNR to undertake an evaluation of the Maryland portion of the basin in consultation with all of the responsible local agencies. The results of this undertaking were summarized in *Maryland Scenic Rivers: The Anacostia* (DNR, 1984).

The state, regional and local governments recognized the need for a coordinated watershed approach to the problems of the Anacostia River basin. The 1984 and 1987 Agreements provided an opportunity for the development of critical information regarding best management practices (BMPs) in urban watersheds and a unified plan to reach the goals for environmental restoration. The political challenge is similar to that which was successfully met for the Potomac River. However, the point source solutions which were vital to the resurgence of the Potomac River estuary are not applicable to the non-point source pollution problems of the Anacostia basin.

Working with the AWRC and having its member agencies, along with ICPRB and MWCOG, as sponsors of the feasibility study benefitted the effort in two major ways. First, the collective knowledge of the needs of the basin was utilized to evaluate appropriate areas for restoration. Second, the sponsors had an extensive amount of experience in addressing the technical aspects of implementing innovative restoration techniques. This enabled the study team to focus on effective and implementable alternatives during the feasibility study.

3.1.3 Opportunities

A wide range of opportunities exists to improve fish and wildlife habitat in the Anacostia River basin. These opportunities have come about due to the extensive efforts on the part of many agencies over the last 20 to 30 years. Laws and regulations governing land use, construction activities and water quality have been strengthened or enacted to reduce the impacts of new development on the watershed. These laws and regulations enabled the study to narrow the study focus for habitat restoration.

The entire Anacostia basin is subject to planning and zoning regulations. Within the District of Columbia, the Office of Planning, the Zoning Commission, and the Board of Zoning Adjustment regulate land use. The specific planning and zoning processes vary somewhat between Prince George's and Montgomery Counties. Generally, M-NCPPC has authority for planning and zoning, subject to approval by the two respective County Councils. The National Capital Planning Commission (NCPC) also regulates the development of Federal land within the Washington metropolitan area.

In the early 1970's, sediment and erosion control procedures were required for all construction sites which exceeded minimum land disturbance criteria. Sediment fencing and settling ponds were required for major non-agricultural projects to reduce sediment input to aquatic systems as a result of runoff. Additional protection was also given to stream habitat by regulations which limited instream construction activities.

In the 1970's and 1980's, the State of Maryland, Prince George's County, Montgomery County and the District of Columbia implemented stormwater control regulations. These regulations required generally that the runoff during rainfall events could not exceed the

pre-development levels. As a result, hundreds of stormwater facilities have been constructed throughout the basin. The State of Maryland passed the Mine Reclamation Act in 1975. As a result of this legislation, a 145-acre sand and gravel mine spoil site in the basin was reclaimed. Tree protection ordinances were enacted by Prince George's County in 1990 and Montgomery County in 1991. The Maryland Forest Conservation Act of 1991 was enacted to protect the forest resources of the state.

Nationally, the 1972 amendments to the Federal Water Pollution Control Act (also referred to as the Clean Water Act) were a major milestone in restoring aquatic habitat. As a result of this legislation, EPA and other Federal, state, local and regional agencies coordinated efforts to upgrade the regional treatment facility which serves almost the entire Anacostia basin. The Washington Suburban Sanitary Commission (WSSC) worked extensively to eliminate any discharge of untreated wastewater.

EPA and DPW developed a two-phased comprehensive combined sewer overflow abatement program which included the use of a swirl concentrator facility to remove pollutants and disinfect the combined sewer flows prior to discharge to the river. This system became operational for the major portion of the drainage area west of the river between June 1990 and April 1991 (O'Brien and Gere, 1992). The system cost approximately $35 million and consists of a series of inflatable dams, outfall control gates and the swirl concentrator facility. Although the swirl facility may be less effective than predicted, the overall design objective of 30 percent reduction in settlable biochemical oxygen demand (BOD) at the Northeast Boundary Sewer outfall appears to have been met.

The existence of land use controls, water quality and stormwater regulations and the commitment on the part of government agencies and private organizations to revitalize the Anacostia River basin make possible a number of opportunities to restore fish and wildlife habitat in the basin. Successful restoration of fish and wildlife habitat is much more likely as a result of these preceding efforts.

3.1.4 Modern Historic Condition of the Anacostia River Basin

The Anacostia River basin previously provided significant fish and wildlife habitat. The freshwater tidal wetlands supported a wide range of waterfowl and wading birds. In addition, the anadromous fishes used this area extensively as spawning and juvenile rearing habitat. The location of the Anacostia River near the head of tide of the Potomac River enhanced its value as fisheries habitat.

3.1.4.a Early Historical Period In the early 1600's, explorers of lands adjacent to the Anacostia River described dense hardwood forests and a great diversity of wildlife. The river contained an abundance of fish and aquatic vegetation, both submerged and emergent. Extensive marshes, habitat for fish and waterfowl, surrounded the tidal Anacostia. The early 1700's brought colonial development to the river basin. Tobacco plantations were

established throughout the basin. Settlers cleared land for cultivation and harvested timber for construction.

In 1791, the mouth of the Anacostia River was 20 feet deep and 1 mile wide. During the early 1800's, the large-scale clearing of land increased runoff, laden with sediment, into the Anacostia. The port of Bladensburg, Maryland, established in 1742, had a reported channel of 40 feet in depth. With the tobacco trade, it became a major colonial port. By the mid-1800's, sediment accumulation reduced the channel depth, effectively closing the port. By 1900, a large portion of the land in the Anacostia watershed was in agricultural use. Through the 1900's, urban development became the principal cause of sedimentation.

3.1.4.b Wetlands In the early 1600's, explorers of lands adjacent to the Anacostia River described dense hardwood forests and a great diversity of wildlife. Emergent tidal wetlands bordered the Anacostia from its mouth to the head of tide at Bladensburg, Maryland. These wetlands were most dominant in the vicinity of Benning Bridge. Marshes extended for three miles above Benning Bridge, with an average width of one-third of a mile (Coutes and Prentis, 1883). Wild rice, saw-grass, lily pads, and several other species of marsh grasses vegetated these tidal flats. Tidal creeks, 3 to 6 feet deep and 10 to 20 feet wide, intersected the marshes and overflowed into them during high tide.

Aerial photographs which were taken in 1927 and obtained from NPS, and the 1891 survey by the Corps of Engineers, show the Anacostia meandering through a broad floodplain of flats of wild rice with occasional hummocks of high marsh. Though having the appearance of a monotypic community due to the height and distinctive appearance of wild rice, these "wild rice marshes" also contained species of arrow arum, pickerelweed, arrowhead, marsh hemp, yellow pond lily, ironweed and marsh hibiscus. The historical wild rice marshes were typical freshwater tidal wetlands supporting a very diverse community.

McAtee (1918) notes the presence of magnolia bogs on the Eastern Branch (the Anacostia), including the Kenilworth Marsh area and the Powdermill bogs near Paint Branch. McAtee also describes the shallow portions of the Anacostia with abundant submerged aquatic vegetation as the habitat of most of the river's fish species. The marshes adjacent to these waters were principally composed of wild rice, cattails, bulrushes, cord-grass, pickerel weed, yellow pond lily, arrow arum, and arrowhead. Williams (1942) describes a marsh community of cattails, wild rice, and sedges. Beyond the marsh vegetation extended a mesophytic forest of oaks, scrub pine, laurel and hickory.

3.1.4.c Fisheries Approximately 100 species of fish historically resided or migrated in the Potomac and Anacostia Rivers. Smith and Bean (1899) list the following: gar pike, mud minnow, bachelor crappie (introduced in 1894), sunfish, and American sole. McAtee (1918) list these fish species as being most abundant in the Eastern Branch: gar, mud minnow, pickerel, killifish, silverside and sunfish. Uhler (1944) mentions the presence of carp and gizzard shad in the main river channel, and mummichogs and golden shiners near the wild

rice flats. Around the turn of the century, the Anacostia, with populations of American and hickory shad, white and yellow perch, redbreasted sunfish, catfish and herring, supported a large fishing industry.

3.1.4.d Wildlife Coutes and Prentis (1883) listed bird species of the tidal wild rice flats above Benning Bridge, including the long-billed marsh wren, reed bird (bobolink), red-winged blackbird, rail birds, Maryland yellow throat, marsh hawk, osprey, bittern, and least tern. Other species in the area included woodcock, king rail, ruffed grouse, and the pine creeping warbler. Bartsch (1903) describes the herons found in the marshes of the Anacostia: the American egret, the great blue heron, the little blue heron, the rare showy heron, the green heron, and black crowned night heron. Mammals found along the Anacostia included flying squirrels, Virginia muskrat, otter, mink, and raccoon (Bailey, 1903). Bailey also lists the Norway rat, star-nosed mole, Maryland shrew, the house mouse, and the field mouse as inhabitants of marshes and swamps in the area.

3.1.5 Effects of Previous Corps Projects

The spatial impact of Corps of Engineers projects described in Section 1.10 extends from the confluence with the Potomac River as far upstream as the Greenbelt Road crossing of Indian Creek, a distance of 17 miles. Corps projects also extend to the Route 1 crossing of the Paint Branch, and the vicinity of the Queens Chapel Road crossing of the Northwest Branch. All of the previously constructed Corps projects are located in the lower one-third of the basin which is the area of highest population density.

Previous project construction eliminated approximately 2,600 acres of wetlands, 500 acres of aquatic habitat and 800 acres of bottomland hardwoods. These ecosystems performed numerous beneficial ecological functions for the Anacostia basin and the associated Potomac River and Chesapeake Bay. One of the primary functions of these ecosystems is fish and wildlife habitat. Historically, the Anacostia River basin contained a diverse assemblage of fish and wildlife species. Populations of these and many other related species have declined sharply due to the habitat degradation and loss in the Anacostia basin. It is estimated that the construction of Federal projects impacted on the order of 17,000 habitat units within the project areas.

The 1,773 acres of wetlands which were dredged and filled within the District of Columbia as a result of Corps of Engineers projects destroyed virtually all of the Anacostia River freshwater tidal wetlands. In addition, the natural channel geometry and sinuosity of the streams were replaced with hard-edged trapezoidal channels by Corps flood control projects. The two flood control projects in Prince George's County have been effective in reducing flood damage; however, approximately 63,000 linear feet of streams and 800 acres of wetlands, which provided an extensive amount of fish and wildlife habitat, were destroyed. Table 3-1 is a listing of the types of habitat which were altered or destroyed through

TABLE 3-1

HABITAT UNITS AFFECTED BY PREVIOUS CORPS PROJECTS

Location	Habitat Type	Affected Area (Acres)	HSI [1] Value	Habitat Units [2] (5 species)
Potomac River	Aquatic	496	0.7	1,736
Confluence to	Wetland	1,773	1.0	8,865
D.C. Line	Bottomland Hardwoods	443	1.0	2,215
D.C. Line to 38th	Aquatic	17	0.8	68
Street (Northwest	Wetland	620	0.8	2,480
Branch) and Riverdale	Bottomland	178	0.6	534
Road	Hardwoods			
(Northeast Branch)				
Queens Chapel Road	Aquatic	2	0.7	7
-/+ 2,500 ft	Wetland	93	0.7	326
(Northwest Branch)	Bottomland Hardwoods	70	0.6	210
Calvert Road + 540 ft	Aquatic	7	0.6	21
to U.S. Route 1 (Paint	Wetland	134	0.7	469
Branch) and Greenbelt	Bottomland	100	0.7	350
Road (Indian Creek)	Hardwoods			
Total Aquatic:		522		1,832
Total Wetland:		2,600		12,140
Total Bottomland Hardwood:		791		3,309
Totals:		3,913		17,281

[1] The Habitat Suitability Index (HSI) is an estimate of the habitat quality which was developed by FWS and can range from 0.0 to 1.0.

[2] Habitat units are calculated by the formula HU = HSI x area. In this simplified example, it was assumed that the HSI was the same for all 5 selected species.

previous projects. It estimates the total number of habitat units affected by previous projects.

With the exception of the Prince George's County flood control project completed in 1975 (described in Section 1.10.5), all Corps of Engineers work was completed prior to the present environmental ethic and the enactment of NEPA. The projects have functioned as designed, providing recreation and economic benefits. They also may have prevented commercial development of additional portions of the riparian zone. However, no mitigation was included as part of any of the previously constructed Anacostia projects.

3.2 FEDERAL OBJECTIVE

The Federal objective of water and related land resources planning is to contribute to national economic development (NED) consistent with protecting the Nation's environment, pursuant to national environmental statutes and applicable executive orders, and to other Federal planning requirements. Contributions to NED are increases in the net value of the national output of goods and services, expressed in monetary units. Contributions to NED are the direct benefits that accrue to the planning area and to the rest of the nation. Contributions to NED include increases in the net value of those goods and services that are marketed, and those that may not be marketed.

Because benefits of fish and wildlife habitat restoration and creation are not amenable to traditional NED benefit analyses, criteria contained in Policy Guidance Letter No. 24, CECW-PA, March 27, 1991, were used to define the Federal objective. Those criteria are:

1. *Project outputs will be primarily for the benefit of fish and wildlife habitat.*

2. *Environmental degradation of the watershed must be related to previous activities of the Corps of Engineers or be best accomplished through modification of a Corps of Engineers project.*

3. *Project outputs must address significant resources (based on public, scientific and institutional considerations). Incremental analysis techniques should be used to optimize return on investment.*

4. *Habitat outputs will be documented with qualitative and quantitative procedures such as the Habitat Evaluation Procedure (HEP).*

5. *Priority consideration is given to projects that emphasize active engineering measures rather than relying solely on the acquisition of land.*

The Federal objective of restoring fish and wildlife habitat is based on the June 25, 1990, Policy Statement of the Assistant Secretary of the Army (Civil Works) and Planning Guidance Letter No. 24, as well as numerous other Federal laws, regulations and executive orders. Specific state and local concerns were stated in the *1987 Anacostia Watershed Restoration Agreement* and *the Six-Point Action Plan.* The specific concerns of both the state, local and Federal agencies relate to the environmental restoration of the basin.

Succinctly stated, the problem which has been evaluated in this study is the replacement of fish and wildlife habitat eliminated by previous Corps Civil Works projects. Efforts were undertaken to evaluate opportunities to either restore habitat, when possible, at the location where the degradation occurred, or to construct new habitat in areas where the associated land use provided an appropriate setting for fish and wildlife habitat.

3.3 PLANNING OBJECTIVES AND CONSTRAINTS

The planning objective of the Anacostia River and Tributaries feasibility study is to restore the fish and wildlife habitat which was destroyed as a result of previous activities of the Corps of Engineers. As previously stated, the combined total habitat destroyed by all Corps of Engineers projects was approximately 2,600 acres of freshwater tidal and non-tidal wetlands, 500 acres of aquatic habitat and 800 acres of bottomland hardwoods. It is estimated that these ecosystems represented 17,000 units of fish and wildlife habitat. Therefore, the ultimate planning objective is to replace or restore up to 17,000 habitat units in the basin. The planning objective can be further defined as the restoration of wetland, bottomland and aquatic habitat in conjunction with the watershed approach of the AWRC.

Complete restoration in such an urbanized basin is neither attainable nor desirable, since such restoration would result in significant economic and social impacts which would be unacceptable to the affected communities. Therefore, within the context of restoring habitat to the modern historic condition, the planning objective is to restore somewhat less than the number of habitat units which were initially lost due to previous Corps projects.

The most important constraint on the feasibility study was the financial capabilities of the non-Federal sponsors. The state, regional, and local governments funded 50 percent of the feasibility study cost during a difficult financial period. In addition to the feasibility study, the state and local governments also continued to fund MWCOG's Anacostia Restoration Team and additional restoration actions in the basin. Therefore, the scope of the feasibility study was based on the work which could be undertaken with the available funds rather than on fully meeting a basin-wide objective of completely restoring the habitat which was lost due to previous activities of the Corps of Engineers.

In rounded figures, the breakdown of study and design effort for each political jurisdiction was $1,000,000 in Montgomery County, $725,000 in Prince George's County and $725,000

in the District of Columbia. The study tasks contained in the FCSA document the efforts associated with each political entity. The cost shared effort which was paid for by each political jurisdiction was applied to that particular jurisdiction only.

An additional constraint for the study was the urbanized nature of the study area. One consideration at almost every potential restoration site is the location of existing utilities. Sewer lines and sometimes gas, telephone, cable television, electrical and fiber optic cable rights-of-way can have a major effect on the implementability of a project. One of the very fortunate situations which exists in the Anacostia River basin is that large portions of the riparian lands are in public ownership. The real estate title to most of the riparian lands in the District of Columbia belongs to the U.S. Department of Interior, National Park Service. In Prince George's and Montgomery Counties, title to most of the riparian lands is held by the Counties or M-NCPPC. Therefore, significant investments could be made directly to implement the required construction actions rather than for purchases of real estate when the construction action is compatible with the property owner's mandate. As with most urban areas, land purchases in the Washington metropolitan area can be costly. Additionally, the location of the proposed projects in areas which border the existing park system establishes a synergistic relationship between the existing habitat and the restored habitat provided by each proposed construction action.

3.4 CHESAPEAKE BAY TRIBUTARIES STRATEGY

The Chesapeake estuary was created 10,000 years ago as the Atlantic Ocean crept up the Susquehanna River valley in the wake of retreating Ice-Age glaciers. Its waters and wetlands teemed with shellfish, finfish and waterfowl when human settlements first appeared along its shores. But unrestrained harvests and decades of degradation had sharply impaired the Chesapeake health and productivity by the mid-1970's, when Congress directed EPA to launch a major study of the Bay's decline.

Findings and recommendations from the $27 million research program laid the foundation for the first Chesapeake Bay Agreement, signed in 1983. In that compact, the governments of Virginia, Pennsylvania, Maryland and the District of Columbia, the Chesapeake Bay Commission, and the EPA agreed to develop and implement coordinated plans "to improve and protect the water quality and living resources of the Chesapeake Bay estuarine system."

In 1987, the compact signatories formally agreed to reduce and control point and nonpoint sources of pollution to attain the water quality conditions necessary to support the living resources of the Bay. To achieve this, they agreed to develop, adopt and begin to implement a strategy to equitably achieve a 40-percent reduction in nitrogen and phosphorus by the year 2000.

The Chesapeake Bay signitories then agreed to the following 1992 amendments to further their commitments made in the 1987 Chesapeake Bay Agreement.

o To reaffirm their commitment to achieve an overall 40 percent reduction of nitrogen and phosphorus entering the mainstem Chesapeake Bay by the year 2000 and to maintain at least this level of reduction thereafter.

o To amend the water quality goal of the 1987 Chesapeake Bay Agreement to reflect the critical importance of the tributaries in the ultimate restoration of Chesapeake Bay.

As shown by the Chesapeake Bay Agreement amendments, there is now a greater focus on the direct restoration of the tributaries and living resources. The goals of the Anacostia River study complement the Chesapeake Bay Program's goals by focusing on a Bay tributary and directly supporting living resources critical to the Bay ecosystem.

3.5 INDICATOR SPECIES

The Chesapeake Bay Program has designated a list of species and species associations as indicators of the Chesapeake Bay's ecological condition. Initially, the Chesapeake Bay Program identified an extensive list of species to represent all aquatic habitats, salinity and depth zones, and trophic levels. They then selected indicator species from the larger list based upon commercial, recreational, ecological and aesthetic significance. The indicator species were selected to characterize all habitat types and trophic levels in the Chesapeake Bay with a manageable subset of representative species. Not all species are meant as indicators of recovery; rather, the abundance of some species reflect the habitat quality, quantity or diversity of the area. Therefore, the species on the list may have commercial and/or recreational importance and due to abundance, productivity or distribution, are important in the flow and accumulation of energy through various trophic levels of the Chesapeake Bay ecosystem. The species are intended to be surrogates for the larger bay ecosystem through their habitat and food chain requirements and ecological associations. Maintenance of these indicator species should help insure the ecological "wellness" and diversity of the Chesapeake Bay ecosystem.

The Baltimore District has selected a subset of the Chesapeake Bay Program's species indicator list which will benefit from the proposed Anacostia work. These species require the types of aquatic, bottomland, and/or wetland habitat that are proposed in this study. The list is as follows:

American shad (Alosa sapidisima)
Hickory shad (Alosa mediocris)

Alewife (Alosa pseudoharengus)
Blueback herring (Alosa aestivalis)
White perch (Morone americana)
Striped bass (Morone saxatilis)
Yellow perch (Perca flavescens)
Wood duck (Aix sponsa)
Canvasback (Aythya valisneria)
Redhead (Aythya americana)
Colonial wading birds (Herons and Egrets)
Osprey (Pandion haliaetus)
Bald eagle (Haliaeetus leucocephalus)

For the purposes of this study, the Baltimore District has also added the River otter (Lutra canadensis) as an indicator of the Anacostia River's ecological integrity. River otter have strong aquatic food chain linages, but their habitat has been severely degraded in the Chesapeake Bay watershed. Otter have also been recently reported in the Anacostia River. Although not an indicator of the basin's ecosystem as a whole, brown trout (Salmo trutta) was also targeted as a species of concern and a local indicator of the Anacostia ecosystem. Brown trout have very specific habitat requirements and are very susceptible to changes in temperature, substrate and physical cover. This susceptibility makes brown trout a good local indicator species of certain coldwater sub-watersheds, such as Paint Branch.

All the species potentially can use or are using the Anacostia River basin at some point in their life histories. The specific habitat restorations will benefit these significant indicator species. Therefore, if these species will benefit, the Anacostia and Chesapeake Bay ecosystem should be improved. The following is a brief description of these species and species associations and their habitat requirements, taken from Habitat Requirements for Chesapeake Bay Resources (Funderburk, et al. (eds), 1991).

3.5.1 American shad (Alosa sapidissima) and Hickory shad (Alosa mediocris)

American shad and hickory shad are anadromous fishes of the clupeid family. American shad are the largest anadromous clupeids of the United States; hickory shad are medium-sized members of the family. Natural shad spawning habitats include non-tidal reaches of virtually all Chesapeake Bay tributaries. American shad juveniles leave the estuary in late fall, mature in the ocean, and return to the tributaries to spawn after two to five years. The life history of hickory shad is similar, but poorly known.

American shad historically supported important recreational and commercial fisheries in Chesapeake Bay tributaries, whereas hickory shad, because of their naturally lower abundance in the region, were a much less important fishery species. Severe stock declines of both species in the latter half of the 20th century led to drastically lower harvests, and a fishing moratorium in the Maryland portion of Chesapeake Bay which has been in effect

since 1980. The causes of the declines apparently include overfishing in earlier decades, blockage of spawning rivers by dams and other impediments, and degradation of water quality and physical habitat in spawning reaches.

The critical life stages of shad are the eggs, larvae and early juveniles, which occur in coastal rivers. Water temperatures > 55 degrees F, pH > 6.0, and dissolved oxygen > 5.0 milligrams per liter (mg/l) are important requirements for American shad eggs. Larvae require water temperatures of 60 to 78 degrees F, pH > 6.7, dissolved oxygen > 5.0 mg/l and suspended solids < 100 mg/l. Requirements of juvenile American shad are similar to those of larvae. Insufficient information is available to make definitive statements about the habitat requirements of hickory shad, but they probably are similar to those of American shad. Major habitat concerns for shad are stream acidification and interaction with dissolved metals, stream blockages, and land disturbance with associated sedimentation and turbidity.

3.5.2 Alewife (Alosa pseudoharengus) and Blueback Herring (Alosa aestivalis)

Alewife and blueback herring are relatively small anadromous fishes of clupeid family. Spawning habitats of these "river herring", include freshwater, non-tidal areas of smaller tributaries of Chesapeake Bay. River herring juveniles leave their nursery areas in fall, mature in the Atlantic Ocean, and return after two to five years to Bay tributaries for spring spawning.

The critical life history stages of alewife (AW) and blueback herring (BH) are the eggs, larvae, and early juveniles. Water temperatures > 52 degrees F (AW) and > 57 degrees F (BH), pH > 5.0 (AW) and > 5.7 (BH) and dissolved oxygen > 5.0 mg/l are important habitat requirements for eggs. Larvae require water temperatures at least 46 degrees F (AW) and 57 degrees F (BH), pH > 5.5 (AW) and > 6.2 (BH), dissolved oxygen > 5.0 mg/l, and suspended solids < 500 mg/l. Major habitat concerns for river herring are stream acidification; stream blockages; and land use changes that alter stormwater runoff patterns, accelerate erosion, and increase sedimentation.

3.5.3 White Perch (Morone americana)

White perch, a semi-anadromous species and one of the most abundant fish in Chesapeake Bay, spends its entire life in the Bay and its tidal tributaries. White perch migrate to tidal fresh and slightly brackish waters each spring to spawn. After spawning, adults move downstream to more brackish areas; summer movements are local and random. White perch overwinter in the downstream portions of the tributaries and deeper saline waters throughout the Bay, usually at depths greater than 20 to 40 feet, in areas with a salinity range of 10 to 20 parts per thousand (ppt). White perch support commercial and recreational fisheries in Maryland and Virginia. White perch concentrate in areas with dissolved oxygen concentrations of at least 6 mg/l.

3.5.4 Striped Bass (Morone saxatilis)

The striped bass is a large anadromous fish found along the entire East Coast of North America. Most of the Atlantic Coast coastal migratory stock originates in Chesapeake Bay. Striped bass spawn in spring in tidal freshwater areas just above the salt wedge. Most juvenile striped bass remain in their natal areas for the first two years of life. Older fish migrate from the Bay into the coastal Atlantic Ocean. Striped bass are voracious predators, feeding mostly on fish. Early life stages are important prey for other species.

Striped bass have been one of the most sought-after commercial and recreational finfish in Chesapeake Bay. A long-term decline in striped bass stocks began in the mid-1970's, primarily because of overfishing. Sustained poor recruitment and low stock abundance led to a complete closure of Maryland and Virginia fisheries by the mid to late 1980's. In response to increased stocks and stronger recruitment, limited commercial and recreational fisheries were reopened in 1990. Acidity and contaminants in spawning habitats have been associated with mortality of striped bass larvae in the Choptank, Nanticoke and Potomac Rivers.

3.5.5 Yellow Perch (Perca flavescens)

Yellow perch stocks in Chesapeake Bay have declined since the mid-1960's. The cause for the decline has not been identified precisely, but several environmental factors undoubtedly hinder stock recovery. They include sedimentation from improper land use, decreased spawning habitat caused by stream blockages, and the interaction of metals and acid rain. Eutrophication caused by excessive nutrient loading may adversely affect yellow perch by decreasing dissolved oxygen, which reduces the forage base for yellow perch.

Suitable habitat for yellow perch includes dissolved oxygen greater than 5.0 mg/l, summer water temperatures below 86 degrees F, and gradually warming water temperatures during egg and larval development (March through May). Yellow perch populations appear able to sustain reproducing populations at pH 5.0. Salinities above 2.0 ppt reduce hatchability of yellow perch eggs. Adults and juveniles tolerate salinities of 13.0 ppt. Restoration of yellow perch to historic abundance levels may be accomplished by reducing sedimentation and eutrophication in the Bay. Toxic inputs also must be reduced, and suitable yellow perch spawning habitat must be restored by reducing stream blockage.

3.5.6 Wood Duck (Aix sponsa)

Threatened with extinction by habitat loss and unregulated hunting near the turn of the century, the wood duck has recovered to become one of our most abundant game ducks. A widely distributed species of forested wetland habitats, the wood duck is an abundant fall and spring migrant - the most abundant breeding anatid in the Chesapeake Bay drainage. The species' primary habitats are interior bottomland hardwood forests and adjoining river and Bay marshes. Wood ducks also occupy habitats extending from tidal-brackish Bay marshes to the very tops of watersheds, including the smallest of watercourses and temporary and seasonal pools within flood plain forests. Wood ducks are well-known for their beautiful plumage, dependence on tree cavities for nesting, and colonial roosting habitat, especially in fall.

Although protection of large contiguous bottomland hardwoods and large riverine marshes is crucial to maintenance of wood duck populations within the Bay region, conservation of wetlands and riparian forest (along even the smallest of watercourses) will protect the diversity of habitats beneficial to wood ducks. Emphasis should be placed on managing riparian timber for mature and old growth, and, especially, on producing mast-bearing and cavity-producing species. Channelization and other actions that alter natural hydrology or habitats along watercourses are detrimental to wood ducks. Prudent management also includes conservative harvest limitations for maintenance of an abundance of wood ducks in the future.

3.5.7 Canvasback (Aythya valisineria)

The Chesapeake Bay historically was the single most important wintering ground for the premier game duck in North America, the canvasback. As recently as the 1950's, Chesapeake Bay harbored over a quarter of a million canvasbacks, or about half of the estimated winter continental population. Today, canvasbacks on the Bay have declined to about 50,000, representing only one-fifth of the continental winter population. Among many factors contributing to the general decline of continental canvasbacks - loss of prairie nesting habitat, loss and degradation of important migratory areas, and vulnerability of females to hunting - degradation of Chesapeake Bay, the species' primary wintering area, probably also has played a significant role.

Changes in the Bay significantly affecting the canvasback include increased nutrients, sedimentation, turbidity, and other contamination of the aquatic environment that has led to major changes in foods available. The important change has been the drastic decline in submerged aquatic vegetation (SAV), the historic and preferred food of canvasbacks. Presently, a few species of edible-sized clams, primarily the Baltic clam, are critical to maintaining the wintering canvasback population. Although the effect of the dietary change is not fully understood, it suggests a declining habitat quality that could affect canvasback

winter survival, winter distribution and subsequent breeding performance. Further, degradation of the Bay is likely to lead to a further decline in canvasback use.

The Chesapeake Bay remains an important wintering area for canvasbacks, and restoration of the Bay is critical to restoring the continental canvasback population. Restoration of water quality is fundamental to improving the abundance and diversity of foods available to canvasbacks, especially SAV.

3.5.8 Redhead (Aythya americana)

The redhead duck historically was one of the most popular game ducks in the Chesapeake Bay region, second only among diving ducks to the larger, more abundant canvasback. The redhead was an abundant, although sporadic fall and spring migrant, and wintering birds displayed exclusive dependence on SAV.

With similar habitat requirements and life histories, redhead and canvasback populations both have declined with the encroachment of man on breeding, migration and wintering areas. Both species have been sensitive to ecological changes such as loss and degradation of habitats throughout their range. As SAV has declined in the Chesapeake Bay, redheads essentially have abandoned the region, while canvasbacks have switched to shellfish as alternate food resources. In the mid 1950's about 70,000 redheads wintered on the bay, representing 40 percent of the Atlantic Flyway population. They have dwindled over the last decade to 2,000 birds (annual average estimate), representing only 2 percent of the Flyway total.

3.5.9 Colonial Wading Birds (Herons and egrets)

Six species of colonially nesting wading birds, the great blue heron, great egret, snowy egret, little blue heron, green-backed heron, and black-crowned night heron, are prominent avian residents of the Chesapeake Bay region. They are top carnivores in a complex food web and, thus may be useful as indicators of change in wetland quality. Except for little blue herons, there is little evidence to suggest that populations in the bay may be declining; in fact, it seems likely that great blue herons are increasing. Although populations may not currently be declining, several factors are of concern: (1) loss of water quality necessary to support SAV beds (hence good nursery areas for fish and crabs); (2) loss of wetlands due to siltation, agriculture and sea level rise; (3) disturbance at islands or other colony sites by boaters and other types of human activity.

3.5.10 Osprey (Pandion haliaetus)

Ospreys feed almost exclusively on live fish. Their position as a consumer at the top of an aquatic food-chain proved hazardous from the 1950's through the early 1970's when organochlorine pesticides adversely affected their reproductive success leading to a

population decline. The banning of some persistent pesticides during the 1970's enabled Chesapeake Bay osprey populations to increase to an estimated 2,000 pairs by the 1980's. Osprey foraging efficiency and energy budgets and the prey type, abundance, and nutritional value are poorly understood and need research. This is especially important in view of reported deteriorating water quality and decreasing fish populations.

3.5.11 Bald Eagle (Haliaeetus leucocephalus)

The Chesapeake Bay may once have provided habitat for as many as 3,000 pairs of breeding bald eagles and for thousands of subadult and migrant birds. The population has declined dramatically over the past three centuries due to habitat destruction, persecution and contamination by chemicals, reaching a low of 80 to 90 breeding pairs in 1970. In 1989, 185 pairs of eagles nested in Maryland and Virginia.

Eagles require large trees for nesting, roosting, and perching. These trees must be in areas with limited human activity. Bald eagles are opportunistic predation-scavengers, consuming many different prey species. They take fish when they are available, but shift to waterfowl and mammals when fish are scarce. Adequate fish and waterfowl populations are required to sustain the species in the future.

3.5.12 River Otter (Lutra canadensis)

The river otter, a member of the weasel family, is a victim of polluted streams, deforestation and relentless trapping. The otter is a non-selective fish-eater. Although an adept swimmer and capable of catching many fish species, more than half of the otter's diet is minnows and suckers. Their indirect effect upon fish populations by consuming other fish predators is not well known. Fish are exposed to predation at all stages of their life cycle, and the otter's diet includes a good many potential egg and fry eaters, crayfish, predatory insect larvae, hellbenders, turtles, water snakes, etc. Restoration of riverine, riparian and wetland ecosystems is critical to the recovery of the river otter.

3.5.13 Brown Trout (Salmo trutta)

Brown trout, a salmonid, inhabits the cold water streams of the Anacostia River basin. Juvenile brown trout are primarily insectivorous although crustaceans also serve as a nutrient source. Adults are carnivorous, size selective feeders preying on crayfish and fish. Cover is recognized as one of the essential components of trout streams. Stream and bank vegetation are essential for providing cover and habitat for prey and for preventing solar heating. Brown trout are most active at night in riparian-covered stream segments. For optimal growth and reproduction, this stream-spawning species requires a silt-free, rocky substrate with riffle run areas comprising 30 to 50 percent of the habitat with the remaining 50 to 70 percent as slow, deep water. Brown trout are relatively pH tolerant, able to exist from pH 5 to 9.5 with an optimal range of 6.8 to 7.8.

Brown trout are fall spawners. They require nesting areas with a gravelly substrate and avoid areas of increased temperature or decreased dissolved oxygen. The critical life stages of brown trout are the eggs, larvae and young frys with optimal embryo development occurring in the temperature range between 36 and 55 degrees F, with a tolerance range of 0 to 59 degrees F. The gravelly spawning substrate preferred is critical for egg development, hatching and fry survival. Excessive sedimentation and decreased dissolved oxygen will reduce survival rates.

Temperatures between 45 and 66 degrees F provide good growth conditions for juveniles, with tolerance range of 0 to 80 degrees F. The MDE Use III classification upper thermal limit is 68 degrees F for naturally reproducing trout water. It has been shown that swimming speed and growth rates significantly decrease with lowering dissolved oxygen levels. The minimal to optimal ranges of dissolved oxygen for juveniles and adults are >3 to 7 mg/l at temperatures < 59 degrees F and > 5 to 9 mg/l at temperatures >59 degrees F. It is apparent that since brown trout are a long-lived species (individuals of up to 18 years of age have been recorded), there is competition between the adults and juveniles for habitat areas. Therefore, juveniles are frequently found at shallower depths and lower velocities than the adults. The survival of brown trout relies heavily on decreasing thermal loading in cold water tributaries, reducing sedimentation rates and providing adequate riparian stream cover.

3.6 SUMMARY

The degradation of the Anacostia River basin occurred over an extensive period of time. The fish and wildlife habitat in the basin has been severely affected by Federal projects and urbanization. Today, there exists what may be a unique opportunity for Federal, state, regional and local governments, and the citizens of the basin to realize substantial benefits from the restoration of the basin. The environmental restoration opportunities evaluated in the study were formulated to provide or improve the habitat requirements of the indicator species.

Anacostia River and Tributaries Feasibility Study

Draft Feasibility Report and EIS

Section 4

Plan Formulation for Feasibility Phase

The plan formulation phase for the feasibility study was undertaken as a two-step process. First, an evaluation was made of potential locations which were amenable to habitat restoration. Then, once the sites were selected based on the criteria of the Corps; the non-Federal sponsors; and the landowning agencies, alternatives were developed which would provide various levels of habitat restoration. As a result of the first step in the formulation phase, two sites in the District of Columbia, two sites in Prince George's County, and nine sites in Montgomery County were selected for detailed analyses. A range of alternatives were then developed for these sites. The details of the plan formulation process are presented in this section.

4.1 FEDERAL CONSIDERATIONS

As outlined in Section 3.3, the Federal objective for the Corps of Engineers is to restore significant fish and wildlife habitat where linkage can be established to previous Civil Works projects. As defined by Engineering Regulation (ER) 1105-2-100, significance is based on institutional, public, and technical recognition.

4.1.1 Resource Significance

The significance of the fish and wildlife resources of the Anacostia River basin is widely recognized by the institutional, public, and technical sectors, both within the Anacostia watershed and in a larger regional context as evidenced by the new emphasis on the tributary strategies to restore the Chesapeake Bay. Over the past 20 years, extensive efforts have been expended to support natural resources management and restoration plans in the Chesapeake Bay region, and specifically in the Potomac and Anacostia River basins.

From an institutional focus, the significance of wetland functions is nationally recognized, and wetlands are now protected by various executive orders and Federal, state, and local laws and regulations. In addition, wetland and stream habitats support a number of nationally significant species such as anadromous fishes and waterfowl.

The feasibility study restoration objectives for restoring wetland, bottomland and aquatic habitat are interrelated in that these three general ecosystem types are interconnected and critical to the ecological integrity of the entire watershed ecosystem.

4.1.1.a Institutional Recognition Numerous Federal laws, regulations, and executive orders recognize the significance of aquatic, bottomland, and wetland habitats and their related species. Some of these include:

Anadromous Fish Conservation Act
Emergency Wetlands Resources Act of 1986
Federal Water Pollution Control Act of 1987
Fish and Wildlife Coordination Act of 1958
Land and Water Conservation Act of 1987
Migratory Bird Conservation Act
Migratory Bird Treaty Act of 1918
National Environmental Policy Act of 1969
Rivers and Harbors Act of 1938
Water Resources Development Acts of 1976, 1986 and 1990
Watershed Protection and Flood Protection Act
Migratory Bird and Game Mammal Treaty with Mexico
Migratory Bird Treaty with Canada
Pan American Convention
Executive Order 11990 Protection of Wetlands
President's Initiative--Protecting America's Wetlands: A Fair, Flexible and Effective Approach, August 24, 1993

Being a part of the Chesapeake Bay watershed, these resources are regionally well recognized as significant. The Chesapeake Bay is the nation's largest estuary and the first to be targeted for restoration as a single ecosystem.

As shown by the Chesapeake Bay Program's statements, a greater focus is being placed on the direct restoration of the tributaries and their living resource. The goals of the Anacostia River study compliment the Chesapeake Bay Program's goals by focusing on a Bay tributary and directly supporting living resources critical to its ecosystem.

Locally, tremendous efforts have been expended to support natural resources management and restoration plans in the region and in the Anacostia River basin. The commitments by the AWRC over the last six years to restore the Anacostia River basin have been extensive. The financial commitment of the member agencies to date is more than $20 million.

There are also a broad range of regulations that reflect the significance of aquatic, bottomland and wetland ecosystems on the regional and local level. Some of these include:

Potomac Valley Compact
State of Maryland Title 8, Subtitle 05, Chapter 3
Construction on Non-Tidal Waters and Floodplains
State of Maryland Title 9 Wetlands and Riparian Rights
State of Maryland Critical Areas Law
State of Maryland Nontidal Wetlands Protection Act.

In addition, the charters, bylaws and formal policy statements from private groups also indicate intense interest from citizens. Some of the groups are listed below.

Anacostia Watershed Restoration Committee
Alliance for the Chesapeake Bay
Anacostia Watershed Society
Audubon Society
Chesapeake Bay Foundation
Chesapeake Wildlife Heritage
Ducks Unlimited, Inc.
Trout Unlimited
Wildlife Society

Both these lists demonstrate the substantial Federal, regional, local and private significance placed on the restoration, enhancement, and preservation of these types of habitats.

4.1.1.b Public Recognition The significance of the Anacostia resources as recognized by the public is demonstrated by the number and scope of public involvement programs supported by the local citizens. From activities such as planting trees and shrubs along small culverts to storm drain stenciling, reminding everyone that the drains ultimately connect with the Chesapeake Bay via the Anacostia and Potomac Rivers, the local citizens have embraced efforts to restore their waterways. The ICPRB newsletter has a circulation of over 14,000; and the Audubon Naturalist Society recently devoted an entire issue (September 1993) to the Anacostia River basin. The Anacostia Watershed Society regularly conducts clean-up campaigns to remove unsightly debris which has been deposited along the river and which contributes negatively to the public perception of the resource. All of these efforts contribute to the restoration of the Anacostia River and the recognition of this resource by the community. Public support for the restoration of the Anacostia River basin is very strong today and continues to grow each year.

4.1.1.c Technical Recognition The technical significance of wetland, bottomland, and aquatic functions are nationally recognized and are now protected by various executive orders and Federal, state, and local laws and regulations, as shown above. In addition, wetland, aquatic, and bottomland systems provide habitat for a number of nationally significant species such as anadromous fishes and waterfowl.

The scientific community has documented the importance of restoration of fish and wildlife resources in the Anacostia Basin through research conducted to develop restoration plans for Kenilworth Marsh and the river fringe wetlands. Historical documents were collected which attest to the extensive amount of wildlife that once lived in the basin. EPA recently hosted the Watershed 1993 conference which centered on the importance of a watershed approach to restoration of fish and wildlife habitat.

4.1.2 Linkage to Previous Corps Projects

One of the requirements for Corps of Engineers involvement in environmental restoration is a linkage to previous Corps of Engineers projects which affected the environment. The Corps of Engineers has a long history of involvement in the Anacostia River basin. Previous Corps projects which are described in Sections 1.10 adversely affected fish and wildlife habitat. During construction of five Civil Works projects, wetlands were filled, stream channels were permanently altered, and bottomland hardwood forests were eliminated. The loss of 17,000 fish and wildlife habitat units is directly related to the construction of Corps of Engineers projects. Section 3.1.5 describes the impacts of previous Corps projects.

4.2 NON-FEDERAL SPONSOR COORDINATION

In addition to their existing programs and projects to restore the Anacostia River basin, the six non-Federal sponsors provided 50 percent of the total feasibility study cost. They provided 34 percent of the total study cost in cash, and 16 percent as in-kind services. The sponsors also contributed information and insight from their experiences in restoring the Anacostia River basin. The in-kind services were provided by civil, hydraulic and environmental engineers, biologists, ecologists, landscape architects and community planners, many of whom hold advanced degrees in their areas of expertise.

Specific coordination efforts were undertaken during the formulation process to understand the non-Federal sponsors' constraints, concerns, and considerations. Coordination with the non-Federal sponsors was undertaken in two ways. First, general coordination was focused through the MWCOG's Anacostia Restoration Team. The full-time staff at MWCOG provided in-kind services to the feasibility study and provided assistance in site evaluation and selection, as well as technical expertise to the basinwide restoration effort.

Information from many of the other MWCOG publications, data bases and water quality models were utilized during this study. The information was used in the site selection process and in the development of restoration alternatives.

Second, individual meetings were held within each of the political jurisdictions to address sites and alternatives specific to each sponsoring agency. Meetings, site visits, and specific information exchange were all used in the coordination process with the non-Federal sponsors. An overview of the significant meetings for the District of Columbia, Prince George's County, and Montgomery County site evaluations follows.

4.2.1 District of Columbia

A series of six meetings were held between April 1992 and April 1993 to specifically develop plans to restore wetlands in the District of Columbia. These meetings were attended by NPS, MWCOG, ICPRB, DPW, DCRA, FWS, the Baltimore District, and the Corps contractor responsible for site evaluation. Each of the agencies involved contributed insight into the range of potential restoration activities based on the needs, responsibilities and experience of their agency. The primary focus of the meetings was related to Kingman Lake; however, as a result of these meetings and associated site visits, the River Fringe wetlands sites were also developed.

A series of meetings were also held regarding the beneficial use of dredged material in Kenilworth Marsh; these meetings, too, were attended by feasibility study team members. The meetings were held from the spring of 1992 through November 1993. The subject of the early meetings was related to implementation issues. These meetings were attended by NPS, EPA, DCRA, DPW, MWCOG, ICPRB, U.S. Army Corps of Engineers, Waterways Experiment Station (WES), and the Baltimore District's Operations Division. After the marsh was restored in 1993, the focus of the meetings was related to monitoring issues. The ongoing monitoring is still being conducted by NPS, ICPRB, FWS, DCRA, the Baltimore District, and the University of the District of Columbia. The valuable experience gained from the Kenilworth Marsh restoration work was utilized by team members preparing feasibility study. Some of the most important design information was related to proper marsh evaluations, sediment quality, and dredge material placement techniques.

4.2.2 Prince George's County

Coordination with the Prince George's County Department of Environmental Resources consisted of a series of meetings, field trips, and development of alternatives for environmental restoration. Separate coordination actions were taken on those projects which were addressed through the Section 1135 process. The initial site selected for restoration in Prince George's County was within the flood control project area at

Bladensburg, Maryland. After a thorough evaluation it was determined that it was infeasible to restore freshwater tidal wetlands at this site without potentially impacting the flood control project. The study team then worked with the DER to replace the site.

After development of concept designs, the plans were coordinated with M-NCPPC and DER. M-NCPPC evaluated the sites based not only on their technical feasibility but also in view of their existing master plans for the area. DER provided input in the feasibility and constructability of each project based on their extensive experience with restoration projects in the basin. After these reviews, the final plans were prepared for the feasibility report.

4.2.3 Montgomery County

Because of the number of sites which were being evaluated in Montgomery County, regularly scheduled monthly meetings were held with DEP, MWCOG and M-NCPPC. During these meetings, the process was the same as that followed with other non-Federal sponsors. Concept designs were developed by the Baltimore District and reviewed by the sponsors. The Corps of Engineers used sponsor input to revise the plans, then sponsors reviewed again before the plans were finalized.

In addition to the monthly meetings, field visits were utilized by all parties to assist in the development of each site and to evaluate the proposed plans. The stream restoration plans in Montgomery County involved a series of concept design and field evaluations. After the initial concepts were developed, the entire lengths of the streams were walked by all involved parties. During the site visits, the concept plans were evaluated, the additional habitat features were considered, and site access was reviewed. The first of these site visits involved approximately 20 participants. Two subsequent field trips were held as the concept plans were refined. DNR also reviewed the site plans and provided assistance, especially in the evaluation of the fisheries habitat proposals for the Northwest Branch and Paint Branch. During the final site evaluations, site access roads were mapped.

4.3 TYPE OF HABITAT RESTORATION CONSIDERED

4.3.1 Focus of the Formulation Process.

The primary focus of the formulation process was wetland, bottomland, and aquatic habitat restoration. All aspects of the *Six-Point Action Plan* can be included within these three general categories. Projects which restore wetlands will provide fish and/or wildlife habitat and other wetland functions such as storage of flood water; removal of sediments, nutrients, and xenobiotic substances; and addition of aquatic diversity. Stream restoration

will enhance fisheries and waterfowl habitat, and provide additional habitat for anadromous fishes. Riparian reforestation will provide bottomland habitat; it was proposed as part of the stream restoration projects where appropriate, to provide habitat and other forest buffer benefits. The sixth point of the plan, public awareness, has increased as a result of the feasibility study process.

The Baltimore District and the non-Federal sponsors evaluated active engineering measures which would restore fish and wildlife habitat to the modern historic condition. After reviewing the problems, needs and opportunities in the basin and evaluating the existing water resources conditions, a wide range of sites was evaluated to address the opportunities for environmental restoration.

As will be described later in this section, the proposed restoration sites which are located outside the previously constructed Corps of Engineers project areas were selected for two reasons. First, the existing project areas lend themselves only to partial restoration because the flood control and navigation project purposes must be maintained. Additionally, conditions that exist in the lower portion of the basin are attributable in large part to activities which occur in the upper portion of the basin. Flood waters, nutrients, chemicals, sediments, and debris all eventually move downstream and are deposited in the tidal Anacostia River or exported to the Potomac River. The wetlands constructed in the upper portion of the basin would provide wetland functions such as habitat, sediment and nutrient removal, and storage of flood waters. As such, the wetlands constructed as part of this study would accrue benefits not only at the site, but also in downstream areas.

All of the project sites recommended in the study are adjacent to existing habitat and, as such, have a synergistic relationship with the existing habitat in the watershed. The selected restoration techniques provide additional habitat diversity to the system. The sites in the upper portion of the watershed are particularly important in reducing the hydrologic impact of relatively small storm events on the downstream watershed. Research has demonstrated that the frequent insult of smaller storms is one of the primary agents of degradation to the ecosystem. The sites in the upper portion of the watershed not only provide benefits on site, but also contribute to the restoration of the downstream watershed by reducing stream velocity and its associated channel alteration and sediment impacts. Upstream habitat and hydrologic improvements benefit the entire downstream ecosystem.

4.3.2 Restoration Strategy

The Baltimore District pursued a strategy of blending the Corps of Engineers restoration policy with the goals of the AWRC. In this way, a watershed approach was assured for the recommendations of the feasibility study. Additionally, the collective experience of all of the resource agencies involved in the basin was utilized in the feasibility study effort.

Initial site consideration began during the reconnaissance study and continued into the FCSA negotiations. Part of the negotiating period for the FCSA was spent working with the non-Federal sponsors to select the site-specific areas and developing cost estimates for the various investigations to be completed in the feasibility study. It was necessary to select a set number of potential sites in order to quantify the feasibility study cost and stay within the sponsors' budget limitations. However, projects which were initially selected during the FCSA negotiations were re-evaluated during the beginning of the feasibility study. If a project was determined to be infeasible based on technical considerations, substitutions were made within the time and funding constraints of the negotiated agreement. Baltimore District study team members revised the cost estimates presented in the reconnaissance report during the FCSA negotiations to reflect new information regarding the number of sites to be included in the feasibility study. During this period, the non-Federal sponsors developed a better understanding of the Corps of Engineers water resources development planning process. This process of negotiating the FCSA (and the IPMP) lasted 12 months.

Specific restoration site selections were based both on Corps of Engineers policy, which focuses on restoration of fish and wildlife habitat, and on the priorities of the non-Federal sponsors. Tradeoffs between short and long-term impacts and long-term habitat benefits at potential sites were considered. Restoration proposals which solely address water quality (such as treatment of combined sewer overflows) were considered for the feasibility study. However, as noted in Sections 1.6 and 3.1.3, EPA and DPW have been working to eliminate combined sewer problems. Therefore, the combined sewer remediation was eliminated from further consideration. The fish and wildlife habitat restoration methods which were considered during the feasibility study would in some cases proved water quality benefits though alteration of the hydrology of a drainage area, reduction in sediment loading, or the addition of wetland filtering capacity.

Restoration sites on private property were considered during the feasibility study. In order to implement a Civil Works project, the local cost-sharing sponsor is required to provide the project land. At the present time, only one of the non-Federal sponsors will consider condemnation of private property to construct restoration projects; however, all sponsors can accept land donations or negotiate to purchase property. Because a wide range of restoration sites were possible on publicly-owned land and because private of land in the Washington metropolitan area is so costly, all restoration sites included in this study are located on publicly owned property.

4.4 FORMULATION OF LOCATIONS FOR RESTORATION - LEVEL I ANALYSIS

The identification and formulation of restoration sites was based on detailed information available in 1991 and 1992. MWCOG was funded by Prince George's County, Montgomery County, and the District of Columbia to produce three individual documents which identified an inventory of potential restoration actions for the Anacostia basin. The documents consisted of site-specific information and descriptions of potential engineering actions which could be undertaken at each location to benefit the basin. The proposed restoration actions were generally categorized as existing stormwater pond retrofits (design modifications) and new stormwater retention basins; stream restoration; fish passage; riparian reforestation; and wetland construction. The retrofit inventories for Montgomery County (MWCOG, 1988), Prince George's County (MWCOG, 1989), and the District of Columbia (MWCOG, 1991) contained specific construction projects which could theoretically be built at each site. Background information included data on drainage area, land use, imperviousness of the sub-watershed, condition of the associated stream and access, along with photographs and a conceptual sketch of the proposed restoration project.

The inventories listed above were revised and published in a summary document titled *A Blueprint for the Restoration of the Anacostia River Basin* (MWCOG, 1992). The *Blueprint* contains 441 restoration projects and, along with the detailed information in the inventories, was one of the primary sources of information used as a preliminary screening tool for site selection in the early feasibility plan formulation process. Table 4-1 shows the breakdown of the *Blueprint* projects by restoration type and sub-watershed within the Anacostia River basin.

The process of selecting sites for the feasibility study proceeded through a number of iterative steps. These steps were used to identify the effects, first of project sites and then of individual alternatives, on significant resources. Each step also followed the Environmental Quality (EQ) phases to define, inventory, assess, and appraise effects on EQ resources. Projects which did not appear to meet Corps environmental restoration criteria were screened from the potential list of candidate project sites. The most relevant of the criteria listed in Section 3.3 are that 1) the benefits of the project are improvements to fish and wildlife habitat, 2) that the habitat is for significant resources, 3) projects recommend active engineering measures rather than general land acquisition. Feasibility study schedule and funds, in-kind services, and the sponsors' and landowners' interests all played important parts in the feasibility study site selection. As stated in Sections 1.5 and 1.6, the feasibility study was designed to complement the existing restoration effort.

TABLE 4–1

SUMMARY OF ANACOSTIA BLUEPRINT PROJECTS

Sub–Watershed	Stormwater Retrofits	Stream Restoration	Fish Passage	Riparian Restoration	Wetland Creation	SHIP	Other
Sligo Creek	14	4	6	5	0	10	2
Northwest Branch	28	11	8	21	5	13	2
Northeast Branch	32	7	1	7	0	6	3
Paint Branch	21	4	1	2	1	1	1
Little Paint Branch	20	3	1	3	7	5	3
Indian Creek	9	10	7	13	5	16	1
Tidal Anacostia R.	35	21	7	17	16	21	5
Totals	159	60	31	68	34	72	17

TOTAL PROJECTS: 441

Modified from MWCOG 1992

4.4.1 Sites Eliminated From Detailed Study

Of the potential universe of 441 restoration projects, small habitat improvement projects (SHIP), general reforestation, and combined sewer projects were eliminated from consideration for the feasibility study because they did not appear to meet the Corps of Engineers' environmental restoration criteria. SHIP activities are designed to be completed through public participation. The *Blueprint* listed 72 completed SHIP projects. These projects are generally activities which do not require any construction equipment and can be finished within a few days time. They are designed to foster stewardship in the restoration effort by community groups.

The 68 reforestation projects were eliminated from consideration unless they could be combined with additional engineered solutions for a particular location. The same projects are already the focus of many existing restoration programs.

EPA has been working with District of Columbia Department of Public Works (DPW) to solve some of the 17 combined sewer, floating urban debris, and other similar problems identified in the "other" category. The elimination of these 17 projects, the 77 stormwater, stream restoration, fish passage, and wetland projects which were in progress or already completed through the efforts of state and local agencies, or were addressed in other programs, and the 90 projects proposed for private property, reduced the identified potential restoration opportunities for the feasibility study to near 120 restoration sites. During the feasibility plan formulation, these sites were then evaluated in detail prior to the final selection of sites. The 120 sites represented a reasonable range of potential restoration sites for consideration.

4.4.2 Site Selection Process - Level II Analysis

Utilizing the Corps of Engineers' environmental restoration criteria (Section 3.3) and working closely with sponsoring and landowning agencies, sites were evaluated through a review of videotapes made during a helicopter overflight, aerial photography, mapping, reports and site visits. Agencies assisted in the site selection process through sharing of data, mapping, photography and reports; site visits and suggested actions; and participation in numerous meetings.

Sites with the potential to provide the largest spatial habitat were the first areas selected. This was because one of the major components of habitat evaluation techniques is the total restoration area. Habitat evaluation techniques provide a method for describing existing habitat conditions and predicting future habitat quality and quantity. Therefore, in order to work towards the goal of restoring 17,000 habitat units, and to provide the greatest environmental return in relation to the investment, the largest potential areas were selected for initial evaluation.

4.4.3 Site Selection - Stormwater Wetlands

The 52 stormwater retrofit projects listed in Table 4-2 are presented to demonstrate the range of sites which were evaluated in the plan formulation process. These projects have been sorted in decreasing order based on the drainage area of the sub-watershed which provides water to the proposed wetland area. The cost figures were prepared by MWCOG and do not include costs for project planning, design, permitting, maintenance or land acquisition, and therefore do not reflect costs which are included in a Corps of Engineers feasibility-level cost estimate. However, these costs reflect the relative cost differences between restoration sites. It should be noted that the costs have not been updated by MWCOG to reflect project proposals that have been modified from those presented in the retrofit inventories.

Table 4-3 contains a comparison of methods to reduce non-paint source pollution in urban areas. Stormwater wetlands provide the best opportunity for improving the discharge from large drainage areas.

Based on the recommendations of DEP, DER, M-NCPPC, ICPRB and MWCOG, site visits were made to retrofit locations which could potentially provide fish and wildlife habitat benefits at the site and also assist in the restoration of stream channels below the stormwater wetlands. Based on the selection criteria and potential access to the sites, six stormwater wetland sites were selected. Smaller areas were considered to provide better habitat when the site was adjacent to existing natural systems. As an example, several of the retrofit proposals involve modifications to stormwater management facilities which are surrounded by parking lots. The potential for fish and wildlife habitat was considered to be marginal at these sites. Therefore, they were not further evaluated. Wetland sites were also evaluated to determine if the water supply was adequate to maintain the area during drought conditions. Five areas in Montgomery County and one area in Prince George's County were selected for detailed analyses.

4.4.4 Site Selection - Stream Restoration

Table 4-4 lists the 42 stream restoration opportunities identified as potential feasibility sites from the *Blueprint*. The final feasibility sites were selected based on a criterion of maximum potential for habitat improvement. All of the project sites selected for evaluation were at least 2000 feet in length, were accessible for construction equipment without significant disturbance of the riparian buffer, and had severely degraded channels.

TABLE 4–2
POTENTIAL STORMWATER WETLAND SITES

Blueprint ID No.	Site Name	Type of Retrofit	Acres Served	Ownership	Juris–diction	Cost ($) Estimate	Notes	Site Selected
DISTRICT OF COLUMBIA SITES								
HR–1	Hickey Run ED Shallow Marsh	end–of–pipe	697	UDSA	DC	1,000,000		
FD–3	Dupont #3	culvert mod to provide dry ED	416	NPS	DC	305,000		
PB–3	Pope Branch #3	extended detention shallow marsh	228	DC Rec & Park	DC	300,000		
FC–3	Ft. Chaplin Dry ED #1	modification to existing culvert	204	NPS	DC	305,000		
PB–2	Pope Branch #2	culvert mod to provide dry ED	192	DC Rec & Park	DC	100,000		
SP–2	Suitland Parkway ED SM #2	ED shallow marsh	178	DC Gov't	DC	350,000		
LA–3	Langston	offline wet ED pond	100	NPS	DC	600,000		
HR–2	Hickey Run ED Shallow marsh	end–of–pipe	90	USDA	DC	550,000		
HR–3	Hickey Run ED Shallow marsh	end–of–pipe	49		DC	500,000		
FD–1	Ft. Dupont ED Shallow marsh	extended detention shallow marsh	44	NPS	DC	470,000		
LA–4	Langston	ED pool, shallow marsh	36	USDA	DC	645,000		
WB–9	Watts Br ED Shallow Marsh 1	extended detention shallow marsh	20	NPS	DC	75,000		
WB–8	Watts Branch Dry ED #1	extended detention via ported weir	14	NPS	DC	25,000		
FL–1	Ft. Lincoln	culvert modification	8	DCHA	DC	12,500		
LA–1	Langston	gully erosion	6	USDA	DC	15,000		
MONTGOMERY COUNTY SITES								
PB–28	Stewart / April Lane	construction of 2–cell, ED marsh	220	MNCPPC	MC	600,000	Corps Feasibility Study	X
SL–9	Edgevale Rd./ Woodside Br.	off–line	216	MNCPPC	MC	200,000	Difficult access	
LPB–13	Tanglewood II	convers. of dry pond to ED wet pond	195	Mont. Co.	MC	100,000	Corps Feasibility Study	X
NWB–31	Dumont Oaks I	dry pond to ED/wetland w/ flow diversion	178	MNCPPC	MC	150,000	Difficult access	
NWB	Scott Dr.	ED dry pond	175	MNCPPC	MC	200,000	Difficult access	
PB–6	Countryside	1) fringe marsh 2) partial baseflow diversion	165	MNCPPC	MC	50,000	Planting completed	
NWB–34	Lockridge Dr.	wet pond/marsh; ported weirs in Lockridge Dr.	155	MNCPPC/DOT	MC	200,000	Corps Feasibility Study	X
PB–25	Rolling Acres	1) riser mod 2) fringe planting	138	MNCPPC	MC	150,000	Site limitations	
PB–16	Snowdens Mill II	ED wet pond with fringe marsh	120	MNCPPC	MC	80,000	Corps Feasibility Study	X
SL–11	Bennington Branch	off–line	119	MNCPPC	MC	200,000	Very difficult site	
NSWC–1		ED wet pond	100	DOD	MC	400,000	Federal property	
PB–15	Snowdens Mill I	dry pond to marsh with baseflow diversion	73	MNCPPC	MC	150,000	Corps Feasibility Study	X

TABLE 4–2
POTENTIAL STORMWATER WETLAND SITES

Blueprint ID No.	Site Name	Type of Retrofit	Acres Served	Ownership	Juris-diction	Cost ($) Estimate	Notes	Site Selected
NSWC–2		ED marsh	70	DOD	MC	300,000		
NWB–33	Burnt Mills Childs St.	marsh creation	61	MNCPPC	MC	150,000	Difficult access	
SL–12	Fairway Ave. Local Park	shrub marsh creation	53	MNCPPC	MC	100,000	MNCPPC concerns	
	Forest Grove Br Flora La Trib	create ED shallow marsh w/ check dams	44	SHA	MC	150,000		
HDL–1	Harry Diamond Lab	ED marsh	30	DOD	MC	150,000		
LPB–6	Edgewood Local Park	convers. of wet pond to ED marsh	22	MNCPPC	MC	50,000		
SL–6	Forest Glen Rd. East	shallow marsh creation	12	MNCPPC	MC	50,000		
PB–11	Oaksprings II	dry pond into ED dry pond/sand filter	8	MNCPPC	MC	30,000		
PB–18	MC Bd of Ed/E Randolph bus	construct. of underground sand filter	2	Mont. Co.	MC	100,000		
PRINCE GEORGE'S COUNTY SITES								
PB–32	Knollwood	ED dry pond construction	216	MNCPPC	PG	200,000	Site limitations	
NWB–44	Fordham St.	off–line marsh creation	156	MNCPPC	PG	300,000	Corps Feasibility Study	X
IC–9	Beltsville Com Pk	ED wet pond, fringe marsh	120	MNCPPC	PG	300,000		
LBC–5	Cheverly East	offline wet ED pond	98	Cheverly	PG	250,000		
NEB–7	Westchester Br.	ED wet pond	80	NPS	PG	350,000		
PB–40	Univesity of MD (I)	ED marsh construction	80	Univ of MD	PG			
NWB–47	Heurich Park	peat–sand filter	77	MNCPPC	PG	150,000		
LPB–31	LPB stream valley park	ED marsh creation 64	64	MNCPPC	PG	270,000		
IC–10	Beltsville Heights	ED shallow marsh	54	MNCPPC	PG	140,000		
SL–15	Fairview Avenue	ED wet pond creation w/ fringe marsh	41	PEPCO	PG	150,000		
LPB–24	Evans Farm Trail I	ED wet pond construction	32	MNCPPC	PG	240,000		
LPB–30	BARC	ED wet pond construction	28	USDA	PG	210,000		
BC–3	Montpelier no.2	ED marsh	19	MNCPPC	PG	50,000		
NEB–8	Greenbelt Rd #2	ED marsh	9	SHA	PG	50,000		
PB–43	U of MD (IV)	install sand filters	5	Univ of MD	PG	150,000		
	BARC	ED marsh		USDA	PG	300,000		

TABLE 4-3 A COMPARITIVE ASSESSMENT OF CURRENT URBAN BEST MANAGEMENT PRACTICES

URBAN BMP OPTIONS	RELIABILITY FOR POLLUTANT REMOVAL	LONGEVITY	APPLICABLE TO MOST DEVELOPMENTS	ENVIRONMENTAL CONCERNS	COMPARATIVE COSTS	SPECIAL CONSIDERATIONS
Extended Detention Ponds	Moderate, but not always reliable	20–years, but frequent clogging and short detention common	Widely applicable.	Possible stream warming and habitat destruction.	Lowest cost alternative in size range.	Recommended with design improvements and with the use of micropools and wetlands.
Wet Pond	Moderate to high	20+years	Widely applicable.	Possible stream warming, trophic shifts, habitat destruction, safety hazards, sacrifice of upstream channels.	Moderate to high compared to conventional stormwater detention.	Recommended, with careful site evaluation.
Stormwater Wetlands	Moderate to high	20+years	Space may be limiting.	Stream warming, natural wetland alteration.	Marginally higher than wet ponds.	Recommended.
Multiple Pond Systems	Moderate to high; redundancy increases reliability	20+years	Many pond Options	Selection of appropriate pond option minimizes overall environmental impact.	Most expensive pond option.	Recommended.
Infiltration Trenches	Presumed moderate	50% failure rate within five years	Highly restricted (soils, ground water, slope area, sidement input).	Slight rist of ground water contamination.	Cost–effective on smaller Rehab costs can be considerable.	Recommended with pretreatment and geotechnical evaluation.
Infiltration Basins	Presumed moderate, if working	60–100% failure within five years.	Highly restricted (see infiltration trench).	Slight risk of ground water contamination.	Construction cost moderate, but rehab cost	Not widely recommended until longevity is improved.
Porous Pavement	High (if working)	75% failure within five years.	Extremely restricted (traffic, soils, ground water, slope, area, sediment input).	Possible ground water impacts; uncontrolled runoff.	Cost–effective compared to conventional asphalt when working properly.	Recommended in highly restricted applications with careful construction and effective maintenance.
Sand Filters	Moderate to high	20+years	Applicable (for smaller developments).	Minor.	Comparatively high construction cost and frequent maintenance.	Recommended, with local demonstration.
Grassed Swales	Low to moderate.	20+years	Low density development and roads.	Minor.	Low compared to curb and gutter.	Recommended, with checkdams, as one element of a BMP system.
Filter Strips	Unreliable in urban settings.	Unknown, but may be limited	Restricted to low density areas.	Minor	Low.	Recommended as one element of a BMP system.
Water Quality Inlets	Presumed low	20+years	Small, highly impervious catchments (<2 acres).	Resuspension of hydrocarbon loadings. Disposal of hydro–carbon and toxic residuals.	High, compared to trenches and sand filters.	Not currently recommended as a primary BMP option.

Adapted from: Schueler, et. al, 1992

TABLE 4-4
STREAM RESTORATION SITES

Blueprint ID No.	Length	Nature of Project	Ownership	Jurisdiction	Cost ($) Estimate	Notes	Site Selected
DISTRICT OF COLUMBIA SITES							
HR-6	410	stream stabilization/fish hab.	USDA Arboretum	DC	100,000		
FC-1	300	stream channel stabl.	NPS	DC	75,000		
HR-11	300	stream stabilization	USDA, NPS	DC	50,000		
HR-8	175	stream stabilization	USDA Arboretum	DC	25,000		
WB-5	150	channel stabilization/fish hab.	DC Dept. of Rec.	DC	20,000		
FDA-1	100	stream channel stabl.	NPS	DC	50,000		
FC-2	100	stream channel stabl.	NPS	DC	30,000		
WB-6	75	bank stabiliz./habitat restor.	DC Dept. of Rec.	DC	20,000		
MONTGOMERY COUNTY SITES							
PR-2,3,4	11000	fish habitat	MNCPPC	MC	250,000		X
NR-1	8000	fish habitat/bank stabilization	MNCPPC	MC	300,000	restricted access	
SR-3	6000	fish habitat	MNCPPC	MC	150,000	WSSC associated construction	
NWB	4400	fish habitat improvement	MNCPPC	MC	5,000	not in Blueprint/below Randolph Rd	X
NR-2	3000	streambank stabilization	MNCPPC	MC	160,000		
SL	2600	fish habitat improvement	MNCPPC	MC	2,000	not in Blueprint/Wayne to Piney Br	X
NR-3	2200	fish habitat	MNCPPC	MC	40,000		
PR-1	2000	parallel pipe	MNCPPC	MC	150,000	Gum Springs Trib.	X
NR-4	2000	bank stabilization	MNCPPC	MC	250,000		
NSWC	1000	bank stabilization	DOD	MC	100,000		
HDL	700	fish habitat	DOD	MC	100,000		
PRINCE GEORGE'S COUNTY SITES							
NWB-41	8000	fish habitat improvement	MNCPPC	PG	200,000	and NWB-43	X
BARC	5200	fish habitat	USDA	PG	200,000		
NEB-6	4000	fish habitat	NPS	PG	250,000		
LPB-20	4000	fish habitat improvement	SHA	PG	250,000		
NEB-10	3000	fish habitat improvement	MNCPPC	PG	150,000		
LPB-29	2500	fish habitat	USDA	PG	150,000		
NEB-5	2000	bank stabil./fish habitat imp.	NPS	PG	80,000		
NEB-8	2000	fish habitat improvement	MNCPPC	PG	120,000		
NWB-50	2000	fish habitat improvement	MNCPPC	PG	100,000		
LBC-24	2000	streambank stabilization	Board of Ed.	PG			
IC-17	2000	fish habitat improvement	MNCPPC	PG	150,000		
NWB-49	1500	channel stabilization	MNCPPC	PG	90,000		
LBC-26	1500	streambank stabilization	MNCPPC	PG	60,000		
IC-16	1500	fish habitat improvement	MNCPPC	PG	150,000		
LBC-19	1500	fish habitat improvement	MNCPPC	PG	100,000		
LPB-28	1400	bank stabiliz.	MNCPPC	PG	125,000		
NWB-45	1000	bank stabili	MNCPPC	PG	100,000		
PB-43	1000	fish habitat	University of MD	PG	80,000		
LBC-13	1000	fish habitat improvement	MNCPPC	PG	60,000		
LBC-30	700	channel stabilization	MNCPPC	PG	25,000		
NWB-48	500	channel stabilization	MNCPPC	PG	30,000		
LBC-17	500	channel stabilization/fish hab.	MNCPPC	PG	25,000		
LBC-4		channel stabilization	MNCPPC	PG	25,000		

Based on the recommendations of DNR, DEP, DER, M-NCPPC, ICPRB and MWCOG, site visits were made to 10 reaches of stream which were considered to have especially deteriorated conditions. During the site visits, habitat conditions of the stream reaches were evaluated and potential habitat restoration measures were considered. The most evident features of the selected stream reaches were wide, shallow areas with eroding banks, unstable channels and large sediment bars. Many of the stream sites were in natural areas with no existing access road system. Site access was an important consideration because the potential loss of habitat associated with moving heavy equipment to the construction site could offset the habitat benefits of any proposed work. Based on maximizing habitat benefits and access to the area, four stream restoration sites were selected for Montgomery County and one site was selected for Prince George's County.

4.4.5 Site Selection - Tidal and Non-Tidal Wetlands

Table 4-5 contains 21 locations which were potential wetland restoration or creation sites. The majority of these areas are in the tidal portion of the basin. The table shows one of the more prominent difficulties in formulating wetland restoration sites: there are only a very limited number of sizable opportunities for restoration of wetlands remaining in the basin. Most of these areas are in the District of Columbia.

The two largest wetland sites were selected for work within the District of Columbia. Kingman Lake and the River Fringe wetlands represented the largest opportunities, at 45 and 30 acres, respectively. Other sites consisting of the deltas associated with the stormwater outfalls were initially considered. These sites were later eliminated due to the sediment quality issues in that portion of the Anacostia River located below the Conrail bridge. No other areas were evaluated within the District of Columbia.

4.5 DESCRIPTION OF SITES SELECTED FOR DEVELOPMENT OF ALTERNATIVES

The 13 sites selected for development of alternatives are all located on public property and are closely associated with existing habitat. These sites represent the largest potential number of habitat units which could be formulated within the limitations of study funds (1.5.2), sponsors' and cooperating landowning agencies' missions (1.8), Federal objectives (3.2), planning objectives and constraints (3.3), and site limitations (size, associated habitat, water supply, access, construction impacts, and Federal, state, and local environmental regulations (4.4). The selected sites also represent the diversity of habitats which were impacted by previous Corps activities.

TABLE 4-5

WETLAND CREATION SITES

Blueprint ID No.	Site Name	Type of Wetland	Acres Served	Ownership	Juris-diction	Cost ($) Estimate	Notes	Site Selected
DISTRICT OF COLUMBIA SITES								
AR-3	Kingman Lake	emergent	45	NPS	DC	1,750,000	COE Anacostia Feasibility Study	X
	River Fringe	river fringe	30	NPS	DC	1,000,000	COE Anacostia Feasibility Study	X
AR-13	WC #7	tidal embayment	1.5	NPS	DC	25,000	excavate and plant	
AR-14	WC #8	river fringe	0.4	NPS	DC	20,000	river fringe under bridge	
AR-8	WC #5	island fringe	0.3	NPS	DC	50,000	experimental island fringe system	
NEB-8	Yaeger Prop.	emergent	0.3	NPS	DC	50,000	ICPRB lead agency	
LA-5	Langston Wetland #1	shallow marsh	0.3	NPS	DC	15,000		
AR-16	WC #9	seawall	0.2	NPS	DC	10,000	excavate & plant behind seawall	
AR-12	WC #6	seawall	0.2	NPS	DC	10,000	modify & excavate behind seawall	
AR-5	WC #3	emergent tidal	0.2	NPS	DC	30,000	adjacent to railroad bridge	
AR-17	WC #10	seawall	0.1	NPS	DC	7,500	excavate & plant behind seawall	
FD-2	Wetland Creation #1	shallow marsh		NPS	DC	25,000	expand, enhance and existing	
MONTGOMERY COUNTY SITES								
W-1	Trolley Museum	emergent	2	MNCPPC	MC	250,000	3 wetland creation areas	
W-2	Old Randolph Road	emergent	1	MNCPPC	MC	250,000		
PRINCE GEORGE'S COUNTY SITES								
NEB-11	An. River Park	E/SS/O	4	MNCPPC	PG	400,000		
	Calvert Rd. #1	emergent	2.7	MNCPPC	PG	150,000		
	Calvert Rd #2	emergent	2	MNCPPC	PG			
IC-3	Muirkirk	E/O	2	MNCPPC	PG			
NEB-14A	A. River Park NE Br.	emergent	1	MNCPPC	PG	600,000		
NEB-14	An River Park II	SS/O	1	MNCPPC	PG	40,000		
USDA	BARC	emergent/SS	1	USDA	PG	150,000		

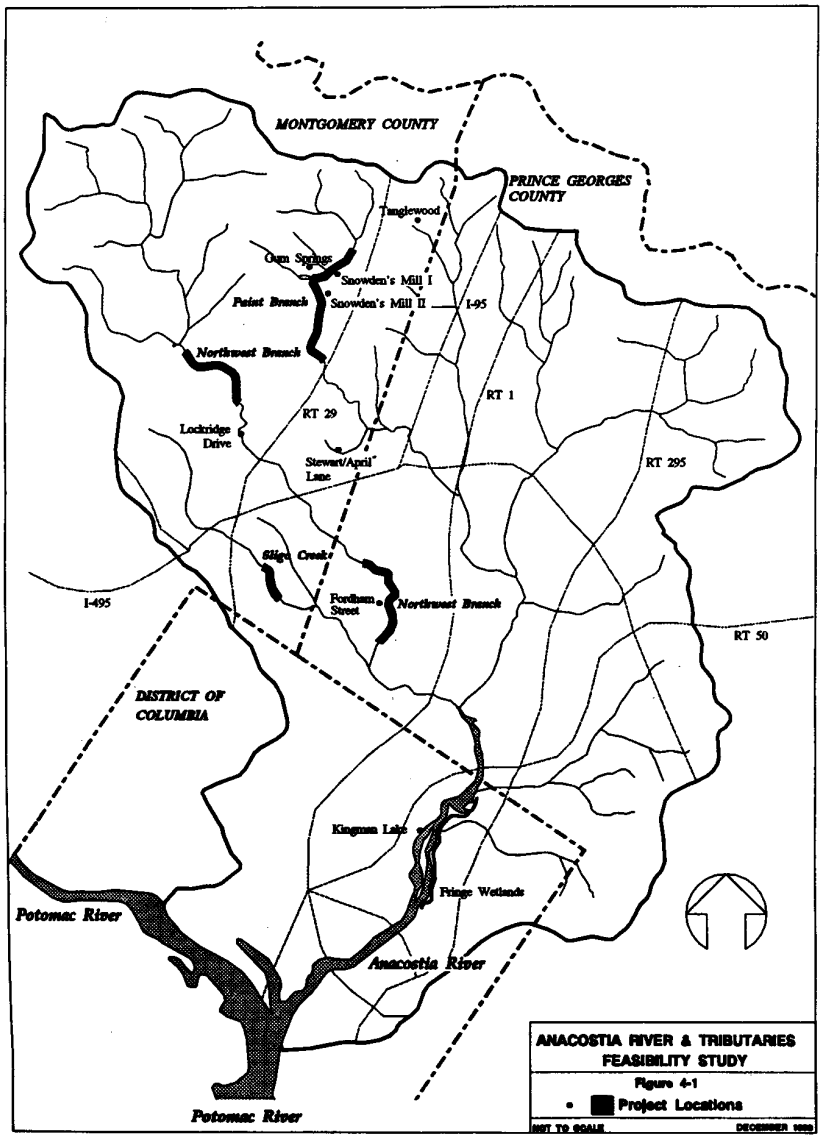
The 13 sites were selected after consultation with the landowning and sponsoring agencies, and review of the proposals included in the detailed site inventories. Site visits were made to over 100 areas where restoration actions were proposed. The selected sites represent the largest range of implementable projects which could be designed within the financial contribution of the potential LCA cooperating agencies.

Additional site information is contained in Section 5 and in Appendix A. Starting in the lower basin, the District of Columbia site descriptions are followed by those in Prince George's and Montgomery Counties. Figure 4-1 shows the location of the feasibility study restoration sites. These sites represented the largest number of potential restoration sites which could be evaluated in detail within the feasibility study requirements established by the Water Resources Development Act of 1986 (PL 99-662) and the financial contributions of the feasibility study sponsors.

4.5.1 District of Columbia

The goal within the District of Columbia was to restore fish and wildlife habitat by increasing structure and diversity. This could be accomplished through creation of emergent, scrub-shrub, and forested wetlands; expansion and improvement of the existing forest buffer; and the addition of physical structures to attract and maintain wildlife in and around the tidal Anacostia River. The two sites considered within the District of Columbia are owned by the National Park Service and are part of Anacostia Park.

4.5.1.a Kingman Lake. Kingman Lake is located in Anacostia Park along the western edge of the Anacostia River in the vicinity of Robert F. Kennedy (RFK) Memorial Stadium. The study area included all open water areas and, above Benning Road, the area landward of the mean high tide for a distance of approximately 80 feet. The lake measures approximately 110 acres and is separated from the Anacostia River by the 94-acre island known as the Burnham Barrier or Kingman Island. Kingman Lake is hydraulically connected to the Anacostia River by two inlets located at the northern and southern ends of the lake. The upper section of the lake (north of Benning Road) is characterized by a dendritic tidal gut system, and during low tide, is primarily exposed mud flats. The lower section of the lake has an average depth of about three feet at low tide, has fewer mud flats, and lacks a tidal gut system. The majority of the water enters the lake during tidal events through the southern inlet; only a minor amount of water flows into the lake through the northern connection. There are three islands in the upper lake and one island in the lower lake. The area was evaluated for both wetland and bottomland habitat construction opportunities.


MONTGOMERY COUNTY
PRINCE GEORGES COUNTY
Tanglewood
Gum Springs
Snowden's Mill I
Paint Branch
Snowden's Mill II
I-95
Northwest Branch
RT 1
RT 29
Lockridge Drive
Stewart/April Lane
RT 295
Sligo Creek
I-495
Fordham Street
Northwest Branch
RT 50
DISTRICT OF COLUMBIA
Kingman Lake
Fringe Wetlands
Potomac River
Anacostia River
Potomac River
ANACOSTIA RIVER & TRIBUTARIES
FEASIBILITY STUDY
Figure 4-1
Project Locations
NOT TO SCALE
DECEMBER 1999

4.5.1.b River Fringe Wetlands. From the confluence with the Potomac River to the District of Columbia boundary at the New York Avenue bridge, the Anacostia River is bounded by concrete, stone-faced seawalls. These walls were constructed by the Corps in the 1920's and 1930's as part of the design for Anacostia Park. The seawalls confine the river and limit its width to approximately 300 feet during normal high and low tides. The channel has been maintained since the 1950's.

The tidal range in the river is approximately 2.9 feet. In many areas of the river above the Conrail bridge, the thalweg is located near the center of the river, and a band of shallow sediments, which can be more than 100 feet in width, borders both sides of the channel. During the twice-daily high-tide cycle, these areas are inundated to a depth of two feet or more. During the low-tide cycle, the unvegetated mud flats are exposed. Potential fringe wetland areas were inventoried and five locations along the river between New York Avenue and the Conrail bridge were evaluated in detail for wetland construction.

4.5.2 Prince George's County

The goal in Prince George's County was to restore fish and wildlife habitat through the construction of wetland and aquatic habitat. A stormwater wetland system was considered at Fordham Street to create wetland habitat and improve downstream water quality. Aquatic habitat restoration techniques for the Northwest Branch included an evaluation of the stream meander geometry, selected bank stabilization utilizing bioengineering techniques, removal and/or shaping of channel bars, and installation of fisheries habitat structures. Augmentation of existing riparian vegetation was considered as a means of extending bottomland habitat. After completing the investigations described in Sections 2.9.1 and 4.2.2, the remaining funds were utilized in the lower Northwest Branch area. Other areas were considered; however, the areas were selected due to the severity of the degradation and the proximity to other DER restoration projects.

4.5.2.a Fordham Street Wetland. The Fordham Street wetland site is located within the Northwest Branch Stream Valley Park immediately east of the intersection of Fordham Street and West Park Drive. The site is one mile west of the University of Maryland. The property is within 500 feet of the Northwest Branch and is owned by the M-NCPPC. The 222-acre drainage area has an estimated base flow of 0.3 cubic feet per second (cfs) and is 36-percent impervious to rainfall.

A stormwater wetland was evaluated for the site. The site could be excavated to provide the necessary storage for an off-line stormwater wetland (a wetland that is built outside of the existing stream channel). An instream diversion structure would force all or part of the stream flow into the excavated wetland. The small adjacent stream would provide the required base flow during dry periods.

4.5.2.b Northwest Branch Stream Restoration. The study area encompasses the Northwest Branch of the Anacostia River and the associated riparian areas from the approximate vicinity of the PEPCO power lines down to the East-West Highway bridge. The site is located above and below University Boulevard and encompasses the Fordham Street wetland site. The study area is classified as Use IV (Recreational Trout Waters) by MDE and has a drainage area of approximately 35 square miles. The entire 8,000-foot reach of stream is located within the Northwest Branch Stream Valley Park and is owned by M-NCPPC.

This stream reach has been severely degraded, resulting in the loss of fish and wildlife habitat. Most relatively small rainfall events cause a significant increase in streamflow. Substantial quantities of sediment are added to the system by scouring of the highly erodible soils. The tree canopy has been lost in many areas where the channel widened to contain stormflows. Three major blowouts of the stream occur within the study area. Eroding streambanks and the associated tree loss, and the formation of mid-channel bars due to diminished sediment transport, not only reduce the habitat value within each individual area, but also contribute to habitat degradation of downstream reaches. The area was evaluated for stream habitat restoration.

4.5.3 Montgomery County

The goal in Montgomery County was to restore fish and wildlife habitat through the construction of stormwater wetland, bottomland, and aquatic habitat. Stormwater wetland systems were considered at five sites (Stewart/April Lane, Lockridge Drive, Snowden's Mill I, Snowden's Mill II, and Tanglewood) to create wetland habitat, improve downstream water quality, and reduce storm discharge. With the exception of the Tanglewood site, all of the stormwater wetland sites were located in Use III or Use IV watersheds. Within these watersheds, special consideration for thermal impacts as a result of ponding water was necessary. Galli (1990) documented temperature issues related to stormwater wetlands. Concrete and rip rap channels, runoff from heated pavement and ponded water can cause an increase in the temperature of the receiving stream.

Baseflow bypass diversion system alternatives were evaluated for all of the stormwater wetlands. Baseflow diversions capture a portion of the non-storm flow into the wetland system and pipe it directly to the outfall. This prevents heating of the base flow and helps to offset the thermal impacts of the stormwater wetland.

New impoundment structures are necessary at Stewart/April Lane and Lockridge Drive. The remaining stormwater wetland sites are existing impoundments which could be redesigned for additional habitat. Both of these sites are located in the piedmont plateau in the vicinity of the fall line. Off-line wetland alternatives for the sites were not available

due to the site topography. Both of these sites have been previously disturbed due to utility construction.

Aquatic habitat restoration techniques for Paint Branch, Sligo Creek, and Northwest Branch included an evaluation of the stream meander geometry, selected bank stabilization utilizing bioengineering techniques, removal and/or shaping of channel bars, and installation of fisheries habitat structures. At Gum Springs, aquatic habitat restoration was evaluated through the use of a bypass pipe. Restoration of bottomland habitat was considered through augmentation of existing riparian vegetation. The selected sites and the proposed restoration work are described below. Site names were selected by the non-Federal sponsors and usually were taken from the name of the local subdivision or the street closest to the site.

4.5.3.a Stewart/April Lane. The site is located 4000 feet due east of the intersection of Route 29 and New Hampshire Avenue. The area is a partially forested stream valley which is part of the M-NCPPC park system. The watershed drains to Paint Branch. The 203-acre watershed is approximately 46-percent impervious to rainfall. The base flow is approximately 0.2 cfs. The watershed is highly developed with parking lots, apartments, and shopping centers.

The site was evaluated for construction of wetland areas and stream habitat improvements to Paint Branch. The proposed project is a wetland construction action which would also function to control water quantity and quality. Wetland habitat would be provided at the site and water quality would be improved downstream of the site. A base flow diversion pipe was also considered to offset potential thermal impacts of the wetland.

4.5.3.b Lockridge Drive. The site is located approximately 4,000 feet north of the intersection of University Boulevard and Route 29. The existing site is in a wooded portion of the M-NCPPC stream valley park. The base flow is approximately 0.2 cfs. The entire 153-acre watershed was developed as a suburban community in the 1950's and is 38-percent impervious.

Within the site area, streambank erosion has severely degraded the aquatic habitat and is a major source of sediment to the Northwest Branch. The site was evaluated for wetland construction which would also function to control water quantity and quality in downstream reaches. A base flow diversion pipe was also considered to offset potential thermal impacts of the wetland.

4.5.3.c Snowden's Mill I. This site is located approximately 3,500 feet northwest of the intersection of East Randolph Road and Route 29. The site is adjacent to Paint Branch Park and is owned by M-NCPPC. The site is an existing stormwater management pond

which controls runoff from a 91-acre suburban development which is approximately 26-percent impervious.

The site is located in the Paint Branch watershed which is classified by MDE as Use III, (naturally reproducing trout) water. Baseflow is estimated to be 0.15 cfs. The water control structure is designed to store and slowly release storm events up to the two-year level. The existing embankment was built to U.S. Department of Agriculture Soil Conservation Service (SCS) standards. The site, presently maintained in turf grass, was evaluated for wetland creation, reforestation, and improved water quality control. A base flow diversion pipe to reduce the present thermal loading which occurs as water flows through the existing dry pond was also considered for the site. The bypass would also offset potential thermal impacts of the wetland.

4.5.3.d Snowden's Mill II. This site is also adjacent to the Paint Branch Stream Valley Park, is owned by M-NCPPC, and is within 600 feet of the Snowden's Mill I site. The site is an existing stormwater management pond which controls runoff from a 120-acre suburban development which is approximately 43 percent impervious.

The site is located in the Paint Branch watershed which is classified by MDE as Use III (naturally reproducing trout) water. Base flow is estimated to be 0.2 cfs. The water control structure is designed to store and slowly release storm events up to the two-year level. The existing embankment was built to SCS standards. The site, presently maintained in turf grass, was evaluated for wetland creation, reforestation and improved water quality control. A base flow diversion pipe to reduce the present thermal loading which occurs as water flows through the existing dry pond was also considered for the site. The bypass would also offset potential thermal impacts of the wetland.

4.5.3.e Tanglewood. The site is located approximately 3,200 feet east of the intersection of Fairland Road and Route 29. This area is contained within M-NCPPC's Tanglewood Park. The 54-acre watershed is approximately 41 percent impervious. The existing site contains a dry stormwater management facility which does not pond the estimated 0.3 cfs base flow.

The site is located in the Little Paint Branch watershed, which is classified by MDE as Use I, Contact Recreation waters. The site, presently maintained in turf grass, was evaluated for wetland creation and improved water quality control. Reforestation of the slopes surrounding the site would provide additional habitat. The existing embankment was built to SCS standards.

4.5.3.f Gum Springs. The site is located approximately 650 feet southeast of the end of Twig Road in M-NCPPC's Upper Paint Branch Park in the vicinity of the intersection of Good Hope Road and Briggs Chaney Road. Gum Springs is a tributary of Paint Branch

(Use III) which supports a naturally reproducing brown trout (Salmo trutta) fishery. The site-specific goals were to decrease thermal loading and to reduce storm flows in Gum Springs in order to restore brown trout spawning habitat.

Two stormwater management ponds were built on the Oak Springs tributary to Gum Springs in conjunction with suburban development. The Oak Springs Tributary has a 153-acre drainage area. Gum Springs, which has historically contributed about 50 percent of the trout population to the Paint Branch system, has been monitored by the Maryland DNR for the past 12 years to evaluate trout reproduction. DNR has documented a dramatic decline in trout reproduction in the area below the confluence since the development of the Oak Springs catchment area. Stream restoration through the use of a bypass pipe system to divert stormflows around the lower portion of Gum Springs was evaluated for the site in order to restore the trout spawning habitat.

4.5.3.g Sligo Creek. The site is located in the vicinity of Blair High School within M-NCPPC's Sligo Creek Park. The stream reach evaluated for restoration is bounded on the upstream end by Wayne Avenue and on the downstream end by Piney Branch Road. Stream restoration was considered along this reach utilizing the previously described techniques. The study area was 2,500 feet in length and has a drainage area of 6.3 square miles.

The Montgomery County DEP has constructed four major retrofit projects in the upper Sligo Creek watershed to help restore the system through stormwater containment and treatment with urban best management practices (BMP's), and stream modifications.

4.5.3.h Paint Branch. Stream restoration is being proposed for a 11,200-foot portion of Paint Branch between Fairland Road and Route 29. The site is located in M-NCPPC's Upper Paint Branch and Paint Branch Stream Valley Parks. The Snowden's Mill stormwater wetlands drain to this part of Paint Branch. The drainage area above the stream restoration site is approximately 11 square miles.

The existing stream channel is degraded in much the same way as other stream project sites. Severe erosion, undercutting of trees, and geomorphological changes to the channel have resulted in degraded fisheries habitat. The Paint Branch site was evaluated for the restoration of the stream through the use of selected bio-engineering techniques. The re-establishment of an abandoned stream channel was also considered.

4.5.3.i Northwest Branch. The selected portion of the Northwest Branch is located in the vicinity of Randolph Road in M-NCPPC's Northwest Branch Stream Valley Park. The upstream area begins at the old Randolph Road bridge and extends downstream for 3,700 feet. The drainage area is approximately 23 square miles. This portion is classified as Use

IV trout waters. The Montgomery County section of the Northwest Branch is located approximately six miles above the Prince George's County Northwest Branch site.

This section of the stream has severe erosion problems which have resulted in the formation of a wide, shallow stream channel. In many areas the forest canopy has been lost due to undercutting of the streambank vegetation. Bar formation throughout this reach is evidence that the sediment load is high and that sediment transport is out of balance. The proposed modifications were combinations of streambank protection and channel modification to restore the channel geometry. The restoration work considered was bank protection, installation of instream structures and augmentation of existing bottomland habitat.

4.6 FISH AND WILDLIFE HABITAT RESTORATION MEASURES

The Anacostia feasibility study evaluated three general types of actions to achieve the wetland, aquatic, and bottomland habitat restoration goals, which will restore the habitats of the indicator species. The actions include (1) wetland construction, (2) stream restoration, and (3) stormwater wetland construction.

Habitat, simply stated, is the place where plants and animals live, feed, shelter, and reproduce. Habitat is comprised of many components including water quantity, water quality, vegetative composition, vegetative structure, physical structure, associated species, and adjacent habitats. The habitat requirements of a species change through its life history, and it may require various habitat types to exist. The feasibility study focused on three general habitat types: (1) wetland, (2) bottomland, and (3) aquatic. There is a great deal of scientific recognition of the significance of the general habitat categories and the specific habitats discussed below on a national, regional, and local scale.

Wetland construction has the direct effect of restoring wetland and aquatic habitats through water quality improvements. The wetland construction proposed in this study entails the building of tidal freshwater wetlands in the District of Columbia. Stream restoration has the effect both of restoring aquatic habitat through improvements to physical structures and water quality (increased shading - decreased erosion) and also of restoring bottomland habitat through reforestation. Stormwater wetlands restore aquatic habitat through improvements to water quantity and water quality, and directly create wetland habitat. In some cases, bottomland habitat can also be established at the site.

4.6.1 Wetland Habitat Restoration

Wetlands are transitional areas between aquatic and upland ecosystems, performing unique functions not found in the adjacent ecosystems. Some of the functions include providing

wildlife habitat, flood-control, ground water recharge, erosion protection, sediment and toxin removal, nutrient uptake, food chain support, and primary production.

Wetlands primarily consist of three interrelated components: hydrology, vegetation, and substrate. Hydrology is the driving force of a wetland system. Water depth, duration and frequency of inundation and seasonal fluctuation, determine the types of plants and wildlife that will inhabit the wetland system. The type of vegetation within the system is a result of the hydrological regime and substrate type. Vegetation is the primary component for wetland habitat and provides sources of food, cover, and reproductive areas.

This report focuses on two types of wetland systems, (1) tidal freshwater emergent wetlands and (2) urban freshwater emergent stormwater wetlands.

Tidal freshwater wetlands are a distinctive type of ecosystem located upstream from tidal saline wetlands (salt marshes) and downstream from non-tidal freshwater wetlands. They are characterized by (1) near freshwater conditions (average annual salinity of 0.5 ppt or below), (2) plant and animal associations (communities) dominated by freshwater species, and (3) a daily, lunar tidal fluctuation.

In the U.S. Fish and Wildlife Service's classification system (Cowardin, et al., 1979), tidal freshwater wetlands are classified as either (1) palustrine, emergent wetland, persistent and nonpersistent, or (2) riverine, emergent wetland, nonpersistent. The classification depends on the wetland's position as related to the river. The most extensive development of tidal freshwater marshes occurs on the east coast between southern New England and Georgia. Many of these systems are adjacent to urbanized areas and have been degraded.

A number of species of freshwater, estuarine, marine, and anadromous fishes use tidal freshwater areas at some stage in their life histories. This results in extensive sport and commercial fisheries in most tidal freshwater rivers. The Potomac River, for example, supports a commercial fishery worth millions of dollars. A relatively small portion of the Potomac catch actually comes from tidal freshwater. However, the leading eight species caught spend some part of their life cycles in tidal freshwater even though they may be captured farther downstream. (Odum, et al., 1984).

As mentioned previously, the lower portion of the Anacostia River historically supported a very productive tidal freshwater wetland ecosystem. Human impacts, including various Corps projects, have degraded the ecosystem to the extent that tidal emergent wetlands have been nearly extirpated from the basin. A great deal of attention recently has been given to a general category of wetland ecosystems called "urban wetlands". Urban wetlands are simply wetland systems that are in an urban landscape. These wetlands vary considerably in size, shape, origin, and type. However, the basic type of urban wetland in this study is palustrine emergent wetland.

Urban wetlands are, generally, not considered pristine and are under continual stress from their urban landscapes. However, because these areas are scarce within the urban landscape, their value is increased. Urban wetlands provide an oasis for select wildlife and perform water quality and quantity functions; thus, they improve the aquatic habitat in their receiving waterbodies.

The modification of existing and construction of new stormwater wetlands (urban wetlands) at various locations in the Anacostia watershed would provide additional habitat at the sites and improve aquatic habitat downstream. Reductions in water quantity and improvements in water quality are key components in restoration of the Anacostia basin. Stormwater wetlands will reduce stormflow, sediments, nutrients, and contaminants prior to their reaching the tidal river, in much the same manner that the historic wetlands functioned. These stormwater wetlands are also tied into the park/greenway corridors along most of the Anacostia River tributaries. This connection to the greenway allows the stormwater wetlands to have added habitat value.

4.6.2 Bottomland Habitat

Bottomlands are low-lying areas along rivers and streams (Mitsch and Gossenlink, 1986). For the purpose of this report, the term *bottomland* includes all the forested areas, both upland and wetland, along the stream corridors which occupy the historical floodplain. Ecologists generally perceive bottomland forests as being different from adjacent forests (Mitsch and Gossenlink, 1986; Yanosky, 1982). Fluvial geomorphic processes are the dominant environmental factors influencing bottomlands (Hupp and Osterkamp, 1984; Hupp, 1982, 1983; Yanosky, 1982; Gosselink and Lee, 1989). Flood protection projects drastically alter the fluvial geomorphic processes of a stream, thus greatly effect the bottomland ecosystem.

Bottomlands provide unique productive habitat along water corridors. Their presence also creates aquatic habitat in the adjacent streams and rivers and reduces bank erosion. Bottomlands additionally function to reduce non-point source pollution entering the aquatic systems.

The forested stream corridor not only shades the streams, but also provides opportunities for wildlife movement. Selected areas along the stream sections where tree cover is lacking or sparse were evaluated for reforestation. Reforestation areas were evaluated in conjunction with other wetland and aquatic restoration opportunities.

4.6.3. Aquatic Habitat Restoration

Aquatic habitat consists primarily of three inter-related components: physical features (biotic and abiotic structures, geomorphology), hydrology (quantity, frequency, velocity, etc.), and water quality. Physical features include biotic structures such as plants, abiotic structures such as gravel and boulders, and stream geomorphology such as channel width and depth. Physical features are crucial to aquatic habitat's providing cover and living substrates. Physical features directly affect the systems hydrology. Water quality is a key component to aquatic habitat. Water quality includes many parameters such as temperature, dissolved oxygen, suspended solids, nutrients, and other physiochemical properties.

The stream restoration approach taken for this study was one of careful evaluation of the existing conditions and development of proposals to improve habitat within the particular reach under study. Because the study areas were all publicly owned parkland, consideration was always given to the most non-intrusive techniques possible. A two-step process was used to restore stream habitat. First, severely eroding banks which contribute to the sediment and debris load of the system were evaluated for protection. Second, once the system was stabilized, proposals were evaluated for improving the instream habitat.

A root wad is a root fan and lower trunk of dead tree which provide a means for armoring eroding banks. The trunk portion of the root wad is anchored into the bank using footer boulders and logs, and the root fan is oriented in an upstream angle facing into the stream flow. The root fan also provides instream habitat. Bank protection with root wads requires the installation of a series of overlapping trunks. The area is additionally stabilized with plantings.

Imbricated riprap is a bank stabilization technique which consist of large stones of specific sizes which are individually placed to provide gaps at and below the water level. The gaps provide habitat for fish and other aquatic organisms. Imbricated riprap is stacked vertically and can be used on steep to vertical stream banks for stabilization.

Stone toe protection with revegetation (bioengineering) entails placing rock at the base of the bank to extend above the mean water line. The bank is often cut back and planted with selected vegetation. The plant material takes root and provides subsurface anchoring and a surface vegetation layer which acts as a protective layer, reducing flow velocity and erosion of the bank during storm flows.

After the streambanks are stabilized, defectors, boulder fields, rock fields, rock vortex weirs and vegetation can be used to provide instream habitat. The techniques are not completely interchangeable and are usually used in combination with one another.

Deflectors are instream structures which consist of a triangular-shaped grouping of stone which extends 6 to 12 inches above the base flow of the stream. Defectors must be very carefully placed in order to avoid undesirable erosion of banks. They must be constructed in low profile with few protrusions to avoid trapping drifting debris. Although a very useful technique for increasing meandering and pool/riffle ratios with minimal man-made perturbations, defectors have been specified conservatively in this plan because of the instability of the alluvium composing the stream banks and high and flashy storm flows in these streams.

Boulders are used to create mid-channel pockets for feeding sites and to augment existing pool/riffle habitat. The turbulence associated with the boulders has a scouring effect and often flushes out fine material embedded in coarse substrate (gravel). Boulders are ultimately sized and placed in harmony with the stream's flow regimes.

Rock vortex weir structures consist of a semi-circle of boulders that are tied into each bank with the open side of the semi-circle facing downstream. The boulders are spaced at a distance of approximately one- to one-and-a-half of their diameter. The weirs act to concentrate flow and to scour pools. Placed in a series, they help to increase the riffle ratio in long stretches of slack water.

Overhanging bank vegetation is critical for providing cover for juvenile and adult fish. In many parts of the study area, herbaceous and shrub vegetation on the banks is sparse to totally lacking due to the steep vertical bank faces and the erosive velocity of storm flows. Increasing vegetation along the banks can dramatically increase habitat quality as well as reduce sediment inputs to the system from bank erosion.

4.7 ALTERNATIVES CONSIDERED FOR THE SELECTED SITES

As a result of the preliminary formulation phase, 13 sites were selected for development of alternatives. These sites were located throughout the basin and were selected for their potential to restore habitat for significant resources, their location adjacent to existing wildlife habitat, and their acceptability to the non-federal sponsor and the agency with title to the site.

A wide range of alternatives, described in Section 5, were developed for each of the sites considered in the feasibility study. However, the alternatives considered varied among sites. The 13 sites considered during the feasibility study were grouped for the purpose of alternatives development into wetland construction, stream restoration and stormwater wetland alternatives.

4.7.1 Wetland Construction Alternatives

Two wetland restoration sites were selected for restoration, Kingman Lake and the River Fringe wetlands. For Kingman Lake, alternatives were developed based on a combination of two considerations. First, since the primary problem was the length of time that the wetland soil was covered with water, one alternative was to limit the amount of water entering the lake with a water control structure. The second consideration was the total acres of wetlands which were to be constructed for Kingman Lake. By combining these two considerations, ten alternatives were developed.

Alternatives for the River Fringe wetlands were significantly different in that the alternatives were various combinations of the five selected fringe mud flat areas identified by the study team. The various combination of the 5 sites resulted in 31 alternatives.

4.7.2 Stream Restoration Alternatives

The stream restoration alternatives were identified according to the various methods of providing bank stabilization within the affected reach. The three methods considered were root wads, imbricated riprap (stone), and stone toe protection. The selected stream restoration sites are Northwest Branch (Prince George's County), Sligo Creek, Paint Branch, and Northwest Branch (Montgomery County).

Alternatives for four of the stream restoration sites were developed depending on these three bank stabilization techniques. Choice of the particular bank protection technique proposed for each stream reach required a detailed evaluation of the existing bank vegetation which would be impacted by the construction technique. In cases where mature canopy trees existed, imbricated rip-rap was considered to have less of an impact on the existing habitat than the other two methods. Use of instream habitat structures such as wing deflectors, boulder fields, and rock vortex weirs were similar for all of the alternatives.

At the final stream restoration site, Gum Springs, a parallel pipe bypass system was considered to protect the trout spawning area. Alternatives were developed related to the location of the inflow and discharge of the pipe. Therefore, the alternatives all related to the length of the bypass pipe.

4.7.3 Stormwater Wetland Alternatives

Stormwater wetland alternatives at the fives sites were developed around three design aspects. The design considerations were modifications to the outfall (riser) structure, aquatic and terrestrial plantings, and a base flow bypass pipe. The selected sites were Stewart/April Lane, Lockridge Drive, Snowden's Mill I and II, and Tanglewood.

Various appropriate combinations of these three design considerations were formulated for each site. Modifications to the risers at the existing ponds would be necessary for water quality improvements and for wetland development. Landscaping for habitat could be installed, or the habitat could become established naturally over time. The base flow bypass pipe was considered to be especially important in the Use III and IV watersheds where temperature of stormwater ponds could have a detrimental impact on water temperature in the receiving stream.

One of the habitat benefits of stormwater wetlands is the improvement in the water quality of the releases from the stormwater wetland system. Extended detention (ED) control is a term that means that the stormwater runoff from a drainage area is stored and then released slowly over a period of 24 hours. The extended detention time improves water quality by allowing sediment and the associated pollutants to settle out of the runoff. An additional benefit is the reduction in the peak discharge of the drainage area. Typically the runoff volume controlled by the ED storage has a return period that ranges from 4 to 12 months. This means that the ED storage portion of the stormwater wetland would, on average, be filled from one to three times per year.

Stormwater wetlands can also provide peak discharge control (in addition to ED control) to regulate the timing of the discharged to the receiving stream. Depending on the site conditions and the location of the drainage area, peak discharge control can be designed for storms with a 2-year or a 10-year return period. This means that the stormwater wetland can hold water from a storm that has a 50 percent probability (2-year storm) or a 10 percent probability (10-year storm) of occurring each year. In the Anacostia basin, the 2-year event is approximately 3.2 inches of rainfall and the 10-year event is approximately 5.2 inches of rainfall over a 24-hour period. A detailed explanation of the stormwater wetland hydrology is contained in Appendix A.

Four different alternatives were developed for the Fordham Street wetland site, as it would be an off-line stormwater wetland. Three of the alternatives were based on wetland size which ranged from three to five acres. An additional alternative was also evaluated based on deleting the berm within the wetland which provides additional water quality benefits. Table 4-6 summarizes the 78 alternatives formulated for habitat restoration in the Anacostia River basin.

TABLE 4-6

FEASIBILITY STUDY ALTERNATIVES

Alternative #	Habitat Size	Proposed Action		
Kingman Lake - 10 Wetland Alternatives				
1	42-acre wetland	No tidal control	Upper/lower wetland	Reforestation
2	56-acre wetland	Tidal control	Upper/lower wetland	Reforestation
3	56-acre wetland	Tidal control	Upper/lower wetland	Reforestation
4	36-acre wetland	Tidal control	Lower wetland	Reforestation
5	35-acre wetland	No tidal control	Upper wetland	Reforestation
6	23-acre wetland	No tidal control	Lower wetland	Reforestation
7	51-acre wetland	No tidal control	Upper/lower wetland	Reforestation
8	56-acre wetland	No tidal control	Upper/lower wetland	Reforestation
9	29-acre wetland	No tidal control	Upper/lower wetland	Reforestation
10	55-acre wetland	No tidal control	Upper/lower wetland	Reforestation
River Fringe - 31 Wetland Alternative Combinations				
Five sites were grouped in all possible combinations resulting in 31 alternatives	Site A - 4.2-acres Site B - 18.0-acres Site C - 2.3-acres Site D - 1.9-acres Site E - 3.2-acres	Modify existing mudflat elevations	Plant with emergent wetland vegetation	

TABLE 4-6

FEASIBILITY STUDY ALTERNATIVES
(Cont'd)

Alternative #	Habitat Size	Proposed Action	
Fordham Street - 4 Stormwater Wetland Alternatives			
1	2.3-acre wetland	Extended flowpath	Reforestation
2	2.6-acre wetland	No flowpath	Reforestation
3	1.2-acre wetland	Extended flowpath	Reforestation
4	4.6-acre wetland	Extendef flowpath	Reforestation
Northwest Branch - Prince George's County - 3 Stream Restoration Alternatives			
1	8,000 feet	Root Wad Bank Protection - Instream Structures	Reforestation
2	8,000 feet	Imbricated Riprap Bank Protection - Instream Structures	Reforestation
3	8,000 feet	Stone Toe Bank Protection -Bioengineering - Instream Structures	Reforestation

TABLE 4-6

FEASIBILITY STUDY ALTERNATIVES
(Cont'd)

Alternative #	Habitat Size	Proposed Action
Stewart/April Lane - 3 Stormwater Wetland Alternatives - New Dam		
1	0.7-acre	Habitat Plantings with Bypass Pipe
2	0.7-acre	Habitat Plantings without Bypass Pipe
3	0.7-acre	No Habitat Plantings with Bypass Pipe
Lockridge Drive - 3 Stormwater Wetland Alternatives - New Dam		
1	0.3-acre	Habitat Plantings with Bypass Pipe
2	0.3-acre	Habitat Plantings without Bypass Pipe
3	0.3-acre	No Habitat Plantings with Bypass Pipe

TABLE 4-6

FEASIBILITY STUDY ALTERNATIVES
(Cont'd)

Alternative #	Habitat Size	Proposed Action	
Snowden's Mill I - 4 Stormwater Wetland Alternatives - Existing Dam			
1	0.2-acres	New Outlet Design, Habitat Plantings, with Bypass Pipe	Reforestation
2	0.2-acres	New Outlet Design, Habitat Plantings, without Bypass Pipe	Reforestation
3	0.2-acres	New Outlet Design, with Bypass Pipe	Reforestation
4	0.2-acres	Habitat Plantings, with Bypass Pipe	Reforestation
Snowden's Mill II - 4 Stormwater Wetland Alternatives - Existing Dam			
1	0.3-acres	New Outlet Design, Habitat Plantings, with Bypass Pipe	Reforestation
2	0.3-acres	New Outlet Design, Habitat Plantings, without Bypass Pipe	Reforestation
3	0.3-acres	New Outlet Design, with Bypass Pipe	Reforestation
4	0.3-acres	Habitat Plantings, with Bypass Pipe	Reforestation
Tanglewood - 4 Stormwater Wetland Alternatives - Existing Dam			
1	0.5-acres	New Outlet Design, Habitat Plantings, with Bypass Pipe	Reforestation
2	0.5-acres	New Outlet Design, Habitat Plantings, without Bypass Pipe	Reforestation
3	0.5-acres	New Outlet Design, with Bypass Pipe	Reforestation
4	0.5-acres	Habitat Plantings, with Bypass Pipe	Reforestation

TABLE 4-6

FEASIBILITY STUDY ALTERNATIVES
(Cont'd)

Alternative #	Habitat Size	Proposed Action	
Gum Springs - 3 Stream Restoration Alternatives			
1	1,800 feet	1,650-Foot Bypass Pipe	
2	1,800 feet	1,700-Foot Bypass Pipe	
3	1,800 feet	2,000-Foot Bypass Pipe	
Sligo Creek - 3 Stream Restoration Alternatives			
1	2,500 feet	Root Wad Bank Protection - Instream Structures	Reforestation
2	2,500 feet	Imbricated Riprap Bank Protection - Instream Structures	Reforestation
3	2,500 feet	Stone Toe Bank Protection -Bioengineering - Instream Structures	Reforestation
Paint Branch - 3 Stream Restoration Alternatives			
1	11,000 feet	Root Wad Bank Protection - Instream Structures	Reforestation
2	11,000 feet	Imbricated Riprap Bank Protection - Instream Structures	Reforestation
3	11,000 feet	Stone Toe Bank Protection -Bioengineering - Instream Structures	Reforestation
Northwest Branch - 3 Stream Restoration Alternatives			
1	3,700 feet	Root Wad Bank Protection - Instream Structures	
2	3,700 feet	Imbricated Riprap Bank Protection - Instream Structures	
3	3,700 feet	Stone Toe Bank Protection -Bioengineering - Instream Structures	

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Section 5

Alternative Assessment and Evaluation

Having identified and described selected sites and restoration methods in Section 4, impact analyses were conducted from several perspectives in order to provide the basis for a comparison of the alternatives.

This section consists of some site-specific existing conditions, future without project conditions which reflect the No-Action Plan, and the effects/impacts of the alternatives for all 13 actions. A summary of the subjects of primary interest or concern are discussed in the text and the impacts of the alternatives are located at the end of each section. Some impacts are not discussed in the text but are addressed in the summary tables located at the end of each section.

5.1 NO-ACTION PLAN

Three types of actions, stream restoration, wetland creation and stormwater wetland retrofits, are proposed. Existing habitat conditions in the basin are in a severely degraded state. The proposed 13 alternatives are designed to improve conditions not just at the specific site, but downstream as well. Complementary actions act together to improve habitat throughout the basin by improving critical areas.

The proposed stream restoration projects include modifications to stabilize severly eroding stream banks, increase riparian vegetation, restructure stream morphology, enhance/create instream habitat and reforest bottomland. By improving stretches of streams in critical areas, aquatic habitat downstream is improved with lower sediment loads, increased density and diversity of aquatic wildlife, and lower water temperatures.

The goals of the wetland creation projects are to restore wildlife habitat to the area by increasing the cover type, diversity, and structure through the creation of various wetlands systems. Since wetlands are critical habitat for many species of fish and wildlife and are vegetatively diverse, the ecological value of these areas is high. Improving the diversity and quality of wetland in one area promotes species carryover into adjacent areas, thereby improving conditions both upstream and downstream of the proposed site.

The stormwater management pond retrofit projects propose to increase fish and wildlife habitat and provide wetland habitat by creating shallow marsh wetlands in dry detention ponds. These retrofits would provide enhanced stormwater quantity and quality control for the developed areas draining into the sites. Consequently, fish and wildlife habitat in the tributaries downstream of these areas would benefit from improved conditions.

The No Action alternative for each site would forego any of the benefits, both on site and downstream, of the proposed action. Fish and wildlife habitat would remain in a severely degraded state as a result of urbanization, and the poor overall condition of the basin's water resources would remain unchanged and may continue to deteriorate. Furthermore, the No-Action alternative would not improve the scarcity of rooted vegetation and structural cover, the lack of SAV, the water quality or the low quality physical habitat. Kingman Lake and the Fringe Wetland sites would continue to collect sediment and debris. Without the proposed stormwater retrofits, flashy water influxes, debris and suspended solids would continue to enter the tributaries and the Anacostia River. The absence of stream restoration projects would ensure that stream stretches remain wide and unmeandering with severely eroding banks and poor aquatic habitat.

The short-term construction impacts to the surounding areas and the potential thermal impacts to some of the tributaries would be avoided with the No Action plan. However, the long term significant beneficial environmental impacts to the watershed would be foregone. These far-reaching, long-term beneficial effects far outweigh the potential negative impacts of implementing this project.

The No-Action alternative does not meet the planning objectives in restoring habitat in the Anacostia River basin. In addition, it does not address the objectives in the *Six-Point Action Plan* proposed by the AWRC. Therefore, it was not considered a feasible alternative and was eliminated from further alternative analysis. Refer to Tables 5-1 through 5-13 for a more detailed summary of the impacts of the No-Action alternative for each site.

5.2 KINGMAN LAKE--DISTRICT OF COLUMBIA

The goal of the Kingman Lake restoration plan is to restore habitat by increasing the cover type, diversity and structure through the creation of a wetland. The plan was guided by scientific evaluations and considered the compatibility of the plan with the surrounding area. There were 10 alternatives considered for this site and they varied in acreage, tidal control, and upper/lower wetland combinations. All alternatives included reforestation. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-1 contains summary information on potential impacts of the alternative plans considered for Kingman Lake.

TABLE 5-1 KINGMAN LAKE - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERANTIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION
2. Aesthetic Values	ADVERSE IMPACTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS
3. Recreational Opportunities	ADVERSE IMPACTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS
4. Transportation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
5. Public Health & Safety	NO IMPACT	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
8. Business and Home Relocations	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
9. Existing and Potential Land Use	ADVERSE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
3. Public Facilities & Services	NO IMPACT	NO ADVERSE IMPACTS BENEFICIAL EFFECTS	NO ADVERSE IMPACTS BENEFICIAL EFFECTS	NO ADVERSE IMPACTS BENEFICIAL EFFECTS	NO ADVERSE IMPACTS BENEFICIAL EFFECTS	NO ADVERSE IMPACTS BENEFICIAL EFFECTS
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT

TABLE 5-1 KINGMAN LAKE - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS
2. Wetlands	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS
3. Aquatic Habitat	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS
5. Biological Productivity	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS
6. Surface Water Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	FURTHER TESTING NECESSARY	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS

TABLE 5-1 KINGMAN LAKE - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 6	ALTERNATIVE 7	ALTERNATIVE 8	ALTERNATIVE 9	ALTERANTIVE 10
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION
2. Aesthetic Values	ADVERSE IMPACTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS
3. Recreational Opportunities	ADVERSE IMPACTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS
4. Transportation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
5. Public Health & Safety	NO IMPACT	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
8. Business and Home Relocations	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
9. Existing and Potential Land Use	ADVERSE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
3. Public Facilities & Services	NO IMPACT	NO ADVERSE IMPACTS BENEFICIAL EFFECTS	NO ADVERSE IMPACTS BENEFICIAL EFFECTS	NO ADVERSE IMPACTS BENEFICIAL EFFECTS	NO ADVERSE IMPACTS BENEFICIAL EFFECTS	NO ADVERSE IMPACTS BENEFICIAL EFFECTS
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT

TABLE 5-1 KINGMAN LAKE - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 6	ALTERNATIVE 7	ALTERNATIVE 8	ALTERNATIVE 9	ALTERNATIVE 10
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS
2. Wetlands	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS
3. Aquatic Habitat	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS
5. Biological Productivity	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS
6. Surface Water Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	FURTHER TESTING NECESSARY	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS

FOOTNOTES:
*SELECTED ACTION PLAN

5.2.1 Environmental Effects

5.2.1.a Aquatic Resources

Existing Conditions. Fish and wildlife habitat alternative restoration strategies incorporated into the restoration plan consist of creating emergent, scrub-shrub and forested wetlands; establishing a wider forest buffer; creating additional escape and nesting cover through the use of natural and artificial habitat structures; and constructing channels through the upper portion of the lake for fish and water movement.

Kingman Lake provides tidally influenced, shallow and deep water habitat for warmwater fish species. The majority of the lake consists of shallow water habitat where open water areas have an average depth of three feet during low tide. During low tide, the shallow water habitat consists of a few isolated areas of vegetated wetlands and extensive unvegetated mud flats in the upper portion of the lake.

The location of Kingman Lake is in a heavily urbanized watershed. The scarcity of rooted vegetation and structural cover, the lack of SAVs, and the silty composition of the substrate limit species diversity and population size of the fisheries of Kingman Lake. These low quality physical habitat factors in combination with existing poor water quality further reduce the optimal conditions for sustained fisheries.

Alternatives. All 10 alternatives for Kingman Lake propose wetlands which would increase the food and spawning habitat for a number of aquatic species. The alternatives vary in the size of wetland types, but basically all provide significant beneficial impacts to aquatic habitat through creation of food, cover, spawning areas and improved water quality.

Construction activities would cause temporary disturbance to aquatic life in both Kingman Lake and the Anacostia River. Construction activities for all the alternatives would include dredging in Kingman Lake and the Anacostia River and placement of sediment into Kingman Lake. Sediment from the river would be hydraulically dredged and deposited with pipelines. Straw bale berms would be constructed to contain the dredged material. A specialized pipeline discharge system would be used to distribute the material at the appropriate elevations and slopes.

The dredged material would elevate the substrate to create conditions conducive to the establishment of emergent wetland vegetation. Once the substrate is placed, vegetation would be planted on the sites to further stabilize the material.

Channels would be cut during the wetland creation process. The proposed tidal guts in the upper portion of the lake would allow fish movement throughout the lake. The channels

would ensure additional tidal flushing of the proposed wetlands from upstream water, which would improve the overall water quality for fisheries in the lake.

An erosion and sediment control plan (E&S) would be prepared specifying and illustrating control devices to be employed during construction. Erosion and sediment control practices could include temporary seeding or mulching, straw bale dikes, silt fences, stabilized construciton entrances and sedimentation ponds. E & S devices would be selected and designed according to current industry standards and technology. Control devices would be maintained throughout construction and for approximately one year following planting.

The existing water control structures at the north and south inlets are in a state of disrepair and Alternatives 1, 5, 6, 7, 8, 9, and 10 propose their removal without replacement. Alternatives 2, 3, and 4 propose construction of new tidal control structures. These structures would benefit the lake by trapping debris. However, the tidal gates would impair boating activities and fish movement, and the cost of construction and maintenance would be high. Based on these reasons it was decided by the Corps of Engineers and the local sponsors that tidal gates would not be constructed.

Impacts. Minor, temporary adverse effects and long-term beneficial effects would result from implementing the alternatives. Non-mobile benthic species would be smothered with the discharge of silty material on the site. Within a short period of time, species diversity and density would be expected to increase in the discharge area as a result of the introduction of less contaminated material and the addition of wetland vegetation.

The substrate of the discharge site is primarily silt, with less than 13 percent sand, deposited over the last several decades from the Anacostia River. Chemical analyses show concentrations of PCBs, PAHs, pesticides, chlordane and trace metals (except mercury) in concentrations similar to, but higher than, those found in the proposed discharge material. As stated in Section 2.2.2, bioassays performed by the FWS concluded that there was no statistically significant difference between sediment samples taken from the control sites in the Potomac River and those taken from Kingman Lake and the Anacostia River. Beneficial effects would result from the placement of less contaminated material on top of more contaminated material. Monitoring results from a similar dredge/fill wetland creation project (Kenilworth Marsh) near the Kingman Lake site found no significant movement of contaminants.

The No-Action Plan would not improve the scarcity of rooted vegetation and structural cover, the lack of SAVs, the water quality, or the existing low quality physical habitat. Conditions would remain as currently exist with a potential decline through time.

5.2.1.b Wetlands

Alternatives. All alternatives include various acreages of emergent wetland. Plant selections throughout the different wetland zones would provide for and maximize the diversity of food sources and habitat available to wildlife. Plant species that provide food sources and habitat are listed in Appendix A. The alternative plans assume that some of the volunteer species listed below would become established throughout the marsh zones.

Typical volunteer species:

Acnida cannabina	water hemp
Bidens sp.	beggar-ticks
Carex spp.	sedges
Impatiens capensis	spotted touch-me-nots
Iris pseudacorus	yellow flag
Iris versicolor	blue flag
Mikania scandens	climbing hempweed
Polygonum sp.	smartweed

Only Alternative 1 would provide two deep water pocket wetlands to provide diversity in aquatic habitat. One would be created in the mid-marsh emergent wetlands on the east side of the lake and the other in the high-marsh emergent wetlands on the west side of the lake. The exact location of the two pocket wetlands would be determined in the field.

Alternatives 1 and 5 propose two ponds to be constructed on the forested, northernmost island of the lake. The ponds would serve as suitable habitat for wood ducks, turtles, frogs and a variety of other species of wildlife.

Impacts. Beneficial effects are expected as a result of increased filtering and microbial action in the created wetlands. Pollutants from non-point sources in the urban watershed including sediment, nutrients, coliform bacteria, PAHs, pesticides, PCBs and heavy metals have been found in the Anacostia River. The wetlands are expected to reduce the concentration of these existing contaminants as a result of filtering and microbial action in the created wetlands.

The existing high rates of sediment deposition in the lake should decrease due to improved flushing patterns and an anticipated decrease in water residence time in the lake. Therefore, the need for frequent (e.g., annual) sediment removal is unlikely. Regular monitoring of sediment deposition is recommended and excess material in tidal guts should be removed when the channel constriction reaches 50 percent or more. Vegetation, particularly in the low- and mid-marsh zones, should be monitored to detect diebacks from excess sediment deposition. Excess material should be removed and replanted during the appropriate season.

Flushing and water velocity patterns should be examined to identify the source, magnitude and continuance of the depositional patterns.

Debris accumulation is evident throughout the tidal portion of the Anacostia River. Field observations have confirmed the presence of drift lines of debris, especially in the upper end of the lake. Debris can cause extensive damage to herbaceous wetland plant communities by covering and smothering plants. It is likely that large volumes of debris accumulation would continue to occur in Kingman Lake if a deflector or boom is not placed at each inlet to prevent debris from entering the lake. The placement of either a deflector or boom would prove beneficial in reducing the amount of debris entering the lake.

5.2.1.c Terrestrial Resources

Existing Conditions. The upland habitat surrounding Kingman Lake consists of managed grasses of the golf course and driving range, a narrow forest buffer along the shorelines of much of the lake, and forest stands on the islands. The upland community would be enhanced by expanding the existing forest buffer along the edges of the lake adjacent to Langston Golf Course.

Habitat availability is limited in Kingman Lake due to its current physical structure. Adequate food sources, escape cover and breeding habitats are minimal or non-existent for many species of wildlife. The lake's location in a highly urbanized area and at the end of a terrestrial wildlife corridor further reduce habitat suitability for secretive or interior dwelling species. Year-round species of wildlife in the study area are composed chiefly of urban-tolerant and pest species.

Alternatives. Logs removed from the island during the construction of the two ponds in Alternative 1 would be placed in various locations to provide habitat features. Logs strategically situated in wetland areas and between wetland and upland habitats would provide rest and sunning sites for ducks, turtles, and snakes. Logs in the water would also provide cover for breeding salamanders and some fish species.

All of the alternatives propose expansion of the forest buffer adjacent to the Langston Golf Course property. The expanded forest buffer would supply a source of food, cover, and nesting or breeding habitat for wildlife; screen urban disturbances which might otherwise prevent certain species of wildlife from utilizing the lakes; improve the water quality by filtering sheet flow; and enhance the overall aesthetics of the lake.

Additionally, all of the alternatives propose planting of a riparian buffer in addition to the upland restoration. The riparian scrub-shrub zone would be planted along the shoreline to serve as a buffer between the upland forest and the created wetlands. The community would be dominated by bottomland hardwood trees and shrubs. The buffer would be planted with

native tree species and native grasses. Although grass and shrub species constitute the bulk of plants used for food and cover, many proposed tree species would provide fruits, seeds, leaves, twigs, bark, stems, and roots for many kinds of wildlife (Hightshoe, 1988). Plant composition and spacing has been designed to maximize wildlife for food and cover.

Many wildlife species inhabit areas referred to as ecotones, where the borders of two different habitats meet (e.g., forests and meadows). The restoration plan proposes to enhance the existing ecotones by expanding the upland forest buffer along the edge of the open grassy area by approximately 20 feet. Restoration of the existing ecotones between the mud flats, vegetated wetlands, forest buffer and open grassy areas would be completed by creating structural diversity between habitats, expanding the forest buffer, and creating distinct wetland zones.

Any dead or dying trees (snags) on the islands or within the forest buffer would be left standing as proposed in all the alternatives. Snags provide nesting sites, perches, and food sources for a variety of birds and mammals. Insect larvae commonly occur under the bark and in the wood of snags. Hard snags, which are dead or dying trees with limbs often remaining, and soft snags, which are dead trees in an advanced stage of decomposition, are both important to wildlife. One or two snags within the forest buffer may be removed and erected in the marsh areas to provide habitat for species more commonly found in the open marsh. Fallen snags would be left on the ground to provide food and cover sites for birds, small mammals, reptiles, and amphibians.

Alternative 1 proposes additional escape and nesting cover through the use of artificial habitat structures such as nesting boxes, cut logs, and nest platforms. Artificial nest boxes and nest platforms are used by a variety of wildlife species. Nest boxes designed to meet specific biological needs of the targeted species have been incorporated into the restoration plan. The nest boxes would provide adequate nesting cover and aide in the long-term establishment of the species to Kingman Lake. Species were selected based upon their breeding range, desirability, tolerance to urban disturbances, and habitat requirements. Nest boxes proposed include boxes for tree swallows, northern flickers, American kestrel, common screech owls, and wood ducks. A nest platform would also be constructed for use by osprey.

Impacts. The construction of the upland habitat would temporarily disturb birds and other small mammals which inhabit the area. Long term impacts from the proposed scrub-shrub and upland restoration would expand food, cover, nesting and breeding habitat, and would provide a screen from the urban surroundings.

An overall positive impact would result from the increase in diversity and abundance of terrestrial habitat that would attract other wildlife, particularly water-dependent and aquatic-foraging birds and mammals. Additional escape and nesting cover would be created

with natural and artificial habitat structures. By increasing habitat in this critical area and creating a refuge for species displaced by continued urban development, effects of this action should be realized basin-wide.

5.2.1.d Threatened and Endangered Species

According to the U.S. Fish and Wildlife Service (FWS), no rare, threatened, or endangered species would be impacted by the construction of any of the proposed alternatives.

5.2.1.e Prime and Unique Farmlands

Based upon analysis of the United States Department of Agriculture Soil Conservation Service (SCS) soil survey maps, there are no prime and unique farmland soils in existence within the Kingman Lake site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use. Compliance with the Farmland Protection Policy Act of 1981 is met.

5.2.1.f Water Quality

Existing Conditions. Water quality conditions in the tidal Anacostia River, including the section of river in the vicinity of Kingman Lake, have consistently been poor. Low dissolved-oxygen concentration, suspended solids, and high fecal coliform counts are the major problems in the tidal Anacostia. Many of the water quality components violate the District of Columbia water quality standards for support of aquatic life. Dissolved-oxygen levels are expected to increase as a result of improved water circulation. Decreased turbidity would allow greater light penetration to the photic zone, thereby enhancing primary production and vegetation establishment which would increase dissolved-oxygen levels.

Impacts. The main goal of the restoration plan is habitat restoration which is primarily achieved through the creation of wetlands. The proposed wetlands and upland vegetated buffers would also have a beneficial effect on water quality within the lake. Anticipated water quality improvements include filtering nutrients and particulate pollutants contained in the river flow, adjacent tributaries, overland flow, and storm drain discharge to the lake.

Construction of any of the alternatives would cause minor, temporary adverse effects to the sediments causing turbidity and decreased oxygen levels. The impacts would be minimized through employment of hydraulic dredging and use of best management practices. These impacts would be temporary and should not present any long-term or widespread adverse effects on the water quality of the Anacostia River. The constructed wetland alternatives would cause long-term beneficial effects to the water quality in Kingman Lake and downstream in the Anacostia River.

5.2.1.g Air Quality.

Washington D.C. falls within the Metropolitan Washington non-attainment area as defined by the Federal guidance published pursuant to the Clean Air Act Ammendments of 1990 (CAAA). The metropolitan Washington area is a serious nonattainment area for ozone. Construction of the Kingman Lake action may cause temporary impacts to air quality due to exhaust from construction machinery but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts to air quality may result due to the filtering aspects of additional vegetative cover. The actions proposed do not conflict with the proposed State Implementation Plan (SIP). The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed. Reg. 63214, Nov. 30, 1993).

5.2.1.h Hazardous, Toxic and Radioactive Wastes

During the preliminary assessment a potential hazardous, toxic, or radioactive waste (HTRW) source was identified in the vicinity of the reforestation action. The reforestation action would be located north of Benning Road, on the west bank of Kingman Lake and on the west bank of Kingman Island. The potential source is a former landfill. This area would be investigated during the next phase of study prior to any construction action, to address worker health and safety issues. If an HTRW concern is identified by further testing, the area of contamination will be avoided.

5.2.2 Aesthetic and Recreational Effects

The scenic value of Kingman Lake is reduced to the extensive mud flats and heavy sediment loading. The wetlands would create an attraction with various heights and types of vegetation. The wetland vegetation would attract various aquatic, terrestrial and wetland species which many people enjoy watching for recreation.

With the No-Action Plan, the lake would continue to collect sediment and debris and maintain the same visual appearance.

5.2.3 Cultural Effects

The area of potential effect upon cultural resources by the proposed actions is limited to the river bed. Due to the depth of the Anacostia River in this vicinity and the construction of the surrounding Anacostia Park and Langston Golf Course, the riverbed is situated up to 20 feet below the surrounding grade and is not readily visible outside of the immediate vicinity of Anacostia Park. Due to the constricted view of the site location, there would be no indirect or visual effects upon any historic structures. All potential effects to archaeological

resources would be limited to the area defined as Anacostia Park, a graded parkland surrounded by roadways.

Research into the Maryland Historical Trust site files revealed that there are fourteen prehistoric sites located in close proximity to the present study location. All of the sites are located adjacent to, but outside of, the Anacostia Park. Their location suggests that the 20-foot elevation represented the primary terrace above the wide marshy floodplain of the Anacostia River. The wetland area of the river would have provided a diverse ecosystem of fish and migratory wildlife that would have attracted large, seasonal prehistoric populations into the area. The wetland areas, however, would not have been directly inhabited, but rather would have been locations of food resource collection. Therefore, the entire area that had been tidal would have contained only minimal evidences of prehistoric utilization.

Additionally, the entire Anacostia Park region has been subjected to extensive grading, filling, and river channelization by the Corps of Engineers. Due to the recorded disturbances that have occurred within the site, specifically the dredging of river bed materials, the construction of seawalls, and the placement of large amount of fill within Anacostia Park, there would be no cultural resources that would be affected by the proposed alternatives. The Anacostia River was extensively dredged and channelized during the construction of the original navigation project. All locations where material would be dredged and removed from the Anacostia River are previously disturbed navigation channels.

The State Historical Preservation Officer of the District of Columbia concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources.

5.3 RIVER FRINGE WETLANDS--DISTRICT OF COLUMBIA

The River Fringe Wetland sites are located along the Anacostia River in the vicinity of RFK stadium and extending northward to the New York Avenue bridge.

A total of 31 alternatives are proposed for the River Fringe Wetlands action. The alternatives consist of five separate sites ranging in size of 18.0 acres to 1.9 acres, which were grouped in all possible combinations. Area A ranges along 5 acres of the west bank of the River located south of Whitney Young Memorial Bridge. Area B extends for 18 acres along the east bank of the river from the Conrail bridge to the Benning Road bridge. Area C extends for 2 acres along the east bank of the river to either side of the cove between Benning Road bridge and Watts Branch. Area D stretches for 2 acres along the east bank just north of Watts Branch. Area E extends for approximately 3 acres on the west bank across from Kenilworth Marsh. Refer to Table 4-6 for detailed alternative site descriptions.

The goal of this restoration plan is to restore wildlife habitat in the area by increasing the cover type, diversity and structure through the creation of a diverse wetlands systems. The depth of water at high tide inhibits the establishment and growth of emergent wetland plant species. The emergent marsh would be established by increasing the substrate elevation, thereby decreasing the depth of water at high tide. Fill material would be obtained from the river above the Conrail bridge.

Table 5-2 contains summary information on potential impacts of the alternative plans considered for the River Fringe wetlands.

5.3.1 Environmental Effects.

5.3.1.a Aquatic Resources

MWCOG and the District of Columbia have conducted a number of studies (Athanas, 1990 & 1991) to determine the viability of establishing river fringe wetlands. In addition to debris problems, the primary limiting factor for river fringe wetlands seems to be the elevation of the substrate. Emergent vegetation cannot survive prolonged inundation by high tide. The proposal for river fringe wetland creation includes modification of elevations with dredge material. The proposed restoration work would not have an impact on existing wetlands within the sites. The discharge sites have been located to correlate with natural areas of accretion. The proposed wetlands would mimic the shape and size of existing shallow areas.

Alternatives. All of the proposed alternatives would increase the food and habitat sites for many aquatic species. All the individual alternatives would provide beneficial impacts to aquatic habitat; however, as the alternatives are combined, the beneficial impacts of wetlands associated with food, cover, spawning areas and water quality would increase.

Material would be hydraulically dredged from the river and deposited with pipelines. Straw bale berms would be constructed to contain the dredged material. A specialized pipeline discharge system would be used to distribute the material at the appropriate elevations and slopes.

The dredged material would elevate the substrate to create conditions more conducive to the establishment of emergent wetland vegetation. Once the substrate is placed, vegetation would be planted on the sites to further stabilize the material.

The silty sediment from the Anacostia River which is to be placed on the five wetland creation sites is similar in nature to the existing substrate, but has lower concentrations of contaminants. As stated in Section 2.2.2, bioassays performed by the FWS concluded that

TABLE 5-2 RIVER FRINGE WETLANDS - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	*ALTERNATIVE 2	*ALTERNATIVE 3	*ALTERNATIVE 4	*ALTERANTIVE 5
A. SOCIAL EFFECTS		C + D	A + C + D	A + C + D + E	A + B + C + D + E	C
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION
2. Aesthetic Values	ADVERSE IMPACTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS
3. Recreational Opportunities	ADVERSE IMPACTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS
4. Transportation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
5. Public Health & Safety	NO IMPACT	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS	BENEFICIAL EFFECTS
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
8. Business and Home Relocations	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
9. Existing and Potential Land Use	ADVERSE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT
10. Energy Needs and Resource	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT

TABLE 5-2 RIVER FRINGE WETLANDS - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	*ALTERNATIVE 2	*ALTERNATIVE 3	*ALTERNATIVE 4	*ALTERNATIVE 5
C. NATURAL RESOURCES		C + D	A + C + D	A + C + D + E	A + B + C + D + E	C
1. Terrestrial Habitat	ADVERSE IMPACTS	SIGNIFICANT POSITIVE IMPACT	SIGNIFICANT POSITIVE IMPACT	SIGNIFICANT POSITIVE IMPACT	SIGNIFICANT POSITIVE IMPACT	SIGNIFICANT POSITIVE IMPACT
2. Wetlands	ADVERSE IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS
3. Aquatic Habitat	ADVERSE IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS	SIGNIFICANT POSITIVE IMPACTS
5. Biological Productivity	ADVERSE IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS
6. Surface Water Quality	NO IMPACT	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
11. Air Quality	NO IMPACT	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS	TEMPORARY ADVERSE IMPACTS SIGNIFICANT LONG-TERM BENEFICIAL IMPACTS
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS

FOOTNOTES:
*SELECTED ACTION PLAN

there were no statistically significant differences between the control sites in the Potomac River and the reference sediment samples in Kingman Lake and the Anacostia River. Beneficial effects would result from the placement of less contaminated material on more contaminated material. Monitoring results from a similar dredge/fill wetland creation project near the site (Kenilworth Marsh), have found no significant movement of contaminants.

Construction activities for all the alternatives would include dredging in the Anacostia River above the Conrail bridge, and placement of sediment onto mud flats sites in the Anacostia River. Impacts would be minimized through the dredging of the existing river channels.

Impacts. Construction activities would cause temporary disturbance to aquatic life in the Anacostia River. Non-mobile benthic species would be smothered with the discharge of silty material on the sites. Within a short period, species diversity and density is expected to increase in the discharge area as a result of the introduction of less contaminated material and the addition of wetland vegetation. Benthos in the Anacostia River is expected to benefit from improved quality of the water filtered through the wetlands. Nekton would be temporarily disturbed by the mechanical action of the dredge and increased turbidity during construction. They would return after completion and the wetlands would provide additional feeding and spawning habitat. An overall positive effect on the food web is expected with increased aquatic habitat that would support an increased diversity of species.

An Erosion and Sediment Control Plan would be prepared specifying the control devices to be employed during substrate construction, plantings, and habitat structure installation. Construction standards and time of year restrictions would be in accordance with the District of Columbia regulations.

5.3.1.b Wetlands

Fringe wetlands along the tidal Anacostia are limited. The establishment of fringe wetlands would provide opportunity for wetland functions and values to enhance the river corridor. Wetland functions and values, along with the benefits they can afford the basin in terms of water quality and habitat, have been presented earlier in Section 5.2.1.

Pollutants from non-point sources in the urban watershed including sediment, nutrients, coliform bacteria, hydrocarbons, pesticides, PCBs, and heavy metals have been found in the Anacostia River. The proposed wetlands are expected to reduce some of these existing contaminants as a result of filtering and microbial action in the created wetlands.

5.3.1.c Terrestrial Resources

The only direct impact to terrestrial resources would be the staging area for construction and the existing mud flats. The staging area is an existing parking lot and would only be used for worker parking and for storage of medium-sized construction machinery. The majority of the construction activities would be on the Anacostia River and equipment would be launched at appropriate launch sites.

Anywhere from 2 acres to 30 acres (depending on the alternative) of mud flats that are currently exposed at low tide would be replaced with wetlands. Although the mud flats provide habitat for wading birds, the wetlands would provide a more biologically productive, diverse vegetated environment. An overall positive impact would result from the increase in diversity and abundance of aquatic habitat that would attract other wildlife, particularly water-dependent and aquatic-foraging birds and mammals. No long-term significant impact to terrestrial resources would occur with construction of Alternatives 1-31.

5.3.1.d Threatened and Endangered Species

According to the FWS, no rare, threatened, or endangered species would be impacted by the construction of the proposed alternatives.

5.3.1.e Prime and Unique Farmlands

Based upon analysis of the SCS soil survey maps, there are no prime and unique farmland soils in existence within the proposed Fringe Wetlands site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use. Compliance with the Farmland Protection Policy Act of 1981 is met.

5.3.1.f Water Quality

Overall improvements in the water quality of the Anacostia river are essential to the long-term success of the fringe wetland habitat restoration. Acceptable levels of turbidity, toxins, nutrients, and bacteria must be maintained in order to avoid adverse impacts to fish and wildlife. Beneficial effects on chemical water quality are expected from the alternatives. These benefits would result from wetland functions that would filter and break down nutrients and particulate pollutants contained in the river.

Dissolved-oxygen levels are expected to increase as a result of the introduction of wetland plants and the trapping of suspended sediments. Decreased turbidity would allow greater light penetration to the photic zone, thereby enhancing primary production and vegetation establishment which would increase dissolved-oxygen levels.

Placement of sediments onto the sites would cause minor, temporary adverse effects. The hydraulic dredging would resuspend the sediments and cause a temporary reduction in the clarity in the open water adjacent to the sites. However, long term beneficial impacts are expected as the created wetlands trap suspended sediments and increase both water clarity at the site and water discharged from the site.

5.3.1.g Air Quality

Washington D.C. falls within the Metropolitan Washington non-attainment area as defined by the Federal guidance published pursuant to the Clean Air Act Amendments of 1990 (CAAA). The metropolitan Washington area is a serious nonattainment area for ozone. Construction of the River Fringe action may cause temporary impacts to air quality due to exhaust from construction machinery but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts on air quality may result due to the filtering aspects of additional vegetative cover. The actions proposed do not conflict with the proposed State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed. Reg. 63214, Nov. 30, 1993).

5.3.1.h Hazardous, Toxic and Radioactive Waste

The identified HTRW sources would not impact the proposed project due to distance from the site.

5.3.2 Aesthetics and Recreational Effects

The scenic value of this area is reduced due to the heavy silt load from the tributaries. The banks are composed of a fine muck and the calm water collects debris from the watershed.

Recreational fishing in the tidal Anacostia is severely limited due to poor water quality and degraded fish habitat. DCRA and EPA have issued a health advisory regarding consumption of fish from the river due to PCB and chlordane levels which exceeded the Food and Drug Administration action levels. Water contact recreation such as swimming is restricted in the tidal Anacostia due to poor water quality and the associated potential health risks. Washington D.C. has put restrictions on fish consumption from the Anacostia River.

A combination of all the alternatives would greatly enhance the visual character and recreational value of the Anacostia River. The scenic and recreational value would remain diminished with the No-Action Alternative.

5.3.3 Cultural Effects

The area of potential effect upon cultural resources by the proposed actions is limited to the river bed. Due to the depth of the Anacostia River in this vicinity, and the construction of seawalls, the riverbed is not readily visible outside of the immediate vicinity of Anacostia Park. Due to the constricted view of the site location, there would be no indirect or visual effects upon any historic structures.

Research into the Maryland Historical Trust site files revealed that there are fourteen prehistoric sites located in close proximity to the present study location. All of the sites are located adjacent to, but outside of, the Anacostia Park. Due to the recorded disturbances that have occurred within the area, specifically the dredging of river bed materials, the construction of seawalls, and the placement of large amounts of fill within Anacostia Park, there would be no cultural resources that would be affected by the proposed placement of dredge material within the riverbed. Additionally, any dredge removal areas would be contained within the previously altered river channel, and would not have the potential to affect cultural resources. Therefore, the proposed River Fringe Wetlands restoration work would have no effect upon cultural resources.

The State Historical Preservation Officer of the District of Columbia concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources.

5.4. FORDHAM STREET WETLAND–PRINCE GEORGE'S COUNTY

The Fordham Street stormwater wetland is proposed for the site of an existing baseball field, immediately north of a small unnamed tributary to Northwest Branch and approximately 200 feet upstream of the confluence of the unnamed tributary and Northwest Branch. This small tributary conveys the untreated runoff from the adjacent developed area into Northwest Branch which is classified as a Use IV-Recreational Trout Waters by MDE. The tributary is fed by two 72-inch reinforced concrete pipes and a trapezoidal concrete channel. The tributary's banks have been partially covered with riprap during past channelization activities. The substrate of the remaining "natural" channel consists of gravel, sand and silt.

The goal of this wetland creation is to increase fish and wildlife habitat in the Northwest Branch of the Anacostia River by providing limited water quality and quantity control for the developed area drained by the tributary, and by creating emergent wetlands habitat.

There were four alternatives considered for this site. The alternatives varied in size and type of flow path. All alternatives included reforestation. Refer to Table 4-6 for detailed

alternative site descriptions. Table 5-3 contains summary information on potential impacts of the alternative plans considered for the Fordham Street wetland.

5.4.1 Environmental Effects

5.4.1.a Aquatic Resources

As described in Section 4, Table 4-6, the Fordham wetland alternatives consist of four wetlands of various sizes from 1.5 to 3.5 acres. All alternatives have a flow path which would extend the detention period for the water within the wetland. As the water flows through the wetland, nutrients, suspended solids and debris, all of which have a negative effect on the water quality, would filter out into the wetland. Alternative 2 is a 2.2 acre wetland without the extended flow path.

Fill for the inlet/outlet structure for the created wetland would begin where the existing concrete channel ends and extend downstream approximately 180 linear feet. Geotextile fabric, riprap and gabions would be placed on the tributary substrate with the use of a truck and crane and/or front end loader. Entrance into aquatic habitat by construction machinery would be limited to that necessary for proper rock placement. The fabric material would be placed by hand.

Impacts. Alternatives 1, 2, 3 and 4 would have a minor, temporary adverse effect in tributary stream during construction of the flow diversion structure. Some pollution-tolerant species in the unconsolidated stream bottom would be buried with the fabric and rock fill. It is expected that organisms of the same species, and other less common species would become re-established in the unconsolidated material trapped instream by the riprap.

Alternatives 1, 2, and 4 would have long-term beneficial effects on the aquatic habitat of the tributary and the Northwest Branch. In addition, more diverse species would become established in the biologically productive environment of the created wetland and in the Northwest Branch which would receive less-polluted discharge from the wetland. As water quality in the Northwest Branch improved, the aquatic habitat would improve. Water, debris and suspended solids would continue to directly enter the stream under the No-Action Plan.

5.4.1.b Wetlands

The addition of non-tidal wetlands to the Anacostia River basin has wide-reaching effects on wildlife. The provision of habitat for nesting, cover, reproduction and feeding potentially increases the density and diversity of species at the site, thereby improving the basin's ecological quality.

TABLE 5-3 FORDHAM STREET WETLAND - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERANTIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	
2. Aesthetic Values	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
3. Recreational Opportunities	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION BASEBALL FIELD TO BE RELOCATED	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION BASEBALL FIELD TO BE RELOCATED	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION BASEBALL FIELD TO BE RELOCATED	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION BASEBALL FIELD TO BE RELOCATED	
4. Transportation	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
7. Community Growth & Development	NO IMPACT	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	
8. Business and Home Relocations	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
9. Existing and Potential Land Use	ADVERSE IMPACTS	NO SIGNIFICANT ADVERSE IMPACTS	NO SIGNIFICANT ADVERSE IMPACTS	NO SIGNIFICANT ADVERSE IMPACTS	NO SIGNIFICANT ADVERSE IMPACTS	
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	POSITIVE IMPACTS RELATED TO AESTHETICS	POSITIVE IMPACTS RELATED TO AESTHETICS	POSITIVE IMPACTS RELATED TO AESTHETICS	POSITIVE IMPACTS RELATED TO AESTHETICS	
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	

TABLE 5-3 FORDHAM STREET WETLAND - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
2. Wetlands	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
3. Aquatic Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
5. Biological Productivity	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
8. Ground Water	NO ADVERSE IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	
9. Soils	NO ADVERSE IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	NO SIGNIFICANT IMPACTS	
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	

FOOTNOTES:

* SELECTEDED ACTION PLAN

The proposed location is presently a baseball field. No wetlands exist within the area of any of the alternatives; therefore, no wetlands would be impacted with the construction of any of the alternatives.

Maintenance for Alternatives 1, 2, 3, and 4 would require removal of sediments from the forebay. The No-Action Alternative would not meet the goals of the AWRC and the Corps in terms of enhancing aquatic diversity and providing for a quality urban fishery, reducing the pollutant loading, or increasing the natural filtering capacity by increasing the acreage of non-tidal wetlands.

5.4.1.c Terrestrial Resources

Vegetation at the site is sparse, as it is now primarily a mowed field. Alternatives 1, 2, 3 and 4 propose a one-acre reforestation action adjacent to the wetlands to complement the wetland area and create wildlife habitat. The reforestation would extend the existing forest and improve the habitat for small mammals and birds. The wetland would provide and improve the habitat for waterfowl and small mammals. The addition of improved habitat in this area would increase the biodiversity of the Anacostia basin as a whole.

5.4.1.d Threatened and Endangered Species

According to the FWS, there are no rare, threatened or endangered species that would be impacted by construction of any of the alternatives at this site.

5.4.1.e Prime and Unique Farmland

Based upon analysis of SCS soil survey maps, there are no prime and unique farmland soils in existence within the Fordham Street Wetland site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use. Compliance with the Farmland Protection Policy Act of 1981 is met.

5.4.1.f Water Quality

Alternatives 1, 3, and 4 would have a positive impact to the water quality of the Northwest Branch by removing debris, sediment, and nutrients from the 222-acre drainage area. Alternative 2 would not provide water quality benefits because the water would remain within the wetland for only a short period of time.

The created wetland would have beneficial impacts on the water quality in the Northwest Branch. The wetland would reduce the nutrient levels through filtering of the suspended

solids in the wetland. All fill material would meet applicable water quality standards and all work would be performed in accordance with all applicable water quality standards.

5.4.1.g Air Quality

Prince George's County falls within the metropolitan Washington non-attainment area as defined by Federal guidance published pursuant to the CAAA. The metropolitan Washington area is a serious non-attainment area for ozone. Construction of the Fordham Street wetland site may cause temporary impacts on air quality due to exhaust from construction machinery but emissions will fall well below designated rates allowable in nonattainment areas. Long term beneficial impacts on air quality may result due to the filtering aspects of additional vegetative cover. According to the Maryland Department of the Environment (MDE), the actions proposed are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.4.1.h Hazardous, Toxic and Radioactive Waste

None of the alternatives would impact HTRW. During construction of the environmental restoration actions, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course of construction, appropriate measures would be taken to contain the material.

5.4.2 Aesthetic and Recreational Effects

All of the alternatives for the Fordham Street wetland action would be constructed on an existing baseball field in the Northwest Branch Stream Valley Park. The field would be relocated in an open area of the park to reduce impacts on existing recreational areas, and aesthetic resources. Temporary impacts would be avoided by the relocation of the baseball field through construction sequencing. All the alternatives would have a positive impact on the visual character of the area. The area would be revegetated after construction of the wetland and the new vegetation would extend the corridor of the downstream forested area.

5.4.3 Cultural Effects

There are no recorded historic or prehistoric sites within the vicinity of the site. The portion of the park affected by the proposed work is totally surrounded by post-1940's single-family residential structures. The site has been severely affected by the construction of the Northwest Branch Stream Valley Park. No evidence of prehistoric or historic occupation or intensive utilization of the site could be identified. The proposed alternatives would have no effect upon cultural resources.

The State Historical Preservation Officer of Maryland concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources and that no further investigations are warranted for the site.

5.5 NORTHWEST BRANCH STREAM RESTORATION--PRINCE GEORGE'S COUNTY

The goal of this proposed restoration action is to increase fish and wildlife habitat in the Northwest Branch through stabilizing severely eroding stream banks, increasing riparian vegetation, deepening broad shallow stream sections, and creating instream habitat diversity.

The portion of the Northwest Branch within the study area is 8,000 feet in length with a normal channel width of 35 to 50 feet, with some sections up to 90 feet wide. Bank heights range from 5 to 10 feet. The stream bank materials are sands, silts and clays and the stream bed materials are predominantly sand and gravel. Eroded pipelines and other structures indicate significant past-stream channel degradation within the study reach.

Three alternatives were considered for this site that varied in the type of bank protection provided and the presence of instream habitat structures. All alternatives included reforestation. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-4 contains summary information on potential impacts of the alternative plans considered for the Northwest Branch stream restoration in Prince George's County.

5.5.1 Environmental Effects

5.5.1.a Aquatic Resources

Existing Conditions. Unstable conditions, including severe erosion and channel widening, and sedimentation have degraded the aquatic habitat. As a result of the high width-to-depth ratio of the stream, base flow depths are shallow, providing little cover for fish. Substrate embeddedness is in the 50-percent range, rendering the bed materials unsuitable for spawning. Restoration at this site would not only improve streambank morphology and water quality while adding habitat, but would also contribute to the downstream water quality and fish habitat.

Alternatives. Alternatives 1, 2, and 3 would have minor, temporary impacts in the immediate area of material placement (root wad, riprap, or rock, respectively). The root wad bank protection, Alternative 1, would temporarily disturb aquatic species during construction. Imbricated riprap bank protection, Alternative 2, and the fabric and rock fill of Alternative 3 would bury some pollution-tolerant species in the unconsolidated stream bottom. It is expected that organisms of the same species, and other less common species,

TABLE 5-4 NORTHWEST BRANCH PRINCE GEORGE'S COUNTY - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	*ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION		
2. Aesthetic Values	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
3. Recreational Opportunities	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
4. Transportation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Business and Home Relocations	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
9. Existing and Potential Land Use	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		

TABLE 5-4 NORTHWEST BRANCH PRINCE GEORGE'S COUNTY - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	*ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	TEMPORARY ADVERSE IMPACTS ACCESS AREA RESTORED	TEMPORARY ADVERSE IMPACTS ACCESS AREA RESTORED	TEMPORARY ADVERSE IMPACTS ACCESS AREA RESTORED		
2. Wetlands	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
3. Aquatic Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
5. Biological Productivity	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		

FOOTNOTES:
*SELECTED ACTION PLAN

would become re-established in the unconsolidated material. Additionally, Alternatives 2 and 3 would have long-term positive impacts by providing a more diverse aquatic environment in the riprap and rocks.

Alternatives 1, 2, and 3 would improve the instream habitat by stabilizing eroding streambanks and constructing instream flow structures. Temporary impacts would occur to aquatic species and habitat during the construction of all the proposed alternatives.

Impacts. Time-of-year restrictions would be adhered to during construction of instream features. Best management practices and an erosion and sediment control plan (E&S) would be prepared specifying and illustrating control devices to be employed during construction. The devices should be selected and designed according to current local, state, and Federal standards and technology. No long-term significant adverse impacts on aquatic species or habitat are expected to occur from the construction of the alternatives. An overall positive impact on the food web is expected with increased benthic habitat, aquatic habitat, and riparian habitat that would support an increased diversity of benthic, aquatic and terrestrial species.

5.5.1.b Wetlands

There are no wetlands present or proposed on the Northwest Branch site; therefore, no impacts on wetlands would occur with any of the alternatives.

5.5.1.c Terrestrial Resources

Vegetative cover in Northwest Branch Park consists of mature bottomland hardwood forest. Species diversity and density are high and forest strata are well developed.

Impacts. Reforestation of the area would provide habitat value, creating a buffer between the stream and suburban surroundings, and stabilizing the area.The reforestation would also expand the downstream forest corridor and the associated habitat within the corridor. The instream construction and the reforestation would have no long-term significant adverse impacts on terrestrial resources. An overall positive impact would result from the increase in diversity and abundance of aquatic habitats that would attract other water-dependent and aquatic-foraging birds and mammals.

5.5.1.d Threatened and Endangered Species

According to the FWS, no rare, threatened or endangered species would be impacted by the construction of the alternatives.

5.5.1.e Prime and Unique Farmlands

Based upon analysis of the SCS soil survey maps, there are no prime and unique farmland soils in existence within the Northwest Branch stream stabilization site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use. Compliance with the Farmland Protection Policy Act of 1981 is met.

5.5.1.f Water Quality

Water quality in the lower reaches is rated as fair. Existing data indicates water quality criteria for temperature and dissolved oxygen are seldom or never exceeded, although fecal coliform bacteria counts have occasionally exceeded state standards. The reforestation and the instream structures in the proposed alternatives would stabilize the channel morphology, which would keep the sediments and pollutants that travel into the stream to a minimum. With the decreased suspended solids, dissolved-oxygen levels would increase because of the increased photic activity. Solar heating may also be slightly reduced due to the increase in water depths and shading from tree planting.

Impacts. Construction of instream structures would cause temporary disturbance to the sediments causing turbidity and decreased oxygen levels. The impacts would be minimized through employment of best management practices and should not present any long-term or widespread adverse effects on water quality of the Northwest Branch or the Anacostia River. The stream would continue to erode and be unstable if the action is not constructed. Streambank erosion would continue to release sediments and lack of reforestation would continue to allow nutrients and other pollutants to enter the stream. The No-Action Plan would continue to degrade the stream and, in turn, the Anacostia River.

All fill material would be clean material that would meet applicable state water quality standards, and all work would be performed in accordance with the same standards.

5.5.1.g Air Quality

Prince George's County falls within the metropolitan Washington nonattainment area as defined by the Federal guidance published pursuant to the CAAA. The metropolitan Washington area is a serious nonattainment area for ozone. Construction of the Northwest Branch action may cause temporary impacts to air quality due to exhaust from construction machinery, but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts to air quality may result due to the filtering aspects of additional vegetative cover. According to MDE, the construction actions are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.5.1.h Hazardous, Toxic and Radioactive Waste

No CERCLA sites were identified within a one-mile radius of the site. Six hazardous waste generators were identified through the Maryland HWR. All sources, except one, consist of service stations and dry cleaners. The remaining source is a C&P Telephone office identified as a conditionally exempt small quantity generator. These sources are considered to have a low probability of affecting the action.

During construction of the environmental restoration sites, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course of construction, appropriate measures would be taken to contain the material.

5.5.2 Aesthetic and Recreational Effects

Due to the heavily forested nature of the Northwest Branch area and the reforestation, it was determined that modifications to the stream would not have any long-term indirect or direct visual effects upon the character of the area. Temporary impacts on the aesthetic and recreational values would occur during construction of all of the alternatives. The Corps would work with the M-NCPPC to minimize the effects upon aesthetic and recreational resources.

5.5.3 Cultural Effects

Due to the heavily forested nature of the Northwest Branch area, modifications to the stream would not have any indirect visual effects upon historic structures. The placement of riprap could have an effect upon cultural sites either situated on the riverbank or eroding into it. The excavation of selected portions of the bank prior to the placement of riprap could further affect archaeological sites located in proximity to the bank, if any were found to be present.

A records search produced no known prehistoric or historic sites located within the vicinity of the Northwest Branch site. During a field survey for this site, no cultural sites were located, and no cultural materials were recovered. Due to the lack of evidence of any cultural sites that would be affected by the proposed modifications to the banks of the Northwest Branch in this location, it was determined that the proposed alternatives would have no effect upon cultural resources.

The State Historical Preservation Officer of Maryland concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources and that no further investigations are warranted for the site.

5.6 STEWART/APRIL LANE--MONTGOMERY COUNTY

The goal of this proposed stormwater management pond is to increase fish and wildlife habitat in the area. This goal would be accomplished by the creation of a shallow marsh wetland pond that would provide stormwater quantity and quality control for the 203 heavily developed acres draining to the site.

Three alternatives have been considered for this site. Two of the alternatives propose habitat plantings, one with a bypass pipe and one without. The remaining alternative proposes a bypass pipe with no plantings. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-5 contains summary information on potential impacts of the alternative plans considered for the Stewart-April Lane stormwater wetland site.

5.6.1 Environmental Effects

5.6.1.a Aquatic Resources

Alternatives. All of the alternatives considered for this site included the construction of a new embankment. The concept was to impound water for wetland habitat while providing water quantity and quality control. A bypass pipe was considered to pass some of the stream base flow around the pond in order to prevent heating of the water during the summer months.

The White Oak tributary to Paint Branch collects flows from areas of heavy urbanization. Detaining this water in a stormwater pond is expected to increase the water temperature and cause thermal loading downstream in the tributary and Paint Branch. Alternative 2 would not divert the base flow around the pond; therefore, it would retain the base flow in the pond and possibly increase the water temperature.

Alternatives 1 and 3 propose to divert the base flow (approximately 0.2 cfs) around the pond to the pond's concrete riser outlet structure via a valve-controlled 15-inch bypass pipe. This diversion would maintain the low temperature of the water and reduce the possibility of thermal impacts. Although the base flow would bypass the forebay area which collects sediment, debris and nutrients, the storm drain system is designed to allow sediment collection in an area of easy removal and disposal. The amount of water flowing through the storm drain could be adjusted to pass any portion of the base flow. This would allow flushing of the proposed pond, which could help prevent algae blooms. The pond would control the flashy flows and the erosion in the area below the site and would provide a trap for pollutants, sediments and debris from the 203-acre urban drainage area.

TABLE 5-5 STEWART/APRIL LANE - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERANTIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION		
2. Aesthetic Values	ADVERSE IMPACTS	ADVERSE LONG-TERM IMPACT	ADVERSE LONG-TERM IMPACT	ADVERSE IMPACTS		
3. Recreational Opportunities	ADVERSE IMPACTS	ADVERSE IMPACTS	ADVERSE IMPACTS	ADVERSE IMPACTS		
4. Transportation	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Business and Home Relocations	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Existing and Poserial Land Use	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Contoversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		

TABLE 5-5 STEWART/APRIL LANE - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	ADVERSE IMPACTS		
2. Wetlands	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	NO ADVERSE IMPACTS		
3. Aquatic Habitat	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS		
5. Biological Productivity	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS		
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS		
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
D. CULTURAL RESOURCES						
1. Historic Architectual Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		

FOOTNOTES:
*SELECTED ACTION PLAN

Impacts. Increased thermal loading is an important potential impact of this site as this section of Paint Branch is classified as a Use III (natural trout) stream. The base flow bypass pipe should minimize thermal loading during normal flows as it allows base amounts of unponded water to pass into Paint Branch. During runoff events, the project is not likely to cause higher thermal loading than occurs under the existing conditions. Galli (1990) documented violations of the MDE Use III standard (not to exceed 68 degrees F.) in 60 percent of the summer sampling period. The beneficial aspect of trapping pollutants, sediments and debris outweighs the potential for a slight increase in temperature in Paint Branch during storm flows as heated water from the permanent pool is displaced by run-off. The impacted portion of Paint Branch is exclusively adult trout habitat.

The proposed alternatives would have a long-term impact upon aquatic resources within the White Oak tributary. Although the dam would create a long-term impact, the impact would not be considered significant, due to the existing minimal fish habitat and lack of anadromous fish. The construction of the dam (Alternatives 1, 2, and 3) and proposed wetland plantings (Alternatives 1 and 2) would create minor temporary adverse impacts by increasing downstream sedimentation during and immediately after construction.

As a result of the filtering action of the wetland in Alternatives 1 and 2, long-term positive impacts would include the reduction of existing sediments and discharge material movement into Paint Branch. This reduction is expected to minimize the erosion and stream-channel deterioration along the tributary and Paint Branch. The positive beneficial impacts on the tributary and Paint Branch also contribute to the restoration of the entire watershed as conditions will improve downstream from the site.

All the alternatives would have minor, temporary adverse impacts on organisms which would be buried and excavated as a result of the action. Some of the aquatic species are expected to recolonize the new aquatic habitat created. Nekton would be temporarily disturbed during construction, but are expected to return and increase after construction is complete. Overall the food web is expected to increase benthic, aquatic and riparian habitat that would support an increased diversity of benthic, aquatic and terrestrial species.

Sediment and erosion control measures in compliance with local, state and Federal laws would be used to minimize impacts on aquatic habitat.

5.6.1.b Wetlands

No wetlands exist on the site. Therefore, the alternatives would not significantly impact any wetlands.

The proposed wetland plantings in Alternatives 1 and 2 would provide positive impacts by reducing the downstream loadings of metals and organic contaminants through filtering and microbial functions, and by creating a more diverse, biologically productive environment.

5.6.1.c Terrestrial Resources

The alternatives would remove forest vegetation for the construction of the action. The pond would be located in an existing open area which is surrounded by forest vegetation. The action would remove habitat for forest species and replace it with habitat associated with wetland and small pond species. The amount of forested land that is disturbed during construction of the pond and access would be replaced at other feasibility study sites in the basin which have been identified as needing reforestation.

The proposed alternatives would have a positive impact on terrestrial resources through increased diversity and abundance of aquatic habitats that would attract other water-dependent and aquatic-foraging birds and mammals. It would also serve as an area for colonization for displaced species from areas of additional development.

5.6.1.d Threatened and Endangered Species

According to the FWS, no rare, threatened or endangered species would be impacted by the construction of the alternatives.

5.6.1.e Prime and Unique Farmlands

Based upon analysis of the SCS soil survey maps, there are no prime and unique farmland soils in existence within the Stewart/April Lane site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use. Compliance with the Farmland Protection Policy Act of 1981 is met.

5.6.1.f Water Quality

The watershed of Stewart/April Lane was developed as a suburban community in the early 1960's prior to implementation of stormwater management controls. Benefits to water quality from stormwater qualitative and quantitative control would occur in the downstream reaches. The stormwater pond and associated wetland are expected to reduce erosion and suspended solids. This reduction would increase the water clarity and decrease the downstream loadings of metals and organic contaminants in the tributary and Paint Branch. As the suspended solids decrease, dissolved-oxygen levels would increase with increased photic activity.

All fill material would be clean material that would meet applicable water quality standards. All work would be performed in accordance with the same standards.

5.6.1.g Air Quality

Montgomery County falls within the metropolitan Washington nonattainment area as defined by the Federal guidance published pursuant to the CAAA. The area is designated as a serious nonattainment area for ozone. Construction of the Stewart/April Lane action may cause temporary impacts on air quality due to exhaust from construction machinery but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts on air quality may result due to the filtering aspect of additional vegetative cover. According to MDE, the proposed actions are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.6.1.h Hazardous, Toxic and Radioactive Waste

During the site investigation, considerable trash and debris were observed at the site. Further investigation indicated that the dumping had occurred some time ago. Because no evidence of actual hazardous or potentially hazardous material was found at this site, no adverse effects to the proposed action are predicted. From the Maryland HWR and the CERCLIS list search, 11 potential HTRW sources were identified within a 1-mile radius of the site. Due to the distance from the site, it was determined that they would have no effect upon the proposed action.

During construction of the environmental restoration actions, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course of construction it would be handled in accordance with applicable local, state and Federal laws, and Corps regulations.

5.6.2 Aesthetic and Recreational Effects

A stormwater detention basin would be constructed within forested parklands, impacting and altering the character of the lands. Although this is a character change, the area would be put to beneficial use as described in the goals of the action. Field observations have identified that the area is inhabited by various bird species. The construction of a pond and wetland may attract additional wetland bird species which would be of interest to recreationalists. The wetland plant growth would act as a visual barrier to the open water. The gentle slope of the pond edge and the vegetation screen could prevent drowning through accidental falling or slipping into the deep water pond. The Corps would work with the M-NCPPC to minimize the effects upon the aesthetic and recreational resources during construction of the proposed action.

5.6.3 Cultural Effects

The construction and formation of the detention basin would occur within forested parklands, therefore, there would be no indirect, or visual effects, by the proposed action to potential cultural resources in the vicinity. The inundation of low terraces along the tertiary stream has the potential for affecting archeological resources.

According to the records of the Maryland Historic Trust, there are no recorded sites within the present study location. During the disturbance survey, it was determined that this site location has been subjected to only limited disturbance by modern construction activities (location of two sewer lines). Although residential development has occurred in close proximity to the area, there remains sufficient undisturbed area to provide the potential for locating prehistoric sites.

Field investigations revealed that there was no evidence that the soil horizons contain the type of information necessary to meet the criteria of the National Register of Historic Places. Implementation of the alternatives would have no effect upon cultural resources. No further investigations are required and no mitigation measures are necessary. With the No-Action Plan, there would be no effect upon cultural resources because there would be no disturbance to the area.

The State Historical Preservation Officer of Maryland concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources and that no further investigations are warranted for the site.

5.7 LOCKRIDGE DRIVE--MONTGOMERY COUNTY

The goal of this proposed pond is to increase fish and wildlife habitat in the Northwest Branch and to provide wetlands habitat in the area. This would be accomplished by the creation of a shallow marsh wetland pond that would provide stormwater quantity and quality control for the 153 heavily developed acres draining to the site.

Three alternatives have been considered for this site. Two of the alternatives propose habitat plantings, one with a bypass pipe and one without. The remaining alternative proposes a bypass pipe with no plantings. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-6 contains summary information on potential impacts of the alternative plans considered for the Lockridge Drive stormwater wetland site.

TABLE 5-6 LOCKRIDGE DRIVE - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	*ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERANTIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION		
2. Aesthetic Values	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
3. Recreational Opportunities	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
4. Transportation	NO IMPACT	TEMPORARY ADVERSE IMPACT DURING CONSTRUCTION	TEMPORARY ADVERSE IMPACT DURING CONSTRUCTION	TEMPORARY ADVERSE IMPACT DURING CONSTRUCTION		
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Business and Home Relocations	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Existing and Potential Land Use	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
9. Flooding Effects	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Energy Needs and Resource	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		

TABLE 5-6 LOCKRIDGE DRIVE - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	*ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	ADVERSE IMPACTS		
2. Wetlands	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	NO ADVERSE IMPACTS		
3. Aquatic Habitat	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
5. Biological Productivity	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		

FOOTNOTES:
*SELECTED ACTION PLAN

5.7.1 Environmental Effects

5.7.1.a Aquatic Resources

The proposed action at Lockridge Drive would hold stormwaters before depositing them first into the tributary and then into the Northwest Branch. This would allow debris and sediment to settle out before being deposited into the secondary stream. The proposed action for the Lockridge site would have moderate beneficial impacts upon fish habitat and water quality in the downstream reach of the Northwest Branch.

Alternatives 1 and 3 propose a bypass pipe to divert the inflow directly to the outlet structure; bypassing the pond. Alternative 2 does not propose a bypass pipe; instead, it allows the water to enter the pond and pass naturally into the tributary. As the Northwest Branch is a cool-to-warm water fishery, the possible impact to the aquatic habitat of the Northwest Branch from heated water would be marginal. Reduction of thermal impacts in the Northwest Branch is not a goal, and the construction and maintenance for the pipe would be an unnecessary additional expense.

The proposed pond would provide a trap for pollutants, sediments and debris from the 153-acre urban drainage area. The pond would control the flashy flows and the erosion in the area below the site.

Impacts. The alternatives would have a positive long-term impact upon aquatic resources within the unnamed tributary. Although the dam would create a long-term impact, the impact would not be significant due to the existing lack of aquatic habitat and the minimal base flow. The construction of the dam (Alternatives 1, 2 and 3) and the proposed wetland plantings (Alternatives 1 and 2) would create minor, temporary adverse impacts by increasing downstream sedimentation during and immediately after construction.

Long-term positive impacts are expected on aquatic habitat as a result of the creation of the wetlands which produce a biologically diverse, productive environment. Other less common, more diverse species are expected to establish residence with the creation of a more biologically productive habitat in the tributary and in the Northwest Branch due to improved water quality.

All the alternatives would have minor, temporary adverse impacts on organisms which would be buried and excavated as a result of the action. Some of the aquatic species are expected to recolonize the newly created aquatic habitat. Nekton would be temporarily disturbed during construction, but are expected to return and increase after construction is complete. Overall, the food web is expected to increase benthic, aquatic and riparian habitat that would support an increased diversity of benthic, aquatic and terrestrial species.

This action may increase the thermal load within the Northwest Branch. This should not have a detrimental effect on the biota since this part of the Northwest Branch contains thermally tolerant species, and the water released from the project enters the Burnt Mills reservoir a short distance downstream. Sediment and erosion control measures in compliance with local, state, and Federal laws would be used to minimize impacts to aquatic habitat.

5.7.1.b Wetlands

Presently, no wetlands exist within the study area and no significant impacts would occur to wetlands. The wetlands proposed in Alternatives 1 and 2 would provide positive impacts to water quality, aquatic habitat and terrestrial habitat. Specifics on the types of impacts are described in the respective sections.

5.7.1.c Terrestrial Resources

The proposed alternatives would eliminate the severe streambank erosion that has undercut streambank vegetation and forest canopy. Once established, the pond in Alternatives 1 and 2 would create habitat for fish and wildlife through the planting of wetland vegetation. The proposed alternatives would have a positive impact on terrestrial resources through increased diversity and abundance of aquatic habitats that would attract other water-dependent and aquatic-foraging birds and mammals.

The action would remove habitat for forest species and replace it with habitat associated with wetland and small-pond species. The amount of forested land that is disturbed during construction of the pond and access would be replaced at other feasibility study sites in the basin which have been identified as needing reforestation.

5.7.1.d Threatened and Endangered Species

According to the FWS, there are no rare, threatened, or endangered species within the area.

5.7.1.e Prime and Unique Farmlands

Based upon analysis of the SCS soil survey maps, there are no prime and unique farmland soils in existence within the Lockridge Drive site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use. Compliance with the Farmland Protection Policy Act is met.

5.7.1.f Water Quality

The Lockridge Drive action Alternatives 1, 2 and 3 would have a positive impact on water quality in the tributary and in the Northwest Branch.

Benefits to water quality from stormwater qualitative and quantitative control would occur in the downstream reaches. As mentioned in the section on aquatic resources, the stormwater pond and associated wetland are expected to reduce erosion and suspended solids. This reduction would increase the water clarity and decrease the downstream loadings of metals and organic contaminants in the tributary and Northwest Branch. As the suspended solids decrease, dissolved-oxygen levels would increase with increased photic activity.

All fill material would be clean material that would meet applicable water quality standards. Work would be performed in accordance with all applicable state water quality standards.

5.7.1.g Air Quality

Montgomery County falls within the metropolitan Washington nonattainment area as defined by the Federal guidance published pursuant to the CAAA. The area is designated as a serious nonattainment area for ozone. Construction of the Lockridge Drive site may cause temporary impacts on air quality due to exhaust from construction machinery, but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts to air quality may result due to the filtering aspect of additional vegetative cover. According to MDE, the proposed actions are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.7.1.h Hazardous, Toxic and Radioactive Waste

The Maryland HWR identified four potential hazardous waste sources within a one-mile radius of the site. Because of the nature of these sources and their distance from the site, their potential impacts on the site are considered minimal. No evidence of potential HTRW sources was observed during the investigation. During construction of the environmental restoration sites, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course of construction, appropriate measures would be taken to contain the material.

5.7.2 Aesthetic and Recreational Resources

The Lockridge Drive action would involve the construction of a dam and the formation of a stormwater wetland. The construction and formation of the wetland would occur within

heavily forested parklands, causing the removal of large trees for pond construction and access. This action would significantly alter the character of the site. The amount of forested land that is disturbed during construction would be replaced elsewhere in the basin. A management plan would be drafted during the next phase of study in accordance with Maryland's Forest Management Plan. Due to the reforestation plan, the effects are not considered significant.

An existing trail passes through the proposed site. This trail is currently used by residents in the surrounding neighborhoods. During construction of the proposed site, access in and out of the area would be difficult; however, adjacent parklands that would not be disturbed would be available for recreation purposes. A gravel access road would be permanently created from Lockridge Drive into the pond site. This road would be available for access to the Northwest Branch and the wooded trail areas.

The Corps would work with the M-NCPPC to minimize the effects upon aesthetic and recreational resources.

5.7.3 Cultural Effects

According to the records of the Maryland Historic Trust, there are two historic mill sites located near the study area. Both are located on the major stem of the Northwest Branch, several hundred feet to the north of the present study location. There are no recorded historic or prehistoric sites within the present study area.

During the disturbance survey, it was determined that this site location has been subjected to only limited disturbance by modern construction activities. Although residential development has occurred in close proximity to the area, there remains sufficient undisturbed area to provide the potential for locating prehistoric sites. Field investigations consisted of a through surface reconnaissance and shovel test excavation. No surface evidence of cultural materials was found. The shovel testing revealed no evidence of prehistoric or historic occupation or intense utilization of the area. It is determined that the proposed action would have no effect upon cultural resources.

The State Historical Preservation Officer of Maryland concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources and that no further investigations are warranted for the site.

5.8 SNOWDEN'S MILL I–MONTGOMERY COUNTY

The goal of this proposed stormwater management pond retrofit is to increase fish and wildlife habitat in Paint Branch and the unnamed tributary and to provide wetland habitat at the site. This would be accomplished by the creation of a shallow marsh wetland pond in

what is now a dry detention pond. This proposed retrofit would provide enhanced stormwater quantity and quality control for the 91.3 developed acres draining into the site. Baseflow from Snowden's Mill I is estimated to be 0.15 cubic feet per second (cfs). The water control structure is designed to store and slowly release storm events up to the two-year storm event level.

Four alternatives for this site have been proposed. Two of the alternatives propose a new outlet design and habitat plantings; Alternative 1 has a bypass pipe and Alternative 2 does not. Alternative 3 proposes a new outlet design with a bypass pipe and Alternative 4 suggests habitat plantings with a bypass pipe. All alternatives include reforestation. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-7 contains summary information on potential impacts of the alternative plans considered for the Snowden's Mill I stormwater wetland site.

5.8.1 Environmental Effects

5.8.1.a Aquatic Resources

Alternatives. No significant aquatic resources exist in the stormwater management pond. The concern of this stormwater pond is its thermal impact on the unnamed tributary and on Paint Branch. The object of this action is not only to increase fish and wildlife habitat but also to decrease the thermal loading caused by the stormwater management pond to the tributary and Paint Branch.

The proposed alternatives would have no negative significant impacts on any aquatic resources within the existing channel or the tributary. Alternatives 1, 3, and 4 include a base flow bypass pipe which would help decrease the thermal loading downstream. Alternative 2 does not include a bypass pipe and the heated water would continue to wash into the tributary and Paint Branch. The proposed wetland plantings in Alternatives 1, 2, and 4 would filter the pollutants and suspended solids associated with residential use which flow into Paint Branch. Alternative 3 does not propose wetland plantings, and the pollutants, suspended solids and debris would continue to flow through the bypass pipe into the tributary and Paint Branch.

Impacts. Best management practices and an erosion and sediment control plan would be prepared specifying and illustrating control devices to be employed during construction. The devices should be selected and designed according to current local, state and Federal standards and technology. No long-term significant adverse impacts to aquatic species or habitat are expected to occur from the construction of the alternatives. An overall positive impact on the food web is expected with increased aquatic habitat and riparian habitat that would support an increased diversity of benthic, aquatic and terrestrial species.

TABLE 5-7 SNOWDEN'S MILL I - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERANTIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	
2. Aesthetic Values	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
3. Recreational Opportunities	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
4. Transportation	NO IMPACT	NO ADVERSE IMPACT	NO ADVERSE IMPACT	NO ADVERSE IMPACT	NO ADVERSE IMPACT	
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
8. Business and Home Relocations	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
9. Existing and Potential Land Use	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	

TABLE 5-7 SNOWDEN'S MILL I - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	
2. Wetlands	ADVERSE IMPACTS	POSITIVE IMPACTS.	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	
3. Aquatic Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
5. Biological Productivity	ADVERSE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	

FOOTNOTES:
*SELECTED ACTION PLAN

Increased thermal loading is an important potential impact of this site as this section of Paint Branch is classified as a Use III (natural trout) stream. The base flow bypass pipe should minimize thermal loading during normal flows as it allows base amounts of unponded water to pass into Paint Branch. In addition, a reforestation plan to increase shading of the stormwater wetland will also serve to minimize temperature increases. During runoff events, the project is not likely to cause higher thermal loading than occurs under the existing conditions. The beneficial aspect of trapping pollutants, sediments and debris outweighs the potential for a slight increase in temperature in Paint Branch during storm flows as heated water from the permanent pool is displaced by run-off.

5.8.1.b Wetlands

No wetlands exist within the proposed site; therefore, the proposed action would not impact any existing wetlands. Approximately a 0.2-acre wetland would be constructed in the existing stormwater management pond. The proposed changes to the outlet structure in Alternatives 1, 2, and 3 would control the outflow and allow fluctuation in the water depth to keep the wetlands active. Alternative 4 does not propose any changes to the outlet structure; therfore, it decreases the likelihood for wetland vegetation survival.

Maintenance for Alternatives 1, 2, and 4 would require periodic draining of the created wetland and removal of sediments to adjust the created wetland for optimal vegetative growth and effectiveness. Alternative 3 and the No-Action Alternative would not meet the goals of the AWRC or the Corps in terms of enhancing aquatic diversity and providing for a quality urban fishery, reducing the pollutant loading, and increasing the natural filtering capacity by increasing the acreage of non-tidal wetlands.

Impacts. The proposed wetland plantings in Alternatives 1, 2, and 4 would provide positive impacts by increasing dissolved oxygen through the reduction of suspended solids which would allow more photosynthetic activity; reducing the downstream loadings of metals and organic contaminants through filtering and microbial functions; and creating a more diverse, biologically productive environment. Alternative 3 does not propose any wetlands and would not gain the benefits that wetlands offer.

5.8.1.c Terrestrial Resources

Alternatives 1, 2, and 4 propose reforesting the adjacent upland area which would have a positive impact on terrestrial resources within the site. An overall positive impact would result from the increased diversity and aquatic habitat that would attract other water-dependent and aquatic-foraging birds and mammals. Alternative 3 does not propose to plant any trees or shrubs in the existing sparsely vegetated area. Alternative 3 would have the same effects as the No-Action Plan.

5.8.1.d Threatened and Endangered Species

According to the FWS, no rare, threatened or endangered species would be impacted by the construction of the alternatives.

5.8.1.e Prime and Unique Farmlands

Based upon analysis of the SCS soil survey maps, there are no prime and unique famland soils in existence within the Snowden's Mill I site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use. Compliance with the Farmland Protection Policy Act of 1981 is met.

5.8.1.f Water Quality

Baseflow would be diverted through a pipe to protect it from thermal loading due to extended impoundment in the pond in Alternatives 1, 3 and 4; Alternative 2 does not divert the base flow. All alternatives propose a 0.2-acre wetland which would act as a sediment, debris, and pollutant collector for the runoff from the highly developed drainage area.

Water quality improvements from wetlands include: reduction of suspended solids, increased dissolved-oxygen levels, reduction of nutrient levels, and water clarity.

5.8.1.g Air Quality

Montgomery County falls within the metropolitan Washington nonattainment area as defined by the Federal guidance published pursuant to the CAAAA. The area is designated as a serious nonattainment area for ozone. Construction of the Snowden's Mill I action may cause temporary impacts to air quality due to exhaust from construction machinery, but emissions will fall well below the designated rates allowable in nonattainment areas. Long-term beneficial impacts to air quality may result due to the filtering aspect of additional vegetative cover. According to MDE, the proposed actions are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.8.1.h Hazardous, Toxic and Radioactive Waste

Eleven potential HTRW sources were identified through the CERCLIS and the Maryland HWR searches. Six of the sources are located in the Montgomery Industrial Park approximately one mile south of the proposed site. The other sources were located within one mile of the proposed site. The distance from the site and the nature of the sources

decreases the likelihood that they would impact the action. During a field reconnaissance no evidence of potential HTRW sources was observed at the proposed site.

During construction of the environmental restoration actions, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course of construction, it would be handled in accordance with applicable local, state, and Federal laws and Corps regulations.

5.8.2 Aesthetic and Recreational Effects

Presently, the proposed site has minimal visual character and recreational value. The construction of the proposed wetlands would enhance the visual character of the site. The wetlands would attract waterfowl and other species associated with wetlands which would enhance the aesthetic and recreational value of this community space in an area of single family homes.

5.8.3 Cultural Effects

The proposed actions would involve the relocation of fill material within the basin of the detention pond. These actions could have both direct and indirect effects upon possible cultural resources in the area. According to the records of the Maryland Historic Trust, there are four recorded cultural sites within a mile of the study location, two prehistoric sites and two historic sites.

During the disturbance survey, it was determined that this area is a completely man-made feature of the landscape. Although undisturbed forested lands are located within 100 feet of the site, all of the construction activities would be confined to the interior of the artificial basin. Therefore, the action does not have the potential for affecting any areas that may contain archeological resources. The area is surrounded by a suburban neighborhood. Therefore, there would be no indirect visual effects upon any historic structures from the proposed action. As this action would only involve the regrading of previously disturbed soils, no further investigations were warranted for this location, and the proposed actions would have no effect upon cultural resources.

The State Historical Preservation Officer of Maryland concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources and that no further investigations are warranted for the site.

5.9 SNOWDEN'S MILL II--MONTGOMERY COUNTY

The goal of this proposed stormwater management pond retrofit is to increase fish and wildlife habitat in Paint Branch and the unnamed tributary and to provide wetland habitat in

the area. This would be accomplished by the creation of a shallow marsh wetland pond in what is now a dry detention pond. This proposed retrofit would provide enhanced stormwater quantity and quality control for the 120 developed acres draining into the site. Baseflow from Snowden's Mill II is estimated to be 0.15 cubic feet per second (cfs). The water control structure is designed to store and slowly release storm events up to the two-year storm event level.

Four alternatives for this site have been proposed. Two of the alternatives propose a new outlet design and habitat plantings; Alternative 1 has a bypass pipe and Alternative 2 does not. Alternative 3 proposes a new outlet design with a bypass pipe and Alternative 4 suggests habitat plantings with a bypass pipe. All alternatives include reforestation. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-8 contains summary information on potential impacts of the alternative plans considered for the Snowden's Mill II stormwater wetland site.

5.9.1 Environmental Effects

5.9.1.a Aquatic Resources

Alternatives. No significant aquatic resources exist in the stormwater management pond. The concern of this stormwater pond is its thermal impact on the unnamed tributary and on Paint Branch. The object of this action is not only to increase fish and wildlife habitat but also to decrease the thermal loading caused by the stormwater management pond to the tributary and Paint Branch.

Impacts. The proposed alternatives would have no negative significant impacts on aquatic resources within the existing concrete channel or downstream. Alternatives 1, 3, and 4 include a base flow bypass pipe which would help decrease the thermal loading downstream. The proposed wetland plantings in Alternatives 1, 2, and 4 would filter the pollutants and suspended solids associated with residential use which flow into Paint Branch.

Best management practices and an erosion and sediment control plan would be prepared specifying and illustrating control devices to be employed during construction. The devices should be selected and designed according to current local, state and Federal standards and technology. No long-term significant adverse impacts to aquatic species or habitat are expected to occur from the construction of the alternatives. An overall positive impact on the food web is expected with increased aquatic habitat and riparian habitat that would support an increased diversity of benthic, aquatic and terrestrial species.

TABLE 5-8 SNOWDEN'S MILL II - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERANTIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	
2. Aesthetic Values	ADVERSE IMPACTS	POSITIVE IMPACT RELATING TO AESTHETICS	POSITIVE IMPACT RELATING TO AESTHETICS	POSITIVE IMPACT RELATING TO AESTHETICS	POSITIVE IMPACT RELATING TO AESTHETICS	
3. Recreational Opportunities	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
4. Transportation	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
8. Business and Home Relocations	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
9. Existing and Potential Land Use	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	POSITIVE IMPACT RELATING TO AESTHETICS	POSITIVE IMPACT RELATING TO AESTHETICS	POSITIVE IMPACT RELATING TO AESTHETICS	POSITIVE IMPACT RELATING TO AESTHETICS	
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	

TABLE 5-8 SNOWDEN'S MILL II - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	*ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	
2. Wetlands	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	
3. Aquatic Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
5. Biological Productivity	ADVERSE IMPACTS	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	

FOOTNOTES:
*SELECTED ACTION PLAN

Increased thermal loading is an important potential impact of this site as this section of Paint Branch is classified as a Use III (natural trout) stream. The base flow bypass pipe should minimize thermal loading during normal flows as it allows base amounts of unponded water to pass into Paint Branch. In addition, a reforestation plan to increase shading of the stormwater wetland will also serve to minimize temperature increases. During runoff events, the project is not likely to cause higher thermal loading than occurs under the existing conditions. The beneficial aspect of trapping pollutants, sediments and debris outweighs the potential for a slight increase in temperature in Paint Branch during storm flows as heated water from the permanent pool is displaced by run-off.

5.9.1.b Wetlands

No wetlands exist within the proposed site; therefore, the proposed action would not impact any existing wetlands. Approximately a 0.2-acre wetland would be constructed in the existing stormwater management pond. The proposed changes to the outlet structure in Alternatives 1 and 2 would control the outflow and allow fluctuation in the water depth to keep the wetlands active. Alternative 4 does not propose any changes to the outlet structure; therefore, it decreases the likelihood for wetland vegetation survival.

Maintenance for Alternatives 1, 2, and 4 would require periodic draining of the created wetland and removal of sediments to adjust the created wetland for optimal vegetative growth and effectiveness. Alternative 3 and the No-Action Alternative would not meet the goals of the AWRC and the Corps in terms of enhancing aquatic diversity and providing for a quality urban fishery, reducing the pollutant loading, and increasing the natural filtering capacity by increasing the acreage of non-tidal wetlands.

The proposed wetland plantings in Alternatives 1, 2 and 4 would provide positive impacts by increasing dissolved oxygen through the reduction of suspended solids which would allow more photosynthetic activity; reducing the downstream loadings of metals and organic contaminants through filtering and microbial functions; and creating a more diverse, biologically productive environment.

5.9.1.c Terrestrial Resources

Alternatives 1, 2, and 4 propose reforesting the adjacent upland area which would have a positive impact on terrestrial resources within the proposed site. An overall positive impact would result from the increased diversity and increased aquatic habitat that would attract other water-dependent and aquatic-foraging birds and mammals.

5.9.1.d Threatened and Endangered Species

According to the FWS, no rare, threatened, or endangered species would be impacted by the construction of the alternatives.

5.9.1.e Prime and Unique Farmlands

Based upon analysis of the SCS soil survey maps, there are no prime and unique farmland soils in existence within the Snowden's Mill II site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of famland to nonagricultural use. Compliance with the Farmland Protection Policy Act is met.

5.9.1.f Water Quality

Baseflow would be diverted through a pipe to protect it from thermal loading due to extended impoundment in the pond in Alternatives 1, 3 and 4. All alternatives propose a 0.2-acre wetland which would act as a sediment, debris, and pollutant collector for the runoff from the highly developed drainage area.

Water quality improvements from wetlands include: reduction of suspended solids, increased dissolved-oxygen levels, reduction of nutrient levels, and water clarity.

5.9.1.g Air Quality

Montgomery County falls within the metropolitan Washington nonattainment area as defined by the Federal guidance published pursuant to the CAAA. The area is designated as a serious nonattainment area for ozone. Construction of the Snowden's Mill II action may cause temporary impacts on air quality due to exhaust from construction machinery, but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts to air quality may result due to the filtering aspect of additional vegetative cover. According to MDE, the proposed actions are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.9.1.h Hazardous, Toxic and Radioactive Waste

Eleven potential HTRW sources were identified through the CERCLIS and the Maryland HWR searches. Six of the sources are located in the Montgomery Industrial Park approximately one mile south of the proposed site. The other sources were located within one mile of the proposed site. The distance from the site and the nature of the sources

decreases the likelihood that they would impact the action. During a field reconnaissance, no evidence of potential HTRW sources was observed at the proposed site.

During construction of the environmental restoration actions, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course of construction it would be handled in accordance with applicable local, state, and Federal laws, and Corps regulations.

5.9.2 Aesthetic and Recreational Effects

Presently the proposed site has minimal visual character and recreational value. The construction of the proposed wetlands would enhance the visual character of the site. The wetlands would attract waterfowl and other species associated with wetlands which would enhance the recreational value of this community space in an area of single family homes.

5.9.3 Cultural Effects

The proposed actions would involve the relocation of fill material within the basin of the detention pond. These actions have the potential for both direct and indirect effects upon possible cultural resources.

According to the records of the Maryland Historic Trust, there are four recorded cultural sites within a mile of the study location, two prehistoric sites and two historic sites. During the disturbance survey, it was determined that this area is a completely man-made feature of the landscape. Although undisturbed forested lands are located within 100 feet of the basin, all of the proposed activities would be confined to the interior of the artificial trough. Therefore, the action does not have the potential for affecting any areas that may contain archeological resources. Additionally, since this area is surrounded by suburban neighborhood, there would be no indirect visual effects to historic structures. As this action would only involve the regrading of previously disturbed soils, it was determined that no further investigations were warranted for this location, and the proposed actions would have no effect upon cultural resources.

The State Historical Preservation Officer of Maryland concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources and that no further investigations are warranted for the site.

5.10 TANGLEWOOD--MONTGOMERY COUNTY

The goal of this proposed stormwater management pond retrofit is to increase fish and wildlife habitat in Little Paint Branch and the unnamed tributary and to provide wetlands habitat in these areas. This would be accomplished by the creation of a shallow marsh

wetland in what is now a dry detention pond. This proposed retrofit would provide enhanced stormwater quantity and quality control for the 54 developed acres draining into the site.

Four alternatives for this site have been proposed. Two of the alternatives propose a new outlet design, and habitat plantings; Alternative 1 has a bypass pipe and Alternative 2 does not. Alternative 3 proposes a new outlet design with a bypass pipe and Alternative 4 suggests habitat plantings with a bypass pipe. All alternatives include reforestation. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-9 contains summary information on potential impacts of the alternative plans considered for the Tanglewood stormwater wetland site.

5.10.1 Environmental Effects

5.10.1.a Aquatic Resources

Alternatives. The proposed wetland plantings would filter the pollutants and suspended solids associated with residential use which flow into Little Paint Branch. Alternatives 1, 2 and 4 propose aquatic and terrestrial plantings, but Alternative 3 would not include the aquatic and terrestrial plantings which act as filters for pollutants and debris. Until the plants establish, debris, sediments and pollutants would continue to enter Little Paint Branch and would not promote increased fish and wildlife habitat.

Alternative 2 proposes multiple pools of emergent wetland plant growth and a sediment forebay which will provide progressive water treatment. This treatment would greatly enhance the efficiency of sedimentation, debris collection and the qualitative treatment of stormwater through planting of emergent wetland plants. The proposed pools would collect the majority of the sediments and debris that typically enter Little Paint Branch.

Impacts. A bypass pipe is not necessary to maintain the water temperature in Little Paint Branch. Inflow to Little Paint Branch from the tributary would not cause significant increases in the water temperature or thermal loading from the tributary. A series of pools would collect debris, sediments, and pollutants associated with the residential development.

Aquatic resources would experience minor temporary adverse impacts during the construction of the proposed alternatives. No long-term significant adverse impacts to aquatic species or habitat are expected to occur from the construction of the alternatives. Time-of-year restrictions would be adhered to during construction of the features. Best management practices and an erosion and sediment control plan would be prepared specifying and illustrating control devices to be employed during construction.

TABLE 5-9 TANGLEWOOD - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	*ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERANTIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	
2. Aesthetic Values	ADVERSE IMPACTS	LONG-TERM BENEFICIAL IMPACTS	LONG-TERM BENEFICIAL IMPACTS	LONG-TERM BENEFICIAL IMPACTS	LONG-TERM BENEFICIAL IMPACTS	
3. Recreational Opportunities	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	
4. Transportation	NO IMPACT	TEMPORARY IMPACTS DURING CONSTRUCTION	TEMPORARY IMPACTS DURING CONSTRUCTION	TEMPORARY IMPACTS DURING CONSTRUCTION	TEMPORARY IMPACTS DURING CONSTRUCTION	
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
8. Business and Home Relocations	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
9. Existing and Potential Land Use	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	POSITIVE IMPACTS RELATED TO AESTHETICS	POSITIVE IMPACTS RELATED TO AESTHETICS	POSITIVE IMPACTS RELATED TO AESTHETICS	POSITIVE IMPACTS RELATED TO AESTHETICS	
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT	

TABLE 5-9 TANGLEWOOD - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	*ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	
2. Wetlands	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	
3. Aquatic Habitat	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	POSITIVE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	
5. Biological Productivity	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	

FOOTNOTES:
*SELECTED ACTION PLAN

5.10.1.b Wetlands

A small amount of wetland vegetation which primarily consists of willow clumps exists in the present stormwater management pond. This vegetation would be removed during construction of the ponds, and Alternatives 1, 2, and 4 propose planting of new wetland vegetation. The proposed plantings would exceed the size and diversity of the existing wetlands and provide additional habitat for wetland species. Alternative 3 does not propose planting of new wetland vegetation and would rely on the natural establishment of wetland plant species.

Alternatives 1, 3, and 4 propose a pond bypass pipe which would divert the base flow around the created and naturally established wetland areas. This action could cause unstable water amounts in the wetlands and decrease their success, thereby defeating the goal set for the study. No long-term significant impacts on the created wetlands are expected from Alternative 2.

Beneficial effects are expected as a result of increased filtering and microbial action in the created wetlands. Pollutants from non-point sources in the urban watershed including sediment, nutrients, PAHs, and pesticides have been found in the Anacostia River. The wetlands are expected to reduce contaminants as a result of filtering and microbial action in the created wetlands.

5.10.1.c Terrestrial Resources

Mammals which use this area for food and cover as well as existing vegetation would be temporarily displaced during construction of the action. Alternatives 1, 2, and 4 would replace and expand the the lost vegetation and the habitat value of the site would increase. These alternatives would not present any long-term or widespread adverse impacts on the terrestrial resources. The planting of terrestrial vegetation would cause long-term positive impacts. Alternative 3 would rely on establishing vegetation naturally and would adversely impact the wildlife which use the site for food, cover and habitat.

5.10.1.d Threatened and Endangered Species

According to the FWS, no rare, threatened or endangered species would be impacted by the construction of any of the alternatives.

5.10.1.e Prime and Unique Farmlands

Based upon analysis of the SCS soil survey maps, there are no prime and unique farmland soils in existence within the Tanglewood site. Therefore, there would be no impacts on

these soil types and no unnecessary conversion of farmland to nonagricultural use. Compliance with the Farmland Protection Policy Act of 1981 is met.

5.10.1.f Water Quality

Alternative 2 proposes treatment which would greatly enhance the efficiency of sediment and debris filtering, as well as the qualitative treatment of stormwater.

5.10.1.g Air Quality

Montgomery County falls within the metropolitan Washington nonattainment area as defined by the Federal guidance published pursuant to the CAAA. The area is designated as a serious nonattainment area for ozone. Construction of the Tanglewood action may cause temporary impacts to air quality due to exhaust from construction machinery, but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts to air quality may result due to the filtering aspect of additional vegetation. According to MDE, the proposed actions are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.10.1.h Hazardous, Toxic and Radioactive Wastes

The proposed alternatives would not have an impact on HTRW, because field investigations and records searches did not reveal potential sites within one mile of the proposed site. During construction of the environmental restoration actions, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course of construction, it would be handled in accordance with applicable local, state, and Federal laws, and Corps regulations.

5.10.2 Aesthetic and Recreational Effects

The existing area provides habitat for a number of small to large mammals and various bird species. Alternatives 1, 2, and 4 would enhance the existing habitat and open up the area for recreational animal and bird watching. Alternative 3 does not propose any habitat and/or reforestation and would adversely impact aesthetic and recreational resources.

5.10.3 Cultural Effects

The proposed actions would involve the removal and relocation of fill material within the basin of the detention pond. This action has the potential for both direct and indirect effects upon potential cultural resources. The site files of the Maryland Historical Trust documented that there are five recorded cultural sites located within a mile of the study location.

During the disturbance survey, it was found that the area is severely disturbed. The construction of the stormwater detention basin consisted of channelization of the streambed and the placement of up to 20 feet of fill material to form the existing embankment. All proposed actions are to be contained within the disturbed portions of this location. Since there would be no effects on naturally occurring soils, this action would not have an effect upon any archeological sites. Additionally, it was found that the Tanglewood stormwater detention pond is totally surrounded by recently constructed townhomes and single family residences. Therefore, the proposed action would not have any indirect visual effects. Since this action would only involve the re-grading of previously disturbed soils, it was determined that no further investigations were warranted for this location, and the proposed actions would have no effect upon cultural resources.

The State Historical Preservation Officer of Maryland concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources and that no further investigations are warranted for the site.

5.11 GUM SPRINGS--MONTGOMERY COUNTY

The proposed action is to construct a bypass pipe that would direct the stormwater into the Paint Branch, rather than via Oak Springs. This action would involve construction of a headwall across Oak Springs, a 36-inch pipe along a 1,800 foot segment of the parkland and streambank protection (placement of riprap) along a 100-foot section of the outflow at Paint Branch. The Gum Springs action is a stream restoration construction action. Gum Springs is a tributary of Paint Branch and is classified as Use III-Natural Trout Waters by the MDE. The goal of this action is to decrease thermal loading and flashy stormwater flows from the Oak Springs tributary of Gum Springs. This is to be accomplished by diverting the flow from Oak Springs directly to Paint Branch, thereby bypassing Gum Springs.

Three alternatives were considered for this site. The alternatives differ in the length of the bypass pipe. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-10 contains summary information on potential impacts of the alternative plans considered for the Gum Springs stream restoration.

TABLE 5-10 GUM SPRINGS - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION		
2. Aesthetic Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
3. Recreational Opportunities	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
4. Transportation	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION		
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Business and Home Relocations	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Existing and Potential Land Use	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
10. Energy Requirements & Conservation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		

TABLE 5-10 GUM SPRINGS - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	*ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	ADVERSE IMPACTS		
2. Wetlands	ADVERSE IMPACTS	NO ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	NO ADVERSE IMPACTS		
3. Aquatic Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
5. Biological Productivity	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION		
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		

FOOTNOTES:
*SELECTED ACTION PLAN

5.11.1 Environmental Effects

5.11.1.a Aquatic Resources

Existing Conditions. Gum Springs, along with Good Hope Branch and the Right Fork, are the major spawning and nursery tributaries for the brown trout population of Paint Branch. The silt-free stream bottom and cool, clear water of Gum Springs provide suitable habitat. Oak Springs receives base flow and impounded stormwater runoff from a highly urbanized drainage area. The stream flow is thermally loaded as a result of extended solar exposure in the existing stormwater ponds. The substrate is silt, sand, and gravel.

Over the past 12 years, the DNR has monitored Gum Springs to evaluate trout reproduction. The existing impacts from stormwater runoff, as stated above, have caused a documented decline in trout reproduction. This naturally reproducing fishery is an extremely scarce resource in the Anacostia River watershed.

Alternatives. All the alternatives propose diversion of the base flow from the Oak Springs stormwater pond directly into Paint Branch. The pipe would discharge into the stream in various places depending upon the alternative; Alternative 1 would discharge at the confluence of Gum Springs and Paint Branch, and Alternatives 2 and 3 would discharge approximately 200 feet downstream of the confluence of Gum Springs and Paint Branch.

The alignment of the pipe in Alternative 1 is expected to cause erosion and reduce the amount of vegetation along the stream area. The outflow from the pipe, especially during high flows, would erode the opposite bank of Paint Branch.

The intake and the outlet are the only locations which require instream fill. The outlet would consist of riprap and filter fabric. This area is a well-buffered stream that receives drainage from predominantly suburban development and large areas of open space. The substrate is silty loam to gravel and cobble. The material would be delivered and placed by the use of a truck and crane and/or front end loader. Entrance into the aquatic habitat by construction machinery would be limited to that necessary for proper material placement. Fabric and plant material would be placed by hand.

The intake at Oak Springs for Alternatives 1 and 2 is located approximately 200 feet upstream of the confluence of Oak Springs and Gum Springs. The pipes would receive stormwater runoff that is thermally loaded as a result of low flows and solar exposure in the pond and in the channel where there is little vegetative cover. Alternative 3 would unnecessarily add 200 feet of pipe and collect the water at the outlet of the Oak Springs pond.

Impacts. Temporary minor adverse effects and long-term beneficial impacts are expected to nekton, plankton and benthic organisms. The organisms would be temporarily disturbed during project installation. The organisms are expected to return and increase after construction is complete as a result of the removal of thermally loaded water from a small cold water stream for dilution in a larger stream.

Increased thermal loading is an important potential impact of this site as this section of Paint Branch is classified as a Use III (natural trout) stream. The bypass pipe should minimize thermal loading as it allows up to the two-year storm event to pass directly into Paint Branch without flowing into Gum Springs. The volume of water from the bypass pipe (approximately 30 cfs maximum) is relatively small compared to the normal flow of Paint Branch. Additionally, the fish in Paint Branch are larger than those in Gum Springs; therefore, they would be more tolerant of temperature fluctuations. The minimization of thermal impacts to Gum Springs with the restoration of the trout reproduction area far outweighs the potential for a slight increase in temperature in Paint Branch. An overall positive impact on the food web is expected with the improvement of the natural trout fishery that would support an increased diversity of benthic and aquatic species.

Minimal movement of sediments is expected with the construction of the various restoration actions. Construction of the instream structures would cause temporary disturbance to aquatic habitats and aquatic species. The State of Maryland's standards for instream construction would be followed.

Time-of-year restrictions would be adhered to during construction of instream features. Best management practices and an erosion and sediment control plan (E&S) would be prepared specifying and illustrating control devices to be employed during construction. The devices should be selected and designed according to current local, state, and Federal standards and technology. No long-term significant adverse impacts to aquatic species or habitat are expected to occur from the construction of the alternatives. An overall positive impact on the food web is expected with increased benthic habitat, aquatic habitat, and riparian habitat that would support an increased diversity of benthic, aquatic, and terrestrial species.

5.11.1.b Wetlands

Alternatives 2 and 3 could temporarily impact a small (400 square feet) wet area located adjacent to Paint Branch. The exact alignment of the pipe would have to be field located to make this determination.

The pipe for Alternatives 2 and 3 would be placed in this wet area. Placement of this pipe could cause seeping of water which would be an adverse impact. Anti-seep pipe collars would be installed to contain water in the area and keep it from draining. This construction

action would minimize harm to the area and reduce any significant adverse impacts to the resource. Alternative 1 would place the pipe outside the wet area and would not adversely impact the area.

5.11.1.c Terrestrial Resources

Alternatives 1 and 2 would create temporary adverse impacts to terrestrial species during the clearing for the pipe and construction activities. The pipe would follow an existing trail, but the trail would have to be widened to allow construction machinery and construction. A permanent maintenance access road would be maintained along the same cut as the pipe placement. This access area would not be a long-term significant adverse impact to terrestrial resources. Any adverse impacts would be minimized through employment of best management practices. These impacts would not present any long-term or widespread adverse impacts on the terrestrial resources in the area.

Alternative 3 would extend the pipe an additional 300 feet directly to the Oak Springs stormwater pond. This additional 300 feet of pipe would require extensive clearing of vegetation. The additional 300 feet of pipe and the permanent adverse impacts are not necessary to meet the goal of the restoration action. Vegetation removed as a result of this action would be replaced as part of the restoration plan, except in the area needed for a maintenance access route.

The instream construction and the vegetation restoration would have no long-term significant adverse impacts to terrestrial resources. An overall positive impact would result from the increase in diversity and abundance of aquatic habitats.

5.11.1.d Threatened and Endangered Species

According to the FWS, no rare, threatened or endangered species would be impacted with the construction of any of the alternatives.

5.11.1.e Prime and Unique Farmlands

Based upon analysis of the SCS soil survey maps, there are no prime and unique farmland soils in existence within the Gum Springs site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use. Compliance with the Farmland Protection Policy Act of 1981 is met.

5.11.1.f Water Quality

Water quality in Gum Springs is rated as good and supports naturally reproducing brown trout habitat. However, thermal loading has reduced the population since the construction of the Oak Springs stormwater management ponds.

The bypass pipe in Alternatives 1, 2, and 3 would significantly reduce the thermal loading into Gum Springs through piping the base flow directly into Paint Branch. The removal of the Oak Springs base flow from Gum Springs would not adversely impact the aquatic resources or the water quality of the stream. Minor temporary impacts are expected from all alternatives during and immediately following construction. The impacts would be minimized through use of best management practices. These impacts would not present any long-term or widespread adverse impacts on the water quality of Gum Springs or Paint Branch. The action would cause long-term positive impacts by reducing the temperature and increasing the naturally reproducing Brown trout habitat.

All fill material would be clean material that would meet applicable water quality standards. Work would be performed in accordance with all applicable state water quality standards.

The No-Action Plan would continue to degrade the stream and, in turn, the Anacostia River.

5.11.1.g Air Quality

Montgomery County falls within the metropolitan Washington nonattainment area as defined by the Federal guidance published pursuant to the CAAA. The area is designated as a serious nonattainment area for ozone. Construction of the Gum Springs action may cause temporary impacts to air quality due to exhaust from construction machinery, but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts to air quality may reslut due to the filtering aspect of additional vegetation. According to MDE, the proposed actions are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.11.1.h Hazardous, Toxic and Radioactive Wastes

The field investigation revealed some dumped yard debris along one of the paths. An old car frame was found near the confluence of the tributary and Paint Branch. No other evidence of dumping or evidence of HTRW sources was observed. The records search did not identify any RCRA or CERCLA sites within a one-mile radius of the site. The action would not impact any known sources of HTRW. During construction of the environmental restoration actions, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course

of construction, it would be handled in accordance with applicable local, state, and Federal laws and Corps regulations.

5.11.2 Aesthetic and Recreational Effects.

The area is moderately forested parkland with an existing path parallel to Gum Springs. Access into the area would be provided through residential development into the parkland. The pipe alignment would correlate with an existing open trail. The trail would be cleared to expand the work area and the maintenance area. The Corps would work with the M-NCPPC to minimize the negative impacts upon the aesthetic and recreational resources.

Vegetation would be replaced after construction is completed and the path widened to allow maintenance access. The path would continue to be available for recreational purposes after the construction is complete. Short-term adverse impacts to aesthetic and recreational resources are expected as a result of some vegetation clearing. Impacts would be minimized with the selection of a pipe alignment that correlates with an existing open trail.

5.11.3 Cultural Effects

The Gum Springs action area would involve the placement of piping along a 1,700-foot construction corridor. The excavation of this trench was determined to have a potential effect on archeological resources along its entire corridor. However, since all construction would occur within heavily forested parklands, there would be no indirect or visual effects from the proposed action on architectural resources. There are no historic or prehistoric sites recorded within a mile of the proposed site.

Due to the potential for affecting buried archeological deposits within the area along a linear pipeline corridor, field investigations were conducted for this site.

The investigation revealed a generally consistent soil development along the entire corridor. A shallow A-horizon (up to 0.4 feet) was underlain by a series of yellow and tan alluvial silts. At approximately one foot, a red clay substrata was encountered. The only artifact that was recovered was a quartzite cobble, with possible flakes removed. This artifact was recovered from the disturbed A-horizon. Given the absence of any other related artifacts, this recovered artifact was not considered to indicate any original site location. Evaluation of the soil horizons, combined with the present high water table, suggests that the entire area is located within historically natural wetlands. The thin A-horizon and thick alluvial deposited B-horizon suggests that this entire area has been subjected to frequent flooding episodes, and would not have provided sites for occupation. It is likely that the primary terrace, located adjacent to the proposed site, would have been a likely area of prehistoric occupation, and that the present study area would have been utilized only for food

procurement. Due to the absence of prehistoric or historic archeological sites within this study area, construction at the proposed site would have no effect upon cultural resources.

The State Historical Preservation Officer of Maryland concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources and that no further investigations are warranted for the site.

5.12 SLIGO CREEK--MONTGOMERY COUNTY

The goal of this proposed restoration action is to increase fish and wildlife habitat in Sligo Creek through the stabilization of eroding stream banks, increase of riparian vegetation, deepening of broad shallow stream sections, and the restoration of instream habitat diversity. According to Maryland State Water Use designations, Sligo Creek is capable of supporting cool and warmwater fisheries.

Three alternatives were proposed for this stite. The alternatives vary in the type of bank stabilization suggested. All of the alternatives include instream habitat structures and reforestation. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-11 contains summary information on potential impacts of the alternative plans considered for the Sligo Creek stream restoration.

5.12.1Environmental Effects

5.12.1.a Aquatic Resources

Existing Conditions. An evaluation of aquatic habitat conditions revealed a combination of both suitable and degraded reaches. Portions of Sligo Creek contained an adequate number of pools, riffles, undercut banks, and cobble structures, indicating the potential for diverse fish communities. In other places, unstable conditions (including severe erosion and channel widening) and sedimentation have created degraded reaches. Very few macroinvertebrates or aquatic plants were observed.

Alternatives. Alternatives 1, 2, and 3 propose the placement of instream structures to meet the goal of this action. The placement of instream structures would enhance the aquatic habitat. Instream structures would include restoration of existing pool/riffle areas and creation of new areas. This restoration would be accomplished through boulder placement.

TABLE 5-11 SLIGO CREEK - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1:	ALTERNATIVE 2	*ALTERNATIVE 3	ALTERNATIVE 4	ALTERANTIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION		
2. Aesthetic Values	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
3. Recreational Opportunities	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION		
4. Transportation	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Business and Home Relocations	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Existing and Potential Land Use	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		

TABLE 5-11 SLIGO CREEK - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	*ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
2. Wetlands	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
3. Aquatic Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
5. Biological Productivity	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
7. Water Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		

FOOTNOTES:
*SELECTED ACTION PLAN

Although portions of the streambank have little woody vegetation, the bank is fairly stabile due to the existing riprap. Alternative 1 would provide bank stabilization at selected locations with the construction of root wad bank protection. This would decrease the amount of sediment deposited in the stream, thereby increasing the spawning habitat. Alternative 2 would have similar impacts; however, stabilization would be accomplished through use of riprap. Alternative 3 proposes bank stabilization through vegetation and stone toe protection in the stream which would increase the physical habitat for aquatic resources.

Impacts. Construction of the instream structures would cause temporary disturbance to aquatic habitats and aquatic species. The State of Maryland's standards for instream construction would be followed.

Alternatives 1, 2, and 3 would have minor temporary impacts in the immediate area of material placement (root wad, riprap, or rock, respectively). The root wad bank protection, Alternative 1, would temporarily disturb aquatic species during construction. Imbricated riprap bank protection, Alternative 2, and the fabric and rock fill of Alternative 3 would bury some pollution-tolerant species in the unconsolidated stream bottom. It is expected that organisms of the same species, and of other less common species, would become reestablished in the unconsolidated material. Additionally, Alternatives 2 and 3 would have long-term positive impacts by providing a more diverse aquatic environment in the riprap and rocks.

Alternatives 1, 2, and 3 would improve the instream habitat by stabilizing eroding streambanks and constructing instream flow structures. Temporary impacts would occur to aquatic species and habitat during the construction of all the proposed alternatives. The No-Action Plan would not improve the instream habitat or stabilize the eroding streambanks. The streambanks are expected to continue eroding, and the aquatic habitat and water quality is expected to decline.

Time-of-year restrictions would be adhered to during construction of instream features. Best management practices and an erosion and sediment control plan (E&S) would be prepared specifying and illustrating control devices to be employed during construction. The devices would be selected and designed according to current local, state, and Federal standards and technology. No long-term significant adverse impacts on aquatic species or habitat are expected to occur from the construction of the alternatives. An overall positive impact on the food web is expected with increased benthic, aquatic, and riparian habitats that would support an increased diversity of benthic, aquatic, and terrestrial species.

5.12.1.b Wetlands

The stream appears to have downcut to a point where storm flows cannot reach the adjacent floodplain. An historical evaluation of soil horizon, combined with the present high water, suggests that the entire site is located within historically natural wetlands. Presently no significant wetlands exist within the proposed area. No adverse impacts on wetlands would occur with the construction of any of the alternatives.

5.12.1.c Terrestrial Resources

Within the parkland along Sligo Creek, much of the vegetation consists of maintained turf grass with randomly spaced mature deciduous trees; shrub and understory layers exist in approximately 50 percent of the area. There are wooded areas of vegetation that are not maintained and have higher diversity and density of the herbaceous, shrub, and understory layers.

The reforestation action associated with each alternative would provide habitat value, a buffer between the stream and the suburban surroundings, and stabilization to the area. Degradation of stream banks would be reversed, allowing vegetation on the banks to flourish, eliminating undercutting of mature vegetation, and creating habitat for wildlife.

Reforestation of the area would provide habitat value, creating a buffer between the stream and suburban surroundings, and stabilizing the area. The reforestation would also expand the downstream forest corridor and the associated habitat within the corridor. The instream construction and the reforestation would have no long-term significant adverse impacts on terrestrial resources. An overall positive impact would result from the increase in diversity and abundance of aquatic habitats that would attract other water-dependent and aquatic-foraging birds and mammals.

5.12.1.d Threatened and Endangered Species

According to the FWS, no rare, threatened, or endangered species would be impacted by the construction of the alternatives.

5.12.1.e Prime and Unique Farmland

Based upon analysis of the SCS soil survey maps, there are no prime and unique farmland soils within the Sligo Creek site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use. Compliance with the Farmland Protection Policy Act of 1981 is met.

5.12.1.f Water Quality

Water quality in Sligo Creek is rated as fair. While temperature, turbidity and dissolved-oxygen levels have not violated water quality standards, fecal coliform bacteria counts can be high, particularly during high flows.

Placement of instream structures, stabilizing streambanks, and allowing streambank vegetation to flourish would all have a beneficial impact upon water quality. Although these actions do not specifically address bacteria levels in the stream, the reforestation action may act as a filter to the non-point source runoff.

The reforestation and the instream structures in the proposed alternatives would stabilize the channel morphology, which would keep the sediments and pollutants that travel into the stream to a minimum. With decreased suspended solids, dissolved-oxygen levels would increase from increased photic activity. Solar heating may also be slightly reduced due to the increase in water depths and shading from tree planting.

Construction of instream structures would cause temporary disturbance to the sediments, causing turbidity and decreased oxygen levels. The impacts would be minimized through employment of best management practices and should not present any long-term or widespread adverse effects on water quality of the Sligo Creek or the Anacostia River. The stream would continue to erode and be unstable if the action is not constructed. The eroding would continue to release sediments, and lack of reforestation would continue to allow nutrients and other pollutants to enter the stream. The No-Action Plan would continue to degrade the stream and, in turn, the Anacostia River.

All fill material would be clean material that would meet applicable state water quality standards. Work would be performed in accordance with the same standards.

5.12.1.g Air Quality

Montgomery County falls within the metropolitan Washington nonattainment area as defined by the Federal guidance published pursuant to the CAAA. The area is designated as a serious nonattainment area for ozone. Construction of the Sligo Creek action may cause temporary impacts to air quality due to exhaust from construction machinery, but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts to air quality may reslut due to the filtering aspect of additional vegetation. According to MDE, the proposed actions are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.12.1.h Hazardous, Toxic and Radioactive Waste

The assessment determined that no CERCLA, RCRA sites were present within the proposed site limits. During construction of the environmental restoration actions, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course of construction, it would be handled in accordance with applicable local, state and Federal laws, and Corps regulations. At this time, no further investigations are recommended for the Sligo Creek proposed site.

5.12.2 Aesthetic and Recreational Effects

The proposed actions consist of the placement of instream structures to enhance the ability of fish to survive. Due to the limited height of the proposed instream habitat structures, proposed alterations to the stream would not be readily visible outside the immediate vicinity of the adjacent parkland.

As stated in Section 2.0, the stream valley parks are the focus for recreation in this urbanized watershed. Water contact recreation such as swimming is severely limited in Sligo Creek due to poor water quality and the associated potential health risk. The upper reaches of the tributaries, although shallow in depth, offer the least risk for swimming in terms of water quality.

Temporary impacts on the aesthetic and recreational value would occur during construction of all of the alternatives. The Corps would work with the M-NCPPC to minimize the effects upon aesthetic and recreational resources. The proposed action would not have a significant impact upon aesthetic or recreational resources.

5.12.3 Cultural Effects

The Area of Potential Effect upon cultural resources from the proposed actions is limited to the river bed. Due to the height of the proposed instream habitat structures, proposed alterations to this stream would not be readily visible outside of the immediate vicinity of the adjacent parkland. There would be no indirect or visual effects upon any historic structures.

The records of the Maryland Historic Trust document that there are six prehistoric sites located near the study area. There are no recorded archeological sites within the present study area. There are also no historic structures within the viewshed of the Sligo Creek site which is surrounded by suburban residences.

According to the disturbance survey, the proposed area has been previously disturbed by the placement of streambank protection and the landscaping of the adjacent park land. The

proposed action would result in only minor changes to the pooling of water within the stream. Due to the disturbed nature of the stream, the proposed action would have no effect upon cultural resources.

The State Historical Preservation Officer of Maryland concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources and that no further investigations are warranted for the site.

5.13 PAINT BRANCH--MONTGOMERY COUNTY

The goal of this proposed restoration action is to increase fish and wildlife habitat in Paint Branch through the stabilization of severely eroding stream banks, the increase of riparian vegetation, the deepening of broad shallow stream sections, the restoration/creation of instream habitat diversity, and the reforestation of 8.5 acres.

Three alternatives were proposed for this site. The alternatives vary in the type of bank stabilization suggested. All of the alternatives include instream habitat structures and reforestation. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-12 contains summary information on potential impacts of the alternative plans considered for the Paint Branch stream restoration.

5.13.1 Environmental Effects

5.13.1.a Aquatic Resources

Existing Conditions. According to Maryland State Water Use designations, Paint Branch is a Use III stream, capable of supporting naturally reproducing populations of brown trout. Spawning functions are also provided, especially in the upper portion of the watershed. The highest priorities in this stream are the stabilization of eroding streambanks and the improvement of aquatic habitat by the construction of instream structures such as wing deflectors, boulder groups and rock vortex weirs.

Alternatives. Alternative 1 would provide bank stabilization with the construction of root wad bank protection. This would decrease the amount of sediments deposited in the stream, thereby increasing the spawning habitat. Alternative 2 would have similar impacts, although stabilization would be accomplished through use of riprap. Alternative 3 proposes bank stabilization through vegetation and stone toe protection in the stream which would increase the physical habitat for aquatic resources.

TABLE 5-12 PAINT BRANCH - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION		
2. Aesthetic Values	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
3. Recreational Opportunities	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
4. Transportation	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Business and Home Relocations	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Existing and Potential Land Use	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
9. Flooding Effects	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		

TABLE 5-12 PAINT BRANCH - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	*ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
2. Wetlands	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
3. Aquatic Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
5. Biological Productivity	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		

FOOTNOTES:
*SELECTED ACTION PLAN

Alternatives 1, 2, and 3 propose the described features at various locations throughout the reach. The placement of the instream structures would enhance the aquatic habitat. Instream structures would include restoration of existing pool/riffle areas and creation of new areas. This restoration would be accomplished through minimal lowering of the channel bottom elevation and boulder placement.

Another major feature of the alternatives is the diversion of the stream into the abandoned channel. A channel block would be placed at the upstream end of the active channel to divert flows into the abandoned channel. An additional block would be placed further downstream.

Impacts. Construction of the instream structures would cause temporary disturbance to aquatic habitats and aquatic species. The State of Maryland's standards for instream construction would be followed.

Alternatives 1, 2, and 3 would have minor, temporary impacts in the immediate area of material placement (root wad, riprap, or rock, respectively). The root wad bank protection, Alternative 1, would temporarily disturb aquatic species during construction. Imbricated riprap bank protection, Alternative 2, and the fabric and rock fill of Alternative 3 would bury some pollution-tolerant species in the unconsolidated stream bottom. It is expected that organisms of the same species, and other less common species, would become reestablished in the unconsolidated material. Additionally, Alternatives 2 and 3 would have long-term positive impacts by providing a more diverse aquatic environment in the riprap and rocks.

Alternatives 1, 2, and 3 would improve the instream habitat by stabilizing eroding streambanks and constructing instream flow structures. Temporary impacts on aquatic species and habitat would occur during the construction of all the proposed alternatives. The No-Action Plan would add not improve the instream habitat nor stabilize the eroding streambanks, and would continue to have an adverse impact on the aquatic resources in Paint Branch. The streambanks are expected to continue eroding, and the aquatic habitat and water quality is expected to decline.

Time-of-year restrictions would be adhered to during construction of instream features. Best management practices and an erosion and sediment control plan (E&S) would be prepared specifying and illustrating control devices to be employed during construction. The devices would be selected and designed according to current local, state and Federal standards and technology. No long-term significant adverse impacts on aquatic species or habitat are expected to occur from the construction of the alternatives. An overall positive impact on the food web is expected with increased benthic, aquatic, and riparian habitats that would support an increased diversity of benthic, aquatic and terrestrial species.

5.13.1.b Wetlands

Presently no significant wetlands exist within this proposed site; therefore, no adverse impacts on wetlands would occur from the construction of the alternatives.

5.13.1.c Terrestrial Resources

Vegetative cover in Paint Branch Park consists of mature bottomland hardwood forest. Species diversity and density is high, and forest strata are well developed. Vegetation on the banks is similar to that of Northwest Branch, although more dense.

The reforestation action associated with each alternative would provide habitat value, a buffer between the stream and the suburban surroundings, and stabilization to the area. Degradation of stream banks would be reversed, allowing vegetation on the banks to flourish, eliminating undercutting of mature vegetation, and creating habitat for wildlife.

The reforestation action associated with each alternative would provide habitat value, a buffer between the stream and the suburban surroundings, and stabilization to the area. Degradation of stream banks would be reversed, allowing vegetation on the banks to flourish, eliminating undercutting of mature vegetation, and creating habitat for wildlife.

Reforestation of the area would provide habitat value, create a buffer between the stream and suburban surroundings, and stabilize the area. The reforestation would also expand the downstream forest corridor and the associated habitat within the corridor. The instream construction and the reforestation would have no long-term significant adverse impacts to terrestrial resources. An overall positive impact would result from the increase in diversity and abundance of aquatic habitats that would attract other water-dependent and aquatic-foraging birds and mammals.

5.13.1.d Threatened and Endangered Species

According to the FWS, no rare, threatened, or endangered species would be impacted by the construction of the alternatives.

5.13.1.e Prime and Unique Farmlands

Based upon analysis of the SCS soil survey maps, there are no prime and unique farmland soils in existence within the Paint Branch site. Therefore, there would be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use.

5.13.1.f Water Quality

Water quality varies in this sub-watershed, but it is generally better in the upper, less stressed watershed. Here a healthy variety of aquatic life is supported in clear streams well-shaded by vegetation.

Thermal loading and flashy stormwater flows from the adjacent residential developments have decreased trout survival in the stream. Sediment loading during the flashy stormwater events should be reduced with the construction of the streambank stabilization actions. The reduction of sediment loading would provide qualitative beneficial impacts on aquatic habitat. The proposed action would not create any adverse significant impacts on water quality in the area or in the Anacostia River basin.

The reforestation and the instream structures in the proposed alternatives would stabilize the channel morphology, which would keep the sediments and pollutants that travel into the stream to a minimum. With the decreased suspended solids, dissolved-oxygen oxygen levels would increase from the increased photic activity. Solar heating may also be slightly reduced due to the increase in water depths and shading from tree planting.

Construction of instream structures would cause temporary disturbance to the sediments causing turbidity and decreased oxygen levels. The impacts would be minimized through employment of best management practices and should not present any long-term or widespread adverse effects on water quality of the Paint Branch or the Anacostia River. The stream would continue to erode and be unstable if the action is not constructed. The eroding would continue to release sediments, and lack of reforestation would continue to allow nutrients and other pollutants to enter the stream. The No-Action Plan would continue to degrade the stream and, in turn, the Anacostia River.

All fill material would be clean material that would meet applicable state water quality standards. Work would be performed in accordance with the same standards.

5.13.1.g Air Quality

Montgomery County falls within the metropolitan Washington nonattainment area as defined by the Federal guidance published pursuant to the CAAA. The area is designated as a serious nonattainment area for ozone. Construction of the Paint Branch action may cause temporary impacts on air quality due to exhaust from construction machinery, but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts on air quality may result due on the filtering aspect of additional vegetation. According to MDE, the proposed actions are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.13.1.h Hazardous, Toxic and Radioactive Waste

Sixteen potential HTRW sources were identified for Paint Branch from CERCLIS and the Maryland HWR. Seven sources were located in the Montgomery Industrial Park and of the seven, two were listed as CERCLA sites. The remaining sources were identified through the Maryland HWR, except the Naval Surface Warfare Center, which was contained in both the CERCLA and HWR. No effect to the area is anticipated due to the distance of this source from the area. During a field reconnaissance, miscellaneous trash and occasional orange discolorations in the water due to iron precipitation was noticed. No evidence of potential HTRW sources was observed.

During construction of the environmental restoration actions, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course of construction, it would be handled in accordance with applicable local, state and Federal laws, and Corps regulations.

5.13.2 Aesthetic and Recreational Effects

Construction of the proposed actions would temporarily disturb the recreational access in the park area surrounding Paint Branch. The Corps would work with the M-NCPPC to minimize the effects upon aesthetic and recreational resources. No long-term significant impacts on aesthetics and recreational features would occur after the proposed action is constructed.

5.13.3 Cultural Effects

The placement of riprap could have an affect upon potential cultural sites either situated on the riverbank or eroding into it. The excavation of selected portions of the bank prior to the placement of riprap could further affect potential cultural sites located in proximity to the bank. Due to the heavily forested nature of the Paint Branch site, it was determined that modifications to the stream would not have any indirect visual effects upon historic structures.

According to the records of the Maryland Historic Trust, there are four recorded cultural sites within a mile of the study location, two prehistoric sites and two historic sites. The two historic sites are a historic road and bridge corridor, and a historic mill site. The mill site is located within the northern portion of the present study location. The historic roadbed is located immediately east of the present study area, and unidentified portions of it may extend into the present study area. Another site is located within the center of the study area.

Prior to the initiation of the field investigations, the Corps consulted with M-NCPPC concerning sites located within the region that are not recorded within the state site files. M-NCPPC determined that the entire portion of Paint Branch between Randolph and Fairland Roads is potentially eligible for inclusion in the National Register as a historic archeological district, but the nomination to the National Register has not yet been prepared.

Field reconnaissance identified a series of historic milling sites along the Paint Branch between Randolph and Fairland Roads. During the field reconnaissance, a total of six mill races were identified on the landscape, as well as associated features such as road embankments, dam sites, and brick and artifact scatters. A number of porcelain and earthenware ceramic artifacts are present within the eroding stream bed of the Paint Branch, although their association with any one of the milling sites could not be established.

Due to the presence of potentially significant prehistoric archeological materials along the lower Paint Branch, additional investigations were conducted for this study. No artifacts were recovered during these investigations. Due to the lack of any evidence of original cultural materials, it was determined that the artifacts recovered within the stream were, most likely, displaced from an unidentified location upstream. Therefore, no site was identified for further investigation at this location.

The only cultural resource that would be affected by the proposed action is the Paint Mills Historic District, which retains sufficient integrity to meet Criteria D of the National Register of Historic Places, that is, which may be likely to yield information important to history concerning its industrial history. M-NCPPC is currently preparing the nomination form for this district. The proposed action would result in minor alterations to the stream and the removal of some flow barriers. The Baltimore District has determined that there would be minor effects, resulting from the placement of riprap along the stream edges of the sites. The effects would result in the preservation of the archeological resources and, therefore, are not adverse. Additionally, the M-NCPPC has informed the District of the intent to use the archeological resources for academic study and training of archeological technique. Therefore, the Baltimore District would avoid impacting the Paint Branch archeological sites, and further proposes to conduct the following: 1)comprehensive mapping of the above-ground features, 2) supplemental archival research, and 3) preparation of a plan for the extended excavation of the resources, to be implemented by the M-NCPPC.

The State Historical Preservation Officer of Maryland concurs with the Corps determination.

5.14 NORTHWEST BRANCH STREAM RESTORATION--MONTGOMERY COUNTY

The goal of this proposed restoration action is to increase instream and riparian habitat through the stabilization of severely eroding stream banks, the increase of riparian vegetation, and the creation of instream habitat diversity (instream flow structures).

Three alternatives were proposed for this site. The alternatives vary in the type of bank stabilization suggested. All of the alternatives include instream habitat structures. Refer to Table 4-6 for detailed alternative site descriptions. Table 5-13 contains summary information on potential impacts of the alternative plans considered for the Northwest Branch Stream Restoration site.

5.14.1 Environmental Effects

5.14.1.a Aquatic Resources

Existing Conditions.

The Northwest Branch in the Montgomery County study area is a Use IV stream, capable of supporting stocked populations of trout. In view of the severe erosion of the bank materials, the highest priority is streambank stabilization to form and maintain a stable channel configuration. The second priority is the improvement of aquatic habitat by the construction of instream structures such as wing deflectors, boulder groups, and rock vortex weirs.

Alternatives. Alternatives 1, 2, and 3 propose the described features at various locations throughout the reach. The placement of the instream structures would improve the aquatic habitat. Instream structures would include improvement of existing pool/riffle areas and creation of new areas. This would be accomplished through minimal lowering of the channel bottom elevation and through boulder placement.

Although the instream structures would stabilize the channel morphology to increase aquatic habitat and reduce the movement of sediments, the alternatives also propose various types of bank stabilization. Alternative 1 proposes bank stabilization with the construction of root wad bank protection. This would decrease the amount of sediments deposited in the stream, thereby increasing the spawning habitat. Alternative 2 would have similar impacts, although stabilization would be accomplished through use of riprap. Alternative 3 proposes bank stabilization through vegetation and stone toe protection in the stream, which would increase the physical habitat for aquatic resources, such as spawning areas, through decreased sediment and erosion.

TABLE 5-13 NORTHWEST BRANCH - MONTGOMERY COUNTY - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	*ALTERNATIVE 3	ALTERNATIVE 4	ALTERANTIVE 5
A. SOCIAL EFFECTS						
1. Noise Level	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION		
2. Aesthetic Values	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
3. Recreational Opportunities	ADVERSE IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG–TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG–TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG–TERM BENEFICIAL IMPACTS		
4. Transportation	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
5. Public Health & Safety	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
6. Community Cohesion (Sense of Unity)	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
7. Community Growth & Development	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Business and Home Relocations	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Existing and Potential Land Use	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Controversy	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
B. ECONOMIC EFFECTS						
1. Property Values	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Tax Revenue	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
3. Public Facilities & Services	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
4. Regional Growth	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
5. Employment	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
6. Business Activity	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
7. Farmland/Food Supply	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
8. Commercial Navigation	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		
9. Flooding Effects	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Energy Needs and Resources	NO IMPACT	NO IMPACT	NO IMPACT	NO IMPACT		

TABLE 5-13 NORTHWEST BRANCH - MONTGOMERY COUNTY - SUMMARY OF IMPACTS

NAME OF PARAMETER	NO ACTION	ALTERNATIVE 1	ALTERNATIVE 2	*ALTERNATIVE 3	ALTERNATIVE 4	ALTERNATIVE 5
C. NATURAL RESOURCES						
1. Terrestrial Habitat	ADVERSE IMPACTS	MINOR POSITIVE IMPACTS	MINOR POSITIVE IMPACTS	MINOR POSITIVE IMPACTS		
2. Wetlands	ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
3. Aquatic Habitat	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
4. Habitat Diversity & Interspersion	ADVERSE IMPACTS	MINOR IMPACTS	MINOR IMPACTS	MINOR IMPACTS		
5. Biological Productivity	ADVERSE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
6. Surface Water Quality	NO IMPACT	POSITIVE IMPACTS	POSITIVE IMPACTS	POSITIVE IMPACTS		
7. Water Supply	NO IMPACT	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
8. Ground Water	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
9. Soils	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
10. Threatened/Endangered Species	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
11. Air Quality	NO IMPACT	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS	MINOR TEMPORARY ADVERSE IMPACTS DURING CONSTRUCTION LONG-TERM BENEFICIAL IMPACTS		
12. Hazardous, Toxic & Radioactive Wastes	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
D. CULTURAL RESOURCES						
1. Historic Architectural Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		
2. Pre-Historic & Historic Archaeological Values	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS	NO ADVERSE IMPACTS		

FOOTNOTES:
*SELECTED ACTION PLAN

Impacts. Construction of the instream structures would cause temporary disturbance to aquatic habitats and aquatic species. There would be no long-term adverse, significant impacts to aquatic resources.

Alternatives 1, 2, and 3 would have minor temporary impacts in the immediate area of material placement (root wad, riprap, or rock, respectively). The root wad bank protection, Alternative 1, would temporarily disturb aquatic species during construction. Imbricated riprap bank protection, Alternative 2, and the fabric and rock fill of Alternative 3 would bury some pollution-tolerant species in the unconsolidated stream bottom. It is expected that organisms of the same species, and of other less common species, would become reestablished in the unconsolidated material. Additionally, Alternatives 2 and 3 would have long-term positive impacts by providing a more diverse aquatic environment in the riprap and rocks.

Alternatives 1, 2, and 3 would improve the instream habitat by stabilizing eroding streambanks and constructing instream flow structures. Temporary impacts would occur to aquatic species and habitat during the construction of all the proposed alternatives. The No-Action Plan would not improve the instream habitat nor stabilize the eroding streambanks, and would continue to have an adverse impact on the aquatic resources in the Northwest Branch. The streambanks are expected to continue eroding, and the aquatic habitat and water quality is expected to decline.

Time-of-year restrictions would be adhered to during construction of instream features. Best management practices and an erosion and sediment control plan (E&S) would be prepared specifying and illustrating control devices to be employed during construction. The devices would be selected and designed according to current local, state, and Federal standards and technology. No long-term significant adverse impacts to aquatic species or habitat are expected to occur from the construction of the alternatives. An overall positive impact on the food web is expected from increased benthic, aquatic, and riparian habitats that would support an increased diversity of benthic, aquatic and terrestrial species.

5.14.1.b Wetlands

Presently, no significant wetlands exist within the proposed site. No adverse impacts to wetlands would occur with the construction of the alternatives.

5.14.1.c Terrestrial Resources

Vegetation on the banks is sparse to moderate due to the erosion and consists of sapling, understory, and mature size species. The Northwest Branch action would eliminate streambank erosion that has undercut streambank vegetation and forest canopy.

Degradation of stream banks would be reversed, allowing vegetation on the banks to flourish, eliminating undercutting of mature vegetation, and creating habitat for wildlife.

Reforestation is unnecessary in the area due to the dense nature of the vegetation. Vegetation would be removed for access to the site during the construction of the action and would be replaced after construction is complete. Minor, temporary adverse impacts to terrestrial resources would occur during the construction of the action.

5.14.1.d Threatened and Endangered Species

According to the FWS, no rare, threatened, or endangered species would be impacted by the construction of the alternatives.

5.14.1.e Prime and Unique Farmland

Based upon analysis of the SCS soil survey maps, there are no prime and unique farmland soils in existence within the Northwest Branch Stream Restoration site. Therefore, there be no impacts on these soil types and no unnecessary conversion of farmland to nonagricultural use.

5.14.1.f Water Quality

As stated above, Northwest Branch is a Use IV stream, capable of supporting stocked trout. However, severely eroding streambanks and flashy stormwater flows from the adjacent residential developments have decreased trout survival in the stream. Sediment loading during the flashy stormwater events should be reduced with the construction of the streambank stabilization sites. The reduction of sediment loading would provide qualitative beneficial impacts to aquatic habitat. The proposed action would not create any adverse significant impacts to water quality in the area or the Anacostia River basin.

The instream structures in the proposed alternatives would stabilize the channel morphology and reduce sediment loading. With the decreased suspended solids, dissolved-oxygen levels would increase from the increased photic activity.

Construction of instream structures would cause temporary disturbance to the sediments causing turbidity and decreased oxygen levels. The impacts would be minimized through employment of best management practices and should not present any long-term or widespread adverse effects on water quality in the Northwest Branch in the Anacostia River. The stream would continue to erode and be unstable if the action is not constructed. The eroding would continue to release sediments, and lack of reforestation would continue to allow nutrients and other pollutants to enter the stream. The No-Action Plan would continue to degrade the stream and, in turn, the Anacostia River.

All fill material would be clean material that would meet applicable state water quality standards. Work would be performed in accordance with the same standards.

5.14.1.g Air Quality

Montgomery County falls within the metropolitan Washington nonattainment area as defined by the Federal guidance published pursuant to the CAAA. The area is designated as a serious nonattainment area for ozone. Construction of the Northwest Branch action may cause temporary impacts on air quality due to exhaust from construction machinery, but emissions will fall well below designated rates allowable in nonattainment areas. Long-term beneficial impacts on air quality may result due to the filtering aspect of additional vegetation. According to MDE, the proposed actions are generally accounted for in the State Implementation Plan. The proposed actions comply with Federal conformity requirements exceptions as stated in CAAA (58 Fed.Reg. 63214, Nov. 30, 1993).

5.14.1.h Hazardous, Toxic and Radioactive Wastes

During the field investigation, some areas within the water were discolored orange due to iron precipitation. No evidence of potential HTRW sources was observed. Literature searches did not identify any potential HTRW sources within a one-mile radius of the Northwest Branch stream restoration site. The proposed alternatives would not impact any HTRW within the area. During construction of the environmental restoration actions, excavation and fill activities would require movement of soil. If previously unreported or undetected contaminated material is discovered during the course of construction, it would be handled in accordance with applicable local, state, and Federal laws, and Corps regulations.

5.14.2 Aesthetic and Recreational Resources. The Northwest Branch, Montgomery County, action would eliminate stream erosion problems which have taken much of the forest canopy due to undercutting of streambank vegetation. Once this problem is reversed, the site would provide habitat for fish and wildlife, attracting anglers and other recreators.

Temporary impacts on the aesthetic and recreational value would occur during construction of all of the alternatives. The proposed action would not have a significant impact upon aesthetic or recreational resources; however, the Corps would work with the M-NCPPC to minimize any effects which did occur.

5.14.3 Cultural Effects. The Area of Potential Effect for the Northwest Branch project is limited to a five foot wide section of riverbank along the area. The streambank stabilization could have an affect upon cultural sites either situated on the riverbank or eroding into it. The excavation of selected portions of the bank prior to the placement of stabilizing

materials could further affect cultural sites located in proximity to the bank. Due to the heavily forested nature of the Northwest Branch area, it was determined that modifications to the stream would not have any indirect visual effects upon historic structures.

The records of the Maryland Historic Trust document that there are three prehistoric sites and two historic mill sites in close proximity to the study location. Due to the limited nature of the proposed actions, it was determined that a streambank survey would provide the most appropriate methodology for identifying any cultural sites that would be affected. The largely vertical, eroded faces of the streambank afforded investigators a ready view of any possible cultural sites. The vertical faces were troweled, in an attempt to identify any buried soils that could contain such sites. Additionally, the sediment bars, largely formed from eroded streambank materials, were investigated to determine whether any contained cultural materials. The entire segment of the Northwest Branch was investigated utilizing this approach. No cultural sites were located within the immediate vicinity of the stream, and no cultural materials were recovered.

Due to the lack of evidence of any cultural sites that would be affected by the proposed modifications to the banks of the Northwest Branch in this location, it was determined that the proposed action would have no effect upon cultural resources.

The State Historical Preservation Officer of Maryland concurs with the Corps determination that the proposed project will have no adverse effect on archeological or architectural cultural resources and that no further investigations are warranted for the site.

5.15 CUMULATIVE EFFECTS

This section discusses potential cumulative impacts on the environment which would result from the incremental impacts of the 13 individual actions and other past, present and reasonably foreseeable future actions regardless of the agency (Federal or non-Federal) or organization which may undertake such actions.

The Anacostia River and Tributary feasibility study proposes to construct 13 individual environmental restoration actions in the Anacostia River watershed. The plan would provide for restoration of fish and wildlife habitat through the construction of 80 acres of tidal and non-tidal freshwater wetlands, the restoration of 5 miles of streams, and the planting of 33 acres of bottomland hardwood forest within this highly urbanized area.

The Corps of Engineers has been involved in construction of improvements for navigation and flood control in the Anacostia River basin for more than 115 years. Additionally, projects have been justified for improvement of public health conditions at the Washington Barracks and for the construction of a recreational park for the eastern portion of the City of

Washington. Table 1-1 lists the prior reports prepared by the Corps of Engineers for the Anacostia River basin. The spatial impact of Corps of Engineers projects described in Section 1.10 extends from the confluence with the Potomac River to a point as far upstream as the Greenbelt Road crossing of Indian Creek, a distance of 17 miles. Corps projects also extend to the U.S. Route 1 crossing of the Paint Branch, and the vicinity of the Queens Chapel Road crossing of the Northwest Branch. All of the previously constructed Corps projects are located in the lower one-third of the basin, which is the area of highest population density.

The combined total of all previous Corps of Engineers project construction in the Anacostia River basin eliminated approximately 2,600 acres of wetlands, 500 acres of aquatic habitat, and 800 acres of bottomland hardwoods. It is estimated that 17,000 habitat units were lost as a result of project construction. These ecosystems performed numerous beneficial ecological functions for the Anacostia basin and the associated Potomac River and Chesapeake Bay. One of the primary functions of these ecosystems was fish and wildlife habitat. Historically, the Anacostia River basin contained a diverse assemblage of fish and wildlife. Populations of the fish and wildlife species declined sharply due to the habitat degradation and loss in the Anacostia basin. As discussed in Section 4, many of the indicator species and others have been significantly reduced, as have their habitats, in the Chesapeake Bay and the Anacostia River. This has been due not only to Corps of Engineers projects but also to extensive urban development.

The effects of urban development, clearing the land of vegetation for agriculture, construction of residential and industrial structures; roads; schools; mining and waste management facilities; power lines; parking lots; shopping centers; and government complexes, have had a severely detrimental effect upon the Anacostia River basin. The continued removal of vegetation, an important buffer zone for soil and water, and continued construction of structures and associated infrastructure will increase the amount of impervious surface area in the watershed. If extensive urban development continues, stream systems will be further affected by low base flows, short-term high flow events, and increased pollutants, all of which will affect aquatic habitat. The land will continue to suffer from increased erosion and increased pollution and debris accumulation. All of these effects will serve to degrade fish and wildlife habitat.

However, a wide range of opportunities exist to improve fish and wildlife habitat in the Anacostia River basin. These opportunities have come about due to the extensive efforts on the part of many agencies over the last 20 to 30 years. Laws and regulations governing land use, construction activities and water quality have been enacted or strengthened to reduce the impacts of new development on the watershed. These laws and regulations help to ameliorate the impacts of development and provide an important foundation for the restoration of the basin.

Beginning in the early 1970's, sediment and erosion control procedures were required for all construction sites which exceeded minimum land disturbance criteria. Sediment fencing and settling ponds were required for major non-agricultural projects to reduce sediment input to aquatic systems as a result of runoff. Additional protection was also given to stream habitat by regulations which limited instream construction activities. The effects of these requirements were and continue to be wide reaching. By decreasing the amount of sediment input and limiting instream activities, fish habitat disturbance and sedimentation declined.

Nationally, the 1972 amendments to the Federal Water Pollution Control Act (also referred to as the Clean Water Act) were a major milestone in restoring aquatic habitat. As a result of this legislation, Federal, state, local, and regional agencies coordinated efforts to upgrade the regional wastewater treatment facility which serves almost the entire Anacostia basin.

Unrestrained fish and shellfish harvests and decades of degradation had sharply impaired the Chesapeake Bay's health and productivity by the mid-1970s, when Congress directed the EPA to launch a major study of the bay's decline. Findings and recommendations from the $27 million research program laid the foundation for the first Chesapeake Bay Agreement, signed in 1983. In that compact, the governments of Virginia, Pennsylvania, Maryland, and the District of Columbia; the Chesapeake Bay Commission; and the U.S. Environmental Protection Agency agreed to develop and implement coordinated plans "to improve and protect the water quality and living resources of the Chesapeake Bay estuarine system."

With the Chesapeake Bay Agreement as a basic charter, the Chesapeake Bay Program has become a unique regional institution, guiding and coordinating bay-related activities of literally hundreds of Federal, state, and local government agencies, as well as dozens of non-government business, civic and environmental organizations. Cooperation and coordination among these groups engenders a basin-wide approach to watershed restoration and a commitment to increasing the biodiversity of the region.

In 1987, Virginia, Maryland, Pennsylvania, the District of Columbia, the Chesapeake Bay Commission, and the U.S. Environmental Protection Agency formally agreed to reduce and control point and nonpoint sources of pollution to attain the water quality conditions necessary to support the living resources of the bay. Amendments to the agreement were signed by the partners in 1992 to further the 1987 commitments. Since these amendments, the Chesapeake Bay Program has placed a greater focus on the direct restoration of tributaries and living resources. Clearly, the program has had a far-reaching beneficial effect on the habitat conditions in the Anacostia watershed by placing the focus of the bay's health on the health of the tributaries. This provides an opportunity for the restoration of smaller tributaries, which in turn reduces pollutant and sediment loads that impair aquatic life. The goals of the Anacostia River study compliment the Chesapeake Bay Program's goals by focusing on the restoration of a bay tributary and by directly supporting living resources critical to the bay ecosystem.

There have been a number of efforts over the past 25 years to evaluate the Anacostia River basin to determine how the responsible agencies could best carry out their respective stewardship roles. Formal coordination was initiated in 1984 between the State of Maryland and the District of Columbia when they signed an agreement to combine efforts to control sources polluting the Anacostia River and to implement measures to improve water quality and restore a balanced aquatic community. The 1984 Anacostia Restoration Agreement resulted in an extensive program by the District of Columbia and the Environmental Protection Agency to evaluate and control point source discharges of untreated sewage to the tidal Anacostia River from the combined stormwater/sanitary sewer system. The State of Maryland developed and implemented a program to reduce sediment loading by reclaiming lands which had been used for sand and gravel mining. By doing so, sediment and pollutant loads that are destructive to aquatic habitat have been reduced. Slowly, the health of the Anacostia River and its tributaries is improving as a result of these actions.

In 1987, the State of Maryland, the District of Columbia, Prince George's County, and Montgomery County signed the *Anacostia Watershed Restoration Agreement.* The 1987 agreement expanded the scope of the previous agreement and included the county governments responsible for the majority of the non-tidal portion of the basin. The Baltimore District accepted an invitation in 1991 to become a member of the Anacostia Watershed Restoration Committee (AWRC), and in this capacity, coordinates and promotes Federal restoration activities. The Federal objective of restoring fish and wildlife habitat is based on the June 25, 1990, Policy Statement of the Assistant Secretary of the Army (Civil Works) and Planning Guidance Letter No. 24, as well as numerous other Federal laws, regulations and executive orders. By becoming involved with non-Federal groups engaged in restoration activities, the Corps is able to maximize the outputs of projects by complementing previously planned activities.

Specific state and local concerns, which relate to the environmental restoration of the basin, were stated in the *1987 Anacostia Watershed Restoration Agreement* and the *Six-Point Action Plan.* The commitments by the AWRC over the last seven years to restore the Anacostia River basin have been extensive. The financial commitment of the member agencies to date is more than $20 million. Public support for the restoration of the Anacostia River basin is very strong today and continues to grow each year. Approximately 25 percent of the identified restoration projects have been implemented. Furthermore, ICPRB, MWCOG and many other local, state and Federal agencies have conducted research projects and collected monitoring data to evaluate restoration progress and needs. Through these efforts, portions of the Anacostia River and its tributaries have begun to change for the better. Fish and wildlife species are returning as habitat quality and quantity increases.

Locally, tremendous efforts have been expended to support natural resource management and restoration plans in the region and in the Anacostia River basin. The activities of the

various regional, state and local government agencies, civic groups, businesses and private organizations to the restoration of the basin are wide-ranging. These groups have completed many projects, including reforestation, stormwater retrofits, stream restoration, debris removal and wetland creation/restoration. The focus of these efforts was the restoration of the basin through improvements to water quality and water quantity. Implementation of these plans is recent, but effects on water quality and habitat value are already being seen. There is also a broad range of regulations that reflect the significance of wetland, bottomland, and aquatic ecosystems on a regional and local level. In addition, the charters, bylaws, and formal policy statements from private groups indicate intense interest from citizens.

The projects proposed in this feasibility study mesh readily with public and private restoration efforts in the Anacostia River basin. The site-specific solutions proposed by the Corps will contribute to the restoration of the basin. By improving habitat at 13 individual sites, the Corps and the sponsoring agencies would improve water quality, habitat quantity and quality, and foster public interest and support. The implementation of the majority of the projects proposed in *The Blueprint for the Restoration of the Anacostia River Basin*, will help to fulfill the goals of the *Six-Point Action Plan*, and restore a great deal of the Anacostia River ecosystem.

Many future actions proposed by other agencies and organizations would impact the Anacostia River basin. Projects that were judged to be constructed in the foreseeable future are listed and the expected effects are briefly described.

InterCounty Connector. The State of Maryland Department of Transportation, Prince George's County, and Montgomery County are in the first phase of a study of the InterCounty Connector between the areas of Laurel, and Gaithersburg, Maryland. The InterCounty Connector is a proposed east-west limited-access highway connecting Interstate Route 270 and US Route 1. This study is the product of a similar 1983 study that did not receive final approval from an environmental standpoint. The study is now in the Purpose and Need stage and an extensive public awareness program is underway. Alternatives have not yet been fully developed. One of the alternative routes for the highway is proposed for the Gum Springs area.

The positive effects associated with the Corps project could be diminished, depending upon the planning, design and construction of the Connector. The impacts associated with such a project could include increased stormwater runoff, increased potential for pollutants to enter tributaries of the Anacostia River, and increased noise and air pollution. However, Montgomery and Prince George's Counties have stringent sediment and stormwater management plans that could potentially deal with both increased runoff and the associated water-borne pollutants. Habitat restoration efforts in the Anacostia basin may also serve to offset the negative impacts of this action.

Football Stadium. In October 1993, an EIS was published for the construction of a new football stadium adjacent to Kingman Lake. The proposed project was a stadium with a capacity of approximately 78,600 seats to be built north of RFK Stadium. Existing parking areas would have been reconfigured to provide for parking of approximately 18,500 vehicles within the current limits of the 190-acre site. The proposal stated that no portion of Kingman Lake or the Anacostia River would be filled. Site-related infrastructure such as access roads, parking areas, and utility connections have also been constructed.

There are potentially negative environmental impacts associated with the construction of a new football stadium. These include impacts relative to building within the 100-year floodplain, air and water quality concerns related to increased traffic and human presence, and aesthetic impacts to the viewscapes of residents of Kingman Park. Presently, however, there are no plans to proceed with the project. There is, instead, a proposal for a new stadium in Laurel, Maryland which is outside of the Anacostia basin.

National Children's Island Theme Park. Kingman Island divides the area known as Kingman Lake from the Anacostia River. Children's Island is a recreational park which is proposed for that portion of Kingman Island south of Benning Road. The proposed recreational park is in the vicinity of some of the restoration work planned for Kingman Lake and the River Fringe sites. It is envisioned by its planners, a non-profit corporation and a private, for-profit corporation, as a recreational park with exhibitions and pavilions; restaurants and concession stands; souvenir shops; exhibits; indoor and outdoor facilities for live and recorded musical and theatrical performances; ticket, administrative, and other offices and support facilities; landscaping with pools, fountains, and play areas; parking and utility facilities; and enclosed bridges. The current concept plans propose 11 pavilions with footprints totaling 4.8 acres. An additional 8.8 acres would be dedicated to a retail center, an office tower, a 2500-seat amphitheater, parking, and a restaurant.

The Children's Island site is approximately 50 acres in size. A portion of the site is currently used as a leaf composting facility. Children's Island is bisected by East Capital Street (Whitney Young bridge). The developers of the Children's Island recreational park also propose to build a public park between East Capital Street and the southern end of the island.

Clearly, if constructed, the Children's Island project would increase the impervious surface draining to part of Kingman Lake and one of the River Fringe sites. This increased drainage was considered during the development of the conceptual plans for Kingman Lake and the River Fringe wetlands. The stormwater management plan for the recreational park would have to comply with the regulations of the District of Columbia. There are few resident wildlife species remaining on the island. However, construction of the park could potentially displace many of the remaining individuals. With the construction of the park,

the habitat provided in the two proposed sites would remain valuable, although perhaps less so, to the immediate area as well as to the basin as a whole. Yet, the recreational park and the restoration of Kingman Lake can be compatible. The recreational park will have to undergo the public planning and environmental review processes and meet water quality standards. Other potential impacts of the recreational park would depend on the detailed design plans which are not now available. If these reviews have not been completed by the summer of 1996, the property will revert to the National Park Service.

Barney Circle Connector. The proposed Barney Circle Connector would join Interstate Route 295 with Interstate Route 395 in eastern Washington via a bridge over the Anacostia River. Highways on either side of the river through Anacostia Park would also be constructed. The construction of the highway would entail the removal of lead-contaminated soil adjacent to the river. The Corps has issued a conditional permit for the bridge, noting that the Anacostia River would be disturbed during construction and that sediment control measures must be realized.

The environmental impacts of this project are diverse and are expected to be most acute within Anacostia Park (FHA, 1983). Grading, excavation, and storage of topsoil or other construction material will alter the appearance of the landscape. Hauling roads, parking areas and other construction activities will produce dust and compact the soil. This may retard the natural revegetation process post-construction. The disturbance of existing vegetation within the footprint will remove habitat for resident and migratory species of wildlife and will cause displacement or decline of wildlife populations. Long-term impacts will include the net loss of 29.1 acres of parkland barriers to ground-dwelling wildlife, and the isolation of small areas. The project may also cause further loss of natural zones within the park and therefore will potentially decrease resident wildlife populations. Eight thousand eight hundred (8,800) square feet of river bottom aquatic habitat would be displaced with the construction of the bridge adjacent to the Conrail Bridge. Additional litter also predicted. An increase in surface runoff pollutants, heavy metals, and oil can be expected after the highway is opened. The surface runoff will be treated by a series of water quality filters prior to being discharged into the Anacostia River.

A portion of the proposed mitigation plan for the Barney Circle highway project includes a proposal for the rehabilitation of the existing seawalls between the Conrail bridge and the 11th Street bridge on the east side of the Anacostia River. The Corps had been involved in preparing preliminary designs of the seawall restoration prior to the proposal of the Barney Circle project. The Corps involvement took into account the possibility of wetland restoration at the River Fringe site, as well as the potential for restoration along the east bank. Based upon its planning, design, and construction, the rehabilitated seawall may serve to eliminate the possibility of wetland development along the east bank.

These potential effects, including the increase in impervious surfaces, of the construction of the Barney Circle Connector could negatively impact one of the River Fringe Wetland sites. However, the conceptual restoration plans included consideration of this project. The wetland area may in fact provide a filter for some of the pollutants entering the Anacostia in the runoff. Wildlife habitat provided in the wetland creation site will not be compromised, and may even be utilized by some of the species displaced from Anacostia Park. It is important to note that the project is subject to sediment, stormwater, and erosion control laws of the District of Columbia. This project is supported by both the District of Columbia and the Federal Highway Administration. An extensive plan has been prepared to mitigate the adverse effects of this project.

Southeast Federal Center. The Southeast Federal Center is proposed for the west bank of the river approximately two miles below the Kingman Lake site and southernmost River Fringe Wetland site. This project would not impact the proposed Corps projects.

Summary. The scientific community has documented the importance of restoration of fish and wildlife resources in the Anacostia basin. Many successful projects have been implemented by the Anacostia Watershed Restoration Committee members in Montgomery County, Prince George's County and the District of Columbia.

The Kenilworth Marsh project was completed in the summer of 1993, and in combination with the 13 restoration actions proposed by this feasibility study would provide an important contribution to the improvement of fish and wildlife resources in the Anacostia River basin. The Corps has also authorized the Anacostia Section 1135 project which will modify two barriers in the tributaries of the Anacostia River to enhance anadromous fish passage and habitat; modify an existing high speed channel to facilitate fish passage; and improve aquatic, riparian and terrestrial habitat.

The combination of restoration efforts within the Anacostia River basin is essential to the overall habitat value of the region and the Chesapeake Bay. With urban and suburban development, the watershed's streams will continue to receive stress. Habitat restoration efforts may serve to offset these negative impacts.

It is difficult to specifically determine the cumulative effects of past, current, and potential future actions within the study area and region due to the complexity of actions which have occurred in the past and could potentially occur in the future. However, it is possible to determine that numerous Federal, state, local, and private agencies and organizations are making a commitment, and are enacting regulations and projects to revitalize the Anacostia River basin.

Anacostia River and Tributaries Feasibility Study

Draft Feasibility Report and EIS

Section 6

Plan Selection

Once a site was selected through the process described in Section 4, iterative steps were taken to develop alternatives which would provide a range of habitat outputs for each site. The alternatives for the 13 sites selected for detailed analyses are presented in Section 4. Plan selection consisted of a process of concept design; initial sponsor review; detailed environmental and engineering design; habitat, cost and environmental effects evaluations; final sponsor input and final plan selection. A similar plan selection process was utilized in all three of the political jurisdictions. The major difference in the selection process among areas was the variation in the agencies providing input to the selected sites and the alternatives considered for the different sites.

6.1 INCREMENTAL ANALYSIS

Habitat units were calculated using the PAMHEP habitat evaluation procedure. Appendix D contains the habitat evaluation documentation for the study. Costs for each of the proposed alternatives were developed from the preliminary construction cost estimates. The costs used in this analysis do not represent the total cost of implementing the alternative. However, the relative comparison of habitat output and cost of construction among the alternatives for each site is still defined. Appendix E contains the Micro Computer Assisted Cost Estimating System (MCACES) cost estimate for each selected alternative. A 50-year project life was used for all sites and all alternatives.

Incremental analysis is a process designed to identify alternatives that yield optimum levels of habitat units (HU's) in relation to the cost to produce those units. The process compares changes in project average annual costs (AAC) as HU's increase. The resulting "incremental cost" measures the cost per habitat unit gained as HU's increase from lower output alternatives to higher output alternatives. The incremental analysis gives an indication of the return on investment. In Corps of Engineers environmental restoration studies, the "return" is measured as habitat units. The complete incremental analysis is contained in Appendix G. Use of the final MCACES cost figures would not alter the results of the incremental analyses.

6.2 DECISION MATRIX FOR ALTERNATIVES

In order to present the conclusions of the alternatives analyses, a decision matrix was developed which incorporates elements that address the Corps of Engineers environmental restoration criteria, the experience and input of the local sponsors and landowners, habitat evaluations, cost estimates, and the results of the incremental analysis process. A decision matrix was developed for each study site which summarizes the plan selection process. Table 6-1 describes the relationship between the traditional Corps plan formulation criteria and the factors listed in the decision matrix tables. The plan selection process for the District of Columbia, Prince George's County and Montgomery County is summarized for each of the sites in Sections 6.3 through 6.5.

The final set of alternatives is listed in the decision matrix tables. The preferences of the sponsors and the landowning agency were rated from 1 to 4 with the number 1 assigned to the highest preference. The goals of the AWRC which would be addressed by the alternatives are also noted. In some cases, all of the alternatives would contribute to the AWRC goals, but to varying degrees. No attempt was made to prioritize alternatives in this category.

6.3 DISTRICT OF COLUMBIA

Within the District of Columbia, the two sites evaluated in the alternatives analyses were Kingman Lake and the River Fringe wetlands. Agencies contributing to the selection process were DCRA, DPW, NPS, MWCOG, ICPRB and FWS. The Baltimore District's Operations Division also contributed expertise and insights gained from the restoration of Kenilworth Marsh.

6.3.1 Kingman Lake

Of the ten alternatives evaluated for Kingman Lake, three included structures which would regulate the tide and thereby provide the proper inundation depth for wetlands. As part of the evaluation process, geotechnical samples were taken at the openings of the lake to design tidal control structures. After careful consideration of the alternatives, the tidal control alternatives were eliminated from consideration. NPS (among others) preferred that the lake remain as close as possible to a natural system. Additionally, the costs of construction, and operation and maintenance of the tidal structures were much greater than the costs of an open system.

TABLE 6-1

CRITERIA SUPPORTING PLAN JUSTIFICATION AS UTILIZED IN THE DECISION MATRIX

Corps Criteria	Decision Matrix Criteria	Notes
Linkage	Not Included	Linkage to Corps projects is addressed in Sections 3.1.5 and 4.1.2.
Acceptability	Acceptable to Landowner, the Public, and Resource Agencies	Acceptable to the public as determined by public meetings, approval by M-NCPPC (MC) Park Board; M-NCPPC (PG) and civic association; NPS. Acceptable to Federal and state resource agencies.
	Acceptable to Sponsor	Sponsors' letters of support.
Completeness	Operation and Maintenance	Within each project area, all of the proposed plans would be complete in that each alternative would ensure the realization of planned outputs. Changes in real estate and sponsorship would be noted in the "Acceptability" columns.
Efficiency	Acceptable to AWRC	All government agencies have reviewed plans and based on extensive restoration experience agree that the recommendation measures are the BMPs for urban restoration in the mid-Atlantic Region.

TABLE 6-1
(Cont'd)

CRITERIA SUPPORTING PLAN JUSTIFICATION AS UTILIZED IN THE DECISION MATRIX

Corps Criteria	Decision Matrix Criteria	Notes
Effectiveness	Total Habitat Units, Other Incidental Benefits	Other incidental benefits not quantified.
Restoration Measures Applied	Not Included	All projects and all alternatives emphasize further Corps participation.
Watershed Approach	AWRC Goals	AWRC provides basinwide approach for the restoration efforts.
Partnership Approach	Not Included	All projects and alternatives formulated based on partnership approach as evidenced by EPA report, Kenilworth Marsh restoration.
Implementability	Not Included	Recommended projects are implementable as evidenced by Section 8.8, Financing Plan.
Reasonableness of Costs	Incremental Cost Output, Operation and Maintenance Cost, Total Cost	Cost effectiveness and incremental cost evaluations as well as maintenance considerations.
Adaptive Management	Acceptable to Landowner, Acceptable to Sponsor, Operation and Maintenance	See earlier notes.
Incremental Justification	Incremental Cost Base Incremental Cost Output Incidental Benefits	Significance of outputs and contribution to national and regional goals described in report Sections 4.1.1.

Seven alternatives were evaluated for wetland creation without tidal control structures. All of these alternatives also included reforestation components. As shown in Table 4-5, the size of the alternatives ranged from 23 to 56 acres.

6.3.1.a Incremental Analysis and Plan Selection. The average annual habitat unit outputs (HU's) for the 10 alternatives range from 297 HU's for Alternative 6 to 370 HU's for Alternatives 2, 3 and 10. Alternatives 2, 3, 4, 6, 8 and 9 were eliminated from the analysis based on cost effectiveness comparison. In a cost effective comparison, the alternative that provides the same benefit for the least cost is retained while the other alternative is dropped from consideration. Table 6-2 contains the decision matrix for Kingman Lake for the four remaining alternatives (1, 5, 7 and 10). The four remaining alternatives were then screened by means of a least cost comparison process until all but Alternatives 1 and 10 were eliminated. Alternative 1 is the selected alternative. It represents the largest possible habitat output for the site while maintaining a mixture of wetland and open water habitat.

6.3.1.b Habitat Benefits. Alternative 1 would provide 342 HU's within the 45 restored acres of freshwater tidal wetlands and the associated 5-acre bottomland hardwood buffer. The area would provide nesting sites for waterfowl species and passerine birds, spawning and juvenile habitat for anadromous fishes, and would increase the species diversity at the site.

6.3.1.c Views of Local Sponsors and Landowners. The District of Columbia agencies are in agreement with the selected plan for Kingman Lake. The National Park Service also concurs with the selected plan which is compatible with their policies and programs for Anacostia Park and Langston Golf Course.

6.3.1.d Summary. Alternative 1 would establish 45 acres of freshwater tidal wetlands within the present boundaries of the system. Drawings DC-1 through DC-16, located in the Plate Portfolio, provide detailed design, landscaping and real estate plans for Alternative 1. No changes are proposed for the upper and lower interface between Kingman Lake and the Anacostia River. With the exception of the upland buffer along the Langston Golf Course, all of the work would occur below the mean high tide line. The upland buffer would augment the existing transitional habitat within 80 feet of the lake. The remains of the water control structures would be removed to eliminate a safety hazard and a debris curtain has been incorporated into the design to protect the wetland vegetation from abrasion by floating debris. Other incidental benefits from the Kingman Lake wetland include aesthetics, recreation, economic development and water quality improvements. The MCACES cost estimate, as detailed in Appendix E, for the selected alternative is $6,500,000.

6.3.2 River Fringe Wetlands

For the purposes of site evaluation, it was assumed that approximately 110,000 cubic yards of material would be dredged from the river to construct the Kingman Lake wetlands. The

TABLE 6-2

DECISION MATRIX FOR ALTERNATIVES AT KINGMAN LAKE, DISTRICT OF COLUMBIA WETLAND RESTORATION PROJECT

EVALUATION CRITERIA	**Alternative 1** **45-Acre Freshwater Tidal Marsh**	Alternative 5 56-Acre Freshwater Tidal Marsh	Alternative 7 35-Acre Freshwater Tidal Marsh	Alternative 10 55-Acre Freshwater Tidal Marsh
Preference of Landowner	**1**	3	2	4
Preference of Local Sponsor	**1**	3	2	4
Compatible with AWRC Goals	**1,2,4,5**	1,2,4,5	1,2,4,5	1,2,4,5
Total Habitat Units (HUs)	**342**	322	360	370
Incremental Cost Output [1,2]	**Base**	-	-	$2,013
Operation and Maintenance Cost	**$5,000**	$6,500	$4,000	$6,500
Other Incidental Benefits	**Aesthetics, Recreation, Economic Development**	Aesthetics, Recreation, Economic Development	Aesthetics, Recreation, Economic Development	Aesthetics, Recreation, Economic Development
Cost Per Habitat Unit [2]	**$640**	$570	$700	$740
Average Annual Cost [2]	**$217,000**	$182,000	$254,000	$274,000
Construction Cost [2]	**$2,580,000**	$2,170,000	$3,020,000	$3,250,000

The selected plan is in bold type.

[1] Incremental cost compared to the next lowest level of output.
[2] Estimated cost for alternatives analyses only.

fringe wetlands would use additional material which is available from the portion of the river located above the Conrail bridge.

6.3.2.a Incremental Analysis and Plan Selection. Each of the five river fringe wetland sites is a "stand alone" alternative and each can be combined with any one, two, three, or four of the others to create additional alternatives. There are a total of 31 possible river fringe wetland alternatives. The "stand alone" alternatives are designated A, B, C, D and E. Table 6-3 contains the decision matrix for the four alternatives for the River Fringe wetlands which remained after the cost effectiveness determinations. Alternative 4 is the selected plan for the River Fringe wetlands because it provided the maximum number of habitat units and the incremental analysis indicated that the costs compared well with other alternatives.

6.3.2.b Habitat Benefits. The selected alternative would restore 124 HU's within the 30 acres of freshwater tidal wetlands. The area would provide nesting sites for waterfowl species and passerine birds, spawning and juvenile habitat for anadromous fishes, and would provide additional diversity to the tidal river.

6.3.2.c Views of Local Sponsors and Landowners. The District of Columbia agencies are in agreement with the selected plan for the River Fringe wetlands. The National Park Service also concurs with the selected plan which is compatible with policies and programs for Anacostia Park.

6.3.2.d Summary. The selected alternative provides for the restoration of 30 acres of wetlands on five existing mud flat areas which are located between the Conrail bridge and New York Avenue bridge. Drawings DC-17 through DC-24, located in the Plate Portfolio, provide detailed design, landscaping and real estate plans for Alternative 4.

All of the sites are located between the existing seawalls that bound the river. After containment and placement of sediments from the river by means of a hydraulic dredge, the areas would be planted with the appropriate emergent wetland species. A total of 30 acres of freshwater tidal wetlands would be restored by this alternative. This alternative would not include forest buffer improvement. Implementation of this alternative would not affect the elevation of the water surface profile of the 100-year frequency discharge. The MCACES cost estimate for the selected alternative is $2,750,000.

6.4 PRINCE GEORGE'S COUNTY

Two sites were selected for alternatives analysis in Prince George's County. These two sites were selected after a wetland creation site at the confluence of the two branches was eliminated due to technical difficulties. The two sites are the Northwest Branch stream

TABLE 6-3

DECISION MATRIX FOR ALTERNATIVES AT RIVER FRINGE WETLANDS, DISTRICT OF COLUMBIA WETLAND RESTORATION PROJECT

EVALUATION CRITERIA	Alternative 1 Sites C+D Freshwater Tidal Marsh 4 acres	Alternative 2 Sites A+C+D Freshwater Tidal Marsh 8 acres	Alternative 3 Sites A+C+D+E Freshwater Tidal Marsh 12 acres	**Alternative 4** **Sites A+B+C+D+E Freshwater Tidal Marsh 30 acres**
Preference of Landowner	4	3	2	**1**
Preference of Local Sponsor	4	3	2	**1**
Compatible with AWRC Goals	2,4	2,4	2,4	**2,4**
Total Habitat Units (HUs)	18	35	50	**124**
Incremental Cost Output [1,2]	$578	$673	$758	**$840**
Operation and Maintenance Cost	$350	$700	$1400	**$3,500**
Other Incidental Benefits	Aesthetics Recreation	Aesthetics Recreation	Aesthetics Recreation	**Aesthetics Recreation**
Cost Per Habitat Unit [2]	$3,900	$2,300	$1,900	**$1,200**
Average Annual Cost [2]	$69,000	$81,000	$91,000	**$150,000**
Construction Cost [2]	$820,000	$960,000	$1,080,000	**$1,840,000**

The selected plan is in bold type.

[1] Incremental cost compared to the next lowest level of output.
[2] Estimated cost for alternatives analyses only.

restoration and the Fordham Street wetland. The Fordham Street site is located on M-NCPPC property and is within the flood plain of the Northwest Branch. Assisting in the development and review of alternatives, and selection of the recommended plan for Prince George's County were DER, M-NCPPC, DNR, MWCOG and ICPRB.

6.4.1 Fordham Street Wetland

The Fordham Street wetland site provided an opportunity to create wetland habitat through the construction of an off-line wetland system. Alternatives for the site were developed based on the size of the wetland. The site constraints at Fordham Street were gas and sewer lines, existing baseball fields, the close proximity to a residential neighborhood and compatibility with the existing park master plan.

6.4.1.a Incremental Analysis and Plan Selection. The outputs for the alternatives range from 3.3 HU's for Alternative 3 to 13.2 HU's for Alternative 4. Alternative 2 was eliminated from the analysis based on cost effectiveness comparison with Alternative 1. Both alternatives yield 6.6 HU's, but the cost of Alternative 2 exceeds that of Alternative 1. M-NCPPC was willing to change the existing use of the site from a baseball field to a wetland as long as another baseball field is provided as part of the restoration package. Table 6-4 contains the decision matrix for the Fordham Street wetland site. Based on the matrix information, Alternative 1 was selected as the plan for this site.

6.4.1.b Habitat Benefits. The selected plan consists of the conversion of an existing baseball field into a 2.2 acre non-tidal wetland. Site hydrology would be provided by diverting a portion of the base flow from the drainage area through the wetland system. The shallow ponded water areas and the associated banks would be planted with species selected for their habitat value. This plan would restore 6.6 Hu's within the 2.2 acres of non-tidal wetland. The area would provide nesting sites for waterfowl species and passerine birds, and would add additional diversity to the stream valley corridor. During small storm events, the wetland area would increase residence time for the initial runoff from the drainage area. Figures 6-1 and 6-2 show that the wetland would provide 24-hour extended detention for the first 0.5 inches of runoff from the drainage area and reduce the peak discharge for the extended detention storm by 70 percent. The 2-year storm event would only be slightly modified. This system would provide benefits to the downstream areas of the basin by removing nutrients, sediments and oxygen-demanding materials.

6.4.1.c Views of Local Sponsors and Landowners. DER and M-NCPPC are in agreement with the selected plan for the Fordham Street wetland. M-NCPPC has requested that the reconstruction of the existing baseball field be completed before initiation of construction.

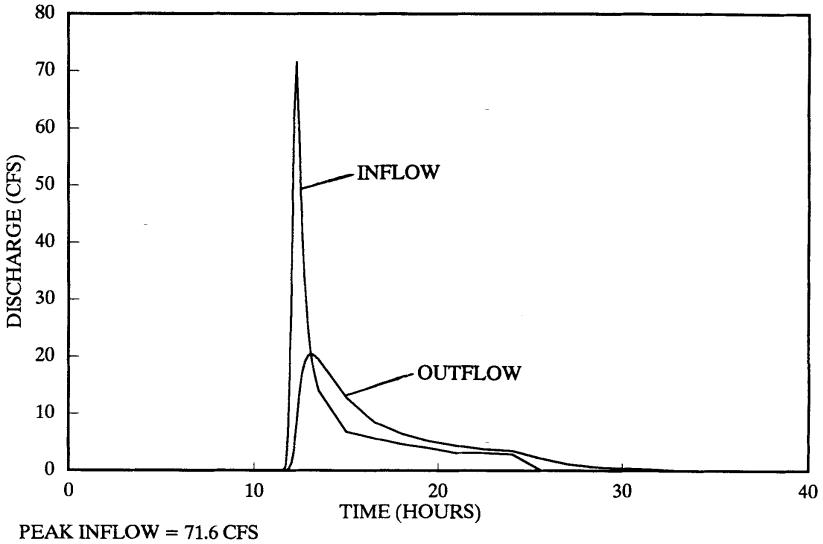
TABLE 6-4

DECISION MATRIX FOR ALTERNATIVES AT FORDHAM STREET, PRINCE GEORGE'S COUNTY WETLAND CONSTRUCTION PROJECT

EVALUATION CRITERIA	**Alternative 1** **2.2-Acre Freshwater Wetland with Extended Flowpath**	Alternative 2 2.6-Acre Freshwater Wetland without Flowpath	Alternative 3 1.2-Acre Freshwater Wetland	Alternative 4 4.6-Acre Freshwater Wetland
Preference of Landowner	**2**	3	1	4
Preference of Local Sponsor	**1**	3	2	4
Compatible with AWRC Goals	**1,4**	4	1,4	1,4
Total Habitat Units (HUs)	**6.6**	6.6	3.3	13.2
Incremental Cost Output [1,2]	**$1,800**	-	Base	$3,500
Operation and Maintenance Cost	**$6,600**	$6,800	$3,300	$13,200
Other Incidental Benefits	**Water Quality**	None	Water Quality	Water Quality
Cost Per Habitat Unit [2]	**$7,300**	$7,300	$13,000	$5,400
Average Annual Cost [2]	**$48,000**	$48,000	$42,000	$72,000
Construction Cost [2]	**$573,000**	$577,000	$501,000	$851,000

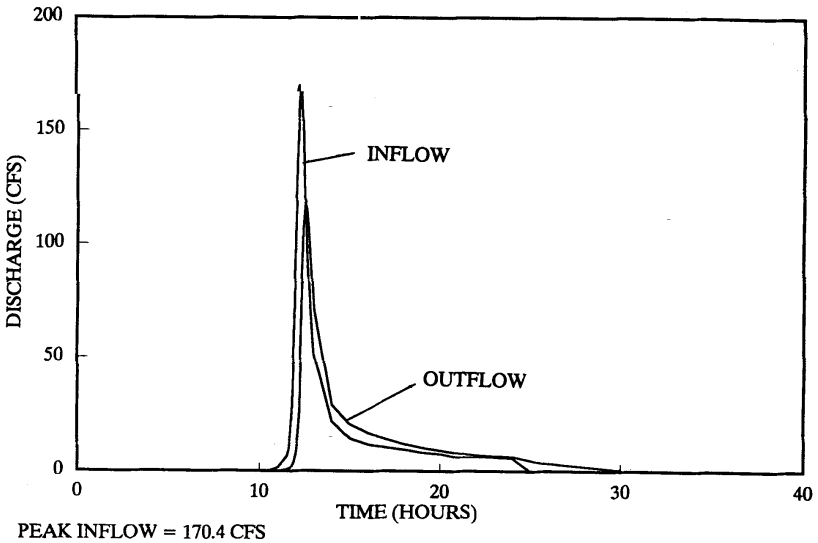
The selected plan is in bold type.

[1] Incremental cost compared to the next lowest level of output.
[2] Estimated cost for alternatives analyses only.



PEAK INFLOW = 71.6 CFS
PEAK OUTFLOW = 20.5 CFS, WATER SURFACE ELEVATION = 53.7

FIGURE 6-1 FORDHAM STREET STORMWATER WETLAND
EXTENDED DETENTION INFLOW AND OUTFLOW



PEAK INFLOW = 170.4 CFS
PEAK OUTFLOW = 119.0 CFS, WATER SURFACE ELEVATION = 54.4

FIGURE 6-2 FORDHAM STREET STORMWATER WETLAND
2-YEAR INFLOW AND OUTFLOW

6.4.1.d Summary. Drawings PG-1 through PG-4, located in the Plate Portfolio, provide detailed design and landscaping plans for Alternative 1. Alternative 4 would require construction of two fields, which was not acceptable to M-NCPPC. DER has constructed 3 additional restoration projects in the area and usually prefers to provide more that 0.5 inches of storage over the drainage area for extended detention stormwater wetlands. Alternative 3 was too small to provide the preferred storage and was therefore not the highest priority for DER. The MCACES cost estimate for the Fordham Street wetland and the associated landscaping is $1,900,000.

6.4.2 Northwest Branch

The three alternatives considered for the Northwest Branch related to the various methods of protecting the eroding banks. In addition to consulting with DER and M-NCPPC, engineers from WES also evaluated the various protection methods considered for this stream reach.

6.4.2.a Incremental Analysis. The average annual habitat unit outputs (HU's) for the three alternatives are equivalent because the habitat evaluation technique could not distinguish habitat differences between the three alternatives. Each alternative yields 72.6 HU's. A cost effectiveness analysis was performed to identify the least costly of the three alternatives. Alternative 3 is the preferred alternative because it yields an equivalent number of HU's as Alternatives 1 and 2 for a lower average annual cost, and no other factors were relevant to the cost analysis.

6.4.2.b Habitat Benefits. This plan would restore 73 HU's along the 8000 feet of stream and the 15 acres of riparian buffer. The area would serve as nesting areas for waterfowl species and as a wildlife corridor along the stream. In addition, the site would reduce the sediment loans from the streambanks along the stretch. The restored fisheries habitat would be available for resident species and also for anadromous species when the remaining blockages on the Northwest Branch are removed or modified. Therefore, Alternative 3, stone toe protection with bioengineered bank stabilization, was the selected alternative. In addition, approximately 15 acres of bottomland habitat would be reforested. Table 6-5 contains the evaluation matrix for the Northwest Branch stream restoration alternatives.

6.4.2.c Views of Local Sponsors and Landowners. The Prince George's County DER and the M-NCPPC support this plan. These agencies have recently completed three reforestation and wetland construction sites in this vicinity which would complement the stream restoration.

6.4.2.d Summary. Drawings PG-5 through PG-12, located in the Plate Portfolio, provide detailed design, landscaping and real estate plans for Alternative 1. The root wad bank protection alternative was considered to be difficult to use in these high-energy areas. Additionally, installation of the root wads require a significant amount of bank disturbance. Because of the limitations of the habitat evaluation technique, it was assumed that all of the

TABLE 6-5

DECISION MATRIX FOR ALTERNATIVES AT NORTHWEST BRANCH, PRINCE GEORGE'S COUNTY STREAM RESTORATION PROJECT

EVALUATION CRITERIA	Alternative 1 Root Wad Bank Protection, Aquatic & Terrestrial Habitat Improvements	Alternative 2 Imbricated Riprap Bank Protection, Aquatic & Terrestrial Habitat Improvements	**Alternative 3** **Stone Toe & Bioengineered Bank Protection & Aquatic and Terrestrial Habitat Improvements**
Preference of Landowner	2	1	**1**
Preference of Local Sponsor	2	1	**1**
Compatible with AWRC Goals	2,5	2,5	**2,5**
Total Habitat Units (HUs)	73	73	**73**
Incremental Cost Output [1,2]	-	-	-
Operation and Maintenance Cost	Replace every 10 years	-	**$800**
Other Incidental Benefits	Water Quality	Water Quality	**Water Quality**
Cost Per Habitat Unit [2]	$700	$200	**$100**
Average Annual Cost [2]	$48,000	$18,000	**$11,000**
Construction Cost [2]	$570,000	$211,000	**$126,000**

The selected plan is in bold type.

[1] Incremental cost not calculated.
[2] Estimated cost for alternatives analyses only.

alternatives provided the same amount of habitat within the study area. Therefore, the least costly alternative was selected. The MCACES estimate for the selected alternative is $1,430,000.

6.5 MONTGOMERY COUNTY

Nine sites were selected for development and evaluation of alternatives for habitat restoration in Montgomery County. Of these nine sites, five were evaluated for stormwater wetland alternatives and four sites were evaluated for stream restoration. Of the five stormwater wetland sites, two sites would require the construction of new embankments (Stewart-April Lane and Lockridge Drive), and three sites are located within existing stormwater management ponds (Snowden's Mill I, Snowden's Mill II and Tanglewood). The four stream restoration sites are Gum Springs, Sligo Creek, Paint Branch and Northwest Branch. With the exception of Gum Springs, the alternatives for stream restoration are the same as described for the Northwest Branch in Prince George's County. A parallel bypass pipe was evaluated to protect Gum Springs.

6.5.1 Stewart-April Lane

All of the alternatives considered for this site included the construction of a new embankment. The concept was to impound water for wetland habitat and also to provide water quality and quantity control. All of the alternatives require the relocation of two sewer lines. The alternatives were developed from combinations of two management measures. A bypass pipe was considered to pass some of the stream base flow around the pond in order to prevent heating of the water during the warm months. Aquatic and terrestrial plantings (landscaping) was the second management measure which was used to increase habitat at the site.

6.5.1.a Incremental Analysis. The outputs for the three alternatives range from 0.2 HU for Alternative 3 to 2.5 HU's for Alternative 1. Alternative 2 yields 2.3 HU's. Alternative 3 was eliminated from the analysis based on cost effectiveness comparison with Alternative 2. The cost, on an average annual basis, to increase output from 2.3 HU's with Alternative 2 to 2.5 HU's with Alternative 1 amounts to $12,190 per HU. The selected plan is Alternative 1 since the cost per habitat unit was essentially the same for Alternative 1 and Alternative 2 and the site is located in a temperature-sensative sub-watershed. Table 6-6 contains the decision matrix for the Stewart-April Lane site.

6.5.1.b Habitat Benefits. The selected plan would provide 2.5 HU's within the existing pool area. The plan would construct 0.7 acres of non-tidal wetlands and reduce thermal and stormwater impacts to the downstream portion of Paint Branch. The wetland areas would serve as habitat for waterfowl and the water quality improvements provided by the selected alternative would benefit all downstream ecosystems.

TABLE 6-6

DECISION MATRIX FOR ALTERNATIVES AT STEWART/APRIL LANE, MONTGOMERY COUNTY WETLAND CONSTRUCTION PROJECT

EVALUATION CRITERIA	**Alternative 1** **Aquatic and Terrestrial Plantings with Partial Pond Bypass Pipe**	Alternative 2 Aquatic and Terrestrial Plantings without Partial Pond Bypass Pipe	Alternative 3 No Aquatic and Terrestrial Plantings with Partial Pond Bypass Pipe
Preference of Landowner	**1**	2	3
Local Sponsor	**1**	2	3
Compatible with AWRC Goals	**1,2,4**	1	1,2
Total Habitat Units (HUs)	**2.5**	2.3	0.2
Incremental Cost Output [1,2]	**$12,190**	Base	-
Operation and Maintenance Cost	**$4,000**	$3,500	$4,000
Other Incidental Benefits	**Water Quality**	Water Quality	Water Quality
Cost Per Habitat Unit [2]	**$11,000**	$11,000	$124,000
Average Annual Cost [2]	**$27,000**	$25,000	$25,000
Construction Cost [2]	**$323,000**	$294,000	$296,000

The selected plan is in bold type.

[1] Incremental cost compared to the next lowest level of output.
[2] Estimated cost for alternatives analyses only.

6.5.1.c Views of Local Sponsors and Landowners. Montgomery County DEP and M-NCPPC support this project.

6.5.1.d Summary Drawings MC-1 through MC-8, located in the Plate Portfolio, provide detailed design, and landscaping and real estate plans for Alternative 1. In addition to the habitat benefits at the site, Figure 6-3 shows that the extended detention storm discharge would be reduced by 83 percent. The water quality of the discharge would also be improved by extended detention. The MCACES cost estimate for the selected alternative is $1,000,000.

6.5.2 Lockridge Drive

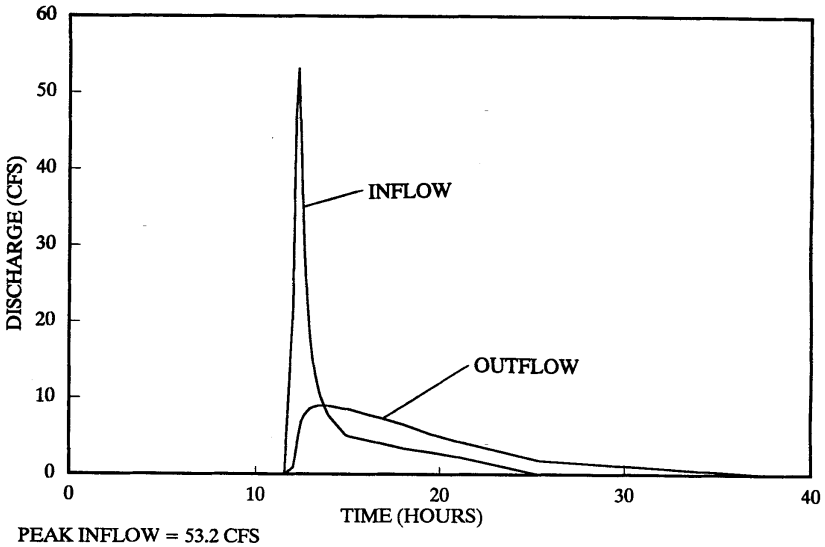
All of the alternatives considered for this site include the construction of a new embankment. The concept was to impound water for wetland habitat and also to provide water quality and quantity control. All of the alternatives require the relocation of a sewer line. The alternatives were developed from combinations of two management measures. A bypass pipe was considered to pass some of the stream base flow around the pond in order to prevent heating of the water during the warm months. Aquatic and terrestrial planting (landscaping) was the second management measure which was used to increase habitat at the site.

6.5.2.a Incremental Analysis and Plan Selection. The outputs for the three alternatives range from 0.1 HU for Alternative 3 to 1.2 HU's for Alternatives 1 and 2. Alternative 1 was eliminated from the analysis based on a cost effectiveness comparison with Alternative 2. Both alternatives yield 1.2 HU's, but the cost of Alternative 1 exceeds that of Alternative 2. Alternative 2 was selected as the plan for this site. Table 6-7 contains the decision matrix for the Lockridge Drive site.

6.5.2.b Habitat Benefits. The selected plan would restore 1.2 HU's within the pool area and additional but unquantifiable benefits to the downstream area. The area would provide nesting sites for waterfowl species and would provide additional wetland diversity to the area. In addition, the site would reduce the sediment loads from existing streambank area within the site. Benefits would also accrue in downstream areas as a result of the reduction in sediment, nutrient and oxygen demand in downstream areas.

6.5.2.c Views of Local Sponsors and Landowners. The Montgomery County DEP and M-NCPPC support this project.

6.5.2.d Summary. Drawings MC-9 through MC-15, located in the Plate Portfolio, provide detailed design, and landscaping and real estate plans for Alternative 2. In addition to the habitat benefits at the site, Figure 6-4 shows that the extended detention storm discharge would be reduced by 88 percent. The water quality of the discharge would also be improved by the extended detention. The water quality and quantity benefits are not reflected in the



PEAK INFLOW = 53.2 CFS
PEAK OUTFLOW = 9.1 CFS, WATER SURFACE ELEVATION = 277.8

FIGURE 6-3 STEWART-APRIL LANE STORMWATER WETLAND
EXTENDED DETENTION INFLOW AND OUTFLOW

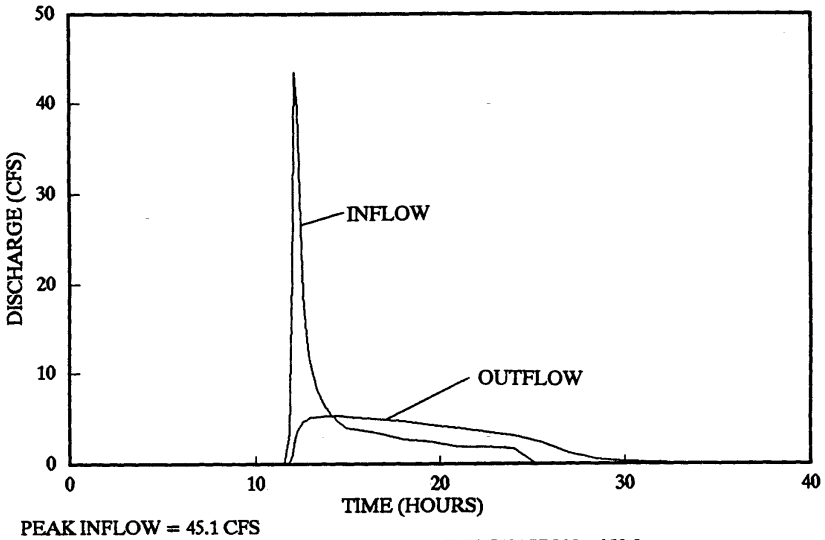
TABLE 6-7

DECISION MATRIX FOR ALTERNATIVES AT LOCKRIDGE DRIVE, MONTGOMERY COUNTY WETLAND CONSTRUCTION PROJECT

EVALUATION CRITERIA	Alternative 1 Aquatic and Terrestrial Plantings plus Partial Pond Bypass Pipe	**Alternative 2** **Aquatic and Terrestrial Plantings without Partial Pond Bypass Pipe**	Alternative 3 No Aquatic and Terrestrial Plantings with Partial Pond Bypass Pipe
Preference of Landowner	2	**1**	3
Preference of Local Sponsor	2	**1**	3
Compatible with AWRC Goals	1,2,4	**1,2,4**	1,2,4
Total Habitat Units (HUs)	1.2	**1.2**	0.1
Incremental Cost Output [1,2]	-	**$1,529**	Base
Operation and Maintenance Cost	$3,600	**$3,600**	$3,600
Other Incidental Benefits	Water Quality	**Water Quality**	Water Quality
Cost Per Habitat Unit [2]	$17,000	**$16,000**	$176,600
Average Annual Cost [2]	$20,000	**$19,000**	$18,000
Construction Cost [2]	$238,000	**$230,000**	$210,000

The selected plan is in bold type.

[1] Incremental cost compared to the next lowest level of output.
[2] Estimated cost for alternatives analyses only.



PEAK INFLOW = 45.1 CFS
PEAK OUTFLOW = 5.3 CFS, WATER SURFACE ELEVATION =252.8

FIGURE 6-4 LOCKRIDGE DRIVE STORMWATER WETLAND
EXTENDED DETENTION INFLOW AND OUTFLOW

habitat units estimated for the site. The MCACES cost estimate for the selected alternative is $700,000.

6.5.3 Snowden's Mill I

The alternatives for the Snowden's Mill ponds were combinations of habitat plantings, a base flow bypass pipe and modifications to the existing pond outlet structure. Since this site is in a Use III watershed, the base flow bypass pipe helped reduce the thermal impacts to Paint Branch.

6.5.3.a Incremental Analysis and Plan Selection. The outputs for the four alternatives range from 0.2 HU for Alternative 3 to 0.8 HU for Alternative 1. Alternatives 2 and 4 each yield 0.6 HU. Alternative 2 was eliminated from the analysis based on a cost effectiveness comparison with Alternative 4. Table 6-8 contains the decision matrix for the Snowden's Mill I site. Based on the matrix information, Alternative 1, which includes modifications to the riser to create wetlands, a bypass pipe and terrestrial and aquatic habitat plantings, was the selected alternative.

6.5.3.b Habitat Benefits. The selected plan would construct a 0.2 acre wetland and 0.1 acres of reforestation in place of an existing dry stormwater management pond. Additionally, a bypass pipe would be constructed which would reduce thermal loading to the Paint Branch trout stream. This plan would restore 0.8 HU within the constructed wetland system and 0.1 acres of riparian buffer. The area would provide nesting sites for waterfowl species and additional habitat diversity. In addition, the site would reduce the sediment, nutrient and oxygen demand and thermal impacts from drainage area serving the site.

6.5.3.c Views of Local Sponsors and Landowners. The Montgomery County DEP and M-NCPPC support this project. These agencies and the Maryland DNR have worked over the past 15 years to monitor and protect the Paint Branch trout fishery. This project will be an integral part of these protection efforts.

6.5.3.d Summary. Drawings MC-16 through MC-19, located in the Plate Portfolio, provide detailed design, and landscaping and real estate plans for Alternative 1. In addition to the habitat benefits at the site, Figure 6-5 shows that the extended detention storm discharge would be reduced by 78 percent. The water quality of the discharge would also be improved by the extended detention. Figure 6-6 shows that the 2-year storm event outflow would be reduced by 88 percent. The water quality and quantity benefits are not reflected in the habitat units estimated for the site. The MCACES cost estimate for the selected alternative is $310,000.

6.5.4 Snowden's Mill II

The alternatives considered were the same as those evaluated for the Snowden's Mill I site.

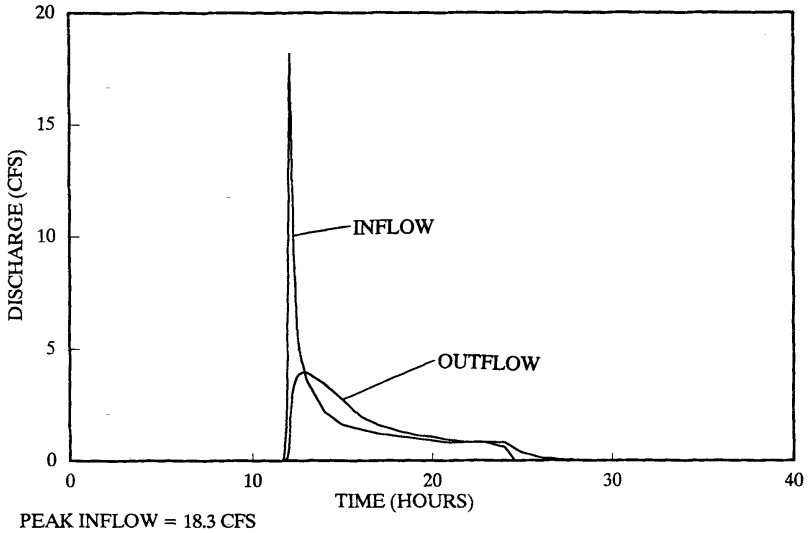
TABLE 6-8

DECISION MATRIX FOR ALTERNATIVES AT SNOWDEN'S MILL I, MONTGOMERY COUNTY WETLAND CONSTRUCTION PROJECT

EVALUATION CRITERIA	Alternative 1 **Riser Design, Aquatic & Terrestrial Plantings with Pond Bypass Pipe**	Alternative 2 Riser Design, Aquatic & Terrestrial Plantings without Pond Bypass Pipe	Alternative 3 Riser Design without Aquatic & Terrestrial Plantings with Pond Bypass Pipe	Alternative 4 No Change to Riser Design, Aquatic & Terrestrial Plantings with Pond Bypass Pipe
Preference of Landowner	**1**	3	2	4
Preference of Local Sponsor	**1**	3	2	4
Compatible with AWRC Goals	**1,2,4,5**	1,4,5	1,2	2,4,5
Total Habitat Units (HUs)	**0.8**	0.6	0.2	0.6
Incremental Cost Output [1,2]	**$5,465**	-	Base	$2,313
Operation and Maintenance Cost	**$3,200**	$3,100	$3,200	$3,200
Other Incidental Benefits	**Aesthetics Water Quality**	Aesthetics Water Quality	Water Quality	Aesthetics Water Quality
Cost Per Habitat Unit [2]	**$9,000**	$10,000	$26,000	$10,000
Average Annual Cost [2]	**$7,000**	$6,000	$5,000	$6,000
Construction Cost [2]	**$85,000**	$74,000	$61,000	$72,000

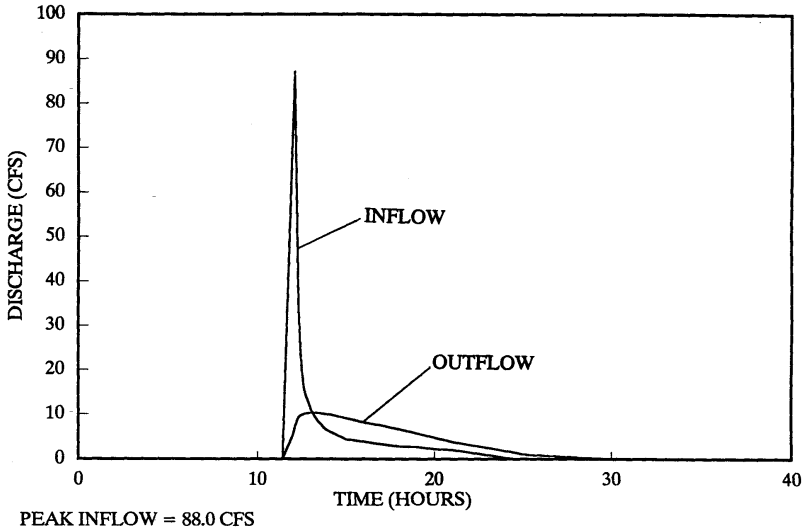
The selected plan is in bold type.

[1] Incremental cost compared to the next lowest level of output.
[2] Estimated cost for alternatives analyses only.



PEAK INFLOW = 18.3 CFS
PEAK OUTFLOW = 4.0 CFS, WATER SURFACE ELEVATION = 307.7

FIGURE 6-5 SNOWDEN'S MILL I STORMWATER WETLAND
EXTENDED DETENTION INFLOW AND OUTFLOW



PEAK INFLOW = 88.0 CFS
PEAK OUTFLOW = 10.4 CFS, WATER SURFACE ELEVATION = 313.0

FIGURE 6-6 SNOWDEN'S MILL I STORMWATER WETLAND
2-YEAR INFLOW AND OUTFLOW

6.5.4.a Incremental Analysis and Plan Selection. The outputs for the four alternatives range from 0.2 HU for Alternative 3 to 1.0 HU for Alternative 1. Alternatives 2 and 4 each yield 0.8 HU. Alternative 2 was eliminated from the analysis based on cost effectiveness comparison with Alternative 4. Table 6-9 contains the decision matrix for the Snowden's Mill II site. Based on the matrix information, Alternative 1 was selected for this site.

6.5.4.b Habitat Benefits. The selected plan would restore 1.0 HU. The plan would construct 0.3 acres of wetlands and 0.1 acres of riparian habitat within the existing dry pond. This alternative would provide benefits similar to those of the Snowden's Mill I site.

6.5.4.c Views of Local Sponsors and Landowners. The Montgomery County DEP, M-NCPPC, and DNR support this project for the same reasons listed for the Snowden's Mill I site.

6.5.4.d Summary. Drawings MC-20 through MC-24, located in the Plate Portfolio, provide detailed design, and landscaping and real estate plans for Alternative 1. In addition to the habitat benefits at the site, Figure 6-7 shows that the extended detention storm discharge would be reduced by 88 percent. The water quality of the discharge would also be improved by the extended detention. Figure 6-8 shows that the 2-year storm event outflow would be reduced by 90 percent. The water quality and quantity benefits are not reflected in the habitat units estimated for the site. The MCACES cost estimate for the selected alternative is $330,000.

6.5.5 Tanglewood

The alternatives considered at this site are the same combinations as those considered at the Snowden's Mill sites. The Little Paint Branch sub-watershed is classified as Use I.

6.5.5.a Incremental Analysis The average annual habitat unit outputs (HU's) for the four alternatives range from 0.0 HU for Alternative 3 to 1.7 HU's for Alternatives 1 and 2. Alternative 4 yields 1.6 HU's. Alternatives 1, 3 and 4 were eliminated from the analysis based on cost effectiveness comparison with Alternative 2. Each of the eliminated alternatives yield fewer HU's than Alternative 2 for the same or greater cost. The incremental analysis indicated that Alternative 2 is the most cost effective choice. Table 6-10 contains the decision matrix for the Tanglewood site. Based on this information and maximizing the number of AWRC goals, the selected alternative for this site is Alternative 2.

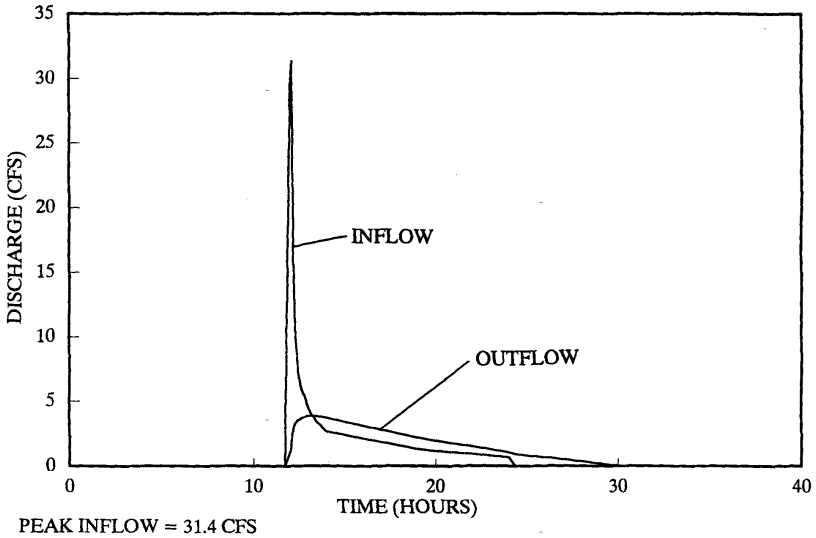
TABLE 6-9

DECISION MATRIX FOR ALTERNATIVES AT SNOWDEN'S MILL II, MONTGOMERY COUNTY WETLAND CONSTRUCTION PROJECT

EVALUATION CRITERIA	**Alternative 1** **Riser Design, Aquatic & Terrestrial Plantings with Pond Bypass Pipe**	Alternative 2 Riser Design, Aquatic & Terrestrial Plantings without Pond Bypass Pipe	Alternative 3 Riser Design without Aquatic & Terrestrial Plantings with Pond Bypass Pipe	Alternative 4 No Change to Riser Design, Aquatic & Terrestrial Plantings with Pond Bypass Pipe
Preference of Landowner	**1**	4	3	2
Preference of Local Sponsor	**1**	4	3	2
Compatible with AWRC Goals	**1,2,4,5**	1,4,5	1,2	2,4,5
Total Habitat Units (HUs)	**1.0**	0.8	0.2	0.8
Incremental Cost Output [1,2]	**$6,725**	-	Base	$1,682
Operation and Maintenance Cost	**$3,200**	$3,100	$3,200	$3,200
Other Incidental Benefits	**Aesthetics Water Quality**	Aesthetics Water Quality	Water Quality	Aesthetics Water Quality
Cost Per Habitat Unit [2]	**$8,000**	$9,000	$29,000	$9,000
Average Annual Cost [2]	**$8,000**	$7,000	$6,000	$7,000
Construction Cost [2]	**$97,000**	$85,000	$69,000	$81,000

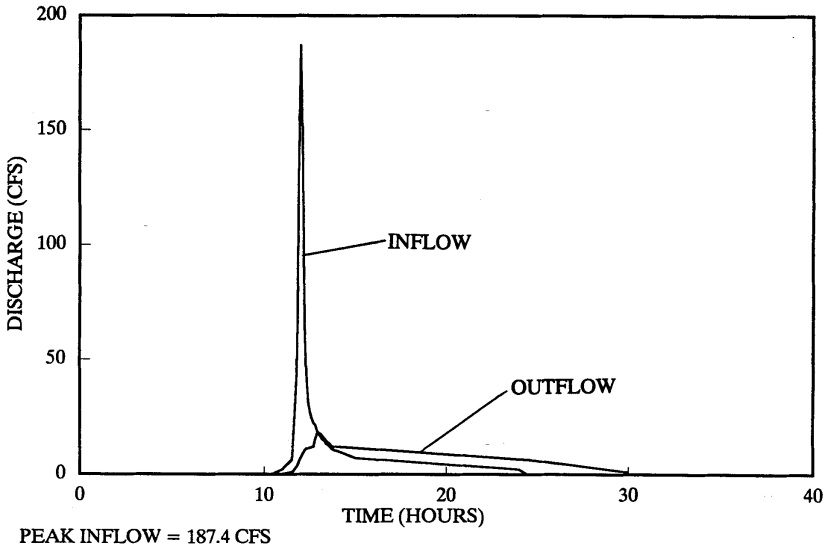
The selected plan is in bold type.

[1] Incremental cost compared to the next lowest level of output.
[2] Estimated cost for alternatives analyses only.



PEAK INFLOW = 31.4 CFS
PEAK OUTFLOW = 3.9 CFS, WATER SURFACE ELEVATION = 305.6

FIGURE 6-7 SNOWDEN'S MILL II STORMWATER WETLAND
EXTENDED DETENTION INFLOW AND OUTFLOW



PEAK INFLOW = 187.4 CFS
PEAK OUTFLOW = 18.1 CFS, WATER SURFACE ELEVATION = 312.1

FIGURE 6-8 SNOWDEN'S MILL II STORMWATER WETLAND
2-YEAR INFLOW AND OUTFLOW

TABLE 6-10

DECISION MATRIX FOR ALTERNATIVES AT TANGLEWOOD, MONTGOMERY COUNTY WETLAND CONSTRUCTION PROJECT

EVALUATION CRITERIA	Alternative 1 Outlet Design, Aquatic & Terrestrial Plantings with Pond Bypass Pipe	**Alternative 2** **Outlet Design, Aquatic & Terrestrial Plantings without Pond Bypass Pipe**	Alternative 3 Outlet Design without Aquatic & Terrestrial Plantings with Pond Bypass Pipe	Alternative 4 No Change to Outlet Design, Aquatic and Terrestrial Plantings with Pond Bypass Pipe
Preference of Landowner	1	**2**	4	3
Preference of Local Sponsor	1	**2**	3	4
Compatible with AWRC Goals	1,2,4,5	**1,2,4,5**	1,2	4,5
Total Habitat Units (HUs)	1.7	**1.7**	0	1.6
Incremental Cost Output [1,2]	-	-	-	-
Operation and Maintenance Cost		**$3,300**		
Other Incidental Benefits	Aesthetics Water Quality	**Aesthetics** Water Quality	Aesthetics Water Quality	Aesthetics Water Quality
Cost Per Habitat Unit [2]	$10,000	**$9,000**	0	$10,000
Average Annual Cost [2]	$17,000	**$16,000**	$15,000	$16,000
Construction Cost [2]	$208,000	**$192,000**	$176,000	$192,000

The selected plan is in bold type.

[1] Incremental cost compared to the next lowest level of output.
[2] Estimated cost for alternatives analyses only.

6.5.5.b Habitat Benefits. The selected plan would provide wetland habitat and reforestation benefits and would improve water quality in the Little Paint Branch stream below the site. This plan would restore 1.7 HU's within the 0.5 acre wetland and 2.2 acres of riparian buffer. The area would provide nesting sites for waterfowl species and add diversity to the area.

6.5.5.c Views of Local Sponsors and Landowners The Montgomery County DEP and M-NCPPC support this project. These agencies are constructing a similar project in the adjacent drainage area of the Little Paint Branch.

6.5.5.d Summary. Drawings MC-25 through MC-28, located in the Plate Portfolio, provide detailed design, and landscaping and real estate plans for Alternative 2. In addition to the habitat benefits at the site, Figure 6-9 shows that the extended detention storm discharge would be reduced by 95 percent. The water quality of the discharge would be improved by the extended detention. Figure 6-10 shows that the 2-year storm event outflow would be reduced by 89 percent. The water quality and quantity benefits are not reflected in the habitat units estimated for the site. The MCACES cost estimate for the selected alternative is $500,000.

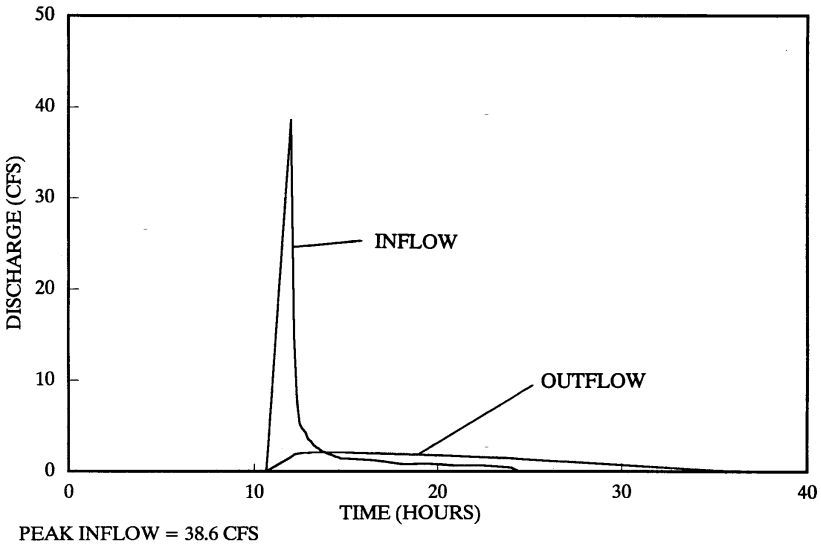
6.5.6 Gum Springs

The Gum Springs bypass pipe alternatives differ by the location of the intake and outfall structures. The various locations required differing lengths of pipe and therefore resulted in different costs for each alternative.

6.5.6.a Incremental Analysis and Plan Selection. The outputs for the three alternatives range from 0.3 HU for Alternative 1 to 0.4 HU for Alternatives 2 and 3. Alternative 3 was eliminated from the analysis based on a cost effectiveness comparison with Alternative 2. Both alternatives yield 0.4 HU, but the cost of Alternative 3 exceeds that of Alternative 2. Table 6-11 contains the decision matrix for the Gum Springs site. Based on the matrix information, the selected plan is Alternative 2.

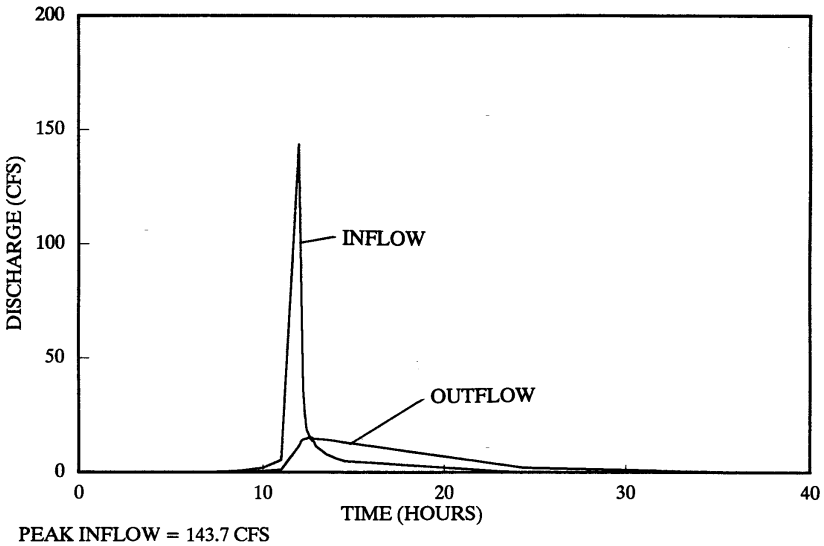
6.5.6.b Habitat Benefits. The plan would restore scarce spawning habitat in the Gum Springs. This plan would restore 0.4 HU along 1800 feet of stream. In addition, sediment loads from the streambank area along Gum Springs would be reduced. The restored fisheries habitat would be available for spawning and juvenile fish.

6.5.6.c Views of Local Sponsors and Landowners. The Montgomery County DEP, DNR and M-NCPPC support this project. These agencies have worked diligently to protect this resource.



PEAK INFLOW = 38.6 CFS
PEAK OUTFLOW = 2.1 CFS, WATER SURFACE ELEVATION = 302.1

FIGURE 6-9 TANGLEWOOD STORMWATER WETLAND
EXTENDED DETENTION INFLOW AND OUTFLOW



PEAK INFLOW = 143.7 CFS
PEAK OUTFLOW = 15.5 CFS, WATER SURFACE ELEVATION = 308.4

FIGURE 6-10 TANGLEWOOD STORMWATER WETLAND
2-YEAR INFLOW AND OUTFLOW

TABLE 6-11

DECISION MATRIX FOR ALTERNATIVES AT GUM SPRINGS, MONTGOMERY COUNTY STREAM RESTORATION PROJECT

EVALUATION CRITERIA	Alternative 1 Parallel Pipe 1650-feet Long	**Alternative 2** **Parallel Pipe** **1700-feet Long**	Alternative 3 Parallel Pipe 2000-feet Long
Preference of Landowner	2	**1**	3
Preference of Local Sponsor	2	**1**	3
Compatible with AWRC Goals	2	**2**	2
Habitat Units (HUs)	0.3	**0.4**	0.4
Incremental Cost Output [1,2]	Base	**$2,500**	-
Operation and Maintenance Cost	$2,300	**$2,300**	$2,300
Other Incidental Benefits	Reduced Sediment	Reduced Sediment	Reduced Sediment
Cost Per Habitat Unit [2]	$38,000	**$29,000**	$32,000
Average Annual Cost [2]	$11,000	**$12,000**	$13,000
Construction Cost [2]	$137,000	**$140,000**	$152,000

The selected plan is in bold type.

[1] Incremental cost compared to the next lowest level of output.
[2] Estimated cost for alternatives analyses only.

6.5.6.d Summary. Drawings MC-29 through MC-31, located in the Plate Portfolio, provide detailed design, landscaping and real estate plans for Alternative 2. The MCACES cost estimate for the selected alternative is $420,000.

6.5.7 Sligo Creek

The three alternatives considered for stream protection in Sligo Creek, Paint Branch and Northwest Branch differ by the various methods of protecting the eroding banks. In addition, approximately 15 acres of bottomland habitat would be reforested. The selected plan for Sligo Creek is Alternative 3.

6.5.7.a Incremental Analysis and Plan Selection. The outputs for the three alternatives are equivalent; each alternative yields 2.4 HU's. Alternative 3 is the preferred alternative because it yields an equivalent number of HU's as Alternatives 1 and 2 for a lower average annual cost. Table 6-12 contains the decision matrix for the Sligo Creek site. Based on this information, Alternative 3, stone toe protection with bioengineered bank stabilization, was the selected alternative.

6.5.7.b Habitat Benefits. The selected plan would restore stream habitat in selected areas along an 2,500-foot section of the stream. The restored areas within the stream would serve as fisheries habitat, and the reforestation would strengthen the forest buffer along Sligo Creek. This plan would restore 2.4 HU's along the stream and 0.6 acres of riparian buffer. The area would provide nesting sites for waterfowl species and for fisheries habitat. In addition, the site would reduce the sediment loads from streambank areas along the stretch. The restored fisheries habitat would be available for resident species.

6.5.7.c Views of Local Sponsors and Landowners. The Montgomery County DEP and M-NCPPC support this project. These agencies have completed construction of two major stormwater management sites, a forested wetland, and 3,000 feet of stream restoration within this watershed. Two additional projects are in planning or construction. The combined benefits of these projects would accrue within the project areas and in the downstream reaches of Sligo Creek, the Northwest Branch and the Anacostia River.

6.5.7.d Summary. Drawings MC-32 through MC-33, located in the Plate Portfolio, provide detailed design, landscaping and real estate plans for Alternative 3. The design does provide for the use of root wads in one selected low energy area to evaluate this technique. The MCACES cost estimate for the selected alternative is $410,000.

6.5.8 Paint Branch

6.5.8.a Incremental Analysis and Plan Selection. Three alternatives were investigated for the Paint Branch environmental restoration project in Montgomery County. The outputs for the three alternatives are equivalent; each alternative yields 43.4 HU's. Alternative 3 is the

TABLE 6-12

DECISION MATRIX FOR ALTERNATIVES AT SLIGO CREEK, MONTGOMERY COUNTY STREAM RESTORATION PROJECT

EVALUATION CRITERIA	Alternative 1 Root Wad Bank Protection and Aquatic & Terrestrial Habitat Improvements	Alternative 2 Imbricated Rip-Rap Bank Protection and Aquatic & Terrestrial Habitat Improvements	**Alternative 3** **Stone Toe & Bioengineered Bank Protection and Aquatic & Terrestrial Habitat Improvements**
Preference of Landowner	3	1	**2**
Preference of Local Sponsor	3	1	**2**
Compatible with AWRC Goals	2,5	2,5	**2,5**
Total Habitat Units (HUs)	2.4	2.4	**2.4**
Operation and Maintenance Cost	Replace every 10 years		**$800**
Incremental Cost Output [1,2]	-	-	-
Other Incidental Benefits	Sediment Reduction	Sediment Reduction	Sediment Reduction
Cost Per Habitat Unit [2]	$5,700	$1,300	**$790**
Average Annual Cost [2]	$14,000	$3,000	**$2,000**
Construction Cost [2] Cost [2]	$160,000	$37,000	**$22,000**

The selected plan is in bold type.

[1] Incremental cost not calculated.
[2] Estimated cost for alternatives analyses only.

preferred alternative because it yields an equivalent number of HU's as Alternatives 1 and 2 for a much lower average annual cost. Table 6-13 contains the decision matrix for Paint Branch. However, the use of imbricated riprap in selected areas is required due to site access, bank vegetation and stream velocities. Based on this information, Alternative 2 was selected for the Paint Branch site.

6.5.8.b Habitat Benefits. The selected plan would restore stream habitat in selected areas along a 10,000-foot section of the stream. The restored areas within the stream would serve as fisheries habitat and the reforestation would strengthen the forest buffer along the Paint Branch. This plan would restore 43.4 HU's along the 10,000 feet of stream and the 8.5 acres of riparian buffer. The area would provide nesting sites for waterfowl and would serve as adult trout habitat. In addition, the site would reduce the sediment loads from streambank area along the stretch.

6.5.8.c Views of Local Sponsors and Landowners. The Montgomery County DEP, Maryland DNR and M-NCPPC support this project. These agencies have worked to protect this resource for the last 15 years.

6.5.8.d Summary. Drawings MC-34 through MC-39, located in the Plate Portfolio, provide detailed design, landscaping and real estate plans for Alternative 3. The MCACES cost estimate for the selected alternative is $1,970,000.

6.5.9 Northwest Branch - Montgomery County

6.5.9.a Incremental Analysis and Plan Selection. The outputs for the three alternatives are equivalent; each alternative yields 7.0 HU's. Alternative 3 is the preferred alternative because it yields an equivalent number of HU's as Alternatives 1 and 2 for a much lower average annual cost. Table 6-14 contains the decision matrix for the Northwest Branch. However, the use of imbricated riprap in selected areas is required due to site access, bank vegetation and stream velocities. Based on this information, Alternative 2 was selected.

6.5.9.b Habitat Benefits. The selected plan would restore 7 HU's along the 3,700 feet of stream. The area would provide nesting sites for waterfowl species. The restored areas within the stream would serve as fisheries habitat. In addition, the site would reduce the sediment loads from streambank area along the stretch. The restored fisheries habitat would be available for resident species.

6.5.9.c Views of Local Sponsors and Landowners. The Montgomery County DEP, DNR and M-NCPPC support this project.

6.5.9.d Summary. Drawings MC-40 through MC-43, located in the Plate Portfolio, provide detailed design, landscaping and real estate plans for Alternative 2. The MCACES cost estimate for the selected alternative is $600,000.

TABLE 6-13

DECISION MATRIX FOR ALTERNATIVES AT PAINT BRANCH, MONTGOMERY COUNTY STREAM RESTORATION PROJECT

EVALUATION CRITERIA	Alternative 1 Root Wad Bank Protection and Aquatic & Terrestrial Habitat Improvements	**Alternative 2** **Imbricated Rip-Rap Bank Protection and Aquatic & Terrestrial Habitat Improvements**	Alternative 3 Stone Toe & Bioengineered Bank Protection and Aquatic & Terrestrial Habitat Improvements
Preference of Landowner	3	**1**	2
Preference of Local Sponsor	3	**1**	2
Compatible with AWRC Goals	2,5	**2,5**	2,5
Total Habitat Units (HUs)	43	**43**	43
Operation and Maintenance Cost	Replace every 10 years	$800	$800
Incremental Cost Output [1,2]	-	-	-
Other Incidental Benefits	Sediment Reduction	Sediment Reduction	Sediment Reduction
Cost Per Habitat Unit [2]	$1,500	**$540**	$320
Average Annual Cost [2]	$64,000	**$23,000**	$14,000
Construction Cost [2]	$760,000	**$230,000**	$170,000

The selected plan is in bold type.

[1] Incremental cost not calculated.
[2] Estimated cost for alternatives analyses only.

TABLE 6-14

DECISION MATRIX FOR ALTERNATIVES AT NORTHWEST BRANCH, MONTGOMERY COUNTY STREAM RESTORATION PROJECT

EVALUATION CRITERIA	Alternative 1 Root Wad Bank Protection and Aquatic & Terrestrial Habitat Improvements	**Alternative 2** **Imbricated Rip-Rap Bank Protection and Aquatic & Terrestrial Habitat Improvements**	Alternative 3 Stone Toe & Bioengineered Bank Protection and Aquatic & Terrestrial Habitat Improvements
Preference of Landowner	3	**1**	2
Preference of Local Sponsor	3	**1**	2
Compatible with AWRC Goals	2,5	**2,5**	2,5
Total Habitat Units (HUs)	7	**7**	7
Operation and Maintenance Cost	Replace every 10 years	$800	$800
Incremental Cost Output [1,2]			
Other Incidental Benefits	Sediment Reduction	Sediment Reduction	Sediment Reduction
Cost Per Habitat Unit [2]	$5,000	**$2,000**	$1,2600
Average Annual Cost [2]	$37,000	**$14,000**	$8,000
Construction Cost [2]	$440,000	**$160,000**	$100,000

The selected plan is in bold type.

[1] Incremental cost not calculated.
[2] Estimated cost for alternatives analyses only.

6.6 SUMMARY

As a result of the plan selection process, various alternative methods of producing the habitat outputs for the selected sites were evaluated. After consultation with the appropriate Federal, state, regional and local officials and in close coordination with the study sponsors, site-specific alternatives were selected which would provide cost effective investments for habitat restoration in the basin.

Incremental analysis techniques were used to evaluate various alternatives at each site. For the most part, the selected alternative provided the greatest habitat benefit at the least cost. However, at some locations, other factors, especially access to streams, required that a higher cost alternative be selected.

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Section 7

Description of Selected Plan

The selected plan for the Anacostia River and Tributaries feasibility study incorporates a wide range of techniques to restore fish and wildlife habitat to the basin. The selected plan for each site takes into consideration the organizational goals of the sponsoring agencies, the land owning agencies and the environmental laws and regulations which govern construction activities in the region. The selected plan for the Anacostia River and Tributaries feasibility study incorporates a wide range of techniques to restore fish and wildlife habitat to the basin. The selected plan also incorporates the combined environmental restoration and project implementation expertise of the Corps of Engineers and the Anacostia Watershed Restoration Committee.

7.1 DESCRIPTION OF THE SELECTED PLAN

The selected plan provides for the restoration of 79 acres of tidal and non-tidal wetlands in the basin. A total of 5 miles of stream habitat restoration and 33 acres of bottomland habitat reforestation is also included in the selected plan. A total of 604 habitat units would result from the selected plan.

The selected plan includes restoration of tidal and non-tidal wetlands, bottomland habitat and stream restoration. A variety of techniques was selected to construct fish and wildlife habitat. Restoration of tidal wetlands will be accomplished through the beneficial use of dredged material. Non-tidal wetlands are designed as part of stormwater wetland systems which not only provide habitat but also control water quality and water quantity. Storm restoration consists of bank stabilization and installation of instream structures.

Table 7-1 summarizes the selected plan for environmental restoration of the Anacostia River basin. Implementation of this plan will complement the restoration work of the AWRC and will contribute to the restoration goals; however, this plan alone will not restore the environmental integrity of the basin.

The Plate Portfolio contains the detailed design drawings for each of the selected alternatives. The detailed engineering, real estate, cultural resources, natural resources, cost estimating and incremental analysis information is contained in appendices A through H.

TABLE 7-1

SELECTED PLAN

Jurisdiction and Site	Fully funded MCACES Cost Estimate	Restoration Result
District of Columbia		
Kingman Lake	$6,500,000	45-Acre Wetland 5.6-Acres Reforestation
River Fringe	$2,750,000	30-Acre Wetland
Prince George's County		
Fordham Street	$1,900,000	2.2-Acre Wetland 1.0-Acre Reforestation
Northwest Branch	$1,430,000	8000' Stream Restoration 14.8 Acres Reforestation
Montgomery County		
Stewart/April Lane	$1,000,000	0.7-Acre Wetland
Lockridge Drive	$700,000	0.3-Acre Wetland
Snowden's Mill I	$310,000	0.2-Acre Wetland 0.1-Acre Reforestation
Snowden's Mill II	$330,000	0.3-Acre Wetland 0.1-Acre Reforestation
Tanglewood	$500,000	0.5-Acre Wetland 2.2-Acres Reforestation
Gum Springs	$420,000	1,800' Stream Restoration
Sligo Creek	$410,000	2,500' Stream Restoration 0.6-Acres Reforestation
Paint Branch	$1,970,000	11,000' Stream Restoration 8.5-Acres Reforestation
Northwest Branch	$600,000	3,700' Stream Restoration
Totals	$18,820,000	79.2 Acres Wetlands 32.9 Acres Bottomland Forest 5.1 Miles Stream Restoration

7.2 REAL ESTATE CONSIDERATIONS

7.2.1 District of Columbia

The National Park Service is the landowner for sites within the District of Columbia. NPS is supportive of the restoration at Kingman Lake and the River Fringe wetlands. A real estate permit from the NPS will be needed for two staging and work areas with a total area of 0.5 acre. No real estate permit will be required for lands below the mean high water line. The real estate requirements for the two sites in the District of Columbia are contained in the Plate Portfolio, Volume IV, Numbers DC-14 through DC-16 and DC-21 through DC-24. Additional information is contained in Appendix B.

7.2.2 Prince George's County

M-NCPPC is the landowner for the two sites in Prince George's County and is supportive of restoration in these two areas. Maps showing the real estate requirements for Prince George's County are contained in the Plate Portfolio, Volume IV, Numbers PG-9 through PG-12. A gross appraisal estimated the fair market value for the real estate interests to be provided for the sites in Prince George's County at $21,000. Additional information is contained in Appendix B.

7.2.3 Montgomery County

Most of the real estate at the nine Montgomery County sites is currently owned by M-NCPPC which is supportive of the restoration work in these areas. Maps showing the real estate requirements for the nine Montgomery County sites are contained in the Plate Portfolio, Volume IV, Numbers MC-8, 15, 19, 24, 28, 31, 37-39, and 41. A gross appraisal estimated the fair market value for the real estate interests to be provided for the sites in Montgomery County at $57,000. Additional information is contained in Appendix B.

7.3 ENVIRONMENTAL CONSIDERATIONS

The environmental restoration proposals at the 13 selected sites will restore fish and wildlife habitat for significant resources in the Anacostia River basin. Other than minor temporary impacts during construction, implementation of the selected plan will be beneficial to the human environment. The selected plan is in compliance with all applicable Federal environmental laws and regulations. Table 7-2 contains the environmental compliance evaluation.

TABLE 7-2

ENVIRONMENTAL COMPLIANCE EVALUATION

Compliance of the Proposed Actions With Environmental Protection Statutes and Other Environmental Requirements.

Federal Statutes	Level of Compliance
Anadromous Fish Conservation Act	Full
Archeological and Historic Preservation Act	Full
Clean Air Act	Full
Coastal Zone Management Act	Full
Comprehensive Environmental Response, Compensation and Liability Act	Full
Endangered Species Act	Full
Estuary Protection Act	N/A
Federal Water Project Recreation Act	Full
Fish and Wildlife Coordination Act	Full
Land and Water Conservation Fund Act	Full
Marine Mammal Protection Act	N/A
National Historic Preservation Act	Full
National Environmental Policy Act	Full
Resource Conservation and Recovery Act	Full
Rivers and Harbor Act	Full
Watershed Protection and Flood Prevention Act	Full
Wild and Scenic Rivers Act	Full
Farmland Protection Policy Act	Full
Executive Orders, Memoranda, etc.	Full
Protection and Enhancement of Cultural Environment (E.O.11593)	Full
Floodplain Management (E.O. 11988)	Full
Protection of Wetlands (E.O. 11990)	Full
Prime and Unique Farmlands (CEQ Memorandum, 11 Aug 80)	Full
40 CFR 122.26 (B)(14), 19 Nov 1990	Full
Environmental Justice (E.O. 12898)	Full

NOTES:

a. Full Compliance Having met all requirements of the statute, E.O. or other environmental requirements for the current stage of planning.

b. Partial Compliance Not having met some of the requirements that normally are met in the current stage of planning.

c. Non-Compliance Violation of a requirement of the Statute, E.O. or other environmental requirements.

d. N/A = Not-Applicable No requirements for the statute, E.O. or other environmental requirements for the current stage of planning.

A preliminary screening for HTRW determined that none of the recommended projects should be affected by HTRW problems. At Kingman Lake, additional soil sampling was recommended for the reforestation portion of the restoration proposal.

A cultural resources survey was conducted at each of the 13 sites. With the exception of the Paint Branch stream restoration site, none of the proposed actions should have an affect on cultural resources. Additional cultural resources research is recommended for the Paint Branch stream corridor.

Section 404(b)(1) evaluations have been prepared for each of the sites where the recommended construction will utilize fill material. Annex C contains the evaluations for 10 of the 13 sites. Section 404(b)(1) does not apply to the proposed work at the existing stormwater ponds.

7.4 SOCIAL AND ECONOMIC CONSIDERATIONS

The existing flood control projects on the Anacostia River and its tributaries were designed and constructed to provide national economic development (NED) benefits attributable to flood damage reduction. Inundation reduction was the project purpose which triggered Federal involvement in the planning, engineering, design and construction of the levees and channel improvement features in the Anacostia basin.

Based upon the findings of hydraulic analysis of the impact of the environmental restoration projects, changes in the flood stages and frequency of flooding are insignificant. The current level of protection provided by the flood control projects will not be reduced. Consequently, the communities protected by the existing Federal projects will not experience a loss of NED inundation reduction benefits. However, evidence provided by DEP and DNR suggests that a re-evaluation of those projects is appropriate due to their age and subsequent upland development.

The 13 environmental restoration actions in the Anacostia basin were not evaluated to quantify NED benefits. The primary purpose of the work was not to increase the NED account of the existing flood control works in the basin, but to restore environmental habitat values. This does not exclude the probability that the restoration projects in the basin will impact aesthetic and other quality of life characteristics of residential properties contiguous with project improvements. A beneficial result of this impact could be that the value of residential property contiguous with restoration improvements will increase at a rate in excess of that of comparable properties not contiguous with improvements. This result would be a project NED benefit.

The environmental restoration projects provide potential incidental recreation benefits in conjunction with planned development and redevelopment improvements in the basin. The

characteristics of the restoration projects offer an aesthetically pleasing framework for recreational activities that could be tied into the economic redevelopment plan for the tidal Anacostia River and the Southeast Federal Center development. The residents and employees of these developments will, at least, benefit from the improved viewscapes availed by the restoration projects.

Neither NED incidental recreation nor NED water quality benefits for the projects evaluated in the study were quantified. None of the 13 projects is designed to produce NED benefits. Moreover, differences in the areal scale of development among alternatives at the Montgomery County and Prince George's County project sites are not significant enough to warrant investigation of possible differences in NED outputs. Recreational usage will most likely be limited to local residents at these 11 sites. Minor differences in alternative size and features are not factors expected to either constrain or enhance the quality of recreational experience or the number of users. Nor are the proposed improvements expected to attract users living outside the environs of the neighborhood of the project improvement. Therefore, the small differences among alternatives will not likely influence the level of output of NED recreational benefits, and recreation benefits, if estimated, would be essentially equal for all alternatives at each site.

The areal differences at the Kingman Lake and River Fringe project sites are significant, but because there are no specific recreational features in the designs of the projects, NED benefits attributable to the projects were not measurable. Also, because there are other facilities in the vicinity of these projects which are designed specifically for recreational users, the likelihood is that these other facilities will attract users seeking a recreational experience. The Kingman Lake and River Fringe projects will enhance visual and other aesthetic qualities for those who work or travel near them, but the specific recreational content and value of this effect is not likely to vary among alternatives at the sites.

A non-NED effect of the restoration projects could be an increase in regional employment during the construction period. This effect is not an NED benefit because Montgomery County, Prince George's County and the District of Columbia do not qualify for employment redevelopment benefits under established criteria. Still, an infusion of $19 million of construction spending in the region could improve the short-term employment outlook in construction and ancillary industrial sectors.

The recommendations contained in this report are in compliance with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. One of the requirements of the Executive Order is for Federal agencies to communicate to the public the risks of subsistence consumption of fish and wildlife. Within the tidal Anacostia River, the EPA and DCRA have issued an advisory which recommends against the consumption of more than one eel, catfish or carp per week due to the elevated levels of contaminants which have been found in the tissue of bottom feeding fish species.

The proposed restoration work will have beneficial effects within the Anacostia River basin. The proposed work in Montgomery and Prince George's Counties will provide benefits not only within each site, but also contribute to the restoration of the downstream areas. The wetlands and reforestation within the District of Columbia would improve water quality, air quality and the aesthetics of the area.

7.5 DESIGN CONSIDERATIONS

The environmental goals for each of the selected sites are contained in Appendix A. Specific design considerations for each of the sites are detailed therein.

Generally speaking, design considerations related to safety issues and operation and maintenance were emphasized by the design engineers. The wetland areas were all developed with a safety bench along the perimeter. This eliminated any sharp drop-offs along the edge of the ponds. Additionally, headwalls which drop considerably have safety fencing to prevent falls. Allowing some of the existing trees at the Stewart-April Lane and the Lockridge Drive sites to remain as standing deadwood habitat was also rejected for safety considerations.

Operation and maintenance considerations were an additional important design consideration. Sediment forebays, standardized structural elements and good maintenance access are provided to each of the sites where maintenance is required. The embankment slopes at Stewart-April Lane and Lockridge Drive were designed at a 3:1 slope to allow the M-NCPPC equipment to mow the areas.

The recommended planting design requirements vary between upland, stormwater wetland, streambank protection, river fringe wetland and the Kingman Lake wetland due to the differing site conditions which exist in each of these locations. The proposed designs provide pioneer species and brood stock to initiate site restoration after completion of construction. The planting schemes reflect a desire to avoid introduction and subsequent colonization of the new areas by exotics (*Typha* spp., *Phragmites* spp.) which are fast colonizing and form exclusive, monotypic stands of sub-optimum habitat. However, based on the monitoring now being conducted by NPS and the resource agencies at Kenilworth Marsh, it may be appropriate to provide some selected areas for natural colonization from the existing sediment seedbank for the wetland areas established through the use of dredged material.

7.6 CONSTRUCTION CONSIDERATIONS

7.6.1 District of Columbia

Construction of both elements of this project will be accomplished under one contract for cost effectiveness and improved coordination. A detailed construction sequence will be determined during preconstruction engineering and design (PED) in close coordination with the sponsors. The sequence will consider such factors as recreational use of the areas and the anadromous fish migratory period of March 1 through June 15 which may restrict work within the river. Twenty months have been scheduled for construction to ensure all work can be accomplished regardless of the work windows. Preparatory work outside of the river, and terrestrial work (e.g. riparian buffer) can generally be accomplished without regard to the work windows.

7.6.2 Prince George's County

Construction of both elements of this project will be accomplished under one contract for cost effectiveness and improved coordination. A detailed construction sequence will be determined during PED in close coordination with the sponsors. The sequence will consider such factors as recreational use of the areas and the Use IV windows which restrict work within the stream. Sixteen months have been scheduled for construction to ensure all work can be accomplished regardless of the noted work windows. Preparatory work outside of the stream and non-stream work (e.g., pond excavation) can generally be accomplished without regard to these work windows.

7.6.3 Montgomery County

Construction of all elements of this project will be accomplished under one contract for cost effectiveness and improved coordination. A detailed construction sequence will be determined during PED in close coordination with the sponsors. The sequence will consider such factors as recreational use of the areas, and the Use III and IV windows which restrict work within the streams. Two years have been scheduled for construction to ensure all work can be accomplished regardless of the noted work windows. Preparatory work outside of the streams, and non-stream work (e.g., pond excavation) can generally be accomplished without regard to the work windows.

7.7 OPERATION, MAINTENANCE, & REPLACEMENT CONSIDERATIONS

The local sponsor would have responsibility for performing all operation, maintenance and replacement activities. The tidal wetlands in Kingman Lake and the River Fringe would require the inspection and maintenance of habitat structures, maintenance of sediment

control structures until the dredge material stabilizes, control and removal of exotic and noxious species, and removal of debris. Operation and maintenance manuals will be prepared for each project at the completion of construction. Table 7-3 shows the estimated annual operation and maintenance cost for the District of Columbia sites. The primary operation and maintenance activities for Snowden's Mill I, Snowden's Mill II, Tanglewood, Lockridge Drive, Stewart-April Lane and Fordham Street sites include: annual grass mowing and maintenance of gate valves, quarterly removal of debris, sediment removal from forebays at 5-year intervals, and dredging of stormwater pond micropools at 20-year intervals.

The two Northwest Branch segments, Paint Branch and Sligo Creek sites require the semi-annual inspection for damage or realignment of structures, bank erosion or stream blockages from fallen trees. At Gum Springs, the inlet structure and the pipeline should be inspected three times per year. Tables 7-4 and 7-5 show the estimated annual operation and maintenance costs for Prince George's and Montgomery Counties, respectively.

7.8 SUMMARY OF PLAN ACCOMPLISHMENTS

The plan will contribute to the goals of the *Six Point Action Plan*. The plan will build wetlands, improve water quality, restore stream and wetland habitat, and expand the riparian forest cover. A watershed approach to habitat restoration is being utilized in the Anacostia River basin, and habitat benefits of the selected plan will occur not only within the selected sites but also within the downstream ecosystems.

7.8.1 Project Life

The project life of all of the recommended alternatives is 50 years. This estimate is based on the projected life of the engineered structures for the stormwater wetlands. Although the systems can be refurbished to extend their usefulness, the 50-year project life was determined to be sufficient for the analysis purposes of this report. There are no expected future conditions which would shorten the expected life of these projects.

7.8.2 Sensitivity of Cost Contingencies

A cost contingency of 25 percent was used in the total project cost estimates. The real estate and PED costs have a 20-percent contingency.

TABLE 7-3

ESTIMATED ANNUAL OPERATION AND MAINTENANCE COSTS
DISTRICT OF COLUMBIA

	Annual Inspection	Erosion Control	Debris [1] Removal	Structural Maintenance	Control/Removal Nuisance Problems	Total
KINGMAN LAKE	400	640	2,500	500	1,000	5,040
RIVER FRINGE	400	585	1,600	300	650	3,535
						8,575

[1] Quarterly debris removal

TABLE 7-4

ESTIMATED ANNUAL OPERATION AND MAINTENANCE COSTS
PRINCE GEORGE'S COUNTY

	Annual Inspection	Erosion Control	Debris [1] Removal	Forebay Dredging	Total
FORDHAM STREET WETLAND	400	500	4,800	930	6,630
NORTHWEST BRANCH	800	-	-	-	800
					7,430

[1] Monthly debris removal

TABLE 7-5

ESTIMATED ANNUAL OPERATION AND MAINTENANCE COSTS
MONTGOMERY COUNTY

	Annual Inspection	Valve Maintenance	Erosion Control	Debris [1] Removal	Forebay Dredging	Pool Dredging	Grass Mowing	Structural Repairs	Total
SNOWDEN'S MILL I	400	150	500	1,600	250	80	250	100	3,330
SNOWDEN'S MILL II	400	150	500	1,600	370	120	250	100	3,490
TANGLEWOOD	400	150	500	1,600	190	60	250	100	3,250
STEWART/ APRIL LANE	400	150	500	1,600	790	260	250	100	4,050
LOCKRIDGE DRIVE	400	150	500	1,600	500	170	250	100	3,670
GUM SPRINGS	400	-	500	1,200	-	-	-	-	2,100
SLIGO CREEK	900	-	-	-	-	-	-	-	900
NORTHWEST BRANCH	900	-	-	-	-	-	-	-	900
PAINT BRANCH	900	-	-	-	-	-	-	-	900
								TOTAL	22,290

[1] Quarterly debris removal

7.8.3 Additional Benefits

Table 7-6 estimates the nutrient and sediment load estimates for the stormwater management wetlands. The simple method (Schueler, 1987) calculations were used for the estimates.

7.9 SEA LEVEL RISE

Based on information contained in the General Design Memorandum for the Atlantic Coast of Maryland Hurricane Protection Project (USACE, 1989), the sea level rise at Ocean City, Maryland, for the period of 1940 through 1980 averaged 0.01 feet per year. Assuming that this rate is maintained during the 50-year project life, and assuming that the sea level rise at Ocean City approximates that of the tidal Anacostia River, the expected influence would be to elevate the existing tides by 0.5 feet after 50 years. This estimated rise was not considered to affect the project designs.

7.10 SEDIMENTATION

Sedimentation rates in the Anacostia River embayments have been reported to average between 0.4 and 0.8 inches per year (Scatina, 1987). Sedimentation may eventually affect the tidal wetlands by changing the habitat characteristics of Kingman Lake and the River Fringe wetlands. If sedimentation significantly raised the elevations of these areas, then the wetland habitat type would evolve into the next higher tidal marsh zone. This transition, however, would not reduce the habitat value of the affected area. If necessary, the marsh could be re-graded and re-planted.

Sedimentation in the stormwater management wetlands is anticipated and was considered in the site designs. During normal operation and maintenance procedures, the sediment forebays would be cleaned on a five year cycle. The stream restoration sites were designed to reduce sediment loads in the downstream areas. Construction of the projects in Prince George's and Montgomery Counties will reduce sediment loads to the tidal river.

The anticipated result of implementation of restoration efforts at all of the *Blueprint* sites is ultimately to reduce the sediment load within the entire watershed. To date, significant progress has been made towards meeting that goal.

TABLE 7-6

ESTIMATED ANNUAL NUTRIENT AND SEDIMENT LOADS[1] CAPTURED AT STORMWATER MANAGEMENT WETLAND SITES

Project	Drainage Area (Ac)	Total N Load (lb)	Total P Load (lb)	BOD_5 Load (lb)	Sediment Load lb	Sediment Load CY
Fordham Street	221.6	308	2214	7961	100,350	37.2
Stewart April Lane	202.8	350	2519	9056	114,150	42.3
Lockridge Drive	152.9	224	1612	5795	73,050	27.0
Snowden's Mill I	91.3	109	788	2832	35,700	13.2
Snowden's Mill II	120.0	164	1182	4248	53,550	19.8
Tanglewood	54.0	85	612	2202	27,750	10.3
TOTAL	842.6	1240	8927	32094	304,200	149.8

[1] Simple Method from MWCOG, 1987

7.11 RISK AND UNCERTAINTY ANALYSIS

Risk involves situations where the potential outcomes can be described with known probability distributions. Conversely, uncertainty can not be described with known probability distributions. Risk and uncertainty are inherent to water resources planning due to the variability of natural, economic, demographic and hydrologic information.

The primary areas of risk and uncertainty in the Anacostia River and Tributaries Feasibility Study is the environmental response to the proposed management measures. Risk and uncertainty related to any engineering analyses are addressed in Appendix A.

The three major areas of risk and uncertainty which can be addressed subjectively are the potential future urbanization impacts in the watershed and the future use of the public lands in the basin.

7.11.1 Future Impacts of Urbanization

Potential future impacts of urbanization will continue to affect the Anacostia River basin. Stormwater runoff and combined sewer outfalls will continue to affect water quality in the watershed. However, as described in Section 3.1.3, many Federal, state and local laws are now in place which will reduce the effects of future development.

State and local government agencies will continue to construct retrofit projects in the basin as funds permit. Installation of BMPs will reduce the impact of previous development in the watershed. The combination of the in-place state and local regulations along with the very high probability that agencies will continue to fund retrofit projects suggests that conditions in the basin will not be degraded in the future and will likey improve in many aspects.

7.11.2 Future of the Stream Valley Park System

The stream valley park system operated by the Maryland-National Capital Park and Planning Commission and the National Park Service would require major Federal, state and local legislation before significant land disposal actions could take place. Therefore, the risk and uncertainty of unintentional environmental degradation affecting the benefits of the proposed restoration projects is slight.

7.11.3 Efficacy of Restoration Techniques

The wetland restoration techniques proposed for the River Fringe wetlands and Kingman Lake were utilized in the Anacostia basin to restore Kenilworth Marsh. The effectiveness of these techniques to restore wetlands has been proven, and although only anecdotal data are now available, the habitat response has been visually impressive.

The use of the stormwater wetlands has been monitored by the sponsoring agencies. It has been demonstrated that these techniques are effective in reducing the impacts of stormwater runoff while improving water quality, providing habitat and restoring the downstream reaches of stream channels.

7.12 PROJECT MONITORING

The construction cost estimates for the Montgomery County, Prince George's County and District of Columbia all include funding for post-construction monitoring of the restoration work. The design of the monitoring program will be developed during the PED phase of the projects. Project monitoring will continue for approximately five years after the completion of construction.

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Plan Implementation

The recommended plan described in Section 7 will require a number of commitments on the part of the Corps of Engineers and the non-Federal sponsors in order to realize the benefits of the plan. The major requirements of plan implementation are described below.

8.1 LOCAL COOPERATION REQUIREMENTS

The local cooperation requirements for implementation of the proposed environmental restoration projects have been discussed with the local sponsors. All sponsoring agencies understand that they will be required to provide assurances that they have the authority and are willing to:

1. *Provide 25 percent of total project costs assigned to restoration of fish and wildlife habitat resources, as further specified below:*

   a. Provide all lands, easements, and rights-of-way including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Federal Government to be necessary for the construction, operation and maintenance of the Project.

   b. Provide, or pay to the Federal Government the cost of, all retaining dikes, wasteweirs, bulkheads and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation and maintenance of the Project.

   c. Provide any additional amounts as are necessary to make its total contribution equal to 25 percent of total project costs assigned to restoration of fish and wildlife resources.

2. For so long as the Project remains authorized, operate, maintain, repair, replace and rehabilitate the completed Project, or functional portion of the Project, at no cost to the Federal Government, in a manner compatible with the Project's State laws and any specific directions prescribed by the Federal Government.

3. Grant the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal Sponsor owns or controls for access, for the purpose of completing, operating, maintaining, repairing, replacing or rehabilitating the Project.

4. Hold and save the United States free from all damages arising from the construction, operation, maintenance, repair, replacement and rehabilitation of the Project and any Project-related betterments, except for damages due to the fault or negligence of the United States or its contractors.

5. Keep and maintain books, records, documents and other evidence pertaining to costs and expenses incurred pursuant to the Project to the extent and in such detail as will properly reflect total project costs and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 C.F.R. Section 33.20.

6. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction, operation and maintenance of the Project, except that the non-Federal Sponsor shall not perform such investigations on lands, easements or rights-of-way that the Federal Government determines to be subject to the navigation Servitude without prior specific written direction by the Federal Government.

7. Assume complete financial responsibility, as between the Federal Government and the non-Federal Sponsor, for all necessary cleanup and response costs of any CERCLA regulated materials located in, on or under lands, easements or rights-of-way that the Federal Government determines to be necessary for the construction, operation or maintenance of the Project.

8. To the maximum extent practicable, operate, maintain, repair, replace and rehabilitate the Project in a manner that will not cause liability to arise under CERCLA.

9. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements and rights-of-way, required for the construction, operation and maintenance of the Project, including those necessary for relocations, borrow materials and dredged or excavated material disposal, and inform all affected persons of applicable benefits, policies and procedures in connection with said Act.

10. Comply with all applicable Federal and State laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

11. Provide 25 percent of that portion of total historic preservation, mitigation and data recovery costs attributable to restoration of fish and wildlife resources that are in excess of one percent of the total amount authorized to be appropriated for restoration of fish and wildlife resources.

These requirements are often referred to as the lands, easements, rights-of-way, relocations and disposal areas (for dredging projects) requirements (LERRD) for local sponsors of Corps of Engineers Civil Works projects.

8.2 IDENTIFICATION OF LOCAL SPONSORS

8.2.1 District of Columbia

The project for the District of Columbia would restore fish and wildlife habitat on Federal property which is owned and administered by the U.S. Department of Interior, National Park Service.

The National Park Service supports the recommendations of the feasibility report and is willing to enter into a Memorandum of Understanding (MOU) with the Department of the Army regarding construction of the project. The District of Columbia's Department of Consumer and Regulatory Affairs and Department of Public Works are willing to work with the National Park Service to develop the proper assurances that the project will be operated and maintained in accordance with regulations prescribed by the Secretary of the Army.

The MOU would be signed by the Regional Director, National Capital Region, National Park Service and would incorporate by reference an agreement which divides operation and maintenance responsibilities among the National Park Service, the District of Columbia Department of Public Works and Department of Consumer and Regulatory Affairs, Environmental Regulation Administration. Letters of intent for the project are contained in Annex A.

8.2.2 Montgomery County

The Montgomery County Department of Environmental Protection and the Montgomery County representatives of the Maryland-National Capital Park and Planning Commission have reviewed the recommended plans and support the recommended project for Montgomery County. In addition, the M-NCPPC Park Board has approved the recommended plans for the nine sites.

The Montgomery County agencies have the authority and are willing to enter into a Local Cooperation Agreement (LCA) with the Corps of Engineers for the construction of an environmental restoration project which includes nine sites. The LCA would be signed by the Chief Administrative Officer of Montgomery County and the Executive Director of the Maryland-National Capital Park and Planning Commission. The LCA would incorporate by reference an agreement which divides operation and maintenance responsibilities between Maryland-National Capital Park and Planning Commission (Montgomery County) and the Montgomery County Department of Environmental Protection. Letters of intent for the project are contained in Annex A.

8.2.3 Prince George's County

The Prince George's County Department of Environmental Resources and the Prince George's County representatives of the Maryland-National Capital Park and Planning Commission have reviewed the recommended plans and support the recommended project for Prince George's County. The Prince George's County agencies have the authority and are willing to enter into a Local Cooperation Agreement with the Corps of Engineers for the construction of an environmental restoration project which includes two sites. The LCA should be signed by the Deputy Chief Administrator of Prince George's County and the Executive Director of the Maryland-National Capital Park and Planning Commission. The LCA will incorporate by reference an agreement which divides operation and maintenance responsibilities among Maryland-National Capital Park and Planning Commission (Prince George's County), and the Prince George's County Departments of Environmental Protection and Public Works. Letters of intent for the project are contained in Annex A.

8.3 LIFE CYCLE PROJECT MANAGEMENT

This work will be managed under the Corps of Engineers project management system and executed under the leadership of a project manager, who will be the primary point of contact with the customer, the Corps of Engineers and external interests. A project manager is assigned to the project through construction completion to facilitate implementation of a cost effective project. Each project will be managed according to the Project Management Plan (PMP), which outlines roles and responsibilities, scopes, schedules and cost estimates to accomplish the work. The PMP will be updated periodically to reflect changes in the current status of work items.

8.4 PROJECT MANAGEMENT PLANS

The Project Management Plans which have been prepared for each of the projects located in the three separate political jurisdictions are contained in Appendix H. Each PMP is a thorough and comprehensive tool to enable the project manager to produce an optimum product. It provides for better understanding and communication, reduces uncertainty, improves efficiency, and provides a basis for monitoring and controlling progress. The PMPs included in Appendix H cover the period from the Division Engineer's Public Notice (completion of the feasibility phase) through the acceptance of the project for operation and maintenance by the local sponsors. The final PMPs, which contain certain assumptions regarding the availability of continuous funds for the construction of the projects, will be endorsed by the sponsors and by the Baltimore District's Project Review Board.

8.5 FULL FUNDING PROJECT COST ESTIMATE

The full funding cost estimates have been developed for three individual projects. The full funding estimate includes costs for preparation of plans and specifications, construction, construction management, contingencies and escalation.

The estimate for the District of Columbia project is $9,250,000. This estimate is for the restoration of Kingman Lake and the River Fringe Wetlands. The estimated construction start date is August 1997 and the construction period is estimated at 22 months.

The full funding cost estimate for the Montgomery County project is $6,240,000. This estimate is for the restoration of five wetland sites and four stream sites in Sligo Creek, Northwest Branch, Paint Branch and Little Paint Branch sub-watersheds. The estimated construction start date is June 1997 and the construction period is estimated at 25 months.

The full funding cost estimate for the Prince George's County project is $3,330,000. This estimate is for the construction of one wetland site and one stream site in the Northwest Branch sub-watershed. The estimated construction start date is May 1997 and the construction period is estimated at 17 months.

8.6 FUNDING SCHEDULE

The PED phase is scheduled to begin in October 1994 and continue into FY 1997. The detailed funding schedules for the recommended projects appear in Section 6 of each PMP.

8.7 ABILITY-TO-PAY DETERMINATION

The project recommended for the District of Columbia is located on land owned by NPS. Cost sharing funds can be provided by agencies supporting the restoration efforts. The District government will enter into an agreement with NPS regarding maintenance of Kingman Lake and the River Fringe wetlands.

The Montgomery County Department of Environmental Protection and M-NCPPC provide budget information and testimony each year to the County Council. The DEP's six-year Capital Improvements Program (CIP) budget identifies funds for implementing the recommended construction in Montgomery County.

The Prince George's County government passed a dedicated stormwater tax in 1988. Revenues from this source are used to restore the water resources of the County. These funds will be available to finance the County's portion of the recommended project.

Both Prince George's and Montgomery Counties have included additional information regarding their ability to pay in their respective letters of support for the projects (See Annex A).

8.8 FINANCING PLAN

Prince George's and Montgomery Counties will finance their portion of the recommended projects through a CIP project in each county's budget. Should grant funding be available from the State of Maryland as part of the local sponsor's financing plan, those funds would be identified prior to the signing of the LCAs. The District of Columbia will finance their project through funds provided by supporting agencies.

8.9 VIEWS OF LOCAL SPONSORS

The local sponsors have diligently supported, promoted and financed restoration of the Anacostia River basin. They support the cooperative Federal, state, regional and local partnership under the leadership of the AWRC. The sponsors also support the recommendations of this study, as noted in their respective correspondence.

Anacostia River and Tributaries Feasibility Study

Draft Feasibility Report and EIS

Section 9

Public Involvement and Coordination

Water resources development studies conducted by the Corps of Engineers address problems and evaluate solutions which will provide benefits to the general public. As such, public involvement and coordination with the appropriate state, regional and local agencies are an integral part of the planning process. Also, in order for environmental restoration projects to ultimately be successful, the local citizens must embrace the restoration concept and become caretakers for their local neighborhood resources. In recognition of the importance of public involvement, the AWRC included public participation as one of the focal points in the *Six Point Action Plan.* In addition, public involvement and coordination is required by NEPA and Corps planning regulations. This section describes the public involvement and coordination actions taken for this study.

9.1 DESCRIPTION OF PUBLIC INVOLVEMENT ACTIVITIES

Public involvement activities which have been undertaken for the restoration of the Anacostia basin can be divided into two areas. First, there are a continuing number of programs and actions which are directed by the State of Maryland, Montgomery and Prince George's Counties, MWCOG, ICPRB, the District of Columbia, and private organizations such as the Anacostia Watershed Society to increase awareness and public participation in the watershed. Second, a number of events were undertaken through the feasibility study to ascertain the views of local citizens regarding problems in the basin and potential solutions which could be recommended by this study. Almost without exception, the public response to the feasibility study and the recommendations contained herein has been positive. The public involvement process was initiated with the reconnaissance phase and continued throughout the feasibility phase of this study.

9.1.1 Reconnaissance Phase

Public involvement in the reconnaissance phase was primarily focused on interactions with public agencies which could assist in the problem identification areas. The AWRC, through its member agencies, and ICPRB, EPA, NPS, FWS, M-NCPPC, and MWCOG all provided

assistance and information relative to the recommendations contained in the reconnaissance report. Information relating to the purpose, status and focus of the reconnaissance study was presented during the quarterly meetings of the AWRC and also during the various committee meetings hosted by MWCOG and ICPRB.

During the FCSA negotiating period, coordination continued with the potential sponsors and the public. Several newspaper articles described the results of the reconnaissance study and a number of telephone inquiries were received regarding the feasibility study. Several presentations were made to organizations and interested parties. In July 1991, the District Engineer testified before the Subcommittee on Water Resources of the Committee on Public Works and Transportation regarding the recommendations of the reconnaissance study and in November 1991, presented the reconnaissance results and recommendations at the Anacostia River Basin Conference sponsored by MWCOG.

9.1.2 Feasibility Phase

Public involvement and coordination actions during the feasibility study were undertaken through newsletters, public meetings, participation in conferences, public notices, and the ICPRB sub-basin coordinators. In addition, study progress reports were given as part of the quarterly AWRC meetings.

The feasibility study was the subject of a display at the University of the District of Columbia during their 1992 Earth Day celebration and the EPA/DCRA 1994 Environmental Conference held at Howard University. Presentations, followed by question and answer sessions, were also held for the Anacostia Watershed Society and the University Hills Citizens' Association.

The nine sites proposed for Montgomery County have been presented to, and approved by, the M-NCPPC Park Board. Prior to the Park Board's approval, eight public meetings were held between June 1993 and April 1994, usually at the public facility located nearest the proposed work area.

9.2 COORDINATION WITH NON-FEDERAL SPONSORS

Both collective and individual processes for coordination with the non-Federal sponsors have been established for the study. The AWRC meets quarterly to evaluate the restoration progress and consider policy issues which are of mutual interest to its members. The AWRC meetings provide a public forum for dissemination and exchange of information concerning the full range of restoration actions which are occurring throughout the basin. The focus provided by the AWRC, assisted by the MWCOG staff, has enabled the basinwide restoration effort to progress through a number of fiscally challenging years and

to address a wide range of technically and institutionally difficult issues. Study progress reports have been made at all of the AWRC meetings held since January 1992.

Coordination meetings have also been held on a regular basis with each of the individual political jurisdictions. Coordination with the District of Columbia was undertaken with the Department of Consumer and Regulatory Affairs, Environmental Regulation Administration and the Department of Public Works; the primary Montgomery County agency for coordination was the Department of Environmental Protection; and the primary Prince George's County agency for coordination was the Department of Environmental Resources. Prince George's and Montgomery County projects were also closely coordinated with the Maryland Department of Natural Resources, Maryland Department of the Environment and M-NCPPC. MWCOG, ICPRB and DNR staff participated in the local government project meetings, assisted in site visits and selections, and evaluated numerous restoration proposals.

Meetings were also held with ICPRB to address basinwide public involvement and fisheries issues. The Anacostia newsletter, *In the Anacostia Watershed*, published by ICPRB, served as a major source of public information during the feasibility study. In addition, ICPRB maintains a part-time staff of sub-basin coordinators who are responsible for walking the stream corridors, for increasing public awareness of the restoration efforts, and for providing local citizens with information about restoration related projects and programs. The ICPRB fisheries biologist assisted in site and alternative evaluations related to fisheries issues.

9.3 FEDERAL RESOURCE AGENCY COORDINATION

The four primary Federal agencies which participated in the feasibility study were the National Park Service, the Fish and Wildlife Service, the Environmental Protection Agency and the National Marine Fisheries Service. The contributions of these Federal agencies to the restoration of the Anacostia basin have been previously noted in the report. These agencies also have staffs which are dedicated to the Chesapeake Bay Program and other related restoration efforts in the vicinity of the Anacostia basin. Additionally, their research efforts and technical developments on a national, regional and local scale have been utilized in the Anacostia basin.

Coordination with Federal agencies has been addressed in three areas. Legislated coordination, involvement through the Chesapeake Bay Program (CBP), and interaction due to the Corps AWRC role provide opportunities to interface with Federal agencies. Their collective assistance has been vitally important to the feasibility study and the restoration efforts.

The FWCA and NEPA require specific coordination actions with FWS and EPA. The FWS prepared a FWCA, Section 2(b) report for the study and also assisted in the habitat evaluation efforts. The proposed projects have also been presented to the National Capital Planning Commission (NCPC).

Coordination through the CBP's Federal Agencies Committee provided an opportunity for information exchange and program coordination. CBP program allocations have been used to fund some of the restoration actions implemented by the local governments. In addition to administering its regulatory programs, providing technical assistance and preparing demonstration projects, the EPA completed an evaluation report on the Anacostia River (EPA, 1992). The report endorsed the *Six Point Action Plan* and made a number of recommendations in support of the restoration efforts.

Federal agencies own approximately 15 percent of the basin. As part of the Baltimore District's role as the "Federal" representative, efforts have been made to promote restoration activities on Federal land and to apprise Federal landowners of restoration opportunities which they may be able to support.

The NPS has provided expertise and assistance since the initiation of the reconnaissance study. Representatives from the National Capital Parks - East, the Center for Urban Ecology and the National Capital Region Office have participated in meetings, field trips and habitat evaluations; reviewed reports for Kingman Lake and the river fringe wetlands; and provided data to assist in the site evaluations.

9.4 COORDINATION WITH THE PUBLIC

The ICPRB included articles on the feasibility study in its quarterly newsletter as an in-kind service. The educational newsletter has a circulation of over 14,000, and provides information regarding relevant citizen-based topics for the non-technical reader. Additionally, publications on each sub-watershed in the basin have been prepared to encourage citizen ownership of local resources. ICBRB also has a part-time staff of five sub-basin coordinators who monitor streams and provide information to local citizens regarding the feasibility study. ICPRB sponsored a workshop which promoted citizen involvement and restoration efforts of communities located along the basin tributaries. Well over 50,000 people have been reached through publications and educational efforts.

As part of the study's public involvement activities, presentations were also made to the Suburban Maryland Engineers Society, the Anacostia Watershed Society, the Clean Water Foundation and the University of the District of Columbia to outline study progress and receive input to the study.

9.5 PUBLIC VIEWS AND COMMENTS

The public response has been supportive of the types of restoration actions proposed in the feasibility study. The major public comments regarding the proposed projects can be generally grouped into three areas. First, there have been a number of comments regarding the amount of time required between the completion of the final feasibility report and the initiation of construction. The Project Management Plan shows that it will take approximately two and one-half years after initiation of Preconstruction Engineering and Design to begin construction. Effort has been taken to expedite this process where possible. Second, a number of questions and comments were received regarding safety and the increased mosquito populations associated with wetland construction. The ponds have all been designed with safety benches along the perimeter and fencing along headwalls. The maximum depth at normal pools is four feet. These design considerations should reduce safety concerns. The wetlands are all located in areas which receive base flow. The permanent pools will develop into ecosystems which will include predators to limit mosquito populations. And finally, some citizens noted the specific impacts which will affect them during construction. While these impacts are very important, they will only occur during the construction period.

9.6 DRAFT REPORT AND DEIS RECIPIENTS

As a result of previous coordination, responses to the Notice of Intent to Prepare an Environmental Impact Statement and the Public Notice for the Feasibility Study, the Baltimore District compiled a substantial list of citizens and agencies that will receive notification or copies of the report, as appropriate. Approximately 125 copies of the DEIS were distributed. The mailing list is contained in Annex A of this report.

9.7 REVIEW OF THE DRAFT INTEGRATED FEASIBILITY REPORT AND ENVIRONMENTAL IMPACT STATEMENT

The draft integrated feasibility report and environmental impact statement was sent to numerous local, state and Federal agencies and private interest groups for review and comment. Comments received during the review were considered in preparing the final study documents, and will be considered by reviewers and decision makers during subsequent report processing.

In response to the Notice of Availability for the Integrated Feasibility Report and Draft Environmental Impact Statement, comments were received from 3 Federal agencies, 2

national and 3 regional or local environmental organizations, 9 non-Federal government agencies (including sponsors), and 1 individual. Commenters noted several areas where the DEIS needed clarifications or additional information. In order to address these comments, additional information regarding the evaluation and selection of alternatives and cumulative impacts of reasonably forseeable actions has been added to the document. EPA Region III rated the document LO-1 (Lack of Objections, Adequate information).

Concerns were also expressed by a local citizens organization regarding the stormwater wetland proposed at the Lockridge Drive site in Silver Spring, Maryland. M-NCPPC, DEP, and the Baltimore District will continue to work with the local citizens during the preconstruction engineering and design phase.

The complete text of the commentors' letters, a summary of the comments, and the Baltimore District's response are contained in Annex A.

Anacostia Rvier and Tributaries Feasibility Study

Draft Feasibility Report and EIS

Section 10

Summary and Conclusions

During the course of the Anacostia River and Tributaries Feasibility Study, the Baltimore District and the six non-Federal sponsors examined a wide range of problems which contributed to the degradation of fish and wildlife habitat within the basin. Rapid population growth in the basin in response to employment opportunities with the Federal government and associated businesses led to urbanization of the majority of the basin. Federal projects for flood control, navigation and recreation also contributed to the loss of fish and wildlife habitat. These projects affected more that 3,900 acres of habitat which represented an estimated 17,300 fish and wildlife habitat units. The affected fish and wildlife resources are nationally, regionally and locally significant.

The six non-Federal sponsors have been working together to restore the Anacostia basin since 1987. The Anacostia Watershed Restoration Committee (AWRC) provides the focus and direction for the restoration efforts. The Corps of Engineers has joined with the AWRC in order to formulate comprehensive and coordinated plans which emphasize a watershed approach to problems and opportunities in the basin.

Opportunities to restore wetland and aquatic habitat were evaluated in locations throughout the basin. Through the plan formulation process, 13 sites were selected for further detail design and evaluation. Alternatives were developed for each of the sites using engineering analyses and a variety of environmental restoration techniques. The emphasis of the environmental and engineering design goals was to restore habitat for significant fish and wildlife resources. Alternatives were evaluated utilizing incremental analysis techniques to compare the habitat outputs of the proposed projects with the cost of producing those outputs. As a result of the study, three projects which consist of the 13 sites are recommended for implementation.

Within the District of Columbia, wetland restoration is proposed for 75 acres of freshwater tidal wetlands. Reforestation is also proposed for an additional 6 acres in the vicinity of Kingman Lake. The area to be restored is the property of the National Park Service. The restored wetlands are projected to provide 466 habitat units for waterfowl, anadromous and resident fishes and other significant wildlife resources. The total project cost is $9,250,000. Of this total, 75 percent of the project cost ($6,940,000) will be funded by the Corps of Engineers, with the remaining 25 percent share ($2,310,000) provided by the project

sponsor(s). The National Park Service and the District of Columbia government both support this project.

Within Prince George's County, the construction of a 2-acre wetland, the restoration of 8,000 feet of stream, and the reforestation of 16 acres are proposed to restore fish and wildlife habitat. The restored areas are projected to represent 79 habitat units. The total project cost at these two sites is $3,330,000. Of this total, 75 percent of the project cost ($2,500,000) will be funded by the Corps of Engineers, with the remaining 25 percent share ($830,000) provided by the project sponsor(s). The Prince George's County Department of Environmental Regulation and the Maryland-National Capital Park and Planning Commission both support this project.

Within Montgomery County, the retrofitting of three existing stormwater management ponds, the construction of two new stormwater management wetlands, and the restoration of 17,000 feet of streams are proposed to restore fish and wildlife habitat. A total of 2 acres of wetlands will be constructed along with 12 acres of reforestation. The restored areas are projected to represent 59 habitat units. The total project cost at the nine sites is $6,240,000. Of this total, 75 percent of the project cost ($4,680,000) will be funded by the Corps of Engineers, with the remaining 25 percent share ($1,560,000) provided by the project sponsor(s). The Montgomery County Department of Environmental Protection and the Maryland-National Capital Park and Planning Commission both support this project.

As a result of implementation of these three projects, the Corps of Engineers will construct 80 acres of wetlands, protect and restore 5 miles of streams, and plant 33 acres of bottomland habitat. The total estimated habitat value of these projects is 604 habitat units, and the total cost is $18,820,000. This will represent a substantial contribution to the basinwide goals of the AWRC. However, a great deal of additional work remains to be done before the Anacostia River basin is restored.

Anacostia River and Tributaries Feasibility Study

Draft Feasibility Report and EIS

Section 11

Recommendations

In conducting this feasibility study, I have given consideration to the relevant aspects of public interest, including environmental, social, economic and engineering concerns. I have carefully reviewed the water resources problems in the Anacostia River basin, specifically the need for restoration of fish and wildlife habitat. For the residents of the basin and those who utilize the Potomac River below the confluence and the Chesapeake Bay, the projects to restore habitat in the Anacostia River basin represent a cost-effective proposal. These projects represent a beneficial impact on the human environment through improvement of the environmental resources. No significant impacts would occur to the region's economic, cultural, recreational and social resources. Therefore, based on the information presented in this report, I make the following recommendations for three projects to restore fish and wildlife habitat in the Anacostia River basin:

1. The U.S. Army Engineer District, Baltimore, should enter into a Local Cooperation Agreement to cost share the construction of a fish and wildlife habitat restoration project in Montgomery County. The project will be composed of restoration measures at nine locations in Montgomery County. The project sites are located in the Northwest Branch, Sligo Creek, Paint Branch and Little Paint Branch sub-watersheds, and will provide habitat through construction of wetlands, stream restoration and reforestation. A full description of the nine sites is contained in Appendix A. The estimated total project cost for implementation of this project is $6,240,000.

2. The U.S. Army Engineer District, Baltimore, should enter into a Local Cooperation Agreement to cost share the construction of a fish and wildlife habitat project in Prince George's County. The project will be composed of restoration measures at two locations in Prince George's County. The project sites are located in the Northwest Branch sub-watershed and will provide habitat through wetland construction, stream restoration and reforestation. A full description of the two sites is contained in Appendix A. The estimated total project cost for implementation of this project is $3,330,000.

3. The U.S. Army Engineer District, Baltimore, should enter into a Memorandum of Understanding with the U.S. Department of Interior, National Park Service, National Capital Region to restore wetland habitat at two sites located on NPS property in the District

of Columbia. Should the NPS decide to provide construction cost sharing funds to the District of Columbia, an LCA between the U.S. Army Engineer District, Baltimore and the District of Columbia Government would be required. The recommended projects will restore freshwater tidal wetlands in Kingman Lake and along the tidal Anacostia River. A full description of the two sites is contained in Appendix A. The estimated total project cost for implementation of this project is $9,250,000.

4. The recommended projects will restore 80 acres of wetlands, 33 acres of bottomland hardwoods, and 5 miles of streams. Although this will provide a significant contribution to the restoration of the Anacostia River basin and supplement the existing efforts of the state, regional and local governments, additional efforts are needed to restore the basin to its modern historic condition. Therefore, I additionally recommend that the Corps of Engineers consider the Federal and non-Federal interest in pursuing additional feasibility level investigations related to further opportunities to restore fish and wildlife habitat in the Anacostia River basin.

This plan is recommended with such modifications as are advisable and are within the discretion of the Commander, HQUSACE. The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and funding. However, prior to transmittal to the Congress, the sponsor, the States, interested Federal agencies and other private parties will be advised of any modifications and will be afforded an opportunity to comment further.

J. Richard Capka, P.E.
Colonel, Corps of Engineers
District Engineer

ANACOSTIA RIVER & TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND

INTEGRATED FEASIBILITY REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT

JULY 1994

ANNEX A

PUBLIC VIEWS, COMMENTS, AND MAILING LIST

THIS ANNEX IS SUBDIVIDED INTO

a. COMMENTS ON THE DEIS

b. SUMMARIES AND RESPONSES TO COMMENTS

c. LETTERS OF INTENT FROM NON-FEDERAL SPONSORS

d. STUDY CORRESPONDENCE

e. MAILING LIST

ANNEX A

PUBLIC VIEWS, COMMENTS, AND RESPONSES

COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

DATE	ITEMS
July 1, 1994	Maryland Department of Natural Resources
July 1, 1994	Natural Heritage Program
July 1, 1994	National Capital Planning Commission
June 29, 1994	Anacostia Watershed Society
June 28, 1994	Montgomery County Department of Environmental Protection (DEP)
June 27, 1994	Coalition to Preserve the Natural Environment of Northwest Branch Park (Co-Nature)
June 25, 1994	Dr. Harriette L. Phelps
June 24, 1994	United States Environmental Protection Agency
June 24, 1994	American Rivers
June 23, 1994	Sierra Club Legal Defense Fund, Inc.
June 22, 1994	Prince George's County Department of Environmental Resources
June 22, 1994	Metropolitan Washington Council of Governments
June 21, 1994	Maryland Historical Trust
June 21, 1994	Audubon Naturalist Society
June 16, 1994	United States Department of Commerce National Oceanic and Atmospheric Administration
June 16, 1994	Maryland Department of the Environment

William Donald Schaefer
Governor

Maryland Department of Natural Resources
Water Resources Administration
Tawes State Office Building
Annapolis, Maryland 21401

Torrey C. Brown, M.D.
Secretary
Robert D. Miller
Director

"A Commitment to Excellence in Managing Maryland's Water Resources"

July 1, 1994

Mr. Mark McKevitt
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715
Attention: Planning Division

RE: Anacostia River and Tributaries Feasibility
Study and Draft Environmental Impact Statement

Dear Mr. McKevitt:

The Department of Natural Resources (DNR) has reviewed the Integrated Feasibility Report and Draft Environmental Impact Statement (DEIS) for the Anacostia River and Tributaries, District of Columbia and Maryland. The purpose of the study was to evaluate alternatives which could be implemented by the Corps of Engineers to restore fish and wildlife habitat in the Anacostia River Basin. The study recommends the construction of 80 acres of tidal and nontidal freshwater wetlands, reforestation of 33 acres of bottomland hardwood forest, and the restoration of 5 miles of streams.

As you are aware, the Department reviewed several previous drafts of the study report. However, due to the administrative fast-tracking of the study report, there was insufficient time to put together a consolidated set of DNR comments. Accordingly, on April 26, 1994, I faxed you several memoranda received by this office for your use in preparing the DEIS.

I have reviewed the DEIS based on the issues previously identified by DNR. The attached comments primarily address the Department's regulatory requirements and the potential thermal impacts associated with several of the projects in the Use III and Use IV waters. We realize that the projects are proposed to address past degradation of water quality and habitat within the Anacostia watershed. I want to emphasize that we strongly support these efforts to improve conditions in this watershed. However,

Telephone: (410) 974-2156
DNR TTY for the Deaf: 301-974-3683

given the probability that existing water temperatures in the lower Paint Branch area are stressful to trout, any additional thermal degradation continues to be a concern to the Department.

We greatly appreciate the efforts that you and other involved agencies have made in coordinating with DNR to resolve the thermal impact issue. In this regard, I have also attached a June 20, 1994 memorandum to this office summarizing the results of the June 6, 1994 field meeting, and also containing current comments/ recommendations of the Tidewater Administration on the DEIS. I am confident that continued coordination and cooperation will resolve these issues.

Finally, I recently received detailed comments from our Natural Heritage Program raising concerns over several of the species proposed for use in the restoration activities. Rather than incorporate these into the main set of comments, I have also attached their memorandum.

Thank you for your patience and efforts in addressing DNR's comments on the proposed restoration activities. If you have any questions, please contact me at (410) 974-2156.

Sincerely,

Elder A. Ghigiarelli, Jr.
Chief, Coastal Zone Consistency

Enclosures

EAGJr:cma

cc: Gary Setzer
Bill Jenkins
Rebecca Quinn
Brad Iarossi
Ray Dintaman
Janet McKegg

Department of Natural Resources
Comments on
Feasibility Study and DEIS
Anacostia River and Tributaries

The following comments are provided on the Corps of Engineers (COE) Integrated Feasibility Report and Draft Environmental Impact Statement (DEIS) for the Anacostia River and Tributaries, District of Columbia and Maryland. The Department supports the proposed restoration activities to improve water quality and habitat within the Anacostia watershed. However, there are concerns regarding the potential for thermal impacts from the projects proposed in the Use III and Use IV waters of the watershed. Coordination efforts are ongoing with the COE and other involved agencies to address this concern.

General

1) Each of the proposed projects requires impacts to wetlands and/or waterways. Activities resulting in impacts to nontidal wetlands or a twenty-five foot upland area surrounding the wetlands require authorization from the Nontidal Wetlands and Waterways Division, Water Resources Administration. Approval by the Division is also required for activities which change the course, current or cross-section of the nontidal 100 year floodplain of Use-I streams draining more than 400 acres, the nontidal 100 year floodplain of Use III and Use IV streams draining more than 100 acres, the stream channel of all Use-III streams regardless of drainage area, or the mapped FIRM floodplain (excluding tidal floodplain). Activities planned within the limits of the District of Columbia do not require our authorization.

   Much of the information contained in the document is sufficient for the purposes of completing a wetlands and waterways permit application for each of the projects. Application requirements can be satisfied by appending the final document and making reference to the appropriate sections.

2) It is advisable to have the Local Sponsors (or appropriate analogues on federal properties) to submit the Nontidal Wetlands and Waterways permit applications for each of the proposed projects. Since each of the projects being proposed has utility independent of the other projects being proposed, each is considered to be a complete and entire project, and each will require its own authorization. Agencies empowered by the Local Sponsors have experience with our permit application process and the proper assembly of information for application review purposes, and their making application should make processing smoother and easier. The final feasibility report or EIS will be appended to each application and appropriate references made. Our review will certainly be considerate of the linkages between the projects and will be conducted with the utmost consideration being given to overall objectives.

3) Several of the recommended projects include constructing new or retrofitting existing ponds. Permits are required and will be issued to the property owner or the agency that will be responsible for operation and maintenance. Plantings must be at least 25 feet from any pond embankment.

   For any project that seeks to modify the pond hydraulically the applicant will have to submit H and H analyses that demonstrate that the pond meets existing criteria. The applicant must also demonstrate that the pond is in good condition as we will not issue a permit for a modification when other safety items need to be addressed. The COE should contact the Dam Safety Division, Water Resources Administration, at (410) 974-2101, or the local Soil Conservation District to do a preliminary inspection to identify any deficiencies that may need to be repaired concurrently.

4) The selected projects have been proposed to address past degradation of water quality and habitat within the Anacostia watershed. We strongly support these efforts to improve conditions in this watershed. However, we have concerns for Paint Branch and Northwest Branch regarding thermal impacts that may be associated with some of the proposed stormwater management (SWM) facilities. Even though the purpose of these projects is to provide water quality benefits, compliance with State water temperature limitations for Use III and Use IV streams (referenced below) is still important. While we recognize that some of the project sites have complex circumstances which may affect the standard temperature concerns, it appears that further consideration should be given to minimization of thermal impacts for some or all of the proposed wetland facilities in the Paint Branch and Northwest Branch watersheds. We recommend that the study report include a more complete discussion of thermal impact concerns.

5) Paint Branch and all tributaries above the Capital Beltway are designated Use III (natural trout) waters. Northwest Branch and all tributaries above East-West Highway are designated Use IV (stocked trout) waters. The Maryland Department of the Environment (MDE) has developed State Water Quality Regulations which reference specific water temperature limits in the water quality criteria for Use III and Use IV waters. Use III waters

may not exceed the greater of 68° F or ambient surface water temperatures, and Use IV waters may not exceed the greater of 75° F or ambient surface water temperatures.

6) Some SWM designs features which best address temperature concerns may cause the loss of some pollutant treatment redundancy. However, even if the treatment potential for other water quality parameters may be affected, the protection of existing coldwater habitat and fisheries resources from incremental temperature impacts should be a priority. Several miles of temperature sensitive habitat for wild trout (Paint Branch) or stocked trout (Northwest Branch) exist downstream of some of the project sites, even though the tributaries at the sites may be highly degraded.

7) In the draft report, concern for water temperatures in Paint Branch is briefly discussed, but the minimization of thermal impacts from the proposed wetland SWM facilities is only partially addressed by proposing the use of low flow bypass pipes. Baseflow discharge is only one of the thermal concerns associated with permanent pools. Discharge of heated water from the permanent pool as it is displaced by stormwater runoff is also a concern. The Metropolitan Washington Council of Government's guidelines in Design of Stormwater Wetland Systems cautions that stormwater wetlands may not be appropriate for trout streams. Because of the general concern for ponded water in Use III and Use IV watersheds, the feasibility report should include an in-depth discussion of both the site specific factors and the proposed design features that support the preference for wetland SWM facilities.

8) We recommend that consideration of additional specific design features for impact minimization in wetland facilities be addressed in the report for both the Paint Branch and Northwest Branch watersheds. The report does not adequately explore temperature minimizing designs with the alternatives currently listed for the wetland SWM facilities. While we support the use of SWM designs which will cool and provide quality treatment for first flush runoff, it is also essential to minimize the long term pooling of water.

Detailed Comments

1) Page 3-7. Section 3-2. The selection criteria do not appear to specifically include consideration of avoidance of impacts to existing resources. This may be intended in criteria #3 and #4 which are related to optimizing return on investment and habitat outputs. If so, some specific explanation of avoiding impacts to existing resources would be appropriate. Impact avoidance and

minimization is an important component of our nontidal wetlands permit review.

2) Page 4-10. Section 4.4. An analysis of alternatives is a regulatory requirement for projects impacting wetlands and/or waterways. Impacts associated with a project will not be authorized if other, practicable alternatives exist which would result in less substantial impacts. On this page, it is stated that 90 proposed alternatives were rejected simply because they occur on private property. This is not a sufficient reason for rejecting otherwise practicable alternatives. Our presumption is that they were rejected because project objectives can not practicably be met, or are not met as effectively, on private properties as they are on lands that are already in public ownership. This must be clarified and elaborated upon for permit application purposes. Given the number of alternatives considered, it would be appropriate to generalize about types of alternatives considered or specific site characteristics that led to categorical dismissal.

3) Page 4-15. Section 4.5. Sites Selected for Development of Alternatives. For each site described, it would be appropriate to briefly discuss the characteristics (cover type, hydrologic signature, soil type, etc.) of specific areas where impacts are proposed. The section should also include a summary of expected ecological benefits and a discussion of resource/function tradeoffs for each site. We realize that "Habitat Benefits" are covered in Section 6, but for Nontidal Wetland and Waterway permit application review purposes, it is important to present this information relative to proposed impacts as an assessment of tradeoffs.

4) Page 4-16. Wetland Creation Sites. Sites for wetland creation through excavation of upland areas should be studied thoroughly prior to construction. We recommend that groundwater elevations be measured bimonthly from March through May, and monthly from June through October. Wetland creation projects have frequently failed in the past due to excessive or insufficient water amounts.

5) Section 5. Alternative Assessment and Evaluation. Related to comment #3, above, we recommend that this section provide details on proposed impacts to existing resources, expected resource benefits, and resource/function tradeoffs. Specific attention should be paid to proposed conversion of existing vegetated wetlands to open water habitats.

6) Tables 6-12 through 6-14. Since imbricated riprap is generally considered a "harder" engineering solution to stabilization problems than bioengineered bank

protection, an explanation should be included of why it is preferred in this case to a bioengineering approach.

7) Table 7-2. Environmental Compliance Evaluation. The table indicates that the federal Coastal Zone Management Act (CZMA) is not applicable to the proposed actions. This is incorrect. The proposed actions constitute federally conducted or supported activities and must comply with Section 307 (c)(1) and (2) of the federal CZMA of 1972. The boundary of Maryland's federally approved Coastal Zone Management Program includes all of Prince George's County, but does not include Montgomery County. Regardless, all of the projects potentially affect waters with the State's coastal zone. Therefore, Level of Compliance should be changed from "N/A" to "Full."

8) Annex C. Section 404 (b)(1) Evaluation. This section does not provide evaluation or discussion of temperature concerns for the wetland facilities, despite its attempt to address the positive and negative impacts of the projects. We recommend that this portion of the report include information on potential thermal impacts in both the Paint Branch and Northwest Branch watersheds. The State water temperature standards should also be referenced.

William Donald Schaefer
Governor

Maryland Department of Natural Resources

Terry C. Brown, M.D.
Secretary

Tidewater Administration
Power Plant and Environmental Review Division
Tawes State Office Building
Annapolis, Maryland 21401

Peter M. Dunbar, Ph.D.
Director

RECEIVED
JUN 23 1994
WATER RESOURCES ADMIN.
WATER & WETLANDS
PROGRAM

June 20, 1994

Memorandum

To: Elder A. Ghigiarelli, Jr., Water Resources Administration

From: Ray C. Dintaman, Jr., Chief, Environmental Review Program

Subject: Anacostia River and Tributaries, District of Columbia and Maryland Integrated Feasibility Report and Environmental Impact Statement (Draft)

Greg Golden of my staff met in the field with representatives from several of the agencies which have been involved in the development of the stormwater management (SWM) retrofit projects for Paint Branch and Northwest Branch in the Anacostia watershed. During the meeting several of the retrofit sites were visited, and many aspects of the projects were discussed.

The discussions included details of our concern for potential thermal impacts from the proposed wetland SWM facilities, as well as general information on the existing degradation that the ponds are proposed to improve. John Galli (Metropolitan Washington Council of Governments) provided insight on the watersheds of the proposed wetland SWM facilities, and also explained that some data or observational information is available for these watersheds.

Charlie Gougeon, the Freshwater Fisheries Division Regional Manager responsible for managing the Paint Branch coldwater fishery was also present at the meeting, and confirmed that multiple habitat concerns exist in the lower Paint Branch, including concerns for thermal impacts, water quality, and channel erosion and sedimentation. It was agreed by all participants in the meeting that the proposed wetland SWM facilities should be effective in addressing many of the habitat concerns, but that some degree of thermal impact may be associated with the SWM facilities.

It was also agreed that the water temperature issues for the lower Paint Branch are complex. Stormwater runoff from pavement and other developed areas can be very hot as it flows into the tributaries and mainstem during the summer. Stormwater throughout the watershed cumulatively heats the flows within the mainstem. In addition, base flows in the lower Paint Branch mainstem and tributaries can have very warm daytime temperatures during the

summer. It is likely that water temperatures exceed the Maryland Department of the Environment temperature standards for Use III waters (68° F) on many occasions during the summer.

The water temperature characteristics in the lower Paint Branch area lead us to conclude that in general, temperature regimes in these lower reaches are stressful to trout, and further thermal degradation is of great concern. However, it may be true that water temperature regimes in the tributaries proposed for SWM retrofitting are already degraded to the point that discharges from the SWM wetlands will either infrequently exceed ambient temperatures or that the beneficial aspects of the wetlands will far outweigh any thermal impacts.

Listed below are our current recommendations associated with the draft Environmental Impact Statement (EIS) and the project itself:

1. Based on our current knowledge of the project sites and the watershed characteristics in the area, we agree to the continued consideration of the wetland SWM facilities. However, our concerns for thermal impacts referenced in our previous comments remain.

2. We commend the recent inclusion of additional references to thermal issues in the draft EIS. We advise that further discussion of the thermal concerns, to include the data referenced in items No. 3 and 4 below, may be appropriate to include in the EIS. If this is determined to not be possible due to timing or other constraints, the review of project benefits and impacts can be continued during the State permitting process.

3. We realize that the agencies promoting the SWM retrofits have considered alternatives as well as costs and benefits before proposing the subject projects. However, we request that available information be assembled to provide a summary of the thermal issues as they relate to the intended benefits of the proposed projects. This information will be necessary to justify the proposals under State water quality regulations and fisheries management policies during permitting. Existing information on the subject watersheds, SWM facilities similar to those proposed, and any other related information should be used to discuss the current thermal regimes and the predicted effects of the proposed projects at the sites.

4. Many of the impacts from past development which have affected the lower Paint Branch watershed have not yet been well quantified or studied. We strongly recommend that additional

data be collected and field observations be made as soon as possible and before permit applications are submitted. Data on pre-construction temperature regimes appears to be insufficient, and should be collected in the summer of 1994 if possible. Collection of additional relevant data such as existing water quality at the sites, discharge characteristics from existing wetland facilities at other sites, and temperature mitigating site characteristics should also be considered.

5. Consideration of additional specific design features for the wetland SWM facilities to minimize thermal impacts is very important. Consideration of these design features should be continued throughout the planning and review of the proposed projects. A list of design features that have been or might later be eliminated from consideration should be maintained for use in the permit reviews for the project.

6. The Lockridge Drive SWM retrofit site is immediately above a very large pool area backed up behind a dam on the Northwest Branch mainstem. This pooled area is likely to be subject to considerable solar heating during the summer, but information on water temperatures in this area are not readily available. It is likely that the thermal impacts from this proposed pond will not be significant, but documentation of the thermal issues for the Use IV waterway is still necessary.

If you have any questions concerning these comments, you may contact Greg Golden of my staff at X-2788.

RCD:GJG

cc: Charlie Gougeon, Region III Freshwater Fisheries Manager
Andrew Der, Water Quality Certification Division, MDE

June 28, 1994

MEMORANDUM

TO: Elder Ghigiarelli, Water Resources Administration

FROM: Janet S. McKegg, Director, Natural Heritage Program

SUBJ: Anacostia River and Tributaries District Of Columbia and Maryland Integrated Feasibility Report and Environmental Impact Statement, May, 1994

After reviewing the above referenced documents, the Natural Heritage Program has developed additional comments on the proposed projects. Richard Wiegand of my staff has walked/surveyed the Northwest Branch (Montgomery County portion only) and the Paint Branch sections in Montgomery County between early 1990 and late 1992. These areas support a degraded natural community with a preponderance of weedy alien species, highly disturbed soil profiles, fragmented forest canopy and altered forest structure.

We support efforts to restore these areas, but are concerned that similar problems such as those that have arisen in the Kenilworth Marsh Restoration site along the Anacostia River will also occur at these restoration sites unless some changes are made in the protocol delineated in this document.

At the Kenilworth Marsh restoration site, one of the Program's staff members walked the initial portion of the River Trail two months after the completion of the marsh plantings. He observed dozens to hundreds of mature Purple loosestrife plants scattered throughout the marsh and one robust Phragmites plant with three separate stems. Purple loosestrife invasion was evidenced by the high population level, broad distribution, and mature stature. The level of invasion was very disturbing considering that this marsh has just been completed. The probable source of the invading Purple loosestrife is nearby Kenilworth Aquatic Gardens. The probable source of the Phragmites is less clear. It may have come from the dredge spoil used in the project.

Planning and funding to control invasive species should be a part of this project. Hopefully, once the vegetation in a restored marsh stabilizes after several years, the marsh will develop some resistance to invasion. The need to control invasive species as soon as possible after invasion cannot be overemphasized, since invasion is usually logarithmic. (See the comments on Purple loosestrife and Phragmites at the end of this document). Funding for vegetation management at each site should be established for a minimum of five years.

The planting scheme is another aspect of this project that needs to be further discussed. There is no mention of the source for the trees and the shrubs that will be used in the bottomland reforestation efforts. An attempt should be made to utilize local genotypes. A fairly accurate description of the historic native vegetation of these areas can be ascertained by consulting some of the older botanical publications. These include Guide to the Flora of Washington and Vicinity (Ward, 1881), A Sketch of the Natural History of the District of Columbia (McAtee, 1918), Flora of the District of Columbia and Vicinity (Hitchcock & Standley, 1919) and Plant Life of Maryland (Shreve, 1910).

Several of the species proposed for use in the restoration process should be dropped from the plant list. Salix lucida is State-listed as Endangered-Extirpated and Ilex decidua is State-listed as Threatened. Viburnum lentago is ranked by the Natural Heritage Program as "Highly Rare". Use of State-listed or State-rare species in restoration projects threatens the genetic integrity of our rare plants. For example, large-scale plantings of non-native genotypes of rare plants could result in gene flow between the non-native genotypes and the indigenous plants. This cross-breeding would significahtly change the genetic make-up of our native genotypes that are the target for protection under the Nongame and Endangered Species Conservation Act. The planting of non-native genotypes of a State-listed species for which no remaining populations are known in Maryland (such as Salix lucida) is particularly problematic and illustrates the inadequacy of using plant materials from traditional nurseries in restoration efforts. According to the records of the Natural Heritage Program, Salix lucida has not been reported from the District of Columbia and has only been reported from Maryland twice (from Garrett County and from Cecil County). Planting of this species, if successful, would result in the establishment of a non-native genotype of a State-listed species outside of its natural range. Such a population would be of no conservation value. The population would be alien both genetically and geographically, and would distort the true rarity status of the species in the region. Translocations of rare and listed species should be carefully analyzed and planned and implemented under the auspices of the agency responsible for conservation of listed species, which in Maryland is the Department's Natural Heritage Program.

Viburnum lentago is further recommended for deletion from the planting list because this species is not known to occur on the coastal plain of Maryland. Its distribution in the mid-Atlantic appears to be essentially the upper Piedmont and mountain regions. It probably would not successfully colonize open-canopy wetlands on the coastal plain. Either Viburnum nudum or Viburnum dentatum (V. recognitum) would be a better choice for restoration efforts because they occur commonly, and naturally in coastal plain wetland habitats.

Finally, Rubus odoratus in Maryland is primarily a mountain species preferring moist, shady, rocky habitat from Frederick County west. It is occasionally seen on the Piedmont and was listed by Hitchcock and Standley in the Flora of the District of Columbia and Vicinity. This species is unlikely to survive under hydric conditions in full sun or in tidal marshes or emergent habitat. Quercus ilicifolia is another Piedmont and mountain species that seems inappropriate for use in this restoration effort.

Other State-listed species, exotic species, and species not native to Washington, D.C. and vicinity may be included in the proposed planting lists. These lists should be reviewed and these species' deleted from them.

Planting is an important component of restoration projects. Unfortunately, since indigenous genotypes of native species are rarely used, planting results in the massive introduction of non-native genetic material into wildlands habitats, contrary to the meaning and goals of restoration. Non-native genotypes could reduce the ecological fitness of native populations by changing gene frequencies of locally-adaptive genes and by introducing alien genes inappropriate to survival under local conditions. The Anacostia River restoration project presents a unique opportunity to develop and utilize ecological techniques that are compatible with the concept of restoration. Since the restoration is a long-term project and covers only a limited geographic area, the wild-collection and propagation of indigenous genotypes of native species for the restoration effort is feasible. The development and use of such local stock precludes the need to address several substantive issues such as proposals to plant non-native species, to plant species outside their natural range, to plant non-native genotypes of native species, or to plant rare species. Gene Cooley, Program Botanist, would be happy to provide technical assistance on selecting the appropriate species for the restoration work and developing local sources for plants.

As an experiment, we suggest that 15% of the restoration areas be left unplanted to compare the cost effectiveness of planting and natural colonization. In most non-planting experiments, some type of abiotic substrate stabilization would be appropriate. One of the intended benefits of planting is the rapid establishment of vegetation for substrate stabilization. Another intended benefit is to minimize through competition, the colonization of invasive exotic species. However, it is evident (as demonstrated by a portion of the Kenilworth Marsh restoration) that a marsh planted at high density with a diversity of species can be rapidly overrun by natural colonization by invasive native and non-native species. Engineering, hydrology and timing are probably much more important in a successful restoration project than is the use of planting.

Finally any mechanisms that are used in this restoration effort should minimize soil and canopy disturbance in the forested areas adjacent to stream restoration in order to limit encroachment by weedy, alien, invasive species.

Gene Cooley, Dick Wiegand, and Cynthia Sibrel would like to become more involved with this project. Please notify them of upcoming meetings so that the issues raised in this letter can be addressed by the Anacostia Watershed Restoration Committee.

Purple loosestrife

Purple loosestrife, native to Eurasia, is a stout perennial. It is considered a serious wetlands pest in New England and the Midwest, and the U.S. Fish and Wildlife Service has targeted it for control. In both New England and the Midwest, it was present but not invasive for decades, then rapidly became an invasive pest that now dominates many wetland ecosystems. As far as we know it is not (yet) a pest in the mid-Atlantic region, and I know of only two reports of serious infestations in this area, along the Choptank River on the Eastern Shore and along the Anacostia River near Kenilworth Aquatic Gardens. First year plants of Purple loosestrife have been reported to produce 100,000 seeds each per year. Mature plants can produce two and a half to three million seeds per year.

Phragmites

Phragmites has a very broad distribution worldwide, occurring on all continents except Antarctica. In the United States, it is considered to be a serious invasive pest of wetlands in the East, Upper Midwest, and parts of the South, but not in the West. Phragmites, although native, behaves exactly like an invasive exotic, and should be treated as such. It invades wetland ecosystems and replaces marshes that have good species and structural diversity with structurally uniform monocultures of low habitat value. Although I have seen little historical literature on Phragmites, it is my understanding that it was not perceived to be an invasive pest until after the middle of this century. Some believe that it exists in two forms -- an invasive biotype and a non-invasive biotype. Phragmites usually has very low seed viability and reproduction of Phragmites by seed might be rare, but once established, it vegetatively expands rapidly from robust rhizomes. Disturbance clearly facilitates invasion by Phragmites, but I have seen it invade marshes that have apparently received no direct disturbance, although they may have been disturbed hydrologically. If its aggressive nature is a relatively recent development, the invasive Phragmites we know might be a recent introduction of a nonnative genotype from another continent or region. In fact, in one recent study in the South, genetic differences were detected between an invasive stand of Phragmites and other stable stands. The invasive Phragmites that we consider to be a pest may not be genetically native. Nevertheless, Phragmites is a serious threat to the integrity and habitat value of wetland ecosystems in the Northeastern U.S. and I strongly believe that concern about its nativeness should not preclude prompt and effective control actions.

JM:cs

cc: Cynthia Sibrel
Robert Miller
Dick Wiegand
Gene Cooley
ER# 94217.RAN

NATIONAL CAPITAL PLANNING COMMISSION

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EXECUTIVE DIRECTOR
Reginald W. Griffith

IN REPLY REFER TO:
NCPC File No. MP35

Mr. Mark McKevitt
U.S. Army Engineer District, Baltimore
P.O. Box 1715 ATTN: CENAB-PL-PR
Baltimore, Maryland 21203-1715

Dear Mr. McKevitt:

Thank you for the opportunity to review the U.S. Army Corps of Engineers' (Corps of Engineers) Draft Integrated Feasibility Report and Environmental Impact Statement for the Anacostia River and Tributaries in the District of Columbia and Maryland. At its June 30, 1994 meeting, the Commission approved comments for the Corps of Engineers' consideration in the preparation of the final document.

The Commission commends the Corps of Engineers for its extensive efforts to improve water quality and restore fish and wildlife habitats. The proposed projects conform with goals and policies contained in the Parks, Open Space, and Natural Features element and the Environmental element of the Comprehensive Plan for the National Capital. These goals and policies refer to the protection of the Anacostia shoreline and the associated fish and wildlife habitat, protection of stream valleys within the watershed, enhancement of wetlands, and improvement of the Anacostia's water quality. The potential for the projects to augment the watershed's natural scenic quality and recreational opportunities further supports goals and policies of the Comprehensive Plan.

The proposals would appear to positively impact Capper-Cramton lands. The Capper-Cramton Act of 1930 funded the development and completion of the extension of the Anacostia Park system in the valley of the Anacostia River, Paint Branch, and Northwest Branch. Both Prince George's County projects and the Sligo Creek project in Montgomery County affect Capper-Cramton lands within the Anacostia watershed. The Act requires the Maryland-National Capital Park and Planning Commission (M-NCPPC) to submit any proposed changes to general development plans approved by NCPC for any of the land acquired under the Act. Therefore, we recommend that the EIS address NCPC's and M-NCPPC's roles in Capper-Cramton lands.

801 PENNSYLVANIA AVENUE, N.W., SUITE 301 WASHINGTON, D.C. 20576 (202) 724-0174

We concur with your conclusions that the projects would generate positive environmental impacts. The wetlands creation, stream restoration, and reforestation could yield significant benefits for water quality, fish and wildlife habitat, and riparian vegetation. These projects could increase food and habitats for several species. The combination of the wetlands creation and erosion and sediment control devices would maintain faunal and floral habitat preservation efforts. The projects would provide vegetated buffers that serve several purposes including shoreline stabilization and sediment filtering.

We commend you for additional implementation or mitigation measures, environmental investigations, and coordination efforts. We support the idea of planting native tree and grass species which, in turn, support native wildlife. We note the assessment of the potential of hazardous, toxic, and radioactive wastes associated with a former landfill on Kingman Island and your intention to investigate the site prior to any construction. The Final EIS should either evaluate the findings of the investigation or more certainly indicate when the investigation would begin. The Commission continues to encourage the Corps of Engineers to coordinate with Federal, state, regional, and local agencies through meetings, field trips, report reviews, and data sharing. Intergovernmental cooperation will ultimately determine the success of improving the entire basin's water quality.

Although the DEIS identifies projects, such as the Inter-County Connector, Children's Island, Barney Circle Freeway, Southeast Federal Center, that could affect the Corps' projects, we suggest that the FEIS identify, to the extent possible, potential effects from these projects that could impact the restoration effort.

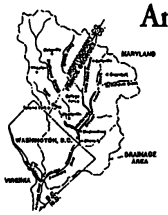
Although the EIS includes the implementation of state and local environmental regulations, we suggest the document analyze local land use plans and policies to evaluate the effectiveness of local land use controls. The EIS should assess planning guidelines and zoning ordinances to determine if the guidelines and ordinances enhance or diminish environmental protection related to the Anacostia River.

We appreciate your consideration of our comments and recommendations, which are discussed in greater detail in the enclosed Executive Director's Recommendation. We look forward to reviewing the proposed projects that could enhance one of our region's greatest resources - the Anacostia River. Please let us know if we can assist the Corps of Engineers in the development of the final document.

Sincerely,

Reginald W. Griffith
Executive Director

Enclosure



Anacostia Watershed Society

(301) 513-0316 FAX (301) 513-9521

START

STOP TRASHING THE ANACOSTIA RIVER TODAY

June 23, 1994

Colonel J. Richard Capka
District Engineer, Baltimore District
ATTN: CENAB-PL-P
P.O.Box 1715
Baltimore, MD 21203-1715

Dear Colonel J. Richard Capka,

On behalf of the Anacostia Watershed Society (AWS), I would like to express our appreciation for this opportunity to bring our experience to the Corps of Engineers' Draft Environmental Impact Statement regarding alternative solutions for restoring fish and wildlife habitat in the Anacostia watershed, phase II.

The Society has been the most active non-government organization in the Anacostia watershed for the past six years. We are a private membership group with board members who reside in all jurisdictions of the watershed and who reflect its diversity.

Since 1989, AWS has organized 2,440 volunteers to remove over 82 tons of auto bodies, trash and floating debris from the river; we have planted 4,869 trees in the watershed; and we have stenciled many stormdrains with "Don't Dump, Anacostia River Drainage".

One of our major campaigns is to reverse the trend of looking upon the National Parklands along the tidal Anacostia as available for commercial development schemes. The Society's Board Member Manifesto expresses our mission: to "Clean the Water, Recover the Shores, and Honor the Heritage" of the Anacostia River.

The Society has been closely studying the actions and effects of the Corps of Engineers' projects on the Anacostia River for the past 115 years. We are encouraged by the Corps' apparent policy changes as expressed in the recent 32 acre Kenilworth Marsh restoration.

We look forward, with this phase of the restoration, to a new and coordinated federal policy to assist the overall effort to restore a balanced and healthy habitat for life as we know it throughout the watershed. Such a new and consistent policy will be informed by the Ecosystem Management Initiative guidelines. The Corps has been a major player in this bio-region. We look forward to a relationship that will sustain a green restoration of the Corps as well as the river.

5110 Roanoke Place, Suite 101 College Park, MD 20740

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Col. Capka, DEIS, P.3.

After reviewing the DEIS, a person would not be informed about three of the most profound proposed projects to affect the tidal Anacostia River in the last 50 years. This appears to be a serious omission for a draft EIS:

1. There is no attempt here to integrate the principles of the Clinton Administration's Ecosystem Management Initiative. This is somewhat bizarre in light of the fact that the Corps of Engineers has been designated as the lead agency for the Anacostia project. When do we begin to see the application of these excellent policies?

2. The Draft study ignores a $200 million Barney Circle interstate freeway and bridge planned and set for bidding that would bifurcate the National Park land, severely limiting pedestrian access and use of the river. This project will profoundly effect the human health and wildlife ecology of that which is adjacent and downwind to the project area, smothering one of the most popular areas of the park (and the only public boat ramp on the entire tidal river) in clouds of poisonous carbon monoxides. The DEIS should futher examine evidence that cumulative environmental impacts are the cause of more human deaths from cancer in the Anacostia community than any other neighborhood in the bio-region.

The study should consider in some detail the impacts to human and fish/wildlife habitat of the proposed Barney Circle Freeway and bridge across the river and adjacent to Kingman Lake. According to the US EPA, vehicle emissions account for over half the aggregate cancer risks associated with airborne toxics in U.S. urban areas.

Motor vehicles are the primary source of carbon monoxide (CO). CO enters the blood stream and reduces delivery of oxygen to the body's organ and tissues. Ozone (O-3) results primarily from the action of sunlight on hydrocarbons and nitrogen oxides from fuel. O-3 damages biological tissues and cells.

Particulate matter pollution, derived from fragments of mineral impurities in fuel, aggravates existing respiratory and cardiovascular disease, alters the body's defense system against foreign materials, damages lung tissue, and can lead to carcinogenesis and premature mortality.

Motor vehicles are the most significant source of nitrogen dioxide (NO-2). NO-2 can irritate the lungs and lower resistance to respiratory infection and degradation. What is the impact to downwind communities from this project?

Col. Capka, DEIS, P.4.

The Chesapeake Bay Foundation has determined that vehicle exhaust contributes up to 40% of the excess nitrogen found in Bay waters. Excess nutrients are the major known pollution source to the Bay. These nutrients cloud the water with the enhanced propagation of algae cells that consume dissolved oxygen and retard the aquatic balance. What are the impacts to the water quality of the river and the Bay from this project?

3. The study does not consider the impacts from the planned Children's Island Theme Park to be constructed on Kingman Island directly adjacent to the Corps' proposed project. What are the impacts to the local human and wildlife community from a theme park with a projected 3 million visitors per year? Bald eagles and more than 60 other species of birds have been counted in this area. Where will the residents find open space to enjoy the river when it is fenced off for private development? Would this scheme be acceptable in the Rock Creek Park?

THE TIDAL ANACOSTIA RIVER

One of the most exciting features about the Anacostia is the tidal portion of the river, as it represents the potential for an outstanding recreational opportunity for biking, birding and boating for 800,000 watershed residents.

FLOATING DEBRIS

Today, the river represents an opportunity lost, as well as an opportunity denied, to three generations of people who have turned their face away from the river because of the visual blight that degrades and insults those who live near its shore. The Anacostia is referred to as the forgotten river for good reason.

Of all the basic problems of urban rivers, (sediment, sewage, stormwater, toxics and trash), trash is the most visible and insulting, and removing it represents a lowest-cost, partial, but positive step forward. When we stop trashing the river, more people will see the resource value that has been degraded. After a strong rain, stormwater flowing from Maryland and D.C. washes our parking lots and roadways clean of styrofoam cups, bottles and cans which accumulate by the ton on the tidal river and flow on to the Bay.

There is no mention of this blight in the DEIS, no solutions offered, no observations about its impact to human, animal or bird life. What are the impacts to a child's self image? what impacts to property values? - to personal safety?

Col. Capka, DEIS, P.5.

No government agency in the watershed has stepped forward to deal with the floating debris problem at its source. Much of the debris is washed into tributaries from jurisdictions far from the tidal river where it accumulates, thereby disguising and deflecting accountability.

There must be a collective effort to develop a solution. Since the Corps is not restrained by local jurisdictional boundaries, it would seem natural that they take the lead to resolve the problem.

Anyone familiar with urban rivers intuitively knows that until the floating debris is contained and removed from the shores, people will not regard the river as a resource of value regardless of the restored wildlife and wetland habitat. The visual blight will continue to insult the self respect of the minority peoples who live nearby; it will continue to depress real estate values in the surrounding communities and attract undesirable activity that only exacerbates the problem. The youth will continue to turn their back to the pollution, as the polluted river limits their options for life experience. This obvious plague should be addressed in the DEIS.

KINGMAN LAKE

Extrapolating from the encouraging success thus far revealed in the Kenilworth Marsh restoration, we look forward with some confidence to a similar result in Kingman Lake.

CITIZEN PARTICIPATION

The Society has but one concern regarding the Kenilworth project, and that is the lack of opportunity for volunteer and paid local citizen participation in the planting of the marsh. Planting, an activity not requiring an advanced degree, is an excellent way for locals to become 'invested' in the local ecology and economy.

We would like to discuss with the Corps, contracting opportunities for citizen participation in the marsh and tree plantings planned for the Kingman Lake area. Local youth in the Kingman Park and River Terrace communities adjacent to the project should be offered the opportunity to participate in this exciting project in their neighborhood.

Col. Capka, DEIS, P.6.

NESTING SITE PROTECTION

The Kingman Lake area presently supports some of the most active birding action in the entire Metropolitan Washington region. At times, I have observed as many as 15 Great Blue Herons along one line of sight. We have also observed bald eagles in the area of the three islands in upper Kingman Lake.

The major concern we have here is the protection of the nesting sites on the islands from predation by feral cats, dogs, raccoons, etc. The islands that support the most bird life are surrounded by water at both high and low tide. Infilling mudflats to a critical level with dredge material is understood to be an art-form at this point. In the Kenilworth experiment, mass fill #1 turned out to be a high marsh rather than a mid-level marsh, a critical difference because, during low tide events, there is dry land between the mainland and the island adjacent to the fill site, providing easy access for predators. Although an inter-tidal gut was promised around the island, with canoe access for environmental education, this has not occurred.

National Park rangers have confided to me that they have noticed a drop in the number of goslings this year compared to previous years. This may be due to the island losing its predation protection because of the fill experiment. When the project is completed, how can we be assured that the islands in Kingman Lake will continue to function as protected nesting sites? Intertidal guts would serve as a barrier to predation and provide canoe access as well.

CANOE ACCESS

Due to the tidal flux, prevailing winds, land use patterns and low flow conditions of the river, the Kingman Lake tends to be the most heavily impacted repository of floating debris along the entire tidal river. The Anacostia Watershed Society has organized numerous volunteer canoe cleanups on Kingman Lake and would like to continue to do so until the problem is properly contained in the tributaries upstream. In addition, AWS organizes environmental education and birding canoe excursions on the river. However, the best canoe access point for the Lake is located on the western shore (just off parking lot #6) at a break in the tree line opposite Heritage Island, near point designation # 282 on the 'Planting Plan' (see map). The Corps plan calls for a zone 2 - mid marsh #1 fringe marsh along the shore at this point. We would request that an inter-tidal gut be created at this point to preserve canoe access to the lake.

Col. Capka, DEIS, P.7.

CONCLUSION

Like most large organizations, the Corps of Engineers is staffed by committed, hardworking professionals, who, as this DEIS shows, have produced a thorough document from a focused engineer's point of view. It follows the traditional Corps guidelines and is somewhat routine and sterile. When you pry it from the can and try to apply it to the real world, however, it offers little relevance, limited scope, and ignorance of the vital flow of issues here in the community and on the Anacostia river.

The preparation of the final EIS provides the Corps with a new opportunity to apply the four principles guiding ecosystem management:
1. manage along ecological rather than political or administrative boundaries;
2. ensure coordination among federal agencies, and increased collaboration with state, local and tribal governments, the public, and Congress.
3. Use monitoring, assessment, and the best science available;
4. Consider all natural and human components and their interaction.

We invite you Colonel Capka, and the staff who have labored to prepare this voluminous draft document, to come see for yourself; join us for a canoe tour of the river, to experience its vital pulse, its beauty and its trashed shores before you write your final study.

We look forward in the coming months to working with the Corps and other federal partners in the restoration of the Great Anacostia River Park.

Thank you for this opportunity to share with you our views. Let me close by emphasizing the importance of this project to the community. My best regards,

Sincerely,

Robert E. Boone
Executive Director

CC: Senators Sarbanes and Mikulski
Congresspersons Hoyer, Morella, Norton and Wynn
Dr. Morgan Reiss, Deputy Asst. Sec. for Planning,COE
Hon.Carol Browner, Admin.EPA; Hon.Pat Kostmayer,EPA,III
Hon.Federico Pena,Sec.DOT
Ms.Glenn Key, Sp.Asst.Sec.Babbitt

Montgomery County Government

June 28, 1994

Mr. Mark McKevitt
U.S. Army Corps of Engineers
P.O. Box 1715, Attn: PL-B
Baltimore, Md. 21203-1715

Dear Mr. McKevitt:

I have reviewed the Anacostia River and Tributaries District of Columbia and Maryland, Integrated Feasibility Report and Draft Environmental Impact Statement, May 1994 (Feasibility Report). I have the following comments regarding the Feasibility Report:

1. The Syllabus needs to be expanded. The Syllabus should list all of the projects proposed in the Feasibility Report and provide a brief (one paragraph maximum) description of each project.

2. In Sections 2.3.2e, 2.4.2e, 2.5.2e, and 2.6.2e, describe the water quality of the Anacostia subwatersheds studies. The source of this information should also be referenced in these sections.

3. The Feasibility report does not address County laws regarding allowable noise levels from construction sites, air pollution, and sediment control. The County Noise Control Ordinance limits the allowable noise from construction sites during certain hours and will affect the Corp's contractors hours of operation. The County Air Pollution law prohibits controlled burning without a County permit. Since it is unlikely that the nine proposed project sites would qualify for a County burning permit, the County law affects the Corps contractors methods for disposal of trees removed from the project sites. Each project will also require a sediment control plan approved by Montgomery County.

   The Corps contractor will be required to obtain a permit from and post a bond with the County Department of Transportation for work within the County right-of-way and potential damage to public improvements from accessing the project from the County street. In addition, a permit for construction on park property from the Maryland National Capital Park and Planning Commission will be required.

4. Due to the large number of actions proposed in Montgomery County, the Project Management Plan (PMP) should include continued regular (monthly or bi-monthly as needed) meetings between Corps and Local Sponsor staff during the preparation of plans and specifications. These regular meetings allowed for quick identification and resolution of problems through improved Corps-Local Sponsor communication and periodic Local Sponsor review of work in progress. If regular progress meetings are held during the Plans and Specification phase, the 45 day time period provided for Local Sponsor review upon completion of plans and specifications is adequate.

Department of Environmental Protection
250 Hungerford Drive, Second Floor, Rockville, Maryland 20850-4159, 301/217-6350, FAX 301/217-6318

5. The PMP has allowed a time interval of six months for obtaining all required construction environmental permits. Montgomery County's experience is that it takes between nine and 12 months to obtain all necessary permits.

6. Although it is not shown in the PMP, it is Montgomery County's assumption that regular progress meetings will be held between the Corps project manager and the construction contractor and that the Local Sponsors will be invited to participate in these meetings.

7. The cost estimate of $6,260,000 includes an engineering contingency of 20%, construction contingency of 25% and an escalation factor of 23%. The Department of Environmental Protection (DEP) typically uses much lower contingency factors in budgeting for final design and construction of the types of projects involved. DEP also prepares all cost estimates in current dollars and does not include an escalation factor. Although DEP will seek to budget for 25% of the full cost estimate ($1,565,000), this will be done with the clear understanding that Montgomery County would be responsible for 25% of the actual final costs of constructing the nine projects in Montgomery County.

8. Utility relocations should be constructed by the Corps construction contractor during project construction to minimize the environmental impacts of project construction. The PMP should provide for design and construction of utility relocations being performed by the Corps, with coordination and funding for relocations being provided by the Local Sponsors.

9. The Snowdens Mill I & II and Stewart/April Lane projects should be redesigned to eliminate the need to acquire additional land. If this is not possible the final project designs should minimize the amount of land or easement acquisition required.

If you have any questions regarding my comments on the Feasibility Report, please contact me at (301) 217-2438.

Sincerely,

Daniel Harper
Senior Engineer

DH:dh

cc: Cameron Wiegand
Robert Kane

101 Belton Road
Silver Spring, MD 20901
(301) 593-0924
June 27, 1994

BY FAX (410) 962-4698 AND BY REGULAR MAIL

Mr. Mark E. McKevitt
U.S. Army Engineer District, Baltimore
P.O. Box 1715
Baltimore, MD 21203-1715
ATTN: CENAB-PL-PR

RE: COMMENTS ON DRAFT ENVIRONMENTAL IMPACT STATEMENT

Dear Mr. McKevitt:

The members of Co-Nature, the Coalition to Preserve the Natural Environment of Northwest Branch Park, ("Co-Nature"), through undersigned counsel, hereby file their comments on the United States Army Corps of Engineers' ("COE") Draft Environmental Impact Statement ("DEIS"). In particular, Co-Nature opposes the COE's proposed dam and wetlands pond in the Northwest Branch Park at the end of Lockridge Drive ("Lockridge dam") More generally, however, Co-Nature's comments also apply to the entire COE Anacostia restoration proposal contained in the DEIS.

I. REQUEST FOR A PUBLIC HEARING

Despite COE's best efforts, the community was not adequately informed about the COE's Lockridge Drive dam proposal. The community was not properly informed either of the scope and impact of the project or of the necessity for immediate citizen action and involvement. Community citizens formed Co-Nature, a coalition independent from any other local associations or organizations, in order to obtain more comprehensive information regarding the COE proposal.

Due to the lack of information, and the relative newness of the technology at issue, Co-Nature is still in the process of gathering the technical information required to fully express and support its position.. Co-Nature is now in the process of hiring experts necessary to properly evaluate the detailed technical aspects of the DEIS proposal. In consequence, Co-Nature has drafted these comments with few technical references and intends its written comments on the DEIS to be introductory in nature. Co-Nature respectfully requests that COE provide it the opportunity to supplement this response at a public hearing where, through its experts, Co-Nature can make a complete technical presentation.

II. INTRODUCTION

Co-Nature objects to the creation of wetlands and the building of the Lockridge dam for the following reasons:

1. The proposed dam and pond is an inappropriate use of Montgomery County parkland.
   a. This forest area was never wetlands. Therefore, COE cannot restore wetlands by creating wetlands in place of the forest.
   b. COE chose this location without regard for:
      1) the present fish and wildlife habitat provided by the undisturbed bottomland forest, and
      2) the community use of the park because of its natural topography.
2. Lockridge Drive is an environmentally incorrect site for a storm water wetland.
3. COE has allowed the project to be presented as all things to all people.
4. COE did not properly evaluate dam impact on the current ecosystem and usage.
   a. COE did not weigh the existing forest habitat units that would be lost by constructing the dam, in relation to the additional wetland habitat units which it estimates will be gained. Wildlife will be significantly impacted during construction and permanently impacted by the removal of the forest and its buffer effects with the residential community.

b. The dam and wetlands pond will significantly devalue the surrounding property values.

c. Upstream degradation and impact on the ecosystem was not addressed.

5. COE did not evaluate other, less destructive alternatives to building a large dam and wetlands pond.

6. There is substantial local opposition to this proposal.

A. Co-Nature Objects To COE's Dam

In brief, Co-Nature objects to the construction of the Lockridge dam because, as proposed, it will destroy the park as we know it and deprive us of its current use. In other words, the community uses this part of the Northwest Branch Park precisely because it is an undisturbed woodland. People hike and climb in this park and study its natural habitat.

Any development is inconsistent with the community's use of this park.

COE's proposal is massively intrusive and will destroy the existing forest in order to create a wetlands. COE's proposal would eliminate over 1½ acres of existing forest and significantly and permanently alter the character of the park. COE proposes to cut down over 200 mature trees and reroute the current trail around the pond. The COE proposal results in a permanent change to the existing topography in the area. Additionally, upchannel degradation caused by this size pond, as described by Schueler (1992), has not been addressed. This proposal also does not address the effects on other run-off areas exacerbated by the changes to the topography. This development is unacceptable to the people who use this park.

B. The Lockridge Dam Is Overdesigned Using Obsolete Technology

COE has identified two problems in the Lockridge Drive creek: (1) the speed of the storm water runoff which causes severe erosion and (2) the sediment and pollution contained in the runoff. COE proposes to solve these problems by building a 22ft. high by 200ft. long dam.

This dam will retain storm water runoff in a large pool and release the water at a slower rate after the sediments and pollutants have had a chance to settle out. The Lockridge dam project requires elimination of 1½+ acres of bottomland hardwoods and re-grading of the natural topography, thereby causing a permanent effect on the natural ecosystem. This ecosystem performs "numerous beneficial ecological functions." (DEIS Annex A, COE Public Notice).

At the time this project was conceived, Co-Nature understands that this type of large dam and pond represented the best technology (*i.e.*, Best Management Practice ["BMP"]) available to solve these problems. Therefore, COE did not study other less intrusive means to restore the Anacostia river basin.

In the meantime, Co-Nature believes that the technology has advanced. Now, the preferred BMP used to solve storm water runoff is to create a series of small retention ponds, with the longest possible flow path and long, irregular shorelines. (Schueler, 1992). Additionally, deep water pools are the most effective deterrents of mosquito breeding problems. The ecological importance of maintaining existing forest is stressed in current literature. A series of small ponds would create a different kind of wetland environment than that contemplated by the present proposal but has the benefit of not destroying the existing park and forest.

In sum, Co-Nature opposes the COE Lockridge dam proposal because it destroys existing natural resources and is based on older, obsolete technology. Co-Nature supports a less destructive alternative BMP, namely a series of smaller detention ponds created in the existihg stream bed area.

C. Lockridge Drive is an Environmentally Incorrect Site

Schueler (1992) states that in assessing environmental constraints for the building of storm water wetlands "Areas expected to be subject to significant loadings of road salts and deicing

compounds should also be avioded." Lockridge Drive is the main artery of Northwood Park and receives consistent snow treatment. Additionally, due to the fact that roads leading off Lockridge Drive are steep hills, the County uses significant amounts of salt and icing compounds here.

III. DISCUSSION

A. DEIS OVERVIEW

1. The Anacostia River Basin

Many of the problems identified in the COE DEIS occur in the lower part of the Anacostia River basin, *i.e.*, below Bladensburg, Maryland. DEIS § 2.1.2.e, page 2-8. COE describes the land surrounding the upstream Northwest Branch in Montgomery County (in which the Lockridge dam would be placed) as: (1) containing well drained soils, with (2) little industrial development, and (3) that the streams (a) have a small amount of alterations, usually in the form of utility installation, storm drainage outfalls and bank stabilization, and (b) are located in wooded parkland owned by the Maryland-National Capital Park and Planning Commission ("M-NCPPC"). DEIS § 2, pages 2-3, 2-5, 2-6 and 2-9-10. The water quality is generally very good. DEIS § 2.1.2.e, page 2-8.

COE concludes that:

> The stream valley parks, of which many are wooded, include both intensely developed recreational facilities and preserved undeveloped natural areas. Roadways or residential developments abut most of the parkland. The parks are heavily used . . . . (emphasis added)

DEIS § 2.1.3, pages 2-9-10.

2. COE objectives

COE states that:

> The planning objective of the Anacostia River and Tributaries feasibility study is to restore the fish and wildlife habitat which was destroyed as a result of previous activities of the Corps of Engineers. (emphasis added)

DEIS § 3.3, page 3-9.

3. Plan objectives in Montgomery County

COE goes on to state that:

> The goal in Montgomery County was to restore fish and wildlife habitat through the construction of stormwater wetland, bottomland and aquatic habitat. Stormwater wetland systems were considered at five sites (Stewart/April Lane, Lockridge Drive, Snowden's Mill I, Snowden's Mill II, and Tanglewood) to create wetland habitat, improve downstream water quality and reduce storm discharge. . . Within these watersheds, special consideration for thermal impacts as a result of ponding water was necessary. Galli (1990) documented temperature issues related (sic) stormwater wetlands. . . . (emphasis added)

DEIS § 4.5.3, pages 4-19--20.

B. The Proposed Dam Is An Inappropriate Use Of Montgomery County Parkland

The COE Lockridge dam proposal is an inappropriate use of the existing parkland. While many of the specific issues Co-Nature raises here are beyond the scope of the DEIS, they are nevertheless important to a full understanding of Co-Nature's opposition.

1. This forest area was never wetlands

In regards to Lockridge Drive, COE states that:

> New impoundment structures are necessary at Stewart/April Lane and Lockridge Drive. . . . Both of these sites are location (sic) in the piedmont plateau[1] in the vicinity of the Fall line. Off-land wetland alternatives were not available do (sic) to the site topography. Both of these sites have been previously disturbed due to utility construction.
> The existing site is in a wooded portion of the M-NCPPC stream valley park. The baseflow is approximately 0.2 cfs.[2] (emphasis added)

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[1] The Piedmont Plateau ranges from 200 to 570 feet National Geodetic Vertical Datum ("NGVD") and contains deep to moderately deep well drained soils. DEIS § 2.1.1.a, pages 2-1-3. Before colonization, the dominant native vegetation was deciduous forest, however, the remaining forests still contain many of the original tree species. DEIS § 2.1.2.c, page 2-7.

[2] The baseflow figures given for the project at Stewart/April Lane are identical. DEIS § 4.5.3.1, page 4-20. However, there are no figures given for other sites, such as Sligo Creek, with which to compare these baseflows. Similarly, where COE cites tons of sediment and estimated percentage of sediment impact for other sites, it does not for the Lockridge Drive site. Therefore, there is no way for the layman to determine the necessity for this project. Co-Nature notes, however, that the Stewart/April Lane site is a 203-acre watershed with 46% imperviousness, contra Lockridge Drive's 153-acre watershed with estimated 38% imperviousness.

DEIS § 4.5.3, page 4-20. More particularly, COE states that "no wetlands exist within the study area . . . ." DEIS § 5.3.2.a, page 5-34.

In sum, the Lockridge Drive site was never wetlands. Rather, the Lockridge Drive area was, as it is now, relatively undisturbed deciduous forest. If COE's goal is to restore wetlands to correct for past COE incursions into the Anacostia River basin, COE should not "restore" wetlands to an area which never contained wetlands.[3]

Given that the COE is attempting to ameliorate ecosystem destruction from 50+ years of COE projects, which included demolition of 700 acres of bottomland forest, it does not make sense to destroy an additional 1 1/2+ acres of bottomland forest. The importance of riparian habitat has been heavily documented. Loss of this habitat would affect noise levels and air quality, both for the wildlife and citizens, in the park and abutting neighbors.

2. **COE chose this location without regard for the present use of the park**

Instead, COE's actions will destroy the parkland as it currently exists. COE acknowledges that neighboring residents currently use the existing trail. DEIS § 5.3.2.b, page 5-35. However, while COE states that during construction these citizens will not be able to use the trail ("access . . . would be difficult"), COE misses the point when it suggests that these citizens can simply use adjacent parklands that will not be disturbed by dam construction: The point is, there are no nearby parklands offering similar recreational opportunities.

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[3] "The construction and formation of the wetland would occur within heavily forested parklands, causing the removal of large trees for pond construction and access. This construction action and the permanent action would significantly alter the character of the site." DEIS § 5.3.2.b, page 5-35.

a. THESE WOODS ARE THE ONLY NATURAL, UNDISTURBED PARKLAND LEFT IN LOWER MONTGOMERY COUNTY

Northwest Branch Park is the only undisturbed parkland remaining in this area of Montgomery County. There is no other parkland in the area that allows hiking, climbing and nature walks in an undisturbed forest setting. The only other parks reasonably close are highly developed, such as Sligo Creek Park.

b. THE CITIZENS USE THIS PARK BECAUSE IT IS UNDEVELOPED

The people who use the Lockridge Drive area of the Northwest Branch Park use it precisely because it remains relatively undisturbed. People who want to use developed parkland can readily find it. In contrast, people from all over the metropolitan area, and as far away as Frederick County, come to this park to hike, walk their dogs, climb and study the natural environment. It is no answer to say that in the next phase of study, COE and others will draft a management plan to replace the destroyed forest land with reforestation elsewhere. DEIS § 5.3.2.b, page 5-35. The County has approved/allowed significant development on the private green space areas in this neighborhood; the former forested Kinsman area, and new development north on Route 29, as well as the Kay tract, adjacent to the Beltway. The loss of forest resources on each of these tracts has, and will continue to, impact this section of the County.

c. THE LOCKRIDGE DAM WILL PERMANENTLY ALTER THE CHARACTER OF THE PARK BY ADDING A PERMANENT ACCESS ROAD AND PARK BENCHES TO THE PARK

Finally, the Lockridge dam will permanently alter the current character of the park. First, COE's proposal requires a permanent access road to the pond replacing part of the existing trail. This access road will allow vehicles into the park, where only foot traffic is possible now.

Second, while COE states that the impact of the change in the park will be minimal, the Montgomery County Parks Department has asked the community how many park benches they want along the pond. These modifications certainly do not benefit present or future wildlife habitat. See Appendix A (Letter From Bradley Alan Rush to M-NCPPC Chairman William H. Hussmann, June 17, 1994). Simply stated, the COE project allows the development of this park in ways it cannot now easily be developed. It should be noted that the M-NCPPC has already persuaded the Washington Suburban Sanitary Commission not to use existing rights of way to bring in required equipment and materials, but rather to use helicopters to minimize adverse environmental impact on the park.

d. COE IS NOT BUYING THIS PARKLAND FROM M-NCPPC

M-NCPPC is allowing COE to convert this park from old bottomland forest to wetlands. The Maryland park system receives no money from COE for this land, and the County must pay 25% of the cost for construction.. Indeed, no title will pass and the dam, when constructed, will revert to M-NCPPC for its maintenance. DEIS, Annex A (letter from James F. Johnson to Gus Bauman, September 16, 1993). This will add significant expense for County citizens.

e. THE PARKS DEPARTMENT CANNOT MAINTAIN THE POND

However, Montgomery County does not have the funds to maintain this pond. The Parks Department is currently unable to maintain its existing storm water management ponds. It is fiscally irresponsible for the County to approve the construction of a dam, knowing that it will have to maintain it when completed and, at the same time, knowing that it has no funds to

maintain it. This should be important to COE, because another unmaintained storm water management pond will not help the Anacostia.

According to Cohn-Lee and Cameron (1992), both MWCOG and Montgomery County have efforts underway to inventory storm water controls and device performances, but no reliable data had been obtained as of that publication date. Until data are available to clearly demonstrate the effectiveness of the projects, it is unreasonable to initiate such a permanent, irreversible, impact on the park. Once the topography and old forest have been removed, correction would take a century.

In sum, the COE proposal is an inappropriate use of the existing parkland. It replaces undisturbed forest to create a wetland where none existed before. It permanently alters and develops a park that people use precisely because it is undeveloped. Last, it creates a burden beyond Montgomery County's financial resources. For all these reasons, Co-Nature objects to the Lockridge dam.

C. **COE Has Allowed The Project To Be Presented As All Things To All People**

As stated above, COE's mission is to restore wetlands. See also, DEIS, Annex C, page 6-1. Thus, COE proposes to create wetlands even where none have existed before -- and at the expense of destroying an important natural resource, namely an undisturbed forest ecosystem.

Montgomery County, however, is interested in storm water management at Lockridge Drive. Therefore, COE couches its Lockridge Drive wetland proposal in terms of storm water management. Like Montgomery County, all of the federal, state and local agencies involved view this project from their own perspectives.

Thus, the Montgomery County Department of Environmental Protection talks about these projects as "environmental restoration" plans. DEIS, Annex A (Letter from Edward U. Graham to Dr. James F. Johnson, January 12, 1994). The National Capital Planning Commission acknowledges the restoration efforts, but points to water quality and flood control. DEIS, Annex A (Letter from Reginald W. Griffith to Mark McKevitt, December 1, 1993). Meanwhile, the Interstate Commission on the Potomac River Basin ("ICPRB") exaggeratedly implies that the Lockridge dam will alleviate the problems in the Northwest Branch, the Anacostia and Potomac Rivers and the Chesapeake Bay! Appendix B (Letter From Barbara Medina to Fran Radovsky, undated).[4]

COE has allowed such hyperbole and confusion. Support has been garnered for this proposal by encouraging people to think that the project is whatever they wish, from preserving the stream at the end of Lockridge Drive to saving the Chesapeake Bay.

The reality is that stated in the DEIS: "The goal of this restoration project is to increase fish and wildlife habitat . . . and to provide wetlands habitat in the area." DEIS, Annex C, page 6-1. COE will accomplish this "restoration" project by radically altering the site: COE will dig out the existing stream and regrade the existing stream bank, COE will remove the forest growth, and COE will enhance the existing trail for use as an access road and reroute the trail around the dam.

[4] As an example of the divisive attitudes and polarizing effect that this project has created in the community, ICPRB concludes its letter by implying that "friends of the park" will join forces in favor of the dam, which will create "additional recreation opportunities" in the park -- presumably fishing and swimming in the pond and enjoying the "natural" beauty of the park from the paved trail to the new park benches. By further implication, ICPRB classifies people opposed to park destruction as not being "friends of the park."

D. COE Did Not Properly Evaluate The Dam's Impact On Existing Wildlife

Accepting the fact that one cannot appraise the value of a tree versus the value of a fish, Co-Nature still asserts that COE's evaluation of the impact that the dam will have was faulty. Although this list is not exhaustive, Co-Nature faults COE's evaluation in three essential areas:

1. COE did not evaluate the impact that dam construction will have on existing non-aquatic wildlife;
2. COE improperly evaluated the dam's impact on property values; and
3. As discussed at section F, below, COE improperly evaluated community response to its proposal.

1. COE did not evaluate the impact that dam construction will have on existing non-aquatic wildlife

The existing woods currently provide habitat for many woodland creatures. While acknowledging that dam construction will permanently alter the character of the existing forest, COE only considered the dam's effect on the aquatic ecosystem. DEIS, Annex C, page 6-5. COE evaluated habitat units and environmental impact using a subset of the Chesapeake Bay Program indicator species list. DEIS § 3.5, pages 3-11-18.

COE did not assess the displacement of existing forest woodland species. This impact is likely to be great. In many areas of Montgomery County, the decreasing areas of undeveloped forest are forcing forest animals, such as deer, to come out of the woods into people's backyards and trash in search of food. See Appendix C, *County Eyes Local Deer Population*, Burtonsville Free Press, June 9, 1994, at 8, col. 1. Additionally, the loss of the forest buffer between the neighborhood and the deeper forest area will negatively impact on forest birds, deer, fox, raccoons, and other species, through the harassment effects of urbanization (pets, noise, urban bird species, etc.).

This dam will further decrease the current forest habitat and exacerbate displacement problems. Wild deer, and other displaced forest creatures, will become pests and create unanticipated ecological problems. This will also increase rabies transmission potential. Air quality impacts and noise level changes, both during and after construction, may also be expected. These certainly may affect Public Health and Safety. COE should have considered the negative environmental impacts on both the wildlife and the community.

2. **COE improperly evaluated the dam's impact on property values**

COE asserts that there will be no adverse impact on property values attributable to Lockridge dam construction while asserting that there will be adverse impact if the dam is not built. DEIS, Table 5-6, page 5-37. Co-Nature does not know how COE arrived at these conclusions. However, COE is wrong.

First, many homeowners purchased their homes because of the undeveloped parkland. This unspoiled parkland has had a positive effect on property values over many years. Developing the parkland will have an effect on property values for the very reason that the park is no longer unspoiled.

Second, there is an immediate impact on property values. In Montgomery County, a seller must inform a potential buyer of all proposed development. Thus, at present, sellers must tell potential buyers that:

a. COE has proposed to construct a dam and wetlands pond at the end of Lockridge Drive;

b. Construction is scheduled to begin in 1997 and may last two years;

c. The Parks Department is discussing further measures, including paved trails and park bench areas, to develop this parkland; and

d. According to the DEIS (page 6-5) "the current aesthetic value of the existing forest will not be replaced for several years."

If a buyer asked whether the marsh/ponds would create additional bug and mosquito problems, the seller would have to answer, at the very least, "Potentially," since the type of ponds noted for the least insect effects are not included herein. Obviously, these will affect property values.

Co-Nature is currently assessing the effect these statements are having on homes currently for sale within the watershed. We repeat our request for a Public Hearing at which we could further share our findings.

E. The COE Did Not Consider Other, Less Destructive Alternatives To Building A Dam And Wetlands Pond

COE states that "[a]ll of the alternatives considered for this site included the construction of a new embankment." DEIS § 6.5.2, page 6-17. Stated another way, COE did not consider less destructive alternatives to the dam. As mentioned before, the COE proposal uses older, perhaps obsolete technology. Newer BMPs suggest that a series of smaller ponds is a better alternative to the massive destruction of a large dam and pond.

Co-Nature has discussed this possible alternative with a private consultant. After viewing the site, he identified several areas in the existing stream bed where smaller ponds could be built. These smaller ponds would create small waterfalls. Such a system of small filtration ponds and waterfalls would, in his opinion, provide all the benefits of the proposed dam. In addition, this system would cool the water and provide aeration (a positive effect for fish and wildlife) without significantly impacting the existing forest.

Co-Nature is currently hiring other consultants to advise us regarding the technical feasibility of this ponds and waterfalls alternative. In addition, members of Co-Nature and its

experts will be meeting with the Montgomery County Parks Department to discuss these alternatives more fully. Co-Nature asserts that a Public Hearing, at which the results of these conversations and studies could be shared, would be in everyone's best interests.

F. **There Is Substantial Local Opposition To The COE Proposal**

In contrast to COE's assertion that there will be no adverse impact on the community, there already is: This community is badly split over COE's proposal. There are friends of many years who are no longer speaking because of this proposal. Neighbors formed Co-Nature independently from any local civic association or organization to attempt to gather information about storm water management without adding to the existing polarization. Unfortunately, the level of feelings involved in this debate is shown by ICPRB's offensive insinuation that only supporters of the Lockridge dam are "friends of the park."

In short, the community is badly divided. Co-Nature feels that allowing this project to be presented as a "feel good" issue, such as saving the Chesapeake, to garner support for a technically obsolete wetlands pond contributes to the extreme and entrenched positions now present in the community. A rational review of scientific data and information is necessary.

Again, Co-Nature welcomes the opportunity to develop this issue more fully at a public hearing.

IV. CONCLUSION

For all these reasons, Co-Nature opposes COE's proposal. We believe that a responsible, scientifically valid, environmentally sound method by which to address the storm water problems in this watershed area can be achieved.

Respectfully submitted,

Bradley Alan Rush
Counsel for Co-Nature,
the Coalition to Preserve the Natural
Environment of Northwest Branch Park

UNIVERSITY OF THE
DISTRICT OF COLUMBIA

Dr. Harriette L. Phelps
Biology Dept. - Bldg. 44
4200 Connecticut Ave., N. W.
Washington, D. C. 20008
202 282-7364
Fax 301 345-6017

25 June 1994

District Engineer
ATTN: CENAB-PL-B
U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715
Dear Dr. Johnson,

I am writing in response to your Public Notice on the *Anacostia River & Tributaries District of Columbia and Maryland Integrated Feasibility Report and Draft Environmental Impact Statement. May 1994.* As a professor of Biology at the University of the District of Columbia, one focus of my research and studies has been sediment toxicology of the Anacostia River estuary region *(Phelps, H.L.1993. Sediment toxicity of the Anacostia River estuary, Washington, DC. Bull Environ Contam Toxicol 51:582-587).* (also attached list). I am a member of the ASTM section on toxicology, an associate editor and reviewer in this field for several journals, and have presented papers and chaired sessions on toxicology at many national and international scientific meetings.

The Public Notice refers to proposed actions regarding Kingman Lake. Regarding the sediments of Kingman Lake the only reference I found was Section 2.2, p. 2-23:

"The FWS conducted bioassays for the Anacostia River and Kingman Lake sediments. The bioassays concluded that there were no statistically significant differences between the control sites in the Potomac River and the reference sediment samples."

A recent study I conducted on sediment in the Anacostia came up with the opposite conclusion, namely that Kingman Lake sediment was highly toxic (*Phelps, H.L. 1991. A Preliminary Study for Identification of Sediment Toxics in the Tidal Freshwater Anacostia River. Report to Water Resources Research Center, Washington, DC. 11p.).* The FWS study has not yet been made available for public comment and review; however, another study on Anacostia sediment toxicity used a Potomac reference site that had high native toxicity and therefore was not a valid control site for comparison.

It is my recommendation that the sediments of Kingman lake be considered as possibly containing persistant highly toxic chemicals. Since from our study the toxicity appears to be long-lived, e.g. due to chemicals more persistant than ammonia, these sediments should not be dredged. More sediment toxicity studies and a wider literature search need to be carried out.

If this study will be considered I would like to have the opportunity to apply for it. My laboratory is currently conducting two other sediment toxicity studies on the Anacostia. UDC is the public higher education institution of the District of Columbia, a HBCU, and this section of the Anacostia lies within the District of Columbia. My research projects at UDC involve local citizens and the training and education of minorities, and this would be an excellent opportunity.

Sincerely,

Harriette Phelps

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Phelps, H.L. May 1990. "Mapping Toxicity of Anacostia River Sediments Using a Corbicula Clam Larva Bioassay." Atlantic Estuarine Research Symposium, Gloucester Point, VA. Poster Session. Abstract.
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

June 24, 1994

Dr. James F. Johnson
Chief, Planning Division
U.S. Army Corps of Engineers
Baltimore District
Attn: CENAB-PL-P
P.O. Box 1715
Baltimore, Maryland 21201-1715

RE: Anacostia River & Tributaries District of Columbia and Maryland Integrated Feasibility Report and Draft Environmental Impact Statement, May 1994

ATTN: Mark McKevitt

Dear Dr. Johnson:

In accordance with the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, EPA has reviewed the above referenced Draft Environmental Impact Statement (DEIS). Based on our review, we have rated the document LO-1 (Lack of Objections, Adequate information).

The "LO" rating indicates that our review has not identified any potential environmental impacts requiring substantive changes to the proposal. The "1" rating indicates that the document adequately addresses the environmental impacts associated with the preferred alternatives, however, there are issues that EPA would like to see addressed in the Final EIS. I have enclosed an explanation of EPA's rating system for your information.

The focus of this project is to address problems related to restoration of fish and wildlife habitat in the Anacostia River Basin (page 1-1, DEIS). As described in the DEIS, the preferred sites that have been identified for restoration are areas in the Anacostia River Basin that have been previously disturbed by U.S. Army Corps of Engineer (Corps) activities. The two major causes of habitat loss include urbanization and the construction of federal navigation and flood control problems (page 3-1, DEIS).

Considering the land use demands that have impacted the Anacostia area, the rating of one of the ten most degraded rivers in the nation and the inequity of funding that has been allocated to the Anacostia River community, this project is well needed and appropriate. EPA has found the efforts of the Corps commendable and we would

like to applaud your efforts to enhance environmental conditions in the Anacostia River Basin. We also understand the limitations in funding and authorization commitments that the Corps faces when developing preferred alternatives which include only areas that have been impacted by Corps activities. However, we encourage you to seriously consider our comments into the Final EIS.

In summary, our comments are as follows:

- We would like the document to include the beneficial and negative impacts of this project to other restoration projects that are proposed or have been implemented in the Anacostia River Basin for the consideration of a biodiverse ecosystem;
- We strongly recommend that the Corps coordinate with lead agencies of projects that are proposed in the area of the preferred restoration sites that have the potential to negate the beneficial environmental impacts of the Corps' restoration projects to ensure that cumulative impacts are addressed in the EIS;
- We would like the document to include a public awareness plan to increase awareness of the non-point source pollution and other environmental problems of the Anacostia River Basin;
- We recommend that the Corps should include a monitoring plan that outlines the specific actions that will be taken to determine progress of the restoration projects in the Final document;
- The document should clearly describe the screening process and the criteria used to eliminate possible alternative restoration sites.

Please see the enclosed "Summary of Findings" for a more detailed description of our comments.

If you have any questions or if we can be of further assistance, please call me or Danielle Algazi of the Environmental and Assessment Section. We can be reached at (215) 597-1177 and (215) 597-1168 respectively. We look forward to continuing working with your office.

Sincerely,

Roy E. Denmark, Jr.
NEPA Review Coordinator

Enclosures

Biodiversity

As you know, no site exists in ecological isolation, therefore, it is important to understand the value of the Anacostia River Basin system as a whole and its importance to a biodiverse ecosystem. Therefore, the preferred alternative projects that are chosen for Corps restoration should be examined to determine their effect on other restoration projects in the area, in the attempt to create a restored, biodiverse ecosystem. The Final EIS should clearly describe the beneficial and negative effects of the restoration efforts on other projects that are being implemented in the Anacostia River Basin. This information should be included in the alternatives analysis and in the criteria that was used for the selection of the preferred alternatives.

Cumulative Impacts

As mentioned previously, the two major causes of habitat loss in the Anacostia River Basin are urbanization and the construction of federal navigation and flood control projects (DEIS, pg. 3-1). While the DEIS clearly addresses the impacts of the latter, it does not address impacts of urbanization to the proposed restoration sites. The DEIS on pages 5-80 and 5-81 identifies possible future actions by other agencies that may have impact on the 13 preferred alternative sites and clearly add to the urbanization of the area. These projects include the Inner-County Connector, Children's Island, Barney Circle Highway and the Southeast Federal Center. Some of the impacts associated with these projects include but are not limited to: added sediments and contaminated stormwater; added debris and litter; and an increase percentage of impervious surfaces. Added together, the cumulative affects of these sites on the restoration could negate the impacts on the Corps' restoration efforts. These issues may influence the preferred alternative for restoration at each site and the location of the sites. For example, section 4.5.3 of the DEIS describes each stormwater wetland restoration site and the percentage of impervious surface which would affect the runoff to the stormwater wetland. Since the restoration alternative and the designs for restoration are based on these percentages, how will the increase in impervious surfaces that will occur from additional actions in the area effect the restoration effort that was chosen for that particular site? Will these designs be adjusted accordingly over time, based on additional urban impacts? These issues should be addressed in the Final EIS.

While the status of these projects are not certain and the construction may or may not be imminent, the Final EIS should include documentation of efforts made to coordinate with the lead agency of each proposed action to determine mitigation measures that these projects will include in their NEPA documentation. The Corps should provide details on how these projects will affect the restoration alternative sites and what will be done to

alter the project for success and to overcome additional impacts.
For example, Gum Springs traditionally provided the Paint Branch system with 50% of the brown trout (Salmo trutta) population (DEIS, section 4.5.3.f). The DEIS states that the Inter-City Connector has potential to negate positive effects associated with the Corps restoration in Gum Springs (DEIS, page 5-80). Therefore, the Final EIS should include efforts to coordinate with the lead agency to determine how they propose to avoid these impacts (DEIS, page 5-80). How will the Inter-City Connector, if constructed, impact the stream restoration efforts and the use of the bypass pipe system to divert storm flows around the lower portion of Gum Springs? Will the length of the bypass pipe need to be increased? How will the lead agency for the project attempt to avoid the impacts? These issues should be addressed in the Final EIS.

Public Awareness

Section 4.3.2 of the DEIS on page 4-8 describes the formulation process for the restoration projects. A Commitment to Restore Our Home River: Six Point Action Plan (MWCOG, 1991) is a plan that was endorsed by Federal, state and local elected officials and regional agencies in November 1991 and are described as encompassing, wetland restoration, stream restoration, riparian restoration and it also includes public awareness (DEIS, page 4-8) The DEIS covers many aspects of this plan, however, it does not discuss how the restoration efforts will tie in with public awareness. There are many ways that the Corps' restoration project can increase public awareness to the Anacostia River Basin. The community can be invited to public workshops or site visits to the restoration locations as the project progress. Community involvement should be encouraged. A section in the Final DEIS should describe at a minimum a preliminary plan for public awareness.

Non-Point Source Pollution

Page 5-4 and 5-14, second paragraph of the DEIS states "wetlands are expected to reduce concentrations of these contaminants" (PCBs, pesticides, heavy metals etc..). This phrase should be changed to state that "wetlands may reduce the concentration of some of these contaminants, however, they will not totally prevent contaminants from entering the ecosystem." In addition, the Final EIS should indicate where the contaminants are coming from, the stress that it puts on the surrounding habitat and what efforts can and are and can be done in the area to prevent it. This would discourage the idea that the wetlands will eliminate the non-point source problems of the Anacostia River Basin. This would also enhance the public awareness commitment of the Seven Point Action Plan.

Monitoring

As the restoration projects develop, the areas should be monitored to measure success of the project and to ensure that future development in the area does not jeopardize success of the project. The monitoring plan should be explained in the Final EIS. The monitoring plan discussion should include actions that would be taken, who would be responsible for the actions and approximate timeframe. It should also outline additional funding that may be needed to make changes in the project as a result of the cumulative impacts on the project and who will be responsible for funding it. Finally, a discussion of how success will be measured for the restoration projects should be included in the Final EIS.

Alternatives Analysis

The document satisfies the requirements for describing the alternative methods of restoration for each of the 13 preferred sites, however, it is lacking when describing the elimination process of the site specific alternatives. The alternatives that are selected and analyzed for a project should satisfy the purpose and need of the project, as NEPA intends. The alternative sites that were eliminated by Corps as described in the DEIS may have satisfied the purpose and need for this project, however, given the information that is documented in the DEIS, it is not clear that they did not. The 441 sites that were identified in the Blueprint for the Restoration of the Anacostia River Basin (Metropolitan Council of Governments, 1992) were narrowed down to approximately 120 sites based on the criteria that were already being used for other restoration projects and other preliminary criteria (DEIS, pg.4-8). The elimination process from the 120 sites to the 13 sites as described in Section 4.4 of the DEIS is not clear. For example, was a site in which the degree of degradation was low chosen as a preferred site for restored? At a minimum, the document should more thoroughly describe the screening process.

Page 4-10 of the DEIS refers to a list of environmental restoration criteria from section 3.3 of the document, however, this information is not found in the document. This list of criteria should be included in the Final EIS.

General Documentation

The maps that were included in the Draft EIS are not sufficient to determine the actual 13 project sites. A location map that identifies all 13 sites on the same map should be included in the Final EIS. Although Volume II contains location maps for each individual site, a map for the Kingman Lake and River Fringe wetlands not included in the document. The Final DEIS Volume II should contain a location map for these two projects. In addition, there are no maps to indicate the location of the alternative sites

that were eliminated. The Final DEIS should provide a separate location map for each of the sub-watershed target areas identifying the alternative sites possible for restoration.

Please note that section 4.4.2 on page 4-11 of the DEIS states that four stream restoration sites were selected. Table 4-3, page 4-14 marks 5 selected sites.

Section 4.4.3 on page 4-15 of the DEIS states that there are "limited number of sizable opportunities for restoration of wetlands remaining in the basin." This statement should be explained in the Final DEIS. Does this mean that the Anacostia River Basin area is so urbanized that locations for restoration efforts for wetlands are practically extinct? This statement provides additional reasons for the importance to examine the cumulative impacts associated with the future development in the area and how it will impact the restoration efforts. The restored wetland areas as described in the DEIS will be part of the few left in the Basin. The Final EIS should describe these issues.

The cost estimates and acreage that are shown on Tables 4-2, 4-3 and 4-4 on pages 4-12, 4-16 and 4-16 respectively vary from the cost estimates and acreage that are mentioned for each site in Section 6 Plan Selection of the DEIS. This should be clarified in the Final EIS.

The Prime and Unique Farmlands paragraph is repeated twice in section 5.1.2.a of the DEIS.

June 24, 1994

Col. Richard Capka, District Engineer
ATTN: CENAB-PL-P
U.S. Army Corps of Engineers, Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715

Re: Anacostia River & Tributaries, District of Columbia and Maryland: Integrated Feasibility Report and Draft Environmental Impact Study

Dear Colonel Capka:

American Rivers, the nation's principal river conservation group, is deeply concerned that the Draft Environmental Impact Statement ("DEIS") for the U.S. Army Corps of Engineers feasibility study for the Anacostia River fails to prescribe a comprehensive solution for the river's many ills. The health of the Anacostia, identified by American Rivers as one of the nation's most endangered rivers, is a concern not only of people who live along the river's banks and many tributaries, but also of national policy-makers, who see the river as a test-case for the restoration of our nation's degraded urban waterways.

American Rivers believes that the DEIS fails on seven counts: 1) It fails to address cumulative and indirect impacts. 2) The rationale for selecting restoration sites is flawed. 3) It fails to consider alternatives which would adequately reforest riparian areas. 4) It fails to consider alternatives which would compensate for the destructive impact of stormwater run-off. 5) It fails to consider alternatives that address the problems of the Northeast Branch and other tributaries in Prince George's County. 6) It fails to consider restoring streams to simulate natural stream channels. 7) It fails to consider alternatives that address how people interact with healthy river systems.

Within walking distance of the nation's capital, the Anacostia typifies the degraded state of our nation's urban rivers. As this neglected river's watershed has been increasingly transformed to meet economic needs, toxic chemicals, untreated sewage and other poisons have been flushed into a waterway that once welcomed tall ships, but is now so choked with mud that it can only be navigated by canoe.

801 Pennsylvania Ave., S.E.
Suite 400
Washington, DC 20003
(202) 547-6900
(202) 543-6142 (FAX)

a member of Earth Share

While the Potomac has received $1 billion in restoration funds, the Capital's "home river" has been neglected, following a national pattern of pollution's burdens inequitably being borne by lower-income, minority communities. See Our Unfair Share, National Wildlife Foundation (1994). As its banks have been cleared of vegetation, the Anacostia, a tidal river that is one of the main contributors of pollutants to the Chesapeake Bay, has increasingly lost the ability to filter the many pollutants added to the river's watershed -- runoff from oil and trash on city streets, fertilizers from agriculture and lawn care, raw sewage from antiquated stormwater and sewage pipes, and harmful chemicals from nearby industrial uses. The river's natural meanders have been replaced by straight, concrete ditches. Once a meandering floodplain river whose fields of wild rice attracted thousands of migrating birds, the Anacostia has been transformed into a nearly lifeless concrete channel that now attracts little more than illegal tire dumpers.

The DEIS lacks an ecosystem-management approach.

In recognition of the destruction of the Anacostia and its river-riparian ecosystem, President Clinton recently recommended that $2.3 million be spent to restore the river during Fiscal Year 1995. As part of an emerging national interest in ecosystem management, the President selected the restoration of the Anacostia basin as one of four pilot programs to reinvent the way government uses and cares for the environment. Budget of the United States Government, Fiscal Year 1995, 143-144.

The Anacostia watershed was selected in large part because it provides a model opportunity for ecosystem-wide collaboration between several jurisdictional authorities, private landowners, and citizens. With an emphasis on maintaining the sustainability and biodiversity of the river, ecosystem management requires "manag[ing] along ecological rather than political or administrative boundaries; ensur[ing] coordination among Federal agencies, and increased collaboration with State, local, and tribal governments, the public, and Congress." Id. at 143. As one of four precedent-setting test programs for ecosystem management, the restoration of the Anacostia basin must proceed with the utmost commitment to an ecosystem-oriented, interagency and intergovernmental effort which successfully fulfills the goals of the Anacostia Watershed Restoration Committee's ("AWRC") Six-Point Action Plan.

The AWRC is an intergovernmental committee established by the 1987 Anacostia Watershed Restoration Agreement to oversee the focus and strategy of the watershed's restoration agenda. The AWRC directed the Metropolitan Washington Council of Governments

SUMMARY OF RATING DEFINITIONS AND FOLLOW-UP ACTION*

Environmental Impact of the Action

LO--Lack of Objections
The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC--Environmental Concerns
The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

EO--Environmental Objections
The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU--Environmentally Unsatisfactory
The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

Adequacy of the Impact Statement

Category 1--Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2--Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category 3--Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and that should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment.

Figure 4-1

("MWCOG") to devise a Six-Point Action Plan for the restoration of the Anacostia basin. The six goals of the Plan are to: 1) reduce pollutant loads to the tidal estuary; 2) restore ecological integrity of streams; 3) restore habitat for fish; 4) restore and enhance wetlands; 5) restore and expand forest cover, and 6) increase public involvement. A Commitment to Restore Our Home River: A Six-Point Action Plan, AWRC (1987).

American Rivers is deeply concerned, however, that the restoration effort proposed in the Corps feasibility study fails to fulfill the ecosystem-oriented, collaborative approach outlined in the Six-Point Action Plan. The DEIS proposes 13 projects, agreed upon through cooperation among several governments and numerous agencies. As a model for future ecosystem management programs, the restoration effort is disappointing. The respective responsibilities and capabilities of the various partners apparently are still unnecessarily confined within their political/administrative boundaries. The proposed projects apparently were not selected according to ecosystem-based criteria. As a result, the DEIS simply fails to comprehensively address the needs of the Anacostia basin in a manner designed to fulfill any of the six goals of the AWRC.

The DEIS fails to address cumulative impacts of restoration projects and future development.

American Rivers believes that the Corps should work with other partners to produce an EIS of the restoration effort as a whole. Ecosystem management is not designed to be a piecemeal effort, and the environmental impacts of a comprehensive restoration program cannot be assessed realistically on a piecemeal basis. The effects of Corps projects will interact with effects of other projects, and the EIS should analyze these interactions so that readers, and the decisionmaker, can assess the true environmental impact of the restoration program. A watershed ecosystem functions as an integrated, organic whole, and successful ecosystem management should approach the ecosystem accordingly. The effects of Corps projects should be designed to interact cumulatively and synergistically with the effects of projects of other sponsors, and the EIS should reflect these indirect and cumulative impacts.

Moreover, the EIS must analyze these cumulative and indirect effects in order to comply with Council on Environmental Quality (CEQ) regulations implementing NEPA. 40 C.F.R. § 1508.25(c); 40 C.F.R. § 1508.7. The EIS must address indirect and cumulative impacts of the proposed Federal projects, including effects of other restoration projects which will affect the efficacy of

those proposed by the Corps, regardless of whether the other projects are Federally sponsored.

Additionally, the EIS should analyze the impact of the proposed projects in light of the harmful effects of other plans which could interfere with the Anacostia's restoration. For example, the proposed Barney Circle Freeway, the proposed Children's Island theme park, and the proposed Intercounty Connector all may reasonably be foreseen to have significant effects on the restoration program's efficacy. The predicted beneficial impact of the Corps' proposed projects will be greatly reduced if these other projects are performed as proposed.

When viewed with these other proposals, the Corps' proposed projects may "have cumulatively significant impacts." 40 C.F.R. § 1508.25(a)(2). CEQ regulations implementing NEPA require that indirect and cumulative impacts be addressed in the EIS. 40 C.F.R. § 1508.25(c). The EIS should address each of these proposed projects and their potential cumulative impacts when viewed with the restoration projects proposed by the Corps.

The EIS also should consider proposed land use plans which may reasonably be foreseen to affect the impact of the restoration projects. The very brief mention of land use planning in § 3.1.3 of the DEIS provides no substantive information regarding impacts of future land use in the Anacostia watershed. To the extent that increasing development in the watershed results in increased stormwater run-off, many of the problems currently facing the restoration program will grow worse.

The Corps should collaborate with the Maryland-National Capital Park and Planning Commission and other appropriate agencies to design ecologically sound plans for land use, and to assess the effects of future development on the restoration program's impact. Analysis of relevant actions and proposals is essential to an ecosystem-based management of the Anacostia basin, and is required by CEQ regulations.

It should be obvious that when restoration projects by one entity are subverted by development projects of another, the principles of ecosystem management are violated in the most fundamental way. Restoration of the Anacostia will be a waste of taxpayers' money if adequate measures to protect the ecosystem are not taken. Cooperative understandings must be entered with those responsible for planning developments which are contrary to the goals of the restoration program.

The criteria for selecting restoration projects lead to a piece-meal approach that is at odds with the principles of ecosystem management.

The Corps should assess all potential project sites from an ecosystem-oriented perspective, rather than focusing narrowly on the perceived limitations of the federal role in the restoration program. The Corps virtually ignores all potential projects which are not within the Corps' interpretation of the federal objective described in § 3.2. DEIS, 3-7. "Succinctly stated, the problem which has been evaluated in this study is replacement of fish and wildlife habitat eliminated by previous Corps projects." DEIS, 3-9. While we do not suggest that the Corps accept responsibility for the entire restoration program, the Corps has not viewed its potential contribution from an ecosystem management perspective.

For instance, the Corps apparently defines "habitat restoration" in a manner so narrow as to preclude Corps involvement in many ecologically beneficial projects. The DEIS declares that the Corps' "ultimate objective is to replace or restore up to 17,000 habitat units in the basin." DEIS, 3-9. By focusing primarily on "habitat units," the Corps may overlook potential projects with ecological benefits less easily quantifiable, but for which Corps expertise would be suited.

"Habitat" is to some extent considered apart from other facets of ecological health; for example, it is contrasted with "water quality." Projects that "solely address water quality" are not to be within the mission of the Corps. DEIS,4-7. However, an ecosystem-oriented approach suggests that this is a false dichotomy: water quality and habitat are functionally inseparable for aquatic species.

We do not intend to imply that the Corps necessarily should assume responsibility for projects which may be performed more efficiently by other entities. However, the Corps' expertise is well-suited to engineering and constructing many environmentally beneficial projects, such as wetlands or dry ponds, which may produce few immediately proximate "habitat units," and the benefits of which may be difficult to quantify by "Habitat Evaluation Procedures." Indeed, the Corps itself recognized to some extent that its narrow interpretation of "habitat restoration" is contrary to a reasonable ecosystem-based approach: "conditions that exist in the lower portion of the basin are in large part attributable to activities which occur in the upper portion of the basin." DEIS, 4-7.

The Corps' position is in a sense self-contradictory: the low number of habitat units located directly on or near potential

project sites is apparently the primary basis for rejecting many potential projects, but broader ecological benefits are occasionally described when discussing habitat restoration measures: "[s]ome of the functions [of wetlands] include unique wildlife habitat,flood control, ground water discharge, erosion protection, sediment and toxin removal, food chain support, and primary production." DEIS, 4-24.

This apparent contradiction in the DEIS between the Corps' narrow interpretation of habitat restoration and a more ecosystemic approach is particularly relevant to stormwater retrofitting projects. Stormwater retrofitting could be extremely beneficial to the Anacostia watershed ecosystem, but these projects may not themselves be very suitable for habitat. Because of extremes in water flow and pollutant input, stormwater abatement wetlands provide less suitable habitat than do natural wetlands. The six proposed stormwater retrofitting projects will probably be much more useful to the Anacostia ecosystem as stormwater abatement methods than as habitat. The U.S. Fish and Wildlife Service, in its § 2(b) Report to the Corps, stated that "[t]he creation of wetland habitat for wildlife is a secondary benefit" of stormwater wetlands construction.

However, the Corps apparently selected these six stormwater abatement projects not primarily for their broader ecological benefits, but in accordance with the "ultimate objective...to replace or restore up to 17,000 habitat units..." DEIS,3-9. Insofar as the Corps' expertise is particularly suited to the engineering and construction tasks needed for stormwater abatement, potential projects should be evaluated for their effects on the ecosystem as a whole, rather than evaluated simply for their potential number of immediately proximate habitat units.

Similarly, the bigger-is-better approach to site selection (DEIS, 4-10) may ignore other factors which may be relevant in assessing the impact of the potential project on the ecosystem. In evaluating sites primarily on the basis of acreage or linear feet, the decision makers may overlook strategic locations of potential project sites. For example, some sites may be in locations particularly suitable for filtering sediment and other pollutants, or for fostering connectivity between distant wetlands communities, but may not be sizeable enough to provide a large number of habitat units. The Corps has recognized that small sites may be suitable for strategic purposes: synergistic effects are noted. DEIS, 3-10; 4-11. However, local habitat creation is the primary consideration, rather than other effects which may benefit habitat upstream or downstream.

In sum, the criteria for selecting projects for proposal are internally inconsistent, are bound by unworkable interpretations of the Corps' administrative jurisdiction, and lead to a piecemeal approach to site selection which is fundamentally at odds with principles of ecosystem management. We do not suggest that the thirteen proposed projects are not properly within the province of the Corps, or that they will not be beneficial to the Anacostia ecosystem as a whole. Rather, we suggest that the methodology for site selection paid inadequate attention to factors other than immediately quantifiable habitat units, and that other, possibly equally important projects were improperly rejected.

The DEIS fails to consider alternatives which would adequately reforest riparian areas.

American Rivers places a high priority on riparian reforestation, and although many trees have been planted thus far, There has been inadequate progress toward the goal of "[e]xpand[ing] the forest cover throughout the watershed and creat[ing] a contiguous corridor of forest...from the tidal river to the uppermost headwater streams." A Commitment to Restore Our Home River: A Six-Point Action Plan. Native riparian vegetation is essential to a healthy river-riparian ecosystem. Riparian reforestation along the Anacostia and its tributaries will help reduce thermal pollution, filter sediment and non-point source contamination, reduce streambank erosion, and increase biological diversity.

The Final EIS should address all reasonable opportunities for riparian reforestation, along with an assessment of the impact of past and present reforestation projects by the Corps and by other entities. We do not suggest that the Corps necessarily should plant all of the vegetation needed in the Anacostia basin. Indeed, it may be reasonable for the Corps to direct its resources to projects more suitable to areas of its expertise.

However, a contiguous riparian forest corridor throughout the basin is a goal that remains unmet by the feasibility study. In accordance with the ecosystem management mandate, the Corps should consider partnership methods of enlisting reforestation assistance from appropriate entities, including agencies of state, county, district, and federal governments, along with grassroots citizens' groups. The Anacostia cannot recover if its riparian component lacks adequate vegetation, and the EIS should address all reasonable alternatives for ensuring that the reforestation goal be met.

The DEIS fails to consider alternatives which would abate the destructive impacts of stormwater run-off.

Perhaps the most important element of the restoration program is stormwater retrofitting. Previous Corps projects and urbanization of the watershed have resulted in massive increases of non-point source pollution entering the river, in thermal pollution, in streambank erosion, and in hypersedimentation. More stormwater wetlands, dry ponds, and other stormwater retrofitting projects are needed to slow floodwaters. This would reduce erosion and consequent sedimentation and cool the water. The projects also would filter out the various non-point source pollutants: sediment, fertilizers, toxins of various sorts, and other contaminants. Until such stormwater abatement and filtering functions are restored, the Anacostia will not recover.

Of the Corps' "short list" of approximately 120 potential projects, 52 were stormwater abatement projects. However, only 6 were approved for proposal in the DEIS. Because stormwater retrofitting is crucial to the recovery of the river, six stormwater abatement projects simply will not restore the sustainability and biodiversity of the river system. Although such projects may not provide enough habitat units to seem attractive to the Corps, other proposed projects will have minimal effects until the stormwater problem is addressed. The Final EIS should address all reasonable opportunities to construct stormwater abatement projects.

The DEIS fails to consider alternatives that would more adequately address the problems of the Northeast branch and other Prince George's County tributaries.

According to the Metropolitan Washington Council of Governments, the water quality of Beaverdam Creek, Brier Ditch, Lower Beaverdam Creek, and the Northeast Branch is the worst of the entire Anacostia basin. We are dissatisfied with the neglect of some of Prince George's County's more impoverished, predominantly minority communities, such as those near Lower Beaverdam Creek, just as we are dissatisfied with the neglect of Watts Branch and Hickey Run in DC. Stormwater retrofitting and wetland and riparian forest filters for pollution are desperately needed to improve the condition of these portions of the Anacostia basin.

However, only one stormwater retrofit site is proposed for Prince George's County, the Fordham Street site along the Northwest Branch. Projects in the uppermost reaches of the Paint and Little Paint Branches will do nothing to improve water quality in Beaverdam Creek or Lower Beaverdam Creek. Reasonable projects were rejected for proposal which would have improved the

condition of other Prince George's County streams and the Anacostia as a whole.

American Rivers commends the Corps for its efforts to ameliorate the problems of the Northeast Branch, including the project just above the confluence of the Northeast and Northwest Branches. However, more efforts are needed. Along with large quantities of sediment and other pollutants from a number of sand and gravel mines, the streams in this area receive unacceptably high levels of chemical and nutrient contamination and other types of urban and suburban non-point source pollutants.

Detention ponds, wetlands and other types of stormwater abatement are needed in this portion of the watershed, along with riparian reforestation in the more developed areas of the county. The EIS should consider all reasonable alternatives. Point source polluters, such as the automobile "recycling" company and the underground tanks suspected of leaking toxins, must also be addressed if the Anacostia basin is to recover. We suggest that the Final EIS consider all reasonable opportunities to address the severe problems of the Northeast Branch, its tributary streams, Brier Creek, and Lower Beaverdam Creek.

The DEIS fails to consider restoring stream channels to some approximation of their natural condition.

Flood control efforts began the decline of the Anacostia River. Channelization, concrete culverts, pipes, and drainage ditches are not ecologically sound methods of flood control, and, by accelerating flows, often transfer flooding problems elsewhere. Often a more effective and more ecologically sound method of flood control is to restore streams and rivers to simulations of their natural channels. Much of the Anacostia's tributaries' riparian area in Maryland is parkland or other undeveloped land, and can serve to provide natural flood control while fostering healthy riparian vegetation.

The Corps should consider removing concrete culverts and drainage ditches and restoring tributary streams to their natural beds. Other flood-prone urban streams have been left to their natural channels with significant benefits to the river-riparian ecosystem and no adverse impact on flood control. See The Real Choices Report: America's Flood Control Policy Failures, American Rivers (1994) (attached).

The DEIS fails to consider alternatives which would increase the social value of the Anacostia.

The restoration effort thus far has not sufficiently included the human component of the ecosystem, including insufficient public involvement in the process of restoration. The President has stated that "[t]he human component [of ecosystem management] is fundamental", and that decision makers should "[c]onsider all natural and human components and their interactions." Budget of the United States Government, Fiscal Year 1995, 148. See also 40 C.F.R. § 1508.8(b). The sixth point of the AWRC's plan is to "[m]ake the public aware of its key role in the cleanup of the river and increase volunteer participation in watershed restoration activities." A Commitment to Restore Our Home River: A Six-Point Action Plan. Reasonable opportunities to better involve the public in the restoration effort should be considered.

While the public awareness efforts have been reasonably successful (DEIS, 9-4), the efforts to increase volunteer participation have been unsuccessful. Numerous small-scale restoration projects such as tree planting and trash cleanup have been performed by volunteers, including Boy Scouts and members of the Anacostia Watershed Society. More effort is needed to increase community involvement in the watershed's restoration.

The DEIS states that general reforestation and small habitat improvement projects (SHIPs) were not considered because they did not meet the Corps' project selection criteria. DEIS, 4-10. The effects of such projects will cumulatively impact the effects of Corps restoration projects, and should be addressed by the EIS.

The Corps should consider the effects of the public performing reforestation and SHIP projects, and should also consider the environmental ramifications of such projects not being performed in a timely manner. The Corps should address reasonable alternatives for increasing public participation, including allocation of funds for grassroots groups to help restore the watershed.

The Corps also should consider the beneficial effects of greater community involvement and of a more aesthetically appealing river system on pollution. Communities who take a concerned, proprietary interest in a clean and beautiful stream will become better stewards of the resource. A positive feedback loop can be created as the restoration and public concern for the river system interact with each other.

Ecologically sound restoration projects with aesthetic benefits include riparian reforestation, removal of visible pollution, and restoration of streams to simulations of their natural channels. Concrete culverts do not foster a river conservation ethic, but clean and natural streams with healthy riparian vegetation can both please the eye and decrease littering.

The EIS should also consider the many social benefits of the Anacostia's restoration. For example, local participation in river-related recreational opportunities will vastly increase when the Anacostia is restored. Aging neighborhoods will become more pleasant and increase in value as the river's aesthetic value increase.

American Rivers believes that the EIS, the economic components of which focus on cost alone, should address the economic benefits of a successful restoration program. Healthy, attractive urban rivers can provide economic benefits of many sorts. See, e.g., "The River That Runs Through Boise Runs Clear Once Again: Cleanup Buoys Environment, Stirs The Local Economy, And Lures Birds, Bathers", Wall Street Journal (4/22/94). See also Economic Impacts of Protecting Rivers, Trails, and Greenway Corridors, National Park Service (1991).

Many urban rivers attest to the economic benefits of river restoration. For example, the Willamette Waterfront section of downtown Portland, Oregon is host to numerous successful restaurants and other businesses, as well as to several sizeable festival events each year. Businesses employ local citizens and increase the city's tax revenue. Many of the neighborhoods near the Anacostia can experience job growth from a successful restoration program. Businesses relocate to be near attractive rivers, trees, and wetland areas. Tourists spend their dollars at businesses near local attractions, including rivers and parks. Local entrepreneurs can capitalize on the increasing recreation along a restored river.

Conclusion

The Corps is presented with an historic opportunity to dramatically improve the integrity of the Anacostia river basin ecosystem and to demonstrate how ecosystem management successfully can achieve its goals of maintaining the sustainability and biodiversity of ecosystems, even in a heavily urban environment. Such a success will require efficient, ecosystem-oriented collaboration among governments, governmental agencies, and the public, including an important role for local citizens and grassroots groups to whom the Corps has paid scant attention.

The Anacostia restoration effort thus far has not comprehensively addressed the needs of a successful ecosystem management approach to meeting the goals of the AWRC's Six-Point Action Plan. The Corps has failed to adopt an ecosystem management approach, preferring to draw seemingly bright but untenable and incoherent lines between the responsibilities of the various partners. To the exclusion of many reasonable alternative and additional projects, the DEIS focuses on a very few seemingly isolated projects which may well be beneficial to ecosystemic integrity, but which apparently were chosen following a methodological paradigm fundamentally incompatible with an ecosystem-based approach.

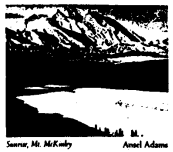
The proposals of the Corps and other sponsors fail to provide sufficient public involvement, wetlands and stream restoration, riparian reforestation, stormwater abatement, and pollution abatement measures. Indeed, the few projects chosen are likely to provide substantial benefits unless the root problems of the Anacostia are addressed: the failure to plan prudently for floodwaters, and the failure to adequately protect the environment of the watershed. Restoration efforts will fall short until the Anacostia basin is adequately protected from further ecological damage. We urge the several sponsors of the restoration program to act aggressively to protect and restore the Anacostia basin before more damage accrues and the costs of restoration become prohibitively high.

American Rivers appreciates the opportunity to comment on the DEIS and will continue to support your efforts to restore the Anacostia River ecosystem.

Sincerely,

Scott Faber
Director of Floodplain Programs

Todd Hutchins
Legal Intern



Sunrise, Mt. McKinley — Ansel Adams

SIERRA CLUB LEGAL
DEFENSE FUND, INC.

The Law Firm for the Environmental Movement

1531 P Street, N.W. Suite 200, Washington, D.C. 20005 (202) 667-4500 FAX (202) 667-2356

WASHINGTON, D.C. OFFICE
Robert G. Dreher
Howard I. Fox
Kevin P. Kirchner
Suellen Lowry
Fern L. Shepard
Staff Attorneys
Edward B. Zukoski
Associate Attorney
Ronald J. Wilson
Of Counsel
Elizabeth B. Ulmer
Director of Planned Giving
Christine I. Kerridge
Office Manager

SAN FRANCISCO OFFICE
San Francisco, California

REGIONAL OFFICES
Bozeman, Montana
Denver, Colorado
Honolulu, Hawaii
Juneau, Alaska
New Orleans, Louisiana
Seattle, Washington
Tallahassee, Florida

June 23, 1993

BY FACSIMILE AND FIRST CLASS MAIL

Col. J. Richard Capka
District Engineer
ATTN: CENAB-PL-P
U.S. Army Corps of Engineers, Baltimore District
10 S. Howard Street
P.O. Box 1715
Baltimore, MD 21203-1715

RE: Comments on Draft EIS on Anacostia River and Tributaries

Dear Col. Capka:

Thank you for this opportunity to comment on the draft environmental impact statement (EIS) on the Anacostia River and tributaries feasibility report. While the proposals to improve the Anacostia River through wetland and stream restoration and stormwater management are positive developments, we are concerned that the draft EIS ignores clear dictates of the National Environmental Policy Act (NEPA) and implementing regulations, as well as important initiatives of the President and Vice-President, and thus requires significant revision prior to the issuance of a final EIS.

The Draft EIS Fails to Adequately Assess Cumulative Impacts of Numerous Projects.

Council on Environmental Quality (CEQ) regulations implementing NEPA require that EISs analyze the impacts of proposed projects that are direct, indirect, and cumulative. 40 C.F.R. § 1508.25(c). Cumulative actions are those "which when viewed with other proposed actions have cumulatively significant impacts." 40 C.F.R. § 1508.25(a)(2). Cumulative impacts analysis thus enables federal decisionmakers, other agencies, and the public to understand an

a member of Earth Share.

action's effects in a larger context together with the effects of other reasonably foreseeable actions.

The draft EIS contains virtually no substantive analysis of several reasonably foreseeable major federal actions which directly impact wetland restoration projects proposed in the draft EIS and/or foreclose other wetland restoration opportunities, including: (1) the President's proposed ecosystem management initiative for the Anacostia watershed; (2) the construction of the Children's Island theme park on Kingman Island; and (3) the construction of the Barney Circle Freeway, among others. These actions directly impact the resources the Corps' proposal seeks to restore.

1. The Draft EIS Ignores the President's Ecosystem Management Initiative for the Anacostia Watershed.

The Corp's proposed actions and the draft EIS on the project are presented at a critical juncture in the history of the Anacostia River, and in the relationship of the federal government to the river's protection and restoration. Earlier this year, the President announced that five federal agencies would spend $2.3 million for an Anacostia River basin restoration effort as part of an innovative "ecosystem management" approach to maintain the sustainability and biodiversity of ecosystems. By selecting the Anacostia River as one of only four areas nation-wide for the ecosystem-based management approach, the administration has demonstrated its commitment to urban environmental restoration, and to fostering inter-agency cooperation to forge a coherent federal vision for river restoration. The Administration seeks to replace "the piecemeal approach of the past, wherein land, water, air, endangered species, and mineral and other resources were primarily dealt with one by one." FY 1995 Budget, p, 137, attached as Exhibit A.

The President's budget set four principles guiding ecosystem management including:

- Manage along ecological rather than political or administrative boundaries.
- Ensure coordination among Federal agencies, and increased collaboration with State, local, and tribal governments, the public, and Congress.
- Use monitoring, assessment, and the best science available.
- Consider all natural and human components and their interaction.

Id. at 143.

In addition, an inter-agency task force on ecosystem management, chaired by Kathleen McGinty, director of the White House Office on Environmental Policy, has been formed, based on the work of Vice President Gore's National Performance Review. We understand that the task force has established working groups that, among other things, will conduct surveys in target ecosystems -- including the Anacostia watershed -- to gain federal, state, local and public input to establish a vision for each ecosystem, and to establish regional ecosystem management teams.

Both of these effort directly related to carrying out the President's commitment are nowhere discussed in the draft EIS. Further, the it does not appear from the draft EIS that the Corps has sought input from the interagency task force on the Anacostia River on the relationship of the Corps' proposal to the work of the inter-agency task force and the Anacostia working group, which, ironically, is chaired by the Army Corps itself. The final EIS must remedy the draft's failure to consider the impact of this proposal on the administration initiatives.

In addition, the draft EIS does not appear to reflect the guiding principles of ecosystem management defined in the President's budget. The draft EIS appears parochially bound by numerous political and administrative boundaries, rather than by ecological ones. The Federal objective of the study itself links habitat and wildlife restoration to "[e]nvironmental degradation of the watershed ... related to previous activities of the Corps of Engineers ...." DEIS, 3-7. The EIS thus ignores potential restoration projects within the watershed that may be highly beneficial to wildlife, but are not related to Corps activities.

In addition, the draft EIS fails to assess alternatives involving the use of private lands within the watershed, because "only one of the non-Federal sponsors will consider condemnation of private property." The draft EIS thus analyzes only alternatives that involve the alteration, and in some cases, elimination of public lands, the bulk of which is public park land. This approach contradicts the principle that the agency should consider "all natural and human components" within the ecosystem, as well as continues the pattern of viewing public park lands along the Anacostia River as "unused" and open for exploitation in favor of other activities. See discussion of Children's Island, Barney Circle Freeway, below.[1]

[1] By assuming that private land along the River could only be used through condemnation, the draft EIS also fails to (continued...)

The failure to consider alternatives beyond the agency's jurisdiction not only contradicts the "ecosystem management" approach proposed by President Clinton for the Anacostia watershed, but the dictates of NEPA as well. Federal courts have required agencies to consider reasonable alternatives beyond their jurisdiction. See, e.g., Natural Resources Defense Council v. U.S. EPA, 822 F.2d 104, 128 (D.C. Cir. 1987) (agency "[took] note of its obligation to consider all reasonable alternatives to the proposed federal action, regardless of whether the agency has the power to implement those alternatives."). The D.C. Circuit Court of Appeals agrees that the spirit of NEPA requires an analysis of alternatives and impacts which goes beyond the bounds of the lead agency's jurisdiction.

> NEPA requires an integrated view of the environmental damage that may be caused by a situation, broadly considered, and its purpose is not to be frustrated by an approach that would defeat a comprehensive and integrated consideration by reason of the fact that particular officers and agencies have particular occasions for and limits on their exercise of jurisdiction.

Henry v. FPC, 513 F.2d 395, 406 (D.C. Cir. 1975). See also CEQ, "Questions and Answers About the NEPA Regulations," 46 Fed. Reg. 18026 (Mar. 23, 1981), as amended, 51 Fed. Reg, 15618 (Apr. 25, 1986), Answer 2b ("Alternatives that are outside the scope of what Congress has approved must still be evaluated in the EIS if they are reasonable, because the EIS may serve as the basis for modifying the Congressional approval or funding in light of NEPA's goals and policies").

Failure to evaluate reasonable alternatives merely because they cannot be directly implemented by the lead agency or the applicant squarely contradicts the goals of the Act. "[T]he evaluation of 'alternatives' mandated by NEPA is to be an evaluation of the alternative means to accomplish the general goal of an action; it is not an evaluation of the alternative means by which a particular applicant can reach his goals." Van Abbema v. Fornell, 807 F.2d 633, 638 (7th. Cir. 1986) (Army Corps of Engineers must explore fully alternatives beyond its jurisdiction in evaluating Clean Water Act § 404 permit).

[1](...continued)
identify reasonable alternatives involving cooperative efforts between private land-owners and state and federal entities that are well within the agency's jurisdiction, in violation of NEPA and CEQ regulations. 42 U.S.C. § 4332(C); 40 C.F.R. § 1502.14.

To manage along ecosystem lines and to comply with NEPA, the final EIS therefore must consider important administration initiatives, as well as restoration projects within the watershed that are not related to Corps activities, and must assess alternatives involving the use of private lands within the watershed.

2. The draft EIS contains insufficient analysis of the Children's Island theme park.

The draft EIS also fails to forge a coherent federal vision for river restoration, as proposed by the President's ecosystem management initiative and the Vice President's inter-agency task force. A key method of coordinating among agencies provided by NEPA, the requirement that agencies incorporate an assessment of the cumulative environmental effects of other public as well as private proposals, is virtually ignored in the draft EIS.

The draft EIS contains three sentences concerning the proposal to construct a theme park on Kingman Island, a project that will directly impact the proposed Kingman Lake and river fringe wetland restoration project. DEIS, 5-80 - 5-81. The draft EIS states only that "the status of this proposal is unknown," and that the project "could increase the impervious surface draining to Kingman Lake." Id.

This discussion plainly fails to meet NEPA's requirements for an analysis of the projects' cumulative effects. The draft EIS's statement to the contrary, the status of the Children's Island theme park proposal is not "unknown"; the National Park Service and District of Columbia have copious files on the Children's Island development.

The theme park development is "reasonably foreseeable" for the purposes of CEQ regulations implementing NEPA, 40 C.F.R. § 1508.7, and therefore must be analyzed as part of the draft EIS's cumulative impacts analysis. See Fritiofson v. Alexander, 772 F.2d 1225, 1245 (5th Cir. 1985). The Park Service transferred jurisdiction of Kingman Island below the Benning Road bridge to the D.C. government in 1993. The D.C. Council approved the lease between the District and two companies pertaining to the development and operation of the Children's Island theme park. On May 13, 1993, the 30 year lease (with an option to renew for an additional 30 years) between the District and two corporations for the exclusive possession of Kingman and Heritage Islands was signed. Lease Between the District of Columbia, National Children's Island Inc., and Island Development Corporation (May 13, 1993), attached as Exhibit B.

Although the exact details of the theme park are not yet final, enough is known to classify its impacts as significant. The transfer document sets forth specific conditions on the development of the transferred lands, permitting structures as high as 50 feet, and building footprints of up to 5 acres. Id. at 12. Paved surfaces may occupy nearly one-fourth of the theme park. Id.

The lease between the District and theme park's developers indicates that development will include: 1) exhibitions and pavilions, 2) restaurants, food courts, and other food vending facilities, 3) concession stands and souvenir shops, 4) exhibits and rides, 5) indoor and outdoor facilities for live and recorded musical, theatrical, and other performances, 6) ticket, administrative, and other offices and related support facilities, 7) landscaped environment with pools, fountains, and play areas, 8) parking and utility facilities, and 8) new or expanded bridges. Id. at 5.

In addition to the lease, maps and narrative descriptions of the design concept for the Children's Island theme park show that the development will include: nine enclosed pavilions (described as Doug Henning's Pavilion of Wonder, The Infinite Crystal and Enchanted Crystal Forest Pavilion, The Hall of Sports, The American Music Center, Dynamic Motion Theater, Communications and Computers Pavilion, Miracles of Medicine Pavilion, The Elements Pavilion, and The Underwater World), one or two restaurants, several cafes "[a]long the water's edge," additional retail and souvenir shops, and two weather-controlled bridges featuring shops and restaurants. Id.; see also Island Development Corporation, Spirit of America Executive Summary, attached as Exhibit C; Island Development Corporation, Kingman Island -- Spirit of America Design Concept, attached as Exhibit D; Washington Post map, attached as Exhibit E; Stadium FEIS at 248, excerpts attached as Exhibit F. Three of these structures are to built on Heritage Island. D.C. officials predict that more than 3.3 million patrons -- an average of nearly 10,000 people per day -- will visit the island once construction is complete. Press Release, District of Columbia Government, Executive Office of the Mayor at 1, December 14, 1992, attached as Exhibit G.

The environmental impacts of this project include the direct elimination of more than 10 acres of wooded parkland, which serves as upland habitat for wildlife, waterfowl and fish habitat on the river. Moreover, the construction of buildings likely will increase storm water run-off into the Anacostia River, altering its hydrology and further exacerbating water pollution. See Stadium FEIS at 4-166. The noise and light pollution from the structures, activities, and visitors will

displace wildlife from the vegetation and flora that remain on the island. Hazardous waste has been discovered on the island, and may require removal prior to construction. Id. at 4-180. The construction of buildings and paving of surfaces also will adversely affect recreational opportunities such as wildlife and bird observation on the island, canoe and boat docking opportunities, and the study of scenery. The 3.3 million visitors will create added traffic and air pollution adjacent to Kingman Lake and likely will increase trash and debris in and along the lake. The "playground" planned for the island below the Whitney Young Memorial Bridge will likely involve the elimination of wooded parkland, to be replaced with manicured lawns.[2]

The theme park's impacts will all occur nearly on top of or directly adjacent to much of the wetland restoration planned for Kingman Lake in the draft EIS. The draft EIS contemplates restoring wetlands around Heritage Island, now under the administrative control of a private corporation which plans to build three structures virtually at the waters edge, and within a few yards of the proposed plantings on the island's shoreline. DEIS, Annex G, Plates DC-5, DC-6. Stormwater runoff and trash flowing into Kingman Lake, as well as noise and light pollution from the theme park will negatively effect wetland restoration efforts in Kingman Lake above Benning Road as well. The Children's Island theme park will severely interfere with the "main goal of the Kingman Lake restoration plan [which] is habitat restoration," DEIS, 5-6, by disturbing or displacing wildlife. The Corps' proposal to "establish[] a wider forest buffer, [and] creat[e] additional escape and nesting cover," DEIS, 5-1, will likely be undermined or rendered useless by the destruction of upland and shore edge habitat on Kingman and Heritage Islands. Beneficial effects on water quality, DEIS, 5-6, would also be compromised.

[2] The National Park Service failed to complete any documentation required by NEPA prior to approving the transfer of jurisdiction. The Sierra Club Legal Defense Fund has challenged that failure in federal district court. Anacostia Watershed Society v. Babbitt, Civ.No. 93-1286 (D.D.C. 1993)(HHG). The administrative record provided by defendants in that case consists of six phone-book sized binders that contain much information that may be useful in the preparation of cumulative impacts analysis. Since the National Park Service and the District of Columbia appear to have been unwilling or unable to provide the Corps with documentation on the project, the Sierra Club Legal Defense Fund would be happy to provide the Corps with an opportunity to review the Fund's files.

The theme park would also have similarly severe impacts on the 18-acre fringe wetlands project proposed for the east bank of the Anacostia River south of the Benning Road Bridge. DEIS, 5-8. The theme park plans six structures at or near the eastern shore of Kingman Island between the Benning Road Bridge and the Whitney Young Memorial Bridge. The noise and light pollution, trash and stormwater runoff from the Island's eastern shore will negatively impact the goal of wildlife restoration, id., of the fringe wetlands less than 75 yards across the river. The introduction of looming structures, in addition to the pollution noted above, would degrade the "visual character and recreational value" of the river, which the fringe wetlands proposals seek to "greatly enhance." DEIS, 5-15.

Because the Children's Island theme park would gravely undermine the goals of the Corps' wetland restoration and fringe wetlands proposals in D.C., a full accounting of the effects of the two projects, when viewed together, must be presented in the final EIS as part of the cumulative impacts assessment.

3. The draft EIS contains insufficient analysis of the Barney Circle Freeway project.

The draft EIS contains five sentences concerning the proposal to construct a freeway bridge and parkway connector at Barney Circle, a project that may impact the river fringe wetland restoration project, and will foreclose potential wetland restoration projects. DEIS, 5-81. The draft EIS makes no attempt to analyze the impacts of the project beyond a very brief references to stormwater impacts.

As with the Children's Island theme park, the Barney Circle Freeway is "reasonably foreseeable" within the meaning of CEQ regulations implementing NEPA, 40 C.F.R. 1508.7, and therefore must be analyzed as part of the draft EIS's cumulative impacts analysis. Construction of the freeway is imminent. The design details of the project are complete. Construction contracts have been put out for bid. The project awaits only the final approval of the Federal Highway Administration and the National Park Service.

In addition, a large amount of data exists concerning the environmental impacts of the project. The Federal Highway Administration completed a final environmental impact statement in 1983, and completed internal re-evaluations of the EIS in 1989 and 1993. While the adequacy of the environmental review process has been challenged in federal court (in part because that

document fails to consider adequately cumulative impacts)[3], the broad outlines of the project's impacts are known.

The proposed freeway would connect I-295 and I-395 in eastern Washington via a bridge over the Anacostia River and highways on both sides of the river through Anacostia Park. It would add nearly 100,000 cars and trucks to the already-dangerous Southeast-Southwest Freeway, increase traffic over the Anacostia River in D.C. by more than 25,000 vehicles, pave almost 20 acres of scarce woodland upland habitat and open space in Anacostia Park, worsen air and noise pollution in and around the River, and increase stormwater runoff and toxic pollutants to the Anacostia River. See Federal Highway Administration, Barney Circle Freeway Re-evaluation Report, passim (Sep. 1993), attached as Exhibit H. In addition, it will require the removal of up to 118 million pounds of hazardous lead-contaminated soil adjacent to the river. Memo of C. McQuayle, The Environmental Company, to F. Wilker, Fleming DeLeuw (Nov. 24, 1993), attached as Exhibit I. Construction of the bridge will require severe disruptions of the river itself, including the construction of coffer dams. Contaminated river sediments will be released during construction. Barney Circle Freeway Re-evaluation Report, p. 45; The Environmental Company, "Barney Circle Freeway Remedial Investigation Report," 1-4 (Dec. 14, 1992), excerpts attached as Exhibit J.

In addition, the "mitigation" plan for the freeway will include the re-construction of more than a mile of seawall between the Conrail bridge and the 11th Street Bridge, and the replacement of wooded parkland with impervious surfaces for the construction of a bike path. See draft Memorandum of Agreement, p. 3 (Feb. 1992), attached as Exhibit K.

The proposed freeway will have numerous negative affects directly adjacent to the planned Anacostia River fringe proposed in the draft EIS for the east bank of the Anacostia River between the Conrail bridge and the Whitney Young Memorial Bridge. Upland habitat, now disrupted by a rail line, will be further disrupted by construction equipment and ultimately by a completed four-lane interstate highway closer to the river, 14 feet off ground, and over which 57,689 vehicles per day will travel. About ten acres of woodland habitat will be destroyed directly by the project. Bike paths will destroy more habitat directly adjacent to the proposed river fringe project. Noise pollution, light pollution, and trash will accompany freeway users, degrading the

[3] Anacostia Watershed Society v. Peña, Civ. No. 94-1101 (D.D.C. 1994)(HHG).

habitat values of the river fringe. The Barney Circle Freeway will thus compound the negative impacts of the Children's Island theme park and -- by harming the river's visual character, recreational values, and wildlife habitat -- will further interfere with the goals of the river fringe project. DEIS, 5-15.

In addition, the seawall will foreclose any opportunity to place river fringe wetlands along Anacostia River's east bank south of the Conrail bridge. Where the seawall has deteriorated, some wetland vegetation has sprung up. The seawall restoration will likely eliminate these plants. The chance to create a nearly continuous band of river fringe from Kenilworth Gardens to the 11th Street bridge will be lost.

Because the Barney Circle Freeway project is thus likely to undermine the goals of the Corps' proposed D.C. river fringe wetland projects, the final EIS must fully analyze the effects of these two projects as part of the cumulative impacts assessment.

4. The draft EIS contains insufficient analysis of the Intercounty Connector.

The draft EIS fails to mention or discusses inadequately the cumulative impacts of other public and private projects that may harm water quality, increase stormwater runoff and eliminate habitat in the Anacostia watershed.

For example, only brief reference is made to the "Inter-County Connector," a major new highway proposed to link I-370 in Montgomery County to U.S. 1 in Prince George's County. The Maryland Department of Transportation and Federal Highway Administration are now preparing a draft EIS on the proposal. The Anacostia draft EIS acknowledges, albeit without further exposition, that "[t]he positive effects of the Corps project could be negated" by the connector. DEIS, 5-80. The final EIS must examine in greater depth the effects of this road project, in particular exploring its potential for completely undermining all of the Corps' hard efforts and financial commitment to Anacostia restoration. See also comments of N. Fitzpatrick, Audubon Naturalist Society (submitted separately).

5. The draft EIS contains almost no analysis of the other public and private river restoration projects.

The draft EIS also devotes little more than a few sentences to the numerous other projects ongoing to restore habitat and wildlife in the watershed. DEIS, 5-80. For example, the Washington Counsel of Governments has established a formal

program to undertake subwatershed habitat improvements. Both Prince George's and Montgomery Counties have completed numerous habitat enhancement projects including: reforestation, stormwater retrofits, streambed restoration and wetland restoration, all aimed at enhancing habitat. These projects derive from the "Blueprint for the Restoration of the Anacostia Watershed," from which the alternatives proposed in the draft EIS also originated. The Anacostia Watershed Society maintains a year-round tree-planting program to protect the watershed. While the draft EIS does discuss the Corps' process for choosing alternatives, it does not answer the questions: How do the Corp's proposed projects fit in with other public and private restoration projects? To what extent are they complementary, and to what extent might they be counterproductive? When all of these projects are complete, what will be the state of habitat in the watershed?

6. <u>The draft EIS fails to address environmental justice concerns</u>.

This February, President Clinton signed Executive Order 12898 and a memorandum to the heads of all departments and agencies establishing new federal policy to address environmental justice in minority populations and low-income populations. See E.O. 12898, attached as Exhibit L; W. Clinton, Memorandum for the Heads of All Departments and Agencies (Feb. 11, 1994), attached as Exhibit M. The memorandum states that agencies shall, as part of NEPA compliance, analyze "the affects on minority communities and low-income communities," and directs that the consideration of mitigation measures "should address significant and adverse environmental affects of proposed federal actions on minority communities and low-income communities." Memorandum at 1.

Past treatment of the Anacostia River by federal and other agencies constitutes an example of environmental injustice. Numerous hazardous waste, incinerators, sources of air and water pollution, and combined sewer overflows foul the River and the neighborhoods along it. The largely African-American communities adjacent to the Anacostia River face an unfair share of the District's pollution. While the Potomac River, lined with generally more affluent, white neighborhoods, has been the subject of an intensive state and federal clean-up campaign over the last twenty years, the Anacostia River has been largely ignored.

We applaud the Corps for its efforts to focus greater attention, effort, and funds on what has been correctly called a "forgotten river." However, the draft EIS fails to adequately explore the social context in which the restoration projects will

be placed. The final EIS must analyze alternatives through the lens of environmental justice. For example, the EIS must analyze whether each alternative will, to a greater or lesser extent, benefit the largely African-American communities and the lower-income communities within the watershed, and must examine whether other alternatives might have a greater beneficial impact on these communities. In addition, the EIS must explore fully all significant and adverse effects of the Corps' proposed actions on these communities.

<u>CONCLUSION</u>.

While the draft EIS on the Anacostia River and tributaries feasibility report contains important information about individual projects proposed by the Corps of Engineers, it fails to contain analysis that considers, let alone meets, the goals of the President's and Vice President's ecosystem management initiative or the requirements of NEPA and its implementing regulations. We urge the Corps of Engineers to correct these legal flaws prior to release of the final EIS.

Again, thank you for the opportunity to present our views.

Sincerely,

Edward M. Sokoski
Attorney for
Anacostia Watershed Society

cc: Mr. Mark McKevitt, Corps of Engineers, Baltimore District
Ms. Danielle Algazi, EPA Region III
Dr. Morgan Reiss, Deputy Assistant Sect'y for Planning, Policy & Legislation, U.S. Army
The Hon. Carol Browner, Administrator, U.S. EPA
Ms. Chantale Wong, Special Ass't to Administrator Browner, U.S. EPA
The Hon. Peter Kostmayer, Regional Administrator, EPA Region III
Ms. Kathleen McGinty, Director, White House Office on Environmental Policy
Mr. William Stelle, White House Office on Environmental Policy
The Hon. Eleanor Holmes Norton, U.S. Congress
The Hon. Federico Pena, Secretary, Dep't of Transportation
Ms. Glynn Key, Special Asst. to Sect'y Babbitt, Dep't of Interior

THE PRINCE GEORGE'S COUNTY GOVERNMENT
DEPARTMENT OF ENVIRONMENTAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT
WATERSHED PROTECTION BRANCH

June 22, 1994

Mr. Mark McKevitt
Feasibility Study Manager
U.S. Army Corp. of Engineers
Post Office Box 1715
Baltimore, Maryland 21203-1715

Re: Anacostia River Feasibility Study

Dear Mr. McKevitt:

Here are some comments and questions on the Project Management Plan draft document dated December 22,1993:

- Please confirm if the baseball field relocation at Fordham is the only "relocation" required? How about any utilities, e.g., gas, electric, WSSC, etc. at Fordham or the NW Stream Restoration? When would you like to determine the costs associated with the relocations?

- Is the relocation activity shown (between August 5 to December 5, 1996) in your bar chart schedule dated November 10, 1993 for the ballfield relocation only or all relocations? Fall weather during this period may cause delays because September, October in this area usually has several days of precipitation.

- Are there any rights-of-way or land acquisitions required that the County should initiate? I am assuming all the project sites are within MNCPPC owned land.

Please give me a call at (301) 883-5901 so we can resolve the above.

Sincerely,

S. Ali Abbasi
Section Head
Project Administration Section

cc: Ann Hurn, Park Planner, MNCPPC

INGLEWOOD III OFFICE BUILDING, 9400 PEPPERCORN PLACE, SIXTH FLOOR, LANDOVER, MARYLAND 20785

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June 22, 1994

Mr. Mark McKevitt
Project Manager
Anacostia River Feasibility Study
Baltimore District
U.S. Army Corps of Engineers
P.O. Box 1715, Attn: PL-PR
Baltimore, Maryland 21203

Re: Anacostia River Feasibility Study Comments

Thank you for the opportunity to provide input to this important effort in the Anacostia. Overall, it is a fine document which will facilitate major improvements toward our shared goal of watershed restoration. For the record, we have the following comments:

1. A clear need exists for technical field assistance in the construction of the proposed projects. Throughout crucial junctures of the construction phase it is imperative that technical staff, possessing both knowledge of the specific project and "hands-on" in-field construction experience, be on-site to ensure that contractors understand and fulfill both the intent and spirit of the projects. Many of the concepts and techniques specified within the projects are essentially prototypical in nature. As a result, little experience in their application exists within the construction community. It has been the experience of COG staff that typically a contractor must initially be "coached" and physically shown what is indicated in the construction drawings. Too much in the form of public expectations, environmental need and human and financial resources are potentially at risk to leave to even the most conscientious contractor's field judgement, interpretation and thoroughness of execution. For these reasons, we strongly recommend that a technical construction assistance team (to include COG technical staff) be formed for the purpose of providing on-site guidance to Corps contractors at critical points of a given project.

2. A similar need exists for inspection of the proposed projects. An inspection component is critical to ensure a given project will achieve its intended function with a minimum of negative adjacent impact. The previously-discussed construction assistance team should play a central part in the inspection effort. It is recommended that they convene prior to the outset of construction in a pre-construction meeting. Typical issues to be addressed would include identification of critical junctures in the construction process and the development of an inspection schedule with the Corps' project manager and their contractors.

3. A need also exists for monitoring of the proposed projects. A baseline evaluation of the project's area of influence, if currently unavailable, is recommended prior to the onset of construction. It is critical to evaluate the performance of the project starting at the completion of construction to include, at a minimum, its first three years of operation. A five year monitoring program is preferred. This element will allow for an early and ongoing evaluation of the performance of a given project. If indicated, opportunities for modifying or "tweaking" the project may present themselves which otherwise would have gone undetected. A small group of technical staff involved with the projects (to include COG staff) should work with the Corps' project manager for the purpose of developing a monitoring and reporting program for each of the proposed projects.

4. Where possible, it is recommended that project earthmoving activities be phased to coincide with required utility relocation activities to minimize the duration of site disruption and realize any potential cost-savings.

5. Where possible, it is recommended that natural materials (i.e. rock, trees, topsoil and subsoil) removed for implementation purposes on one site be temporarily stockpiled and recycled on other project sites. Rock could be used for armoring unstable channel reaches, structure inlet and outlet locations, the creation of structural aquatic habitat and in the modification of hydraulic regimes. Parts of trees could be used for root wads, drop structures and wing deflectors in aquatic habitat restoration projects and as basking logs for amphibians and waterfowl in conjunction with the creation of vernal pools or stormwater ponds.

6. The Kingman Lake restoration and fringe marsh creation component of the feasibility study should be guided by the results of the Kenilworth Marsh restoration effort. Specifically, to achieve a desirable structural and functional wetland plant species diversity, it is critical that the majority (85-90%) of these areas be planted with locally-grown native wetland species. It is indisputable that a large seed bank exists within the dredged sediments of the Anacostia mainstem. Our experience at Kenilworth has shown that the dominant species contained in the seed bank are sufficiently

777 North Capitol Street, N.E. Suite 300 Washington, D.C. 20002-4226 (202) 962-3200 FAX (202) 962-3201

aggressive to overrun a preferred diversity of wetland plants. The resultant domination of one or two species (i.e.cattail, rice cutgrass) substantially reduces the structural and functional values of a more diverse system. We strongly recommend that the vast majority of wetland plants (85-90%) planned for Kingman Lake and the associated river fringe areas be propagated via planting at carefully monitored elevations. Furthermore, any experimentation with natural colonization via the seed bank must be carried-out with the utmost in care and advance scientific thought. To proceed otherwise potentially jeopardizes the success of the District of Columbia component of the study.

7. We would strongly recommend that a second feasibility study be pursued for the Anacostia. The process has proven to be an extremely cost-effective means of achieving a Federal-local partnership in the restoration of the Anacostia Watershed.

We look forward to maintaining a close working relationship with the Corps and a central technical role throughout the implementation phase of the ongoing feasibility study. As mentioned above, it is our hope that a "second round" feasibility study can be executed. Thank you for your continued leadership and support of the Anacostia Watershed restoration effort.

Sincerely yours,

James Shell
Acting Chief
Urban Watershed Planning and Special Studies

cc: Stuart A. Freudberg, MWCOG

MARYLAND HISTORICAL TRUST

William Donald Schaefer
Governor

Jacqueline H. Rogers
Secretary, DHCD

June 21, 1994

Office of Preservation Services
Dr. James F. Johnson
Chief, Planning Division
Baltimore District
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715

RE: Anacostia River and Tributaries
District of Columbia and
Maryland Feasibility Study

Dear Dr. Johnson:

Thank you for sending us a copy of the Draft Integrated Feasibility Report and Environmental Impact Statement for our review. It incorporates, as an appendix, the Planning Division's A Phase I/II Cultural Resource Survey for the Anacostia River Basin Environmental Restoration Project, Montgomery and Prince George's Counties, Maryland and Washington, District of Columbia. Our comments will focus on the Maryland portion of the project.

For archeology, the report concisely describes the survey's goals, methods, and results. We greatly appreciate the inclusion of historic contexts and the use of terminology established by the Advisory Council on Historic Preservation. With only a few additions, the document will meet the Guidelines for Archeological Investigations in Maryland (McNamara 1981). In our opinion, the level of background research and field investigation was sufficient to identify the full range of archeological properties in the areas of potential effects.

The survey located a complex of historical mill features, a prehistoric site, and several isolated prehistoric artifacts. The isolated artifacts consist of debitage from the manufacture of stone tools; no temporally diagnostic items were recovered. Due to the limited research potential of these small quantities of materials and to their sometimes questionable integrity (Paint Branch), we concur that these archeological properties are ineligible for the National Register of Historic Places and warrant no further study.

Division of Historical and Cultural Programs
100 Community Place • Crownsville, Maryland 21032 • (410) 514-7627/7628

EQUAL HOUSING OPPORTUNITY

The Maryland Department of Housing and Community Development (DHCD) pledges to foster the letter and spirit of the law for achieving equal housing opportunity in Maryland.

Shovel testing at Stewart/April Lane similarly located a prehistoric site with rather nondiagnostic quartzite debitage. This complex of lithic reduction areas contained prehistoric artifacts in soils apparently evidencing erosion. The lack of integrity and of research potential indicates that the site at Stewart/April Lane is not National Register eligible; it warrants no further investigation.

Along Paint Branch (Project L) between Randolph and Fairland roads, a pedestrian reconnaissance identified six historical millraces and associated features. The mills represented by these properties apparently operated from the 1720s to about 1900. Your letter of 6 January 1994 refers to the milling sites as the Paint Branch Mills District and indicates that the district is eligible for the National Register under Criterion D for its potential to provide important historical information. Since the current survey entailed no subsurface testing of the archeological district but instead relied on preliminary mapping of surficial features, secondary documentary research, and some cartographic studies, we believe that the report does not provide sufficient justification for evaluating National Register eligibility. A revised report will need to contain more thorough descriptions of the various mill features (including Maryland archeological site forms) and a summary of the kinds of important historical information which the archeological district might provide (under Criterion D.) In addition to these materials, we recommend that a revised report contain a draft of the National Register nomination form being prepared by the M-NCPPC. This supplementary information should permit us to provide a justifiable evaluation of the mill district's significance.

The proposed eleven environmental restoration projects in Maryland are classified into three activities: wetland restoration, stormwater management and stream restoration. Because the undertakings will primarily affect land within five feet of the stream, the areas of potential effect do not contain any historic standing structures. As the report notes, there may be recorded resources within a mile of the project area; this office concurs that these resources are not located within the areas of potential effect, due to the nature of the proposed work. No further architectural investigations are warranted for the eleven environmental restoration projects.

We have a few other minor comments on the report which should be addressed in a revised document:

1) The Project methodology section should contain a more detailed description of the "limited excavation of shovel tests" (e.g., sampling strategy, sieve size); it should also note the repository which will permanently curate the artifacts and field records resulting from the study.

2) Careful editing is needed to correct many typographical and grammatical errors (e.g., on pages 1, 2, 5, 11, 12, 15, 20, 21, 22, 23, 26, Figure 8; spelling of Sorens[e]n). All references to this agency should be as the Maryland Historical Trust. The correct citation for the Maryland Plan is the Maryland Comprehensive Historic Preservation Plan.

3) Citations for "Cox 1972" (p.3) and "Payne and Baumgardt 1990" (p.6) require corresponding entries in References Cited.

4) Figures 7, 9, and 10 are missing and should be supplied.

5) Figures 15 and 18 need to clearly indicate the locations of the areas of potential effect.

6) Copies of official Maryland inventory forms with numbers for the individual mill sites and the Stewart/April Lane prehistoric site must be included as a new appendix; and the report's text should refer to the site numbers.

7) A completed National Archeological Database Reports Recording Form should accompany the final report.

8) Pages 18 to 20 should identify Site 18MO253 as Valley Mill and briefly summarize the work there by Rockville and Magruder High Schools and by Paul Cissna in the 1980s.

9) The last sentence on page 18 should refer to Appendix E.

10) Pages 20 and 23 should be consistent in not referring to the redeposited quartz and quartzite at Paint Branch as an archeological site.

11) The title page should note the individual author of the report. Also, a new appendix must identify the archeologist and historian who served as principal investigators for the project and contain resume which document that they meet the Secretary of the interior's minimum professional qualifications (36 CFR Part 61).

12) Page 23 should note the specific National Register criterion used for eligibility and should refer to the appropriate historic context(s) (pp.5-7).

13) As noted above, the M-NCPPC's draft National Register nomination form for the Paint Branch Mills District should appear as a new appendix.

We appreciate your cooperation and assistance, and we believe that the revised report will enable us to readily conclude our review of this survey and comment on the Corps' determinations of effect for the restoration projects. If you have questions or require further information, please contact Dr. Gary Shaffer (for archeology at 514-7638) or Ms. Lauren Bowlin (for structures at 514-7637).

Sincerely,

Elizabeth J. Cole

Elizabeth J. Cole
Administrator
Archeological Services

EJC/GDS/LLB
9400043/9401089
cc: Mr. Kenneth Baumgardt (COE)
Mr. Robert Miller (DNR)
Ms. Valerie DeCarlo (ACHP)
Dr. James Sorensen (M-NCPPC)
Mr. Stephen J. Raiche (DC-SHPO)
Hon. Gilbert Gude
Dr. Thomas King
Mr. Mike Seebold
Ms. Gwen Marcus
Mr. W. Dickerson Charlton
Mrs. Susan Yatman
Ms. Gail Rothrock

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
410 Severn Avenue, Suite 107A
Annapolis, MD 21403-2524

NOAA CHESAPEAKE BAY OFFICE
Office: (410) 267-5660 Fax: (410) 267-5666

JUN 16 1994

District Engineer
ATTN: CENAB-PL-P
U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715

Dear Sir:

I note that the Anacostia River Feasibility Report states that:

"Despite recent efforts to restore water quality, fishery resources of the Anacostia offer meager commercial value." (p. 2-5), and

"Except for the occasional transient individuals, no Federally listed or proposed endangered or threatened species under the jurisdiction of the United States Fish and Wildlife Service (FWS) are known to exist in the [Anacostia River] basin." (p. 2-7)

While true, I would like the record to show that a small commercial fishery for Atlantic sturgeon (Acipenser oxyrhynchus) existed as recently as the 1970's in the Potomac and that this sturgeon is potentially a highly valuable fishery resource if a viable population could be restored to the Anacostia/Potomac system. Also, while there is only one citation (and that from late in the last century) of the presence of short-nosed sturgeon (Acipenser brevirostrum), a species listed as endangered, it is a fact that that species once inhabited the system and might be restored to it. I further note that there is no mention that striped bass (Morone saxatilis) inhabit the Anacostia and would increase in its restored condition.

The Report identifies the lower Northwest Branch as historical habitat for anadromous species and comments that anadromous use of this tributary is now constrained by stream barriers, two of which are to be removed under a Corps 1135 project. It would be useful to address anadromous habitat in all the tributaries, directly and as a whole, perhaps in paragraph 2.1.2.a on page 2-5, so it is clear what opportunities to restore such habitat exist in the project area and whether those opportunities will be addressed.

NOAA supports the Anacostia River watershed restoration project. These comments are intended to strengthen the analysis of project feasibility and the benefits from its authorization. We are prepared to work with you further in matters where NOAA has expertise.

Sincerely,

M E Gillelan

M. Elizabeth Gillelan
Chief

cc: John Wolflin

June 21, 1994

J. Richard Capka
Baltimore District Engineer
USACOE
P. O. Box 1715
Baltimore, MD 21203

Dear Colonel Capka:

Thank you for the opportunity to comment on the Integrated Feasibility Report and Draft Environmental Impact Statement (DEIS) on the Anacostia River and Tributaries.

The Audubon Naturalist Society is an independent, regional organization with about 10,000 members in the Washington, DC metropolitan area. Our major conservation focus is the protection and restoration of aquatic diversity in local and regional streams and rivers.

We agree completely with the purpose of the Anacostia study - to examine and evaluate the problems and opportunities related to fish and wildlife habitat in the Anacostia River basin, to formulate plans to address those problems and opportunities, and to recommend cost effective solutions for implementation. The elimination of 2,600 acres of wetlands, 500 acres of aquatic habitat, and 800 acres of bottomland hardwoods due to previous construction projects in the Anacostia watershed presents an overwhelming example of water quality and habitat degradation. The extent of the historic degradation of the Anacostia watershed raises compelling questions about how to set realistic restoration objectives.

One of our primary concerns with the DEIS is the failure to plan for a comprehensive hydrologic restoration of Anacostia tributaries. The Anacostia shows classic symptoms of urbanization - increased storm flows, reduced base flows, increased stream velocity, channel widening, loss of riffle and pool habitat, sediment problems from stream bank erosion and construction, increased pollutant levels, increased water temperature, reduction of aquatic diversity, and loss of wetland buffers. Many of these symptoms are directly related to stormwater and are the primary reason the Anacostia has been designated by American Rivers as one of the nation's most endangered and threatened rivers of 1994.

AUDUBON NATURALIST SOCIETY
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We support a shift of DEIS focus to redirect primary attention to a comprehensive hydrologic restoration of the Anacostia tributaries. This shift is necessary in order to address the continuing watershed impacts from stormwater flows and stream bank erosion. This shift is also needed to assure that habitat restoration is achieved through a cost effective method not subject to damage from the next flood.

We have read and agree with the draft comments from the Sierra Club Legal Defense Fund. We especially agree with the failure of the DEIS to address the cumulative impacts of numerous ill-conceived projects planned for the Anacostia watershed. To the list of the proposed Children's Island and the proposed Barney Circle Freeway, we would like to add the proposed Intercounty Connector (ICC).

The alternative G alignment for the proposed ICC would destroy irreplaceable forest, wetland, and floodplain habitat in the ecologically vibrant headwaters of the Northwest Branch, Paint Branch, and Little Paint Branch watersheds. In my view, the impacts of the alternative G alignment cannot be mitigated and pose a threat to the Anacostia watershed that overwhelm the intended improvements that would be achieved if all the projects listed in the DEIS are implemented. The DEIS needs to be reconsidered in order to integrate the impacts of the proposed Children's Island, Barney Circle Freeway, and ICC.

I am concerned that the issue of maintenance is not comprehensively addressed in the DEIS. Adequate funding to maintain best management practices has been avoided for years in Montgomery County. Yet proper maintenance is essential to the function of all BMPs. The DEIS should state who will take responsibility for maintenance and where operating funds will come from to maintain recommended projects.

Additionally, the DEIS does not address sufficiently the issue of project evaluation, both individually and cumulatively. We recommend that biological monitoring be used to evaluate each project and that the EPA Rapid Bioassessment protocol be used to evaluate cumulative effects. We also recommend that the DEIS specifically state who will monitor each project and how long term financial support for monitoring will be assured.

We acknowledge the extensive effort of the Interstate Commission on the Potomac River Basin (ICPRB) and others to document the barriers to fish migration in the Anacostia tributaries. Why didn't the DEIS consider the removal of fish barriers in its list of recommended projects?

Finally, what steps have been taken to address the issue of monitoring the chronic and sublethal effects of wildlife exposure to toxic contaminants in sediments? We agree with the United States Fish and Wildlife Service that a monitoring plan be designed and coordinated with the Service.

Sincerely,
Neal Fitzpatrick

Neal Fitzpatrick
Conservation Director

cc: The Honorable Paul Sarbanes
The Honorable Barbara Mikulski
The Honorable Connie Morella
The Honorable Albert Wynn
Ted Zukoski
Daphne Gemmill

335

MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 Broening Highway • Baltimore, Maryland 21224
(410) 631-3000

William Donald Schaefer
Governor

David A. C. Carroll
Secretary

June 16, 1994

Dr. James F. Johnson
Chief, Planning Division
U.S. Army Corps of Engineers
Baltimore District
ATTN: CBNAB-PL-EC
P.O. Box 1715
Baltimore MD 21203-1715

Dear Dr. Johnson:

Thank you for providing the Maryland Department of the Environment (MDE) with the opportunity to comment on the **Anacostia River and Tributaries Feasibility Study** in partnership with Montgomery, Prince George's Counties, the District of Columbia, the State of Maryland, the Interstate Commission on the Potomac River Basin and the Metropolitan Washington Council of Governments. Copies of the documents were circulated throughout the MDE for review, and the following comments are offered for your consideration.

MDE's Chesapeake Bay Watershed Management Administration (CBWMA) has been involved in several stream restoration projects in the past and recommends that the Corp of Engineers be aware of the following realities of stream restoration. Streams change with every storm, sometimes significantly. The project design should be flexible enough to change with changing conditions. For example, rock placement for bank stabilization or habitat development should have some degree of flexibility associated with it so that the project manager can make changes in the field as needs dictate. It is absolutely imperative that the construction manager have the ability and authority to make decisions and design changes during the course of construction to reflect the needs of current stream conditions. It has been our experience that the skills of the project manager significantly influence the success of the project.

This project is not expected to have a long term detrimental effect on air quality. Temporary construction emissions are generally accounted for in the State Implementation Plan.

However, this document makes unsupported statements about air quality that should be corrected or explained. On page 2-8, the following statements appears: "As the character of Prince George's and Montgomery County changes from urban to rural the air quality changes from fair to good". Nothing in the document indicates that either of these counties is becoming more rural. Air quality is not expected to become better without the implementation of specific improvement measures. Secondly, each Summary of the Impacts Table for an individual project includes under air quality the following phrase: "minor temporary adverse impact during construction -- long-term beneficial impacts" or "minor temporary adverse during construction -- significant long-term beneficial impacts". The reason for these benefits is not explained under the air quality sections. What is the basis for these benefits? Is it increasing tree cover?

Although the project is not expected to have negative impacts, it should not claim unsubstantiated air quality benefits.

Any solid waste including construction, demolition and land clearing debris, generated from the subject project, must be properly disposed of at a permitted solid waste acceptance facility, or recycled if possible. Contact the Solid Waste Program at (410) 631-3318 for additional information.

Again, thank you for giving MDE the opportunity to review this project. If you have any questions or need additional information, please feel free to call me or Nathaniel Brown of my staff at (410) 631-3114.

Sincerely,

John K. Chlada
Director
Office of Strategic Planning and Policy Coordination

JKC:nkb

cc: David A.C. Carroll
Secretary

SUMMARIES AND RESPONSES TO COMMENTS

SUMMARY AND RESPONSE TO COMMENTS RECEIVED DURING DRAFT EIS PUBLIC REVIEW PERIOD

Maryland Department of Natural Resources

Comment 1. Each of the proposed projects requires impacts to wetlands and/or waterways. Activities resulting in impacts to nontidal wetlands or a twenty-five foot upland area surrounding the wetlands require authorization from the Nontidal Wetlands and Waterways Division, Water Resources Administration. Approval by the Division is also required for activities which change the course, current, or cross-section of the nontidal 100-year floodplain of Use-I streams draining more than 400 acres, the nontidal 100-year floodplain of Use-III and Use-IV streams draining more than 100 acres, the stream channel of all Use-III streams regardless of drainage area, or the mapped FIRM floodplain (excluding tidal floodplain). Activities planned within the limits of the District of Columbia do not require our authorization. Application requirements can be satisfied by appending the final document and making reference to the appropriate sections.

Response: Comments noted. Appropriate approvals will be obtained by the non-Federal sponsors prior to construction.

Comment 2. It is advisable to have the local sponsors (or appropriate analogues on Federal properties) to submit the Nontidal Wetlands and Waterways permit applications for each of the proposed projects. Since each of the projects being proposed has utility independent of the other projects being proposed, each is considered to be a complete and entire project, and each will require its own authorization. The final feasibility report or EIS will be appended to each application and appropriate references made.

Response: Comment noted. The capability schedules contained in Volume IV recognize the permitting process required for implementation of these projects.

Comment 3. Several of the recommended projects include constructing new or retrofitting existing ponds. Permits are required. For any project that seeks to modify the pond hydraulically, the applicant will have to submit hydrologic and hydraulic analyses that demonstrate that the pond meets existing criteria. The applicant must also demonstrate that the pond is in good condition. The Corps should contact the Dam Safety Division, Water Resources Administration, or the local Soil Conservation District to do a preliminary inspection to identify any deficiencies that may need to be repaired concurrently.

Response: Comment noted. Appropriate permits will be obtained by the non-Federal sponsors prior to construction.

Comment 4. We have concerns for Paint Branch and Northwest Branch regarding thermal impacts that may be associated with some of the proposed stormwater management (SWM) facilities. It appears that further consideration should be given to minimization of thermal impacts for some or all of the proposed wetland facilities in the Paint Branch and Northwest

Branch watersheds. We recommend that the study report include a more complete discussion of thermal impact concerns.

Response: Section 5 of the report has been revised to further address thermal impacts.

Comment 5. Some SWM design features which best address temperature concerns may cause the loss of some pollutant treatment redundancy. However, even if the treatment potential for other water quality parameters may be affected, the protection of existing coldwater habitat and fisheries resources from incremental temperature impacts should be a priority.

Response: The Corps of Engineers and the project sponsors will continue to work with DNR staff to maximize the habitat benefits of the proposals in Use III and Use IV watersheds.

Comment 6. In the draft report, concern for water temperatures in Paint Branch is briefly discussed, but the minimization of thermal impacts from the proposed wetland SWM facilities is only partially addressed by proposing the use of low flow bypass pipes. Baseflow discharge is only one of the thermal concerns associated with permanent pools. Discharge of heated water from the permanent pool as it is displaced by stormwater runoff is also a concern. The feasibility report should include an in-depth discussion of both the site-specific factors and the proposed design features that support the preference for wetland SWM facilities.

Response: The proposed designs reflect a commitment on the part of the Corps to design SWM wetlands to minimize thermal impacts while maximizing habitat benefits. Each proposed wetland has been examined in depth, and additional information has been added to the appropriate parts of Section 5 where necessary.

Comment 7. We recommend that consideration of additional specific design features for impact minimization in wetland facilities be addressed in the report for both the Paint Branch and Northwest Branch watersheds. The report does not adequately explore temperature minimizing designs with the alternatives currently listed for the wetland SWM facilities. It is essential to minimize the long-term pooling of water.

Response: See response to Comment 6. Minimization of thermal impacts by keeping long-term pooling of water to a minimum will continue to be an important factor during the completion of plans and specifications.

Natural Heritage Program

Comment 1. Planning and funding to control invasive species should be a part of this project. Hopefully, once the vegetation in a restored marsh stabilizes after several years, the marsh will develop some resistance to invasion. The need to control invasive species as soon as possible after invasion cannot be overemphasized, since invasion is usually logarithmic. (See the comments on Purple loosestrife and Phragmites at the end of this document.) Funding for vegetation management at each site should be established for a minimum of five years.

Response: The monitoring program has been identified in Section 7.12 and extended to include five years of monitoring after completion of construction.

Comment 2. The planting scheme is another aspect of this project that needs to be further discussed. There is no mention of the source for the trees and the shrubs that will be used in the bottomland reforestation efforts. An attempt should be made to utilize local genotypes. Several of the species proposed for use in the restoration process should be dropped from the plant list. Other state-listed species, exotic species, and species not native to Washington D.C. and vicinity may be included in the proposed planting lists. These lists should be reviewed and necessary deletions should be made.

Response: The species list has been revised to reflect native species.

Comment 3. Planting is an important component of restoration projects. Unfortunately, since indigenous genotypes of native species are rarely used, planting results in the massive introduction of non-native genetic material into wildland habitats, contrary to the meaning and goals of restoration. As an experiment, we suggest that 15% of the restoration areas be left unplanted to compare the cost effectiveness of planting and natural colonization.

Response: Comment noted.

Comment 4. Finally, any mechanisms that are used in this restoration effort should minimize soil and canopy disturbance in the forested areas adjacent to stream restoration in order to limit encroachment by weedy, alien, invasive species.

Response: Comment noted.

Comment 5. Gene Cooley, Dick Wiegand, and Cynthia Sibrel would like to become more involved with this project. Please notify them of upcoming meetings so that the issues raised in this letter can be addressed by the Anacostia Watershed Restoration Committee.

Response: Notification has been completed.

National Capital Planning Commission

Comment 1. Both Prince George's County projects and the Paint Branch project in Montgomery County affect Capper-Cramton lands within the Anacostia watershed. We recommend that the EIS address NCPC's and M-NCPPC's roles in Capper-Cramton lands.

Response: Additional information has been added to Section 1.8.5.

Comment 2. The Final EIS should either evaluate the findings of the hazardous, toxic, and radioactive waste investigation you intend to complete prior to construction, or more certainly indicate when the investigation would begin.

Response: HTRW investigations have been completed at all of the sites. With the exception of the terrestrial planting band proposed for the area surrounding only the portion of Kingman Lake above Benning Road, no additional HTRW investigations are warranted. For the upland area which is proposed for riparian buffer planting, soil samples will be collected and analyzed for contaminants which could be located within the planting zone. This is currently scheduled to begin in February 1995.

Comment 3. Although the DEIS identifies projects, such as the Inter-County Connector, Children's Island, Barney Circle Freeway, Southeast Federal Center, that could affect the Corps' projects, we suggest that the FEIS identify, to the extent possible, potential effects from these projects that could impact the restoration effort.

Response: Additional information has been added to Section 5.15 of the report.

Comment 4. We suggest the EIS analyze local land use plans and policies to evaluate the effectiveness of local land use controls. The EIS should assess planning guidelines and zoning ordinances to determine if the guidelines and ordinances enhance or diminish environmental protection related to the Anacostia River. These actions have been very important for the Anacostia restoration effort.

Response. Section 3.1.3 summarizes the local land use guidelines and ordinances which facilitate environmental protection in the basin.

Anacostia Watershed Society

Comment 1. There is no attempt here to integrate the principles of the Clinton Administration's Ecosystem Management Initiative. When do we begin to see the application of these policies?

Response: Although the administration's ecosystem management guidelines are currently being developed, the Anacostia Watershed Restoration efforts are being evaluated as a model effort of Federal, state and local cooperation in watershed restoration.

Comment 2. The Draft study ignores a $200 million Barney Circle interstate freeway and bridge planned and set for bidding that would bifurcate the National Park Service's and, severely limiting pedestrian access and use of the river. This project will profoundly affect the human health and wildlife ecology of that which is adjacent and downwind of the project area. The DEIS should further examine evidence that cumulative environmental impacts are the cause of more human deaths from cancer in the Anacostia community than in any other neighborhood in the bio-region. What is the impact to downwind communities from this project?

Response: Additional information regarding the Barney Circle bridge has been added to Section 5.15 of the report.

Comment 3. The study does not consider the impacts from the planned Children's Island Theme Park to be constructed on Kingman Island directly adjacent to the Corps' proposed

project. What are the impacts to the local human and wildlife community from a theme park with a projected 3 million visitors per year?

Response: Additional information regarding the Children's Island Recreational Park has been added to Section 5.15 of the report.

Comment 4. Of all the basic problems of urban rivers, trash is the most visible. After a strong rain, stormwater flowing from Maryland and D.C. washes our parking lots and roadways clean of Styrofoam cups, bottles, and cans which accumulate by the ton in the tidal river and flow on to the Bay. There is no mention of this blight in the DEIS, no solutions offered, no observations about its impact to human, animal, or bird life. What are the impacts to a child's self image? What impacts to property values? To personal safety?

Response: The debris problems were addressed in the reconnaissance report. The EPA and DPW inaugurated a floating trash removal program in 1992. In addition, ICPRB, M-NCPPC, and DER successfully installed a floating boom in the vicinity of Bladensburg. The Corps of Engineers continues to operate a debris-removal operation for the Potomac and Anacostia Rivers to remove hazards to navigation.

Comment 5. Regarding the Kenilworth project, the Society is concerned about the lack of opportunity for volunteer and paid local citizen participation in the planting of the marsh. We would like to discuss with the Corps, contracting opportunities for citizen participation in the marsh and tree plantings planned for the Kingman Lake area.

Response: As was indicated to the AWS in a March 26, 1993, letter from the Deputy District Engineer, the restoration work will be performed under government contract; therefore, there are a number of contractual as well as legal provisions that must be followed. In the event that plants are available at the end of the project, we may be able to accommodate the AWS by having your organization work outside of the contract area. We will also evaluate other assistance which the AWS may be able to provide which would not affect the restoration contractors.

Comment 6. The Kingman Lake area presently supports some of the most active birding action in the entire Metropolitan Washington region. The major concern here is the protection of the nesting sites on the islands from predation by feral cats, dogs, raccoons, etc. The islands that support the most bird life are surrounded by water at both high and low tide. Inter-tidal guts would serve as a barrier to predation and provide canoe access as well.

Response: All of the islands in Kingman Lake are separated from the shoreline by deep water areas.

Comment 7. The best canoe access for Kingman Lake is located on the western shore (just off parking lot #6) at a break in the tree line opposite Heritage Island, near point designation #282 on the 'Planting Plan.' The Corps plan calls for a Zone 2 - mid marsh #1 fringe marsh along the shore at this point. We would request that an inter-tidal gut be created at this point to preserve canoe access to the lake.

Response: As part of the Barney Circle bridge work, a boat launch ramp will be installed immediately below the confluence of Kingman Lake and the Anacostia River. This may negate the need for additional access; if not, the additional tidal gut could be considered during the preparation of plans and specifications.

Montgomery County Department of Environmental Protection

Comment 1. The syllabus should list all of the projects proposed in the feasibility report and provide a brief (one paragraph maximum) description of each project.

Response: The syllabus has been revised to address this comment.

Comment 2. Sections 2.3.2e, 2.4.2e, 2.5.2e, and 2.6.2e describe the water quality of the Anacostia sub-watersheds. The source of this information should be referenced in these sections.

Response: Sections 2.3.2.e, 2.4.2.e, 2.5.2.e, and 2.6.2.e have been revised to include the appropriate water quality references.

Comment 3. The feasibility report does not address County laws regarding allowable noise levels from construction sites, air pollution, or sediment control. These County laws will effect Corps contractors' hours of operation and will affect the Corps contractors' methods for disposal of trees removed from the project sites. Each project will also require a sediment control plan approved by Montgomery County. The Corps contractor will be required to obtain a permit from and post a bond with the County Department of Transportation for work within the County right-of-way and potential damage to public improvements caused by accessing the project from the County street.

Response: The Corps of Engineers will continue to maintain a positive working relationship with its non-Federal sponsors. The Corps will assure that the construction contractor abides by all pertinent local, state, and Federal laws and regulations, including noise level, air pollution, and sediment controls. The Corps contractor will obtain and post all necessary permits and bonds, including permits and bonds pertaining to work within County rights-of-way.

Comment 4. The Project Management Plan (PMP) should include continued regular meetings between Corps and local sponsor staff during the preparation of plans and specifications. If regular progress meetings are held, the 45-day time period provided for local sponsor review upon completion of plans and specifications is adequate.

Response: The Corps of Engineers has worked to foster a positive working relationship with the non-Federal sponsors for the Anacostia projects. We want to carry on this partnership and will assure continued coordination with the non-Federal sponsors, including progress meetings during preparation of plans and specifications. The PMP's have been revised to reflect appropriate progress meetings.

Comment 5. It is Montgomery County's assumption that regular progress meetings will be held between the Corps project manager and the construction contractor and that the local sponsors will be invited to participate in these meetings.

Response: The Corps of Engineers agrees that the Corps project manager and the construction contractor should maintain close coordination, including regular progress meetings (see Appendix H, of the feasibility report). The Corps will assure that the local sponsors are provided every opportunity to participate in these meetings.

Comment 6. The cost estimate of $6,260,000 includes an engineering contingency of 20%, construction contingency of 25%, and an escalation factor of 23%. The Department of Environmental Protection (DEP) typically uses much lower contingency factors in budgeting for final design and construction of the types of projects involved. DEP also prepares all cost estimates in current dollars and does not include an escalation factor. Although DEP will seek to budget for 25% of the full cost estimate ($1,565,000), this will be done with the clear understanding that Montgomery County would be responsible for 25% of the actual final costs of constructing the nine projects in Montgomery County.

Response: The Corps of Engineers recognizes that contingency and escalation factors used in Corps cost estimates are more conservative than those applied by Montgomery County. Montgomery County's 25-percent cost-sharing responsibility will be based on the actual final costs of those projects for which the county is the non-Federal sponsor.

Comment 7. Utility relocations should be taken care of by the Corps contractor during project construction to minimize environmental impacts. The PMP should provide for design and construction of utility relocations being performed by the Corps, with coordination and funding for relocations being provided by the local sponsors.

Response: Comment noted.

Comment 8. The Snowden's Mill I & II and Stewart/April Lane projects should be redesigned to eliminate the need to acquire additional land. If this is not possible, the final project designs should minimize the amount of land or easement acquisition required.

Response: The Corps of Engineers appreciates the Commission's desire to minimize or eliminate any land acquisition requirements for project construction. The Corps will review the design of the Snowden's Mill I and II projects during preconstruction engineering and design and will attempt to minimize land acquisition and easement requirements for each project, within Corps of Engineers design and real estate standards. Revisions have already been made to the Stewart/April Lane site.

Coalition to Preserve the Natural Environment of Northwest Branch Park (Co-Nature)

Comment 1. The proposed dam and pond is an inappropriate use of Montgomery County parkland. This forest area was never wetlands. Therefore, the Corps cannot restore wetlands by creating wetlands in place of the forest. The Corps chose this location without regard for the present fish and wildlife habitat provided by the undisturbed bottomland forest or for the community use of the park because of its natural topography.

Response: The Montgomery County Department of Environmental Protection (DEP) and the Maryland-National Capital Park and Planning Commission (M-NCPPC), are the local sponsors for nine sites in Montgomery County. The M-NCPPC Park Board approved this site for construction on parkland at their May 16, 1994, public meeting. Both agencies have provided letters of intent to pursue the proposal. M-NCPPC, DEP and the Corps will continue to work with the community to develop an acceptable design for the site.

The site was selected after consultation among representatives of the Metropolitan Washington Council of Governments, the Montgomery County DEP, M-NCPPC, and the Corps of Engineers. Construction of the stormwater wetland will impact approximately 1.5 acres of mature hardwood forest. This area contains 232 trees which range in size from 2 inches to 30 inches. However, the total reforestation included in the Montgomery County project covers 12 acres.

Comment 2. Lockridge Drive is an environmentally incorrect site for a stormwater wetland.

Response: The site provides an opportunity to significantly reduce the non-point source pollution from a 153-acre sub-watershed.

Comment 3. The Corps has allowed the project to be presented as all things to all people.

Response: The proposal for Lockridge Drive would provide many different types of benefits to the area.

Comment 4. The Corps did not properly evaluate dam impact on the current ecosystem and usage. The Corps did not weigh the existing forest habitat units that would be lost by constructing the dam, in relation to the additional wetland habitat units which it estimates will be gained. The dam and wetlands pond will significantly devalue the surrounding property values. Upstream degradation and impact on the ecosystem were not addressed.

Response: The Habitat Evaluation Procedure (HEP) was used to evaluate the final group of alternatives which were considered for the site. The evaluation compared the benefits of the three alternatives presented in Table 6-7. As all of the alternatives involved have the same impact on the existing forest habitat, and the values of forest and wetland habitat are not interchangeable, forest losses were not subtracted from wetland benefits. However, the net reforestation gain to the basin as a result of all of the projects is more than 30 acres of bottomland hardwood forests. The net gain in Montgomery County is approximately 9 acres (some forest impacts will also occur at the Stewart/April Lane site).

We have no information that suggests that the proposed construction will have an effect on property values.

Schueler (1992) states that the tributary streams to stormwater wetlands that serve large areas will be severely degraded since they receive no hydrologic control. Therefore, the diversity of fish and macroinvertebrate communities in the upstream channels is often reduced. There are approximately 250 feet of stream channel which would remain after the installation of the stormwater wetland. The degraded state of the stream channel will not be improved by the downstream wetland. However, there are not any impacts to the upstream

channel which would affect its ecological value. No anadromous species of fish exist in the Lockridge Drive tributary.

Comment 5. The Corps did not evaluate other, less destructive alternatives to building a large dam and wetlands pond.

Response: During the feasibility study, the Corps of Engineers and our non-Federal sponsors evaluated a wide range of alternatives throughout the Anacostia basin. Table 4-3 has been added to Section 4 to document the range of reasonable alternatives which can be implemented to address water quality and water quantity concerns. The selected alternative for Lockridge Drive is the most beneficial and the least destructive alternative which can be implemented to treat a 153-acre sub-watershed.

Comments 6. There is substantial local opposition to this proposal.

Response: M-NCPPC, DEP and the Corps of Engineers will continue to work with the community to address their concerns.

Comment 7. Co-Nature requests a public hearing to make a complete technical presentation.

Response: Staff from the DEP, M-NCPPC and the Corps of Engineers met with local citizens on July 27, 1993; March 17, 1994; April 10, 1994; June 8, 1994; and July 7, 1994. Currently, there is an additional meeting scheduled for July 20, 1994. In addition, the Lockridge Drive project was presented to and approved by the M-NCPPC Park Board on May 16, 1994 at the Board's monthly public meeting. The Corps, DEP, and M-NCPPC have all agreed to continue to work with the community to help restore the Anacostia River basin.

Dr. Harriette L. Phelps

Comment: It is my recommendation that the sediments of Kingman Lake be considered as possibly containing persistent highly toxic chemicals.

Response: The U.S. Fish and Wildlife Service conducted bioassays with sediments from Kingman Lake and the proposed borrow areas which are located in the mainstem Anacostia River above the Conrail Bridge. These data did not indicate significant toxicity in either source of sediment. Additionally, the results from two sets of chemical analyses conducted by a Corps contractor and FWS were used to evaluate Anacostia sediments, along with data collected in association with the restoration of Kenilworth Marsh. These data demonstrate that the restoration of Kingman Lake and the river fringe wetlands should proceed.

United States Environmental Protection Agency

Comment 1. In accordance with the National Environmental Policy Act (NEPA) and Section 309 of the Clean Air Act, EPA has reviewed the DEIS. Based on our review, we have rated the document LO-1 (Lack of Objections, Adequate information).

Response. Comment noted.

Comment 2. Considering the land use demands that have impacted the Anacostia area, the rating of one of the ten most degraded rivers in the nation, and the inequity of funding that has been allocated to the Anacostia River community, this project is well needed and appropriate. EPA has found the efforts of the Corps commendable and we would like to applaud your efforts to enhance environmental conditions in the Anacostia River Basin. We also understand the limitations in funding and authorization commitments that the Corps faces when developing preferred alternatives which include only areas that have been impacted by Corps activities.

Response. Comments Noted. We would like to point out that this study did evaluate and include restoration proposals outside the areas impacted by previous Corps projects. Section 4.3, paragraph 2, contains the reasons for including areas outside the Corps project areas.

Comment 3. The document should include the beneficial and negative impacts of this project on other restoration projects that are proposed or have been implemented in the Anacostia River Basin for the consideration of a biodiverse ecosystem.

Response: Section 5 has been revised to further discuss the impacts, both positive and negative, of this project.

Comment 4. The Corps should coordinate with lead agencies of projects that are proposed in the area of the preferred restoration sites and that have the potential to negate the beneficial environmental impacts of the Corps' restoration projects. This will ensure that cumulative impacts are addressed in the EIS.

Response: The Corps of Engineers has coordinated closely with Federal, state, regional and local government agencies as well as private organizations which are involved in the restoration of the basin. Additional information related to cumulative impacts has been added to Section 5.15 of the main report.

Comment 5. The document should include a public awareness plan to increase awareness of the non-point source pollution and other environmental problems of the Anacostia River Basin.

Response: As part of the public involvement program for the feasibility study, the Interstate Commission on the Potomac River Basin contributed space in its quarterly newsletter to provide information regarding the feasibility study. The newsletter, as well as other existing programs in both Montgomery and Prince George's Counties, state programs, and Chesapeake Bay efforts, provide a wealth of information regarding non-point pollution. We often provide a point-of-contact to those requesting information regarding non-point source pollution.

Comment 6. The Corps should include a monitoring plan that outlines the specific actions that will be taken to determine progress of the restoration projects in the final document.

Response: Section 7.12 was added to the document to outline the monitoring program.

Comment 7. The document should clearly describe the screening process and the criteria used to eliminate possible alternative restoration sites.

Response: Additional information has been added to Section 4 to clarify the screening process.

American Rivers

Comment 1. The DEIS lacks an ecosystem-management approach. The restoration effort proposed in the Corps feasibility study fails to fulfill the ecosystem-oriented, collaborative approach outlined in the *Six-Point Action Plan.*

Response: The Corps of Engineers has worked with the members of the Anacostia Watershed Restoration Committee and other agencies in the basin since the initiation of the reconnaissance study in 1989 to formulate restoration actions which would make a significant contribution to the basin.

Comment 2. The DEIS fails to address cumulative impacts of restoration projects and future development. The EIS must analyze these cumulative and indirect effects in order to comply with Council on Environmental Quality (CEQ) regulations implementing NEPA.

Response: Additional information regarding cumulative impacts has been added Section 5.15 of to the report.

Comment 3. The Corps should collaborate with the Maryland-National Capital Park and Planning Commission and other appropriate agencies to design ecologically sound plans for land use and to assess the effects of future development on the restoration program's impact.

Response: The Maryland-National Capital Park and Planning Commission has not requested any assistance with their land-use planning responsibilities. The existing laws and regulations identified in Section 3.1.3 will help to alleviate the environmental impacts of future development.

Comment 4. The criteria for selecting restoration projects has led to a piecemeal approach that is at odds with the principles of ecosystem management. The Corps should assess all potential project sites from an ecosystem-oriented perspective rather than focusing narrowly on the perceived limitations of the Federal role in the restoration program.

Response: The Corps of Engineers worked very closely with the non-Federal sponsoring agencies to develop the most comprehensive plan within the funding constraints of the study and with full knowledge of the other ongoing restoration efforts.

Comment 5. The DEIS fails to consider alternatives which would adequately reforest riparian areas. The Final EIS should address all reasonable opportunities for riparian reforestation, along with an assessment of the impact of past and present reforestation projects by the Corps and by other entities. The Corps should consider partnership methods of enlisting reforestation assistance from appropriate entities, including agencies of state, county, district, and Federal governments, along with grassroots citizens' groups.

Response: The recommendations of the feasibility study include the reforestation of 33 acres of the riparian corridor. In addition, the Section 1135 project in Prince George's County provides for the installation of approximately 400 trees within the flood control levees near Bladensburg, Maryland. These projects are a result of cost shared studies with our six non-Federal sponsors.

Comment 6. The DEIS fails to consider alternatives which would abate the destructive impacts of stormwater run-off. Six stormwater abatement projects simply will not restore the sustainability and biodiversity of the river system. The Final EIS should address all reasonable opportunities to construct stormwater abatement projects.

Response: The feasibility study includes all of the preliminary engineering and design studies for the six stormwater wetland sites. This level of engineering detail requires a considerable amount of time and a significant cost. The final feasibility report and environmental impact statement contains an evaluation of all of the reasonable alternatives which could be evaluated and designed to a detailed level, given time and money constraints.

Comment 7. The DEIS fails to consider alternatives that would more adequately address the problems of the Northeast branch and other of Prince George's County tributaries.

Response: The sites which were evaluated in Prince George's County were selected in concert with DER and M-NCPPC. In addition to the actions recommended by the feasibility study, seven additional restoration actions will be constructed within the Corps flood control project area. These restoration actions were developed and authorized through the Section 1135 (P.L. 99-662) and are described in Section 2.9.1; these actions include sites in the Northeast Branch watershed.

Comment 8. The DEIS fails to consider restoring stream channels to some approximation of their natural condition.

Response: The feasibility study recommends the selective restoration of five miles of stream channels.

Comment 9. The DEIS fails to consider alternatives which would increase the social value of the Anacostia.

Response: Social and economic considerations are addressed in Section 7.4.

Sierra Club Legal Defense Fund, Inc.

Comment 1. The draft EIS fails to adequately assess cumulative impacts of numerous projects. The draft EIS contains virtually no substantive analysis of several reasonably foreseeable major Federal actions which directly impact proposed wetland restoration projects and/or foreclose other wetland restoration opportunities.

Response: Additional information regarding cumulative impacts has been added to the document.

Comment 2. The draft EIS ignores the President's ecosystem management initiative for the Anacostia watershed. The failure to consider alternatives beyond the agency's jurisdiction not only contradicts the "ecosystem management" approach proposed by President Clinton for the Anacostia watershed, but the dictates of NEPA as well. Failure to evaluate reasonable alternatives merely because they cannot be directly implemented by the lead agency or the applicant squarely contradicts the goals of the Act. To manage along ecosystem lines and to comply with NEPA, the final EIS therefore must consider important administration initiatives, as well as restoration projects within the watershed that are not related to Corps activities, and must assess alternatives involving the use of private lands within the watershed. Although the President's initiative on ecosystem management was issued after the completion of the feasibility technical analysis,

Response: Although the President's initiative on ecosystem management was issued after the completion of the feasibility technical analysis, the feasibility study and other efforts by the Corps of Engineers have strongly emphasized a coordinated comprehensive approach within the Anacostia basin. The Corps has demonstrated its willingness to participate along with the other Federal, state, regional, and local government agencies and private citizens within the appropriations and authorizations provided by laws, regulations and Executive Orders.

Comment 3. The draft EIS contains insufficient analysis of the Children's Island theme park.

Response: Additional information relative to Children's Island theme park has been included in Section 5.15.

Comment 4. The draft EIS contains insufficient analysis of the Barney Circle Freeway project.

Response: Additional information relative to Barney Circle Freeway has been included in Section 5.15.

Comment 5. The draft EIS contains insufficient analysis of the Inter-county Connector.

Response: Additional information relative to the Inter-County Connector has been included in Section 5.15.

Comment 6. The draft EIS contains almost no analysis of the other public and private river restoration projects.

Response: The Corps of Engineers is a participant in the Anacostia restoration effort. Sections 1.6.0, 3.1.2, 3.1.3, 4.3.1, 9.1, 9.2, and 9.3 provide information on the wide range of activities which are occurring in the Anacostia basin.

Comment 7. The draft EIS fails to address environmental justice concerns.

Response: Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was issued February 11, 1994. Additional information has been added to Section 7.4 to address this specific executive order.

Prince George's County Department of Environmental Resources

Comment 1. Please confirm if the baseball field relocation at Fordham is the only "relocation" required. How about any utilities, such as gas, electric, WSSC, etc. at Fordham or the NW stream restoration? When would you like to determine the costs associated with the relocations?

Response: Although the sites have not been evaluated through the Miss Utility process, we have conducted numerous site visits and reviewed WSSC water and sewer maps of the project areas. No utility relocations are anticipated. The baseball field located near the intersection of West Park Drive and Fordham Street will be relocated approximately 200 yards west of its present site. The new site is presently a practice field. The practice field will be upgraded to the equivalent of the relocated field. The cost of this relocation is presently estimated to be $40,000. This relocation cost will be the responsibility of the local sponsors and will be a credit towards the 25 percent non-Federal funding requirement for project implementation.

Comment 2. Is the relocation activity shown in your bar chart schedule dated November 10, 1993, for the ballfield relocation only or all relocations? Fall weather during this period may cause delays because September, October in this area usually have several days of precipitation.

Response: Comment noted. The relocation can be re-scheduled, if necessary. M-NCPPC has requested that the relocation be completed prior to initiation of construction of the wetland.

Comment 3. Are there any rights-of-way or land acquisitions required that the County should initiate?

Response: All project lands and rights-of-way are owned by M-NCPPC. No additional land acquisition is anticipated.

Metropolitan Washington Council of Governments

Comment 1. A clear need exists for technical field assistance in the construction of the proposed projects. Throughout crucial junctures of the construction phase, it is imperative that technical staff be on site to ensure that contractors understand and fulfill both the intent and spirit of the projects. We strongly recommend that a technical construction assistance team be formed to provide on-site guidance to Corps contractors at critical points of a given project.

Response: The Corps of Engineers recognizes the importance of assuring that the construction contractors understand and value the intent of the proposed projects. As detailed in the Project Management Plans (PMPs) presented in Appendix H of the feasibility report, the Corps fully intends to provide specialized assistance to construction personnel and the contractor during construction. Qualified Corps of Engineers staff or a Corps of Engineers contractor will participate in site visits and meetings with the construction contractor and construction personnel to clarify design intent, assist in implementation of designed features, and resolve issues related to changed field conditions.

Comment 2. A similar need exists for inspection of the proposed projects. The previously-discussed construction assistance team should play a central part in the inspection effort. It is recommended that they convene prior to the outset of construction in a pre-construction meeting.

Response: The Corps of Engineers agrees that a field inspection and meeting with appropriate technical representatives, construction personnel, and the construction contractor must be held prior to the outset of construction.

Comment 3. A need also exists for monitoring of the proposed projects. A baseline evaluation of a project's area of influence is recommended prior to the onset of construction. A three-to five-year monitoring program will allow for an early and ongoing evaluation of a project. A small group of technical staff involved with the projects should work with the project manager to develop a monitoring and reporting program for each project.

Response: The Corps of Engineers concurs that a five year monitoring plan should be established for each of the proposed projects. The monitoring plans should include a baseline evaluation of the projects' areas of influence, as well as early and ongoing evaluation of the projects. The Project Management Plans (PMPs) presented in Appendix H of the feasibility report identify project monitoring as a task to be completed for each project (see Appendix A of each PMP). Appendix I, plates DC-25, PG-13, and MC-44, presents draft capability schedules for the projects. The capability schedules have been modified to reflect a five-year project monitoring program for each project.

Comment 4. Where possible, it is recommended that project earthmoving activities be phased to coincide with required utility relocation activities.

Response: Relocations and earthmoving will be undertaken under one construction contract. See response to Montgomery County DEP Comment 7.

Comment 5. Where possible, it is recommended that natural materials removed for implementation purposes on one site be temporarily stockpiled and recycled on other project sites.

Response: The Corps of Engineers fully supports recycling of manmade and natural materials. Project specifications will be written to encourage the construction contractor(s) to recycle natural materials removed for project implementation purposes.

Comment 6. The Kingman Lake restoration and fringe marsh creation component of the feasibility study should be guided by the results of the Kenilworth Marsh restoration effort. It is critical that the majority (85-90%) of these areas be planted with locally-grown native wetland species. We also recommend that these plants be propagated via planting at carefully monitored elevations. To proceed otherwise potentially jeopardizes the success of the District of Columbia component of the study.

Response: The plans for wetlands all incorporate information gained from previous restoration efforts. This comment is also supported by the comments of the Maryland Natural Heritage Programs which are part of the comments of the Maryland Department of Natural Resources.

Comment 7. We would strongly recommend that a second feasibility study be pursued for the Anacostia.

Response: In addition to the three projects recommended as a result of the feasibility study, the District Engineer also recommended that the Corps consider the federal and non-Federal interest in pursuing additional Feasibility investigations.

Maryland Historical Trust

Comment 1: For archeology, the report concisely describes the survey's goals, methods, and results. With only a few additions, the document will meet the Guidelines for Archeological Investigations in Maryland. In our opinion, the level of background research and field investigations was sufficient to identify the full range of archeological properties in the areas of potential effects.

Response: Comments noted.

Comment 2: The survey located a complex of historic mill featur[illegible] prehistoric site, and several isolated prehistoric artifacts. We concur that these archeological properties are ineligible for the National Register of Historic Places and warrant no further study.

Response: No further investigations will be conducted at these locations, with the exception of the Paint Branch Mill Complex.

Comment 3: Along the Paint Branch, a complex of historic mills was identified, but there was insufficient data to determine whether it should be considered significant under the

National Register of Historic Places. Additional information should be supplied to the SHPO from the District and the Maryland National Capital Parks and Planning Commission before a final determination can be made.

Response: The District and the M-NPPC will continue to prepare appropriate documentation for the SHPO to make a final determination concerning the Paint Branch Mills Complex. The District will design the construction of this project to be sensitive to the archeological remains and the future plans of M-NPPC.

Comment 4: There were a number of minor editorial corrections required for the final report to be submitted to the SHPO.

Response: The final cultural resource report will be edited and included all information requested by the SHPO.

Audubon Naturalist Society

Comment 1. One of our primary concerns with the DEIS is the failure to plan for a comprehensive hydrologic restoration of Anacostia tributaries. We support a shift of DEIS focus to redirect primary attention to a comprehensive hydrologic restoration of the Anacostia tributaries.

Response: The Corps and the non-Federal sponsors discussed the need for, and the value of a comprehensive watershed modeling effort for the Anacostia basin. After a thorough evaluation of the available information, the costs associated with such a study, and the potential value to the restoration effort, a comprehensive modeling study was rejected. Although the comprehensive hydrologic study was not included in the current feasibility study, we are discussing such an effort for any future feasibility studies.

Comment 2. We agree with the draft comments from the Sierra Club Legal Defense Fund. We especially agree with the failure of the DEIS to address the cumulative impacts of numerous ill-conceived projects planned for the Anacostia watershed. To the list of the proposed Children's Island and the proposed Barney Circle Freeway, we would like to add the proposed InterCounty Connector (ICC).

Response: Responses to the Sierra Club are provided in this section. Additional information on cumulative impacts has been included in Section 5.15.

Comment 3. The alternative G alignment for the proposed ICC would destroy irreplaceable forest, wetland, and floodplain habitat in the Northwest Branch, Paint Branch, and Little Paint Branch watersheds. The impacts of the alternative G alignment pose a threat to the Anacostia watershed that overwhelm the intended improvements.

Response: The cumulative impacts of the ICC have been further addressed in Section 5.15.

Comment 4. The issue of maintenance is not comprehensively addressed in the DEIS. It should state who will take responsibility for maintenance and where operating funds will come from to maintain recommended projects.

Response: Section 8 of the report documents the local cooperation requirements for operation and maintenance of the projects.

Comment 5. The DEIS does not sufficiently address the issue of project evaluation. We also recommend that the DEIS specifically state who will monitor each project and how long-term financial support for monitoring will be assured. We recommend that the EPA Rapid Bioassessment protocol be used to evaluate cumulative effects.

Response: Section 7.12 has been added to outline the monitoring program which was described in the project management plans. Funding for monitoring is included as part of the construction cost for each project.

Comment 6. Why didn't the DEIS consider the removal of fish barriers in its list of recommended projects?

Response: Section 2.9.1 describes a related Corps of Engineers effort which will remove three barriers to migratory fish. Construction of this project is scheduled for 1995. The scope of the feasibility study is described in Section 1.5.2.

Comment 7. What steps have been taken to address the issue of monitoring the chronic and sublethal effects of wildlife exposure to toxic contaminants in sediments? We agree with the U.S. Fish and Wildlife Service that a monitoring plan be designed and coordinated with the Service.

Response: The U.S. Fish and Wildlife Service has evaluated the effects of sediment contaminants. Their report has been included in Annex B, along with the Service's Fish and Wildlife Coordination Act report. A monitoring plan has been included in the project, as noted in Section 7.12.

United States Department of Commerce, National Oceanic and Atmospheric Administration

Comment 1. Species you neglect to mention in your report include the Atlantic sturgeon (Acipenser oxyrhynchus), which is potentially a highly valuable fishery resource if a viable population could be restored to the Anacostia/Potomac system. Also, short-nosed sturgeon (Acipenser brevirostrum), a species listed as endangered, once inhabited the system and might be restored to it. Finally, there is no mention that striped bass (Morone saxatilis), inhabit the Anacostia and would increase in its restored condition.

Response: Section 2 has been revised to include a discussion of Atlantic and short-nosed sturgeon and striped bass.

Comment 2. It would be useful to address anadromous habitat in all the tributaries, directly and as a whole, so it is clear what opportunities to restore such habitat exist in the project area and whether those opportunities will be addressed.

Response: The Interstate Commission on the Potomac River Basin has documented the historical range and blockages to anadromous fish passage in the basin. A drop structure on the Northeast Branch was modified by M-NCPPC in 1992 and the Corps and DER will modify three additional blockages in 1995.

Maryland Department of the Environment

Comment 1. The Maryland Department of the Environment's Chesapeake Bay Watershed Management Administration (CBWMA) recommends that the Corp of Engineers be aware of the following realities of stream restoration. Streams change with every storm, sometimes significantly. The project design should be flexible enough to change with changing conditions. It is absolutely imperative that the construction manager have the ability and authority to make decisions and design changes during the course of construction to reflect the needs of current stream conditions.

Response: The Corps of Engineers recognizes that changing stream conditions can significantly impact project design; therefore, the Corps will design the proposed projects to allow the construction manager flexibility to respond to changing site conditions. As detailed in the Project Management Plans (PMPs) presented in Appendix H of the feasibility report, the Corps will provide specialized assistance to construction personnel and the construction contractor during construction. Qualified Corps of Engineers staff or a Corps of Engineers contractor will participate in site visits and meetings with the construction contractor and construction personnel to clarify design intent, assist in implementation of designed features, and resolve issues related to changed field conditions.

Comment 2. The DEIS makes unsupported statements about air quality that should be corrected or explained.

Response: The report sections related to air quality have been revised.

Comment 3. Any solid waste, including construction, demolition and land-clearing debris, generated from the subject project, must be properly disposed of at a permitted solid waste acceptance facility, or recycled if possible.

Response: The Corps of Engineers will assure project compliance with local, state, and Federal requirements, including the method to be used for disposal of construction materials. The Corps fully supports recycling of manmade and natural materials; project specifications will be written to encourage recycling measures by the contractor.

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
Department of Parks, Montgomery County, Maryland
9500 Brunett Avenue • Silver Spring, Maryland 20901

May 31, 1994

Mr. James S. Turkel
Acting Chief, Real Estate Division
U.S. Army Corps of Engineers
ATTN: CENAB-RE-C
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dear Mr. Turkel:

This letter is to confirm that the Local Cooperation Agreement for the Modifications of the Anacostia River and Tributaries, Montgomery County, Maryland has been reviewed by staff of The Maryland-National Capital Park and Planning Commission. The terms of the Agreement are acceptable, and staff will recommend to The Maryland-National Capital Park and Planning Commission that it execute the Agreement as drafted upon approval of the project.

Sincerely,

William E. Gries
Land Acquisition Specialist

WEG:ymw

File Name: Turkel

Yours for life
MONTGOMERY COUNTY PARKS

Montgomery County Government

June 30, 1994

Mr. James S. Turkel, Acting Chief
Real Estate Division
U.S. Army Corps of Engineers
ATTN: CENAB-RE-C
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dear Mr. Turkel:

This letter is to confirm that the Local Cooperation Agreement (LCA) for the Modifications of the Anacostia River and Tributaries, Montgomery County, Maryland has been reviewed by County technical staff and is now undergoing final legal review. Based upon the technical staff's review thus far, we are continuing our negotiations with the Corps on certain specific language in the LCA.

We remain committed to the implementation of those projects within the County that are recommended in the Anacostia River and Tributaries Feasibility Report. Once the legal review is completed later this summer, the County hopes to be able to reach agreement with the Corps on the final language of the LCA.

Assuming that we reach final agreement on the LCA, we anticipate that funding for the non-Federal share of project costs, currently estimated to be $1,565,000 would be provided through a combination of in-kind services, cash and the value of the land to be used that is currently owned by the local sponsors. Montgomery County currently has $1,060,000 in the County's approved FY 95-2000 Capital Improvements Program (CIP) that is committed to implementation of the Montgomery County Anacostia restoration projects. In developing recommendations for the County's FY 98-2001 CIP, the Department of Environmental Protection will request additional funds as needed to cover the full $1,565,000 local financial obligation for project implementation.

Montgomery County is also currently reviewing and commenting on the Project Management Plan.

If you have any questions or need any additional information, please contact Daniel Harper at (301) 217-2438.

Sincerely,

Edward U. Graham
Director

EUG:CW:dh

cc: Daniel Harper
Mark McKevitt

Department of Environmental Protection
101 Monroe Street, Rockville, Maryland 20850-2589

GOVERNMENT OF THE DISTRICT OF COLUMBIA
DEPARTMENT OF PUBLIC WORKS

March 11, 1994

Dr. James F. Johnson, Chief
Planning Division
U.S. Army Corps of Engineers
Baltimore District
Post Office Box 1715
Baltimore, Maryland 21203-1715

Dear Dr. Johnson:

I have reviewed the Draft Anacostia River and Tributaries Integrated Feasibility Report and Environmental Impact Statement. I concur with the findings and recommendations of the report as they pertain to the two District projects. I want to commend your staff for a very complete and well researched report.

Table 7-3 requires correction of the operating and maintenance cost subtotals: $5,040 for Kingman Lake and $3,535 for River Fringe.

I look forward to our continued review of the report later this Spring.

Sincerely,

Kenneth G. Laden, Chief
Environmental Policy Division

GOVERNMENT OF THE DISTRICT OF COLUMBIA
DEPARTMENT OF CONSUMER AND REGULATORY AFFAIRS
ENVIRONMENTAL REGULATION ADMINISTRATION

11 MAR 1994

James F. Johnson, Ph.D.
Chief, Planning Division
U.S. Army Engineering District, Baltimore
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dear Dr. Johnson:

The staff of the District of Columbia's Environmental Regulation Administration and the Office of Policy and Planning, Department of Public Works, have been working with your staff over the last two years to develop and design environmental restoration plans in the District's portion of the Anacostia River, including Kingman Lake. We have completed our review of the draft Feasibility Study Report which contains the proposed plan for the creation of wetlands in the District. We are in general agreement with the proposed projects.

It is our understanding that since the proposed projects in the District will be on federal land, the District will not be required to participate financially in these projects. The District will work with the National Park Service to develop an arrangement for the maintenance of the projects after they are completed.

We also intend to continue our involvement with the proposed projects during the implementation phase. Please call upon us for any assistance we can provide in facilitating the implementation of projects.

Sincerely,

Ferial S. Bishop
Administrator

cc: Ken Laden, DPW
Moshin Siddique, ERA

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

6600 Kenilworth Avenue • Riverdale, Maryland 20737

March 29, 1994

Mr. James S. Turkel
Chief, Real Estate Division
U.S. Army Corps of Engineers
ATTN: CENAB-RE-C
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dear Mr. Turkel:

This letter is to confirm that the Local Cooperation Agreement for the Modifications of the Anacostia River and Tributaries, Prince George's County, Maryland has been reviewed by Maryland National Capital Park and Planning Commission (the Commission). The terms of the Agreement are acceptable, and the Commission is prepared to execute the Agreement as drafted upon approval of the project.

Sincerely,

Wesly R. Johnson
Park Planning Supervisor

THE PRINCE GEORGE'S COUNTY GOVERNMENT

DEPARTMENT OF ENVIRONMENTAL RESOURCES

January 22, 1994

Mr. James F. Johnson, Ph.D
Chief, Planning Division
U.S. Army Engineer District, Baltimore
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dear Mr. Johnson:

The Department of Environmental Resources has been working with your staff over the last two years to develop and design environmental restoration plans in the Prince George's County portion of the Anacostia River Basin. We are in substantial agreement with the plans that are presented in the Preliminary Draft Feasibility Report and fully support the Corps watershed approach adopted in this study. We understand that the County will be afforded an opportunity to review a complete draft report in February.

In principle, we are in general agreement with the Model Local Cooperation Agreement. However, the County's Office of Law will conduct a full review of the LCA later. We understand that Operation and Maintenance will become our responsibility at the completion of the project.

Should the Corps of Engineers obtain authority to construct the recommended projects, we intend to finance our share of the construction costs through our Capital Improvements Program, subject to approval by the County Council. Should you have any questions, please contact Ali Abbasi with the Watershed Protection Branch. He may be reached directly at (301) 925-5901.

Sincerely,

Eugene T. Lauer
Director

Inglewood Center Three—9400 Peppercorn Place—Fifth Floor—Landover, Maryland 20785
TDD (301) 925-5167

United States Department of the Interior

NATIONAL PARK SERVICE
NATIONAL CAPITAL PARKS-EAST
1900 ANACOSTIA DRIVE, S. E.
WASHINGTON, D.C. 20020

IN REPLY REFER TO:

A3815(NCR-NACE)

January 10, 1994

James F. Johnson, Ph.D
Chief, Planning Division
Baltimore District
U.S. Army Corps of Engineers
Post Office Box 1715
Baltimore, Maryland 21203-1715

Dear Dr. Johnson:

The National Park Service has been working with your staff in the development of environmental restoration plans for the Anacostia Watershed for the past two years. We are familiar with the plans presented in the Draft Feasibility Report, as they relate to the D.C. reach of the Anacostia River, and support the Corps approach to improving the river environment.

We look forward to working with you and your staff in the future to develop the details of the restoration plans and to work out project logistics. Please feel free to contact me or Mr. Stephen Syphax of our Resource Management Office at (202)690-5185.

Sincerely,

Gentry Davis

Gentry Davis
Superintendent,
National Capital Parks-East

STUDY CORRESPONDENCE

ANNEX A

PUBLIC VIEWS, COMMENTS, AND RESPONSES

STUDY CORRESPONDENCE

DATE	ITEMS
May 12, 1994	Notice of Availability for the DEIS
May 9, 1994	M-NCPPC (Montgomery County) staff recommendation to the Park Board for Lockridge Drive
March 29, 1994	M-NCPPC (Montgomery County) staff comments on the draft feasibility report
February 17, 1994	M-NCPPC (Montgomery County)
January 24, 1994	ERA comments on draft feasibility report
January 22, 1994	Prince Georges County Department of Environmental Resources
January 12, 1994	DEP comments on draft feasibility report
January 10, 1994	NPS comments on draft feasibility report
December 9, 1993	NOAA comments on Public Notice
December 1, 1993	NCPC comments regarding Draft EIS
November 5, 1993	Public Notice of feasibility study
October 11, 1993	M-NCPPC (Montgomery County) staff recommendation to Park Board on eight sites
September 21, 1993	Snowden's Mill Homeowners' Association letter to Corps

ANNEX A

PUBLIC VIEWS, COMMENTS, AND RESPONSES

STUDY CORRESPONDENCE

DATE	ITEM
September 16, 1993	Corps letter to Montgomery County regarding non-Federal O & M responsibilities
September 10, 1993	Federal Register - Intent to prepare a Draft EIS
July 21, 1993	University Hills Civic Association comments on public meeting
May 21, 1993	University Hills Civic Association concerns regarding Northwest Branch
May 12, 1993	U.S. Fish and Wildlife request to include investigation of sediment toxicity in feasibility study
March 10, 1993	Prince George's County proposed sites for feasibility study
March 2, 1993	ICPRB comments on Kingman Lake draft plans
July 15, 1992	Montgomery County's proposed sites for feasibility study
February 14, 1992	Feasibility study initiation letter to Senator Sarbanes and other congressional interests
February 12, 1992	Corps letter to National Park Service regarding coordination
December 6, 1991	Feasibility Study Cost Sharing Agreement
December 4, 1991	MWCOG letter to Corps on feasibility study agreement
November 8, 1991	Corps letter to Montgomery County and other signatories regarding FCSA amendment

US Army Corps of Engineers
Baltimore District

Notice of Availability

PUBLIC NOTICE

In accordance with the National Environmental Policy Act (NEPA) and Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers, Baltimore District, is conducting public coordination regarding the construction of fish and wildlife restoration measures for the Anacostia River and Tributaries, District of Columbia and Maryland Feasibility Study. The plan consists of the restoration of 80 acres of wetlands, 5 miles of streams and 33 acres of bottomland habitat. This study was conducted under authority of the U.S. House of Representatives Committee on Public Works and Transportation resolution adopted September 8, 1988. The resolution requested the Corps of Engineers to determine if further improvements for flood control, navigation, erosion, sedimentation, water quality and other related water resources needs are advisable on the Anacostia River and tributaries. Non-Federal sponsors for the feasibility phase of the project are: Montgomery County, Prince George's County, the District of Columbia, the State of Maryland, the Interstate Commission on the Potomac River Basin, and the Metropolitan Washington Council of Governments.

The Corps of Engineers involvement in the basin dates back more than 115 years and includes projects and programs for navigation, flood control, debris removal and aquatic vegetation control. These Federal actions have served their intended purposes well and have benefited the area in terms of improved navigation and reduced flood damage. However, from 1902 through the 1960's, project construction eliminated approximately 2,600 acres of wetlands, 99,000 linear feet of aquatic habitat and 700 acres of bottomland hardwoods. These ecosystems performed numerous beneficial ecological functions for the Anacostia basin and the associated Potomac River and Chesapeake Bay. Historically, the Anacostia River basin contained a diverse assemblage of fish and wildlife species. The populations of many species have sharply declined as a result of habitat loss and degradation in the Anacostia basin.

The proposed actions are of three types, wetland restoration, stormwater management and stream restoration. Wetland restoration is proposed at Kingman Lake and River Fringe Wetlands along the Anacostia River in Washington DC, and on the Northwest Branch at the Fordham Street Wetland in Prince George's County. Restoration efforts including wetland restoration, stormwater management retrofits and stream restoration are proposed at three sites on Paint Branch in Montgomery County; Snowden's Mill I and II, and Stewart/April Lane; at Lockridge Drive on the Northwest Branch in Montgomery County and on the Little Paint Branch at Tanglewood, also in Montgomery County. Stream restoration efforts are proposed on Sligo Creek, Gum Springs and Paint Branch and the Northwest Branch in Montgomery County, and on the Northwest Branch in Prince George's County.

The decision to implement this action will be based on an evaluation of the probable impact of the proposed activities on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal will be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal, including the cumulative effects thereof, will be considered; among these factors are conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, flood plain values, land use, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, and the general needs and welfare of the people.

The Baltimore District has prepared a Draft Environmental Impact Statement (DEIS) which describes the impacts of the proposed projects on environmental and cultural resources in the study area and the overall public interest. The DEIS also applies guidelines issued by the Environmental Protection Agency, under authority of Section 404 of the Clean Water Act of 1977 (P.L. 95-217). An evaluation of the proposed actions on the waters of the United States was performed pursuant to the guidelines of the Administrator, U.S. Environmental Protection Agency, under authority of Section 404 of the Clean Water Act. The Section 404(b)(1) evaluations show that the proposed actions meet all guidelines under the Clean Water Act, and an exemption under Section 404 (r) of Public Law 92-500, as amended, is therefore requested.

In accordance with the National Environmental Policy Act and the Clean Water Act, the Corps of Engineers is soliciting comments from the public, Federal, state and local agencies and officials, and other interested parties. Any comments received will be considered by the Corps of Engineers in the decision to implement the projects. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and other public interest factors listed above. Comments regarding the environmental restoration proposal will be incorporated in to the Final Environmental Impact Statement as required by NEPA. Comments are also used to determine the overall public interest and the need for a public hearing on the proposed activities. This public notice is being sent to organizations and individuals known to have an interest in the restoration of the Anacostia River basin. Please bring this notice to the attention of any other individuals with an interest in this matter.

Any person who has an interest in the proposed projects may make comments and/or request a public hearing. Comments must clearly set forth the interest which may be adversely affected by these activities and the manner in which the interest may be adversely affected. Copies of the DEIS are available upon request. Written comments must be submitted within 45 days of the date of the notice to the following address:

District Engineer
ATTN: CENAB-PL-P
U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, MD 21203-1715

FOR THE COMMANDER:

James F. Johnson

DR. JAMES F. JOHNSON
Chief, Planning Division

DATE: 12 May 1994

Agenda Item # 5

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

Department of Parks, Montgomery County, Maryland
9500 Brunett Avenue • Silver Spring, Maryland 20901

May 9, 1994

Memorandum

To: Montgomery County Park Commission

Via: Kenneth W. Ernst, Acting Chief
Natural Resources Division

Tanya Schmeiler, Acting Chief
Park Planning and Development

From: John E. Hench, Ph.D., Senior Ecologist
Natural Resources Division

J.L. Jalali, P.E., Park Engineer
Park Planning and Development

Subject: Lockridge Drive Stormwater Management Facility

Recommendation

The Montgomery County Department of Environmental Protection (DEP) and the U.S. Army Corps of Engineers (COE) request the Park Commission's approval of the Lockridge Drive Stormwater Management Project. Department of Parks staff recommend approval of the project with the following conditions:

1. DEP and COE work closely with the Department of Parks in preparing the Forest Stand Delineation and Forest Conservation Plan for this project. The Park Commission will review and approve the Forest Conservation Plan.

2. DEP and COE continue to work closely with both the Department of Parks and Citizen's Advisory Committee during the final engineering and design phase of this project in order to ensure that the final limits of disturbance are minimized to the greatest degree possible while still achieving the desired water quality benefits.

Background

The Anacostia River Watershed Restoration Agreement of 1987 committed Montgomery County, Prince George's County, the District of Columbia, and Maryland to work cooperatively to restore water quality and stream habitat in streams in the Anacostia River Basin that have been damaged by urbanization. In 1991 the COE joined this intergovernmental effort. Montgomery County's portion of the Anacostia Watershed includes major segments of Sligo Creek, Northwest Branch, Paint Branch, and Little Paint Branch. The DEP has been working closely with the COE, the M-NCPPC, Department of Parks, and the Metropolitan Washington Council of Governments (COG), to meet the goals of the Agreement by identifying potential urban stormwater pollution control projects and stream restoration projects that can improve water quality and stream habitat conditions for fish, aquatic invertebrates, and other water dependent wildlife in the watershed.

Preliminary studies conducted under the Anacostia Watershed Restoration Agreement by the COG and DEP identified 102 potential project sites in Sligo Creek, Northwest Branch, Paint Branch, and Little Paint Branch sub-basins of the Anacostia River Watershed. These projects are listed in COG's 1992 report *A Blueprint for the Restoration of the Anacostia Watershed*. The types of projects included retrofitting existing ponds, construction of new ponds, stream restoration, and other structural stormwater controls such as peat-sand filters. Approximately 40 % of the projects were proposed for parkland. The remaining projects were proposed for other County owned land or private land.

The Lockridge Drive stormwater management facility is proposed for construction on a tributary of Northwest Branch in Northwest Branch Stream Valley Unit 4 (Figure 1). The project, which consists of an extended detention pond with a sediment forebay and wetland marsh, is designed to retrofit stormwater control to a 153 acre watershed. If the Lockridge Drive stormwater management facility is to be built, it must be located on parkland; unfortunately no other feasible alternative exists. Land use in the watershed is almost entirely residential. The area under study was developed prior to the time stormwater management was a condition of development approval. Because there are no upstream stormwater controls, the Lockridge Tributary is quite wide relative to its base flow. In fact, the stream channel is deeply incised and up to forty feet wide in the vicinity of the proposed pond.

The Department of Parks has been working closely with DEP and COE since October 1993 to minimize project impacts to the park and its natural resources. Although the area proposed for construction of the facility is currently forested, excessive channel erosion has already resulted in the loss of a number of large trees along the Lockridge Tributary and many more are severely undercut and will topple in the near future. To the greatest degree possible, the project has been designed and sited to balance impacts to the park, provide an adequate buffer between the facility and adjacent

residents, and provide the desired water quality benefits.

At the Department of Parks request, DEP has provided a preliminary estimate of the number of trees that would be lost if this project were built.[1] This estimate assumes a disturbance area of approximately 65,000 square feet (1.5 acres). The results were: 8 trees with a diameter greater than 30 inches, 21 with a diameter 18-30 inches, 49 with a diameter 10-18 inches, 86 with a diameter 6-10 inches, and 78 with a diameter 2-6 inches (232 total). Adequate provisions to mitigate this loss will be incorporated into the future Forest Conservation Plan for the project. Specifically, staff will request 2:1 reforestation on a per acre basis in the same watershed, container grown native stock (1-2 inch caliper for trees), and a 10 foot spacing (437 plants per acre) for planted material.

Staff from the DEP, COE, and Department of Parks have met with members of the Northwood-Four Corners Civic Association on three occasions regarding this project: July 27, 1993, March 17, 1994, and April 10, 1994. The most recent meeting was at the project site. The March meeting was attended by 55 citizens whereas only eight citizens accompanied staff from DEP, COE and the Department of Parks on the field walk. A citizen advisory committee has been formed within the civic association to work with staff on the project.

Staff from the DEP and COE will be present at the May 16th Park Commission meeting to present details of this project and answer specific questions.

Attachments:
Figure 1
Letters

B:\lockridge.wp

pc: Mr. Donald K. Cochran
Dr. Edward U. Graham
Mr. Tony Janda
Mr. Mark McKevitt
Mr. Lester Straw

---

[1]Staff also requested a count of the number of trees that have recently been lost to channel erosion along the Lockridge Tributary as well as an estimate of the number of trees that will be lost over the next five years. This information is not yet available.

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
Department of Parks, Montgomery County, Maryland
9500 Brunett Avenue • Silver Spring, Maryland 20901

March 29, 1994

Daniel Harper, Engineer III
Montgomery County Government
Department of Environmental Protection
Division of Water Resources Management
250 Hungerford Drive, Second Floor
Rockville, Maryland 20850-4159

Re: Draft Report - Anacostia River and Tributaries/Integrated Feasibility and Environment Impact Statement

Dear Dan:

The following comments are a result of recent staff review and subsequent discussion of the draft report, dated January 1994, as submitted by the Baltimore District of the U.S. Army Corps of Engineer:

1. Vol. II, Appendix A, Section 5.1. Although recent discussions among county officials concerning the Blair High School - Sligo Golf Course controversy have included the Stewart - April Lane site as a possibility, the authors of this report may not wish to consider this possibility at this time.

2. Vol. II, Appendix A, Section 5.2. Recent discussions concern tree preservation at the Lockridge Drive pond site. We suggest that the designers investigate the possibility of narrowing the maintenance access road on the north side and/or increase the side slope to 2-1/2:1. The 24-hour ED control for 0.4 inches of runoff may be reduced. The existing pedestrian access should be incorporated into the design across the dam.

3. Vol. II, Appendix B - Real Estate. The total land costs for the nine sites in Montgomery County have been assessed at $57,110, or $1307 per acre plus easements and contingencies. M-NCPPC staff feel that this figure is quite low. We will pursue this matter in future discussions with the Real Estate Division.

Yours truly,
MONTGOMERY COUNTY PARKS

4. Vol. II, Appendix C - Cultural Resources. Although M-NCPPC supports the final recommendation as stated in the study, we do not concur with being given the responsibility of production of the Phase III report. These concerns were summarized in the 2/17/94 letter from Jim Sorensen to James Johnson.

5. There is a general concern with regard to construction phasing of the nine Montgomery County projects. Practically speaking, and in the interest of cost efficiency, these projects may be bid as one contract or even added to the Prince George's County sites. Our concern then is the total impact on parkland and in our supervisory/inspection roles during construction. This matter will be discussed at length in the future.

Please contact me if you require further clarification of these comments.

Sincerely,

Robert E. Kane
Park Engineer III

REK/dw
cc - John Hench, Natural Resources
bk32994

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
Department of Parks, Montgomery County, Maryland
9500 Brunett Avenue • Silver Spring, Maryland 20901

February 17, 1994

James F. Johnson, Ph.D.
Chief, Planning Division
U.S. Army Corps of Engineers
Baltimore District

Dear Dr. Johnson:

The Department of Parks, Montgomery County, Maryland was pleased to receive a review copy of "A Phase I/II Cultural Resource Survey of the Anacostia River Basin...". The Montgomery County portion of the report was satisfactory (pp. 12-21), and the Parks Department supports your final recommendations, including the proposed Phase III investigations along portions of the Paint Branch between Fairland and Randolph Roads (p. 23).

However, we want to bring to your attention a statement in the cover letter (p. 2, paragraph 2, item no. 3) which indicates that your actions will consist of " 3) preparation of a plan for the extended excavation of the resources (in the Valley Mill District) to be implemented by the M-NCPPC". If this means that the Department of Parks will be responsible for any Phase III compliance that the Maryland Historical Trust requires, then we cannot concur. Since any archaeological compliance under Section 106 of the Historic Preservation Act of 1966, etc., was only required because of your agency's involvement, the Army Corps should be responsible for the final production of any Phase III report, just as it was responsible for the Phase I/II study initially.

If the Maryland Historical Trust does require a Phase III investigation, the Department of Parks further suggests that the work could be limited to the area of most direct impact, which centers around the Snowden's Mill portion of the Paint Branch section between Fairland and Randolph Roads (pp. 19-20).

Yours Truly,
MONTGOMERY COUNTY PARKS

Finally, as with the Phase I/II investigations, the History and Archaeology Section of the Department of Parks will be more than willing to consult on any further archaeological mitigation plans that the Army Corps undertakes.

Respectfully Yours,

James D. Sorensen

James D. Sorensen, Ph.D.
Archaeologist
Montgomery Co. Dept. of Parks

cc: Michael Dwyer, M-NCPPC
Ken Ernst, M-NCPPC
Laura Henley, SHPO, WDC
Kenneth Baumgardt, ACOE
Gary Shaefer, Ph.D., MHT

GOVERNMENT OF THE DISTRICT OF COLUMBIA

DEPARTMENT OF CONSUMER AND REGULATORY AFFAIRS
ENVIRONMENTAL REGULATION ADMINISTRATION
2100 MARTIN LUTHER KING, JR. AVENUE S.E.
WASHINGTON, D.C. 20020-5722

James F. Johnson, Ph. D.
Chief, Planning Division
U. S. Army Engineer District, Baltimore
Post Office Box 1715
Baltimore, Maryland 21203-1715

Dear Dr. Johnson:

The staff of the District of Columbia's Environmental Regulation Administration and the Office of Policy and Planning, Department of Public Works, have been working with your staff over the last two years to develop and design environmental restoration plans in the District's portion of the Anacostia River, including the Kingman Lake. We have completed our review of the draft Feasibility Study which contains the proposed plan for the creation of wetlands in the District. We are in general agreement with the proposed projects.

It is our understanding that since the proposed projects in the District will be on federal land, the District will not be required to participate financially in these projects. The District will work with the National Park Service to develop an arrangement for the maintenance of the projects after they are completed.

We also intend to continue our involvement with the proposed projects during the implementation phase. Please call upon us for any assistance we can provide in facilitating the implementation of the projects.

Sincerely,

Ferial S. Bishop
Administrator

cc.: Ken Laden, OPP, DPW

THE PRINCE GEORGE'S COUNTY GOVERNMENT
DEPARTMENT OF ENVIRONMENTAL RESOURCES

January 22, 1994

Mr. James F. Johnson, Ph.D
Chief, Planning Division
U.S. Army Engineer District, Baltimore
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dear Mr. Johnson:

The Department of Environmental Resources has been working with your staff over the last two years to develop and design environmental restoration plans in the Prince George's County portion of the Anacostia River Basin. We are in substantial agreement with the plans that are presented in the Preliminary Draft Feasibility Report and fully support the Corps watershed approach adopted in this study. We understand that the County will be afforded an opportunity to review a complete draft report in February.

In principle, we are in general agreement with the Model Local Cooperation Agreement. However, the County's Office of Law will conduct a full review of the LCA later. We understand that Operation and Maintenance will become our responsibility at the completion of the project.

Should the Corps of Engineers obtain authority to construct the recommended projects, we intend to finance our share of the construction costs through our Capital Improvements Program, subject to approval by the County Council. Should you have any questions, please contact Ali Abbasi with the Watershed Protection Branch. He may be reached directly at (301) 925-5901.

Sincerely,

Eugene T. Lauer
Director

15-28

1. Project Number	Agency No.	A. IDENTIFICATION AND CODING INFORMATION	7.PRE. POF PG NO	8. REG. AGEQ. PUB. FAC. DIST.
938142		2. Date Dec 17, 1992	12-33	
		Re. Revised:		
3. Project Name	SM RETROFIT-ANACOSTIA	5. Agency ENVIRONMENTAL PROTECTION		
4. Program	CONSERVATION OF NATURAL RESOURCES	6. Planning Area PATUXENT		

B. EXPENDITURE SCHEDULE ($000)

Cost Elements	(8) Total	(9) Thru FY 92	(10) Estimate FY 93	(11) Total 6 Years	(12) Year 1 FY 94	(13) Year 2 FY 95	(14) Year 3 FY 96	(15) Year 4 FY 97	(16) Year 5 FY 98	(17) Year 6 FY 99	(18) Beyond 6 Years
1. Planning,Design and Supervision	502		174	328	108	100	30	30	30	30	
2. Land											
3. Site Improvements and Utilities											
4. Construction	1080			1080			270	270	270	270	
5. Other											
6. Total	1582		174	1408	108	100	300	300	300	300	

C. FUNDING SCHEDULE ($000)

SM FUND	1157		174	983	108	100	215	220	220	120	
G.O. BONDS	425			425			85	80	80	180	

D. ANNUAL OPERATING BUDGET IMPACT ($000)

DEBT SVC	99	9	18	27	45	
NET IMPACT	99	9	18	27	45	
WORK YRS						

E. DESCRIPTION AND JUSTIFICATION PROJECT NO.: 938142 PROJECT NAME: SM RETROFIT-ANACOSTIA

DESCRIPTION: This project provides for the design and construction of stormwater management retrofit and stream restoration projects which create wetlands and enhance aquatic habitat within the Anacostia River Watershed. In FY 92, the County entered into an interagency agreement with the Army Corps of Engineers [COE] for a feasibility study to make final site selections and prepare engineering designs for numerous projects within the Anacostia River Basin. Other signatories to the agreement are Prince George's County, the District of Columbia, the State of Maryland, the Metropolitan Washington Council of Governments, and the Interstate Commission on the Potomac River Basin. The feasibility study, and design and construction of the projects selected in Montgomery County, will be managed by the COE with assistance from DEP. Service Area: Anacostia River Watershed.
JUSTIFICATION: This project will improve local stream water quality and protect waterway conditions and enhance wildlife and aquatic habitats in the Montgomery County segments of Sligo Creek, Northwest Branch, Paint Branch, and Little Paint Branch tributaries within the interjurisdictional Anacostia River Watershed. The project supports the goals of the Chesapeake Bay initiatives and the Anacostia Watershed Restoration Agreement. Plans and Studies: "Anacostia River Basin Reconnaissance Study", U.S. Army Corps of Engineers. Specific Data: The construction of retrofit projects within the Anacostia River Basin has resulted in degradation of water quality and the loss of wetlands and wildlife and aquatic habitats. This project will help improve water quality and mitigate wetlands and habitat losses.
STATUS: Some projects are in the early stages of design. Cost increase: Due to additional construction in six-year period.
OTHER: This project is funded through a Federal cost-share agreement, with the Federal Government paying for 50% of the costs of the feasibility study and 75% of construction costs for projects designed under the feasibility study. Expenditures displayed above reflect County payments to Corps of Engineers for design/construction activities. Expenditures planned for FY 94 include $11,000 for 0.2 County staff workyear.

F. APPROPRIATION AND EXPENDITURE DATA

		($000)
Date First Appropriation	93	
Initial Cost Estimate		1282
First Cost Est Current Scope	($0)	1282
Last FY's Cost Estimate		1282
Present Cost Estimate	($0)	1582

Cumulative Appropriation	Expenditures/ Encumbrances	Unencumbered Balance
174	0	174

Appropriation Request Budget Yr FY 94	108
Supplemental Appropriation Request	0
Current Year FY 93	

G. RELOCATION IMPACT

H. MAP

I. COORDINATION & OTHER INFORMATION
(INCL SUBPROJS & WORK PROG LISTS)

DEP will provide overall project coordination.

Corps of Engineers will manage design and construction of projects.

MWCOG will provide coordination between all parties of the Cost-Share Agreement.

Montgomery County Government

January 12, 1994

Dr. James F. Johnson, Chief
Planning Division
U.S. Army Corps of Engineers
Baltimore District
P.O. Box 1715
Baltimore, Md. 21203-1715

Dear Dr. Johnson:

The Department of Environmental Protection has been working with your staff over the last two years to develop and design environmental restoration plans in the Montgomery County portion of the Anacostia River basin. We are in substantial agreement with the plans that are presented in the Draft Feasibility Report and fully support the Corps watershed approach adopted in this study.

We are in general agreement with the Model Local Cooperation Agreement. We understand that Operation and Maintenance will become our responsibility at the completion of the project.

Should the Corps of Engineers obtain authority to construct the recommended projects, we plan to finance our share of the construction costs through the Montgomery County Capital Improvements Program (CIP). The project budget sheet for the FY 1994-1999 CIP program, which includes construction cost support for the projects recommended in the Feasibility study, is enclosed. We have also been funding the current feasibility study work out of this project.

Sincerely,

Edward U. Graham
Director

Enclosure

EUG:SW:dh

cc: Daniel Harper

United States Department of the Interior

NATIONAL PARK SERVICE
NATIONAL CAPITAL PARKS-EAST
1900 ANACOSTIA DRIVE, S. E.
WASHINGTON, D.C. 20020

IN REPLY REFER TO:

A3815(NCR-NACE)

January 10, 1994

James F. Johnson, Ph.D
Chief, Planning Division
Baltimore District
U.S. Army Corps of Engineers
Post Office Box 1715
Baltimore, Maryland 21203-1715

Dear Dr. Johnson:

The National Park Service has been working with your staff in the development of environmental restoration plans for the Anacostia Watershed for the past two years. We are familiar with the plans presented in the Draft Feasibility Report, as they relate to the D.C. reach of the Anacostia River, and support the Corps approach to improving the river environment.

We look forward to working with you and your staff in the future to develop the details of the restoration plans and to work out project logistics. Please feel free to contact me or Mr. Stephen Syphax of our Resource Management Office at (202)690-5185.

Sincerely,

Gentry Davis
Superintendent,
National Capital Parks-East

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Habitat And Protected
Resources Division
Oxford, Maryland 21654

December 9, 1993

Dr. James F. Johnson
Chief, Planning Division
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203

Attn: Mark McKevitt

Dear Dr. Johnson:

This pertains to Public Notice CENAB-PL-PR and the feasibility study on restoration of the Anacostia River Basin.

While we unquestionably favor many of the actions being considered, such as stream restoration projects within the nontidal portions of the watershed, others, such as Kingman Lake, may require closer scrutiny relative to potential impacts to riverine hydrology and anadromous fish resources. Consequently, we wish to continue our involvement in the environmental review on this study, particularly regarding the Draft Environmental Impact Statement to be released during spring 1994.

If there are any questions, you may contact John S. Nichols (410) 226-5771.

Sincerely,

Timothy E. Goodger
Assistant Coordinator

cc: MDE-Water Qlty Cert. Div.
US FWS
DNR-WRA-Tidal
DNR-Tide. Admin. Power Plant & Envir. Review
EPA Attn: Ralph Spagnolo

NATIONAL CAPITAL PLANNING COMMISSION

COMMISSION MEMBERS

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Glen T. Urquhart
CHAIRMAN

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Dr. Thaddeus Garrett, Jr.

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Dr. Patricia Elwood
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Administrator of General Services
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Chairman, Committee on Governmental Affairs
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U.S. House of Representatives
Honorable Fortney Pete Stark

Mayor, District of Columbia
Honorable Sharon Pratt Kelly

Chairman, Council of the District of Columbia
Honorable David A. Clarke

EXECUTIVE DIRECTOR
Reginald W. Griffith

IN REPLY REFER TO:
NCPC File Nos. 1200 and MP35

DEC - 1 1993

Mr. Mark McKevitt
ATTN: CENAB-PL-PR
Baltimore District
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715

Dear Mr. McKevitt:

Thank you for your continued coordination of the feasibility of the restoration projects in the Anacostia River basin. We appreciate the opportunity to identify issues that should be addressed in the Draft Environmental Impact Statement (DEIS). The Commission has previously commented on the draft of the Anacostia Federal Environmental Restoration Report. Our comments pertained to the consistency between Restoration Plan's goals, objectives, and initiatives and the Comprehensive Plan for the National Capital's goals and policies. We continue to support your efforts to the extent that they preserve or enhance the natural and scenic qualities of the Anacostia River basin. The Commission has also previously commented that some of the projects might involve Capper-Cramton lands. We encourage you to continue your consultation with the Maryland National Capital Park and Planning Commission.

Our staff supports the restoration efforts, since they could improve aquatic habitats and increase the populations and diversity of fish and wildlife. They should also improve the river's and Chesapeake Bay's water quality. The wetland and stream restorations and stormwater management alternatives should likewise improve flood control efforts.

In addition to our earlier comments, the staff has identified additional issues for your consideration. The following comments address those issues. We encourage the Corps to include interested Federal, state, and local agencies in the National Environmental Policy Act process by meeting with agencies early in the process. Potential opportunities for low impact recreation uses, such as hiker-biker trails, should be evaluated in the DEIS. The life expectancies of projects, particularly alternatives using structural or mechanical features, should be cited in the document. If additional studies will be needed to further evaluate impacts, the

types and scopes of such studies should be incorporated into the DEIS. Finally, we recommend that the DEIS note the agencies responsible for implementation of policies and projects.

Thank you for your consultation regarding the restoration project. If you have any questions, please contact Maurice Foushee at (202) 724-0179.

Sincerely,

Reginald W. Griffith
Executive Director

US Army Corps of Engineers
Baltimore District

NOV 9 1993

Public Notice

ALL INTERESTED PARTIES

The Baltimore District U.S. Army Corps of Engineers is investigating the feasibility of the construction of fish and wildlife restoration projects in the Anacostia River basin. The feasibility study of the potential projects is being conducted under the authority of a U.S. House of Representatives Committee on Public Works and Transportation resolution adopted September 8, 1988. The non-Federal sponsors for the feasibility phase of the project are: Montgomery County, Prince George's County, the District of Columbia, the State of Maryland, the Interstate Commission on the Potomac River Basin and the Metropolitan Washington Council of Governments.

The Anacostia River basin is a 170-square mile sub-basin of the Potomac River which has its headwaters in the piedmont and coastal plain areas of Montgomery and Prince George's Counties, Maryland and joins with the Potomac River in the District of Columbia. The entire river system is freshwater; although, the tidal influence extends for approximately 8 miles above the confluence with the Potomac River.

The environmental integrity of much of the Anacostia River and its tributaries has been severely degraded by urbanization and previous construction of Federal projects to meet flood control and navigation needs. However, portions of the upper reaches of some of the tributaries are relatively undisturbed and contain unique environmental reaches for this watershed.

The Corps of Engineers involvement in the basin dates back more than 115 years and includes projects and programs for navigation, flood control, debris removal and aquatic vegetation control. These Federal actions have served their intended purposes well and have benefited the area in terms of improved navigation and reduced flood damages. However, from 1902 through the 1960s, project construction eliminated approximately 2,600 acres of wetlands, 99,000 linear feet of aquatic habitat and 700 acres of bottomland hardwoods. These ecosystems performed numerous beneficial ecological functions for the Anacostia basin and associated Potomac River and Chesapeake Bay. One of the primary functions of these ecosystems is fish and wildlife habitat. Historically, the Anacostia River basin contained a diverse assemblage of fish and wildlife species. However, populations of many species have sharply declined due to the habitat degradation and loss in the Anacostia basin.

For each of the following actions various restoration alternatives will be considered, including the No Action alternative. A summary of the proposed restoration actions are as follows:

WETLAND RESTORATION:

Site	Action *	Target Stream	Jurisdiction
Kingman Lake	WR	Anacostia River	Washington, DC
River Fringe Wetlands	WR	Anacostia River	Washington, DC
Fordham Street Wetland	WR	Northwest Branch	Prince George's Co

AQUATIC RESTORATION:

Site	Action	Target Stream	Jurisdiction
Northwest Branch	SR	Northwest Branch	Prince George's Co
Tanglewood Retrofit	WR/SM/SR	Little Paint Branch	Montgomery Co
Snowden's Mill I	WR/SM/SR	Paint Branch	Montgomery Co
Snowden's Mill II	WR/SM/SR	Paint Branch	Montgomery Co
Stewart/April Lane	WR/SM/SR	Paint Branch	Montgomery Co
Lockridge Drive	WR/SM/WR	Northwest Branch	Montgomery Co
Gum Springs	SR	Gum Springs	Montgomery Co
Sligo Creek	SR	Sligo Creek	Montgomery Co
Northwest Branch	SR	Northwest Branch	Montgomery Co
Paint Branch	SR	Paint Branch	Montgomery Co

* WR - Wetland Restoration
SM - Stormwater Management
SR - Stream Restoration

The Baltimore District is preparing a Draft Environmental Impact Statement (DEIS) which will describe the impacts of the proposed projects on environmental and cultural resources in the study area and the overall public interest. If applicable, the DEIS will also apply guidelines issued by the Environmental Protection Agency, under the authority of Section 404 of the Clean Water Act of 1977 (Pub. L. 95-217).

The public involvement has included meetings and close coordination with interested private individuals and organizations, as well as concerned Federal, state and local agencies, and other interested organizations and parties to participate in this study. Agencies that are currently involved in the feasibility study and EIS process include, but are not limited to the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Geological Service, U.S. Soil Conservation Service, National Park Service, Montgomery County Department of Environmental Protection, Prince George's County Department of Environmental Resources, District of Columbia Department of Consumer and Regulatory Affairs and Department of Public Works, Maryland Department of Natural Resources, Maryland Department of the Environment, Maryland National Capital Park and Planning Commission, Interstate Commission on the Potomac River Basin, and the Metropolitan Washington Council of Governments.

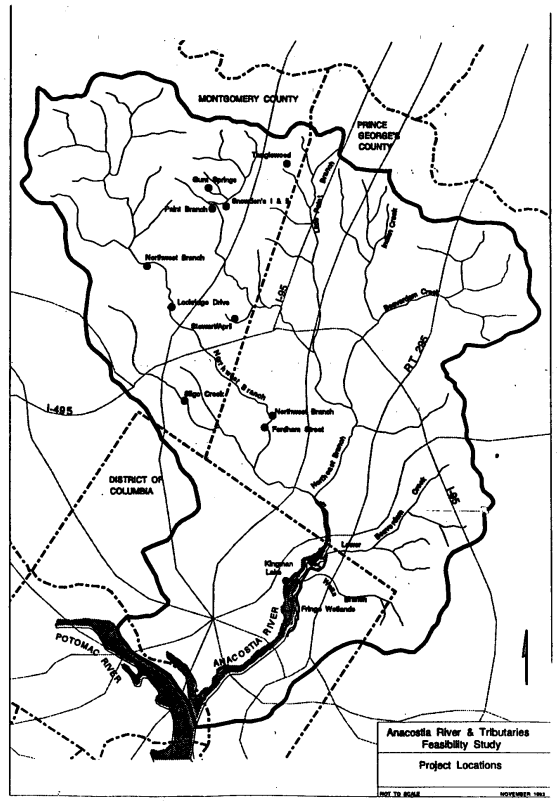
The DEIS is tentatively scheduled to be available for public review in the spring of 1994.

The Baltimore District is currently drafting the EIS and technical appendices. Close coordination has been maintained with the agencies listed in the preceeding paragraph and the affected public. The COE is extending an invitation to others who might be interested in and have comments regarding the proposed projects. Comments are requested within 30 days of the date of this notice to the following address:

Mark McKevitt
ATTN: CENAB-PL-PR
Baltimore District
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203-1715.

David S. Fabb
for Dr. James F. Johnson
Chief, Planning Division

DATE: November 5, 1993



MR. ROBERT J. KLIMPE
STATE CONSERVATIONIST
SOIL CONSERVATION SERVICE, USDA
339 BUSCH'S FRONTAGE ROAD
SUITE 301
ANNAPOLIS, MD 21401-5534

MR. RICHARD ROE
REGIONAL DIRECTOR
NATIONAL MARINE FISHERIES SERVICE
ONE BLACKBURN DRIVE
GLOUCESTER, MA 01930

DR. EDWARD CHRISTOFFERS
NOAA CHESAPEAKE BAY PROGRAM SCIENCE COORDINATOR
NOAA, NATIONAL MARINE FISHERIES SERVICE
410 SEVERN AVENUE, SUITE 107
ANNAPOLIS, MD 21403

MR. TIMOTHY GOODGER
ASSISTANT COORDINATOR
NATIONAL MARINE FISHERIES SERVICE
HABITAT AND PROTECTED RESOURCES
OXFORD, MD 21654-0279

MR. JOHN P. WOLFLIN
SUPERVISOR, ANNAPOLIS FIELD OFFICE
U.S. FISH AND WILDLIFE SERVICE
1825-B VIRGINIA STREET
ANNAPOLIS, MD 21402

MR. JAMES G. PETERS
DISTRICT CHIEF HYDROLOGIST
U.S. GEOLOGICAL SURVEY
208 CARROLL BUILDING
8600 LASALLE ROAD
TOWSON, MD 21286

MR. GENTRY DAVIS
SUPERINTENDENT
NATIONAL CAPITAL PARKS - EAST
U.S. NATIONAL PARK SERVICE
1900 ANACOSTIA DRIVE, SE.
WASHINGTON, DC 20020

MR. JOHN G. PARSONS
ASSOCIATE REGIONAL DIRECTOR
LAND USE COORDINATION
NATIONAL PARK SERVICE, NAT CAPITAL REG
1100 OHIO DRIVE, S.W.
WASHINGTON, DC 20242

MR. ROBERT STANTON
DIRECTOR
NATIONAL CAPITAL REGION
NATIONAL PARK SERVICE
1100 OHIO DRIVE, SW
WASHINGTON, DC 20242

MR. JOHN J. REYNOLDS
REGIONAL DIRECTOR
U.S. NATIONAL PARK SERVICE
143 SOUTH THIRD STREET
PHILADELPHIA, PA 19106

CPT GREGORY S. COPE
COMMANDING OFFICER
U.S. COAST GUARD MARINE SAFETY OFFICE
U.S. CUSTOM HOUSE
40 SOUTH GAY STREET
BALTIMORE, MD 21202-4022

MR. CHARLES SPOONER
U.S. ENVIRONMENTAL PROTECTION AGENCY
401 M STREET S.W.
WASHINGTON, DC 20460

MR. WILLIAM MATUSZESKI
U.S. ENVIRONMENTAL PROTECTION AGENCY
CHESAPEAKE BAY PROGRAM OFFICE
410 SEVERN AVENUE
ANNAPOLIS, MD 21403

MR. ROY E. DENMARK JR.
U.S. EPA, REGION III
ENVIRONMENTAL PLANNING AND ASSESSMENT SECTION
841 CHESTNUT BUILDING
PHILADELPHIA, PA 19107

MR. STANLEY L. LASKOWSKI
ACTING REGIONAL ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY REGION III
841 CHESTNUT BUILDING (3EA43)
PHILADELPHIA, PA 19107-4431

MS. THERESA CORELESS
CRITICAL AREAS COMMISSION
45 CALVERT STREET
2ND FLOOR
ANNAPOLIS, MD 21401

MR. ANDREW DER
STANDARDS & CERTIFICATION DIVISION
WATER QUALITY PROGRAMS
MARYLAND DEPARTMENT OF ENVIRONMENT
2500 BROENING HIGHWAY
BALTIMORE, MD 21224

MR. ROBERT PERCIASEPE JR.
SECRETARY
MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 BROENING HIGHWAY
BALTIMORE, MD 21224

MS. JANET MCKEGG
ADMINISTRATOR
NATURAL HERITAGE PROGRAM
MARYLAND DEPARTMENT OF NATURAL RESOURCES
TAWES STATE OFFICE BUILDING E-1
ANNAPOLIS, MD 21401

MR. ROBERT MILLER
DIRECTOR, WATER RESOURCES ADMINISTRATION
MARYLAND DEPARTMENT OF NATURAL RESOURCES
580 TAYLOR AVENUE
TAWES STATE OFFICE BUILDING
ANNAPOLIS, MD 21401-9974

DR. EMERY T. CLEAVES
DIRECTOR
MARYLAND GEOLOGICAL SURVEY
MARYLAND DEPARTMENT OF NATURAL RESOURCE
2300 ST. PAUL STREET, SUITE 440
BALTIMORE, MD 21218

MR. J. RODNEY LITTLE
STATE HISTORIC PRESERVATION OFFICER
HISTORICAL AND CULTURAL PROGRAMS
MD DEPT OF HOUSING & COMMUNITY DEVELOP.
100 COMMUNITY PLACE, THIRD FLOOR
CROMSVILLE, MD 21032-2023

MS. FERIAL BISHOP
ADMINISTRATOR
ENVIRONMENTAL REGULATION ADMINISTRATION
DEPART OF CONSUMER & REGULATORY AFFAIRS
2100 MARTIN LUTHER KING JR., AVE., SE
WASHINGTON, DC 20020

MR. REGINALD W. GRIFFITH
EXECUTIVE DIRECTOR
NATIONAL CAPITAL PLANNING COMMISSION
801 PENNSYLVANIA AVENUE, NW
SUITE 301
WASHINGTON, DC 20576

MR. HERBERT M. SACHS
EXECUTIVE DIRECTOR
INTERSTATE COMMISSION ON THE
POTOMAC RIVER BASIN
6110 EXECUTIVE BOULEVARD, SUITE 300
ROCKVILLE, MD 20852-3903

MR. WES JOHNSON
MARYLAND NATIONAL CAPITAL PARK AND
PLANNING COMMISSION
PARK PLANNING AND DEVELOPMENT DIVISION
6600 KENILWORTH AVENUE
RIVERDALE, MD 20737

MR. J.L. JALALI
ENGINEERING SUPERVISOR
PARK PLANNING AND DEVELOPMENT
9500 BRUNETT AVENUE
SILVER SPRING, MD 20901

MR. JOHN W. RHOADS
CHAIRMAN
MARYLAND NATIONAL CAPITAL PARK AND
PLANNING COMMISSION
14741 GOVERNOR ODEN BOWIE DRIVE
UPPER MARLBORO, MD 20772

MS. RUTH R. CROWE
EXECUTIVE DIRECTOR
METROPOLITAN WASHINGTON COUNCIL
OF GOVERNMENTS
777 NORTH CAPITOL STREET, NE, SUITE 300
WASHINGTON, DC 20002-4201

MR. THOMAS R. SCHUELER
CHIEF, ANACOSTIA RESTORATION TEAM
METROPOLITAN WASHINGTON COUNCIL
OF GOVERNMENTS
777 NORTH CAPITOL STREET, NE., SUITE 30
WASHINGTON, DC 20002-4201

MR. ROBERT E. BOONE
EXECUTIVE DIRECTOR
ANACOSTIA WATERSHED SOCIETY
5110 ROANOKE PLACE
SUITE 101
COLLEGE PARK, MD 20740

MS. CYNTHIA A. GREENE
PRESIDENT
ARBORETUM CIVIC ASSOCIATION
1822 24TH STREET, N.E.
WASHINGTON, DC 20002

MR. NEAL FITZPATRICK
CONSERVATION DIRECTOR
AUDUBON NATURALIST SOCIETY
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REISS SCIENCE BUILDING, ROOM 406
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WASHINGTON, DC 20020

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PAINT BRANCH CHAIR
POTOMAC/PATUXENT CHAPTER
TROUT UNLIMITED
10602 WOODSDALE DRIVE
SILVER SPRING, MD 20901

MR. RAYMOND J. MILLER
PRESIDENT
UNIVERSITY HILLS CIVIC ASSOCIATION
3319 GUNWOOD DRIVE
HYATTSVILLE, MD 20780

5

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
Department of Parks, Montgomery County, Maryland
9500 Brunett Avenue • Silver Spring, Maryland 20901

Agenda Date: October 18, 1993

October 11, 1993

MEMORANDUM

TO: Montgomery County Park Commission

VIA: Carl Hahn, Chief, Natural Resources Division CH

Myron B. Goldberg, Chief, Park Planning and Development Division

FROM: John E. Hench, Senior Ecologist } CH
J.L. Jalali, Park Engineer

SUBJECT: Request by Montgomery County Department of Environmental Protection to Construct or Retrofit Stormwater Management Facilities and Restore Streams on M-NCPPC Owned or Managed Parkland

---

STAFF RECOMMENDATION:

Staff recommends approval of Montgomery County Department of Environmental Protection's proposal to construct, retrofit or restore the following projects on M-NCPPC owned or managed Parkland:

a. Paint Branch Stream Restoration Project
(Fairland Road to Route 29)

b. Sligo Creek Stream Restoration Project
(Wayne Avenue to Piney Branch Road)

c. Northwest Branch Stream Restoration Project
(South of Randolph Road and east of Kemp Mill Road)

d. Gum Springs Stream Protection Project

e. Tanglewood II Stormwater Management Retrofit Project

f. Stewart/April Lane Stormwater Management Pond

g. Snowdens Mill I Stormwater Management Retrofit Project

h. Snowdens Mill II Stormwater Management Retrofit Project

i. Hollywood Branch Sand/Peat Filter

j. Sligo Creek Golf Course Stormwater Management Pond

BACKGROUND:

Montgomery County was a party to the Anacostia River Watershed Restoration Agreement of 1987. The aim of the agreement was to plan and implement a comprehensive program to restore streams in the Anacostia Basin (segments of Sligo Creek, Northwest Branch, Paint Branch and Little Paint Branch) which were damaged/degraded by the intense development in the area. To meet the goals of the Anacostia Agreement, Montgomery County in cooperation with U.S. Army Corps of Engineers, Metropolitan Washington Council of Governments and M-NCPPC Department of Parks has identified potential sites for stormwater facilities, both new and retrofits, and stream habitat restoration projects which when completed will help control stream pollution and improve the water quality of these streams.

After preparing concept plans, Montgomery County Department of Environmental Protection held public meetings for all the above projects. Public meetings were also held for two other projects, Lycoming Street Detention Marsh and Lockridge Drive Stormwater Management Pond. As a result of public comments received, DEP has decided not to proceed with Lycoming Street Detention Marsh. DEP has also deferred consideration of Lockridge Drive Stormwater Management Pond to provide Department of Parks staff more time to evaluate trade-offs associated with that project.

For the ten projects being presented to the Park Commission on October 18, 1993, no significant adverse comments were heard during the Public Information Meetings.

STREAM RESTORATION PROJECTS
a) PAINT BRANCH, b) SLIGO CREEK, AND c) NORTHWEST BRANCH

Stream Restoration Includes:

1. Bank Protection with installation of imbricated rip rap or root wads, log drop structures (installation of a 12" diameter log across the stream), wing deflectors installation to increase pool depths and improve riffle/pool relationship (stones placed in channel invert

to deflect base flow). All of these measures help in providing good habitat for fish proliferation and stopping bank erosion.

2. Introduction of native fish species in the stream and monitoring their success.

This type of project was successfully implemented in Wheaton Branch of Sligo Creek in 1992.

d) GUM SPRINGS STREAM PROTECTION PROJECT:

Gum Springs Stream is an improtant spawning area for brown trout in Paint Branch. Currently two wet ponds in Oak Springs subdivision are discharging relatively warmer water into Gum Springs Stream. These ponds were a condition of subdivision approval and were designed to remove pollutants from subdivision storm run-off. In order to keep the water temperature in Gum Springs cool, it was determined that it would be better to divert base flow from these ponds around the critical length of Gum Springs Stream. Bypass pipe installation involves only secondary tree growth removal (tree size approximately 2"). The staff believes that the benefits gained however will clearly outweigh the loss of small sapling sized trees.

STORMWATER MANAGEMENT PONDS/RETROFITS
e) TANGLEWOOD II, f) STEWART/APRIL LANE,
g) & h) SNOWDENS MILL I & II, AND
i) SLIGO CREEK GOLF COURSE:

Tanglewood II and Snowdens Mill I & II are existing dry ponds. These are proposed to be converted into wetland ponds. Stewart/April Lane and Sligo Creek Golf Course are new proposed wet ponds.

All of the ponds will be designed to provide extended detention quality control ranging from 0.25 inch to 0.5 inch of run-off. Tanglewood, Snowdens Mill I & II and Sligo Creek Golf Course will also provide 2-year quantity control.

The staff believes that the environmental/water quality benefits derived from these ponds will outweigh potential tree loss. We anticipate loss of approximately 1/2 acre of forest on one (Stewart/April Lane) of the five ponds. Tree loss on the remaining four ponds will be less. The larger issue of project impact to existing tree cover will be dealt with during the detailed design stage of each project when a Forest Conservation Plan is prepared for the Board's approval. As required by County regulation, reforestation/mitigation will be an important element of each plan.

i) HOLLYWOOD BRANCH SAND/PEAT FILTER

Sand/Peat filter will be an underground facility with a small pond at the inflow. This facility will have two advantages: 1) the temperature of water coming out of the facility will be low, and 2) some pollutants will have a higher percentage of removal than in the traditional stormwater management facilities.

CONCLUSION:

Staff believes that all ten of these facilities are going to provide significant cumulative benefit to the water quality in the Anacostia River as well as the county streams. Therefore, staff recommends approval of the above mentioned ten projects. Please refer to attached memorandum from Lester Straw which identifies the background for the staff recommendation.

JLJ:ymw

SNOWDENS MILL HOMEOWNERS' ASSOCIATION, INC.
P.O. Box 118
Burtonsville, Maryland 20866

September 21, 1993

Mr. Mark E. McKevitt
US Army Corps of Engineers
Planning Division
111 Market Place
P. O. Box 1715, Attn: PL-B
Baltimore, MD 21203-1715

RE: Snowdens Mill Stormwater Management Ponds I & II Retrofit

Dear Mr. McKevitt:

I am chairman of the Snowdens Mill Homeowners' Association Grounds Committee. would like to be notified of all meetings and receive any information that you have concerning your future plans on these areas.

Please mail all correspondence to me as follows:
Fred A. Pierdon
1916 Lodestone Drive
Silver Spring, MD 20904

I can be reached during the day at (301) 989-0099.

Sincerely yours,

Fred A. Pierdon

September 16, 1993

Planning Division

Mr. Gus Bauman
Chairman
Montgomery County Park Commission
8787 Georgia Avenue
Silver Spring, Maryland 20910

Dear Mr. Bauman:

The U.S. Army Corps of Engineers, Baltimore District, is in the final stages of the Anacostia River and Tributaries feasibility study which is directed towards the restoration of fish and wildlife habitat in the Anacostia River basin. This $2.45 million study is cost shared (50/50) between the Corps of Engineers and six non-Federal sponsors including the Montgomery County Department of Environmental Protection (DEP).

Eleven of the 13 potential habitat projects will be located on the property of the Maryland - National Capital Park and Planning Commission (M-NCPPC); nine in Montgomery County and two in Prince George's County. The nine Montgomery County projects have been extensively coordinated with DEP and M-NCPPC staff, presented to local residents at public meetings and are scheduled for presentation to the Parks Board on October 18, 1993. The construction costs of the habitat restoration projects which are recommended through the feasibility study and approved by our higher authority, are cost-shared at a ratio of 75 percent Federal and 25 percent non-Federal.

A major, legally binding commitment of the non-Federal sponsor for Corps of Engineers Civil Works projects is the assumption of the operation and maintenance responsibilities for the life of the project. Unless agreement is reached regarding Montgomery County / M-NCPPC policy relating to maintenance responsibilities, none of the feasibility study projects can be implemented with the assistance of the Corps of Engineers.

I hope that this information will be helpful to you as it indirectly relates to Anacostia restoration projects scheduled for discussion at the September 20, 1993 Park Commission meeting. I encourage an expeditious resolution of the matter of non-Federal operation and maintenance responsibilities. If you have any questions on this matter, please call me or my action officer, Mr. Mark McKevitt, at (410) 962-4900.

Sincerely,

James F. Johnson
Chief, Planning Division

UNIVERSITY HILLS CIVIC ASSOCIATION
Hyattsville, Maryland 20782/20783

July 21, 1993

Mr. Mark McKevitt
Water Resources Planner
U.S. Army Corps of Engineers
111 Market Place
P.O. Box 1715, Attn:PL-B
Baltimore, MD 21203-1715

Dear Mr. McKevitt:

On behalf of the University Hills Civic Association, I want to thank you for attending our June meeting. It is important for the members of the community to meet you and for you to tell them about the involved process that the U.S. Corps of Engineers has to use in order to solve problems with our streams.

The citizens from upper Gumwood Drive really appreciated it when you went back to look at the stream with them. I have gotten a lot of positive feed back about your visit. Hopefully, you have inspired people to become more active in the Anacostia Watershed Restoration Project.

Thank you again for spending time with us. We will try to keep pressure on our elected officials to continue funding for the restoration of the Northwest Branch.

Sincerely yours,

Susan M. Stimpson

For John Scott
President
3318 Rosemary Lane
Hyattsville, Maryland 20783

cc: Dr. James Johnson

UNIVERSITY HILLS CIVIC ASSOCIATION
Hyattsville, Maryland 20782/20783

May 21, 1993

Dr. James Johnson
Chief, Planning DIvision
CENAB-PL
U.S. Army Corps of Engineers
111 Market Place
Baltimore, MD 21203-1715

Dear Dr. Johnson:

The members of the University Hills Civic Association have invited Mr. Mark McKevitt to come to our meeting on Tuesday June 8, 1993. It will be held at 7:00 p.m. under the pavillon in the duck pond park near the Stanford Street entrance. His name was suggested to us by Mr. Wes Johnson of the Park Maintenance Department of The Maryland-National Capital Park and Planning Commission. I spoke with Mr. McKevitt on Thursday May 20th and told him about the issues that concern our community.

For your information, I will review them briefly. Before our May 11 meeting, the Civic Association was asked by several citizens who live on Gumwood Drive to contact someone at The M-NCPPC to tell them about the severe deterioration of the banks on the Northwest Branch behind their homes. These people were concerned not only about the loss of the path by the stream but also about flooding which is affecting their properties. I contacted Mr. Johnson and he and several other representatives from M-NCPPC and the Maryland Department of Environmental Resources came to our May 11 meeting to talk to members of the community. At that time, Mr. Johnson said that they would have more details for us by June 8 and we should also contact Mr. McKevitt from the U.S. Army Corps of Engineers.

The members of the community are frustrated by the complications and time factors involved in solving the problems with the Northwest Branch. This is why our Association feels it is better if the agencies involved with the stream answer their questions directly.

If you need to get in touch with me, my phone numbers are: home (301)422-1531 and work (301)504-6209.

Sincerely yours,

Susan M. Stimpson

For Raymond J. Miller
President

Traffic Management Command and Motor Common Carriers Governing the Transportation of Ammunition and Explosives, Class A and B for and on behalf of the U.S. Department of Defense" will be amended to include the following: "Section 7. Safety and Security.

8. Shipments of division 1.1, 1.2 and 1.3 explosives will be moved in direct single line service, as outlined in Section 2 (Rules: Security Services) of the MTMC Freight Traffic rules Publication No. 1A. Truckload shipments of division 1.1, 1.2, 1.3 explosives will not be offloaded or transferred to another vehicle en route, except in emergencies (as defined in 49 Code of Federal Regulations (CFR) 390.5). On less-than-truckload shipments, loading and unloading of explosives will be kept to a minimum and will be performed in a bona fide terminal or carrier facility. If transloading less-than-truckload shipments is necessary, or if there is a change in equipment or driver after a shipment leaves origin, all drivers, tractors, and trailers must meet or exceed the inspection requirements of DD Form 626 (Motor Vehicle Inspection Report and 49 CFR). In addition, upon transloading the shipment, the carrier accepts liability for the integrity of the shipment and its blocking and bracing. Any failure to comply with the aforementioned will be cause for carrier performance action."

DATES: Comments must be received on or before October 12, 1993.

ADDRESSES: Submit written, signed, comments to the Military Traffic Management Command, ADCSOPS–Quality, 5611 Columbia Pike, Falls Church, Virginia 22041–5050.

FOR FURTHER INFORMATION CONTACT:

Ms. Shirley Stachkunas, ADCSLOPS–Quality, Evaluation Division, (703) 756–1292.

Kenneth L. Denton,

Army Federal Register Liaison Officer.

[FR Doc. 93–22045 Filed 9–9–93; 8:45 am]

BILLING CODE 3710–08–M

Corps of Engineers

Intent to Prepare a Draft Environmental Impact Statement (DEIS) for the Proposed Anacostia River and Tributaries, District of Columbia and Maryland Feasibility Study

AGENCY: U.S. Army Corps of Engineers, DOD.

ACTION: Notice of intent.

SUMMARY: The Baltimore District, U.S. Army Corps of Engineers is investigating the feasibility of the construction of fish and wildlife restoration actions in the Anacostia River Basin. The environmental integrity of much of the Anacostia River and its tributaries has been severely degraded by urbanization and previous construction of Federal projects to meet flood control and navigation needs. The feasibility study of the potential restoration actions is being conducted under authority of a U.S. House of Representatives Committee on Public Works and Transportation resolution adopted September 8, 1988. The non-Federal sponsors for the feasibility phase of the project are: Montgomery County, Prince George's County, the District of Columbia, the State of Maryland, and the Interstate Commission on the Potomac River Basin, and the Metropolitan Washington Council of Governments.

ADDRESSES: Project Manager, Baltimore, District, U.S. Army Corps of Engineers, ATTN: CENAB–PL–PR, P.O. Box 1715, Baltimore, Maryland 21203–1715.

FOR FURTHER INFORMATION CONTACT: Mr. Mark McKevitt, Proje t Manager (410) 962–2850.

SUPPLEMENTARY INFORMATION: 1. The U.S. House of Representatives, Committee on Public Works and Transportation, authorized the Anacostia River and Tributaries study in a resolution adopted on September 8, 1988. The resolution requested the Board of Engineers for Rivers and Harbors to determine if further improvements for flood control, navigation, erosion, sedimentation, water quality and other related water resources needs are advisable on the Anacostia River and tributaries.

2. The Anacostia River basin is a 170-square mile sub-basin of the Potomac River. Headwaters of the Anacostia River are in the piedmont and coastal plain areas of Montgomery and Prince George's Counties, Maryland and it joins with the Potomac River in the District of Columbia. The entire river system is freshwater; although, the tidal influence extends for approximately 8 miles above the confluence with the Potomac River.

The environmental integrity of much of the Anacostia River and its tributaries has been severely degraded by urbanization and previous construction of Federal Works to meet flood control and navigation needs. However, portions of the upper reaches of some of the tributaries are relatively undisturbed and contain unique environmental reaches for this watershed.

3. The Corps of Engineers involvement in the basin dates back more than 115 years and includes projects and programs for navigation, flood control, debris removal and aquatic vegetation control. These Federal actions have served their intended purposes well and have benefited the area in terms of improved navigation and reduced flood damage. However, from 1902 through the 1960's project construction eliminated approximately 2,600 acres of wetlands, 99,000 linear feet of aquatic habitat, 700 acres of bottomland hardwoods. These ecosystems performed many beneficial ecological functions for the Anacostia basin and associated Potomac River and Chesapeake Bay. One of the primary functions of these ecosystems is fish and wildlife habitat. Historically, the Anacostia River basin contained a diverse assemblage of fish and wildlife species. However, populations of these species have sharply declined due to habitat loss and degradation in the Anacostia basin.

4. For each of the following actions various restoration alternatives will be considered, including the No Action alternative. A summary of the proposed restoration action are as follows:

Site	Action	Target stream	Location
Wetland Restoration:			
Kingman Lake	WR	Anacostia River	Washington, DC.
River Fringe Wetlands	WR	Anacostia River	Washington, DC.
Fordham Street Wetland	WR	Northwest Branch	Prince George's Co.
Aquatic Restoration:			
NW Branch-PG Co	SR	Northwest Branch	Prince George's Co.
Tanglewood Retrofit	WR/SM/SR	Little Paint Branch	Montgomery Co.
Snowden's Mill I	WR/SM/SR	Paint Branch	Montgomery Co.
Snowden's Mill II	WR/SM/SR	Paint Branch	Montgomery Co.
Stewart/April Lane	WR/SM/SR	Paint Branch	Montgomery Co.
Lockridge Drive	WR/SM/SR	Northwest Branch	Montgomery Co.
Gum Springs	SR	Gum Springs	Montgomery Co.
Sligo Creek	SR	Sligo Creek	Montgomery Co.
NW Branch-Mont. Co			
Paint Branch	SR	Northwest Branch	Montgomery Co.
Branch	SR	Paint Branch	Montgomery Co.

*WR—Wetland Restoration
*SM—Stormwater Management
*SR—Stream Restoration

5. The Baltimore District is preparing a DEIS which will describe the impacts of the proposed projects on environmental and cultural resources in the study area and the overall public interest. If applicable, the DEIS will also apply guidelines issued by the Environmental Protection Agency, under authority of section 404 of the Clean Water Act of 1977 (Pub. L. 95–217).

6. The public involvement will include meetings and close coordination with interested private individuals and organizations, as well as concerned Federal, state and local agencies. A public notice requesting comments on the proposed project and DEIS will be provided to appropriate agencies and the public through printed media and mailings. A scoping meeting is not planned at this time. The Baltimore District invites potentially affected Federal, state and local agencies, and other interested organizations and parties to participate in this study. Agencies that are currently involved in the feasibility study and EIS process include, but are not limited to the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Geological Service, U.S. Soil Conservation Service, National Park Service, Montgomery County Department of Environmental Protection, Prince George's County Department of Environmental Resources, District of Columbia Department of Consumer and Regulatory Affairs and Department of Public Works, Maryland Department of Natural Resources, Maryland Department of the Environment, Maryland National Capital Park and Planning Commission, Interstate Commission on the Potomac River Basin, and the Metropolitan Washington Council of Governments.

7. The DEIS is tentatively scheduled to be available for public review in the spring of 1994.

Kenneth L. Denton,

Army Federal Register Liaison Officer.

[FR Doc. 93–22044 Filed 9–9–93; 8:45 am]

BILLING CODE 3710–41–M

Regulatory Guidance Letters Issued by the Corps of Engineers

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Notice.

SUMMARY: The purpose of this notice is to provide a copy of the Regulatory Guidance Letter (RGL 93–2) to all known interested parties. RGL's are used by the Corps of Engineers as a means to transmit guidance on the permit program (33 CFR parts 320–330) to its division and district engineers. The Corps of Engineers publishes RGL's in the Federal Register upon issuance as a means of informing the public of Corps guidance.

FOR FURTHER INFORMATION CONTACT: Mr. Sam Collinson, Regulatory Branch, Office of the Chief of Engineers at (202) 272–1782.

SUPPLEMENTARY INFORMATION: RGL 93–2, Subject: Guidance on Flexibility of the 404(b)(1) Guidelines and Mitigation Banking is hereby published as follows:

Dated: September 2, 1993.

Approved:

John F. Elsner,

Chief, Operations, Construction and Readiness Division, Directorate of Civil Works.

Regulatory Guidance Letter, RGL 93–2.

Date: 23 August 1993, Expires: 31 December 1998.

Subject: Guidance on Flexibility of the 404(b)(1) Guidelines and Mitigation Banking.

1. Enclosed are two guidance documents signed by the Office of the Assistant Secretary of the Army (Civil Works) and the Environmental Protection Agency. The first document provides guidance on the flexibility that the U.S. Army Corps of Engineers should be utilizing when making determinations of compliance with the section 404(b)(1) Guidelines, particularly with regard to the alternatives analysis. The second document provides guidance on the use of mitigation banks as a means of providing compensatory mitigation for Corps regulatory decisions.

2. Both enclosed guidance documents should be implemented immediately. These guidance documents constitute an important aspect of the President's plan for protecting the Nation's wetlands, "Protecting America's Wetlands: A Fair, Flexible and Effective Approach" (published on 24 August 1993).

3. This guidance expires 31 December 1998 unless sooner revised or rescinded.

For The Director of Civil Works:

2 Encls

John F. Elsner,

Chief, Operations, Construction and Readiness Division, Directorate of Civil Works.

Memorandum to the Field

Subject: Appropriate level of analysis required for evaluating compliance with the section 404(b)(1) guidelines alternative requirements.

1. Purpose: The purpose of this memorandum is to clarify the appropriate level of analysis required for evaluating compliance with the Clean Water Act section 404(b)(1) Guidelines' (Guidelines) requirements for consideration of alternatives. 40 CFR 230.10(a). Specifically, this memorandum describes the flexibility afforded by the Guidelines to make regulatory decisions based on the relative severity of the environmental impact of proposed discharges of dredged or fill material into waters of the United States.

2. Background: The Guidelines are the substantive environmental standards by which all section 404 permit applications are evaluated. The Guidelines, which are binding regulations, were published by the Environmental Protection Agency at 40 CFR part 230 on December 24, 1980. The fundamental precept of the Guidelines is that discharges of dredged or fill material into waters of the United States, including wetlands, should not occur unless it can be demonstrated that such discharges, either individually or cumulatively, will not result in unacceptable adverse effects on the aquatic ecosystem. The Guidelines specifically require that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." 40 CFR 230.10(a). Based on this provision, the applicant is required in every case (irrespective of whether the discharge site is a special aquatic site or whether the activity associated with the discharge is water dependent) to evaluate opportunities for use of non-aquatic areas and other aquatic sites that would result in less adverse impact on the aquatic ecosystem. A permit cannot be issued, therefore, in circumstances where a less environmentally damaging practicable alternative for the

12 May 1993

Colonel J. Richard Capka
District Engineer
Baltimore District, Corps of Engineers
P. O. Box 1715
Baltimore, MD 21203

Re: Anacostia River Feasibility Study

Attn: Mark McKavitt

Dear Colonel Capka,

We are writing to request that our Scope of Work for the Anacostia Feasibility Study be substantially amended to include an investigation of the toxicity of sediments from Kenilworth Marsh and Kingman Lake restoration sites. We have previously outlined our concerns about using Anacostia River sediments for marsh restoration because of the presence of elevated levels of chlordane and other contaminants (Enclosure A). We propose to conduct acute bioassays and assessment of contaminant burdens in the sediment and pore waters from three areas: Kenilworth Marsh, Kingman Lake, and the river reach most likely to be dredged for use in Kingman Lake. A proposal describing the scope and cost of the work is enclosed (Enclosure B).

The goal of this work is to obtain a series of contaminant values, and bioassay responses to these values, to assist in an early assessment of the Kingman Lake project, and provide data consistent with the long-term monitoring effort that is starting at Kenilworth Marsh. There will be much more information collected from Kenilworth Marsh as the monitoring of this project is aimed at assessing how marsh succession may change contaminant levels in the sediments, bioavailability and toxicity of those contaminants to the biota. This monitoring will also evaluate the benefits produced by the marsh restoration. The work proposed in Enclosure B will compliment the monitoring at Kenilworth Marsh but provide essential information to evaluate the potential risks of the Kingman Lake project. We urge your consideration of this amendment and would be happy to discuss this with you further.

Sincerely,

John P. Wolflin

THE PRINCE GEORGE'S COUNTY GOVERNMENT

DEPARTMENT OF ENVIRONMENTAL RESOURCES
DIVISION OF ENVIRONMENTAL MANAGEMENT
WATERSHED PROTECTION BRANCH

March 10, 1993

Mr. Mark McKevitt
US Army Corps of Engineers
Baltimore District
NABPL-PR
Post Office Box 1715
Baltimore, Maryland 21203

Re: US Army Corps of Engineers
Anacostia Feasibility Study

Dear Mr. McKevitt:

Prince George's County would like to submit, for your consideration, eight potential Water Quality Project sites for the US Army Corps of Engineers Anacostia Feasibility Study. These have been obtained from the Prince George's County Anacostia Retrofit Inventory. The projects include the following:

1) Anacostia River Tributary (AT-1) at Quincy Street Area; stream channel protection and habitat restoration; estimated construction cost $250,000.

2) Brier Ditch (BD-1) at east side of Interstate 495; extended detention dry pond; estimated construction cost $350,000.

3) Brier Ditch (BD-5) at Baltimore/Washington Parkway and Kenilworth Avenue; Stream Channel Protection and Fish Habitat Improvement; estimated construction cost $400,000.

4) Indian Creek (IC-7) at Laurel Sand and Gravel area; reconstruction of existing pond to create extended detention control and to meet current design regulations; estimated construction cost $320,000.

5) Indian Creek (IC-8) at Rocky Acres area; creation of shallow extended detention Marsh; estimated construction cost $240,000.

6) Lower Beaverdam Creek (LBC-15) at Landowne, extended detention wet pond with fringe marsh; estimated construction cost $350,000.

7) Northwest Branch (NWB-41) Mainstream at Adelphi Manor Area; stream channel protection and fish habitat improvement; estimated construction cost $250,000.

8) Northwest Branch (NWB-43) Mainstream at Lane Manor Area; stream channel protection and fish habitat improvement; estimated construction cost $150,000.

Please note that the estimated construction costs are preliminary figures and do not include any design or land acquisition cost.

Enclosed, please find conceptual sketches and site data on eight potential sites for your use. Should you need any clarification or additional information, please call Mr. Chai Chowgrajank of my staff, at (301) 925-5889.

We appreciate the opportunity to participate in this study and look forward to working with you.

Sincerely,

S. Ali Abbasi
Section Head
Project Administration Section

Enclosures

cc: Larry Coffman, Assistant Manager, Watershed Protection Branch, DER
Chai Chowgrajank, Pr. Engineer, Project Administration Section, WPB, DER
Moses Fadiran, Sr. Engineer, Project Administration Section, WPB, DER

INTERSTATE COMMISSION ON THE POTOMAC RIVER BASIN

Suite 300
6110 Executive Boulevard
Rockville, Md. 20852-3903
(301) 984-1908
FAX (301) 984-5841

March 2, 1993

Mark E. McKevitt
Water Resources Planner
Planning Division, Environmental Resources Division
Department of the Army
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, MD 21203-1715

Dear Mark:

Thank you for inviting me to participate in the February 24, 1992 meeting to discuss the draft plans for the Kingman Lake area. Your team provided an excellent presentation and I commend you for what I felt was a very productive meeting. As you suggested, I offer you the following suggestions regarding the draft plans:

1. The proposed plans for the area above Benning Road look good and my comments for this section are fairly limited. As you recall from our discussions, due to the historic distribution of wild rice in the Anacostia River, especially in this section of the river, and for the wildlife benefits this plant provides, I encourage you to incorporate wild rice as much as possible in the overall plan, either as an initial introduction or as subsequent introduction after establishment of "pioneer" species.

2. The plan for the two sections downstream of Benning Road needs to be more expansive. I understand the significant constraints that the project is under with respect to transforming plans for the new stadium, "Barney Circle" transportation links and the proposed educational theme park, as well as ever present cost constraints. Nonetheless, from a living resources and water quality standpoint, I believe that it behooves us to prepare a comprehensive plan for the whole lake, including some concepts for integrating this plan with adjacent land use "plans". Also, even at this early stage, I believe shared (i.e., partnership) implementation responsibilities could be formulated and partitioned over time through a Phase I, II, III, etc. type of approach. Plans for these sections should include significant increases in fringe marshes. The western section of shallow water adjacent to the proposed location of the new stadium is an excellent example of an area which would be well served by extending the area of restored marsh complex. In fact, this area could complement the stadium, providing unique environmental landscapes which could be focal points for viewing from the stadium such as from perimeter stadium walkways. These fringe marsh expansions should be in addition to the proposed marsh expansion at Heritage Island.

3. I recommend that you investigate using dredge material from the highly constricted navigational channel between East Capitol Street and the Conrail Bridge for any need for fill materials outside of the project area. The navigational channel is particularly shallow in the middle of this section and is the current limiting depth for boat traffic in the area. As was discussed, the toxic concentration\load of the dredge material from this area obviously needs to be assessed. While on the subject of contaminants, this project also presents us with opportunities to explore innovative approaches to reduce or contain toxic impacts to an urban estuary. I want to stress the importance of monitoring physical\chemical\biological transport or containment of contaminants before, during and after project work in the area. In addition, close cooperation between the monitoring programs of this project and the already developed program for Kenilworth Marsh is encouraged.

In closing, your team seems right on track. Thank you for the opportunity to comment of this exciting project. Please call me if you have any questions or if I may be of further help.

Sincerely,

James D. Cummins
Associate Director-Living Resources

Montgomery County Government

July 15, 1992

Mr. James F. Johnson, Chief
Planning Division
Baltimore District
U.S. Army Corps of Engineers
P.O. Box 1715
Baltimore, Md. 21203-1715

Re: Anacostia River Feasibility Study, Contract No. 21526AA

Dear Mr. Johnson:

The County has presented a list of sites being considered for study under the Anacostia River Feasibility Study to the Maryland National Capital Park and Planning Commission's (M-NCPPC) Parks Department staff. All of the proposed sites are located on parkland under the jurisdiction of the M-NCPPC. The following list of proposed sites are recommended by the County in order of priority for inclusion in the Anacostia River Feasibility study:

1. Stewart/April Lane Storm Water Management Pond,
2. Tanglewood I Storm Water Management Pond Retrofit,
3. Snowdens Mill I Storm Water Management Pond Retrofit,
4. Snowdens Mill II Storm Water Management Pond Retrofit,
5. Paint Branch Stream Habitat Restoration
   A. Gum Springs
   B. Other potential Paint Branch restoration projects between Fairland Road and Route 29 remain under evaluation with M-NCPPC (Priorities undetermined at this time),
6. Sligo Creek Stream Habitat Restoration (Wayne Avenue to Maple Avenue),
7. Northwest Branch (south of Randolph Road),
8. Lockridge Drive Stormwater Management Pond,

If you have any questions regarding these projects, please contact the County's project manager, Daniel Harper at (301) 217-2438.

Sincerely,

Stan Wong

Stan Wong
Chief

SW:DH:dh

cc: J. L. Jalali
John Hench

Department of Environmental Protection, Division of Water Resources Management
Rockville, Maryland 20850, 301/217-2180

February 14, 1992

Planning Division

Honorable Paul S. Sarbanes
United States Senate
Washington, D.C. 20510-2002

Dear Senator Sarbanes:

I am writing to advise you that the Corps of Engineers has initiated a feasibility study of the Anacostia River Basin to develop alternatives to restore fish and wildlife habitat in portions of Montgomery and Prince George's Counties, Maryland and the District of Columbia. This is the beginning of the second phase of the Corps of Engineers two phase study process and is being cost shared equally between the Federal government and the non-Federal sponsors. The non-Federal sponsors for this $2,450,000 study include the previously mentioned local governments along with the State of Maryland, the Interstate Commission on the Potomac River Basin and the Metropolitan Washington Council of Governments.

The primary focus of the study will be the restoration of some of the extensive amount of wetlands previously destroyed by the construction of Federal projects. Some of the restoration plan features identified in the reconnaissance study have already been funded by Congress and are now proceeding towards construction.

Benefits, costs, and impacts will be examined in detail to determine which elements of the basinwide environmental restoration plan are justified. The result of the feasibility phase will be a report containing recommendations for construction of projects by the Corps of Engineers in the Anacostia River Basin. Construction costs for environmental restoration projects are cost shared 75 percent Federal and 25 percent non-Federal. The Division Engineer's Public Notice is scheduled for release in December 1994.

We will continue to keep you informed concerning the progress of the Anacostia River Feasibility Study. If you have any questions on this matter, please contact me or have a member of your staff contact my action officer, Dr. James F. Johnson, at (410) 962-4900.

Sincerely,

Frank R. Finch, P.E.
Colonel, Corps of Engineers
District Engineer

Copy furnished home office:
United States Senator
31 Hopkins Plaza
Baltimore, Maryland 21201

IDENTICAL LETTER SENT TO THE FOLLOWING:

HONORABLE PAUL S. SARBANES
UNITED STATE SENATE
WASHINGTON, D.C. 20510-2002

HONORABLE BARBARA A. MIKULSKI
UNITED STATES SENATE
WASHINGTON, D.C. 20510-2003

HONORABLE STENY H. HOYER
HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515-2005

HONORABLE CONSTANCE A. MORELLA
HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20514-5341

HONORABLE ELEANOR HOLMES NORTON
HOUSE OF REPRESENTATIVES
WASHINGTON, D.C. 20515-5101

February 12, 1992

Planning Division

Mr. Robert Stanton
Regional Director
National Capital Region
U.S. Department of Interior
National Park Service
1100 Ohio Drive, S.W.
Washington, D.C. 20242-0001

Dear Mr. Stanton:

Last November, we signed an Anacostia River and Tributaries Feasibility Study Agreement which symbolized the commitment of our agencies to the restoration of the Anacostia River. The feasibility study was initiated in January 1992, with the expressed single purpose of restoring fish and wildlife habitat to the Anacostia river basin. The draft report will be submitted to our Division Office in January 1994 and released to the public by my Division Engineer in December 1994. Detailed engineering, design, economic and environmental evaluations will be conducted for wetland creation and fisheries habitat improvements. Study sites include National Park Service property.

One of our primary needs is to identify National Park Service (NPS) issues and concerns as they relate to the feasibility study. Additionally, the Corps of Engineers is a member of the Anacostia Watershed Restoration Committee. In this capacity, we need to coordinate the Federal interest in restoring the Anacostia basin. Clear lines of communication between the NPS and the Baltimore District are essential to the success of these efforts. In order for this dialogue to occur, I request that you appoint a single point-of-contact who can address the diverse NPS interests. We are anxious to begin active coordination with you and your staff.

Please have your point-of-contact for the feasibility study call the Study Manager, Mr. Mark McKevitt, at 410-962-2650 to arrange a meeting of our staffs.

Sincerely,

Frank R. Finch, P.E.
Colonel, Corps of Engineers
District Engineer

AGREEMENT
AMONG THE UNITED STATES OF AMERICA
AND
THE SPONSORS
OF THE ANACOSTIA RIVER BASIN
FEASIBILITY STUDY

THIS AGREEMENT, entered into this 9th day, of December, 1991, by and among the United States of America (hereinafter called the "Government"), represented by the Contracting Officer executing this Agreement, and the District of Columbia, Prince George's County, Maryland, Montgomery County, Maryland, the Interstate Commission on the Potomac River Basin, the Metropolitan Washington Council of Governments and the State of Maryland, Department of Natural Resources (hereinafter called the "Sponsors").

WITNESSETH, that

WHEREAS, the Resolution of the Committee on Public Works and Transportation, U.S. House of Representatives dated September 8, 1988 authorized the Corps of Engineers to conduct a study of the Anacostia River and Tributaries, District of Columbia and Maryland; and

WHEREAS, the Corps of Engineers has conducted a reconnaissance study of further improvements for flood control, navigation, erosion, sedimentation, water quality, and other related water resources needs pursuant to this authority, and has determined that further study in the nature of a "Feasibility Phase Study" (hereinafter called the "Study") is required to fulfill the intent of the study authority and to complete the extent of the Federal interest in fish and wildlife habitat restoration measures along the Anacostia River and tributaries located in the District of Columbia and Maryland; and

WHEREAS, fish and wildlife habitat restoration projects consisting of measures undertaken to return fish and wildlife habitat resources to a modern historic condition are cost shared 75 percent Federal and 25 percent non-Federal; and

WHEREAS, the Sponsors have the authority and capability to furnish the co-operation hereinafter set forth and are willing to participate in study cost-sharing and financing in accordance with the terms of this agreement; and

WHEREAS, the Sponsors and the Government all understand that entering into this agreement in no way obligates the Sponsors or the Government to implement a project and that whether a project is supported for authorization and budgeted for implementation depends upon the outcome of this feasibility study and whether the proposed solution is consistent with the Principles and Guidelines and with the budget priorities of the Administration and that at the present time, favorable budget priority is being assigned to projects providing commercial navigation, flood or storm damage reduction outputs and restoration of fish and wildlife habitat; and

WHEREAS, the Water Resources Development Act of 1986 (P. L. 99-662) specifies the cost sharing requirements applicable to the study;

NOW THEREFORE, the parties agree as follows:

ARTICLE I - DEFINITIONS

For the purpose of this Agreement:

a. The term "Study Cost" shall mean all disbursements by the Government pursuant to this Agreement, whether from Federal appropriations or from funds made available to the Government by the Sponsors, and all Negotiated Costs of work performed by the Sponsors pursuant to this agreement. Such costs shall include, but not be limited to: labor charges; direct costs; overhead expenses; supervision and administration costs; and contracts with third parties, including termination or suspension charges; and any termination or suspension costs (ordinarily defined as those costs necessary to terminate ongoing contracts or obligations and to properly safeguard the work already accomplished) associated with this Agreement.

b. The term "Study Period" shall mean the time period for conducting the Study, commencing with the issuance of initial Federal feasibility funds following the execution of this Agreement, and ending when the final report is submitted to the Office of Management and Budget (OMB) by the Assistant Secretary of the Army for Civil Works (ASA(CW)) for review of consistency with the policies and programs of the President.

c. The term "Negotiated Cost" is the fixed fee for a work item to be accomplished by the sponsors as in-kind services as specified in the Initial Project Management Plan (IPMP) incorporated herein and which is acceptable to both parties.

ARTICLE II - OBLIGATIONS OF PARTIES

a. The Sponsors and the Government, using funds contributed by the Sponsors and appropriated by the Congress, shall expeditiously prosecute and complete the Study, currently estimated to be completed in 42 months from the date of this Agreement, substantially in compliance with Article III herein and in conformity with applicable Federal laws and regulations, the Economic and Environmental Principles and Guidelines for Water Related Land Resources Implementation Studies, and mutually acceptable standards of engineering practice.

b. The Government and the Sponsors shall contribute in cash, and in-kind services, fifty (50) percent of all Study Costs, which total cost is currently estimated to be $ 2,450,000 as specified in Article IV herein; provided, that the Sponsors may, consistent with applicable Federal statutes and regulations, contribute up to 25 percent of the Study Costs as in-kind services; provided further, the Government shall not obligate any cash contribution by the Sponsors toward Study Costs until such cash contribution has actually been made available to it by the Sponsors.

c. No Federal funds may be used to meet the local sponsors' share of study costs under this Agreement unless the expenditure of such funds is expressly authorized by statute as verified by the granting agency.

d. The award of any contract with a third party for services in furtherance of this Agreement which obligates Federal appropriations shall be exclusively within the control of the Government. The award of any contract by the Sponsors with a third party for services in furtherance of this Agreement which obligates funds of the Sponsors and does not obligate Federal appropriations shall be exclusively within the control of the Sponsors, but shall be subject to applicable Federal statutes and and regulations.

e. The Government and the Sponsors shall each endeavor to assign the necessary resources to provide for the prompt and proper execution of the Study and shall, within the

limits of law and regulation, conduct the study with maximum flexibility as directed by the Executive Committee established by Article V. herein.

f. The Government will not continue with the Study if it determines that there is no solution in which there is a Federal interest or which is not in accord with current policies and budget priorities unless the Sponsors wish to continue under the terms of this Agreement and the Department of Army grants an exception. If a study is discontinued, it shall be concluded according to Article XII and all data and information shall be made available to both parties.

g. The Sponsor(s) may wish to conclude the Study if it determines that there is no solution in which it has an interest or which is not in accord with its current policies and budget priorities. When such a case exists the study shall be concluded according to Article XII and all data and information shall be made available to all parties.

ARTICLE III - INITIAL PROJECT MANAGEMENT PLAN

The Initial Project Management Plan (IPMP) includes all of the work tasks identified for cost sharing between the Government and the Sponsors in the Anacostia River basin. Each political jurisdiction is responsible only for those work efforts within its own jurisdiction, along with a portion of the overall study tasks.

Appendix A including Attachment I (the IPMP), is hereby incorporated into this Agreement. The parties to this Agreement shall substantially comply with the IPMP in prosecuting work on the Study. The following modifications, to be approved by the Executive Committee, shall refer to only those overall study tasks designated in the IPMP and shall require an amendment to this Agreement:

a. any modification which increases the total Study Costs by more than 5 percent;

b. any modification in the estimated cost of a Study work item or any obligation for a Study work item, which changes the total cost of that work item by more that 10 percent;

c. any extension of the completion schedule for a Study work item of more than thirty 30 days; or

d. any reassignment of work items between the Sponsors and the Government.

e. any modification to the cost and schedule of the work effort within a specific jurisdiction will be approved by the Government and the Sponsor representing that jurisdiction in accordance with the percentage and time guidelines noted above.

f. any projects or construction activities which are identified through this study will be evaluated to determine if they are eligible for implementation through existing Corps of Engineers authorities such as Section 1135 of the Water Resources Development Act of 1986 (P.L. 99-662)

ARTICLE IV - METHOD OF PAYMENT

a. The Government shall endeavor to obtain during each fiscal year the appropriation for that fiscal year at least in the amounts specified in the IPMP incorporated herein. Subject to the enactment of Federal appropriations and the allotment of funds to the Contracting Officer, the Government shall then fund the Study at least in the amounts specified in the IPMP herein. Partial payment will be requested on a quarterly basis.

b. Each of the Sponsors shall endeavor to obtain during each Government fiscal year the cash contribution for that Government fiscal year at least in the amounts specified in the IPMP incorporated herein and, once it has obtained funds for a cash contribution, shall make such funds available to the Government. The Government shall withdraw and disburse funds made available by the Sponsors subject to the provisions of this Agreement.

c. Funds made available by the Sponsors to the Government and not disbursed by the Government within a Government fiscal year shall be carried over and applied to the cash contribution for the succeeding Government fiscal year; provided, that upon study termination any excess cash contribution shall be reimbursed to the Sponsors after a final accounting, subject to the availability of appropriations, as provided in Article XII herein.

d. Should any party fail to obtain funds sufficient to make obligations or cash contributions or to incur Study Costs in accordance with the schedule included in the IPMP incorporated herein, it shall at once notify the Executive Committee established under Article V herein. The Executive Committee shall determine if the Agreement should be amended, suspended, or terminated under Article XII herein.

ARTICLE V - MANAGEMENT AND COORDINATION

a. Overall study management shall be the responsibility of an Executive Committee consisting of the District Engineer, Baltimore District; Chief, Planning Division, Baltimore District; Director, Department of Environmental Protection, Montgomery County; Director, Department of Environmental Resources, Prince George's County; Director, Department of Public Works; and Director, Department of Consumer and Regulatory Affairs, District of Columbia; Secretary, Department of Natural Resources, State of Maryland; Executive Director, Interstate Commission on the Potomac River Basin; and Executive Director, Metropolitan Washington Council of Governments.

b. To provide for consistent and effective communication and prosecution of the items in the IPMP, the Anacostia Watershed Restoration Committee shall work closely with the Study Management Team.

c. The Study Management Team and their designated appointees will coordinate on all matters relating to prosecution of the Study and compliance with this Agreement, including cost estimates, schedules, execution of work elements, financial transactions and recommendations to the Executive Committee for termination, suspension, or amendment of this Agreement.

d. The Study Management Team will prepare periodic reports on the progress of all work items as required by the Executive Committee.

ARTICLE VI - DISPUTES

a. The Study Management Team shall endeavor in good faith to negotiate the resolution of conflicts. Any dispute arising under this Agreement which is not disposed of by mutual consent shall be referred to the Executive Committee. The Executive Committee shall resolve such conflicts or determine a mutually agreeable process for reaching resolution or for termination under Article XII herein.

b. Pending final decision of a dispute hereunder, or pending suspension or termination of this Agreement under Article XII herein, the parties hereto shall proceed diligently with the performance of this Agreement.

ARTICLE VII - MAINTENANCE OF RECORDS

The Government and the Sponsors shall keep books, records, documents and other evidence pertaining to study costs and expenses incurred pursuant to this Agreement to the extent and in such detail as will properly reflect total Study costs. The Government and the Sponsors shall maintain such books, records, documents and other evidence for inspection and audit by authorized representatives of the parties to this Agreement. Such material shall remain available for review for a period of three (3) years following the termination of this Agreement.

ARTICLE VIII - RELATIONSHIP OF PARTIES

a. The parties to this Agreement act in an independent capacity in the performance of their respective functions under this Agreement, and no party is to be considered the officer, agent or employee of the other.

b. To the extent permitted by applicable law, any reports, documents, data, findings, conclusions, or recommendations pertaining to the Study shall not be released outside the Executive Committee or the Study Management Team; nor shall they be represented as presenting the views of either party unless the Parties shall indicate agreement thereto in writing.

ARTICLE IX - OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, or other elected officials, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

ARTICLE X - FEDERAL AND STATE LAWS

In acting under its rights and obligations hereunder, the local sponsors agrees to comply with all applicable Federal and state laws and regulations, including section 601 of Title VI of the Civil Rights Act of 1964 (Public Law 88-352) and Department of Defense Directive 5500.II issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army."

ARTICLE XI - COVENANT AGAINST CONTINGENT FEES

The local sponsors warrant that no person or selling agency has been employed or retained to solicit or secure this Agreement upon agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the local sponsor for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this Agreement without liability, or, in its discretion, to add to the Agreement or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

ARTICLE XII - TERMINATION OR SUSPENSION

a. This Agreement shall terminate at the completion of the Study Period; provided, that prior to such time and upon thirty (30) days written notice, any party may terminate or suspend its participation under this Agreement without penalty.

REVISION NOTED:

b. Within ninety (90) days upon termination of this Agreement the Study Management Team shall prepare a final accounting of Study Costs, which shall display disbursements by the Government of Federal funds and cash contributions by the Sponsors and credits for the Negotiated Costs of the Sponsors. Subject to the availability of funds, within thirty (30) days thereafter the Government shall reimburse the Sponsors for the excess, if any, of cash contributions and credits given over fifty (50) percent of total Study Costs. Within thirty (30) days thereafter, the Sponsors shall provide the Government any cash contributions required so that the total Sponsors share equals fifty (50) percent of total Study Costs.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

John P. Bond III
City Administrator
District of Columbia

Torrey C. Brown, M.D.
Secretary, Maryland Department
of Natural Resources

William H. Hussman
Chief Administrative Officer
Montgomery County, Maryland

Robert O. Duncan
Deputy Chief Administrator
Prince George's County, Maryland

Ruth R. Crone
Executive Director
Metropolitan Washington Council
of Governments

Lee Zeni
Executive Director
Interstate Commission on the
Potomac River Basin

Frank R. Finch, P.E.
Colonel, Corps of Engineers
District Engineer
Contracting Officer

APPENDIX A: INITIAL PROJECT MANAGEMENT PLAN
APPENDIX B: SCHEDULE

CERTIFICATION REGARDING LOBBYING

The undersigned certifies, to the best of his or her knowledge and belief that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing of attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, title 31 U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less that $10,000 and not more than $100,000 for each such failure.

John P. Bond III
City Administrator
District of Columbia

Torrey C. Brown, M.D.
Secretary, Maryland Department
of Natural Resources

William H. Hussman
Chief Administrative Officer
Montgomery County, Maryland

Robert O. Duncan
Deputy Chief Administrator
Prince George's County, Maryland

Ruth R. Crone
Executive Director
Metropolitan Washington Council
of Governments

Lee Zeni
Executive Director
Interstate Commission on the
Potomac River Basin

metropolitan washington
COUNCIL OF GOVERNMENTS
777 North Capitol Street, N.E., Suite 300, Washington, D.C. 20002-4201
(202) 962-3200 FAX: 962-3201

December 4, 1991

Colonel Frank Finch
District Engineer
U.S. ARMY CORPS OF ENGINEERS
Baltimore Distract
P.O. Box 1715
Baltimore, MD 21203

Dear Colonel Finch,

On behalf of Metropolitan Washington Council of Governments and the Anacostia Watershed Restoration Committee, I would like to thank you for taking time out from your busy schedule to participate in the Conference on Restoring the Water Quality and Habitat in the Anacostia Watershed held on November 6th and 7th. Your participation in the signing ceremony held at Kenilworth Marsh was essential in making the conference a success. I have enclosed copies of the signed *Six-Point Action Plan Agreement* and *Feasibility Study Agreement* for your record.

Sincerely,

Ruth R. Crone
Executive Director

ATTACHMENT

/pk

A Commitment to Restore Our Home River:
A Six-Point Action Plan

Whereas, during the past three centuries, the landscape of the Anacostia has been transformed by successive waves of cultivation and urbanization, causing extensive degradation of water quality and habitat; and,

Whereas, the District of Columbia and the State of Maryland responded in 1984 with a landmark agreement termed the "Anacostia Watershed Restoration Strategy" that identified the need for a coordinated watershed-wide effort to improve water quality and aquatic habitat in the basin; and,

Whereas, the need for strong local participation in the Anacostia restoration effort was soon recognized and the partnership was expanded to include Prince George's and Montgomery counties as stated in the "Anacostia Watershed Restoration Agreement of 1987"; and,

Whereas, the 1987 Agreement established a local/state management process for the restoration of the river, under the auspices of the Anacostia Watershed Restoration Committee; and,

Whereas, the Anacostia Watershed Restoration Committee has made significant progress in restoring water quality and habitat in the watershed during the past five years through the implementation of four annual workplans that have provided nearly 25 million dollars for restoration projects; and,

Whereas, the Anacostia Watershed Restoration Committee in 1991 created a detailed blue-print for the future environmental restoration of the watershed, entitled "A Six-Point Action Plan to Restore the Anacostia River" (herein referred to as the Plan); and,

Whereas, the Plan sets forth specific watershed goals, and outlines implementation strategies to achieve these goals by the turn of the century through a unique cooperative local/state and federal partnership.

Now Therefore Be It Resolved that the Signatories reaffirm their commitment to restore the Anacostia watershed by the turn of the century through the pursuit of the following goals and strategies contained in the Plan:

Goal 1: Reduce Pollutant Loads to Tidal Estuary

Dramatically reduce pollutant loads delivered to the tidal estuary to improve water quality conditions by the turn of the century through the pursuit of the following strategies:

- *Sewage Over-Flow Controls* -- Reduce the volume of combined sewage overflow and sewage leakage from the aging urban sewer system into the Anacostia and its tributaries.
- *Urban Stormwater Retrofits* -- Reduce stormwater pollutant loadings from existing development through the implementation of stormwater retrofit ponds, marshes and filter systems.
- *Urban Best Management Practices for New Development* -- Limit increases in urban stormwater pollutant loads generated from new development in the watershed through the use of appropriate stormwater quality and sediment control regulations at new development sites.
- *Control of Trash and Debris* -- Discourage trash and debris from entering the river system through public education and remove floatable debris found within the system.

Goal 2: Restore Ecological Integrity of Streams:

Protect and restore the ecological integrity of urban Anacostia streams to enhance aquatic diversity and provide for a quality urban fishery through the pursuit of the following strategies:

- *Urban stream restoration* -- Implement channel and streambank restoration techniques to improve aquatic habitat and channel stability of degraded urban streams.
- *Urban stream protection* -- Apply land-use controls and appropriate urban stormwater and sediment control practices for additional protection within sensitive watersheds.

Goal 3: Restore Habitat for Fish

Restore the spawning range of anadromous fish to historical limits through the pursuit of the following strategies:

- *Removal of Fish Barriers* -- Remove or modify fish barriers to expand the available spawning range of anadromous and native fish.
- *Habitat Improvement* -- Improve the quality of spawning habitat in the lower Anacostia through the installation of instream habitat improvement structures.

Goal 4: Restore and Enhance Wetlands

Increase the natural filtering capacity of the watershed by sharply increasing the acreage and quality of tidal and non-tidal wetlands through the pursuit of the following strategies:

- *Wetlands Protection* -- Achieve no net loss of wetlands in the watershed as a result of new development and other activities.
- *Urban Wetland Restoration* -- Restore the ecological function of existing degraded wetland areas.
- *Urban Wetland Creation* -- Create several hundred acres of new wetlands throughout the basin to partially replace the natural filtering capacity lost over time.

Goal 5: Restore and Expand Forest Cover

Expand the range of forest cover throughout the watershed and create a contiguous corridor of forest along the margins of its rivers and streams through the pursuit of the following strategies:

- *Forest Protection* -- Reduce the loss of forest cover associated with new development and other activities through implementation of local forest conservation ordinances and the Maryland 1991 Forest Conservation Act.
- *Watershed Reforestation* -- Take full advantage of existing local, state federal and private resources to extensively reforest suitable sites throughout the basin.
- *Riparian Reforestation* -- Reforest ten linear miles of riparian areas along the Anacostia during the next three years, as a first step in creating an unbroken forest corridor from the tidal river to the uppermost headwater streams.

Goal 6: Increase Public Involvement

Make the public aware of its key role in the cleanup of the river and increase volunteer participation in watershed restoration activities.

- *Watershed Outreach and Education* -- Raise the awareness of the public through environmental education regarding its role in the restoration of the Anacostia watershed.
- *Restoration Stewardship* -- Provide the public with opportunities to actively participate in the restoration of the Anacostia.

The Signatories further affirm their support for the unique, cooperative watershed management process set forth in the 1987 Agreement that will be needed to effectively implement the Six-Point Action Plan during the next decade.

Attest, this sixth day of November in the year 1991:

By _____
Honorable Sharon Pratt Dixon
Mayor,
The District of Columbia

By _____
Robert Perciasepe
Secretary, Department of the Environment
for Honorable William Donald Schaefer,
Governor, the State of Maryland

By _____
Honorable Neal Potter
County Executive,
Montgomery County, Maryland

By _____
Honorable Parris N. Glendening
County Executive,
Prince George's County, Maryland

Supporting Witnesses

By _____
Honorable James E. Nathanson,
Chair, Board of Directors,
Metropolitan Washington
Council of Governments

By _____
Lee Zeni
Executive Director,
Interstate Commission on the
Potomac River Basin

By _____
Honorable Steny Hoyer
Maryland Representative,
United States House of Representatives

By _____
Honorable Paul Sarbanes
Maryland Senator,
United States Senate

By _____
Honorable Constance Morella
Maryland Representative,
United States House of Representatives

By _____
Honorable Eleanor Holmes Norton
District of Columbia Representative,
United States House of Representatives

ANACOSTIA RIVER AND TRIBUTARIES FEASIBILITY STUDY AGREEMENT

NOVEMBER 6, 1991

WHEREAS, since the early nineteenth century the Anacostia River basin has suffered from a wide range of water resources problems including deteriorated water quality, erosion and sedimentation and the loss of fish and wildlife habitat and recreation resources; and

WHEREAS, the construction of Federal projects to meet critical flood control, navigation, and drainage needs has contributed in part to the loss of valuable fish and wildlife habitat in the basin; and

WHEREAS, in recognition of the need to improve and enhance the use and management of the basin's resources the Governor of the State of Maryland, the Mayor of the District of Columbia, and the County Executives of Montgomery County and Prince George's County, Maryland entered into an agreement in 1987 termed the "Anacostia Watershed Restoration Agreement" which is administered by the Anacostia Watershed Restoration Committeee with staff support from the Metropolitan Washington Council of Governments and the Interstate Commission on the Potomac River Basin; and

WHEREAS, the Federal government through the U.S. Army Corps of Engineers has completed a reconnaissance-level study that identified a potential Federal interest in undertaking the development of Federal projects to restore lost fish and wildlife habitat in the basin to include such measures as wetland creation, removal of blockages to migratory fish passage, riparian plantings and creation of fish habitat in existing stream channels; and

WHEREAS, the U.S. Department of Interior, National Park Service, owns and administers a significant portion of the riparian lands along the tidal Anacostia River; and

WHEREAS, the Anacostia River Basin is a regional resource and that restoration will be accelerated and enhanced through Federal, state and local cooperation and coordination;

NOW THEREFORE BE IT RESOLVED that the signatories, reaffirm their commitment to the restoration of the Anacostia River basin, endorse the findings of the reconnaissance-level study, and agree to work in partnership with the Corps in undertaking a cost-shared feasibility- level study in support of the further development and implementation of Federal projects designed to restore lost fish and wildlife habitat.

ANACOSTIA RIVER AND TRIBUTARIES
FEASIBILITY STUDY AGREEMENT

NOVEMBER 6, 1991

WITNESS THE FOLLOWING SIGNATURES:

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District of Columbia

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Prince George's County, Maryland

Neal Potter, County Executive
Montgomery County, Maryland

Steny H. Hoyer, Md-5th District
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Colonel, Corps of Engineers

Paul S. Sarbanes
United States Senator

Robert Stanton, Regional Director
National Park Service

Robert Perciasepe, Secretary
Maryland Department of the
Environment

Lee Zeni, Executive Director
Interdtate Commission on the
Potomac River Basin

James E. Nathanson, Chairman
Board of Directors, Metropolitan
Washington Council of Governments

November 8, 1991

Planning Division

Dr. Edward U. Graham
Director
Department of Environmental Protection
Montgomery County
Executive Office Building
Rockville, Maryland 20850

Dear Dr. Graham:

The Anacostia River and Tributaries Feasibility Study Cost Sharing Agreement (FCSA) has been certified by Headquarters, U.S. Army Corps of Engineers subject to a minor change in the third line of Article XII (a) adding the words "its participation under" after the word "suspend."

This change is required in order to assure that, in the event that any of the seven co-sponsors terminates its participation in the contract, only that sponsor's participation is terminated; the contract would remain intact for the remaining sponsors.

Article XII (a) as revised will now read as follows, with the added words underlined:

> This Agreement shall terminate at the completion of the Study Period; provided, that prior to such time and upon thirty (30) days written notice, any party may terminate or suspend <u>its participation under</u> this Agreement without penalty.

I have enclosed a copy of Page 5 of the FCSA for your review and approval. Subsequent to your approval, I will provide a revised original page for initial by you or another appropriate official of your agency. I would greatly appreciate your expeditious handling of this matter, so that we may move forward to initiate this important study.

Please advise me, or my action officer, Mark McKevitt, at (410) 962-2650 when your agency is ready to have the FCSA amendment initialed. In order to complete this action quickly, Mr. McKevitt will hand carry the FCSA to each agency, and wait for the amendment to be initialed.

Thank you in advance for your assistance.

Sincerely,

James F. Johnson/ps/24900/CENAB-PL
Chief, Planning Division

Identical letter sent to the following:

MS. FERIAL BISHOP
ADMINISTRATOR
ENVIRONMENTAL REGULATION ADMINISTRATION
DEPARTMENT OF CONSUMER & REGULATORY AFFAIRS
2100 MARTIN LUTHER KING JR., AVE., SE
WASHINGTON, DC 20020

MR. LEE ZENI
EXECUTIVE DIRECTOR
INTERSTATE COMMISSION ON THE
POTOMAC RIVER BASIN
6110 EXECUTIVE BOULEVARD, SUITE 300
ROCKVILLE, MD 20852-3903

MR. ROBERT D. MILLER
DEPUTY DIRECTOR
WATER RESOURCES ADMINISTRATION
MARYLAND DEPARTMENT OF NATURAL RESOURCES
TAWES STATE OFFICE BUILDING, E-2
ANNAPOLIS, MD 21401-9974

DR. EDWARD U. GRAHAM
DIRECTOR
DEPARTMENT OF ENVIRONMENTAL PROTECTION
MONTGOMERY COUNTY
EXECUTIVE OFFICE BUILDING
ROCKVILLE, MD 20850

MS. RUTH R. CRONE
EXECUTIVE DIRECTOR
METROPOLITAN WASH COUNCIL OF GOVERNMENTS
777 NORTH CAPITOL STREET, NE
WASHINGTON, DC 20002-4201

MR. EUGENE T. LAUER
DIRECTOR
DEPARTMENT OF ENVIRONMENTAL RESOURCES
PRINCE GEORGE'S COUNTY
9400 PEPPERCORN PLACE
LANDOVER, MD 20785

THE FOLLOWING PAGES CONTAIN THE MAILING LIST FOR THE NOTICE OF AVAILIBILITY FOR THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

Baltimore District, Corps of Engineers
Planning Division
Post Office Box 1715
Baltimore, Maryland 21203-1715

19 Jul 1994

Anacostia River

* * * CONGRESSIONAL INTERESTS * * * = UNITED STATES SENATORS

15038 011 MIKULSKI D MD G
HONORABLE BARBARA A. MIKULSKI
UNITED STATES SENATE
320 HART SENATE OFFICE BUILDING
WASHINGTON, DC 20510-2003
(202) 224-4654 FAX (202) 224-8858

16120 011 MIKULSKI D MD G
HONORABLE BARBARA A. MIKULSKI
UNITED STATES SENATOR
SUITE 301
9658 BALTIMORE BOULEVARD
COLLEGE PARK, MD 20740
(301) 345-5517

12824 011 SARBANES D MD G
HONORABLE PAUL S. SARBANES
UNITED STATES SENATE
309 HART SENATE OFFICE BUILDING
WASHINGTON, DC 20510-2002
(202) 224-4524 FAX (202) 224-3452

16086 011 SARBANES D MD G
HONORABLE PAUL S. SARBANES
UNITED STATES SENATOR
SUITE 450
1110 BONIFANT STREET
SILVER SPRING, MD 20910
(301) 589-0797

* * * CONGRESSIONAL INTERESTS * * * = UNITED STATES REPRESENTATIVES

15065 012 HOYER D MD05 G
MR. JOHN BERRY
STAFF ASST. TO CONGRESSMAN HOYER
1513 LONGWORTH HOUSE OFFICE BLDG.
WASHINGTON, DC 20515-2005
(202) 225-4131 FAX (202) 225-4300

15124 012 HOYER D MD05 G
MR. BILL CASTELLI
LEGISLATIVE ASST. TO CONGRESSMAN HOYER
1513 LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-2005
(202) 225-4131

12862 012 HOYER D MD05 G
HONORABLE STENY H. HOYER
HOUSE OF REPRESENTATIVES
1513 LONGWORTH HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-2005
(202) 225-4131

13406 012 HOYER D MD05 G
HONORABLE STENY H. HOYER
REPRESENTATIVE IN CONGRESS
4351 GARDEN CITY DRIVE
SUITE 625
LANDOVER, MD 20785-1882
(301) 436-5510

15046 012 MORELLA R MD08 G
HONORABLE CONSTANCE A. MORELLA
HOUSE OF REPRESENTATIVES
223 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-2008
(202) 225-5341 FAX (202) 225-1389

15047 012 MORELLA R MD08 G
HONORABLE CONSTANCE A. MORELLA
REPRESENTATIVE IN CONGRESS
SUITE 507
51 MONROE STREET
ROCKVILLE, MD 20850
(301) 424-3501 FAX (301) 424-5992

12869 012 NORTON D DC G
MS. ELEANOR HOLMES NORTON
HOUSE OF REPRESENTATIVES
2135 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-5101
(202) 225-8050

15057 012 WYNN D MD04 G
HONORABLE ALBERT R. WYNN
HOUSE OF REPRESENTATIVES
423 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515-2004
(202) 225-8714

* * * STATE INTERESTS * * * = GOVERNORS

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HONORABLE WILLIAM DONALD SCHAEFER
GOVERNOR OF MARYLAND
STATE HOUSE
ANNAPOLIS, MD 21401
(410) 974-3901

* * * FEDERAL AGENCIES * * *

13313 030 USDASCS G
MR. ROBERT J. KLUMPE
STATE CONSERVATIONIST
SOIL CONSERVATION SERVICE, USDA
339 BUSCH'S FRONTAGE ROAD
SUITE 301
ANNAPOLIS, MD 21401-5534
(410) 757-0861

7510 030 USDCNMFS G
MR. RICHARD ROE
REGIONAL DIRECTOR
NATIONAL MARINE FISHERIES SERVICE
ONE BLACKBURN DRIVE
GLOUCESTER, MA 01930
(508) 281-9250

18327 030 USDCNMFS G
MS. ELIZABETH GILLELAN
DIVISION CHIEF
NOAA/NMFS CHESAPEAKE BAY OFFICE
410 SEVERN AVENUE, SUITE 107A
ANNAPOLIS, MD 21403-2524
(410) 267-5560

6312 030 USDCNMFS G
MR. TIMOTHY GOODGER
ASSISTANT COORDINATOR
NATIONAL MARINE FISHERIES SERVICE
HABITAT AND PROTECTED RESOURCES
OXFORD, MD 21654-0279
(410) 226-5771 FAX (301) 226-5417

18872 030 USDCNOAA G
MR. JOSHUA LOTT
OFFICE OF OCEAN AND COASTAL RESOURCE MANAGEMENT, NOAA
N/ORM3,SSMC-4
1305 EAST WEST HIGHWAY
SILVER SPRING, MD 20910
(301) 713-3117

13318 030 USDIFWS G
MR. JOHN P. WOLFLIN
SUPERVISOR, ANNAPOLIS FIELD OFFICE
U.S. FISH AND WILDLIFE SERVICE
1825-B VIRGINIA STREET
ANNAPOLIS, MD 21402
(410) 269-5448 FAX (301) 269-0832

18511 030 USDINPS G
MR. GENTRY DAVIS
SUPERINTENDENT
NATIONAL CAPITAL PARKS - EAST
U.S. NATIONAL PARK SERVICE
1900 ANACOSTIA DRIVE, SE.
WASHINGTON, DC 20020
(202) 690-5193

14020 030 USDINPS G
MR. JOHN G. PARSONS
VICE CHAIRMAN
NATIONAL PARK SERVICE, LAND USE COORD
NATIONAL CAPITAL REGIONAL PLAINNING COMM
1100 OHIO DRIVE, S.W.
WASHINGTON, DC 20242
(202) 619-7025

18084 030 USDINPS G
MR. ROBERT STANTON
DIRECTOR
NATIONAL CAPITAL REGION
NATIONAL PARK SERVICE
1100 OHIO DRIVE, SW
WASHINGTON, DC 20242
(202) 619-7005

13282 030 USDINPS G
MS. B.J. GRIFFIN
REGIONAL DIRECTOR
U.S. NATIONAL PARK SERVICE
143 SOUTH THIRD STREET
PHILADELPHIA, PA 19106
(215) 597-7013

13795 030 USDTCG G
CPT GREGORY S. COPE
COMMANDING OFFICER
U.S. COAST GUARD MARINE SAFETY OFFICE
U.S. CUSTOM HOUSE
40 SOUTH GAY STREET
BALTIMORE, MD 21202-4022
(410) 962-5121

15702 030 USEPA G
MR. CHARLES SPOONER
U.S. ENVIRONMENTAL PROTECTION AGENCY
401 M STREET S.W.
WASHINGTON, DC 20460
(202) 260-1314

18318 030 USEPA G
MR. WILLIAM MATUSZESKI
DIRECTOR
U.S. ENVIRONMENTAL PROTECTION AGENCY
CHESAPEAKE BAY PROGRAM OFFICE
410 SEVERN AVENUE, SUITE 109
ANNAPOLIS, MD 21403
(800) 968-5702

15628 030 USEPA G
MR. ROY E. DENMARK JR.
U.S. EPA, REGION III
ENVIRONMENTAL PLANNING AND ASSESSMENT SECTION
841 CHESTNUT BUILDING
PHILADELPHIA, PA 19107
(215) 597-9857

12700 030 USEPA G
MR. PETER H. KOSTMAYER
REGIONAL ADMINISTRATOR
U.S. ENVIRONMENTAL PROTECTION AGENCY REGION III
841 CHESTNUT BUILDING
PHILADELPHIA, PA 19107-4431
(215) 597-9072 FAX (215) 597-7906

* * * STATE AGENCIES * * *

18488 040 CORELESS G
MS. THERESA CORELESS
CRITICAL AREAS COMMISSION
45 CALVERT STREET
2ND FLOOR
ANNAPOLIS, MD 21401

15299 040 MDDE G
MR. DAVID A.C. CARROLL
SECRETARY
MARYLAND DEPARTMENT OF THE ENVIRONMENT
2500 BROENING HIGHWAY
BALTIMORE, MD 21224
(410) 631-3084 FAX (301) 631-3936

15479 040 MDDE G
MR. KEN PENSYL
WATER QUALTIY CERTIFICATION DIVISION
MARYLAND DEPARTMENT OF ENVIRONMENT
2500 BROENING HIGHWAY
BALTIMORE, MD 21224
(410) 631-3609 FAX (301) 633-4883

* * * STATE AGENCIES * * *

17542 040 MDDNR G
MS. JANET MCKEGG
ADMINISTRATOR
NATURAL HERITAGE PROGRAM
MARYLAND DEPARTMENT OF NATURAL RESOURCES
TAWES STATE OFFICE BUILDING E-1
ANNAPOLIS, MD 21401
(410) 974-2870

15184 040 MDDNR G
MR. ROBERT D. MILLER
DIRECTOR, WATER RESOURCES ADMINISTRATION
MARYLAND DEPARTMENT OF NATURAL RESOURCES
580 TAYLOR AVENUE
TAWES STATE OFFICE BUILDING
ANNAPOLIS, MD 21401-9974
(410) 974-3846 FAX (301) 974-2618

7711 040 MDDNR G
DR. EMERY T. CLEAVES
DIRECTOR
MARYLAND GEOLOGICAL SURVEY
MARYLAND DEPARTMENT OF NATURAL RESOURCES
2300 ST. PAUL STREET, SUITE 440
BALTIMORE, MD 21218
(410) 554-5504 FAX (410) 554-5502

15321 040 MDSHPO G
MR. J. RODNEY LITTLE
STATE HISTORIC PRESERVATION OFFICER
HISTORICAL AND CULTURAL PROGRAMS
MD DEPT OF HOUSING & COMMUNITY DEVELOP.
100 COMMUNITY PLACE, THIRD FLOOR
CROWNSVILLE, MD 21032-2023
(301) 514-7600 FAX (301) 974-3932

* * * REGIONAL AGENCIES * * *

7864 050 ICPRB G
MR. HERBERT M. SACHS
EXECUTIVE DIRECTOR
INTERSTATE COMMISSION ON THE
POTOMAC RIVER BASIN
6110 EXECUTIVE BOULEVARD, SUITE 300
ROCKVILLE, MD 20852-3903
(301) 984-1908 FAX (301) 984-5841

19890 050 MDNCPPC G
DR. JOHN E. HENCH
NATURAL RESOIRCES DIVISION
MARYLAND NATIONAL CAPITAL PARK AND
PLANNING COMMISSION
8000 MEADOWBROOK LANE
CHEVY CHASE, MD 20815
(301) 650-2608

19061 050 MDNCPPC G
MR. WES JOHNSON
MARYLAND NATIONAL CAPITAL PARK AND
PLANNING COMMISSION
PARK PLANNING AND DEVELOPMENT DIVISION
6600 KENILWORTH AVENUE
RIVERDALE, MD 20737

19062 050 MDNCPPC G
MR. J.L. JALALI
ENGINEERING SUPERVISOR
PARK PLANNING AND DEVELOPMENT
9500 BRUNETT AVENUE
SILVER SPRING, MD 20901
(301) 495-2540

15701 050 MDNCPPC G
MR. JOHN W. RHOADS
CHAIRMAN
MARYLAND NATIONAL CAPITAL PARK AND
PLANNING COMMISSION
14741 GOVERNOR ODEN BOWIE DRIVE
UPPER MARLBORO, MD 20772

15511 050 MWCOG G
MS. RUTH R. CRONE
EXECUTIVE DIRECTOR
METROPOLITAN WASHINGTON COUNCIL
OF GOVERNMENTS
777 NORTH CAPITOL STREET, NE, SUITE 300
WASHINGTON, DC 20002-4201
(202) 962-3200 FAX (202) 962-3201

18525 050 MWCOG G
MR. JAMES SHELL
CHIEF, ANACOSTIA RESTORATION TEAM
METROPOLITAN WASHINGTON COUNCIL
OF GOVERNMENTS
777 NORTH CAPITOL STREET, NE., SUITE 300
WASHINGTON, DC 20002-4201
(202) 962-3343

15604 050 NCPC G
MR. REGINALD W. GRIFFITH
EXECUTIVE DIRECTOR
NATIONAL CAPITAL PLANNING COMMISSION
801 PENNSYLVANIA AVENUE, NW
SUITE 301
WASHINGTON, DC 20576
(202) 724-0174

* * * LOCAL AGENCIES * * *

18562 061 ABBASI G
MR. ALI ABBASI
PRINCE GEORGE'S COUNTY
DEPARTMENT OF ENVIRONMENTAL RESOURCES
9400 PEPPERCORN PLACE, SUITE 600
LANDOVER, MD 20785

18324 061 DER G
MR. EUGENE T. LAUER
DIRECTOR
PRINCE GEORGE'S COUNTY
DEPARTMENT OF ENVIRONMENTAL RESOURCES
9400 PEPPERCORN PLACE, SUITE 600
LANDOVER, MD 20785

18325 061 DPWT G
MR. WALTER J. DOMBROWSKI
STORM DRAINAGE MAINTENANCE DIVISION
OFFICE OF HIGHWAY MAINTENANCE
PRINCE GEORGE'S COUNTY
8400 D'ARCY ROAD
FORESTVILLE, MD 20747

* * * LOCAL AGENCIES * * *

16048 061 MONTGOMERY G
DR. EDWARD U. GRAHAM
DIRECTOR
DEPARTMENT OF ENVIRONMENTAL PROTECTION
MONTGOMERY COUNTY
EXECUTIVE OFFICE BUILDING
ROCKVILLE, MD 20850
(301) 217-2400 FAX (301) 217-6718

5128 061 MONTGOMERY G
MR. WILLIAM E. HANNA JR.
PRESIDENT
COUNTY COUNCIL
COUNTY OFFICE BUILDING, 2ND FLOOR
100 MARYLAND AVENUE
ROCKVILLE, MD 20850
(301) 217-2500

8602 061 MONTGOMERY G
MR. NEAL POTTER
COUNTY EXECUTIVE
MONTGOMERY COUNTY
EXECUTIVE OFFICE BUILDING, 2ND FLOOR
101 MONROE STREET
ROCKVILLE, MD 20850
(301) 217-2500

8616 061 PRINCE GEOR G
MS. JO ANN T. BELL
CHAIRPERSON
PRINCE GEORGE'S COUNTY COUNCIL
COUNTY ADMINISTRATION BUILDING
14741 GOVERNOR ODEN BOWIE DRIVE
UPPER MARLBORO, MD 20772
(301) 952-3700

15342 061 PRINCE GEOR G
MR. PARRIS N. GLENDENING
COUNTY EXECUTIVE
PRINCE GEORGE'S COUNTY
COUNTY ADMINISTRATION BUILDING, RM 5032
14741 GOVERNOR ODEN BOWIE DRIVE
UPPER MARLBORO, MD 20772
(301) 952-4131

15722 061 PRINCE GEOR G
MR. JOHN PORCARI
OFFICE OF THE COUNTY EXECUTIVE
PRINCE GEORGES COUNTY
14741 GOVERNOR ODEN BOWIE DRIVE
UPPER MARLBORO, MD 20772
(301) 952-3706

8804 061 WSSC G
MR. CORTEZ A. WHITE
GENERAL MANAGER
WASHINGTON SUBURBAN SANITARY COMMISSION
14501 SWEITZER LANE
LAUREL, MD 20707
(301) 699-4000

* * * LOCAL AGENCIES * * *

14023 062 DC G
MS. FERIAL BISHOP
ADMINISTRATOR
ENVIRONMENTAL REGULATION ADMINISTRATION
DEPART OF CONSUMER & REGULATORY AFFAIRS
2100 MARTIN LUTHER KING JR., AVE., SE
WASHINGTON, DC 20020
FAX (202) 404-1141

15480 062 DC G
MS. BETTY HAGER FRANCIS
DIRECTOR
DC DEPARTMENT OF PUBLIC WORKS
2000 14TH STREET, N.W.
6TH FLOOR
WASHINGTON, DC 20009
(202) 939-8191

12890 062 DC G
HONORABLE SHARON PRATT KELLY
MAYOR
DISTRICT OF COLUMBIA
1 JUDICIARY SQUARE
441 FOURTH STREET, N.W.
WASHINGTON, DC 20001

16103 062 DC G
MR. KEN LADEN
ENVIRONMENTAL POLICY DIVISION
OFFICE OF POLICY AND PLANNING
DC DEPARTMENT OF PUBLIC WORKS
2000 14TH STREET, N.W., 6TH FLOOR
WASHINGTON, DC 20009
(202) 939-8115

19083 062 DC-ECONDEV G
MR. GEORGE BROWN
SPECIAL ASSISTANT FOR ECONOMIC
DEVELOPMENT
1 JUDICIARY SQUARE
441 FOURTH STREET, N.W.
WASHINGTON, DC 20001

19084 062 DCARMORYBRD G
MS. MARY ANN NILES
GENERAL COUNSEL
DISTRICT OF COLUMBIA
ARMORY BOARD
2001 EAST CAPITAL STREET, S.E.
WASHINGTON, DC 20003

19063 062 DCSHPO G
MR. ROBERT MALLETT
1 JUDICIARY SQUARE, DCSHPO
441 FOURTH STREET, N.W.
SUITE 1120
WASHINGTON, DC 20001
(202) 727-6053

* * * PUBLIC MEDIA * * * = NEWSPAPERS

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7051 071 POST G
ENVIRONMENTAL EDITOR
WASHINGTON POST
1150 15TH STREET, NW
WASHINGTON, DC 20071

19891 071 TIMES G
ENVIRONMENTAL EDITOR
WASHINGTON TIMES
3600 NEW YORK AVENUE, NORTHEAST
WASHINGTON, DC 20002
(202) 636-3028 FAX (202) 269-3419

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MS. JUTTA SCHNEIDER
D.C. WATER RESOURCES RESEARCH CENTER
BOX 5004
UDC
4200 CONNETICUTT AVENUE
WASHINGTON, DC 20008

16170 082 UNIV MD G
DR. DENNIS L. TAYLOR
HORN POINT ENVIRONMENTAL LABORATORIES
UNIVERSITY OF MARYLAND
P.O. BOX 775
CAMBRIDGE, MD 21613
(410) 228-9250

* * * SPECIAL INTEREST GROUPS * * * = STATE GROUPS

16665 092 CHESAPEAKE G
MR. WILLIAM C. BAKER
PRESIDENT
CHESAPEAKE BAY FOUNDATION
162 PRINCE GEORGE STREET
ANNAPOLIS, MD 21401
(410) 268-8816

19059 092 SIERRACLLDF G
MR. TED ZUKOSKI
SIERRA CLUB LEGAL DEFENSE FUND
1531 P STREET, N.W.
SUITE 200
WASHINGTON, DC 20005
(202) 667-4500

19058 092 WORLDWILDFU G
MS. CONSTANCE HUNT
WORLD WILDLIFE FUND
1250 24TH STREET, N.W.
WASHINGTON, DC 20037

* * * SPECIAL INTEREST GROUPS * * * = REGIONAL GROUPS

17481 093 POTOMAC RIV G
MR. BURTON K. KUMMEROW
CHAIRMAN
POTOMAC RIVER BASIN CONSORTIUM
REISS SCIENCE BUILDING, ROOM 406
GEORGETOWN UNIVERSITY
WASHINGTON, DC 20057
(202) 687-2472 FAX (202) 687-5662

19258 093 SCHUELER G
MR. THOMAS R. SCHUELER
CENTER FOR WATERSHED PROTECTION
8630 FENTON STREET
SUITE 910
SILVER SPRING, MD 20910-4201

* * * SPECIAL INTEREST GROUPS * * * = LOCAL GROUPS

15700 094 ANACOSTIA W G
MR. ROBERT E. BOONE
EXECUTIVE DIRECTOR
ANACOSTIA WATERSHED SOCIETY
5110 ROANOKE PLACE
SUITE 101
COLLEGE PARK, MD 20740
(301) 513-0316 FAX (301) 513-9321

19067 094 ARBORETUMCA G
MS. CYNTHIA A. GREENE
PRESIDENT
ARBORETUM CIVIC ASSOCIATION
1822 24TH STREET, N.E.
WASHINGTON, DC 20002

9884 094 AUDUBON SOC G
MR. NEAL FITZPATRICK
CONSERVATION DIRECTOR
AUDUBON NATURALIST SOCIETY
8940 JONES MILL ROAD
CHEVY CHASE, MD 20815
(301) 652-9188

* * * SPECIAL INTEREST GROUPS * * *

19068 094 BENNINGRCA G
MR. ALBERT LONG
PRESIDENT
BENNING RIDGE CIVIC ASSOCIATION
722-46TH STREET, S.E.
WASHINGTON, DC 20019

19069 094 CONGRESSHCA G
MS. VIRGINIA L. MAJOR
PRESIDENT
CONGRESS HEIGHTS CIVIC ASSOCIATION
3301 5TH STREET, S.E.
WASHINGTON, DC 20032

19075 094 DCANC G
MS. BARBARA BROWN
ANC 7A CHAIRPERSON
650 ANACOSTIA AVENUE, N.E.
WASHINGTON, DC 20019

19066 094 DCANC G
MR. ERNEST DARLING
1828 - 18TH STREET, S.E.
WASHINGTON, DC 20020
(202) 678-0083

19065 094 DCANC G
MR. JOSEPH E. JOHNSON
723 CROISSANT PLACE, S.E.
WASHINGTON, DC 20020
(202) 581-2893

19076 094 DCANC G
MS. EVA M. JONES
ANC 7C CHAIRPERSON
4651 N.H. BURROUGHS AVENUE, N.E.
SUITE 2
WASHINGTON, DC 20019

19074 094 DCANC G
MR. CLARENCE MARTIN
ANC 6A CHAIRPERSON
MAURY SCHOOL
13TH & CONSTITUTION AVENUE, N.E., #10
WASHINGTON, DC 20002

18098 094 DCHISSOC G
MR. JOHN ALVITI
HISTORICAL SOCIETY OF WASHINGTON, D.C.
1307 NEW HAMPSHIRE AVE., NE.
WASHINGTON, DC 20036
(202) 785-2068

18099 094 DCPRESERV G
MR. RICHARD MOE
PRESIDENT
NATIONAL TRUST FOR HISTORICAL
PRESERVATION
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WASHINGTON, DC 20036
(202) 673-4000

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EXECUTIVE DIRECTOR
DC PRESERVATION LEAGUE
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SUITE 739
WASHINGTON, DC 20004

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DUPONT PARK CIVIC ASSOCIATION
3140 P STREET, S.E.
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ENVIRONMENTAL CONCERN
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WASHINGTON, DC
WASHINGTON, DC 20001
(202) 504-2200

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VICE PRESIDENT
ISLAND DEVELOPMENT CORPORATION
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WASHINGTON, DC 20003
(202) 547-2207

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NORTHWOOD/FOUR CORNERS CIVIC ASSOCIATION
10602 LOCKRIDGE DRIVE
SILVER SPRING, MD 20901

19899 094 NFCCA G
MS. TIERNEY SIEGEL
NORTHWOOD/FOURCORNERS CIVIC ASSOCIATION
108 NORTHWOOD AVENUE
SILVER SPRING, MD 20901

19073 094 RIVERTERRCA G
MR. J. RAMON TAYLOR
PRESIDENT
RIVER TERRACE CIVIC ASSOCIATION
3332 ALDEN PLACE, N.E.
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SIERRA CLUB
MONTGOMERY COUNTY CHAPTER
9 DAIRYFIELD COURT
ROCKVILLE, MD 20852

19259 094 SNOWDEN G
MR. FRED A. PIERDON
CHAIRMAN
SNOWDENS MILL HOMEOWNERS ASSOCIATION
1916 LODESTONE DRIVE
SILVER SPRING, MD 20904

19082 094 TROUT UNLIM G
MR. ROBERT SCHUELER
PAINT BRANCH CHAIR
POTOMAC/PATUXENT CHAPTER
TROUT UNLIMITED
10602 WOODSDALE DRIVE
SILVER SPRING, MD 20901
(301) 593-1255

19078 094 UNIVHILLSCA G
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UNIVERSITY HILLS CIVIC ASSOCIATION
3319 GUMWOOD DRIVE
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LAND ETHICS, INC
MR. PETER KUMBLE
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WASHINGTON, DC 20036
(202) 939-3410

19164 100 TETRA TECH G
MR. DAVE MEEKS
TETRA TECH, INC.
4700 KING STREET
SUITE 500
ALEXANDRIA, VA 22302
(703) 931-9301

* * * INDIVIDUAL INTERESTS * * *

19166 120 THOMAS G
MR. IAN THOMAS
1427 MERIDIAN PLACE, N.W.
WASHINGTON, DC 20010

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WERE ALSO PROVIDED TO:

Professor Hope Babcock
Georgetown University Law Center
600 New Jersey Avenue N.W.
Washington, DC 20001

Director
Office of Federal Activities (A-104)
Environmental Protection Agency
401 "M" Street, SW
Washington, DC 20460

Mr. Greg Golden
Tidewater Administration
Maryland Department of Natural Resources
Power Plant and Environmental Review Div.
Tawes State Office Building
Annapolis, Maryland 21401

Mr. Mike Werner
509 Susan Drive
West Chester, PA 19380-3849

Mr. Joe Berg
EA Engineering
11019 McCommick Rd.
Hunt Valley, Maryland 21031
(410) 584-7000

Mr. Bill Spicer
Naval Surface Warfare Center
16811 Fredrick Rd.
Mt. Airy, Maryland 21771

Mr. James Tate
U.S. Senate
Senate Dirkson
Room 312
Washington, DC 20510
(202) 224-4717

Ms. Karen Felton
Environmental Protection Agency
Region III
841 Chestnut Building
Philadelphia, PA 19107

Mr. Scott Faber
American Rivers
801 Pennsylvania Avenue SE
Suite 400
Washington, DC 20010
(202) 547-6900

Mr. Hank Rick
U.S. Navy Engineer Facilities
Activities Chesapeake
901 "M" Street, SE
Building 212
Washington, DC 20374-5018
(202) 685-3064

Ms. Diane Anderson
509 Rockford Rd.
Silver Spring, Maryland 20902

Ms. Leslie Boness
10819 Margate Road
Silver Spring, Maryland 20901

Mr. Allen Hubler
2750 Prosperity Avenue
Suite 230
Fairfax, Virginia 22031

Mr. Hank Rick
U.S. Navy Engineering Facilities Activity
901 "M" Street, S.E.
Building 212
Washington, DC 20374-5018
202-685-3064

Ms. Mary O'Lone
U.S. EPA
Office of General Counsel
401 "M" Street, S.E. Mail Code 2388R
Washington, DC 20460

Mr. Mark Brousseau
101 West River Road
#200
Tucson, Arizona 85704

Mr. Jace Cuje
JAYCOR Environmental
1608 Spring Hill Road
Vienna, Virginia

Mr. Keith Bowers
Biohabitats, Inc
303 Allegheny Avenue
Towson, Maryland 21204

Mr. Andrew Haines
168 West Shoen Road
Exton, PA 19341

Mr. Bradley Rush
101 Belton Road
Silver Spring, Maryland 20901

Ms. Lillian Woods
USDA Soil Conservation Service
Room 306
901 Newton Street, NE
Washington, DC 20017
(202) 274-6914

Ms. Erica Atkison
STRA
1100 Wilson Boulevard
Suite 1700
Arlington, Virginia 22209

Mr. John Sellers
Canvass Director
Greenpeace
1436 U Street; NW
Washington, DC 20009

Mr. Robert E. Day
President
Organization for Anacostia
Rowing and Sculling
3633 Ellicott Street, NW
Washington, DC 2008-2932

Cambridge Information Group
7200 Wisconsin Avenue
Suite 610
Bethesda, Maryland 20814

Mr. Sam Stribling
TETRA Tech
10045 Red Run Boulevard
Owings Mills, Maryland 21117

Ms. Marion Lane
10709 Lockridge Drive
Silver Spring, Maryland 20901

ANACOSTIA RIVER & TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND

INTEGRATED FEASIBILITY REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT

JULY 1994

ANNEX B

FISH & WILDLIFE COORDINATION ACT REPORT

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
1825 Virginia Street
Annapolis, Maryland 21401

January 31, 1994

Colonel J. Richard Capka
District Engineer
Baltimore District, Corps of Engineers
P.O. Box 1715
Baltimore, Maryland 21203

Re: Anacostia River and
Tributaries
Feasibility Study

Dear Colonel Capka:

This constitutes the report of the U.S. Fish and Wildlife Service (Service) for the proposed habitat restoration project for the Anacostia River and tributaries, District of Columbia and Maryland. It is submitted in accordance with Section 2(b) of the Fish and Wildlife Coordination Act (49 Stat. 401, as amended; 16 U.S.C. 661 *et seq.*). The Service's involvement in the project originated in the Anacostia River Basin Reconnaissance Study (see Planning Aid Report dated November, 1990).

In January 1994 we submitted a planning aid report which provided information on the baseline biological conditions and the expected project effects. The present report summarizes this information and sets forth the Service's official position on the Corps' recommended plan.

Project Description

The project consists of 13 restoration actions in the Anacostia River basin in the District of Columbia and Maryland. Two projects, Kingman Lake and the Anacostia fringes, involve the creation of 79 acres of tidal wetlands. The wetlands would be created by placing dredged material in shallow water areas to raise the bottom to an elevation that would be suitable for planting tidal wetland vegetation. Approximately 266,000 cubic yards of material would be dredged from the river navigation channel and 40,000 cubic yards would come from dredging within Kingman Lake. The wetlands would be primarily emergent although small areas of scrub/shrub would also be established.

Three projects, Lockridge Drive, April/Stewart Lane, and Fordham Street, involve the creation of stormwater wetland systems with capacity for extended detention. At Lockridge Drive a twelve foot high embankment would be constructed across a forested drainageway with a small intermittent/perennial stream connecting to the Northwest Branch. The resulting basin would be cleared and recontoured to create a wetland area of approximately 13,300 square feet, of which approximately two-thirds would consist of emergent marsh and water less than 18 inches deep and with the remainder being open water 18 to 48 inches deep. The system also includes a deep forebay at the head to collect incoming sediment, and a deeper micropool at the outlet to facilitate a clog-free discharge.

The April/Stewart Lane site is located within the Paint Branch watershed. The project would entail constructing a 20-foot high embankment across a forested drainageway to create a wetland area approximately 31,000 square feet in size. Approximately one-third of the area would be an emergent wetland and the rest open water. There would also be a sediment forebay.

The Fordham Street proposal involves diversion of a stormwater drainage into an existing open recreation field, which would be converted into a emergent wetland. Dikes would be installed to confine the water and to create a long flow path through the wetland. After coursing through the wetland, the stormwater would be discharged into a drainage leading into the Northwest Branch.

Three projects involve the conversion of existing dry stormwater basins into stormwater wetland systems. Snowdens Mill East and West are small (< 1 acre), grassed stormwater basins located within the Paint Branch drainage. The Tanglewood site is a small basin located in the Little Paint Branch watershed that is currently vegetated with a mixed herbaceous community.

Four projects involve the installation of stream habitat improvement measures. They consist of a 0.7 mile long reach of the upper Northwest Branch in Montgomery County, a 2.1 mile long reach of the lower Northwest Branch in Prince Georges' County, a 0.5 mile reach of Sligo Creek, and a 2.0 mile reach of Paint Branch. Proposed stream habitat improvement measures include: rock wing deflectors, stream boulder placement, rock vortex weirs, bank protection, removal of debris and depositional material, and riparian planting.

One project involves diversion of a stormwater discharge to protect trout spawning in Gum Springs. The diversion would be accomplished by installing an 1800 foot long pipeline parallel to Gum Springs. The pipeline would discharge into the much larger stream of Paint Branch. All stormwater discharges up to the two year storm would be diverted.

Fish and Wildlife Resources Without the Project

The upper Anacostia River is a tidal, freshwater area that has been heavily impacted by past dredging and filling activities. The most significant impact was the elimination of most of the extensive tidal marshes that existed earlier this century. The river continues to receive nonpoint discharges derived from the intensively developed surrounding areas. This results in water quality problems including a serious dissolved oxygen deficiency from late spring to early fall, high turbidity, and high bacteria levels. Oil releases have been a chronic problem. The sediments contain elevated concentrations of various organic and inorganic contaminants. High levels of chlordane and polychlorinated biphenyls in fish tissue have resulted in the issuance of a public health advisory to limit consumption of bottom feeding fishes such as catfish, eel, and carp.

The benthic invertebrate fauna is rather poorly developed and consists mostly of oligochaetes (ie., worms) and chironomids (ie. non-biting midge larvae). The fish fauna consists of resident and migratory species that are typically at least moderately pollution tolerant. The more common species include: gizzard shad (*Dorosoma cepedianum*), eastern silvery minnow (*Hybognathus regius*), pumpkinseed (*Lepomis gibbosus*), mummichog (*Fundulus heteroclitus*), carp (*Cyprinus carpio*), green sunfish (*Lepomis cyanellus*), brown bullhead (*Ictalurus nebulosus*), and American eel (*Anguilla rostrata*). The Anacostia has not experienced the resurgence in aquatic resources that has occurred in the Potomac River and the populations of gamefish such as largemouth bass (*Micropterus salmoides*), remain low.

The upper Anacostia contains a fairly well developed wooded riparian zone that is part of a public park system. Despite the highly urbanized condition of the surrounding land, the riparian zones are utilized by a wide variety of wildlife. Common avian species include: waterfowl (mallard (*Anas platyrhynchos*) and Canada goose (*Branta canadensis*)), wading birds (especially great blue heron (*Ardea herodias*)), shorebirds (especially killdeer (*Charadrius vociferus*)), raptors, kingfisher (*Ceryle aleyon*), gulls (*Larus spp.*), perching birds, and others. Various urban tolerant mammals such as raccoon (*Procyon lotor*) and opossum (*Didelphis marsupialis*) are also expected to be present.

Upstream tributaries where project actions are proposed include the Northwest Branch and its primary tributary Sligo Creek, Paint Branch and its tributary Gum Springs, and Little Paint Branch. The watersheds of these tributaries vary from urban to rural. The area inside the Capital Beltway is generally urbanized and the ecological condition of the streams has been adversely affected. North of the Beltway land use is progressively more rural.

The tributaries in the more urbanized areas have been affected in a number of ways. The presence of substantial amounts of impervious or cleared land surfaces greatly accelerates runoff during rainfall events. This results

in significantly higher peak flows in the streams, leading to stream bank and channel erosion, and sedimentation problems. The large volume of runoff, in addition to carrying sediment and other pollutants into the streams, also produces undesirable increases in water temperature.

Although most of the tributaries are at least moderately degraded, their condition varies widely throughout the basin. Sligo Creek, the most urbanized tributary, is considered to be in poor condition. Its banks are armored with riprap, and it contains poorly developed invertebrate and fish assemblages. The upper Northwest Branch exists in a rural landscape but still exhibits high rates of bank erosion, channel downcutting, sediment deposition, and debris accumulation. The lower Northwest Branch in Prince Georges' County is much more urbanized. Most of the stream is bordered by a narrow buffer of parkland, much of which is maintained in a natural state. The fish community of the Northwest Branch is relatively diverse with recent surveys yielding 18 species per station. The resident gamefish population is low and consists mainly of sunfish (*Lepomis spp.*).

Upper Paint Branch arises from springs in a relatively undeveloped area and is considered to have the best water quality of all the Anacostia subwatersheds. Above the Capital Beltway it is designated a Maryland Class III waterway which indicates that it is suitable for natural trout reproduction. This section of Paint Branch supports a self-sustaining population of brown trout (*Salmo trutta*) which is unusual given its location so close to the urban suburbs of Washington, D.C. Gum Springs is one of three small tributaries which, together with the main stem above Fairland Road, comprise the primary trout spawning areas. Little Paint Branch also begins in a relatively undeveloped area. Its watershed becomes more developed downstream but the stream is buffered by a vegetated border. Its fish community is relatively diverse with recent surveys yielding an average of 17 species per station. Unlike Paint Branch, it does not support a natural trout population.

In general, the fish communities of the Anacostia tributaries have become much more diverse since 1970. This desirable trend has apparently been the result of improved land and water use practices in the watershed.

Endangered Species

Except for occasional transient individuals, no Federally listed or proposed endangered or threatened species under our jurisdiction are known to exist in the project impact areas. Therefore, no Biological Assessment or further Section 7 Consultation pursuant to the Endangered Species Act of 1973 is required with the Fish and Wildlife Service. Should project plans change, or if additional information on listed or proposed species becomes available, this determination may be reconsidered.

Biological Effects of the Project

The conversion of approximately 79 acres of intertidal flats into vegetated tidal wetlands in the upper Anacostia River will restore a portion of the wetlands that were eliminated by dredging and filling earlier this century. The project should improve habitat diversity and complexity because, with the exception of the 32 acres recently created at Kenilworth Marsh, there are very few vegetated wetlands in existence on the river. The wetlands should provide habitat for a wide variety of wetland dependent wildlife ranging from muskrats to egrets. The wetlands can also be expected to benefit fish by enhancing production of invertebrate food sources.

In addition, to their direct habitat value, the wetlands should improve the river's water quality by filtering out sediment and associated pollutants. This function is considered especially valuable in the Anacostia because of the high level of suspended sediment. The wetlands may also act as a sink for nitrogen and phosphorous, thereby helping to reduce the excessive amounts of these nutrients in the Potomac estuary. A further benefit of the project is that by using material from the navigation channel, the need for future maintenance dredging will be reduced.

The project does involve some ecological risk because of the contaminant burden in the sediments. During dredging and placement of the fill material, the increase in suspended sediment will likely make the associated contaminants more available to biota. The recent experience with the Kenilworth Marsh restoration indicates that this impact may not be great. Specifically, the sediment grain size distribution (mixed sand and silt), use of material retention structures (water tubes, hay bales, etc.) and controls on the placement operation (eg. Y-valves) appear to have been effective in minimizing the transport of suspended material outside the project area.

Wildlife that are attracted to the constructed wetland would be subjected to potential toxic effects due to the presence of elevated levels of PCBs, chlordane, lead, zinc, and possibly other contaminants. While bioassay tests have indicated that the sediments are not acutely toxic to invertebrate test organisms, they may be capable of causing adverse chronic or sublethal effects. Although we believe that the potential for wildlife benefits exceeds the potential for toxic effects, the contaminant levels are high enough that a program to monitor chronic and sublethal effects must be incorporated into the project plan. We recommend that the design of this program be coordinated with the Service.

The Anacostia River has been identified as a Toxics Region of Concern by the Chesapeake Bay Program's Executive Council. A Regional Action Plan will be developed by August/September 1994. We envision that the monitoring plan recommended above will be an integral part of the Regional Action Plan.

The proposed stormwater wetland systems are designed to remove pollutants from surface water runoff and to reduce peak flows downstream during the smaller, but more frequent rain events. The creation of wetland habitat for wildlife is a secondary benefit. The habitat value of stormwater wetlands will not be as great as natural, unaltered wetlands because of the extremes in flow and pollutant input. Stormwater wetlands typically have lower plant and animal diversity.

The Lockridge Drive stormwater wetland system would be constructed in a wooded drainageway. The drainage area encompasses 153 acres of moderately dense residential area. Uncontrolled surface water runoff has produced severe erosion in the drainageway. The project would alleviate this problem as well as achieve an incremental improvement in water quality and flow conditions downstream in the Northwest Branch. The conversion of the existing woodland habitat into stormwater wetland habitat appears to be a reasonable tradeoff.

The April/Stewart Lane stormwater wetland system would be located in a position to control runoff from 203 acres of dense commercial and residential development. The drainage area is estimated to consist of 60 percent impervious surfaces. The system would be constructed in a wooded drainageway, which discharges into the natural trout waters of Paint Branch. Because the wetland would be subjected to increased thermal loading that could be detrimental to the cool water ecology of Paint Branch, the system has been designed with the capability to bypass all or a portion of the base flow around the wetland. The benefits to Paint Branch from improved water quality and peak flow reduction should greatly exceed the potential detrimental effect associated with increased thermal loading. The replacement of the existing wooded habitat with stormwater wetland appears to be a fair exchange.

The Fordham Street stormwater wetland would be established in an open recreation field by constructing dikes and diverting an existing stormwater drainage from a dense residential area. The project sh uld improve the conditions in the Northwest Branch as well as improving the on-site habitat.

The Snowdens Mill East and West stormwater wetland systems would be constructed in existing detention basins that are maintained in mowed grass. These projects should increase the pollutant removal efficiency of the existing basins, and significantly improve the on-site habitat value. Since these systems drain into the natural trout waters of Paint Branch, each project includes an adjustable base flow bypass. Since the water temperature in the wetland would be elevated, the base flow would be diverted around it to reduce the thermal discharge to the stream below.

The Tanglewood stormwater basin would be constructed by regrading an existing dry stormwater detention basin to create a series of wetland terraces. The primary benefit would be increased pollutant removal. The existing basin is well vegetated with a mixed community of primarily herbaceous species and probably accomplishes a fair degree of filtering. The wetland terraces would improve this filtering function by encouraging sheet flow over a wider area. The habitat value of the proposed wetland would probably be a small improvement over the existing condition.

All of the above discussed stormwater wetland projects involve relatively small drainage areas ranging from 54 to 222 acres in existing developed areas. As a result of the small proportion of the drainage area involved, the beneficial effects of each project on the downstream areas will be limited. However, each project is one incremental step among many which are proposed as part of the multijurisdictional Anacostia Watershed restoration effort. The Anacostia Restoration Blueprint identified 159 stormwater retrofit projects. While each of the projects individually may not exert a large effect, cumulatively they should achieve significant ecological improvement.

The diversion of the stormwater discharge away from Gum Springs should measurably improve the reproductive success of brown trout in the lower 1,800-foot section of this stream. Several years of monitoring by State biologists have shown that trout recruitment in this stream section is inversely correlated with the frequency of runoff episodes. Thermal spikes in Gum Springs caused by this particular stormwater input are strongly implicated as the reason for the pattern of low recruitment. The project should substantially reduce thermal spikes by diverting all stormwater flows up to the two-year storm down to Paint Branch. Because this system has a much higher flow, it should be better able to absorb the thermal load. Biological impacts to the woodland community associated with construction of the diversion pipeline should be relatively small, especially since the route follows a hiking trail along much of the way.

The stream habitat improvement measures proposed for Northwest Branch, Paint Branch, and Sligo Creek should be effective in stabilizing banks and restoring riffles, pools, and instream and overhead cover. They should significantly improve the aquatic habitat conditions in these areas, which together comprise over 5 miles of stream. The invertebrate and fish populations can be expected to respond accordingly. However, the long-term success of those measures may depend on how well the stream hydrology is brought into equilibrium with its hydraulic capacity. The upper Northwest Branch, in particular, has sections where the channel is unstable due to increased runoff, sediment deposition, and related causes. In such areas it may be prudent to implement runoff controls prior to installation of extensive stream habitat improvement measures.

Conclusions

Because these projects are innovative, diligent maintenance and/or monitoring will be needed to assure that their habitat improvement objectives are met. Information obtained from monitoring will also be important in designing future habitat improvement projects. We believe that each of the proposed projects should result in a net improvement in the habitat conditions in the Anacostia River basin. These projects constitute significant steps in the ongoing multijurisdictional effort toward restoration of the Anacostia River. It also appears that these projects could produce some benefits further downstream in the Potomac River estuary. The Chesapeake Bay Restoration Program has recently increased its focus on the tributaries as a strategy to improve conditions in the Bay estuary. To the extent that these projects reduce the release of nutrients, sediment, and other pollutants, they will inevitably contribute to improved conditions in the estuary. The Service, therefore, supports these projects and encourages their expeditious implementation.

Sincerely,

John P. Wolflin
Field Supervisor
Chesapeake Bay Field Office

INTRODUCTION

The Anacostia Watershed Restoration Agreement of 1987 initiated a comprehensive effort directed toward the restoration and renovation of the Anacostia River Basin. One of the goals of the action plan is to increase the acreage and quality of tidal wetlands. To address this goal, the Army Corps of Engineers developed an enhancement project with the objective of reestablishing emergent wetlands in Kingman Lake by depositing sediment dredged from the Anacostia River.

A variety of contaminants, including metals, polynuclear aromatic hydrocarbons, and organochlorine compounds occur in sediments of the Anacostia River (ChemAlysis Incorporated, 1992; Velinsky *et al.* 1992; LTI, Limno-Tech, 1990; Pinkney *et al.* 1993). The levels of chlordane compounds and polychlorinated biphenyls (PCBs) in Anacostia River sediments are of concern because of their persistence in habitats, their adverse effects on a wide range of organisms, and their biomagnification through the food chain. Chlordane and PCB compounds have low solubility in water and have a tendency to bind to sediment organic carbon. They attach to suspended sediments that rapidly settle out of the water column and enter the food chain via benthic organisms (Wilcock *et al.* 1993).

Contaminants in sediments may serve as a source for contamination of biota (Salomons, 1985, Salomons *et al.* 1987), or they may be covered by other sediments and sequestered. Contaminants may transform, remain stable, or degrade due to abiotic or biotic factors (Dickson *et al.* 1987). Availability of sediment contaminants to biota is either through ingestion of sediment, or through the water, especially pore water (Giesy and Hoke 1989, DiToro *et al.* 1991). Although aquatic organisms are not usually exposed to high, acutely toxic concentrations of chemicals due to dilution and dispersion (Haasch *et al.* 1993), they are exposed to lower, sublethal levels. The lower levels may not produce death, but they can have effects on the future survival of the organisms (Rand and Petrocelli 1985).

Sediment toxicity tests and macroinvertebrate surveys indicated biological impairment in the Anacostia River (Velinsky *et al.* 1992). Biota in the Anacostia River are exposed to organic and inorganic contaminants through the sediments and bioaccumulation by macroinvertebrates, fish, and waterfowl is a major concern. In 1989, the District of Columbia Department of Consumer and Regulatory Affairs (DCRA) issued a health advisory limiting consumption of carp, catfish, and eels due to their exceedance of U.S. Food and Drug Administration (FDA) action levels for PCBs (2.0 ppm wet weight) and chlordane (0.3 ppm). A 1992 survey of the Anacostia River found high concentrations of these contaminants in carp and catfish (Pinkney *et al.* 1993). Total PCB concentrations as high as 17.9 ppm and total chlordane concentrations (sum of α-chlordane, γ-chlordane, heptachlor, heptachlor epoxide, oxychlordane, cis-nonachlor, and trans-nonachlor) as high as 2.45 ppm were reported in channel catfish from the River.

The use of sediment from the Anacostia River for the Kingman Lake enhancement project involves dredging and deposition of sediment that may serve to mobilize buried pollutants. In addition, wetlands created from these sediments provide a source of contaminants for wetland organisms to accumulate PCBs and chlordane. This study was designed to address two objectives. The first objective was to identify the presence and distribution of contaminants in the sediment proposed to be dredged from the Anacostia River and Kingman Lake. The second objective was to determine the acute toxicity of these sediments to biota using sediment and pore water bioassays.

MATERIALS AND METHODS

Field Sampling Procedures

Sediment sampling in the Anacostia River and Kingman Lake occurred on 10 August 1993. Sampling stations were accessed via boat. The specific location of each station was determined using GPS and locations are described in Table 1 and Figure 1. In the Anacostia River, three stations were sampled between the Penn Central Railroad Bridge and the Benning Road Bridge. In Kingman Lake, one station was located near the north entrance. A control station was established in the Potomac River near the south end of Roosevelt Island (Figure 2).

Sediment collections were made with a Wildco 2" KB Core Sampler with a Lexan core tube liner. An eggshell core catcher was used at the end of the core tube to retain intact sediment cores. The core tubes were driven into the sediments manually to a depth of 20 inches. At each station, ten cores were taken from a 10 meter radius and composited. A new Lexan core tube liner was used at each sample site to prevent sample contamination. The samples were transported to the laboratory on ice for biological and chemical analyses under chain of custody. Sediment samples for chemical analysis were carefully packed in coolers on ice and sent to Geochemical and Environmental Research Group (GERG), Texas A & M, for analysis. Water chemistry, including temperature, pH, dissolved oxygen, conductivity, and depth was measured with a HydroLab Surveyor (Table 2). The meter was calibrated prior to sampling.

Analytical Methods

Sediment Chemical Analysis

Inorganics

Sediments were digested in heavy-walled, screw-cap Teflon Bombs with concentrated nitric acid, concentrated hydrofluoric acid and 4.5% boric acid added sequentially with separate 6-12 hour oven heating (120°C) after each addition. This procedure resulted in a total digestion and solubilized all trace elements present in the sediment sample. Metals in the digestate were determined by graphite furnace atomic absorption spectrometry (AAS), and achieved detection limits of Al=10 ppm, As=0.5 ppm, Cd=0.2 ppm, Cr=1 ppm, Cu=1 ppm, Fe=10 ppm, Mn=5 ppm, Ni=5 ppm, Pb=5 ppm,

Se=1 ppm, and Zn=5 ppm. Mercury was determined by cold vapor AAS, in which Sn^{+2} was used to reduce HgO and achieved detection limits of Hg=0.1 ppm.

Organics

The sediment samples were freeze-dried and extracted in a Soxhlet extraction apparatus. Briefly, the freeze-dried sediment samples were homogenized and a 10- gram sample was weighed into the extraction thimble. Surrogate standards and methylene chloride were added and the samples extracted for 12 hours. The extracts were treated with copper to remove sulfur and were purified by silica/alumina column chromatography (MacLeod et al. 1985, Brooks et al. 1989) to isolate the aliphatic and aromatic/pesticide/PCB fractions. This method achieved limits of detection of toxaphene=0.05 ppm, PCB (Total and Individual)=0.05 ppm, and all other compounds=0.01 ppm.

Total Organic Carbon (TOC)

Coulometrics was the method used to determine total organic carbon (TOC). The sediment was burned under an oxygen atmosphere to produce carbon dioxide gas. This gas was bubbled through an electrochemical cell, where a reaction between the CO_2 and the cell solution produced a color change. This solution was then electrically back-titrated to the endpoint. The amount of electricity used to reach this endpoint was directly proportional to the amount of organic carbon in the sample. The concentration of inorganic carbon was determined using the same detector, but the CO_2 was produced by acidifying the sample in a closed environment.

Grain Size

A small aliquot of sediment was treated with 30% hydrogen peroxide to remove organic coating from grains. A dispersing agent was then added to the sample. The sand and mud fractions were then separated using a 63 micron sieve. The sand fraction (> 63 microns) was retained on the screen and the mud fraction (silt and clay < 63 microns) was washed into a one liter volumetric cylinder. The sand fraction was dried, sieved on a 63 micron screen and weighed. The sediment which passed through the screen the second time was added to the one liter cylinder. The mud fraction was analyzed by stirring the cylinder and sampling 20 ml aliquots at 4 and 8 phi intervals. The 4 and 8 phi samples were dried and weighed. The % sand, silt, and clay fractions were determined on a dry weight basis.

Biological Analyses

Pore Water Bioassays

Ninety-six hour pore water bioassays were conducted from 13 August to 17 August 1993. Pore water was extracted using a pore water extractor that consisted of a fused-glass air stone attached to a 60-cc syringe by 18" polyethylene tubing (Winger and Lasier 1991; Winger and Lasier 1993).

Sediment samples brought into the laboratory were stirred to alleviate any compaction that occurred during transport. Immediately after stirring, twenty pore water extractors were inserted into each sample by placing the air stones near the bottom of the storage containers. Sediment pore water was extracted by applying a vacuum created by retracting and bracing the syringe plunger. The extractors stayed in place for four hours until 300 mL of pore water was extracted. The pore water obtained was clear and required no filtering. A hard water control was prepared using $NaHCO_3$=400 mg/L, $CaSO_4$=250 mg/L, $MgSO_4$=250mg/L, and KCl=17 mg/L to achieve hardness=350 mg/L $CaCO_3$ and alkalinity=275 mg/L. A soft water control (reconstituted water) was prepared using $NaHCO_3$=96 mg/L, $CaSO_4$=50 mg/L, $MgSO_4$=30 mg/L, $CaCl_2$=50 mg/L, and KCl=4 mg/L to achieve hardness=90 mg/L $CaCO_3$.

Five treatment groups were prepared using the freshly extracted pore water and reference pore water and were aerated for thirty minutes. The treatments were aerated for thirty minutes and distributed among the test chambers which were 30 mL glass beakers. For quality control, soft water and hard water controls were prepared using the same procedures. Twenty mL of pore water were added to each test chamber and each treatment had ten replicates. The test chambers were placed randomly (random numbers table) in holes drilled in a Styrofoam board to support and stabilize the cups. A 2 cm x 2 cm square of Nitex netting for attachment and substrate contact for the organisms was placed in each test chamber. Ten juvenile *Hyalella azteca* (2-3 mm), were placed in each replicate. *Hyalella azteca* , a freshwater amphipod, is a common used test species because of its sensitivity (ASTM 1992; ASTM 1990). They were fed 0.25 mL of yeast, cerophyll, and trout chow mix at the start of the test. The chambers were covered with Saran wrap and a Plexiglas cover, placed in an environmental chamber with a 16-hour light and 8-hour dark cycle, and maintained at 20 °C. After 48 hours, the organisms were fed 0.25 mL of yeast, cerophyll, and trout chow mix per replicate.

At the end of the 96-hour period, the replicates were assessed for survival rates. Survival was determined by the motility of the organisms. The pore water, reference pore water, and control water beakers were tested for pH, conductivity, temperature, dissolved oxygen, total ammonia, hardness, and alkalinity (Table 3). A 96-hour QC bioassay was conducted with KCL as a reference toxicant to measure the vitality and hardiness of the *Hyallella azteca* stock culture. Survival in this bioassay was within limits considered acceptable for a healthy culture.

Sediment Bioassays

Ten-day flow through sediment bioassays were conducted from 13 August to 23 August 1993 using the composited sediment samples. Fifty mL of fresh sediment was transferred using a 60 cc syringe with the needle fitting cut off. Syringes were changed between samples to avoid cross contamination. The sediment was transferred to 300 mL glass beakers that had been customized with 2 cm x 2 cm square screening along the top edge to prevent overflow. One hundred mL of soft reconstituted water was added to each beaker.

Each treatment had six replicates and the 300 mL beakers were placed randomly (random numbers table) into the flow through system. Each beaker received 50 mL of soft reconstituted water two times a day at twelve-hour intervals, at 0924 and 2124 throughout the experiment. Each beaker was stocked with ten juvenile *Hyalella azteca* (2-3 mm), and the organisms were fed 1 mL of yeast, cerophyll, and trout chow mix daily.

Twenty mL of water overlying the sediment by 1 cm were drawn daily at 0900 for temperature and dissolved oxygen readings to monitor water quality. At the end of the ten-day test, 20 mL of overlying water were drawn from the eight replicates of each treatment, composited, and the pH, conductivity, temperature, dissolved oxygen, ammonia, hardness, and alkalinity was measured (Table 4).

At the conclusion of the ten-day flow through bioassay, the replicates were assessed for survival rates. The top 2 cm of sediment were examined for survivors and then the entire sample was placed through a No. 45 sieve and sorted to determine survival of *Hyalella azteca*.

RESULTS AND DISCUSSION

Sediment Chemical Analysis

Inorganics

The results from the inorganic analysis, procedural blanks, duplicate, reference materials, and spike recoveries are presented in Appendix A. Duplicate, spike, and reference results were within acceptable ranges as determined by Patuxent Analytical Control Facility (PACF). A summary of results for As, Cd, Cr, Cu, Hg, Ni, Pb, and Zn are presented in Table 5. Several metals in the Anacostia River and Kingman Lake samples were substantially higher than the Potomac River control. Cd levels in the Anacostia River and Kingman Lake (ANA01, ANA02, ANA03, KING1) ranged from 1.07 ppm to 2.15 ppm dry weight as opposed to 0.29 ppm at the reference site in the Potomac River (REF01). Cr showed a range of 64.9 ppm to 93.4 ppm in the proposed dredging sites while the Potomac River reference only had 30.3 ppm dry weight. Pb levels in the reference site were 28.7 ppm while Pb in the Anacostia and Kingman samples ranged from 116.6 ppm to 320.9 ppm dry weight. The Anacostia and Kingman ranges for Zn were 254 ppm to 482 ppm compared to 138 ppm at the control station.

Long and Morgan (1990) have developed criteria for NOAA's National Status and Trends program that rank sediment contaminant concentrations according to estimates of the potential biological impact posed by sediment contaminants. These values were obtained by screening data bases for which biological effects are associated with a particular contaminant concentration, ranking the concentrations, and identifying the concentration associated with the lower 10th percentile causing biological effects (ER-L), and the median concentration causing biological effects (ER-M) (Table 5).

Several samples exceeded ER-L and ER-M values. At ANA01, Ni, Pb, and Zn values exceeded the ER-M and Cr, Cu, and Hg exceeded the ER-L. ANA02 sediment exceeded the ER-M for Pb and Zn and exceeded the ER-L for Hg and Ni. Sediment from ANA03 exceeded the ER-M for Ni, Pb, and Zn and the ER-L for Cu and Hg. The sediment collected from the Kingman Lake site, KING1, exceeded the ER-M for Pb and exceeded the ER-L for Ni and Zn. Reference sediment collected at the Potomac River site, REF01, exceeded no ER-M values and exceeded only the ER-L for Zn.

Organics

A complete listing of all results from the organic analysis, procedural blanks, duplicate, reference materials, and spike recoveries are presented in Appendix B. Duplicate, spike, and reference results were within acceptable ranges as determined by PACF. The results for the PCB compounds are summarized in Table 6. The concentrations of total PCB in sediments from the Anacostia River and Kingman Lake range from 2.04 ppm to a high of 3.37 ppm dry weight. The concentration at the reference site in the Potomac River was 0.15 ppm dry weight. The ER-M was exceeded for ANA01, ANA02, ANA03, and KING1 and exceeded the ER-L for REF01.

The results for chlordane and other cyclodiene compounds are given in Table 7. Concentrations of total chlordane at the Anacostia River and Kingman Lake stations range from 0.341 ppm to 0.507 ppm dry weight. The value of total chlordane was below the detection limit in the reference site in the Potomac River. The total chlordane values for ANA01, ANA02, ANA03, and KING1 exceeded the ER-M. It must be noted that the ER-L and ER-M for chlordane has a low subjective degree of confidence (Long and Morgan 1990).

The results for DDT, DDE, and DDD are given in Table 8. The levels of o,p'-DDE and o,p'-DDT were below detection limits at all sites. At the Potomac River reference site, o,p'-DDD was not detected at the reference site and but had a range of 0.016 to 0.022 ppm dry weight in the proposed dredge sites. Values for p,p'-DDT were below detection at all sites except ANA01 in the Anacostia which had a value of 0.021 ppm dry weight. Similarly, p,p'-DDD was below detection at the reference and had a range of 0.064 to 0.147 ppm dry weight in the Anacostia and Kingman Lake. Levels of p,p'-DDE were below detection except for ANA03, 0.022 ppm dry weight and the reference, 0.016 ppm dry weight. The values for p,p'-DDD exceeded the ER-M for ANA01, ANA02, ANA03, and KING1 The values for p,p'-DDE exceeded the ER-M at two sites, ANA03 and REF01.

Biological Analyses

Pore Water Bioassays

The results from the 96-hour pore water bioassays are given in Table 9. The soft water and hard water controls exhibited high survival rates, 99% and 97%, respectively and low total ammonia values. Total ammonia (NH_3 + NH_4^+) has been identified as a major source of toxicity in fresh water

sediment contamination assessments (Ankley *et al.* 1990). Concentrations in the pore water in this study are in the range of those attributed by Ankley *et al.* (1990) as causing toxicity. Velinsky *et al.* (1992) used a mean LC50 value of 20 ppm for total ammonia reported for the St Louis Bay strain of *Hyalella azteca* as a comparative value for his study. ANA01 had a survival rate of 13% and the total ammonia in the pore water was 41.1 ppm, well above the LC50 of 20 ppm. ANA02 had a high survival rate of 100% and the total ammonia was 14.3 ppm. ANA03 had the lowest survival rate observed, 3%, but the total ammonia was 68.1 ppm, the highest value measured. The Kingman lake sample, KING1, had a survival rate of 81% and the total ammonia was 35.0 ppm. Temperature and pH affect the level of un-ionized ammonia in freshwater systems. Although total ammonia levels in the King1 sample were high, survival at these levels may have been due to the temperature and pH in this treatment. The Potomac River reference, REF01, had a survival rate of 60% and the total ammonia was 25.7 ppm. Thus, the low survival rates reported for ANA01, ANA03, and REF01 may be attributed to toxicity to the high total ammonia levels.

Sediment Bioassays

The results from the ten-day flow through sediment bioassays are given in Table 10. All samples had survival rates in the range of 95% to 98.75%. This indicates that the sediment is not acutely toxic to *Hyalella azteca* under ten-day flow through bioassay conditions.

SUMMARY AND CONCLUSIONS

The results from the 96-hour pore water bioassays and ten day flow through sediment bioassays indicate that the sediment obtained from the Anacostia River and Kingman Lake is not acutely toxic. However, these tests do not address the issues of chronic toxicity or bioaccumulation. The levels of chlordane and its components, polychlorinated biphenyls, DDD, DDE, and select metals in the Anacostia River and Kingman Lake sediments suggest the need for further studies to determine bioaccumulation and other sublethal effects. Determining the environmental fate of the contaminants in the sediments to be used to restore emergent marsh habitat is very important to insure that cycling of PCB, cyclodienes, or metals within the food chain at Kingman Lake will not cause unacceptable or adverse effects to fish and wildlife resources. This need can be met through monitoring and study of this system as the marsh restoration process occurs.

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FIGURE 1. SEDIMENT SAMPLING LOCATIONS FOR PROPOSED DREDGING SITES FROM THE ANACOSTIA RIVER AND KINGMAN LAKE

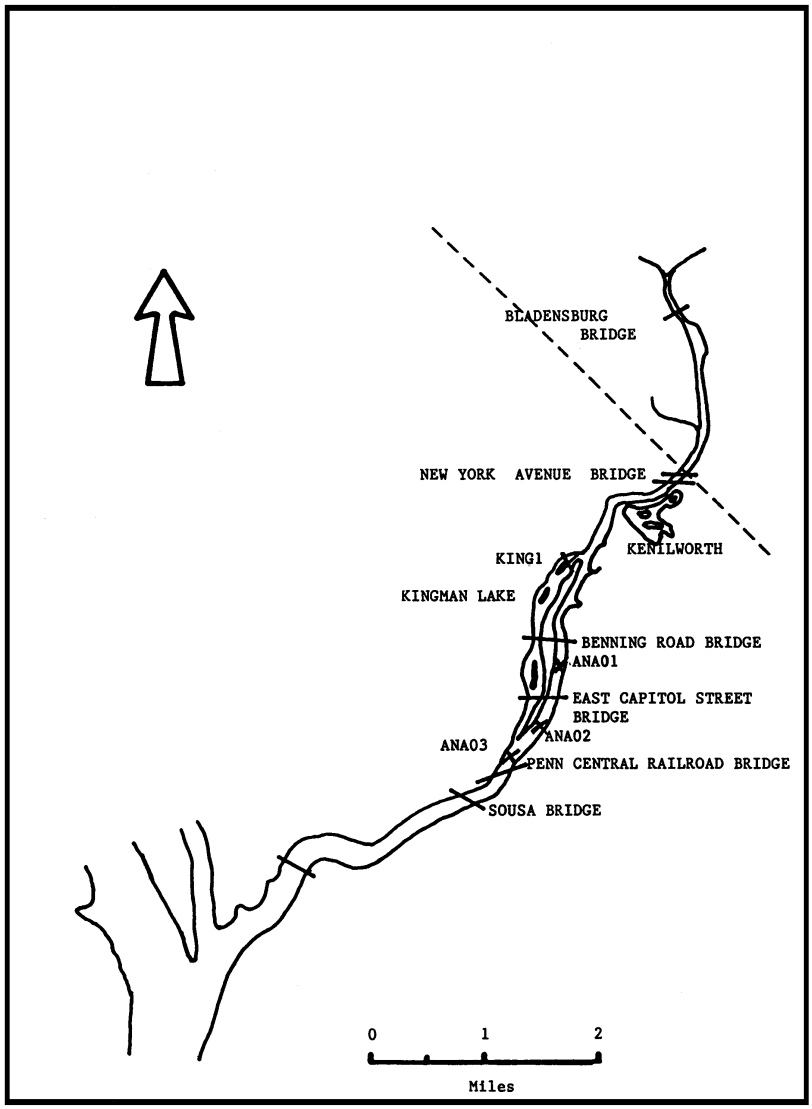

FIGURE 2. Sediment sampling locations for the Potomac River reference

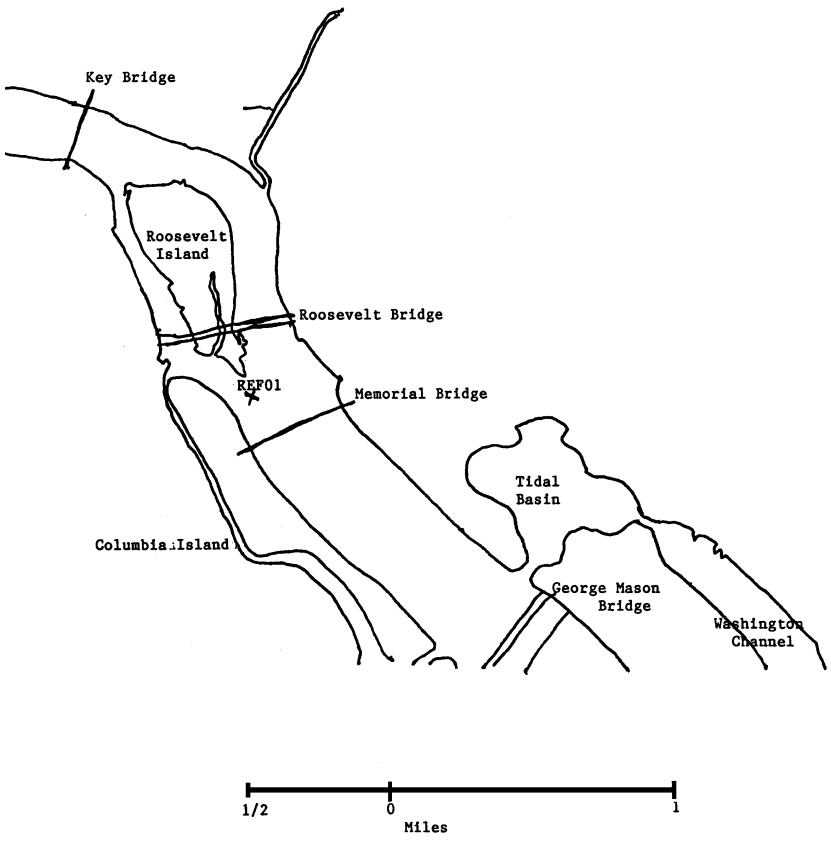

TABLE 1. SEDIMENT SAMPLING LOCATIONS FOR PROPOSED DREDGING SITES FROM THE ANACOSTIA RIVER AND KINGMAN LAKE

SAMPLE ID	LATITUDE (N)	LONGITUDE (W)	SITE DESCRIPTION
ANA01	38°53'32.0"	76°57'49.6"	West side of Anacostia River, between Benning Road Bridge and Capitol Street Bridge
ANA02	38°53'17.1"	76°57'55"	West side of Anacostia River, between Railroad Bridge and Capitol Street Bridge
ANA03	38°53'0.1"	76°58'16.2"	West side of Anacostia River, between South mouth of Kingman Lake and Railroad Bridge
KING1	38°54'24.9"	76°57'34.7"	Kingman Lake, North entrance, near East bank, by golfcourse
REF01	38°53'23.9"	77°03'28.2"	Reference site, Potomac River, 25-50 m off the South end of Roosevelt Island

TABLE 2. WATER CHEMISTRIES MEASURED AT THE TIME OF SAMPLE COLLECTION FROM THE ANACOSTIA RIVER AND KINGMAN LAKE SITES

SAMPLE ID	TEMP(°C)	pH	DO(mg O_2/L)	CONDUCTIVITY (mmho/cm)	DEPTH OF H_2O (m)
ANA01 [a]	24.9	6.5	4.8	.201	0.5
ANA02 [b]	26.1	6.8	6.0	.199	0.2
ANA03 [c]	25.85	6.8	5.91	.206	0.3
KING1 [d]	27.8	6.6	5.9	.195	0.1
REF01 [e]	27.5	7.6	8.9	.328	0.5

[a] West side of the Anacostia River, between Benning Road Bridge and Capitol Street Bridge

[b] West side of the Anacostia River, Between the Railroad Bridge and Capitol Street Bridge

[c] West side of the Anacostia River, between the South mouth of Kingman Lake and The Railroad Bridge

[d] Kingman Lake, North entrance, near the East Bank by golfcourse

[e] Reference Site, Potomac River, 25-50 m off the South end of Roosevelt Island

TABLE 3. END WATER CHEMISTRIES FOR THE 96-HOUR PORE WATER BIOASSAY TESTS

SAMPLE ID	pH	CONDUCTIVITY (uS/cm)	TEMP(°C)	DO (mg/L)	NH_3(ppm)	HARDNESS (mg/L $CaCO_3$)	ALKALINITY (mg/L)
ANA01	8.482	746	21.0	8.2	41.1	178	410
ANA02	8.484	455	23.0	8.2	14.3	158	210
ANA03	8.567	845	22.0	8.0	68.1	138	400
KING1	8.575	681	23.0	7.6	35.0	257	350
REF01	8.505	598	22.0	8.1	25.7	178	350
CONTROL (HARDH_2O)	8.574	1060	21.5	8.0	1.35	356	300
CONTROL (SOFT H_2O)	8.022	366	21.0	8.3	1.47	138	140

TABLE 4. END WATER CHEMISTRIES FROM THE TEN-DAY SOLID PHASE FLOW-THROUGH BIOASSAY TESTS

SAMPLE ID	pH	CONDUCTIVITY (uS/cm)	TEMP(°C)	DO (mg/L)	NH_3(ppm)	HARDNESS (mg/L $CaCO_3$)	ALKALINITY (mg/L)
ANA01	7.636	359	22.0	6.8	1.19	158	200
ANA02	7.616	355	22.0	7.2	0.44	138	200
ANA03	7.557	365	22.0	6.8	3.63	138	190
KING1	7.525	356	22.0	7.0	0.86	158	150
REF01	7.662	374	22.0	6.8	0.74	177	180

TABLE 5. INORGANIC CONCENTRATIONS (ppm DRY WEIGHT) IN SEDIMENTS COLLECTED FROM SAMPLE SITES IN THE ANACOSTIA RIVER AND KINGMAN LAKE

COMPOUND	ANA01	ANA02	ANA03	KING1	REF01	ER-L	ER-M
As	5.02	4.28	5.58	4.29	3.19	33	85
Cd	1.5	1.54	2.15	1.07	0.29	5	9
Cr	93.4	67.2	79.1	64.9	30.3	80	145
Cu	99.7	58.6	113.8	49.7	31.7	70	390
Hg	.227	.224	.72	.148	0.11	0.15	1.3
Ni	67.1	47.6	66.2	40.4	30	30	50
Pb	116.6	177.3	320.9	144.6	28.7	35	110
Zn	434	328	482	254	138	120	270
% TOC	3.77	2.3	4.23	1.59	2.4		
% Silt/Clay	80.8	82.3	87.4	63.7	52.7		

TABLE 6. PCB CONCENTRATIONS (ppm DRY WEIGHT) IN SEDIMENTS COLLECTED FROM SAMPLE SITES IN THE ANACOSTIA RIVER AND KINGMAN LAKE

COMPOUND	ANA01	ANA02	ANA03	KING1	REF01	ER-L	ER-M
PCB-1254	1.96	2.76	2.39	3.29	0.15		
PCB-1260	0.06	0.06	0.13	0.08	<0.02		
PCB-TOTAL	2.05	2.81	2.50	3.37	0.15	.050	.400
% TOC	3.77	2.3	4.23	1.59	2.4		
% Silt/Clay	80.8	82.3	87.4	63.7	52.7		

TABLE 7. CHLORDANE CONCENTRATIONS (ppm DRY WEIGHT) IN SEDIMENTS COLLECTED FROM SAMPLE SITES IN THE ANACOSTIA RIVER AND KINGMAN LAKE

COMPOUND	ANA01	ANA02	ANA03	KING1	REF01	ER-L	ER-M
Heptachlor	<0.021	<0.019	<0.022	<0.016	<0.016		
alpha chlordane	0.107	0.135	0.175	0.164	<0.016		
cis-nonachlor	0.043	0.039	0.044	0.049	<0.016		
gamma chlordane	0.128	0.174	0.197	0.196	<0.016		
heptachlor epoxide	<0.021	<0.019	<0.022	<0.016	<0.016		
oxychlordane	<0.021	0.019	<0.022	0.016	<0.016		
trans-nonachlor	0.064	0.077	0.066	0.082	<0.016		
Total Chlordane	0.341	0.443	0.482	0.508	<0.016	0.0005	0.006
% TOC	3.77	2.3	4.23	1.59	2.4		
% Silt/Clay	80.8	82.3	87.4	63.7	52.7		

TABLE 8. DDT, DDE, AND DDD CONCENTRATIONS (ppm DRY WEIGHT) IN SEDIMENTS COLLECTED FROM SAMPLE SITES IN THE ANACOSTIA RIVER AND KINGMAN LAKE

COMPOUND	ANA01	ANA02	ANA03	KING1	REF01	ER-L	ER-M
o,p'-DDD	<0.021	0.019	0.022	0.016	<0.016		
o,p'-DDE	<0.021	<0.019	<0.022	<0.016	<0.016		
o,p'-DDT	<0.021	<0.019	<0.022	<0.016	<0.016		
p,p'-DDD	0.064	0.077	0.088	0.147	<0.016	0.002	0.02
p,p'-DDE	<0.021	<0.019	0.022	<0.016	0.016	0.002	0.015
p,p'-DDT	0.021	<0.019	<0.022	<0.016	<0.016	0.001	0.007
% TOC	3.77	2.3	4.23	1.59	2.4		
% Silt/Clay	80.8	82.3	87.4	63.7	52.7		

TABLE 9. SURVIVAL RATES OF *Hyalella azteca* DURING 96-HOUR PORE WATER BIOASSAY TESTS

REPLICATE	ANA01	ANA02	ANA03	KING1	REF01	CONTROL 1 (SOFT WATER)	CONTROL 2 (HARD WATER)
REP #1	0	10	2	10	7	10	10
REP #2	1	10	0	9	5	9	10
REP #3	1	10	0	9	6	10	10
REP #4	0	10	0	10	4	10	9
REP #5	1	10	0	10	7	10	10
REP #6	2	10	1	6	7	10	10
REP #7	2	10	0	8	5	10	10
REP #8	1	10	0	5	5	10	10
REP #9	4	10	0	7	8	10	9
REP #10	1	10	0	7	6	10	9
TOTAL NUMBER SURVIVING	13	100	3	81	60	99	97
% SURVIVAL	13%	100%	3%	81%	60%	99%	97%

TABLE 10. SURVIVAL RATES OF *Hyalella azteca* DURING TEN-DAY SOLID PHASE FLOW-THROUGH BIOASSAY TESTS

REPLICATE	ANA01	ANA02	ANA03	KING1	REF01
REP #1	10	10	10	9	8
REP #2	9	9	6	10	10
REP #3	10	9	10	9	10
REP #4	10	10	10	9	10
REP #5	10	10	10	9	10
REP #6	10	10	10	10	10
REP #7	10	10	10	10	10
REP #8	10	10	10	10	10
TOTAL NUMBER SURVIVING	79	78	76	76	78
% SURVIVAL	98.75%	97.5%	95%	95%	97.5%

ANACOSTIA RIVER & TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND

INTEGRATED FEASIBILITY REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT

JULY 1994

ANNEX C

SECTION 404(b)(1) EVALUATION

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
KINGMAN LAKE ENVIRONMENTAL ENHANCEMENT
ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND
FEASIBILITY STUDY

JULY 1994

I. PROJECT DESCRIPTION

a. Location - The U.S. Army Corps of Engineers, Baltimore District, proposes actions for environmental restoration in the Anacostia River Basin. The action assessed in this evaluation is the restoration of habitat at Kingman Lake in the Anacostia River, District of Columbia (Figure 1).

b. General Description - The proposed action is the creation of emergent, scrub-shrub and forested wetlands; the expansion and restoration of the existing forest buffer; and the addition of physical structures to attract and maintain wildlife in and around the lake. The plan was developed in cooperation with the Anacostia Watershed Restoration Committee (AWRC), the National Park Service (NPS), the District of Columbia (DC), the US Fish and Wildlife Service (USFWS), and other resource management agencies. It is consistent with the stewardship roles of the District of Columbia and NPS. Additional information about this project and the other restoration projects proposed by the Baltimore District in the Anacostia River Basin can be found in the Integrated Feasibility Study and Environmental Impact Statement for the Anacostia River and Tributaries, District of Columbia and Maryland, 1994 (Feasibility Study).

c. Description of Fill Action - Approximately 148,000 cubic yards of dredged material from the Anacostia River will be placed to create average depths of 18 to 24 inches at high tide. The majority of the fill will placed in upper Kingman Lake, north of Benning Road, and in an area south of Benning Road along the perimeter of Heritage Island. The fill will be placed behind straw bales to create variable elevations to support low, mid and high marsh zones. The fill will be planted subsequently with native wetland vegetation. Approximately 43 acres of vegetated wetlands will be created. Existing channels will be dredged to create deepwater channels which will increase water flushing action and facilitate fish movement through the lake. Approximately 6 cubic yards of riprap will be placed to create spillways for each storm drain outfall now discharging into the lake. The spillways will reduce runoff velocity and potential scour of vegetation and substrate below the outfalls. More detailed information about the proposed fill action can be found in the Plate Portfolio of the Feasibility Report.

d. Purpose - The purpose of the proposed action is to enhance wildlife habitat and increase wetland functions and values. Habitat restoration is identified by the Anacostia Watershed Restoration Committee (local, state, regional and federal agencies) as one of several actions needed to restore living resources in the Anacostia River.

e. General Description of Discharge Material - The fill material will consist of approximately 148,000 cubic yards of material dredged from the mainstem of the Anacostia River above Conrail Bridge and from upper Kingman Lake. The material ranges from loam to silty clay loam. Chemical analyses show contamination with toxic metals and organic chemicals in the lake and river sediment. Bioassays conducted by the USFWS showed no statistically significant

difference between the biological effects of sediment from reference samples from Kingman Lake, the Anacostia River dredging sites and a control site in the Potomac River. Approximately 6 cubic yards of Class I riprap on geotextile will be used to construct spillways at existing stormdrain outfalls. Additional information about the discharge material can be found in the Feasibility Study.

f. Description of the Proposed Discharge Site - The proposed discharge site, Kingman Lake, is located along the western edge of the Anacostia River in Washington, DC. The site was identified in the Anacostia River and Tributaries, District of Columbia and Maryland Reconnaissance Study (COE, 1990) as an area of focus for potential restoration. The lake area was dredged from uplands and wetlands in the 1920s to create an open water recreational area. Presently, the lake is a shallow tidal embayment consisting of open water and extensive areas of nonvegetated mudflats. Like the adjacent Anacostia River, the lake suffers from poor water and sediment quality.

The lake is bisected by Benning Road and is hydrologically connected to the Anacostia River by two inlets located at the northern and southern ends of the lake. The upper section of the lake (north of Benning Road Bridge), is characterized by a dendritic tidal gut system and exposed mudflats, with water depths ranging from 1.0 feet at mean low tide to 4.0 feet at mean high tide. The lower section of the lake has a greater average depth, far less mudflats and lacks a tidal gut system.

The discharge area includes all open water areas and, above Benning Road, the area landward of the mean high tide for a distance of approximately 80 feet. The lower and upper portions of the lake are connected by a 30 foot wide culvert under Benning Road. The lake measures approximately 110 acres and is separated from the Anacostia River by the 94 acre island known as the Burnham Barrier or Kingman Island.

The substrate of the discharge site is primarily silt, with less than 13% sand, deposited over the last several decades from the Anacostia River. Chemical analyses show concentrations of PCBs, PAHs, pesticides, chlordane, and trace metals, except mercury (Hg) in concentrations similar, but higher, than those that were found in the proposed discharge material. More detailed information about the discharge site can be found in the Feasibility Study.

g. Description of Discharge Method - Dredged material will be hydraulically dredged and deposited with pipelines. Straw bale berms will be constructed to contain the dredged material. The pipes will be shifted periodically to prevent excessive mounding and to create a gradual downstream slope. Riprap for the spillway construction will be delivered and placed with the use of a truck and crane and/or front end loader. Entrance to the site by construction machinery will be limited to that necessary for proper rock placement. Additional information about the discharge method can be found in the EIS.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - The elevation and slope of the lake substrate will be changed to create conditions more conducive to the establishment of emergent, non-persistent wetland vegetation.

(2) Sediment Type - Sediment in the placement site is similar to the sediment which will be discharged. The substrate ranges from loam in the upper part of the lake to finer silty clay

loam in the lower sections. Clean, quarried riprap will be placed on the fill at the discharge points of storm drains that currently empty into the marsh.

(3) Discharge Material Movement - Beneficial effect expected from removing contaminated sediments from the higher energy riverine environment and stabilizing them with vegetation in the created wetland. Based on the monitoring results from a similar dredge, fill and wetland creation project near the site (Kennilworth Marsh), no significant movement of discharge materials or contaminants is expected.

(4) Physical Effects on Benthos - Minor, temporary adverse effects and long term beneficial effects will result from the proposed action. Non-mobile benthic species will be smothered with the discharge of silty material on the project site. Within a short period, species diversity and density is expected to increase in the discharge area as a result of the introduction of less contaminated material and the addition of wetland vegetation. Benthos in the Anacostia River is expected to benefit from removal of contaminated sediments from the channel bed.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Straw bale berms will be constructed to contain the discharged material, vegetation will be planted to further stabilize the material, and riprap spillways will be constructed to reduce erosion of the material at existing storm water outfalls. Additional erosion control techniques will be employed during and after construction and planting for approximately one year following planting. Additional information about actions that will be taken to minimize impacts can be found in the Feasibility Study.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - Minor beneficial effects are expected in water circulation and fluctuation in the immediate project area.

(a) Salinity - N/A.

(b) Chemistry - Beneficial effects on chemical water quality are expected. These will result from wetland functions that will filter and breakdown nutrients and particulate pollutants contained in the river flow, adjacent tributaries, overland flow, and storm drain discharge to the lake.

(c) Clarity - Minor, temporary adverse effects and long term beneficial effects are expected. Resuspension of sediment will reduce clarity in open water of the project site temporarily. The trapping of suspended sediment by the wetland will increase water clarity on the site and in the water discharged from the site to the Anacostia River.

(d) Color - No change expected.

(e) Odor - Minor beneficial effect may result from enhancing the wetland with plant growth.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Beneficial effects expected. Dissolved oxygen levels are expected to increase as a result of improved water circulation, the reduction in temperature with the introduction of plants, and the trapping of suspended sediment. Decrease turbidity will

allow greater light penetration to the photic zone, thereby enhancing primary production and vegetation establishment which will increase dissolved oxygen levels.

(h) Nutrients - Beneficial reduction in nutrients is expected primarily as a result of the filtering and microbial action in the wetland created.

(i) Eutrophication - The opportunity for eutrophication should be reduced with the establishment of a diverse emergent wetland and improved water circulation.

(j) Others as Appropriate - N/A.

(2) Current Patterns and Circulation - Beneficial effects are expected as a result of improved water circulation. No adverse effects are expected to the current tidal patterns or circulation.

(a) Current Patterns and Flow - No adverse effect expected. Beneficial effects expected from enhanced flow in dredged tidal guts.

(b) Velocity - No adverse effects expected.

(c) Stratification - Stratification should be reduced with improved water circulation.

(d) Hydrologic Regime - Water depths will be reduced to improve conditions for the establishment of persistent emergent wetland plants.

(3) Normal Water Level Fluctuations - No change expected.

(4) Salinity Gradients - No change expected.

(5) Actions to Minimize Impacts - Channels will be dredged to ensure improved water circulation of river flow and tidal flushing through the proposed wetland.

e. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Vicinity of Disposal Site - Minor, temporary adverse impacts during and immediately after the proposed discharge, and long term beneficial effect of overall reduction in suspended particulate and turbidity.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration - Temporary reduction and long term increase as a result of the sediment filtering action of the wetland.

(b) Dissolved Oxygen - Beneficial effects expected. Dissolved oxygen levels are expected to increase as a result of improved circulation, the reduction in temperature with the introduction of plants, and the trapping of suspended sediment. Decrease turbidity will allow greater light penetration to the photic zone, thereby enhancing primary production and vegetation establishment which will increase dissolved oxygen levels.

(c) Toxic Metals and Organics - Beneficial effect expected from removing contaminated sediments from the higher energy riverine environment and stabilizing them with vegetation in the created wetland. Based on the monitoring results from a similar dredge, fill and marsh creation project near the site (Kennilworth Marsh), no significant movement of

contaminants is expected. Filtering action by wetland vegetation and complex biological, chemical and physical processes in the wetland substrate are expected to further reduce contaminant availability.

Analyses showed enrichment for PCBs, pesticides, chlordane, and all metals except mercury (Hg) in the lake and river sediments. Chemical analyses indicate that the level of contaminants in some of the proposed discharge material is lower than that in the proposed placement site. Bioassays conducted by the USFWS showed no statistically significant difference between the biological effects of sediment from reference samples from Kingman Lake, the Anacostia River dredging sites, and a control site in the Potomac River. Additional information about toxic metals and organics can be found in the Feasibility Study.

(d) Pathogens - Beneficial effects are expected as a result of increased filtering and microbial action in the created wetland. The wetland is expected to reduce the discharge of potential pathogens associated with sewer overflow that enters the the Anacostia through the lake.

(e) Aesthetics - Beneficial effects are expected through the creation of a more diverse ecosystem.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - Contaminant levels in the Anacostia River will be reduced as a result of removing contaminated sediments from the higher energy riverine environment (channel bed) and stabilizing them with vegetation in the wetland. Biological, physical and chemical processes in the wetland substrate are expected to further reduce contaminant availability. Based on the USFWS monitoring results from a similar dredge, fill and marsh creation project near the site (Kennilworth Marsh), no significant movement of contaminants is expected.

Analyses showed enrichment for PCBs, pesticides, chlordane, and all metals except mercury (Hg) in the lake and river sediments. Chemical analyses indicate that the level of contaminants in some of the proposed discharge material is lower than that in the proposed placement site. Bioassays conducted by the USFWS showed no statistically significant difference between the biological effects of sediment from reference samples from Kingman Lake, the Anacostia River dredging sites, and a control site in the Potomac River. Additional information about contaminant determinations can be found in the Feasibility Study.

e. Aquatic Ecosystem and Organism Determinations - The proposed action is expected to improve the overall ecological function of the Anacostia River and the lake. The action will improve aquatic habitat and increase nutrient recycling and primary productivity.

(1) Effects on Plankton - No change expected.

(2) Effects on Benthos - Minor, temporary adverse effects and long term beneficial effects will result from the proposed action. Non-mobile benthic species will be smothered with the discharge of silty material on the project site. Within a short period, species diversity and density is expected to increase in the discharge area as a result of the introduction of less contaminated material and the addition of wetland vegetation. Benthos in the Anacostia River is expected to benefit from improved quality of the water discharged from the lake.

(3) Effects on Nekton - Nekton will be temporarily disturbed by the mechanical action and increased turbidity during construction, but will return after project completion. The

wetland will provide additional feeding and spawning habitat. Fish access to the project area will be increased with the construction of improved channels.

(4) Effects on Food Web - An overall positive effect on the food web is expected with increased aquatic and riparian habitat that will support an increased diversity of species.

(5) Effects on Special Aquatic Sites - Approximately 43 acres of mudflats will be replaced with more biologically productive, diverse vegetated wetlands.

(6) Threatened and Endangered Species - There are no known endangered or threatened species inhabiting the project limits.

(7) Other Wildlife - An overall positive impact will result from the increase in diversity and abundance of aquatic and terrestrial habitat that will attract other wildlife, particularly water dependent and aquatic foraging birds and mammals. Additional escape and nesting cover will be created with natural and artificial habitat structures. Additional information about beneficial effects on other wildlife can be found the EIS.

(8) Actions to Minimize Impacts - Straw bales, vegetation and rip-rap spillways will be used to minimize material movement, and hydraulic dredging will be used to minimize the a intrusion of machinery into the lake area. More detailed information about actions to minimize impacts can be found in the Feasibility Study.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A

(2) Determination of Compliance with Applicable Water Quality Standards. Work will be performed in accordance with all applicable state water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance this use with the improvement of aquatic habitat.

(c) Water Related Recreation - Beneficial effect expected to result from creation of more appealing, biologically productive and diverse environment.

(d) Aesthetics - Beneficial effects are expected by the restoration of more naturally attractive aquatic, riparian and terrestrial environment on the Anacostia River.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - No adverse effect expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - The existing aquatic ecosystem will be improved as a result of this project, with an increase in quantity and quality of diverse aquatic, riparian and terrestrial habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem -Secondary effects on the aquatic ecosystem are expected to be positive, resulting in increased numbers and diversity of fish and wildlife in the Anacostia River Basin.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. No feasible alternative is available for this action that would accomplish the project objectives with as little cost and as much benefit to the environment.

c. The planned placement of the material will be in compliance with state water quality standards.

d. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

e. The proposed activity will benefit anadromous and resident fish and other birds and mammals with no negative effect on any endangered species.

f. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

g. The proposed placement of the material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity, productivity and stability will result as a result of the project.

h. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

i. On the basis of the Guidelines, the proposed discharge site for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem. Sediment control devices will be implemented in compliance with Federal, state and local laws.

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
FRINGE WETLANDS
ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND
FEASIBILITY STUDY

JULY 1994

I. PROJECT DESCRIPTION

a. Location - The U.S. Army Corps of Engineers, Baltimore District, proposes actions for environmental restoration in the Anacostia River Basin. The action assessed in this evaluation is the establishment of river fringe wetlands at five sites along the Anacostia River between New York Avenue and the Conrail Bridge, Washington, DC (Figure 1).

b. General Description - From the confluence with the Potomac River to the DC boundary at the New York Avenue bridge, the Anacostia River is bounded by seawalls. These walls were constructed by the Corps as part of the design for Anacostia Park. The seawalls confine the river and limit its width during normal high and low tides where vegetated wetlands might naturally occur. The proposed action is to convert the mudflats along the seawall and elsewhere in the river into vegetated wetlands that will provide more biologically productive habitat. The proposed action has been developed in cooperation with the Anacostia Watershed Restoration Committee (AWRC), the National Park Service (NPS), the District of Columbia (DC), the US Fish and Wildlife Service (USFWS), and other resource management agencies. It is consistent with the stewardship roles of the District of Columbia and NPS. More detailed information about this project and the other restoration projects proposed by the Baltimore District in the Anacostia River Basin can be found in the Integrated Feasibility Study and Environmental Impact Statement for the Anacostia River and Tributaries, District of Columbia and Maryland, 1994 (Feasibility Study).

c. Description of Fill Action - Approximately 90,000 cubic yards of dredged material from the Anacostia River will be placed to create average depths of approximately 18 to 30 inches at high tide at five sites along the river's edge. The project sites include all mudflat areas along the river between New York Avenue and the Conrail Bridge that are currently exposed a low tide (existing substrate depths less than two feet below high-tide. The fill will be placed behind straw bales, will be planted subsequently with native wetland vegetation. Approximately 30 acres of vegetated wetlands will be created. More detailed information about the fill action can be found in the Plate Portfolio in the Feasibility Study.

d. Purpose - The purpose of the proposed action is to enhance wildlife habitat and increase wetland functions and values. Habitat restoration is identified by the AWRC (local, state, regional and federal agencies) as one of several actions needed to restore living resources in the Anacostia River.

e. General Description of Discharge Material - The fill material will consist of approximately 90,000 cubic yards of material dredged from the mainstem of the Anacostia River above Conrail Bridge. The material ranges from loam to silty clay loam. Chemical analyses showed contamination with toxic metals and organic chemicals in the river sediment. Bioassays conducted by the USFWS showed no statistically significant difference between the biological

effects of sediment from reference samples from the Anacostia River dredging sites and a control site in the Potomac River downstream. Additional information about the discharge material can be found in the Feasibility Study.

f. Description of the Proposed Discharge Site - The proposed discharge sites are all areas along the Anacostia River between New York Avenue and the Conrail Bridge that are exposed at low tide. The sites were identified in the Anacostia River and Tributaries, District of Columbia and Maryland Reconnaissance Study (COE, 1990) as areas of focus for potential restoration. The tidal range in the river is approximately 2.9 feet, which inundates the discharge sites to a depth of approximately 2 feet or less.

The discharge sites are narrow bands of shallow sediments which can be more than 100 feet in width on the channel edge. The substrate of the discharge site is primarily silt, with less than 13% sand, deposited over the last several decades from the Anacostia River. More detailed information about the discharge site can be found in the Feasibility Study.

g. Description of Discharge Method - Dredged material will be hydraulically dredged and deposited with pipelines. Straw bale berms will be constructed to contain the dredged material. The pipes will be shifted periodically to prevent excessive mounding and to create a gradual downstream slope. Additional information about the discharge method can be found in the Feasibility Study.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - The elevation and slope of the lake substrate will be changed to create conditions more conducive to the establishment of emergent, non-persistent wetland vegetation. The existing elevations will be raised two feet or less.

(2) Sediment Type - Sediment in the placement sites is similar to the sediment which will be discharged. The substrate is predominantly silty clay loam.

(3) Discharge Material Movement - No significant movement of discharge materials is expected. Beneficial effect expected from removing contaminated sediment from the higher energy channel bed environment and stabilizing it with vegetation in the created wetland.

(4) Physical Effects on Benthos - Minor, temporary adverse effects and long term beneficial effects will result from the proposed action. Non-mobile benthic species will be smothered with the discharge of silty material on the project site. Within a short period, species diversity and density is expected to increase in the discharge area as a result of wetland conditions created. Benthos in the Anacostia River is expected to benefit from removal of contaminated sediments from the channel bed.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Discharge material movement will be minimized with the use of straw bales and vegetation plantings. Additional information about actions that will be taken to minimize impacts can be found in the Feasibility Study.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - Minor beneficial effects are expected in water circulation and fluctuation in the immediate project area.

(a) Salinity - N/A.

(b) Chemistry - Beneficial effects on chemical water quality are expected. These will result from wetland functions that will filter and breakdown nutrients and particulate pollutants contained in the river flow, adjacent tributaries, overland flow, and storm drain discharge to the lake.

(c) Clarity - Minor, temporary adverse effects and long term beneficial effects are expected. Resuspension of sediment will reduce clarity temporarily in open water adjacent to the project sites. The trapping of suspended sediment by the wetland will increase water clarity on the site and in the water discharged from the site to the Anacostia River.

(d) Color - No change expected.

(e) Odor - Minor beneficial effect may result from enhancing the wetland with plant growth.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Beneficial effect of increased dissolved oxygen that will be produced by the wetland plants that will be established with this action.

(h) Nutrients - Beneficial reduction in nutrients is expected primarily as a result of the filtering and microbial action in the wetland created.

(i) Eutrophication - N/A.

(j) Others as Appropriate - N/A.

(2) Current Patterns and Circulation - No adverse effects are expected to the current tidal patterns or circulation.

(a) Current Patterns and Flow - No adverse effect expected.

(b) Velocity - No adverse effects expected.

(c) Stratification - No adverse effects expected.

(d) Hydrologic Regime - Water depths will be reduced to improve conditions for the establishment of persistent emergent wetland plants.

(3) Normal Water Level Fluctuations - No change expected.

(4) Salinity Gradients - No change expected.

(5) Actions to Minimize Impacts - Discharge sites have been located to correlate with natural areas of accretion. The wetlands created will mimic the shape and size of existing shallow areas.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Vicinity of Disposal Site - Minor, temporary adverse impacts during and immediately after the proposed discharge, and long term beneficial effect of overall reduction in suspended particulate and turbidity.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration - Temporary reduction and long term increase as a result of the sediment filtering action of the wetland.

(b) Dissolved Oxygen - Beneficial effects expected. Dissolved oxygen levels are expected to increase as a result of the introduction of wetland plants, and the trapping of suspended sediment. Decrease turbidity will allow greater light penetration to the photic zone, thereby enhancing primary production and vegetation establishment which will increase dissolved oxygen levels.

(c) Toxic Metals and Organics - No adverse effects are expected. Some beneficial effects are expected as a result of removing contaminated sediments from the high energy channel bed environment and stabilizing them with vegetation in the fringe wetlands created. Biological, physical, and chemical processes in the wetland substrate are expected to further reduce the contaminant availability.

Analyses showed enrichment for PCBs, pesticides, chlordane, and all metals except mercury (Hg) in the river sediments. Bioassays conducted by the USFWS showed no statistically significant difference between the biological effects of sediment from reference samples from the Anacostia River and a control site in the Potomac River. Additional information about toxic metals and organics can be found in the Feasibility Study.

(d) Pathogens - N/A.

(e) Aesthetics - Beneficial effects are expected through the creation of a more diverse ecosystem.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - No adverse effects and some beneficial effects expected. Additional information can be found in the discussion of toxic metals and organics above (Section 2.c.c) and in the Feasibility Study.

e. Aquatic Ecosystem and Organism Determinations - The proposed action is expected to improve the overall ecological function of the Anacostia River. The action will improve aquatic habitat and increase nutrient recycling and primary productivity.

(1) Effects on Plankton - No change expected.

(2) Effects on Benthos - Minor, temporary adverse effects and long term beneficial effects will result from the proposed action. Non-mobile benthic species will be smothered with

the discharge of silty material on the project site. Within a short period, species diversity and density is expected to increase in the discharge area as a result of the introduction of less contaminated material and the addition of wetland vegetation.

(3) Effects on Nekton - Nekton will be temporarily disturbed disturbed by the mechanical action and increased turbidity during construction, but will return after project completion. The wetland will provide additional feeding and spawning habitat.

(4) Effects on Food Web - An overall positive effect on the food web is expected with increased aquatic and riparian habitat that will support an increased diversity of species.

(5) Effects on Special Aquatic Sites - Approximately 30 acres of mud flats that are currently exposed at low tide will be replaced with more biologically productive, diverse vegetated wetlands.

(6) Threatened and Endangered Species - There are no known endangered or threatened species inhabiting the project limits.

(7) Other Wildlife - An overall positive impact will result from the increase in diversity and abundance of aquatic and terrestrial habitat that will attract other wildlife, particularly water dependent and aquatic foraging birds and mammals. Additional escape and nesting cover will be created with natural and artificial habitat structures. Additional information about beneficial effects on other wildlife can be found the EIS.

(8) Actions to Minimize Impacts - Straw bales and vegetation will be used to minimize material movement. Hydraulic dredging will be used to minimize the intrusion of machinery into the discharge area. More detailed information about actions to minimize impacts can be found in the Feasibility Study.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A

(2) Determination of Compliance with Applicable Water Quality Standards. Work will be performed in accordance with all applicable state water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance this use with the improvement of aquatic habitat.

(c) Water Related Recreation - Beneficial effect expected to result from creation of more appealing, biologically productive and diverse environment.

(d) Aesthetics - Beneficial effects are expected by the restoration of more naturally attractive aquatic, riparian and terrestrial environment on the Anacostia River.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - No adverse effect expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - The existing aquatic ecosystem will be improved as a result of this project, with an increase in quantity and quality of diverse aquatic, riparian and terrestrial habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem -Secondary effects on the aquatic ecosystem are expected to be positive, resulting in increased numbers and diversity of fish and wildlife in the Anacostia River Basin.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. No feasible alternative is available for this action that would accomplish the project objectives with as little cost and as much benefit to the environment.

c. The planned placement of the material will be in compliance with state water quality standards.

d. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

e. The proposed activity will benefit anadromous and resident fish and other birds and mammals with no negative effect on any endangered species.

f. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

g. The proposed placement of the material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity, productivity and stability will result as a result of the project.

h. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

i. On the basis of the Guidelines, the proposed discharge site for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem. Sediment control devices will be implemented in compliance with Federal, state and local laws.

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
FORDHAM STREET STORMWATER WETLAND
PRINCE GEORGES COUNTY
ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND
FEASIBILITY STUDY

JULY 1994

I. PROJECT DESCRIPTION

a. Location - The U.S. Army Corps of Engineers, Baltimore District, proposes actions for environmental restoration in the Anacostia River Basin. The action assessed in this evaluation is the restoration of habitat at the Northwest Branch Stream Valley Park, 300 feet east of the intersection of Fordham Street and West Park Drive in Prince Georges County, Maryland (Figure 1). The site is owned by the Maryland National Capitol Parks and Planning Commission, and is located within 500 feet of another proposed habitat restoration project on the Northwest Branch. The wetland will be created on an upland site that is currently used as a baseball field. The project site is immediately adjacent to an unnamed tributary, approximately 200 feet upstream from where the tributary flows into the Northwest Branch.

b. General Description - The action proposed is to create a freshwater wetland and conduct reforestation that will provide aquatic and terrestrial habitat, and water quality and quantity control. The wetland will receive a portion of the base flow from the unnamed tributary, and the first 0.5 inches of storm runoff, before those flows enter the Northwest Branch. The wetland will provide habitat functions as well as increase water quality by reducing pollutants (nutrients, sediment and debris) to Northwest Branch. Additional information about this project and the other restoration projects proposed by the Baltimore District in the Anacostia River Basin can be found in the Integrated Feasibility Study and Environmental Impact Statement for the Anacostia River and Tributaries, 1994 (Feasibility Study).

c. Description of Fill Action - An inflow diversion control structure will be constructed in the unnamed tributary channel to divert a portion of the base flow and the first 0.5 inches of stormwater into the proposed wetland. The diversion structure will be composed of a gabion weir wall placed across the natural channel to block the flow, which will be underlaid with geotextile fabric and reinforced with riprap. Geotextile fabric and riprap will be placed in the stream channel immediately upstream and downstream of the gabion structure to minimize erosion. More detailed information about the fill action can be found in the Plate Portfolio of the Feasibility Study.

d. Purpose - The purpose of the action proposed is to enhance fish and wildlife habitat in the Northwest Branch of the Anacostia River by providing limited water quality and quantity control for the developed areas drained by the unnamed tributary and the creation of emergent wetland habitat. The action proposed was identified by the Anacostia Watershed Restoration Committee (local, state, regional and federal agencies) as one of several actions needed to restore living resources in the Anacostia River.

e. General Description of Discharge Material - Fill will consist of approximately 380 square yards of geotextile fabric, approximately 9.75 cubic yards of gabions, and approximately 380 cubic yards of minimum 30" diameter riprap.

f. Description of the Proposed Discharge Site - Fill will be discharged on approximately 180 linear feet of an unnamed stream channel. The small stream conveys the untreated runoff from the adjacent densely developed areas to the Northwest Branch. Baseflow is approximately 0.3 cubic feet per second. The stream bed is approximately 15 feet in width with channel banks approximately 2 feet in height.

The stream is fed by two 72 inch reinforced concrete pipes and a trapezoidal concrete channel.The stream banks have been partially covered with riprap during past channelization activities. The substrate of the remaining "natural" channel gravel, sand and silt. The proposed fill will begin where the existing concrete channel ends and extend downstream approximately 180 linear feet (Figure 2).

g. Description of Discharge Method - Rock material will be delivered and placed with the use of a truck and crane and/or front end loader. Entrance into aquatic habitat by construction machinery will be limited to that necessary for proper rock placement. Fabric material will be placed by hand.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - The elevation and slope of the channel substrates will be changed to create an even gradient to the diversion structure for maximum head into the proposed wetland.

(2) Sediment Type - Fabric, riprap and gabion will be placed on gravel, sand and silt channel bed substrates.

(3) Discharge Material Movement - Geotextile fabric and riprap and gabions protection have been designed according to Corps and state criteria to minimize material movement.

(4) Physical Effects on Benthos - Temporary, minor adverse effects in the immediate area of the discharge, and longterm beneficial effects. Some pollution tolerant species in the unconsolidated stream bottom will be buried with the fabric and rock fill. It is expected that organisms of the same species, and other less common species, will become reestablished in the unconsolidated material trapped instream by the riprap. In addition, more diverse species will become established in the biologically more productive environment of the wetland created, and in the stream segment that receives the less polluted discharge from the wetland.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Sediment control devices will be used in compliance with local, state and Federal laws.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - Beneficial changes are expected in water circulation in the immediate project area.

(a) Salinity - N/A.

(b) Chemistry - Beneficial effects resulting from the filtering and microbial action of the wetland created.

(c) Clarity - Beneficial effects of reduced suspended sediment as a result of the filtering action of the wetland creation.

(d) Color - No change expected.

(e) Odor - No change expected.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Dissolved oxygen levels will increase with the introduction of wetland vegetation, and increased photic activity with decreased suspended sediment.

(h) Nutrients - Beneficial effect of reduced nutrient levels as a result of wetland filtering and microbial functions.

(i) Eutrophication - N/A.

(j) Others as Appropriate - Temperature may be reduced slightly due to the increase in water depths, and shading from associated tree plantings and other landscaping.

(2) Current Patterns and Circulation - Beneficial effects resulting from the circulation of stream flow through the artificially created wetland.

(a) Current Patterns and Flow - No change expected except in immediate vicinity of construction.

(b) Velocity - Beneficial effects expected from less flashy stormwater flows resulting from water quantity control function of wetland proposed.

(c) Stratification - No change expected.

(d) Hydrologic Regime - No change expected except in immediate area of constructed wetland.

(3) Normal Water Level Fluctuations - No change expected.

(4) Salinity Gradients - No change expected.

(5) Actions to Minimize Impacts - No adverse impacts expected.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Vicinity of Disposal Site -Beneficial effects of long term decrease in suspended particulates resulting from filtering and sediment attenuation by wetland proposed.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration - Beneficial effect resulting from decrease in suspended sediment.

(b) Dissolved Oxygen - Beneficial effect resulting from n as well as reduction in suspended sediment which will allow more photosynthetic activity. from reduced temperatures resulting from increased water depths.

(c) Toxic Metals and Organics - Potential reduction in stormwater contaminants resulting from biological, physical and chemical processes in wetland proposed.

(d) Pathogens - Potential reduction in pathogens from sewer overflow runoff resulting from biological, physical and chemical processes in wetland proposed.

(e) Aesthetics - Beneficial effects expected with reduction of suspended sediments/turbidity as result of the filtering and sediment attenuation of the wetland proposed.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - Pollutants from non-point sources in the urban watershed suc as sediment, nutrients, coliform bacteria, PAHs, pesticides, PCBs and heavy metals are expecte to be reduced as a result of physical, biological and chemical processes in the wetland proposed No toxic or hazardous contaminants will introduced as a result of this project.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton - Long range beneficial effects are expected as a result of the creation of a more biologically diverse, productive environment.

(2) Effects on Benthos - Temporary, minor adverse effect and long term beneficial effec expected. Some organisms will be buried and excavated as a result of the action proposed. Soi of the same species are expected to recolonize the aquatic habitat created. Other less common, more diverse species are expected to become established with the creation of more biologically productive habitat created on site and with the improved water quality downstream.

(3) Effects on Nekton - Temporary, minor adverse effects and long term beneficial effe are expected. Nekton will be temporarily disturbed during construction, but are expected to ret and increase after construction. The action proposed is designed to benefit nekton by enhancin fish habitat and decreasing downstream erosion.

(4) Effects on Food Web - An overall positive effect on the food web is expected with increased benthic habitat, aquatic habitat and riparian habitat that will support an increased diversity of benthic, aquatic and terrestrial species.

(5) Effects on Special Aquatic Sites - N/A.

(6) Threatened and Endangered Species - There are no known endangered or threatenec species inhabiting the project limits.

(7) Other Wildlife - An overall positive impact will result from the increase in diversity and abundance of aquatic habitat that will attract other water dependent and aquatic foraging birds and mammals.

(8) Actions to Minimize Impacts - Sediment and erosion control methods approved by the Corps and the state will be implemented to minimize material movement during and after construction.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A

(2) Determination of Compliance with Applicable Water Quality Standards - Fill will be clean material that will meet applicable water quality standards. Work will be performed in accordance with all applicable State water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance this use downstream with the improvement of aquatic habitat.

(c) Water Related Recreation - No effect expected.

(d) Aesthetics - Short term adverse impacts expected as a result of forest clearing and the negative appearance of a newly graded, artificially vegetated landscape with artificial structures imposed. The site will be reforested to replace the vegetation removed. The present aesthetic value of the site will not be restored until the vegetation becomes established after several years.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - No effect expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem -The existing aquatic ecosystem will be improved as a result of this project, with an increase in quantity and quality of diverse aquatic habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem -Secondary effects on the aquatic ecosystem are expected to be positive, resulting in increased numbers and diversity of fish and wildlife in the Anacostia River Basin.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. No feasible alternative is available for this action that would accomplish the project objectives with as little cost and as much benefit to the environment.

c. The planned placement of the material will be in compliance with state water quality standards.

d. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

e. The proposed activity will benefit anadromous and resident fish and other birds and mammals with no negative effect on any endangered species.

f. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

g. The proposed placement of the material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity, productivity and stability will result as a result of the project.

h. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

i. On the basis of the Guidelines, the proposed discharge site for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem. Sediment control devices will be implemented in compliance with Federal, state and local laws.

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
NORTHWEST BRANCH STREAM RESTORATION
PRINCE GEORGES COUNTY
ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND
FEASIBILITY STUDY

JULY 1994

I. PROJECT DESCRIPTION

a. Location - The U.S. Army Corps of Engineers, Baltimore District, proposes actions for environmental restoration in the Anacostia River Basin. The action assessed in this evaluation is the stream restoration in an 8,000 foot reach of the Northwest Branch of the Anacostia River, in Prince Georges County, Maryland (Figure 1). This section of the Northwest Branch is in the Northwest Branch Stream Valley Park and is bounded to the north by PEPCO power transmission lines, approximately 2,100 feet northwest of University Boulevard, and to the south by the East-West Highway (Maryland State Route 410). This stream segment is 500 feet south of the proposed Fordham Street Wetlands site and is located on property owned by the Maryland National Capital Park and Planning Commission (MNCPPC).

b. General Description - The restoration design focuses on stabilizing severely unstable portions of the stream channel and improving physical habitat structure. The primary techniques that will be implemented with this action are stone toe protection with revegetation, apposing wing deflectors, and reforestation. The plan proposes approximately 14.8 acres of bottomland reforestation to produce wildlife habitat and improve the riverine ecosystem. Additional information about this project and the other restoration projects proposed by the Baltimore District in the Anacostia River Basin can be found in the Integrated Feasibility Study and Environmental Impact Statement for the Anacostia River and Tributaries, 1994 (Feasibility Study).

c. Description of Fill Action - A variety of restoration techniques will be implemented in selected parts of the stream. The techniques used will include stone toe protection with revegetation, apposing wing deflectors, placement of instream and streambank boulders, construction of rock vortex weirs, installation of stone dikes, and reforestation. The plan proposes approximately 14.8 acres of bottomland reforestation to produce wildlife habitat and improve the riverine ecosystem. More detailed information about the fill action can be found in the Plate Portfolio in the Feasibility Study.

d. Purpose - Northwest Branch within the limits of the restoration reach has been classified as a Use IV-Recreational Trout Waters by the Maryland Department of Natural Resources. The goal of this proposed restoration project is to increase fish and wildlife habitat in the Northwest Branch by stabilizing severely eroding stream banks, increasing riparian vegetation, deepening broad shallow stream sections and the enhancing/creating instream habitat diversity. The action proposed was identified by the Anacostia Watershed Restoration Committee (local, state, regional and federal agencies) as one of several actions needed to restore living resources in the Anacostia River.

e. General Description of Discharge Material - Fill in waters of the U.S. will consist of approximately 42 boulders of 36 inches minimum diameter and 750 pounds minimum weight; 18

rock wing deflectors constructed of 12.5 cubic yards of riprap and 9 square yards of geotextile fabric each (225 cubic yards of riprap total); 279 square yards of riprap and 930 yards of geotextile fabric used for stone toe protection.

f. Description of the Proposed Discharge Site - The portion of the Northwest Branch within the study area is 8,000 feet in length with a normal channel width of 35 to 50 feet, with some sections up to 90 feet wide. Bank heights range from 5 to 10 feet. Projected flows for existing conditions and ultimate development range from 3,264 to 13,949 cubic feet per second. The Northwest Branch is an urbanized stream flowing through coastal plain sediments. The stream bank materials are sands, silts and clays; the stream bed materials are predominantly sand and gravel. Eroded pipelines and other structures indicate significant past stream channel degradation within the study reach.

g. Description of Discharge Method - Rock material will be delivered and placed with the use of a truck and crane and/or front end loader. Entrance into the aquatic habitat by construction machinery will be limited to that necessary for proper rock placement. Fabric material will be placed by hand.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - The elevation and slope of the channel substrates will not be changed significantly.

(2) Sediment Type - Fabric, riprap and gabion will be placed on gravel, sand and silt channel bed substrates.

(3) Discharge Material Movement - Beneficial effects are expected as a result of the proposed actions to reduce erosion and stream channel deterioration. Geotextile fabric and riprap and gabions protection have been designed according to Corps and state criteria to minimize material movement.

(4) Physical Effects on Benthos - Temporary, minor adverse effects in the immediate area of the discharge, and longterm beneficial effects. Some pollution tolerant species in the unconsolidated stream bottom will be buried with the fabric and rock fill. It is expected that organisms of the same species, and other less common species, will become reestablished in the unconsolidated material trapped instream by the riprap. In addition, more diverse species will become established in the biologically more diverse aquatic environment created, and in the downstream channels that receive improved water quality from from the project area.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Sediment control devices will be used in compliance with local, state and Federal laws.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - Beneficial changes are expected as a result of actions proposed to improve habitat.

(a) Salinity - N/A.

(b) Chemistry - Beneficial effects resulting from the decrease in stream erosion and the increase in biological diversity.

(c) Clarity - Beneficial effects of reduced suspended sediment as a result of the erosion control proposed.

(d) Color - No change expected.

(e) Odor - No change expected.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Dissolved oxygen levels will increase with the increased photic activity with decreased suspended sediment.

(h) Nutrients - Beneficial effect of reduced nutrient as a result of filtering and microbial functions associated with stream bank revegetation.

(i) Eutrophication - N/A.

(j) Others as Appropriate - Temperature may be reduced slightly due to the increase in water depths, and shading from associated tree plantings and other landscaping.

(2) Current Patterns and Circulation - Beneficial effects resulting from pool and riffle patterns created with fill proposed.

(a) Current Patterns and Flow - Beneficial effects resulting from pool and riffle patterns created with fill proposed.

(b) Velocity - Beneficial effect of more varied stream flow to enhance fish habitat.

(c) Stratification - No change expected.

(d) Hydrologic Regime - No change expected.

(3) Normal Water Level Fluctuations - No change expected.

(4) Salinity Gradients - No change expected.

(5) Actions to Minimize Impacts - No adverse impacts expected.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Vicinity of Disposal Site -Beneficial effects of long term decrease in suspended particulates resulting from proposed action.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration - Beneficial effect resulting from decrease in suspended sediment.

(b) Dissolved Oxygen - Beneficial effect resulting from reduction in suspended sediment which will allow more photosynthetic activity.

(c) Toxic Metals and Organics - No change expected.

(d) Pathogens - No change expected.

(e) Aesthetics - No adverse impacts are expected. Moderate beneficial effects are expected with the reduction and treatment of severely eroded stream bank.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - No change is expected.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton - Long range beneficial effects expected as a result of the creation of more biologically diverse, productive environment.

(2) Effects on Benthos - Temporary, minor adverse effect and long term beneficial effect expected. Some organisms will be buried with the placement of boulders, riprap and geotextile fabric proposed. Similar species are expected to recolonize the stream in the sediment that becomes trapped in the stones placed within a short period. Other more diverse species are expected to become established with the creation of more stable, biologically productive habitat resulting from the action proposed.

(3) Effects on Nekton - Temporary, minor adverse effects and longterm beneficial effects are expected. Nekton will be temporarily disturbed during project installation, but are expected to return and increase after construction. The action proposed is designed to benefit nekton by enhancing instream habitat and decreasing erosion.

(4) Effects on Food Web - An overall positive effect on the food web is expected with increased benthic habitat, aquatic habitat and riparian habitat that will support an increased diversity of benthic, aquatic and terrestrial species.

(5) Effects on Special Aquatic Sites - N/A.

(6) Threatened and Endangered Species - There are no known endangered or threatened species inhabiting the project limits.

(7) Other Wildlife - An overall positive impact will result from the increase in diversity and abundance of aquatic habitats that will attract other water dependent and aquatic foraging birds and mammals.

(8) Actions to Minimize Impacts - Sediment and erosion control methods approved by the Corps and the state will be implemented to minimize material movement during and after construction.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A

(2) Determination of Compliance with Applicable Water Quality Standards - Fill will be clean material that will meet applicable water quality standards. Work will be performed in accordance with all applicable State water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance this use with the improvement of aquatic habitat.

(c) Water Related Recreation - No effect expected.

(d) Aesthetics - Beneficial effects are expected by the restoration of aquatic, riparian and terrestrial habitat, and the reduction of severe erosion in stream and along both banks of the Northwest Branch.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - Beneficial effect expected to the Northwest Branch Stream Valley Park with improved biological and aesthetic environments resulting from the proposed action.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - The existing aquatic ecosystem will be improved as a result of this project, with an increase in quantity and quality of aquatic habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem -Secondary effects on the aquatic ecosystem are expected to be positive, resulting in increased numbers and diversity of fish and wildlife in the Anacostia River Basin.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. No feasible alternative is available for this action that would accomplish the project objectives with as little cost and as much benefit to the environment.

c. The planned placement of the material will be in compliance with state water quality standards.

d. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

e. The proposed activity will benefit anadromous and resident fish and other birds and mammals with no negative effect on any endangered species.

f. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

g. The proposed placement of the material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity, productivity and stability will result as a result of the project.

h. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

i. On the basis of the Guidelines, the proposed discharge site for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem. Sediment control devices will be implemented in compliance with Federal, state and local laws.

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
STEWART/APRIL LANE STORMWATER WETLAND
MONTGOMERY COUNTY
ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND
FEASIBILITY STUDY

JULY 1994

I. PROJECT DESCRIPTION

a. Location - The U.S. Army Corps of Engineers, Baltimore District, proposes actions for environmental restoration in the Anacostia River Basin. The action assessed in this evaluation is the construction of a stormwater management pond with shallow marsh wetlands on an unnamed tributary to Paint Branch of the Anacostia River in Montgomery County, Maryland. The stormwater management pond is to be located approximately 4,000 feet southeast of the intersection of Columbia Pike (U.S. Route 29) and New Hampshire Avenue. The site is on property owned by the Maryland National Capital Park and Planning Commission (MNCPPC), just east of the terminus of Stewart/April Lane and approximately 1,400 feet upstream of the confluence of the unnamed tributary and Paint Branch.

b. General Description - The goal of this restoration project is to increase fish and wildlife habitat in Paint Branch and the unnamed tributary and to provide wetlands habitat in the area. This will be accomplished by the creation of a shallow marsh wetland pond that will provide stormwater quantity and quality control for the 203 heavily developed acres draining to the site. Additional information about this project and the other restoration projects proposed by the Baltimore District in the Anacostia River Basin can be found in the Integrated Feasibility Study and Environmental Impact Statement for the Anacostia River and Tributaries, District of Columbia and Maryland, 1994 (Feasibility Study).

c. Description of Fill Action - The proposed pond will be constructed with an earth embankment and excavation. The pond will have a permanent pool with a volume of 65,210 cubic feet and a maximum depth of 4 feet. Baseflow inflow (approximately 0.2 cubic feet per second) to the proposed facility will be protected from thermal loading by diverting it around the pond to the pond's concrete pipe. The earth embankment will be approximately 24 feet high from the top of the dam to the downstream toe of fill at the centerline of the stream. The design incorporates a sediment forebay, several emergent wetland zones, and deep water area. The main emergent wetland zone separates the sediment forebay from the deep water zone. The wetland zone will be approximately 0.7 acre in size. More detailed information about the fill action can be found in the Plate Portfolio in the Feasibility Study.

d. Purpose - The reach of Paint Branch near the Stewart/April Lane site has been classified as a Use III - Natural Trout Waters by the Maryland Department of Natural Resources. The goal of this proposed restoration project is to increase fish and wildlife habitat in Paint Branch and the unnamed tributary and to provide wetlands habitat in the area.

e. General Description of Discharge Material - Instream fill will consist of approximately 1500 cubic yards (cy) of clean earth embankement fill, 20 cy 12 inch riprap, one precast concrete endwall, one modified head wall, one concrete diversion intake headwall, and approximately 400

feet of concrete and iron pipe. Additional information about discharge material can be found in the Feasibility Study.

f. Description of the Proposed Discharge Site - An approximately 900 foot segment of stream will be directly affected by excavation and fill for project construction. Approximately 400 feet of that stream segment will be filled. The stream is a small unnamed stream channel with a baseflow of approximately 0.2 cubic feet per second. The watershed is highly developed with parking lots, apartments and shopping centers which contribute a high pollutant loading to the stream. Streambed materials in the channel are primarily fine gravels through medium and fine sands.

g. Description of Discharge Method - Rock, plant and geotextile materials will be delivered and placed with the use of a truck and crane and/or front end loader. Entrance into the aquatic habitat by construction machinery will be limited to that necessary for proper material placement. Fabric and plant material will be placed by hand. Vegetation removed will be replanted as part of the action proposed.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - The elevation and slope of the stream in the area of the stormwater management pond will be changed to create a shallow marsh wetland.

(2) Sediment Type - The stream substrate is gravel, sand and silt.

(3) Discharge Material Movement - Minor, temporary adverse effects and longterm beneficial effects are expected. Slightly increased downstream sedimentation during and immediately after construction is likely. Existing sediment and discharge material movement will be reduced in the longterm as a result of the filtering action of the stormwater management wetland proposed. reduce erosion and stream channel deterioration. Geotextile fabric and rock protection have been designed according to Corps and state criteria to minimize material movement.

(4) Physical Effects on Benthos - Minor adverse effect expected in the immediate area of the discharge, and longterm beneficial effects. Organisms in the stream channel on the site of construction will be buried or excavated. Some of the same species are expected to recolonize the aquatic habitat created. In addition, more diverse species will become established in the more biologically productive aquatic environment created, and in the downstream channels that receive improved water quality from the project area.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Sediment control devices will be used in compliance with local, state and Federal laws.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - Beneficial changes are expected as a result of actions proposed to provide water quality and quantity control.

(a) Salinity - N/A.

(b) Chemistry - Beneficial effects resulting from the decrease in suspended particulates (and associated nutrients) and the increase in biological diversity (and associated primary productivity).

(c) Clarity - Beneficial effects of reduced suspended sediment as a result of the erosion control proposed.

(d) Color - No change expected.

(e) Odor - No change expected.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Dissolved oxygen levels will increase with the increased photic activity with decreased suspended sediment.

(h) Nutrients - Beneficial effect of reduced nutrients as a result of filtering and microbial functions associated with the wetland created.

(i) Eutrophication - N/A.

(j) Others as Appropriate - N/A.

(2) Current Patterns and Circulation

(a) Current Patterns and Flow - No change expected except in immediate area of construction where approximately 900 feet of stream will be piped into the wetland riser outlet structure.

(b) Velocity - Beneficial effect of less flashy stormwater flows resulting from water quantity control function of wetland proposed.

(c) Stratification - No change expected.

(d) Hydrologic Regime - No change expected except in immediate area of constructed wetland where existing stream baseflow will be diverted.

(3) Normal Water Level Fluctuations - No change expected.

(4) Salinity Gradients - No change expected.

(5) Actions to Minimize Impacts - No adverse impacts expected.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Vicinity of Disposal Site -Beneficial effects of long term decrease in suspended particulates resulting from proposed action.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration - Beneficial effect resulting from decrease in suspended sediment.

(b) Dissolved Oxygen - Beneficial effect resulting from reduction in suspended sediment which will allow more photosynthetic activity.

(c) Toxic Metals and Organics - Beneficial effects resulting from filtering and microbial functions of wetland proposed which will reduce downstream loadings of metals and organic contaminants.

(d) Pathogens - Beneficial effects resulting from filtering and microbial functions of wetland proposed.

(e) Aesthetics - No adverse impacts are expected. Moderate beneficial effects are expected with the creation of a more diverse, biologically productive environment.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - Pollutants from non-point surfaces in the urban watershed including sediment, nutrients, coliform bacteria, PAHs, pesticides, PCBs and heavy metals have been found in the Anacostia River watershed. The proposed project is expected to reduce the quantity of such contaminants discharged downstream of the project as a result of the filtering and microbial functions of the wetland proposed.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton - Longrange beneficial effects expected as a result of the creation of a more biologically diverse, productive environment.

(2) Effects on Benthos - Temporary, minor adverse effect and longterm beneficial effect expected. Some organisms will be buried and excavated as a result of the action proposed. Some of the same species are expected to recolonize the aquatic habitat created. Other less common, more diverse species are expected to become established with the creation of more biologically productive habitat created and in the improved water quality downstream of the action proposed.

(3) Effects on Nekton - Temporary, minor adverse effects and longterm beneficial effects are expected. Nekton will be temporarily disturbed during project installation, but are expected to return and increase after construction. The action proposed is designed to benefit nekton by enhancing fish habitat and decreasing downstream erosion.

(4) Effects on Food Web - An overall positive effect on the food web is expected with increased benthic habitat, aquatic habitat and riparian habitat that will support an increased diversity of benthic, aquatic and terrestrial species.

(5) Effects on Special Aquatic Sites - N/A.

(6) Threatened and Endangered Species - There are no known endangered or threatened species inhabiting the project limits.

(7) Other Wildlife - An overall positive impact will result from the increase in diversity and abundance of aquatic habitats that will attract other water dependent and aquatic foraging birds and mammals.

(8) Actions to Minimize Impacts - Sediment and erosion control methods approved by the Corps and the state will be implemented to minimize material movement during and after construction.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A

(2) Determination of Compliance with Applicable Water Quality Standards - Fill will be clean material that will meet applicable water quality standards. Work will be performed in accordance with all applicable State water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance this use with the improvement of downstream aquatic habitat.

(c) Water Related Recreation - No effect expected.

(d) Aesthetics - Short term adverse effect. The aesthetically pleasing existing forest will be clear cut in the project site and replaced with a newly graded, revegetated landscape with imposing artifical structures. Reforestation is proposed as part of the project design, but the existing aesthetic value will not be replaced for several years.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - No effect expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - As the upper portions of Paint Branch are classified as Use III waters (with temperatures not to exceed 68 degrees F), thermal loading is a potential impact. However, the baseflow bypass pipe should minimize potential thermal loading during base flows. During run-off events, the project is not likely to cause higher thermal loading than occurs under the existing conditions. Overall, the existing aquatic ecosystem will be improved as a result of this project, with an increase in quantity and quality of aquatic habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem -Secondary effects on the aquatic ecosystem are expected to be positive, resulting in increased numbers and diversity of fish and wildlife in the Anacostia River Basin.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. No feasible alternative is available for this action that would accomplish the project objectives with as little cost and as much benefit to the environment.

c. The planned placement of the material will be in compliance with state water quality standards.

d. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

e. The proposed activity will benefit anadromous and resident fish and other birds and mammals with no negative effect on any endangered species.

f. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

g. The proposed placement of the material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity, productivity and stability will result as a result of the project.

h. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

i. On the basis of the Guidelines, the proposed discharge site for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem. Sediment control devices will be implemented in compliance with Federal, state and local laws.

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
LOCKRIDGE DRIVE STORMWATER WETLAND
MONTGOMERY COUNTY
ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND
FEASIBILITY STUDY

JULY 1994

I. PROJECT DESCRIPTION

a. Location - The U.S. Army Corps of Engineers, Baltimore District, proposes actions for environmental restoration in the Anacostia River Basin. The action assessed in this evaluation is the construction of a stormwater management pond with shallow marsh wetlands on an unnamed tributary to Northwest Branch of the Anacostia River in Montgomery County, Maryland. The stormwater management pond is to be located approximately 1,700 feet northwest of where Colesville Road (U.S. Route 29) crosses the Northwest Branch of the Anacostia River. The site is on property owned by the Maryland National Capital Park and Planning Commission (MNCPPC), just east of the terminus of Lockridge Drive and approximately 320 feet upstream of the confluence of the unnamed tributary and Northwest Branch.

b. General Description - The goal of this restoration project is to increase fish and wildlife habitat in Northwest Branch and the unnamed tributary and to provide wetlands habitat in the area. This will be accomplished by the creation of a shallow marsh wetland pond that will provide stormwater quantity and quality control for the 153 heavily developed acres draining to the site. Additional information about this project and the other restoration projects proposed by the Baltimore District in the Anacostia River Basin can be found in the Integrated Feasibility Study and Environmental Impact Statement for the Anacostia River and Tributaries, District of Columbia and Maryland, 1994 (Feasibility Study).

c. Description of Fill Action - The proposed pond will be constructed with an earth embankment and excavation. The pond will have a permanent pool, several emergent wetland zones, and a deep water area. The wetland area will be approximately 0.3 acres in size. The permanent pool will have a volume of of 14060 cubic feet and a maximum depth of 4 feet. The pool will be fed by a baseflow of approximately 0.2 cubic feet per second. More detailed information about the fill action proposed can be found in the Plate Portfolio in the Feasibility Study.

d. Purpose - The goal of this proposed restoration project is to increase fish and wildlife habitat in Northwest Branch and the unnamed tributary and to provide wetlands habitat in the area.

e. General Description of Discharge Material - A portion of the following fill material will be discharged into the stream: approximately 960 cubic yards (cy) of clean earth embankment fill, 300 cy of 12 inch riprap, 640 square yards of geotextile fabric, a concrete endwall and headwall, approximately 200 feet of concrete and iron pipe.

f. Description of the Proposed Discharge Site - The discharge site is a small unnamed stream channel with a baseflow of approximately 0.3 cubic feet per second. Severe streambank erosion

has severely degraded the aquatic habitat and is a major source of sediment. Streambed materials are primarily fine gravels through medium and fine sands.

g. Description of Discharge Method - Rock, plant and geotextile materials will be delivered and placed with the use of a truck and crane and/or front end loader. Entrance into the aquatic habitat by construction machinery will be limited to that necessary for proper material placement. Fabric and plant material will be placed by hand.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - The elevation and slope of the stream in the area of the stormwater management pond will be changed to create a shallow marsh wetland.

(2) Sediment Type - The stream substrate is gravel, sand and silt.

(3) Discharge Material Movement - Temporary adverse effects and longterm beneficial effects are expected. Slightly increased downstream sedimentation during and immediately after construction is likely. Existing sediment and discharge material movement will be reduced in the longterm as a result of the filtering action of the stormwater management wetland proposed. reduce erosion and stream channel deterioration. Geotextile fabric and rock protection have been designed according to Corps and state criteria to minimize material movement.

(4) Physical Effects on Benthos - Minor adverse effect expected in the immediate area of the discharge, and longterm beneficial effects. Organisms in the stream channel on the site of construction will be buried or excavated. Some of the same species are expected to recolonize the aquatic habitat created. In addition, more diverse species will become established in the more biologically productive aquatic environment created, and in the downstream channels that receive improved water quality from the project area.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Sediment control devices will be used in compliance with local, state and Federal laws.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - Beneficial changes are expected as a result of actions proposed to provide water quality and quantity control.

(a) Salinity - N/A.

(b) Chemistry - Beneficial effects resulting from the decrease in suspended particulates (and associated nutrients) and the increase in biological diversity (and associated primary productivity).

(c) Clarity - Beneficial effects of reduced suspended sediment as a result of the erosion control proposed.

(d) Color - No change expected.

(e) Odor - No change expected.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Dissolved oxygen levels will increase with the increased photic activity with decreased suspended sediment.

(h) Nutrients - Beneficial effect of reduced nutrients as a result of filtering and microbial functions associated with the wetland created.

(i) Eutrophication - N/A.

(j) Others as Appropriate - N/A.

(2) Current Patterns and Circulation

(a) Current Patterns and Flow - No change expected except in immediate area of construction where the stream will be partially channelized and diverted through the wetland created.

(b) Velocity - Beneficial effect of less flashy stormwater flows resulting from water quantity control function of wetland proposed.

(c) Stratification - No change expected.

(d) Hydrologic Regime - No change expected except in immediate area of constructed wetland.

(3) Normal Water Level Fluctuations - No change expected.

(4) Salinity Gradients - No change expected.

(5) Actions to Minimize Impacts - No adverse impacts expected.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Vicinity of Disposal Site -Beneficial effects of long term decrease in suspended particulates resulting from proposed action.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration - Beneficial effect resulting from decrease in suspended sediment.

(b) Dissolved Oxygen - Beneficial effect resulting from reduction in suspended sediment which will allow more photosynthetic activity.

(c) Toxic Metals and Organics - Beneficial effects resulting from filtering and microbial functions of wetland proposed which will reduce downstream loadings of metals and organic contaminants.

(d) Pathogens - Beneficial effects resulting from filtering and microbial functions of wetland proposed.

(e) Aesthetics - Beneficial effects resulting from reduction of suspended particulates/turbidity resulting from biological, physical and chemical processes in the wetland created.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - Pollutants from non-point sources in the urban watershed such as sediment, nutrients, coliform bacteria, PAHs, pesticides, PCBs and heavy metals will be reduced as a result of biological, physical and chemical processes in the wetland proposed.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton - Long range beneficial effects expected as a result of the creation of a more biologically diverse, productive environment.

(2) Effects on Benthos - Temporary, minor adverse effect and longterm beneficial effect expected. Some organisms will be buried and excavated as a result of the action proposed. Some of the same species are expected to recolonize the aquatic habitat created. Other less common, more diverse species are expected to become established with the creation of more biologically productive habitat created and in the improved water quality downstream of the action proposed.

(3) Effects on Nekton - Temporary, minor adverse effects and longterm beneficial effects are expected. Nekton will be temporarily disturbed during project installation, but are expected to return and increase after construction. The action proposed is designed to benefit nekton by enhancing fish habitat and decreasing downstream erosion.

(4) Effects on Food Web - An overall positive effect on the food web is expected with increased benthic habitat, aquatic habitat and riparian habitat that will support an increased diversity of benthic, aquatic and terrestrial species.

(5) Effects on Special Aquatic Sites - N/A.

(6) Threatened and Endangered Species - There are no known endangered or threatened species inhabiting the project limits.

(7) Other Wildlife - An overall positive impact will result from the increase in diversity and abundance of aquatic habitats that will attract other water dependent and aquatic foraging birds and mammals.

(8) Actions to Minimize Impacts - Sediment and erosion control methods approved by the Corps and the state will be implemented to minimize material movement during and after construction.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A

(2) Determination of Compliance with Applicable Water Quality Standards - Fill will be clean material that will meet applicable water quality standards. Work will be performed in accordance with all applicable State water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance this use with the improvement of downstream aquatic habitat.

(c) Water Related Recreation - No effect expected.

(d) Aesthetics - Short term adverse effects expected as a result of clearing the existing forest. The landscape will be converted to a newly graded and planted view with large artificial structures imposed. The site will be reforested as part of the project proposed. However, the current aesthetic value of the existing forest will not be replaced for several years.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - No effect expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - The existing aquatic ecosystem will be improved as a result of this project, with an increase in quantity and quality of aquatic habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem -Secondary effects on the aquatic ecosystem are expected to be positive, resulting in increased numbers and diversity of fish and wildlife in the Anacostia River Basin.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. No feasible alternative is available for this action that would accomplish the project objectives with as little cost and as much benefit to the environment.

c. The planned placement of the material will be in compliance with state water quality standards.

d. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

e. The proposed activity will benefit anadromous and resident fish and other birds and mammals with no negative effect on any endangered species.

f. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

g. The proposed placement of the material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity, productivity and stability will result as a result of the project.

h. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

i. On the basis of the Guidelines, the proposed discharge site for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem. Sediment control devices will be implemented in compliance with Federal, state and local laws.

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
GUM SPRINGS BYPASS
MONTGOMERY COUNTY
ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND
FEASIBILITY STUDY

JULY 1994

I. PROJECT DESCRIPTION

a. Location - The U.S. Army Corps of Engineers, Baltimore District, proposes actions for environmental restoration in the Anacostia River Basin. The action assessed in this evaluation is the diversion of storm water runoff flowing into Gum Springs from the Oak Springs tributary in the Anacostia River watershed. section of Gum Springs is located in Upper Paint Branch Park in Montgomery County, Maryland. the site is on Maryland National Capital Park and Planning Commission (MNCPPC) property and is located approximately 600 feet south and east of the terminus of Twig Road (Figure 1). The intake of the pipe proposed will be below the stormwater management pond on Oak Spring approximately 200 feet upstream of the intersection of Oak Spring with Gum Spring. The pipe will follow a path roughly parallel to Gum Spring approximately 1800 feet. The pipe will discharge into Paint Branch approximately 200 feet downstream of the intersection of Gum Spring and Paint Branch.

b. General Description - The Gum Springs project is a stream restoration construction action. Gum Springs is a tributary of Paint Branch and is classified as a Use III - Natural Trout Waters by the Maryland Department of Natural Resources. Gum Springs is one of the best naturally reproducing Brown trout streams in the Anacostia watershed. However, thermal loading and flashy stormwater flows from the adjacent residential developments has decreased the Brown trout survivalship in the stream. The goal of this project is to decrease thermal loading and flashy stormwater flows from the Oak Springs tributary of Gum Springs. This is to be accomplished by diverting the flow from Oak Springs directly to Paint Branch, thereby bypassing Gum Springs. Additional information about this project and the other restoration projects proposed by the Baltimore District in the Anacostia River Basin can be found in the Integrated Feasibility Study and Environmental Impact Statement for the Anacostia River and Tributaries, District of Columbia and Maryland, 1994 (Feasibility Study).

c. Description of Fill Action - The intake of the pipe proposed will be below the stormwater management pond on Oak Spring approximately 200 feet upstream of the intersection of Oak Spring with Gum Spring. The pipe will follow a path roughly parallel to Gum Spring approximately 1800 feet. The pipe will discharge into Paint Branch approximately 200 feet downstream of the intersection of Gum Spring and Paint Branch. Only construction at the intake and outlet will require instream fill. Additional information about the proposed discharge action can be found in the Plate Portfolio in the Feasibility Study.

d. Purpose - The purpose of the proposed project is to divert baseflow and stormwater from a highly urbanized drainage area around a thermally sensitive reach of the Gum Springs tributary to enhance natural trout habitat.

e. General Description of Discharge Material - Instream fill will consist of approximately 60 feet of 12 to 16 inch riprap on approved filter fabric upstream and downstream of the intake and downstream of the outlet and a concrete pipe and endwall at the intake. Additional information about the discharge material can be found in the Feasibility Study.

f. Description of the Proposed Discharge Site - The discharge site at the intake in Oak Springs is an artificially disturbed stream that receives baseflow and impounded stormwater runoff from a highly urbanized drainage area. The stream flow is thermally loaded as a result of low flows and solar exposure upstream and in the channel where there is little vegetative cover. The substrate is silt, sand and gravel.

The discharge site at the outlet structure in Paint Branch is a well buffered stream that receives drainage from predominantly suburban development and large areas of open space. A naturally reproducing population of brown trout (Salmo trutta) exists from the headwaters of Paint Branch, to just below I-495. The upper Paint Branch, in which this restoration project is proposed, including Gum Springs, is the only remaining self-sustaining trout stream in the metropolitan Washington area. However, thermal loadings and flashy flows from Oak springs has decreased the brown trout survivalship. The substrate is silty loam to gravel and cobble.

g. Description of Discharge Method - Rock, plant and geotextile materials will be delivered and placed with the use of a truck and crane and/or front end loader. Entrance into the aquatic habitat by construction machinery will be limited to that necessary for proper material placement. Fabric and plant material will be placed by hand. Vegetation removed as a result of this action will be replaced as part of the restoration plan.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - No change expected.

(2) Sediment Type - The stream substrate is cobble, gravel, sand and silty loam.

(3) Discharge Material Movement - Minimal movement is expected. Geotextile fabric and rock protection have been designed according to Corps and state criteria to minimize material movement.

(4) Physical Effects on Benthos - Adverse effects expected in the immediate area of construction and beneficial effect downstream. Aquatic benthos will be eliminated in the dewatered stream segment of Oak Springs below the intake structure proposed. However, benthos that support cold water trout fisheries in Gum Springs will benefit from the removal of thermal loadings from Oak Springs.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Sediment control devices will be used in compliance with local, state and Federal laws.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - No change expected except in immediate area of construction.

(a) Salinity - N/A.

o change expected.

(b) Chemistry - N/A.

(d) Color - No change expected.

(e) Odor - No change expected.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Dissolved oxygen levels in Gum Springs should increase with reduction in temperature resulting from elimination of thermally loaded flow from Oak Springs.

No change expected.

(h) Nutrients -

(i) Eutrophication - N/A.

(j) Others as Appropriate - N/A.

(2) Current Patterns and Circulation

(a) Current Patterns and Flow - No change expected except in immediate area of construction where flow will bypass approximately 200 feet of Oak Springs channel to be discharged into Paint Branch. Flow patterns in Paint Branch are not expected to change measurably because of the relatively high volume of flow in Paint Branch.

(b) Velocity - No change expected. of less

(c) Stratification - No change expected.

(d) Hydrologic Regime - No change expected except in immediate area of construction.

(3) Normal Water Level Fluctuations - No change expected except in immediate area of construction.

(4) Salinity Gradients - No change expected.

(5) Actions to Minimize Impacts - No adverse impacts expected.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Vicinity of Disposal Site - No change expected.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration - No change expected.

(b) Dissolved Oxygen - Increase in dissolved oxygen in Gum Springs as a result of the removal of thermally loaded water from Oak Springs.

(c) Toxic Metals and Organics - No change expected.

(d) Pathogens - No change expected.

(e) Aesthetics - Minimal effect resulting from the removal of a limited amount of vegetation to install construction.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - No change expected.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton - Beneficial effects expected as a result of the removal of thermally loaded water from a small cold water stream for dilution in a larger stream.

(2) Effects on Benthos - Beneficial effects expected as a result of the removal of thermally loaded water from a small cold water stream for dilution in a larger stream.

(3) Effects on Nekton - Temporary, minor adverse effects and long-term beneficial effects are expected. Nekton will be temporarily disturbed during project installation, but are expected to return and increase after construction. The action proposed is designed to benefit brown trout.

(4) Effects on Food Web - An overall positive effect on the food web is expected with the improvement of the natural trout fishery that will support an increased diversity of benthic, aquatic and terrestrial species.

(5) Effects on Special Aquatic Sites - N/A.

(6) Threatened and Endangered Species - There are no known endangered or threatened species inhabiting the project limits.

(7) Other Wildlife - An overall positive impact will result from the increase in quality of a unique aquatic resource (naturally reproducing trout fishery) that will attract other birds and mammals.

(8) Actions to Minimize Impacts - Sediment and erosion control methods approved by the Corps and the state will be implemented to minimize material movement during and after construction.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A

(2) Determination of Compliance with Applicable Water Quality Standards - Fill will be clean material that will meet applicable water quality standards. Work will be performed in accordance with all applicable State water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance this use with the improvement of downstream aquatic habitat.

(c) Water Related Recreation - No effect expected.

(d) Aesthetics - Short term adverse effects expected as a result of some vegetation clearing. Impacts will be minimized with the selection of a pipe alignment that correlates with an existing open trail. The site will be reforested as part of the project proposed.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - No effect expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - The bypass pipe diverting stormwater flow around Gum Springs will discharge directly into Paint Branch, a designated Use III stream (not to exceed 68 degrees F). The diverted stormwater from Oak Springs may occasionally increase the thermal load in Paint Branch. The fish in this section of Paint Branch are larger than those in Gum Springs and therefore more tolerant of temperature fluctuations. The existing aquatic ecosystem will be improved as a result of this project, with an increase in quantity and quality of aquatic habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem -Secondary effects on the aquatic ecosystem are expected to be positive, resulting in increased numbers and diversity of fish and wildlife in the Anacostia River Basin.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. No feasible alternative is available for this action that would accomplish the project objectives with as little cost and as much benefit to the environment.

c. The planned placement of the material will be in compliance with state water quality standards.

d. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

e. The proposed activity will benefit anadromous and resident fish and other birds and mammals with no negative effect on any endangered species.

f. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

g. The proposed placement of the material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity, productivity and stability will result as a result of the project.

h. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

i. On the basis of the Guidelines, the proposed discharge site for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem. Sediment control devices will be implemented in compliance with Federal, state and local laws.

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
SLIGO CREEK STREAM RESTORATION
MONTGOMERY COUNTY
ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND
FEASIBILITY STUDY

JULY 1994

I. PROJECT DESCRIPTION

a. Location - The U.S. Army Corps of Engineers, Baltimore District, proposes actions for environmental restoration in the Anacostia River Basin. The action assessed in this evaluation is the stream restoration on a 2,500 foot reach of the Sligo Creek in Montgomery County, Maryland (Figure 1). This section of the Sligo Creek is parallel to Sligo Creek Parkway and is bounded to the north by Wayne Avenue and to the south by Piney Branch Road (Maryland State Route 320). The proposed stream restoration site is located in Sligo Park on property owned by the Maryland National Capital Park and Planning Commission (MNCPPC).

b. General Description - The major restoration goal in Sligo Creek is to improve instream and riparian habitat by constructing instream flow structures. Additional information about this project and the other restoration projects proposed by the Baltimore District in the Anacostia River Basin can be found in the Integrated Feasibility Study and Environmental Impact Statement for the Anacostia River and Tributaries, District of Columbia and Maryland, 1994 (Feasibility Study).

c. Description of Fill Action - Instream fill proposed is placement of a rock vortex weir, instream boulders, rock wing deflector, and stone toe protection. Streambank modifications include the installation of windrow refusal and root wads, reforestation, and the reconfiguration of the bank. Additional information about the fill action proposed can be found in the Plate Portfolio in the Feasibility Study.

d. Purpose - Sligo Creek within the limits of the restoration reach has been classified as a Use IV - Recreational Trout Waters by the Maryland Department of Natural Resources. The goal of this proposed restoration project is to increase fish and wildlife habitat in the Sligo Creek through the stabilization of severely eroding stream banks, increasing riparian vegetation, deepening broad shallow stream sections, and the restoration/creation of instream habitat diversity.

e. General Description of Discharge Material - Instream fill will consist of approximately 45 boulders 36 inches and 750 pounds minimum; 5 rock wing deflectors constructed of Class II riprap placed on geotextile fabric (63 cubic yards of riprap and 45 square yards of geotextile fabric total); a rock vortex weir (30 stones 18 to 24 inches diameter); and 123 yards of Class I stone toe protection (111 square yards of riprap and 369 yards of geotextile total).

Materials that will be installed in the stream bank will include 50 yards of Class I riprap windrow refusal (145 square yards of riprap, 215 yards of geotextile and 270 yards of vegetation); a root wad (two selected hardwood tree root balls) 1610 square yards of streambank vegetation. Additional information about discharge material can be found in the EIS.

f. Description of the Proposed Discharge Site - Sligo Creek drains one of the most heavily urbanized subwatersheds in the Anacostia Basin. Restoration actions are proposed in separate locations along a 2,500 foot stream segment. Streambed materials in the active channel are primarily coarse, medium, and fine gravel. Depositional materials on the bars, banks and overwash berms consist of fine gravels through medium and fine sands. depositional areas. Sligo Creek has a low gradient, fairly high sinuosity, and moderate to high width to depth ratio. Storm flow velocities within the channel tend to be high which can result in a significant increase in bank erosion and channel depositional features. Storm drains and other point discharges occur frequently along the channel. Much of the channel banks have been ripraped. There is little toe erosion of the banks. Recent retrofit projects in the upper Sligo Creek watershed have contributed to improvement of the water quality in the creek in recent years to "fair to good" quality. According to Maryland State Water Use designations, Sligo Creek is capable of supporting cool and warmwater fisheries.

g. Description of Discharge Method - Rock, plant and geotextile materials will be delivered and placed with the use of a truck and crane and/or front end loader. Entrance into the aquatic habitat by construction machinery will be limited to that necessary for proper material placement. Fabric and plant material will be placed by hand. Vegetation that is removed will be replaced after construction.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - The elevation and slope of the channel substrates will not be changed significantly.

(2) Sediment Type - Fabric, rock and vegetation will be placed on gravel, sand and silt channel bed substrates.

(3) Discharge Material Movement - Beneficial effects are expected as a result of the proposed actions to reduce erosion and stream channel deterioration. Geotextile fabric and rock protection have been designed according to Corps and state criteria to minimize material movement.

(4) Physical Effects on Benthos - Temporary, minor adverse effects in the immediate area of the discharge, and longterm beneficial effects. Some species in the unconsolidated stream bottom will be buried with the fabric and rock fill. It is expected that organisms of the same species, and other less common species, will become reestablished in the unconsolidated material trapped instream by the riprap. In addition, more diverse species will become established in the more biologically productive aquatic environment created, and in the downstream channels that receive improved water quality from the project area.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Sediment control devices will be used in compliance with local, state and Federal laws.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - Beneficial changes are expected as a result of actions proposed to improve habitat.

(a) Salinity - N/A.

(b) Chemistry - Beneficial effects resulting from the decrease in suspended particulates (and associated nutrients) and the increase in biological diversity (and associated primary productivity).

(c) Clarity - Beneficial effects of reduced suspended sediment as a result of the erosion control proposed.

(d) Color - No change expected.

(e) Odor - No change expected.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Dissolved oxygen levels will increase with the increased photic activity with decreased suspended sediment.

(h) Nutrients - Beneficial effect of reduced nutrient as a result of filtering and microbial functions associated with stream bank revegetation.

(i) Eutrophication - N/A.

(j) Others as Appropriate - N/A.

(2) Current Patterns and Circulation - Beneficial effects resulting from pool and riffle patterns created with fill proposed.

(a) Current Patterns and Flow - Beneficial effects resulting from pool and riffle patterns created with fill proposed.

(b) Velocity - Beneficial effect of more varied stream flow to enhance fish habitat.

(c) Stratification - No change expected.

(d) Hydrologic Regime - No change expected.

(3) Normal Water Level Fluctuations - No change expected.

(4) Salinity Gradients - No change expected.

(5) Actions to Minimize Impacts - No adverse impacts expected.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Vicinity of Disposal Site -Beneficial effects of long term decrease in suspended particulates resulting from proposed action.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration - Beneficial effect resulting from decrease in suspended sediment.

(b) Dissolved Oxygen - Beneficial effect resulting from reduction in suspended sediment which will allow more photosynthetic activity.

(c) Toxic Metals and Organics - No change expected.

(d) Pathogens - No change expected.

(e) Aesthetics - No adverse impacts are expected. Moderate beneficial effects are expected with the reduction and treatment of severely eroded stream banks.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - No change is expected.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton - Longrange beneficial effects expected as a result of the creation of a more biologically diverse, productive environment.

(2) Effects on Benthos - Temporary, minor adverse effect and longterm beneficial effect expected. Some organisms will be buried with the placement of boulders, riprap and geotextile fabric proposed. Similar species are expected to recolonize the unconsolidated material that becomes trapped in the stones placed within a short period. Other species are expected to become established with the creation of more stable, biologically productive habitat resulting from the action proposed.

(3) Effects on Nekton - Temporary, minor adverse effects and longterm beneficial effects are expected. Nekton will be temporarily disturbed during project installation, but are expected to return and increase after construction. The action proposed is designed to benefit nekton by enhancing instream habitat and decreasing erosion.

(4) Effects on Food Web - An overall positive effect on the food web is expected with increased benthic habitat, aquatic habitat and riparian habitat that will support an increased diversity of benthic, aquatic and terrestrial species.

(5) Effects on Special Aquatic Sites - N/A.

(6) Threatened and Endangered Species - There are no known endangered or threatened species inhabiting the project limits.

(7) Other Wildlife - An overall positive impact will result from the increase in diversity and abundance of aquatic habitats that will attract other water dependent and aquatic foraging birds and mammals.

(8) Actions to Minimize Impacts - Sediment and erosion control methods approved by the Corps and the state will be implemented to minimize material movement during and after construction.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A

(2) Determination of Compliance with Applicable Water Quality Standards - Fill will be clean material that will meet applicable water quality standards. Work will be performed in accordance with all applicable State water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance this use with the improvement of aquatic habitat.

(c) Water Related Recreation - No effect expected.

(d) Aesthetics - Beneficial effects are expected by the restoration of aquatic, riparian and terrestrial habitat, and the reduction of severe erosion in stream and along both banks of Sligo Creek.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - No change expected.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - The existing aquatic ecosystem will be improved as a result of this project, with an increase in quantity and quality of aquatic habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem -Secondary effects on the aquatic ecosystem are expected to be positive, resulting in increased numbers and diversity of fish and wildlife in the Anacostia River Basin.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. No feasible alternative is available for this action that would accomplish the project objectives with as little cost and as much benefit to the environment.

c. The planned placement of the material will be in compliance with state water quality standards.

d. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

e. The proposed activity will benefit anadromous and resident fish and other birds and mammals with no negative effect on any endangered species.

f. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

g. The proposed placement of the material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity, productivity and stability will result as a result of the project.

h. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

i. On the basis of the Guidelines, the proposed discharge site for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem. Sediment control devices will be implemented in compliance with Federal, state and local laws.

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
PAINT BRANCH STREAM RESTORATION
MONTGOMERY COUNTY
ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND
FEASIBILITY STUDY

JULY 1994

I. PROJECT DESCRIPTION

a. Location - The U.S. Army Corps of Engineers, Baltimore District, proposes actions for environmental restoration in the Anacostia River Basin. The action assessed in this evaluation is the stream restoration in an 11,200 foot reach of the Paint Branch of the Anacostia River in Montgomery County, Maryland (Figure 1). This section of the Paint Branch is in the Upper Paint and Paint Branch Stream Valley Parks and is bounded to the north by Fairland road, and to the south by Columbia Pike (U.S. Route 29). The central portion of the proposed stream reach is approximately 1,000 feet from the proposed Snowdens Mill Storm Water Management Pond Retrofit sites. The proposed restoration reach is located on property owned by the Maryland National Capital Park and Planning Commission (MNCPPC).

b. General Description - The major environmental goals in Paint Branch are to improve aquatic, riparian and terrestrial habitat by stabilizing eroding streambanks, constructing instream flow structures, especially those which would provide additional cover for adult trout, and reforestation. The Paint Branch stream restoration uses a variety of restoration techniques in selected parts of the stream. The primary techniques used are stone toe protection with revegetation, wing deflectors, and 8.5 acres of reforestation. Additional information about this project and the other restoration projects proposed by the Baltimore District in the Anacostia River Basin can be found in the Integrated Feasibility Study and Environmental Impact Statement for the Anacostia River and Tributaries, District of Columbia and Maryland, 1994 (Feasibility Study).

c. Description of Fill Action - Instream fill proposed is 1) placement of a rock vortex weir to reduce erosion and create improved aquatic habitat; 2) placement of 117 instream boulders and 21 rock wing deflectors to create instream habitat, 3) installation of 156 yards of stone toe protection to reduce erosion, and 4) installation of a stone closure dam and stream channel backfill to reconfigure one section of stream channel. Rocks, boulders and stone will be partially embedded in the streambank and streambed to minimize movement and increase effectiveness. In addition, boulders, imbricated riprap, windrow refusal, live branches, and vegetation will be installed in the stream bank. More detailed information about the fill action proposed can be found in the Plate Portfolio in the Feasibility Study.

d. Purpose - Paint Branch is classified as a Use III - Natural Trout Waters by the Maryland Department of Natural Resources. The Paint Branch Watershed provides the best trout habitat in the Anacostia watershed. However, thermal loadings and flashy stormwater flows from the adjacent residential developments have decreased trout survival in the stream. The goal of this proposed restoration project is to increase fish and wildlife habitat in the Paint Branch through the stabilization of severely eroding stream banks, increasing riparian vegetation, deepening broad shallow stream sections, and enhancing/creating instream habitat diversity. The action proposed was identified by the Anacostia Watershed Restoration Committee (local, state,

regional and federal agencies) as one of several actions needed to restore living resources in the Anacostia River.

e. General Description of Discharge Material - Instream fill will consist of approximately 65 stones 1500 to 3000 pounds, 90 stones 1000 to 1500 pounds; 30 stones 750 pounds minimum; 21 rock wing deflectors constructed of 30 inch riprap placed on geotextile fabric (263 cubic yards of riprap and 189 square yards of geotextile fabric total); 156 yards of 24 inch stone toe protection (140 cubic yards of riprap and 468 yards of geotextile total); 662 yards of 30 inch stone toe protection (596 cubic yards of riprap and 2,000 yards of geotextile fabric total); two stone dams (932 cubic yards of stone and 486 yards of geotextile total); and stream channel backfill (1,130 cubic yards of natural streambed materials consisting of stone, cobble and sand). In addition approximately 0.34 acres of stream channel backfill will be revegetated with native plants.

Materials that will be installed in the streambank will consist of 135 boulders (750 to 3000 pound stones); 93 yards of imbricated riprap (279 square yards of stone and 345 yards of geotextile total); 40 yards of windrow refusal 24 to 30 inches (551 square yards of riprap 817 yards of geotextile and 1,026 yards of revegetation); and live branch packing (210 square yards). Additional information about discharge material can be found in the EIS.

f. Description of the Proposed Discharge Site - The Paint Branch is an urbanized stream flowing through coastal plain sediments. The stream bank materials in the 11,200 foot segment in which restoration actions are proposed are sands, silts and clays; the stream bed materials are predominantly sand and gravel. Paint Branch is classified as a Use III - Natural Trout Waters by the Maryland Department of Natural Resources. The Paint Branch Watershed provides the best trout habitat in the Anacostia watershed. However, thermal loadings and flashy stormwater flows from the adjacent residential developments have decreased trout survival in the stream.

g. Description of Discharge Method - Rock material will be delivered and placed with the use of a truck and crane and/or front end loader. Entrance into the aquatic habitat by construction machinery will be limited to that necessary for proper rock placement. Fabric material will be placed by hand.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - The elevation and slope of the channel substrates will not be changed significantly.

(2) Sediment Type - Fabric, riprap and gabion will be placed on gravel, sand and silt channel bed substrates.

(3) Discharge Material Movement - Beneficial effects are expected as a result of the proposed actions to reduce erosion and stream channel deterioration. Geotextile fabric and riprap and gabion protection have been designed according to Corps and state criteria to minimize material movement.

(4) Physical Effects on Benthos - Temporary, minor adverse effects in the immediate area of the discharge, and longterm beneficial effects. Some species in the unconsolidated stream bottom will be buried with the fabric and rock fill. It is expected that organisms of the same species, and other less common species, will become reestablished in the unconsolidated

material trapped instream by the riprap. In addition, more diverse species will become established in the more biologically productive aquatic environment created, and in the downstream channels that receive improved water quality from the project area.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Sediment control devices will be used in compliance with local, state and Federal laws.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - Beneficial changes are expected as a result of actions proposed to improve habitat.

(a) Salinity - N/A.

(b) Chemistry - Beneficial effects resulting from the decrease in suspended particulates (and associated nutrients) and the increase in biological diversity (and associated primary productivity).

(c) Clarity - Beneficial effects of reduced suspended sediment as a result of the erosion control proposed.

(d) Color - No change expected.

(e) Odor - No change expected.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Dissolved oxygen levels will increase with the increased photic activity with decreased suspended sediment.

(h) Nutrients - Beneficial effect of reduced nutrient as a result of filtering and microbial functions associated with stream bank revegetation.

(i) Eutrophication - N/A.

(j) Others as Appropriate - N/A.

(2) Current Patterns and Circulation - Beneficial effects resulting from pool and riffle patterns created with fill proposed.

(a) Current Patterns and Flow - Beneficial effects resulting from pool and riffle patterns created with fill proposed.

(b) Velocity - Beneficial effect of more varied stream flow to enhance fish habitat.

(c) Stratification - No change expected.

(d) Hydrologic Regime - No change expected.

(3) Normal Water Level Fluctuations - No change expected.

(4) Salinity Gradients - No change expected.

(5) Actions to Minimize Impacts - No adverse impacts expected.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Vicinity of Disposal Site -Beneficial effects of long term decrease in suspended particulates resulting from proposed action.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration - Beneficial effect resulting from decrease in suspended sediment.

(b) Dissolved Oxygen - Beneficial effect resulting from reduction in suspended sediment which will allow more photosynthetic activity.

(c) Toxic Metals and Organics - No change expected.

(d) Pathogens - No change expected.

(e) Aesthetics - No adverse impacts are expected. Moderate beneficial effects are expected with the reduction and treatment of severely eroded stream banks.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - No change expected.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton - Long range beneficial effects expected as a result of the creation of a more biologically diverse, productive environment.

(2) Effects on Benthos - Temporary, minor adverse effect and longterm beneficial effect expected. Some organisms will be buried with the placement of boulders, riprap and geotextile fabric proposed. Similar species are expected to recolonize the unconsolidated material that becomes trapped in the stones placed within a short period. Other species are expected to become established with the creation of more stable, biologically productive habitat resulting from the action proposed.

(3) Effects on Nekton - Temporary, minor adverse effects and longterm beneficial effects are expected. Nekton will be temporarily disturbed during project installation, but are expected to return and increase after construction. The action proposed is designed to benefit nekton by enhancing instream habitat and decreasing erosion.

(4) Effects on Food Web - An overall positive effect on the food web is expected with increased benthic habitat, aquatic habitat and riparian habitat that will support an increased diversity of benthic, aquatic and terrestrial species.

(5) Effects on Special Aquatic Sites - N/A.

(6) Threatened and Endangered Species - There are no known endangered or threatened species inhabiting the project limits.

(7) Other Wildlife - An overall positive impact will result from the increase in diversity and abundance of aquatic habitats that will attract other water dependent and aquatic foraging birds and mammals.

(8) Actions to Minimize Impacts - Sediment and erosion control methods approved by the Corps and the state will be implemented to minimize material movement during and after construction.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A

(2) Determination of Compliance with Applicable Water Quality Standards - Fill will be clean material that will meet applicable water quality standards. Work will be performed in accordance with all applicable State water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance this use with the improvement of aquatic habitat.

(c) Water Related Recreation - No effect expected.

(d) Aesthetics - Beneficial effects are expected by the restoration of aquatic, riparian and terrestrial habitat, and the reduction of severe erosion in stream and along both banks of the Paint Branch.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - Beneficial effect expected to the Upper Paint and Paint Branch Stream Valley Parks with improved biological and aesthetic environments resulting from the proposed action.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - The existing aquatic ecosystem will be improved as a result of this project, with an increase in quantity and quality of aquatic habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem -Secondary effects on the aquatic ecosystem are expected to be positive, resulting in increased numbers and diversity of fish and wildlife in the Anacostia River Basin.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. No feasible alternative is available for this action that would accomplish the project objectives with as little cost and as much benefit to the environment.

c. The planned placement of the material will be in compliance with state water quality standards.

d. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

e. The proposed activity will benefit anadromous and resident fish and other birds and mammals with no negative effect on any endangered species.

f. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

g. The proposed placement of the material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity, productivity and stability will result as a result of the project.

h. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

i. On the basis of the Guidelines, the proposed discharge site for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem. Sediment control devices will be implemented in compliance with Federal, state and local laws.

CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
NORTHWEST BRANCH STREAM RESTORATION
MONTGOMERY COUNTY
ANACOSTIA RIVER AND TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND
FEASIBILITY STUDY

JULY 1994

I. PROJECT DESCRIPTION

a. Location - The U.S. Army Corps of Engineers, Baltimore District, proposes actions for environmental restoration in the Anacostia River Basin. The action assessed in this evaluation is the stream restoration on a 3,700 foot reach of the Northwest Branch of the Anacostia River in Montgomery County, Maryland (Figure 1). This section of the Northwest Branch is in the Northwest Branch Stream Valley Parks and is bounded to the north by Old Randolph road and extends southward for 3,700 feet. The proposed restoration reach is located on property owned by the Maryland National Capital Park and Planning Commission (MNCPPC).

b. General Description - The major environmental goals in Paint Branch are to increase fish and wildlife habitat in the Northwest Branch through the stabilization of severely eroding stream banks, increasing riparian vegetation, deepening broad shallow stream sections, and the restoration/creation of in stream habitat diversity. Additional information about this project and the other restoration projects proposed in the Anacostia River Basin by the Baltimore District can be found in the Integrated Feasibility Study and Environmental Impact Statement for the Anacostia River and Tributaries, District of Columbia and Maryland, 1994 (Feasibility Study).

c. Description of Fill Action - Instream fill proposed is 1) placement of 42 instream boulders and 18 rock wing deflectors to create instream habitat and 2) installation of 310 yards of stone toe protection to reduce erosion. In addition, native vegetation will be planted on reshaped point bars instream. In addition, boulders, imbricated riprap, windrow refusal, live branches, and vegetation will be installed in the stream bank. Stone, boulders and rock will be partially embedded in the streambank and streambed to minimize movement and increase effectiveness. More detailed information about the fill action proposed can be found in the Plate Portfolio in the Feasibility Study.

d. Purpose - Northwest Branch within the limits of the restoration reach has been classified as a Use III - Natural Trout Waters by the Maryland Department of Natural Resources. This stream segment is capable of supporting stocked populations of trout. The major goal in the Northwest Branch is to improve instream and riparian habitat by stabilizing eroding streambanks and constructing instream flow structures. The action proposed was identified by the Anacostia Watershed Restoration Committee (local, state, regional and federal agencies) as one of several actions needed to restore living resources in the Anacostia River.

e. General Description of Discharge Material - Instream fill will consist of approximately 42 boulders 36 inches and 750 pounds minimum; 18 rock wing deflectors constructed of 30 inch riprap placed on geotextile fabric (225 cubic yards of riprap and 162 square yards of geotextile fabric total); 310 yards of 30 inch stone toe protection (280 cubic yards of riprap and 930 yards of geotextile total); and vegetation on approximately 450 square yards of reshaped point bars.

Materials that will be installed in the streambank will consist of 25 boulders (750 pounds and 36 inch); 220 yards imbricated riprap (660 square yards of stone and 814 yards of geotextile total); 95 yards of 30 inch windrow refusal (276 square yards of riprap, 410 yards of geotextile and 515 yards of vegetation); and 420 square yards of streambank vegetation. Additional information about discharge material can be found in the Feasibility Study.

f. Description of the Proposed Discharge Site - The 3,700 foot stream segment proposed for restoration drains forested and low density residential areas in the upper reaches, and more suburban and urban watershed in the lower sections. Bed materials are primarily coarse, medium and fine gravels in the active channel and medium to fine sand particle size in the depositional areas. Stream gradients are typically moderate, with a baseflow of approximately 0.3 cubic feet per second. The stream has an irregular meander pattern and extensive bar building has occurred along the channel. Almost all outside meanders are extensively undercut, and in many areas, both the right and left banks of the straight stream sections are eroded. Extensive lateral erosion of both banks is evident from the exposed roots and scour behind live trees. Active channel widening is also evident.

g. Description of Discharge Method - Rock, plant and geotextile materials will be delivered and placed with the use of a truck and crane and/or front end loader. Entrance into the aquatic habitat by construction machinery will be limited to that necessary for proper material placement. Fabric and plant material will be placed by hand.

II. FACTUAL DETERMINATIONS

a. Physical Substrate Determinations

(1) Substrate Elevation and Slope - The elevation and slope of the channel substrates will not be changed significantly.

(2) Sediment Type - Fabric, rock and vegetation will be placed on gravel, sand and silt channel bed substrates.

(3) Discharge Material Movement - Beneficial effects are expected as a result of the proposed actions to reduce erosion and stream channel deterioration. Geotextile fabric and rock protection have been designed according to Corps and state criteria to minimize material movement.

(4) Physical Effects on Benthos - Temporary, minor adverse effects in the immediate area of the discharge, and longterm beneficial effects. Some species in the unconsolidated stream bottom will be buried with the fabric and rock fill. It is expected that organisms of the same species, and other less common species, will become reestablished in the unconsolidated material trapped instream by the riprap. In addition, more diverse species will become established in the more biologically productive aquatic environment created, and in the downstream channels that receive improved water quality from the project area.

(5) Other Effects - N/A

(6) Actions Taken to Minimize Impacts - Sediment control devices will be used in compliance with local, state and Federal laws.

b. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water - Beneficial changes are expected as a result of actions proposed to improve habitat.

(a) Salinity - N/A.

(b) Chemistry - Beneficial effects resulting from the decrease in suspended particulates (and associated nutrients) and the increase in biological diversity (and associated primary productivity).

(c) Clarity - Beneficial effects of reduced suspended sediment as a result of the erosion control proposed.

(d) Color - No change expected.

(e) Odor - No change expected.

(f) Taste - N/A.

(g) Dissolved Gas Levels - Dissolved oxygen levels will increase with the increased photic activity with decreased suspended sediment.

(h) Nutrients - Beneficial effect of reduced nutrient as a result of filtering and microbial functions associated with stream bank revegetation.

(i) Eutrophication - N/A.

(j) Others as Appropriate - N/A.

(2) Current Patterns and Circulation - Beneficial effects resulting from pool and riffle patterns created with fill proposed.

(a) Current Patterns and Flow - Beneficial effects resulting from pool and riffle patterns created with fill proposed.

(b) Velocity - Beneficial effect of more varied stream flow to enhance fish habitat.

(c) Stratification - No change expected.

(d) Hydrologic Regime - No change expected.

(3) Normal Water Level Fluctuations - No change expected.

(4) Salinity Gradients - No change expected.

(5) Actions to Minimize Impacts - No adverse impacts expected.

c. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Vicinity of Disposal Site -Beneficial effects of long term decrease in suspended particulates resulting from proposed action.

(2) Effects on Chemical and Physical Properties of the Water Column.

(a) Light Penetration - Beneficial effect resulting from decrease in suspended sediment.

(b) Dissolved Oxygen - Beneficial effect resulting from reduction in suspended sediment which will allow more photosynthetic activity.

(c) Toxic Metals and Organics - No change expected.

(d) Pathogens - No change expected.

(e) Aesthetics - No adverse impacts are expected. Moderate beneficial effects are expected with the reduction and treatment of severely eroded stream banks.

(f) Others as Appropriate - N/A.

d. Contaminant Determinations - No change is expected.

e. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton - Longrange beneficial effects expected as a result of the creation of a more biologically diverse, productive environment.

(2) Effects on Benthos - Temporary, minor adverse effect and longterm beneficial effect expected. Some organisms will be buried with the placement of boulders, riprap and geotextile fabric proposed. Similar species are expected to recolonize the unconsolidated material that becomes trapped in the stones placed within a short period. Other species are expected to become established with the creation of more stable, biologically productive habitat resulting from the action proposed.

(3) Effects on Nekton - Temporary, minor adverse effects and longterm beneficial effects are expected. Nekton will be temporarily disturbed during project installation, but are expected to return and increase after construction. The action proposed is designed to benefit nekton by enhancing instream habitat and decreasing erosion.

(4) Effects on Food Web - An overall positive effect on the food web is expected with increased benthic habitat, aquatic habitat and riparian habitat that will support an increased diversity of benthic, aquatic and terrestrial species.

(5) Effects on Special Aquatic Sites - N/A.

(6) Threatened and Endangered Species - There are no known endangered or threatened species inhabiting the project limits.

(7) Other Wildlife - An overall positive impact will result from the increase in diversity and abundance of aquatic habitats that will attract other water dependent and aquatic foraging birds and mammals.

(8) Actions to Minimize Impacts - Sediment and erosion control methods approved by the Corps and the state will be implemented to minimize material movement during and after construction.

f. Proposed Disposal Site Determinations

(1) Mixing Zone Determinations - N/A

(2) Determination of Compliance with Applicable Water Quality Standards - Fill will be clean material that will meet applicable water quality standards. Work will be performed in accordance with all applicable State water quality standards.

(3) Potential Effects on Human Use Characteristics

(a) Municipal and Private Water Supply - No effect expected.

(b) Recreational and Commercial Fisheries - Project is expected to enhance this use with the improvement of aquatic habitat.

(c) Water Related Recreation - No effect expected.

(d) Aesthetics - Beneficial effects are expected by the restoration of aquatic, riparian and terrestrial habitat, and the reduction of severe erosion in stream and along both banks of the Northwest Branch.

(e) Parks, National and Historical Monuments, National Seashore, Wilderness Areas, Research Sites, and Similar Preserves - Beneficial effect expected to the Northwest Branch Stream Valley Park with improved biological and aesthetic environments resulting from the proposed action.

g. Determination of Cumulative Effects on the Aquatic Ecosystem - The existing aquatic ecosystem will be improved as a result of this project, with an increase in quantity and quality of aquatic habitat.

h. Determination of Secondary Effects on the Aquatic Ecosystem -Secondary effects on the aquatic ecosystem are expected to be positive, resulting in increased numbers and diversity of fish and wildlife in the Anacostia River Basin.

III. FINDING OF COMPLIANCE

a. No adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

b. No feasible alternative is available for this action that would accomplish the project objectives with as little cost and as much benefit to the environment.

c. The planned placement of the material will be in compliance with state water quality standards.

d. The proposed placement of material is not expected to violate the Toxic Effluent Standard of Section 307 of the Clean Water Act.

e. The proposed activity will benefit anadromous and resident fish and other birds and mammals with no negative effect on any endangered species.

f. No Marine Sanctuaries, as designated in the Marine Protection, Research, and Sanctuaries Act of 1972, are in the project area.

g. The proposed placement of the material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Positive effects on aquatic ecosystem diversity, productivity and stability will result as a result of the project.

h. Appropriate steps to minimize potential impacts of the placement of the material in aquatic systems will be followed.

i. On the basis of the Guidelines, the proposed discharge site for the material is specified as complying with the inclusion of appropriate and practical conditions to minimize contamination or adverse effects to the aquatic ecosystem. Sediment control devices will be implemented in compliance with Federal, state and local laws.

ANACOSTIA RIVER & TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND

INTEGRATED FEASIBILITY REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT

JULY 1994

ANNEX D

ENVIRONMENTAL IMPACT STATEMENT INDEX

ANNEX D.
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ANACOSTIA RIVER & TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND

INTEGRATED FEASIBILITY REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT

JULY 1994

ANNEX E

LIST OF PREPARERS

NAME	DISCIPLINE/EXPERTISE	EXPERIENCE
Mr. Mark McKevitt	Biologist	5 yrs aquatic research/impact assessment; IAS/ U. of North Texas; 5 yrs EIS/EA preparation; Savannah District; 5 yrs water resources / restoration planning; Baltimore District
Mr. Brian Yanchik	Biologist Natural Resource Management	2 yrs; Baltimore District 2 yr; Private sector
Ms. Lacy Evans	Landscape Architect/Aesthetics; Recreation, Environmental and Water Resources Planning	3 yrs; Baltimore District
Ms. Jennifer Moyer	Biologist Natural Resource Management	3 mths; Baltimore District 1 yr; Private sector
Mr. Timothy Mathews	Landscape Architect/Agricultural Economics, Environmental and Natural Resource Planning	6 mths; Baltimore District
Mr. Richard Starr	Landscape Architect/Aesthetics; Recreation, Environmental and Water Resources Planning	3 yrs; Baltimore District
Ms. Marilyn Benner	Landscape Architect/Aesthetics; Recreation, Environmental and Water Resources Planning	10 yrs; Huntington and Baltimore Districts
Mr. Kenneth Baumgardt	Archeologist/Cultural Resource Analysis	12 yrs; Private sector; 3 yrs; Baltimore District
Mr. Howard Callender	Civil Engineer/Engineering Management	2 yrs; Baltimore District; 25 yrs; Private sector
Mr. Alan Warminski	Chemist/HTRW	2 yrs; Baltimore District; 13 yrs; U. S. Army
Mr. George Weitzel	Civil Engineer/Civil Engineering	36 yrs; Baltimore District
Mr. James Ludlum	Civil Engineer/Civil Engineering	2 yrs; Baltimore District; 4 yrs; Private sector
Ms. Margaret Burns	Hydraulic Engineer/Hydraulic Engineering	10 yrs; Omaha and Baltimore Districts
Mr. Brett Morris	Hydraulic Engineer/Hydraulic Engineering	3 yrs; Baltimore District; 3 yrs. Private sector
Mr. James Snyder	Geotechnical Engineer/ Geotechnical Engineering	22 yrs; Baltimore District
Mr. Cedric Bland	Cost Estmating	16 yrs; Baltimore District
Mr. Dennis Klosterman	Economist Economic Analysis	12 yrs; Baltimore and St. Louis Districts

ANACOSTIA RIVER & TRIBUTARIES
DISTRICT OF COLUMBIA AND MARYLAND

INTEGRATED FEASIBILITY REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT

JULY 1994

ANNEX F

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DISTRICT OF COLUMBIA AND MARYLAND

INTEGRATED FEASIBILITY REPORT AND FINAL ENVIRONMENTAL IMPACT STATEMENT

JULY 1994

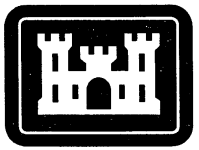
ANNEX G

PLATES

ANACOSTIA RIVER BASIN RESTORATION
DISTRICT OF COLUMBIA AND MARYLAND
FINAL FEASIBILITY REPORT

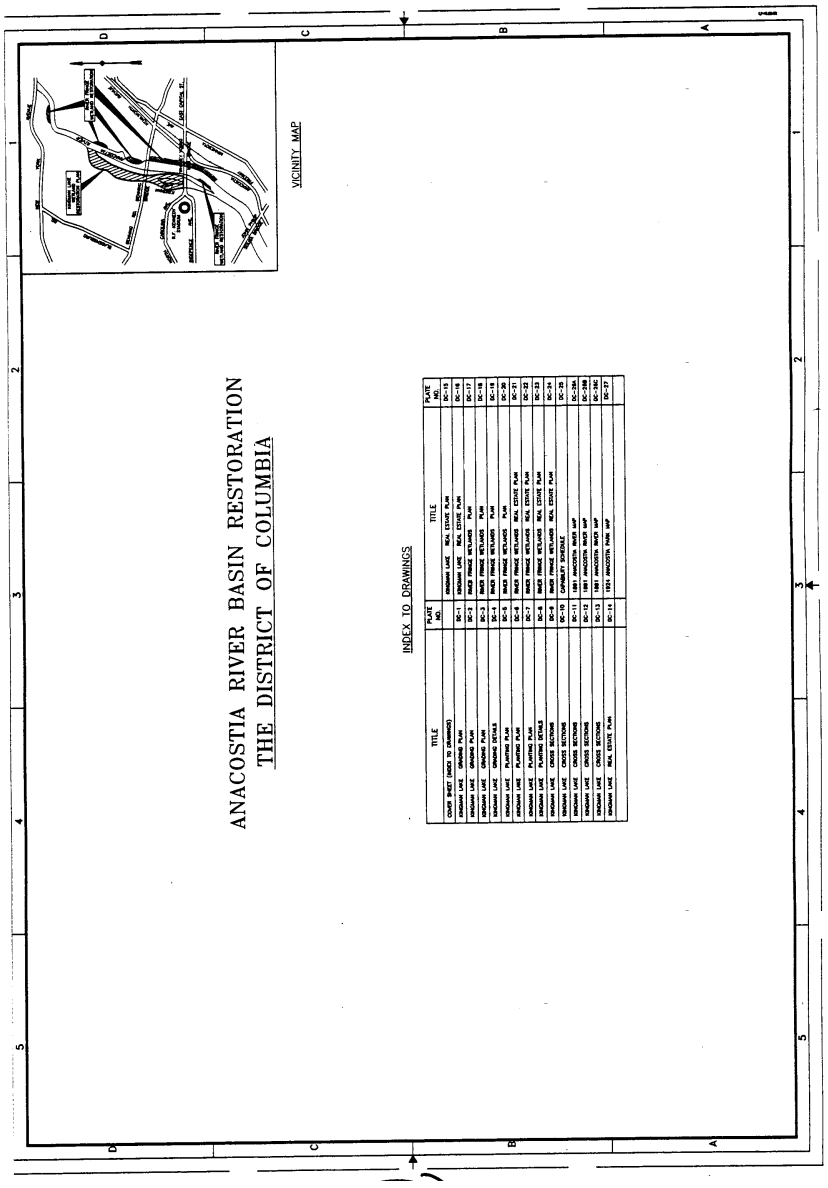
JULY 1994

APPENDIX I
PLATE PORTFOLIO



DEPARTMENT OF THE ARMY
Baltimore District, Corps of Engineers
Baltimore, Maryland

VOLUME IV



ANACOSTIA RIVER BASIN RESTORATION
THE DISTRICT OF COLUMBIA

VICINITY MAP

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KINGMAN LAKE GRADING PLAN	DC-3	REED FRINGE WETLANDS PLAN	DC-18
KINGMAN LAKE GRADING DETAILS	DC-4	REED FRINGE WETLANDS PLAN	DC-19
KINGMAN LAKE PLANTING PLAN	DC-5	REED FRINGE WETLANDS PLAN	DC-20
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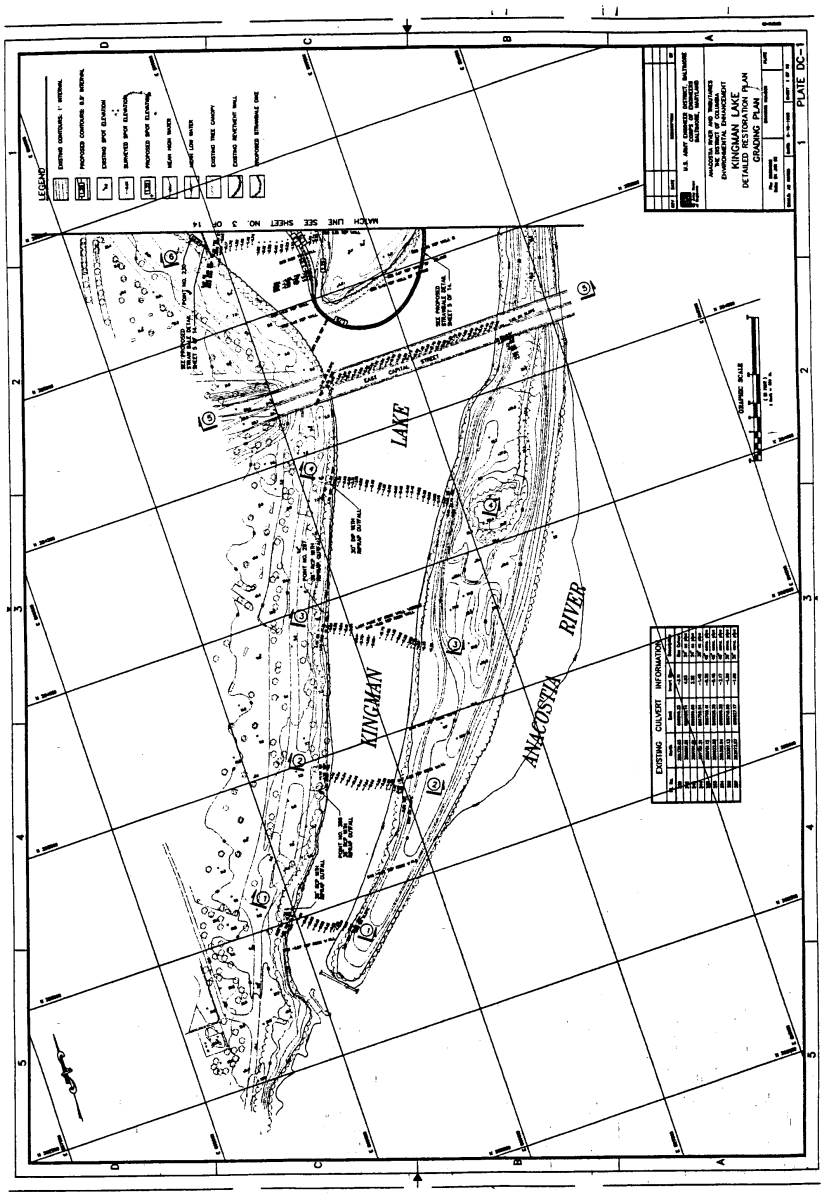
KINGMAN LAKE
ANACOSTIA RIVER
LEGEND
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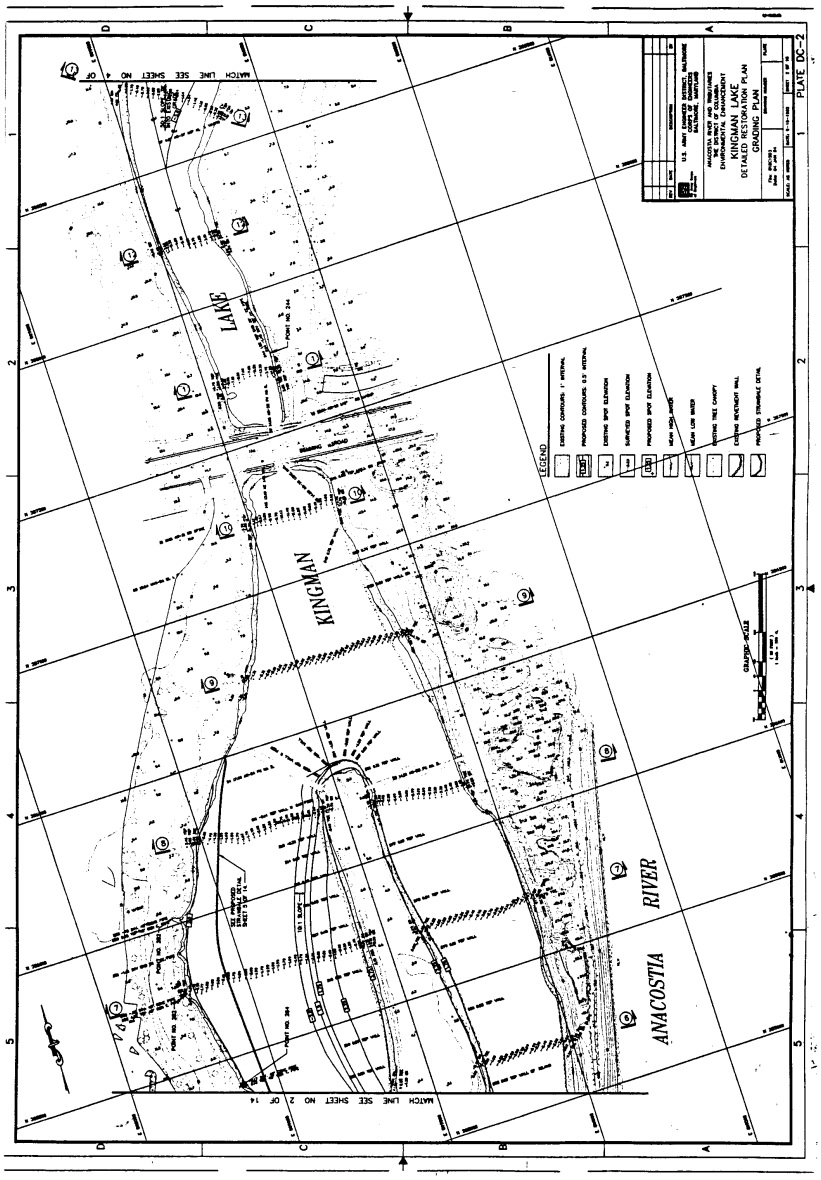
EXISTING CULVERT INFORMATION
KINGMAN LAKE
DETAILED STUDY PLAN
GRADING PLAN
PLATE DC-1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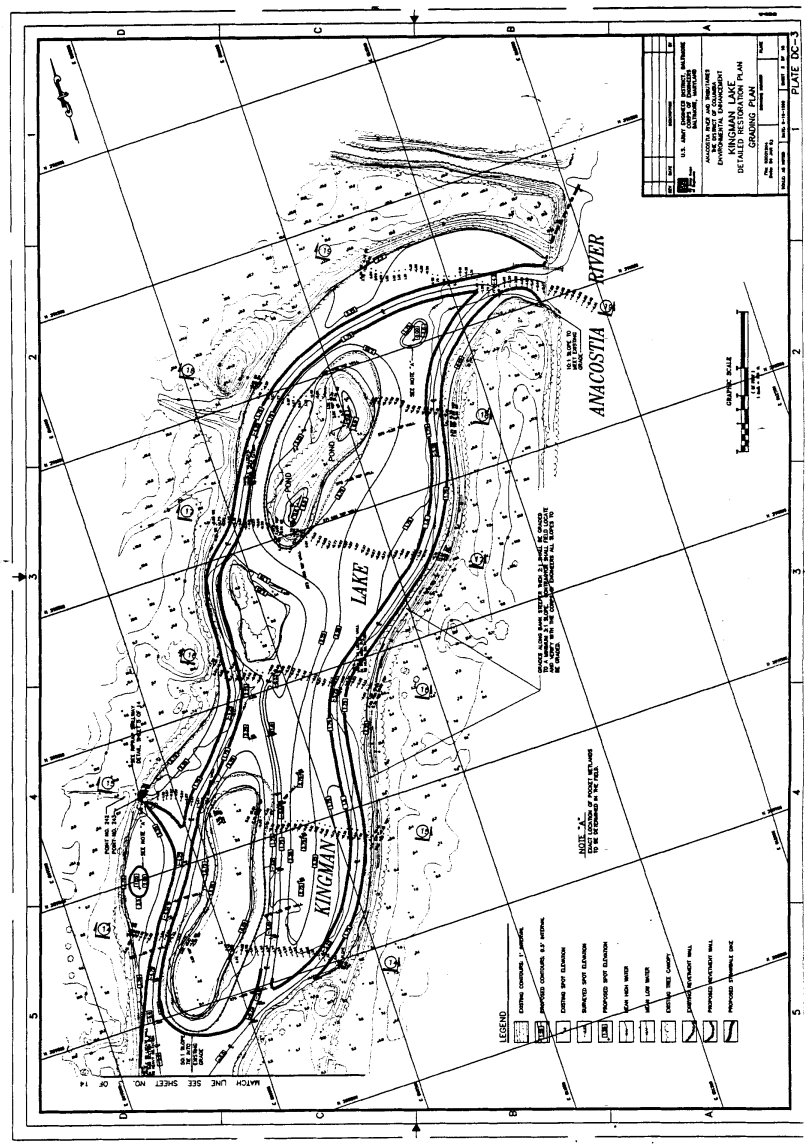
ANACOSTIA RIVER
LEGEND
MATCH LINE SEE SHEET NO 2 OF 14
MATCH LINE SEE SHEET NO 4 OF
KINGMAN LAKE
DETAILED RESTORATION PLAN
GRADING PLAN
PLATE DC-2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DETAILED RESTORATION PLAN
GRADING PLAN
PLATE DC-3
ANACOSTIA RIVER
KINGMAN LAKE
LEGEND
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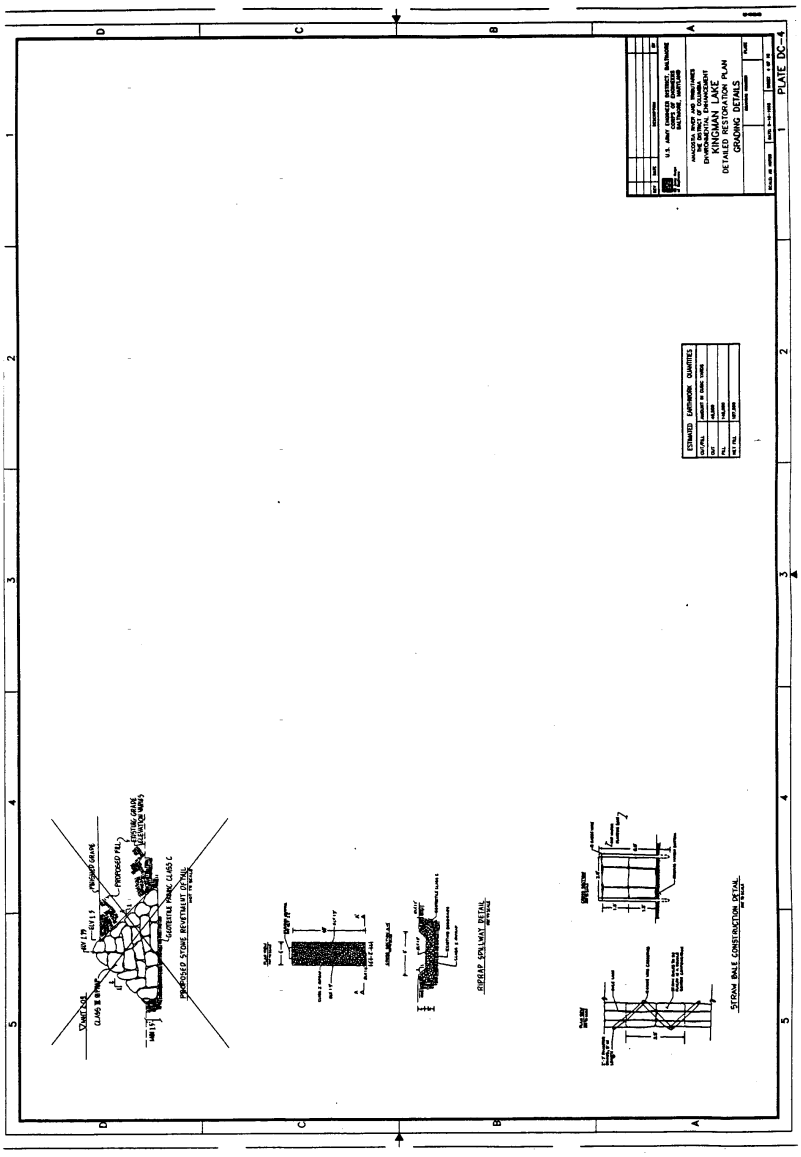
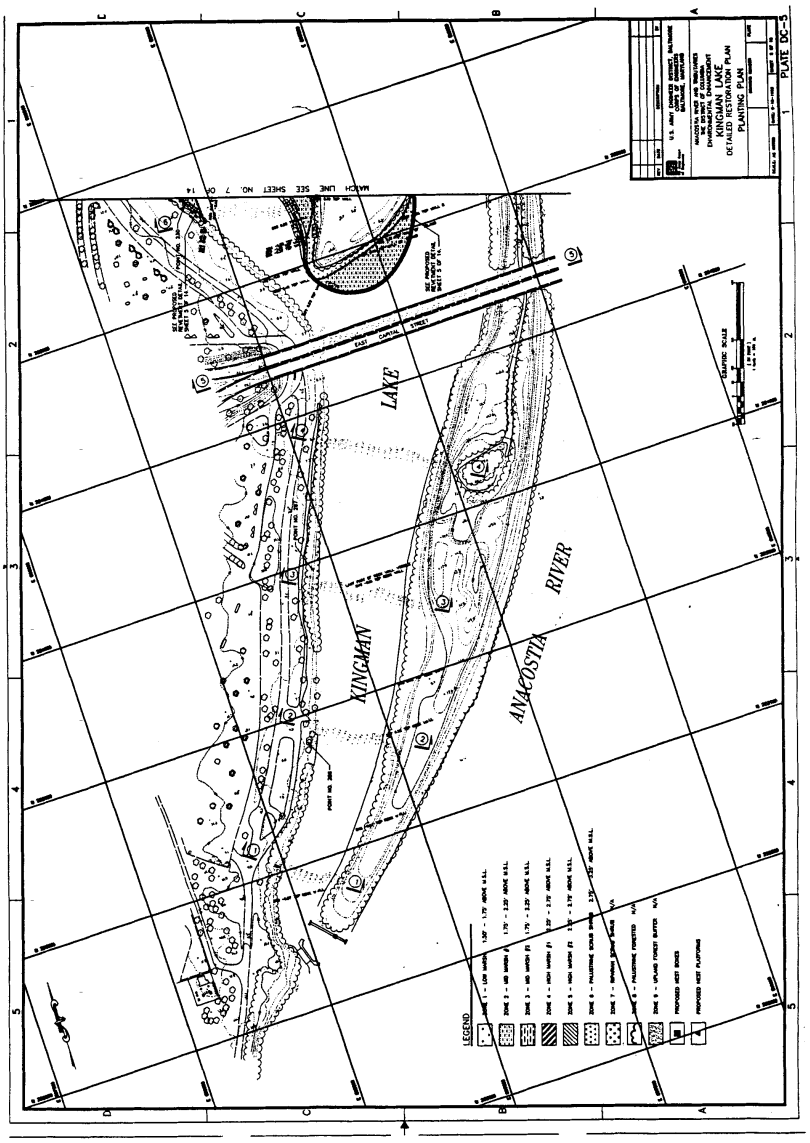
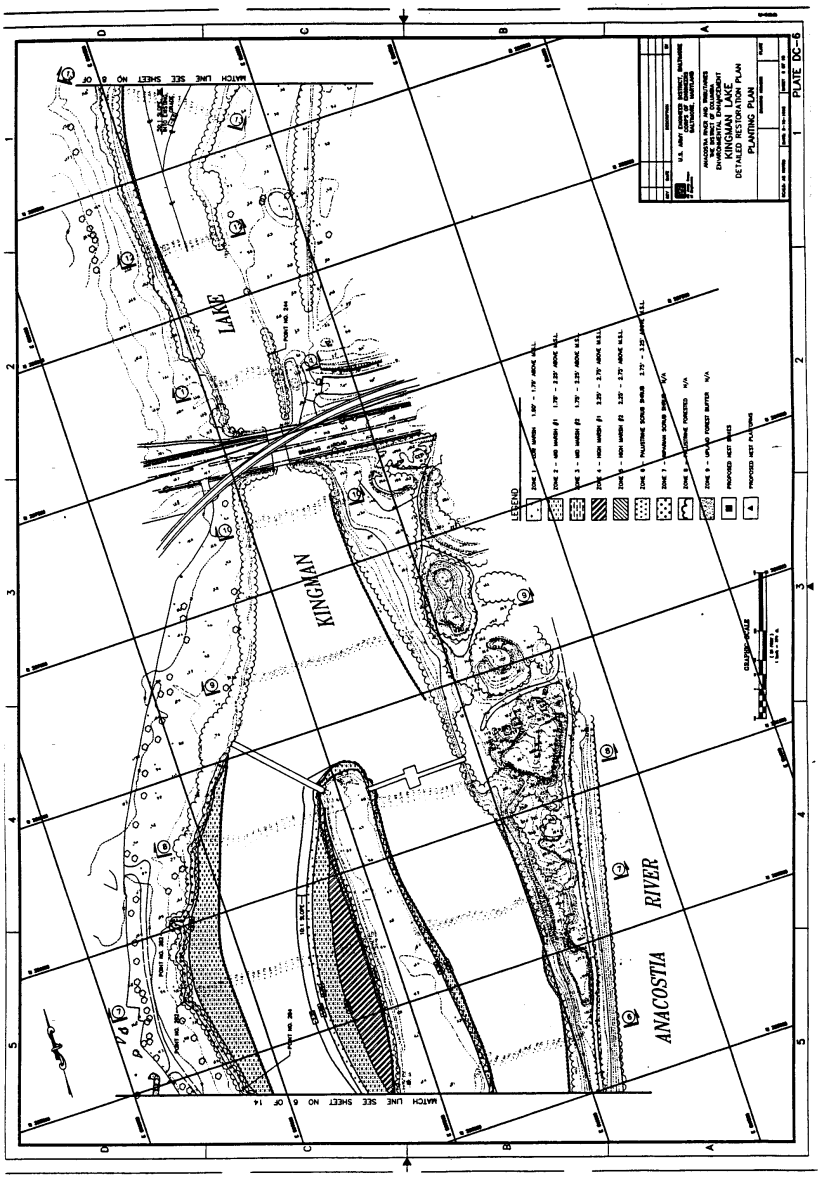


PLATE DC-4
KINGHAM LAKE
DETAILED RECREATION PLAN
GRADING DETAILS
ESTIMATED EARTHWORK QUANTITIES
STORM DRAIN CONSTRUCTION DETAIL
RIPRAP SPILLWAY DETAIL


KINGMAN LAKE
ANACOSTIA RIVER
PLATE DC-5
PLANTING PLAN
LEGEND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ANACOSTIA RIVER
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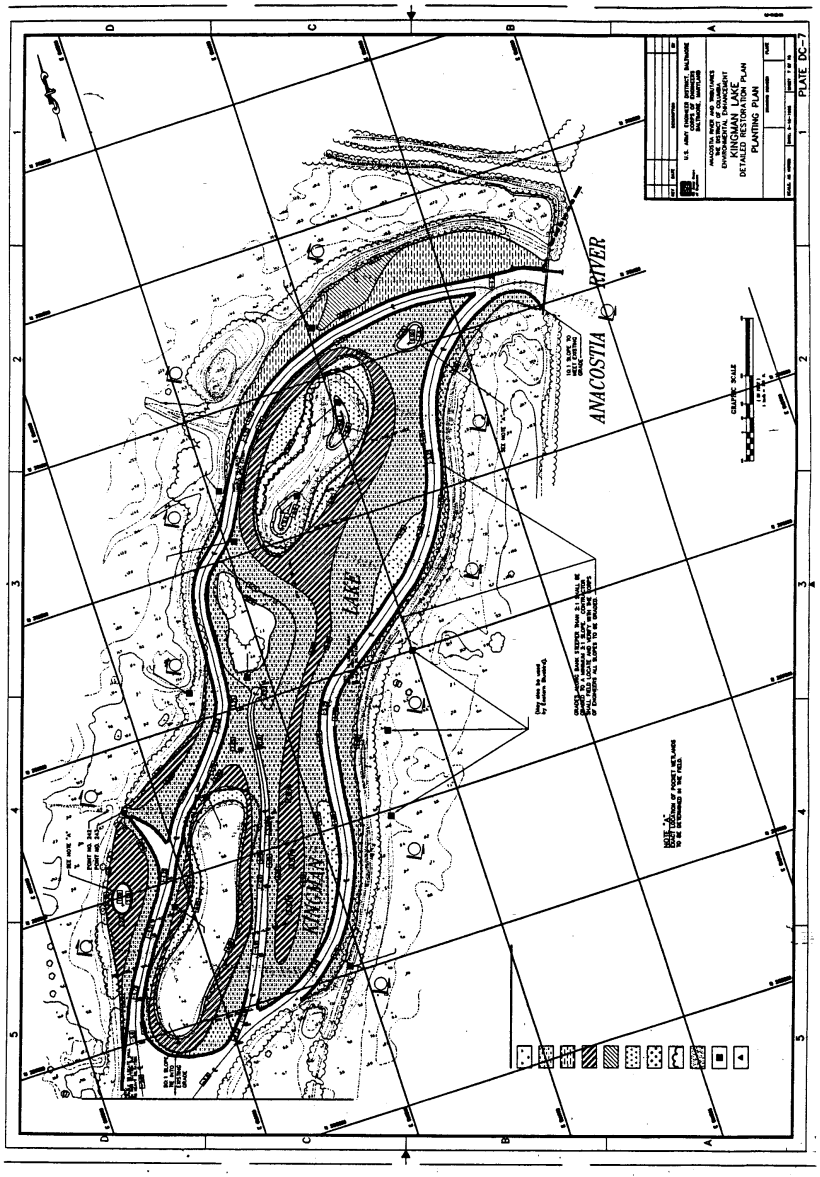
MATCH LINE SEE SHEET NO 8 OF
PLANTING PLAN
PLATE DC-5
LEGEND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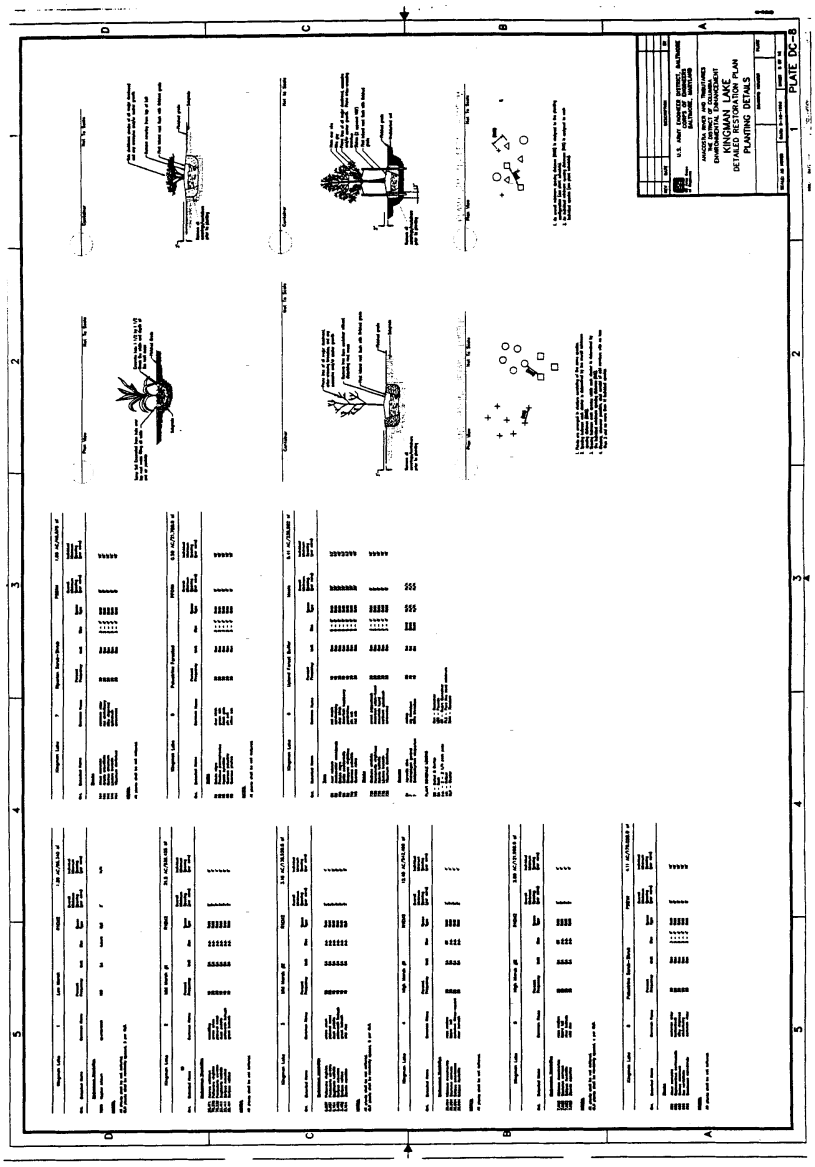
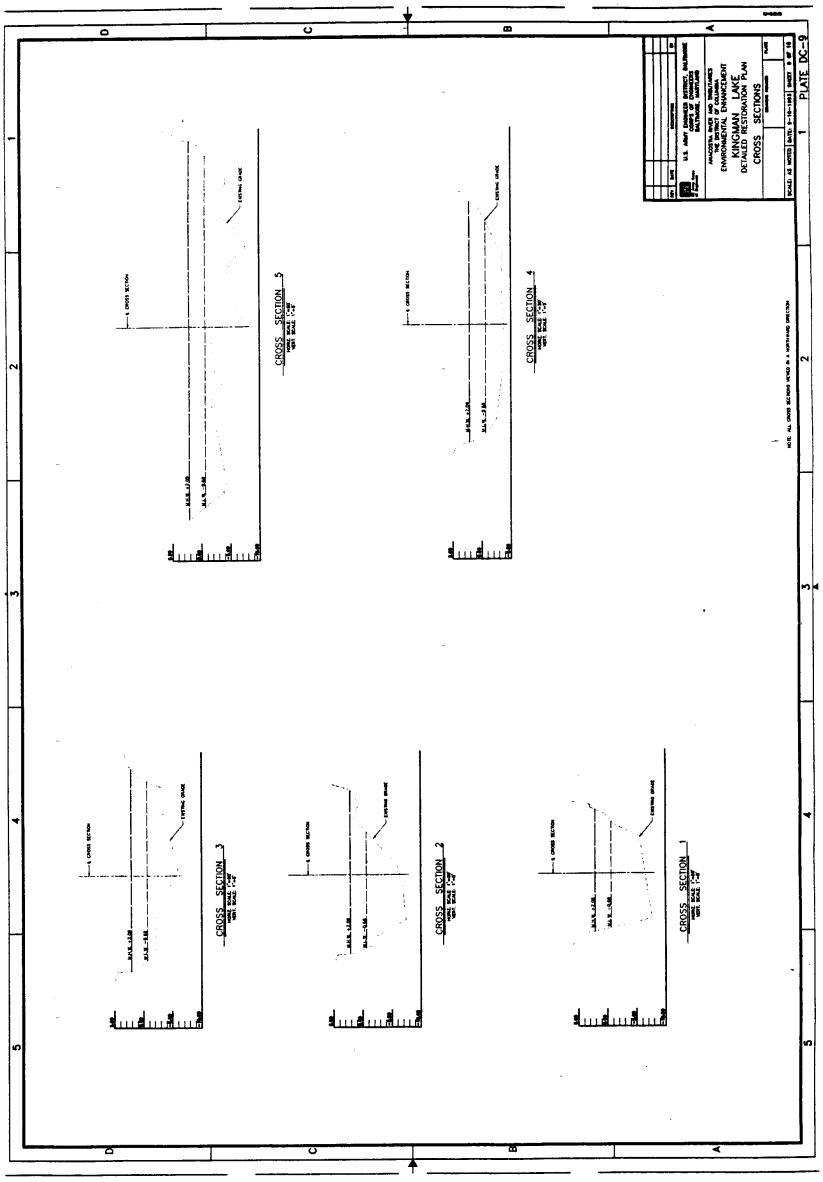
DETAILED RESTORATION PLAN
PLANTING PLAN
PLATE DC-7
ANACOSTIA RIVER
KINGMAN LAKE

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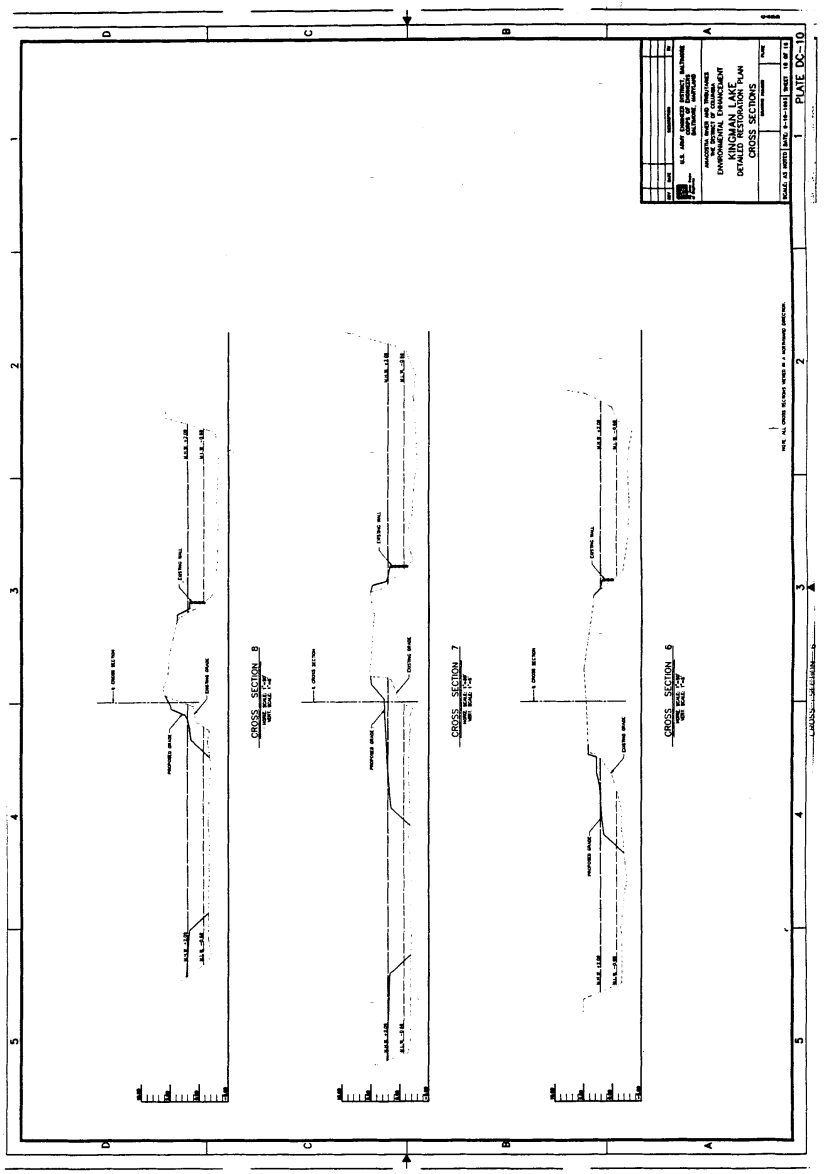
CROSS SECTION 4
CROSS SECTION 3
CROSS SECTION 2
CROSS SECTION 1
KINGMAN LAKE
DETAILED RESTORATION PLAN
CROSS SECTIONS
PLATE D6-9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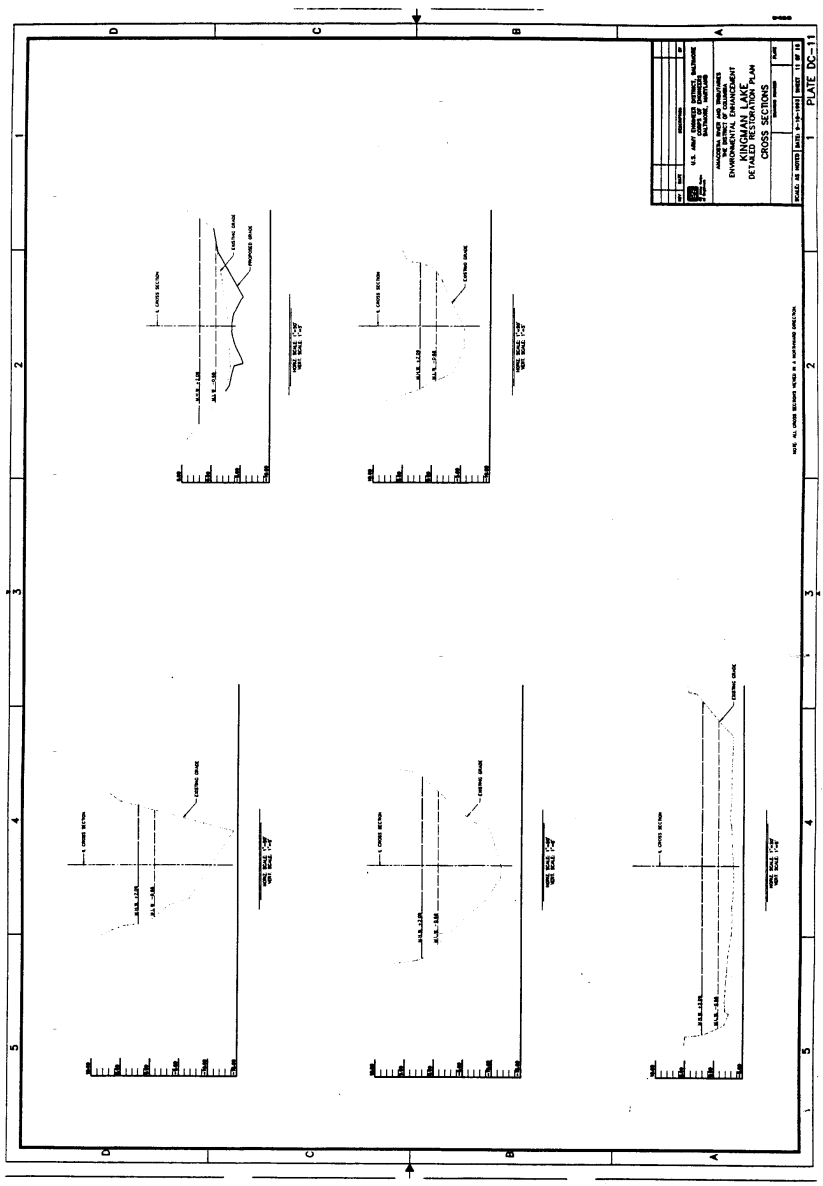
ENVIRONMENTAL ENHANCEMENT
DETAILED RESTORATION PLAN
CROSS SECTIONS
PLATE DC-10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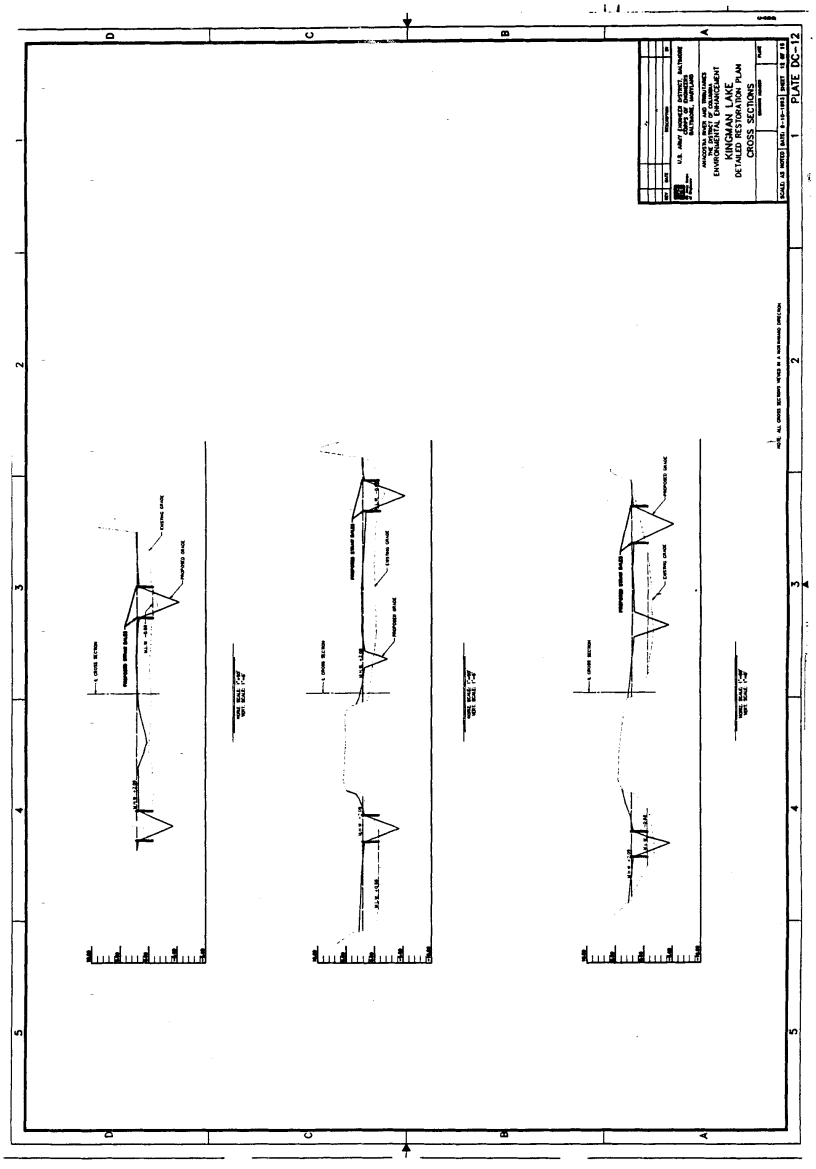
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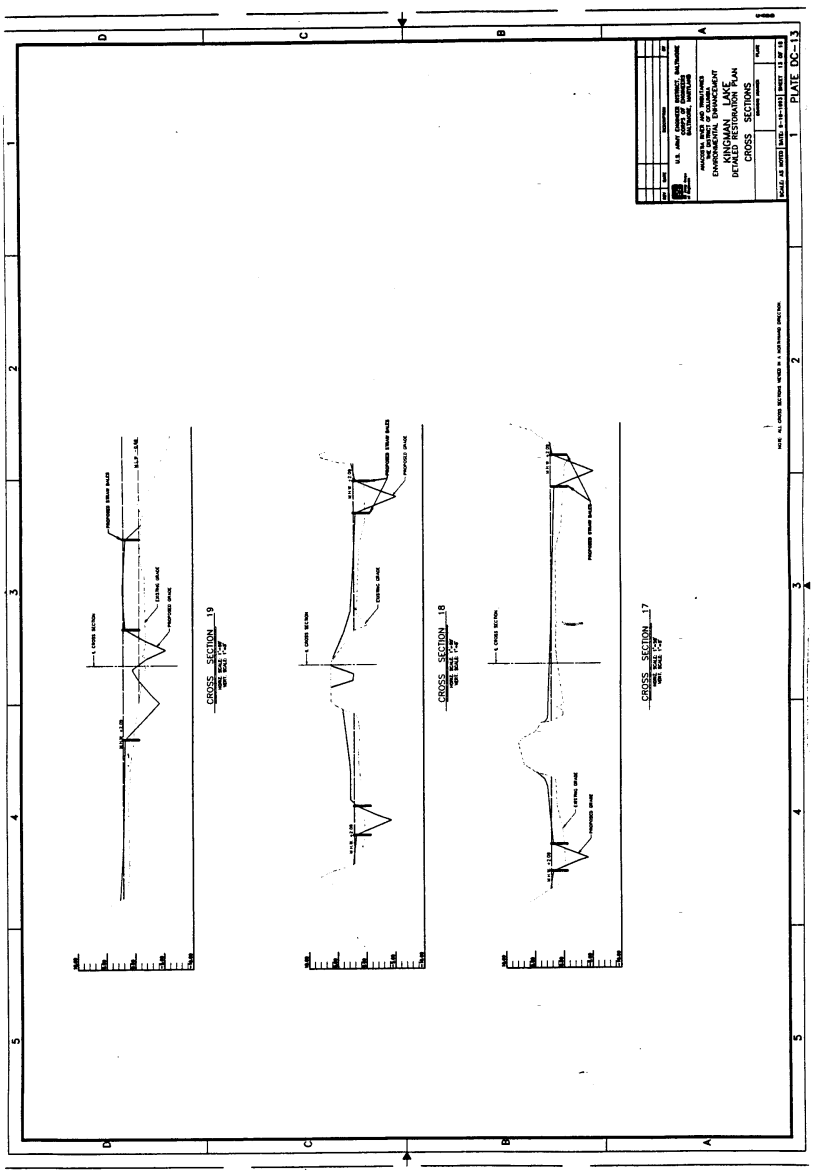
DETAILED RESTORATION PLAN
CROSS SECTIONS
PLATE DC-12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CROSS SECTION 17
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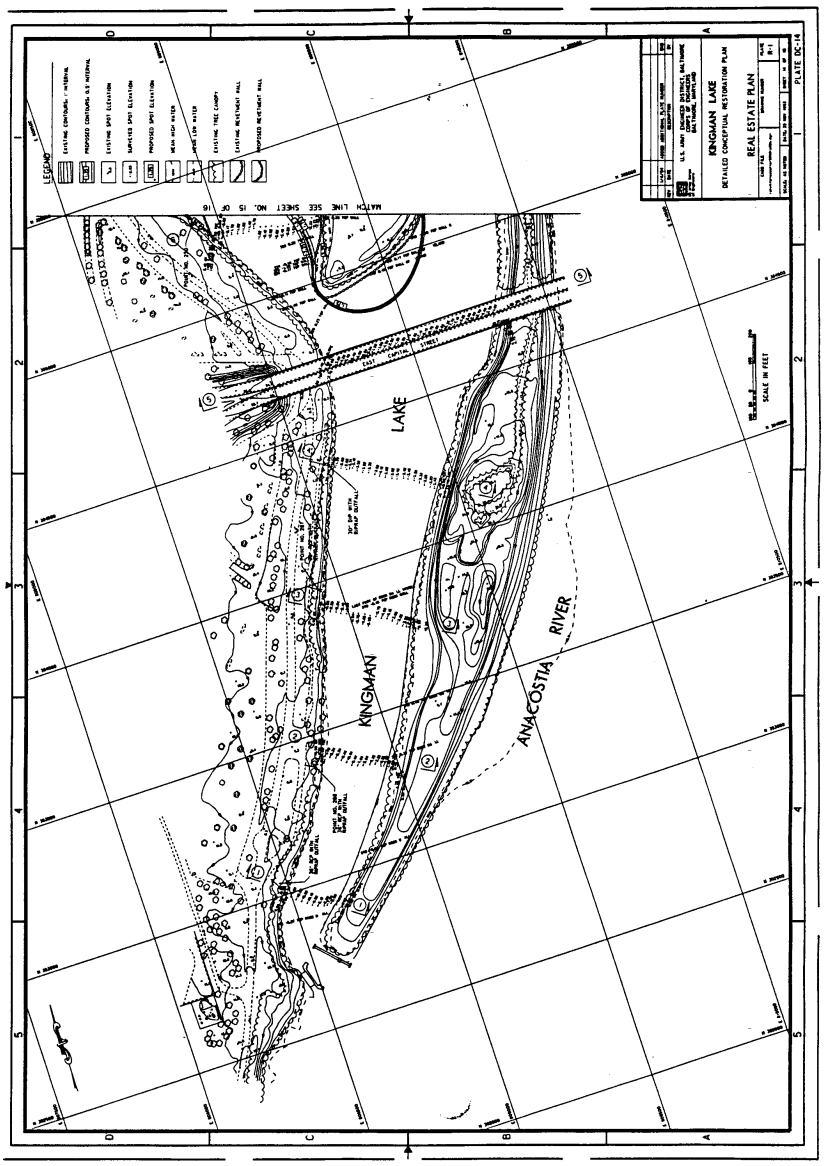
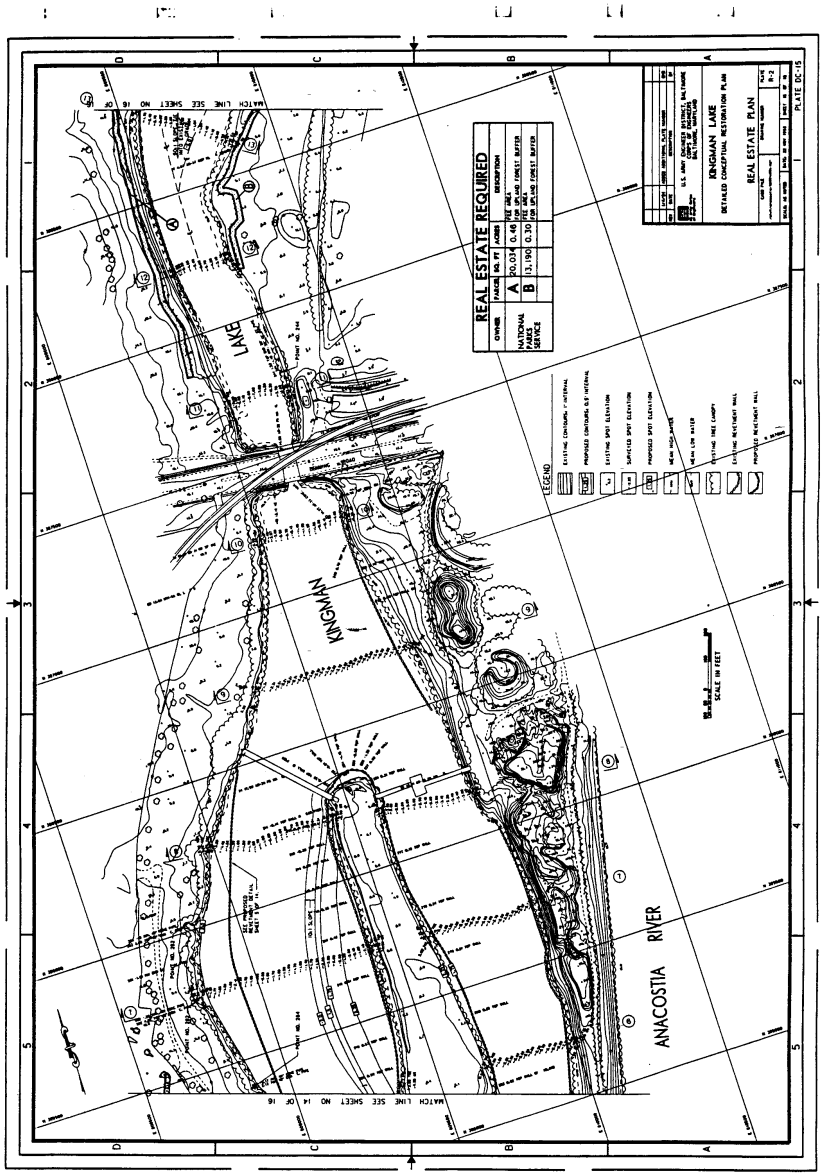
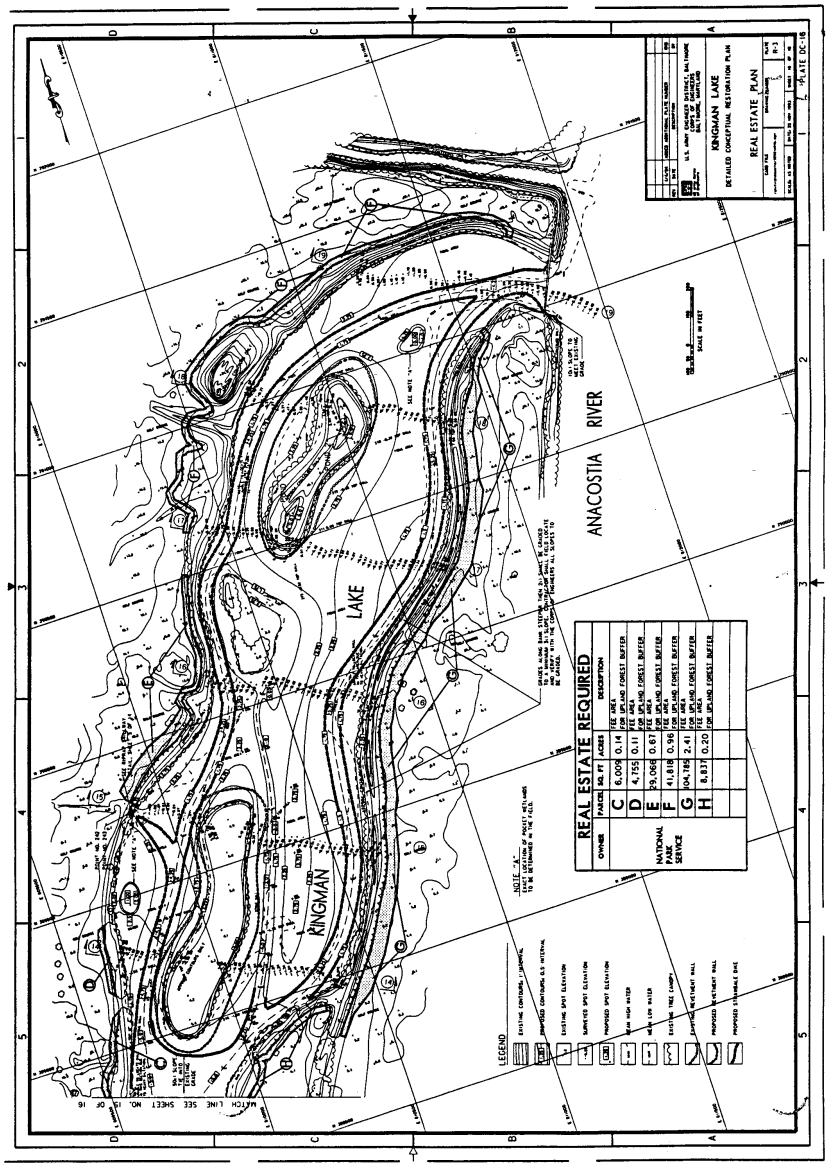
ENVIRONMENTAL ENHANCEMENT
DETAILED DESIGN PLAN
CROSS SECTIONS
PLATE DC-13


KINGMAN LAKE
DETAILED CONCEPTUAL RESTORATION PLAN
REAL ESTATE PLAN
LEGEND
MATCH LINE SEE SHEET NO. 15 OF 16
KINGMAN LAKE
ANACOSTIA RIVER
SCALE IN FEET
PLATE DC-14


REAL ESTATE REQUIRED
OWNER
PARCEL NO. ET
AGRES
DESCRIPTION
NATIONAL PARKS SERVICE
A
20.03
0.46
FEE AND FOREST BUFFER
B
13.190
0.30
FEE AND FOREST BUFFER
KINGMAN LAKE
DETAILED CONCEPTUAL RESTORATION PLAN
REAL ESTATE PLAN
PLATE DC-15
LEGEND
KINGMAN LAKE
ANACOSTIA RIVER
MATCH LINE SEE SHEET NO 16 OF
MATCH LINE SEE SHEET NO 14 OF 16


KINGMAN LAKE
DETAILED CONCEPTUAL RESTORATION PLAN
REAL ESTATE PLAN
ANACOSTIA RIVER
KINGMAN LAKE
REAL ESTATE REQUIRED
OWNER
PARCEL
SQ. FT
ACRES
DESCRIPTION
NATIONAL PARK SERVICE
C
6,009
0.14
FEE AREA FOR UPLAND FOREST BUFFER
D
4,755
0.11
FEE AREA FOR UPLAND FOREST BUFFER
E
29,068
0.67
FEE AREA FOR UPLAND FOREST BUFFER
F
41,818
0.96
FEE AREA FOR UPLAND FOREST BUFFER
G
104,785
2.41
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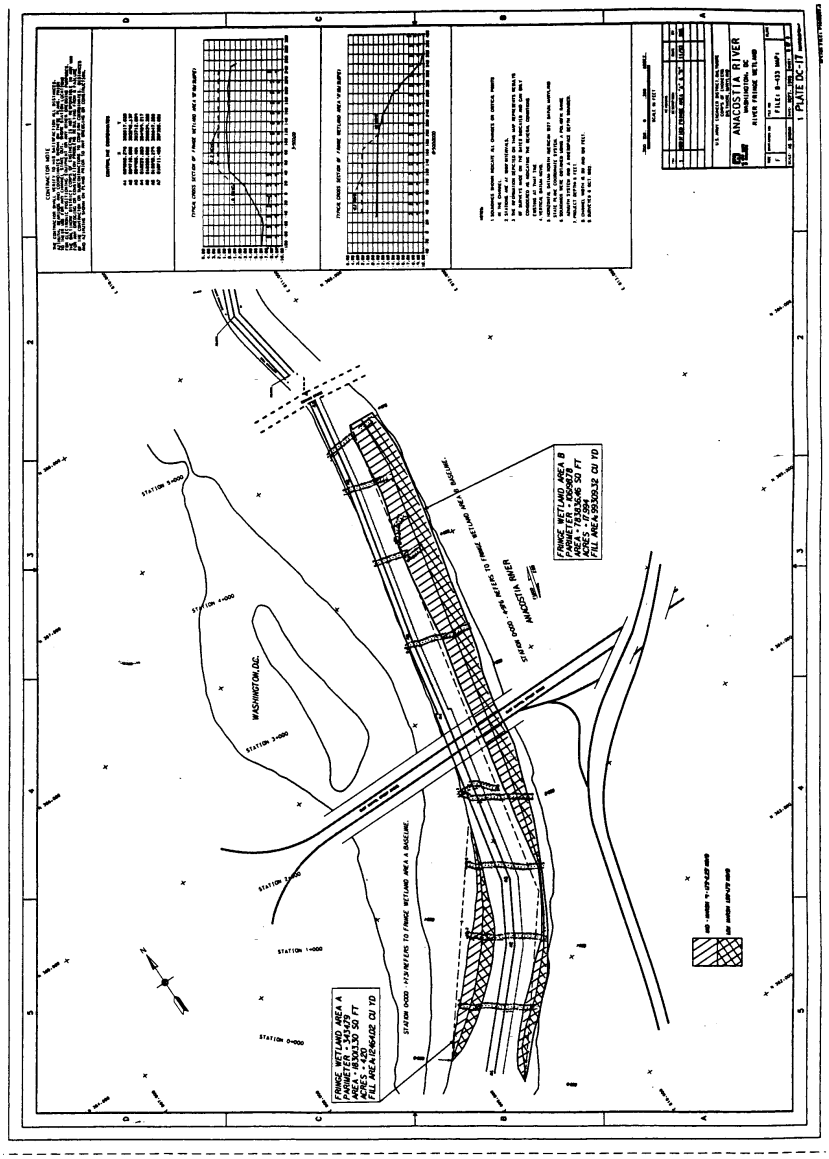
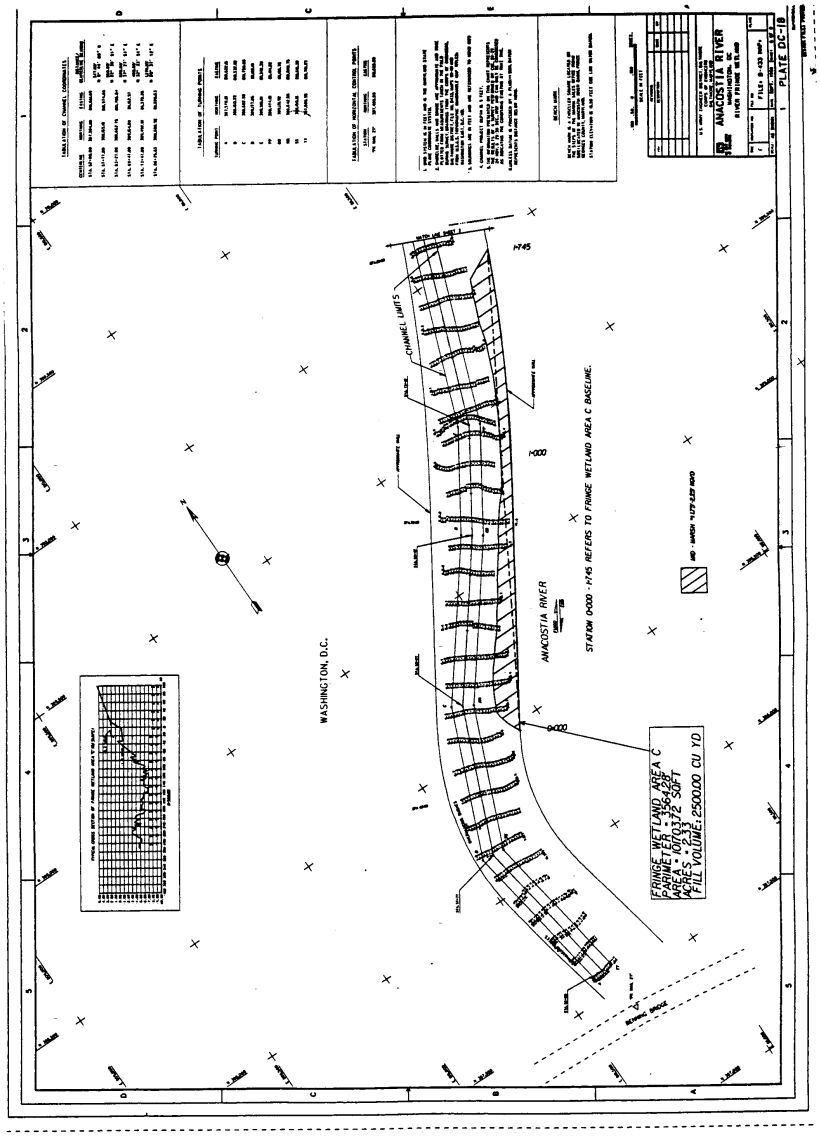
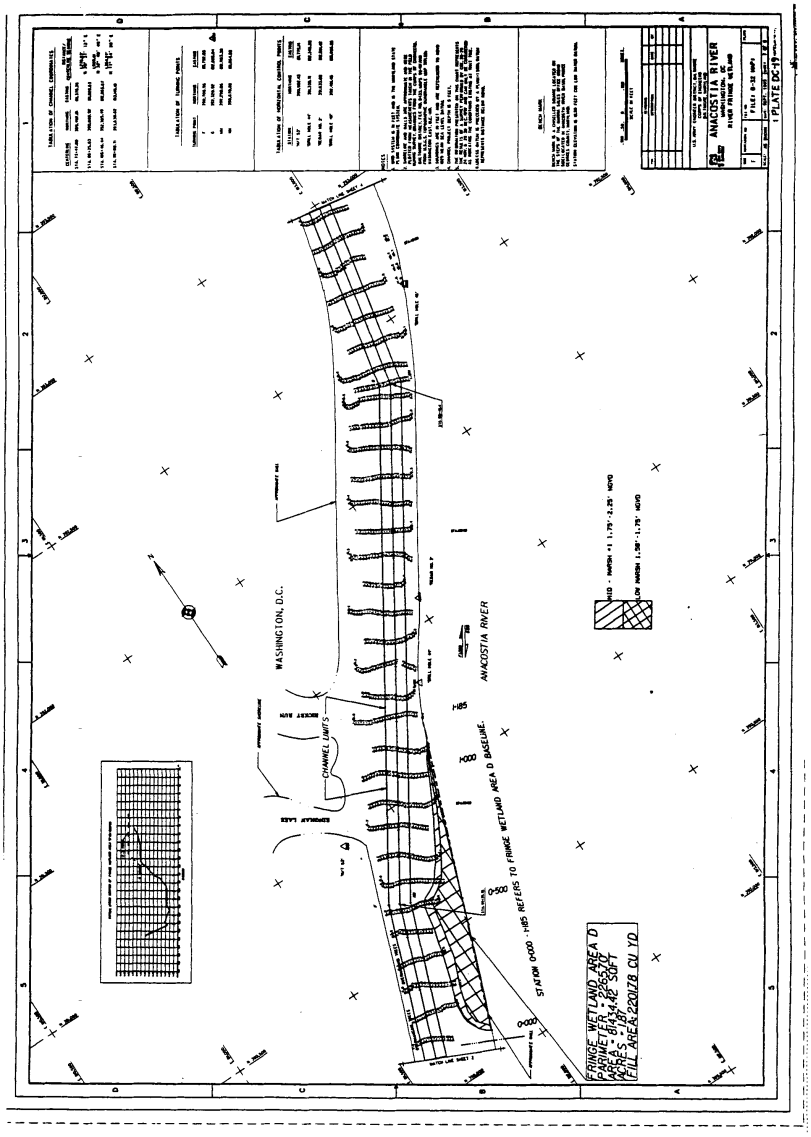
H
8,837
0.20
FEE AREA FOR UPLAND FOREST BUFFER
LEGEND
SCALE IN FEET


ANACOSTIA RIVER
WASHINGTON, DC
MONUMENTAL AVENUE
STATION 0+000
STATION 1+000
STATION 2+000
STATION 3+000
STATION 4+000
STATION 5+000
FRINGE WETLAND AREA A
PERIMETER = 5,510 FT
AREA = 1,330,307 SF
ACRES = 43.0
FILL AREA 42,564.02 CU YD
FRINGE WETLAND AREA B
PERIMETER = 3,000 FT
AREA = 719,536.46 SQ FT
ACRES = 16.594
FILL AREA 23,030.32 CU YD
1 PLATE DC-17


ANACOSTIA RIVER
PLATE DC-18
WASHINGTON, D.C.
ANACOSTIA RIVER
CHANNEL LIMITS
STATION 0000 +745 REFERS TO FRINGE WETLAND AREA C BASELINE
FRINGE WETLAND AREA C
PERIMETER = 36428'
AREA = 207372 SQFT
4.76 ACRES
FILL VOLUME: 2500.00 CU YD


ANACOSTIA RIVER
WASHINGTON, D.C.
CHANNEL LIMITS
ANACOSTIA RIVER
STATION 0+00 - HIS REFERS TO FRINGE WETLAND AREA D BASELINE
FRINGE WETLAND AREA D
PARIMETER - 2265 LF
AREA - 81,434.42 SQFT
FILL AREA 2201.78 CU YD
PLATE DC-19

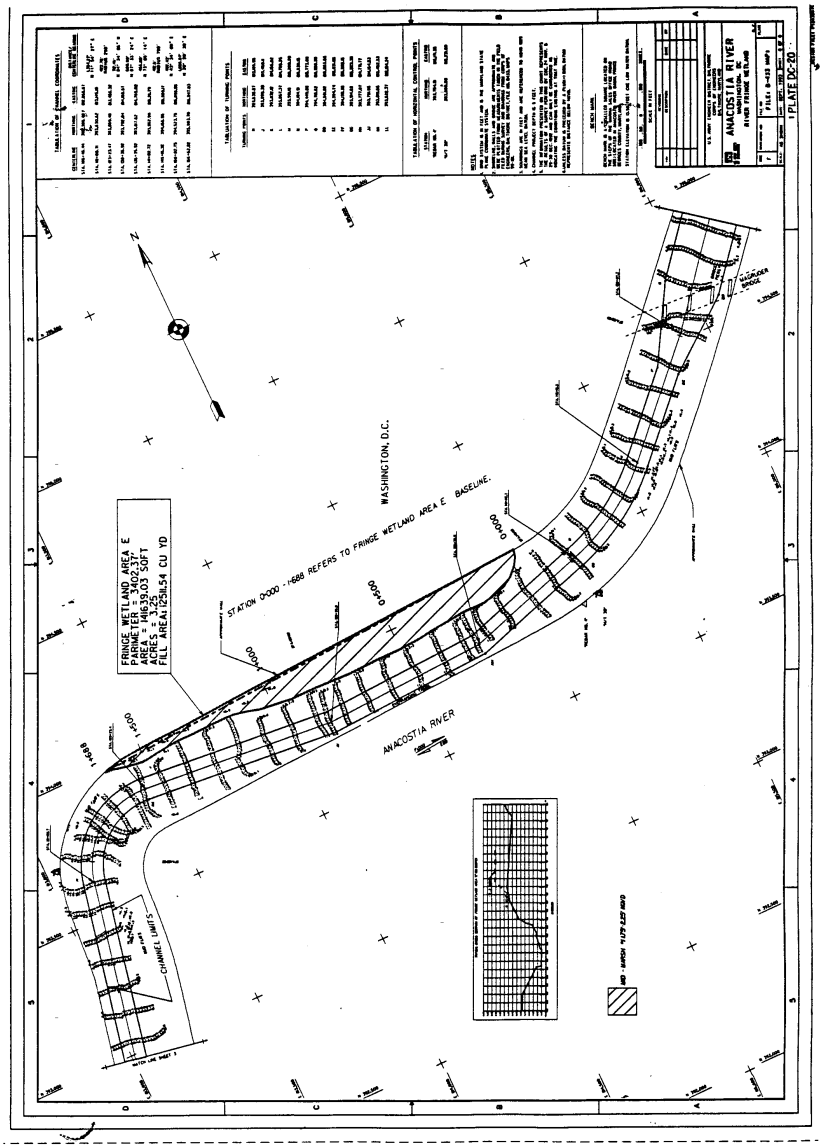
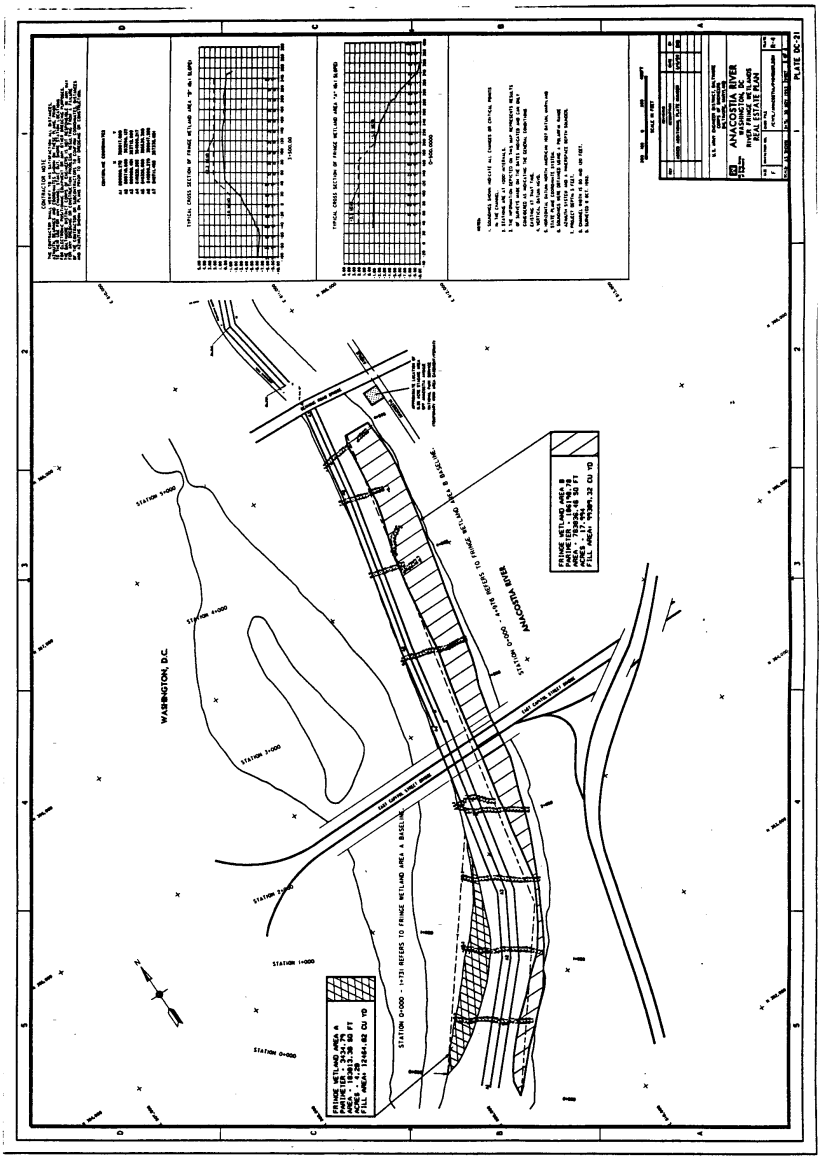
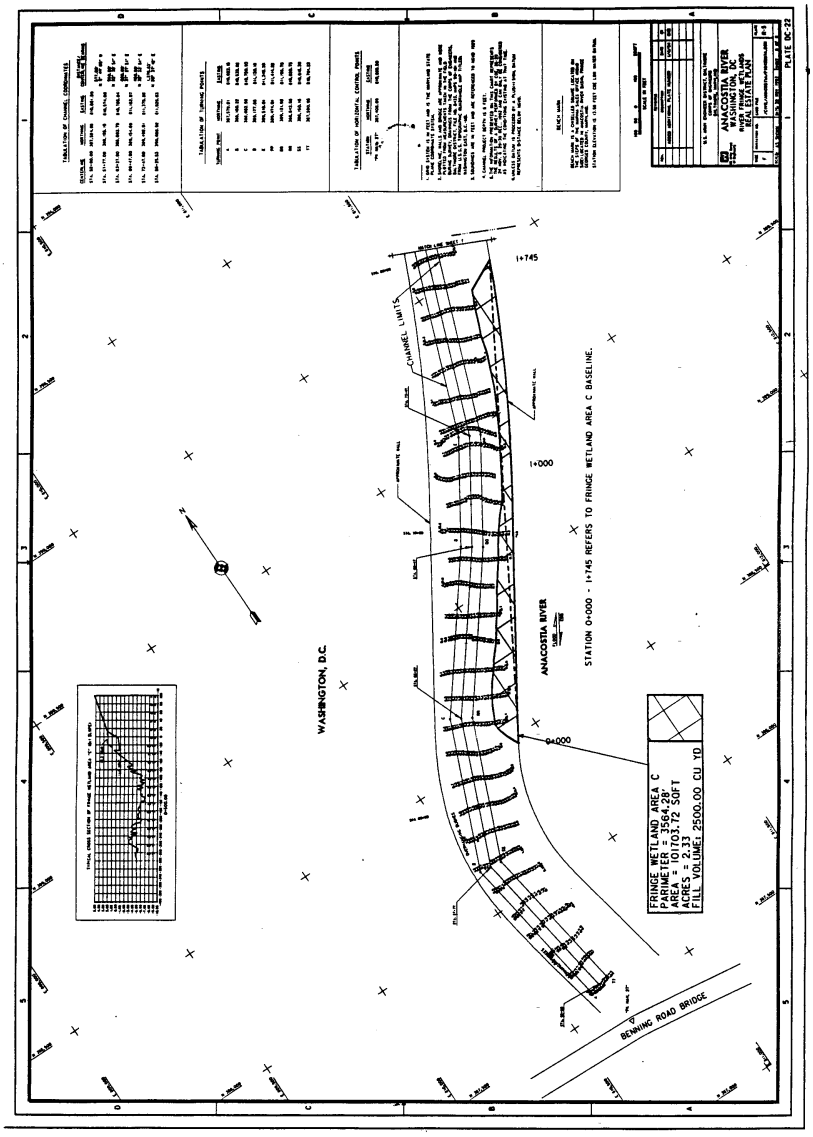
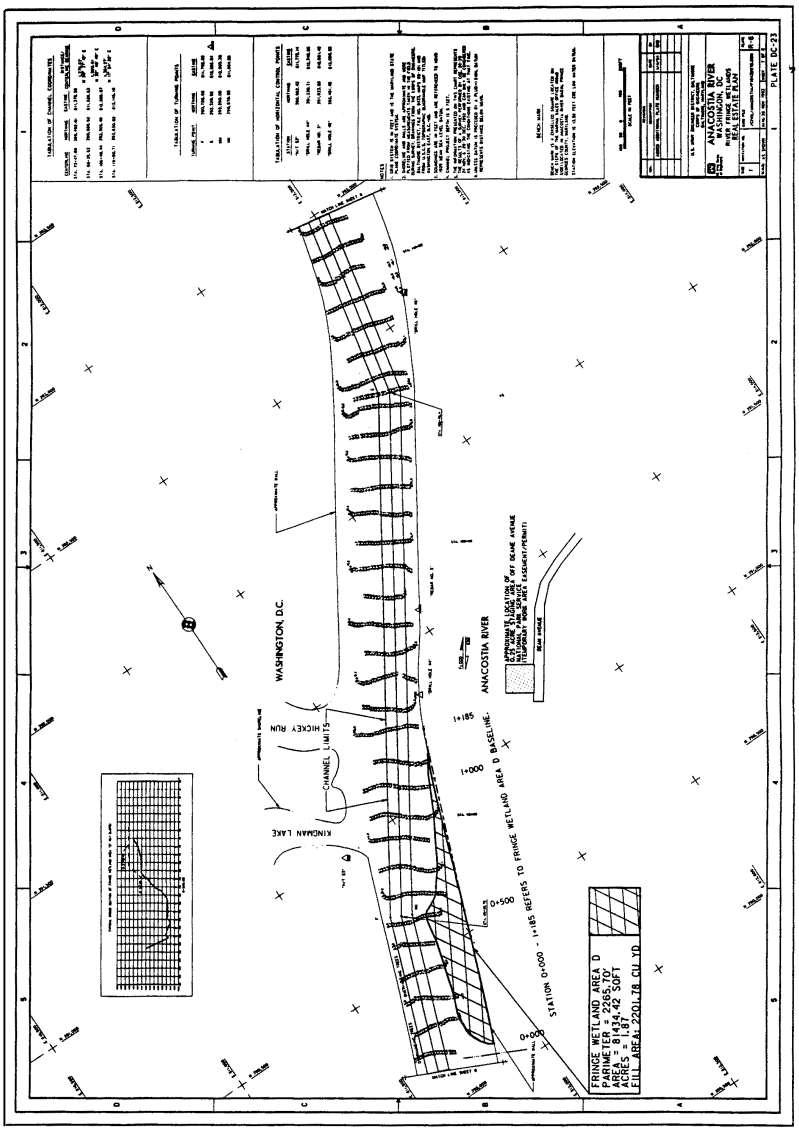
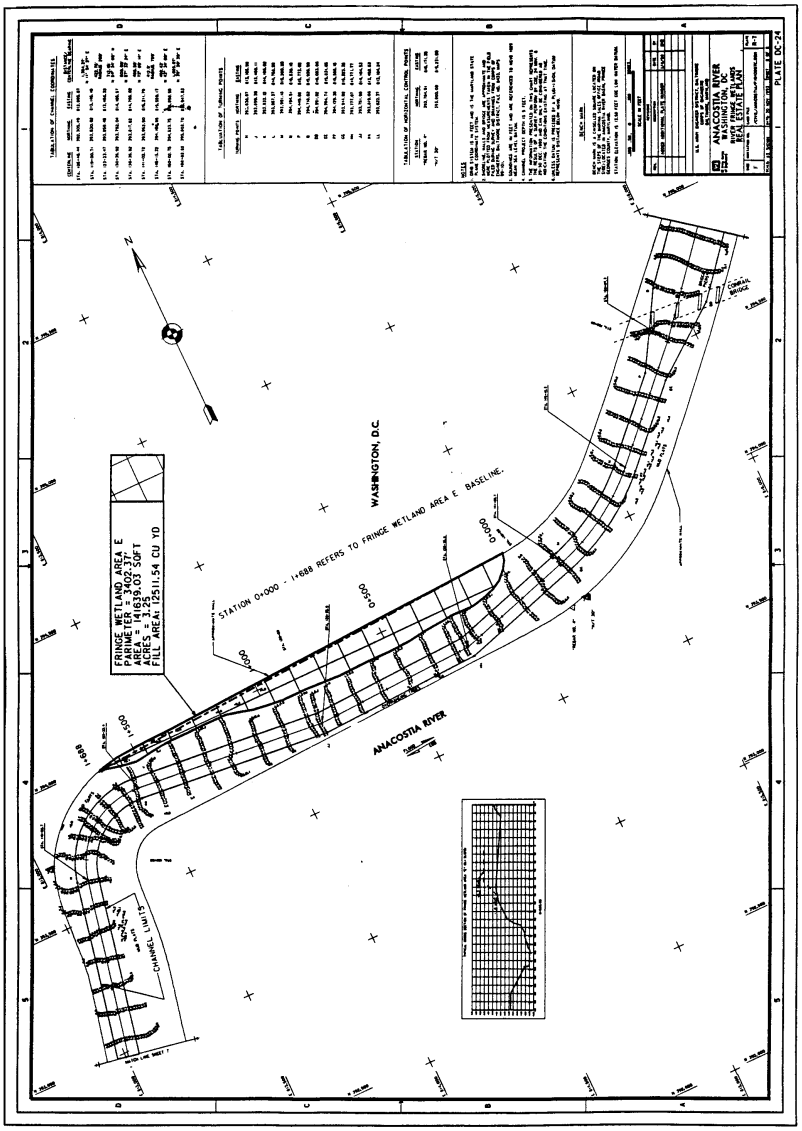


PLATE DC-20
ANACOSTIA RIVER
RIVER FRINGE WETLAND
WASHINGTON, DC
WASHINGTON, D.C.
ANACOSTIA RIVER
FRINGE WETLAND AREA E
PARIMETER = 3402.37'
AREA = 146,139.03 SQFT
AREA = 5.41 ACRES
FILL AREA:1251.54 CU YD
STATION 0+00 - 14+88 REFERS TO FRINGE WETLAND AREA E BASELINE
CHANNEL LIMITS
SOUTHERN BRIDGE


WASHINGTON, D.C.
ANACOSTIA RIVER
STATION 0+000 - 14+73 REFERS TO FRINGE WETLAND AREA A BASELINE
STATION 0+000 - 14+73 REFERS TO FRINGE WETLAND AREA B BASELINE
STATION 0+000
STATION 1+000
STATION 2+000
STATION 3+000
STATION 4+000
PLATE 6C-21


ANACOSTIA RIVER
WASHINGTON, D.C.
CHANNEL LIMITS
1+745
1+000
0+000
STATION 0+000 - 1+745 REFERS TO FRINGE WETLAND AREA C BASELINE.
FRINGE WETLAND AREA C
PERIMETER = 3562.20'
AREA = 101703.72 SQFT
ACRES = 2.33
FILL VOLUME 2500.00 CU YD
BENNING ROAD BRIDGE
PLATE DC-22


ANACOSTIA RIVER
WASHINGTON, DC
REAL ESTATE PLAN
WASHINGTON, D.C.
ANACOSTIA RIVER
HICKEY RUN
CHANNEL LIMITS
KINGMAN LAKE
1+185
1+000
0+500
0+000
STATION 0+000 - 1+185 REFERS TO FRINGE WETLAND AREA D BASELINE
FRINGE WETLAND AREA D
PERIMETER = 2,057 FT
AREA = 81,434.2 SQFT
ACRES = 1.87
FILL AREA: 2201.78 CU YD
PLATE DC-23


ANACOSTIA RIVER
WASHINGTON, D.C.
REAL ESTATE PLAN
PLATE DC-24
FRINGE WETLAND AREA E
PARIMETER = 3402.37'
AREA = 141639.03 SQFT
ACRES = 3.25
FILL AREA: 12511.54 CU YD
STATION 0+000 - 14688 REFERS TO FRINGE WETLAND AREA E BASELINE.
CHANNEL LIMITS
ANACOSTIA RIVER
WASHINGTON, D.C.

Anacostia River Restoration
Washington, D.C.
CENAB-PP-C Capability Schedule 13 July 1994

Task Name	Start Date	Duration	End Date
Start PED	3-Jun-95	0.0	3-Jun-95
E1 Milestone Meeting	17-Jun-95	0.0	17-Jun-95
Value Engineering Study	3-Jun-95	40.0 d	1-Mar-95
Tidal Study	1-Mar-95	8.0 m	11-Dec-95
Tide Gage Data Collection	1-Mar-95	6.0 m	5-Sep-95
Hydraulic Model	5-Sep-95	3.0 m	11-Dec-95
Channel Barings/Analysis	3-Jun-95	4.0 m	9-May-95
Mapping	3-Jun-95	140.0 d	21-Jul-95
Aerial Photography	3-Jun-95	80.0 d	29-Mar-95
Surveying/Mapping	27-Apr-95	60.0 d	21-Jul-95
Kenilworth Marsh As-Built	27-Apr-95	65.0 d	21-Jul-95
HTRW Investigation	15-Feb-95	65.0 d	9-Jun-95
Kingman Lake PM&	6-Sep-95	304.0 d	30-Nov-96
Operations Design	6-Sep-95	7.0 m	17-Apr-96
Environmental Design	18-Oct-95	5.0 m	29-Mar-96
H&H Design	13-Dec-95	65.0 d	9-Mar-96
Civil Design	13-Dec-95	45.0 d	15-Feb-96
Geotechnical Design	13-Dec-95	30.0 d	26-Jan-96
Modify PM&	14-Jun-96	30.0 d	26-Jul-96
Finalize PM&	6-Oct-96	30.0 d	30-Nov-96
Fringe Wetlands PM&	6-Sep-95	304.0 d	30-Nov-96
Operations Design	6-Sep-95	7.0 m	17-Apr-96
Environmental Design	18-Oct-95	5.0 m	29-Mar-96
Civil Design	13-Dec-95	45.0 d	15-Feb-96
H&H Design	13-Dec-95	45.0 d	15-Feb-96
Modify PM&	14-Jun-96	30.0 d	26-Jul-96
Finalize PM&	6-Oct-96	30.0 d	30-Nov-96
Develop Monitoring Plan	29-Jul-96	60.0 d	23-Oct-96
Cost Estimates	29-Jul-96	200.0 d	14-May-97
Initial Estimate	29-Jul-96	30.0 d	23-Aug-96
Final Estimate	21-Nov-96	30.0 d	19-Dec-96
Government Estimate	17-Apr-97	20.0 d	14-May-97
PM& Review/Approval	16-Apr-96	160.0 d	30-Nov-96
Sponsor Review	16-Apr-96	30.0 d	29-May-96
Environmental Review	31-May-96	10.0 d	13-Jun-96
CENAD Review (E10)	26-Aug-96	30.0 d	7-Oct-96
CENAD PM& Approval (E11)	21-Nov-96	0.0	21-Nov-96
BCO Review	16-Apr-96	170.0 d	19-Dec-96
First Review	16-Apr-96	20.0 d	16-May-96
Final Review	26-Jul-96	20.0 d	23-Aug-96
Backcheck Review	21-Nov-96	20.0 d	19-Dec-96
BCO Certification	20-Dec-96	0.0	20-Dec-96
Environmental Activities	29-Jul-96	65.0 d	27-Nov-96
Environmental Documentation	29-Jul-96	25.0 d	30-Aug-96
Public Review	3-Sep-96	30.0 d	15-Oct-96
Issue Final Documentation	16-Oct-96	30.0 d	27-Nov-96
Public Meetings	26-Jul-96	20.0 d	23-Aug-96
Real Estate Activities	3-Jun-96	575.0 d	16-Apr-97
Rights of Entry	3-Jun-96	30.0 d	14-Feb-96
R/E Studies	29-Jul-96	40.0 d	23-Sep-96
R/E Acquisition	20-Mar-97	20.0 d	16-Apr-97
Permit Applications	21-Nov-96	6.0 m	3-Jun-97
Limited Reevaluation Report	5-Feb-97	30.0 d	19-Mar-97
Memorandum of Agreement	29-Jul-96	160.0 d	19-Mar-97
MOA Negotiations	29-Jul-96	40.0 d	23-Sep-96
HQ Review/Approval	20-Dec-96	60.0 d	19-Mar-97
MOA Signing	20-Mar-97	0.0	20-Mar-97
Dredge Surveys	20-Mar-97	307.0 d	8-Jun-98
Contract Survey	20-Mar-97	30.0 d	18-Apr-97
BID Survey	21-Jul-97	30.0 d	29-Aug-97
AD Survey	11-May-98	20.0 d	8-Jun-98
Construction	17-Apr-97	24.2 m	1-Jun-99
Advertising	17-Apr-97	40.0 d	13-Jun-97
Evaluate RFP	13-Jun-97	45.0 d	15-Aug-97
Construction Award	15-Aug-97	0.0	15-Aug-97
Owner Connect	15-Aug-97	20.4 m	1-Jun-99
Contractor Submittals	15-Aug-97	40.0 d	14-Oct-97
Dredging Window	3-Sep-97	0.0	3-Sep-97
Dredging/Placement	15-Oct-97	6.0 m	24-Apr-98
Wetland Planting	3-Mar-99	3.0 m	4-Aug-99
Construction of Plants	1-Mar-99	0.0	1-Mar-99
Warranty Replanting	1-Mar-99	3.0 m	1-Jun-99
Owner Management	15-Aug-97	20.0 m	15-May-99
Dredging Technical Report	8-Jun-98	60.0 d	1-Sep-98
Engr during Construction	15-Oct-97	11.0 m	30-Sep-98
Life Cycle Project Management	3-Jun-95	60.0 m	15-May-99
Engineering Management	3-Jun-95	30.0 m	15-Aug-97
Planning Management	3-Jun-95	30.0 m	15-Aug-97
O&M Manual	3-Mar-99	45.0 d	3-May-99
Project Turnover	3-Jun-99	0.0	3-Jun-99
Project Monitoring	3-Jun-99	60.0 m	1-Sep-04

PLATE DC-25

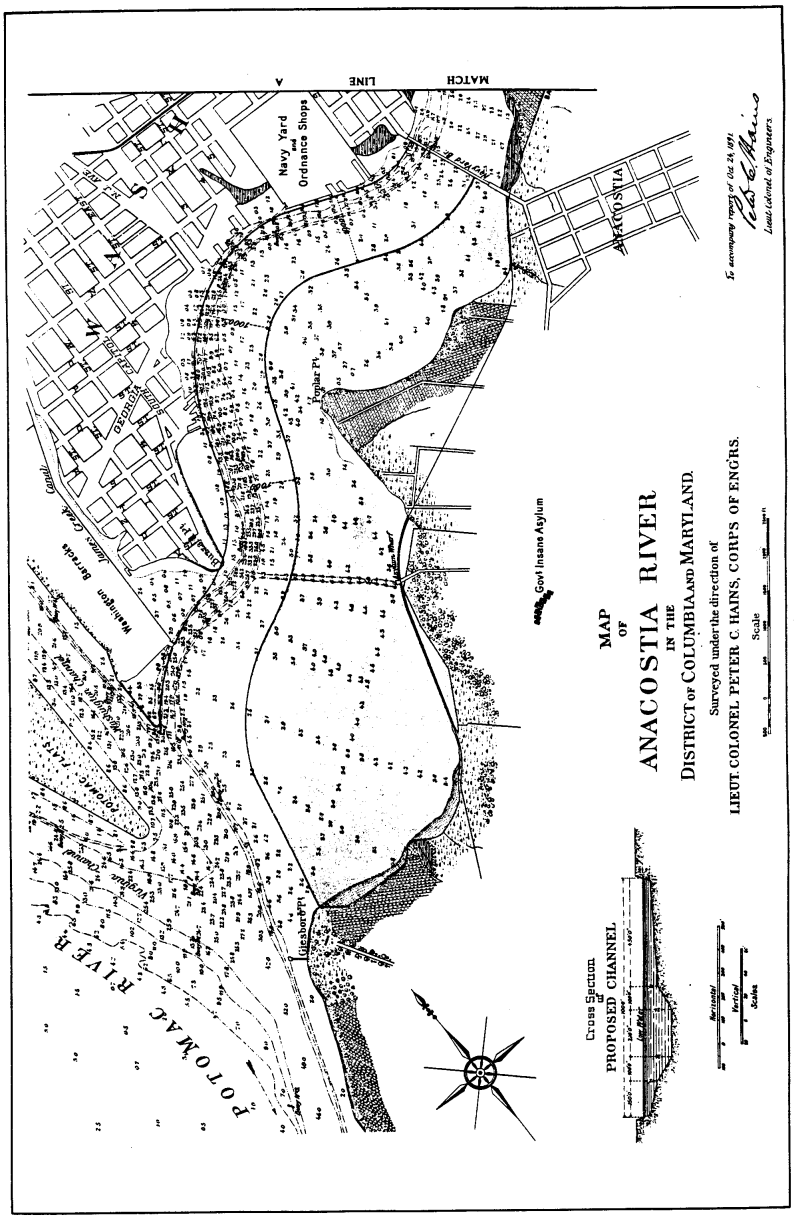
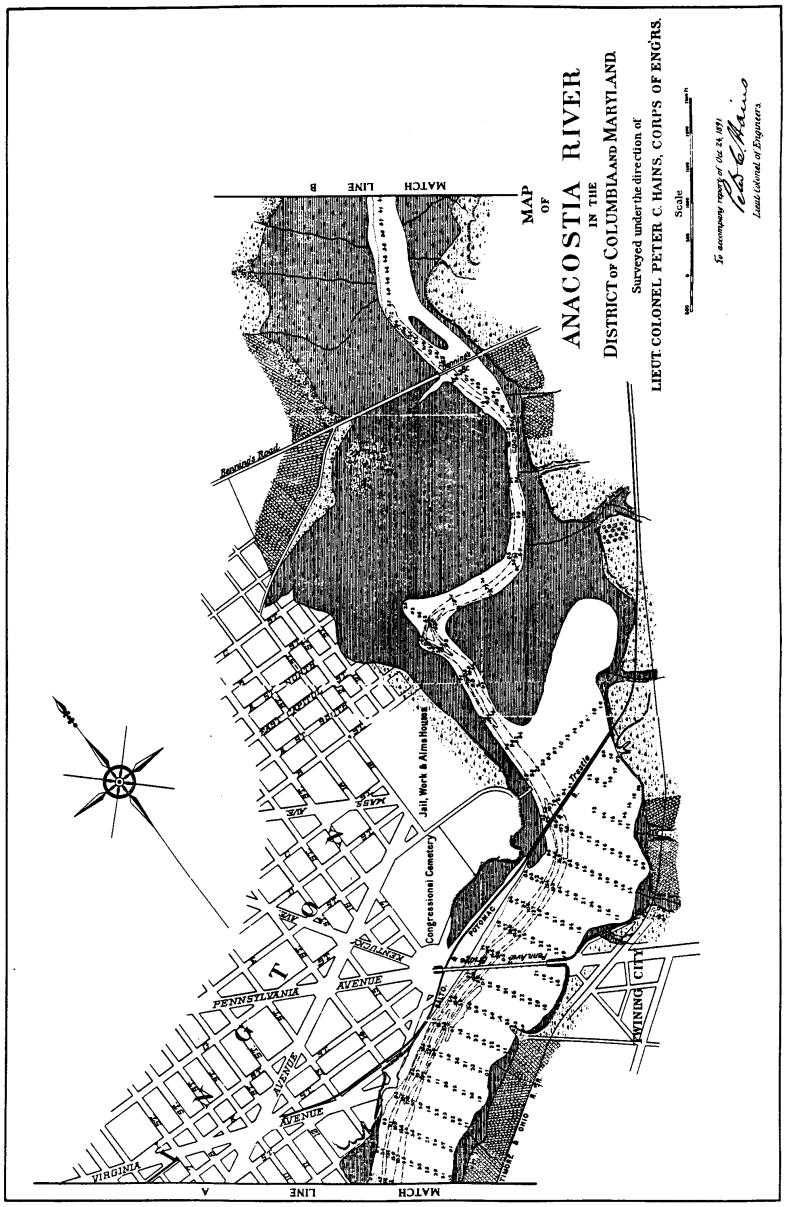

MAP
OF
ANACOSTIA RIVER
IN THE
DISTRICT OF COLUMBIA AND MARYLAND.
Surveyed under the direction of
LIEUT. COLONEL PETER C. HAINS, CORPS OF ENG'RS.
Scale
Cross Section
of the
PROPOSED CHANNEL.
Horizontal
Vertical
Scales
To accompany report of Dec 28, 1871
Lieut-Colonel of Engineers
MATCH LINE A
Navy Yard
Ordnance Shops
ANACOSTIA
Govt Insane Asylum
Poplar Pt.
Uniontown
Washington Barracks
James Creek Canal
POTOMAC RIVER
Georgetown Flats

PLATE DC-26A


MAP
OF
ANACOSTIA RIVER
IN THE
DISTRICT OF COLUMBIA AND MARYLAND
Surveyed under the direction of
LIEUT. COLONEL PETER C. HAINS, CORPS OF ENGRS.
Scale
To accompany report of Oct 24 1891
Lieut. Colonel of Engineers
PLATE DC-26B
MATCH LINE B
MATCH LINE A
Bennings Road
Jail, Work & Alms Houses
Congressional Cemetery
Navy Yard
Branch
Potomac
Eastern
Virginia
Pennsylvania
Avenue
Avenue
Avenue
Virginia
Avenue
Maine
Avenue
Maine
Avenue
Virginia
Avenue
Penn.
Ave.
Bennings
City

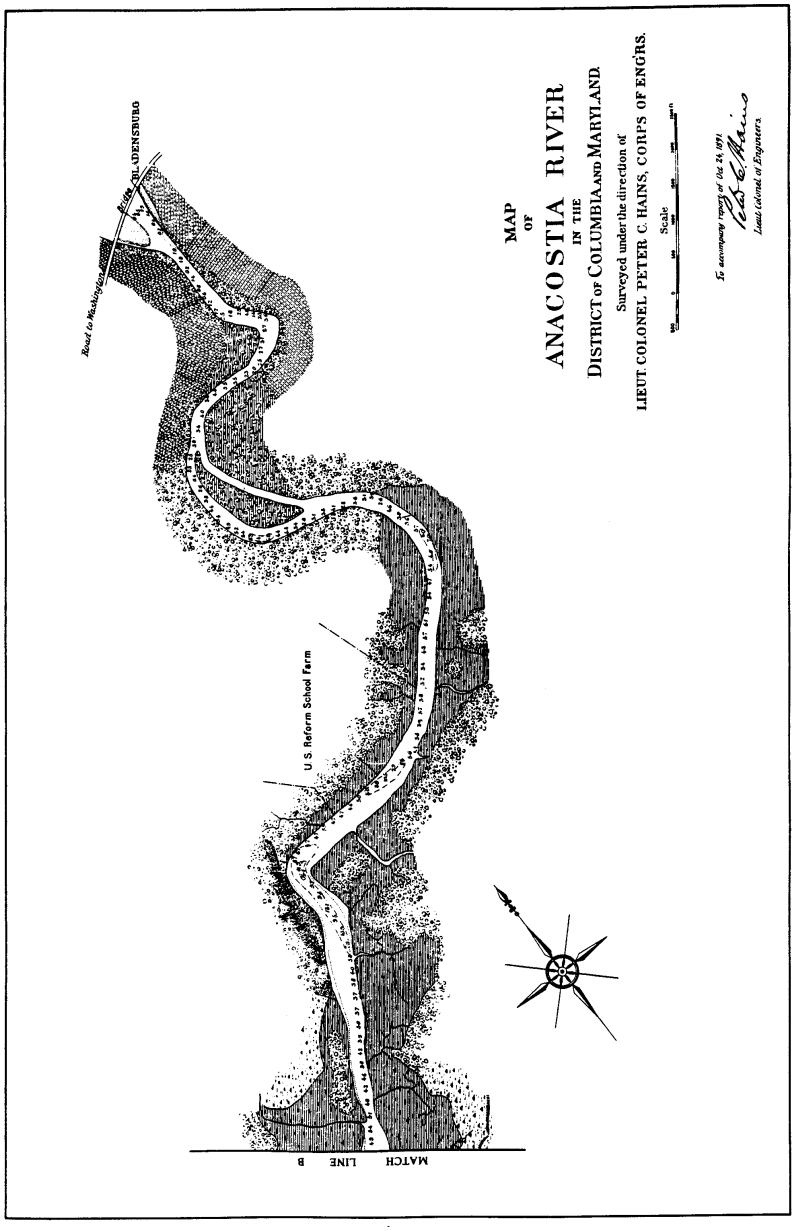

MAP
OF
ANACOSTIA RIVER
IN THE
DISTRICT OF COLUMBIA AND MARYLAND
Surveyed under the direction of
LIEUT. COLONEL PETER C. HAINS, CORPS OF ENG'RS.
Scale
To accompany report of Oct 24, 1891
Lieut Colonel of Engineers
Road to Washington
Road to BLADENSBURG
U S Reform School Farm
MATCH LINE B

PLATE DC-26C

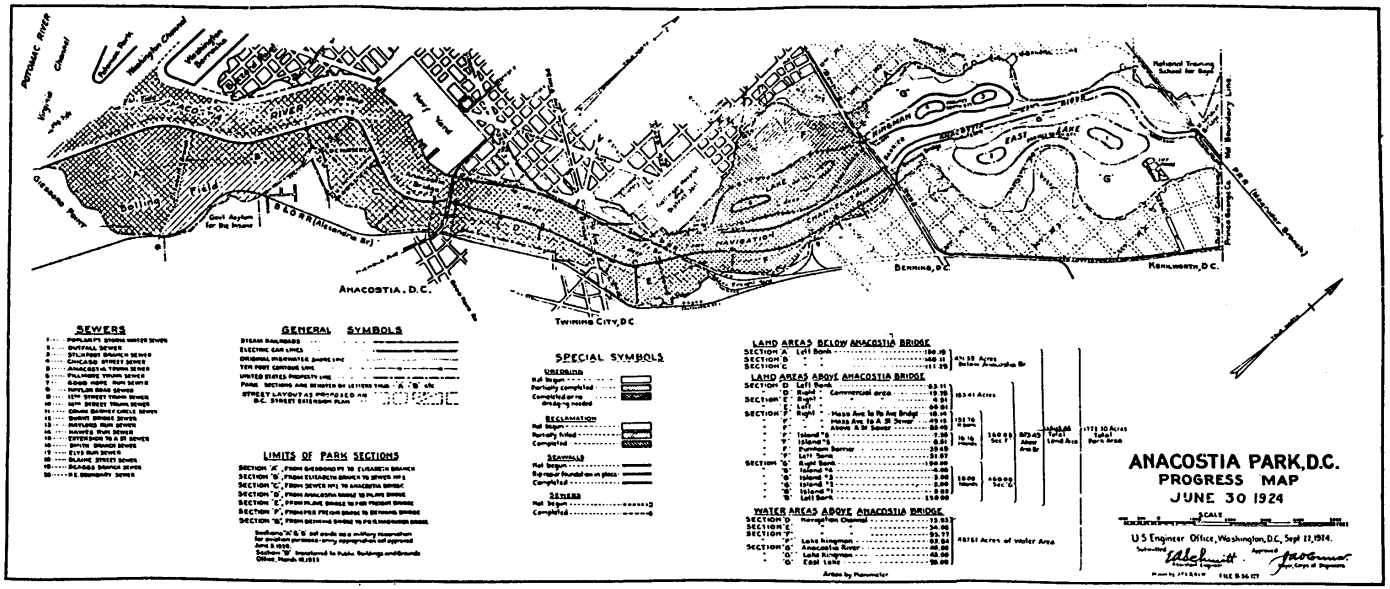
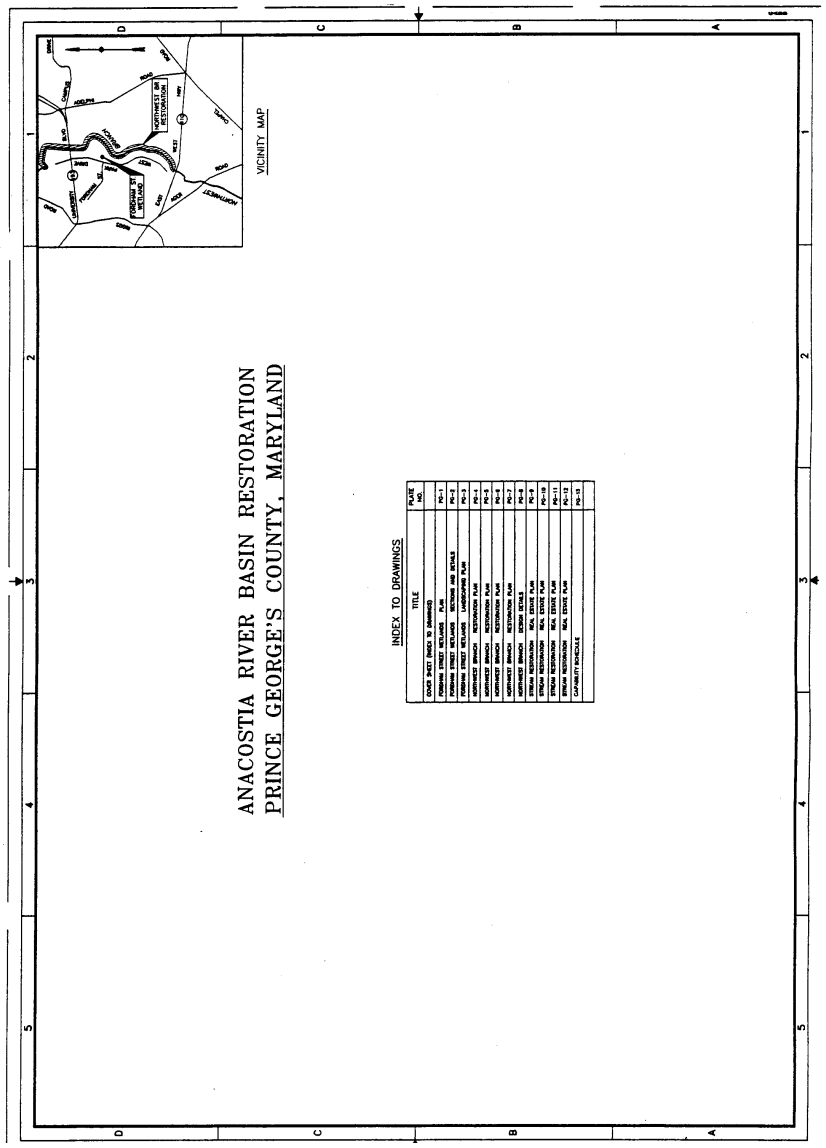
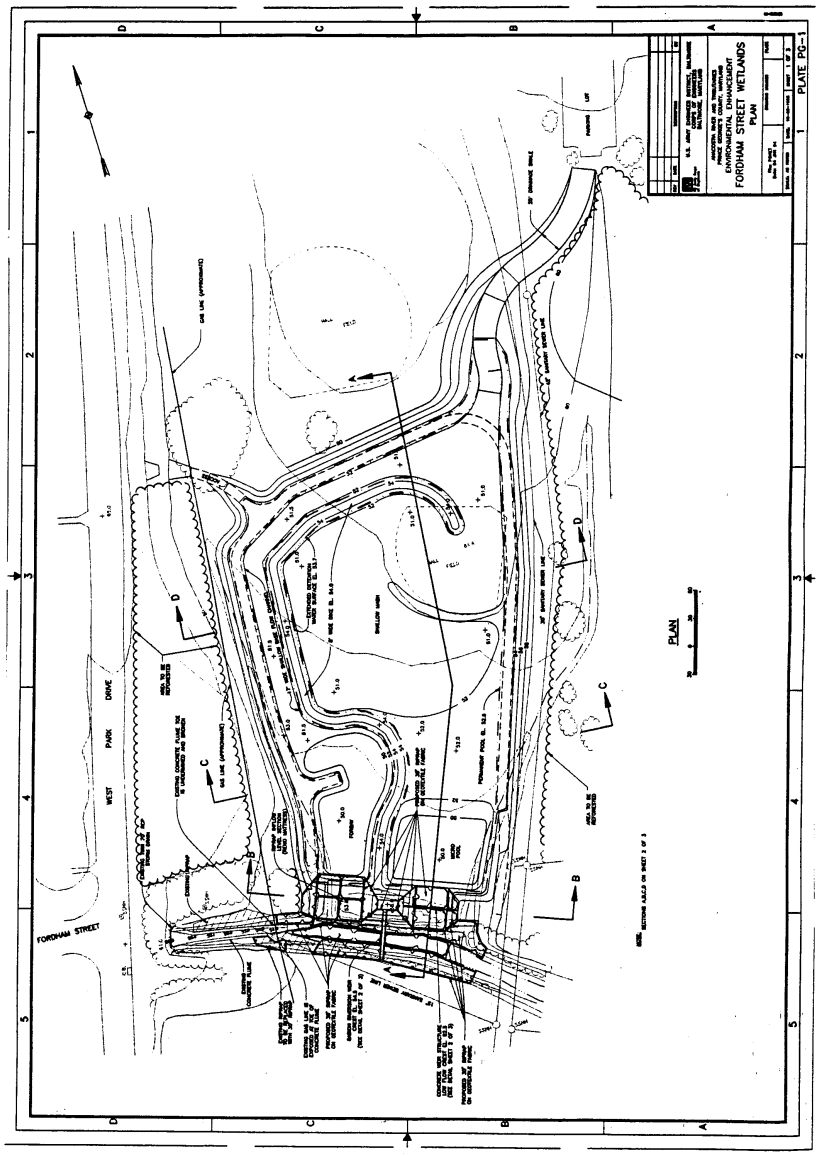
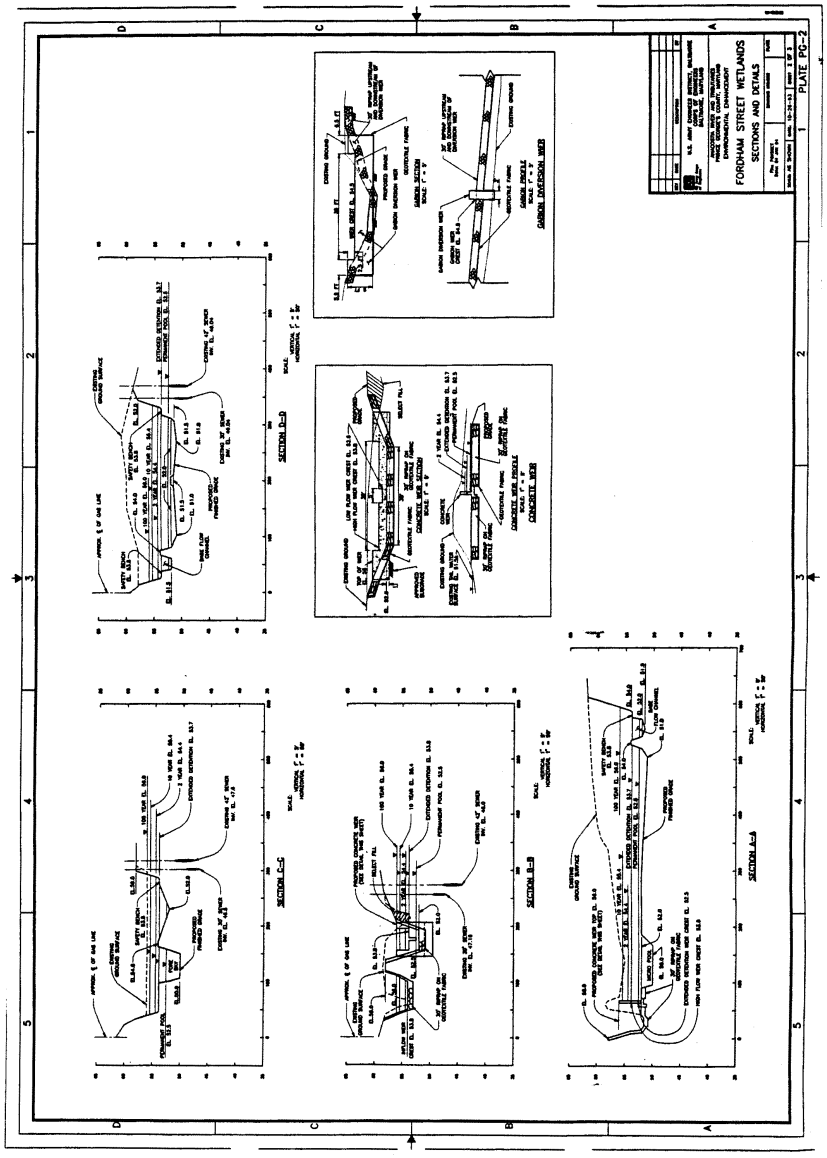
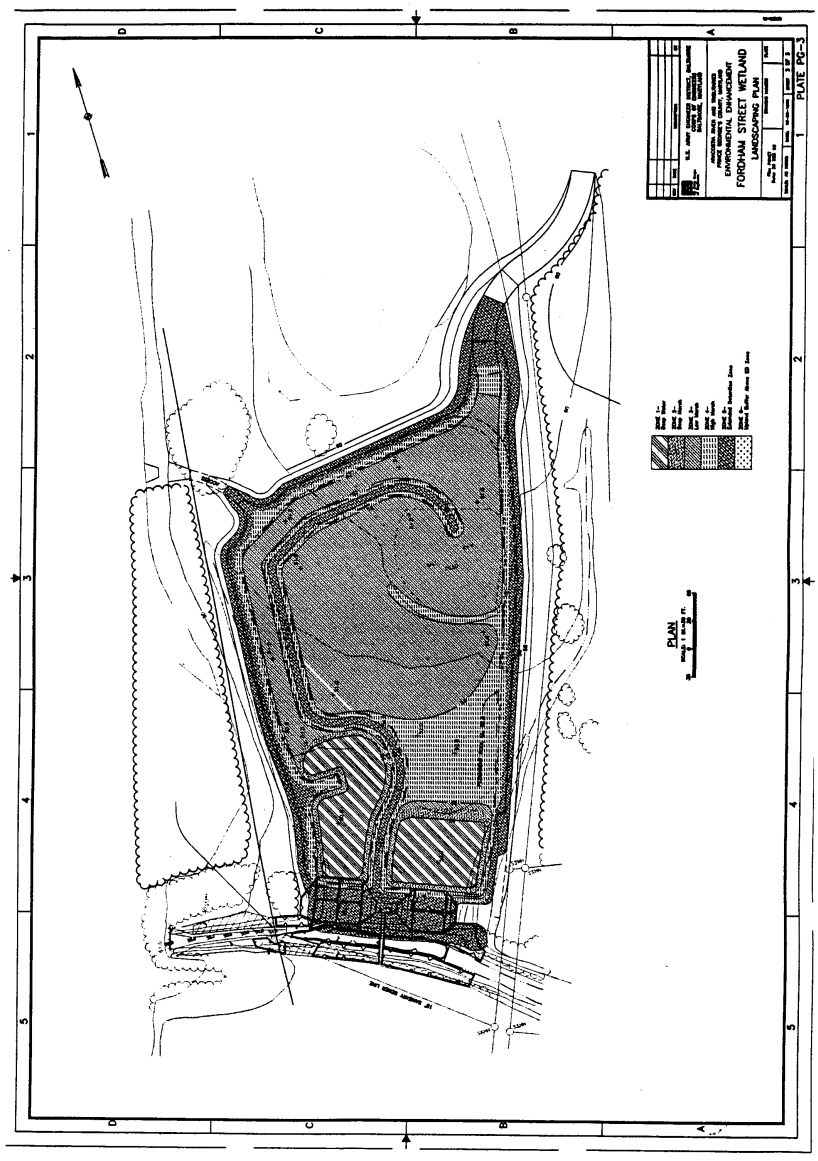

ANACOSTIA PARK, D.C.
PROGRESS MAP
JUNE 30 1924
ANACOSTIA, D.C.
BENNING, D.C.
KENILWORTH, D.C.
TWINING CITY, D.C
SEWERS
GENERAL SYMBOLS
SPECIAL SYMBOLS
LIMITS OF PARK SECTIONS
LAND AREAS BELOW ANACOSTIA BRIDGE
LAND AREAS ABOVE ANACOSTIA BRIDGE
WATER AREAS ABOVE ANACOSTIA BRIDGE
SCALE
U S Engineer Office, Washington, D.C., Sept 17, 1924.

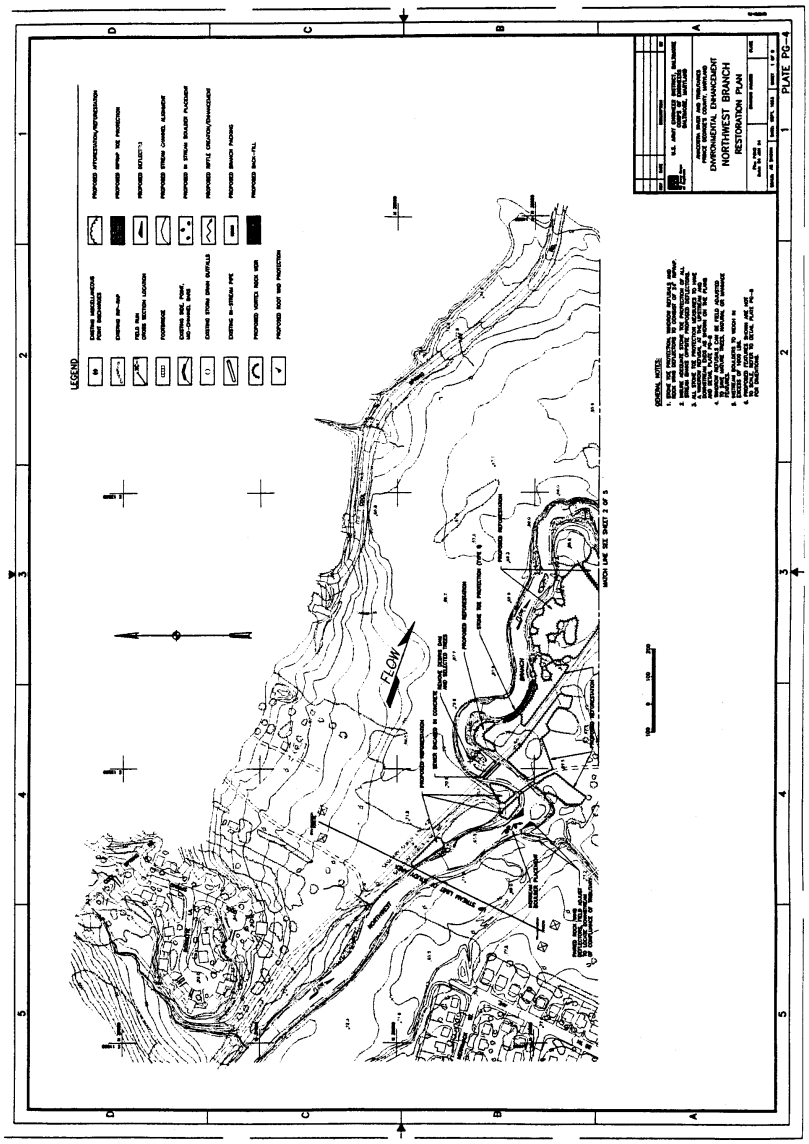
PLATE DC–27

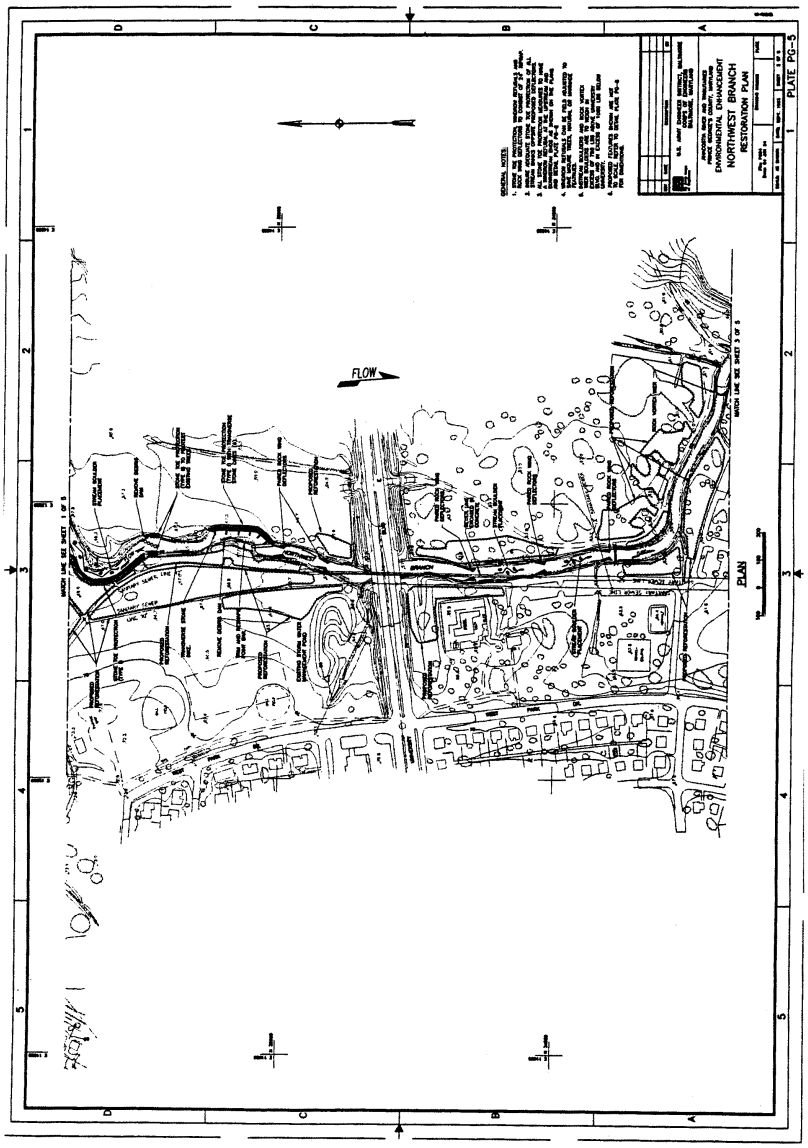

ANACOSTIA RIVER BASIN RESTORATION
PRINCE GEORGE'S COUNTY, MARYLAND
VICINITY MAP
INDEX TO DRAWINGS
TITLE
PLATE NO.
COVER SHEET (INDEX TO DRAWINGS)
PG-1
FORBURN STREET WETLANDS PLAN
PG-2
FORBURN STREET WETLANDS SECTIONS AND DETAILS
PG-3
FORBURN STREET WETLANDS PLANTING PLAN
PG-4
NORTHWEST BRANCH RESTORATION PLAN
PG-5
NORTHWEST BRANCH RESTORATION PLAN
PG-6
NORTHWEST BRANCH RESTORATION PLAN
PG-7
NORTHWEST BRANCH RESTORATION PLAN
PG-8
STREAM RESTORATION REAL ESTATE PLAN
PG-9
STREAM RESTORATION REAL ESTATE PLAN
PG-10
STREAM RESTORATION REAL ESTATE PLAN
PG-11
STREAM RESTORATION REAL ESTATE PLAN
PG-12
CAPACITY CHECKLIST
PG-13


FORDHAM STREET
WEST PARK DRIVE
PLAN
ENVIRONMENTAL ENHANCEMENT
FORDHAM STREET WETLANDS
PLAN
PLATE PG-1


FORDHAM STREET WETLANDS
SECTIONS AND DETAILS
PLATE PG-2


FORDHAM STREET WETLAND
LANDSCAPING PLAN
PLATE PG-3
PLAN


LEGEND
FLOW
ENVIRONMENTAL ENHANCEMENT
NORTHWEST BRANCH
RESTORATION PLAN
PLATE PG-4


FLOW
PLAN
NORTHWEST BRANCH
RESTORATION PLAN
PLATE PG-5

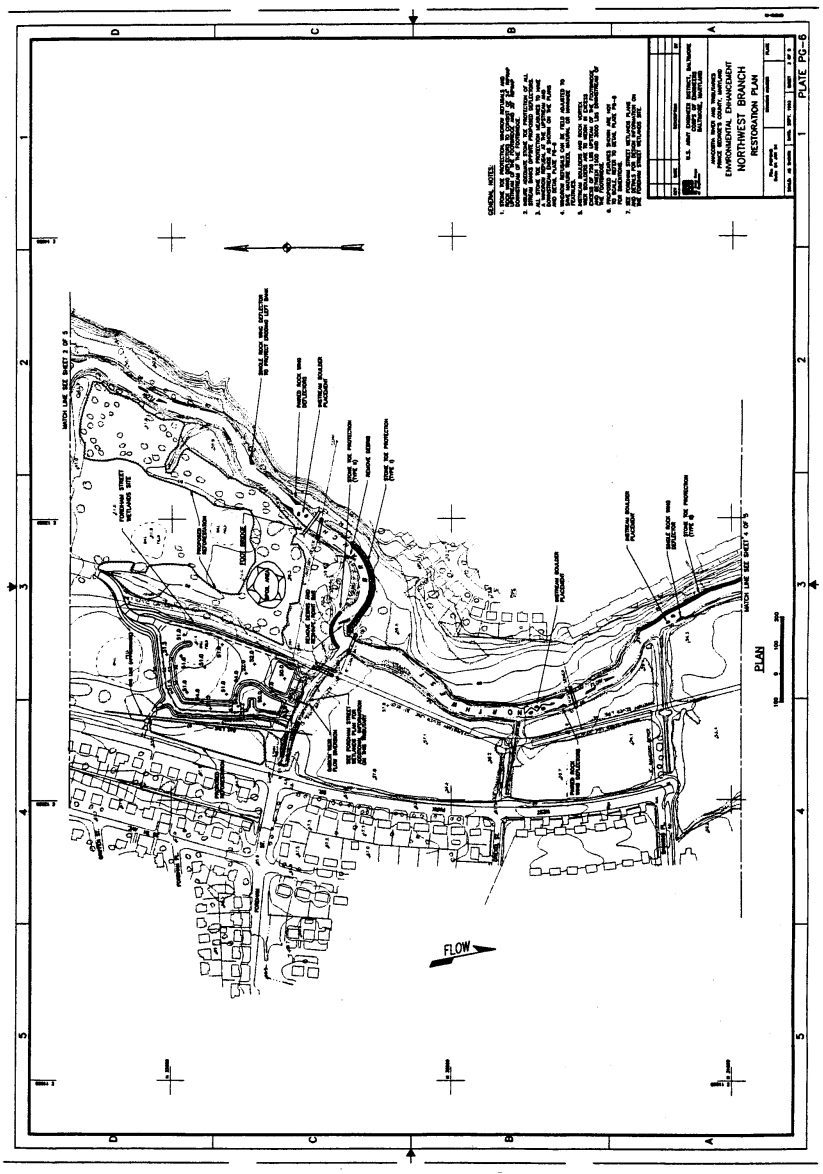
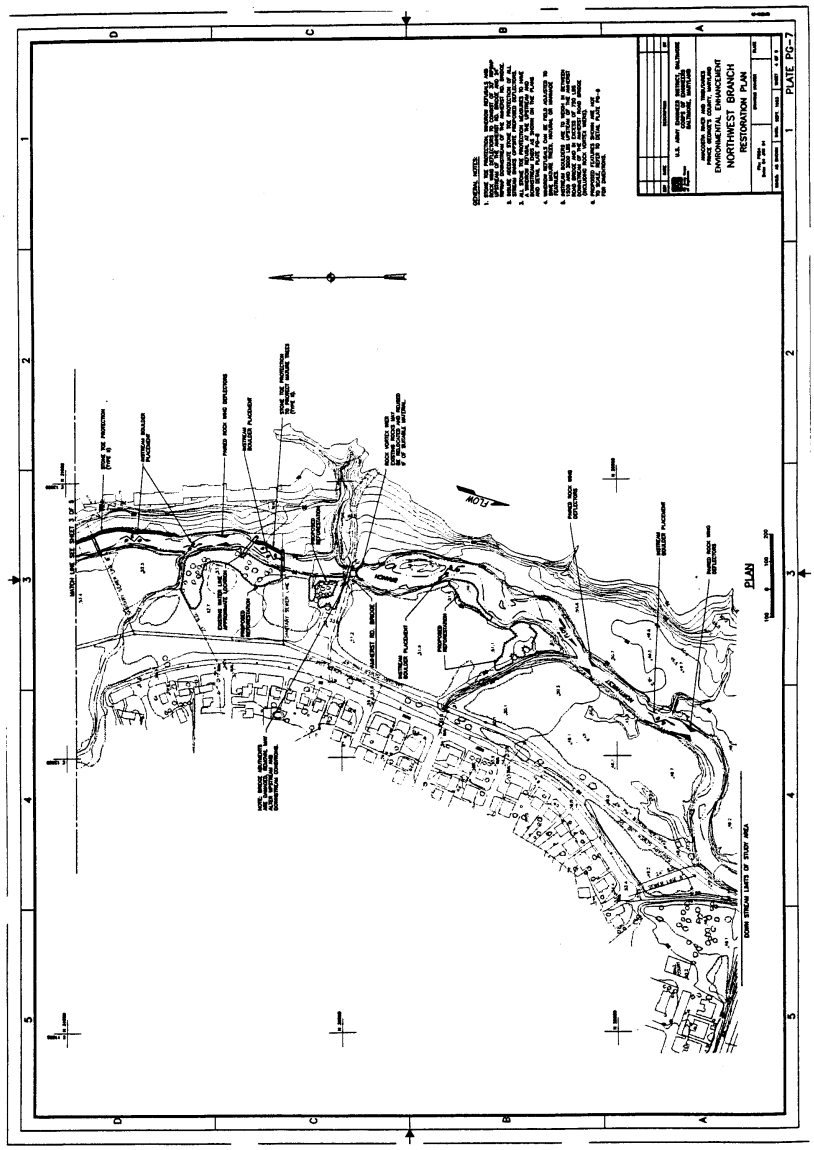
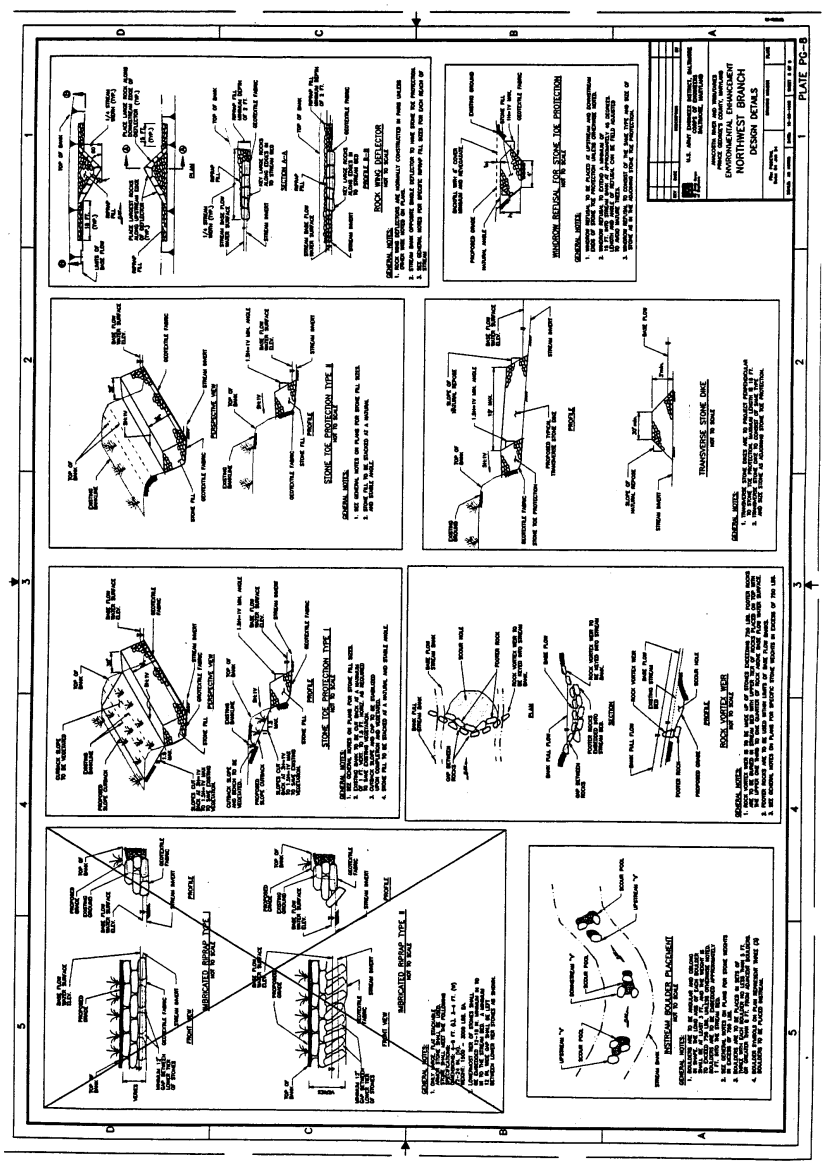
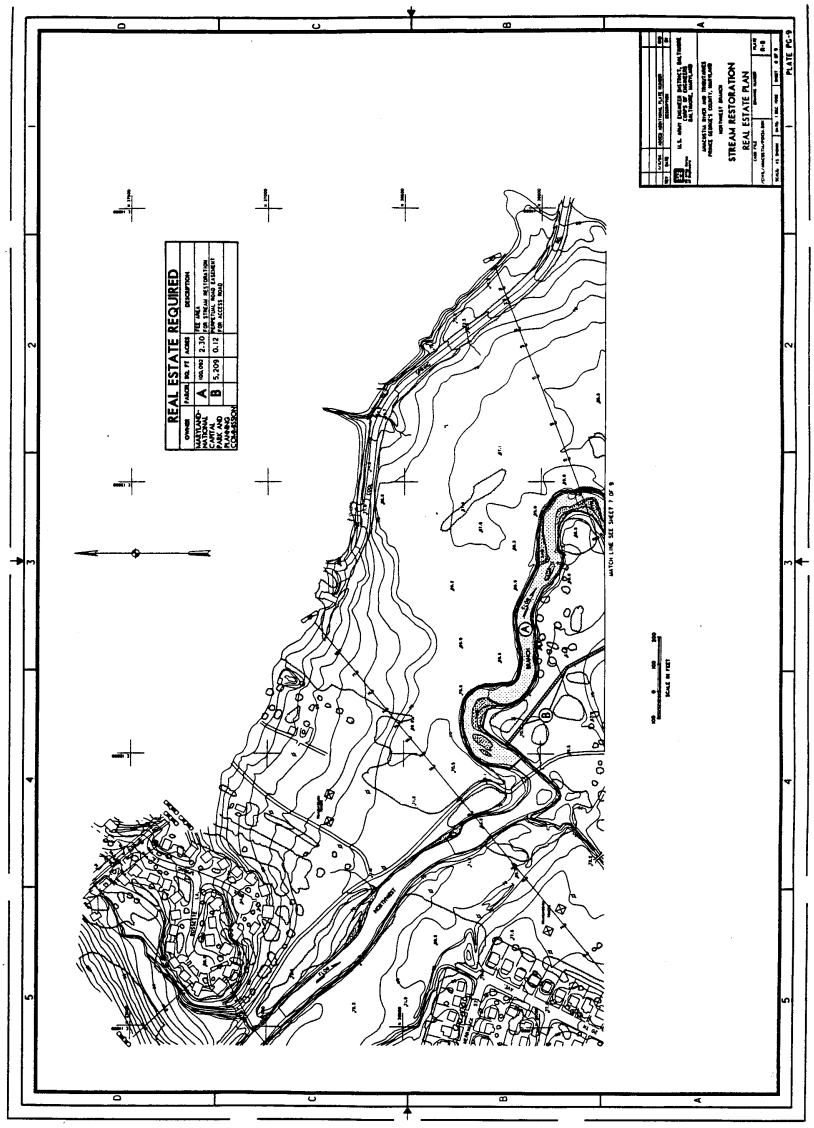
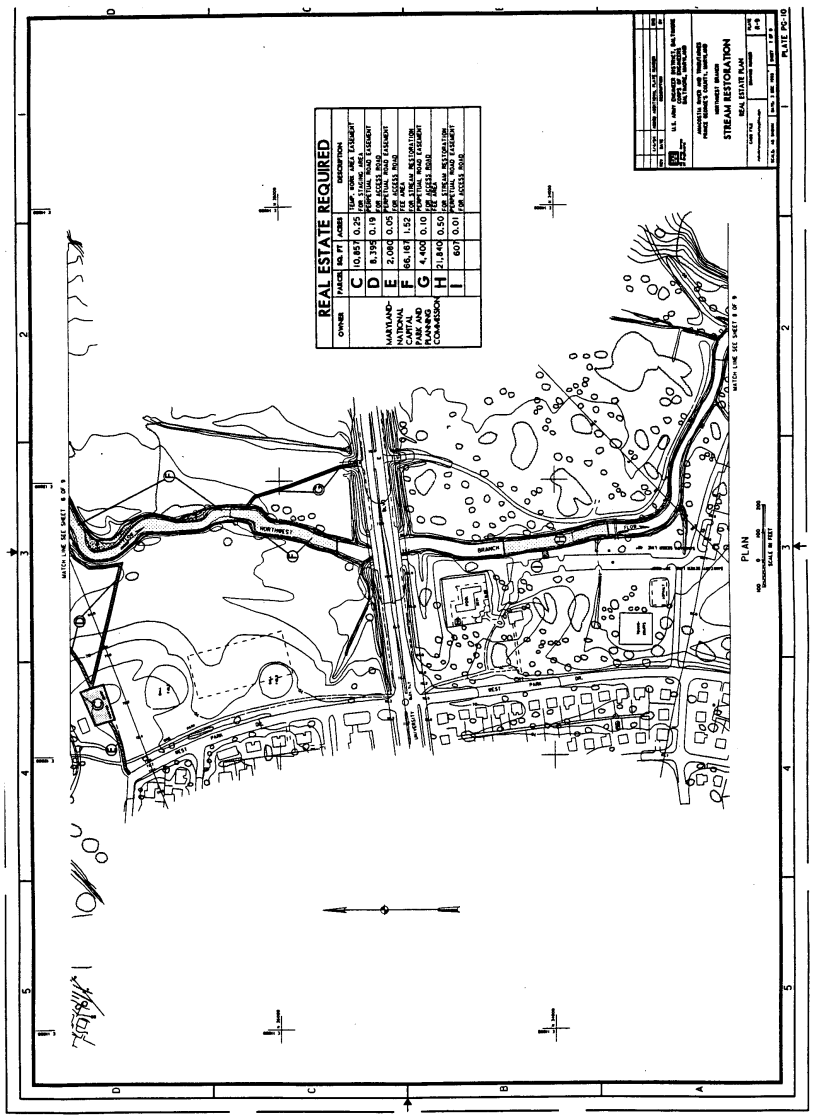


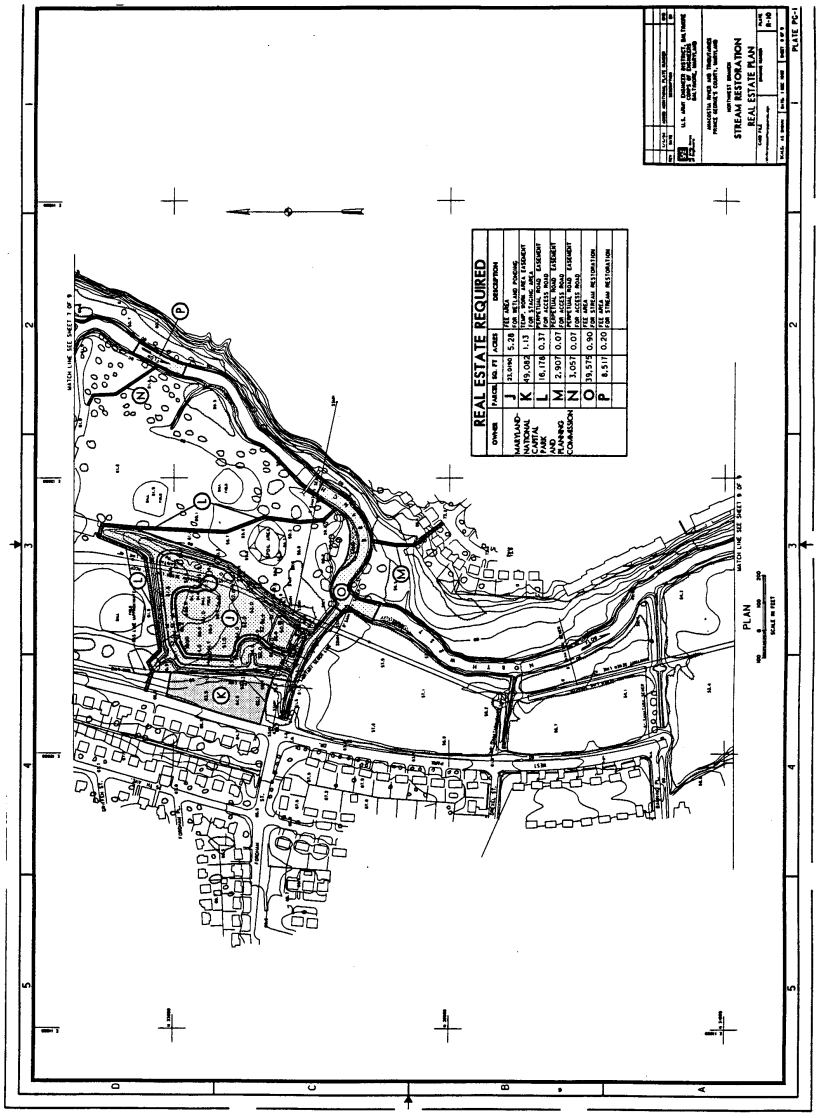
PLATE PG-6
NORTHWEST BRANCH
RESTORATION PLAN
PLAN
FLOW

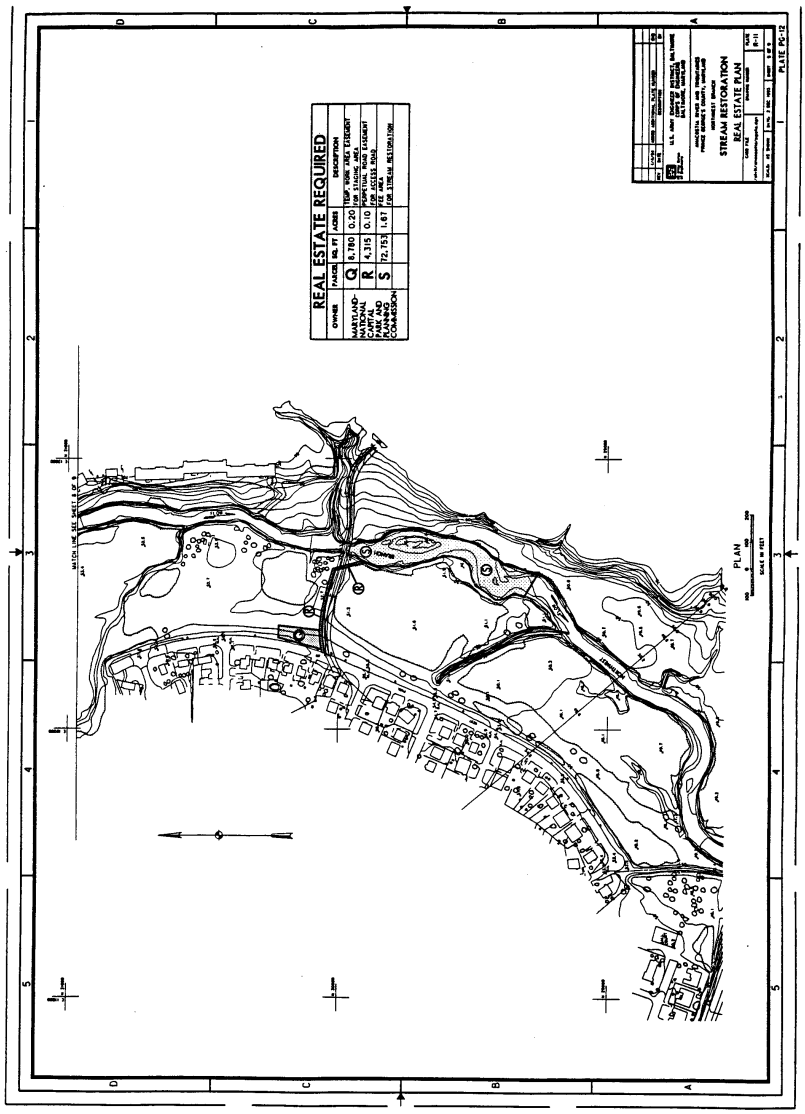

ENVIRONMENTAL ENHANCEMENT
NORTHWEST BRANCH
RESTORATION PLAN
PLATE PG-7
PLAN
FLOW


ENVIRONMENTAL ENHANCEMENT
NORTHWEST BRANCH
DESIGN DETAILS
PLATE PG-5


REAL ESTATE REQUIRED
STREAM RESTORATION
REAL ESTATE PLAN
PLATE PC-3


REAL ESTATE REQUIRED
OWNER
PARCEL
SQ. FT.
ACRES
DESCRIPTION
C
10,857
0.25
FOR STREAM RESTORATION AND PERPETUAL ROAD EASEMENT
D
8,395
0.19
PERPETUAL ROAD EASEMENT
MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
E
2,085
0.05
PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
F
66,161
1.52
FOR STREAM RESTORATION AND PERPETUAL ROAD EASEMENT
G
4,400
0.10
FOR ACCESS ROAD
H
21,840
0.50
FOR STREAM RESTORATION AND PERPETUAL ROAD EASEMENT
I
601
0.01
FOR ACCESS ROAD
NORTHWEST BRANCH
PLAN
STREAM RESTORATION
REAL ESTATE PLAN
PLATE PR-10


REAL ESTATE REQUIRED
OWNER
PARCEL NO.
FEE AREA ACRES
DESCRIPTION
MARYLAND NATIONAL CAPITAL PARK AND PLANNING COMMISSION
J 25.0940 5.28 FEE AREA ZONING
K 49,082 1.13 TEMP. WORK AREA EASEMENT FOR STREAM RESTORATION
L 16,178 0.37 PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
M 2,907 0.07 PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
N 3,051 0.07 PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
O 39,573 0.90 TEMP. WORK AREA EASEMENT FOR STREAM RESTORATION
P 8,511 0.20 FEE AREA FOR STREAM RESTORATION
STREAM RESTORATION
REAL ESTATE PLAN
PLATE PC-1
PLAN


REAL ESTATE REQUIRED
OWNER
PARCEL NO.
ACRES
DESCRIPTION
MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
Q
8,780
0.20
TEMPORARY ROAD EASEMENT FOR ACCESS AND
R
4,315
0.10
PERPETUAL ROAD EASEMENT FOR ACCESS AND
S
72,753
1.67
FEE AREA FOR STREAM RESTORATION
STREAM RESTORATION
REAL ESTATE PLAN
PLAN
PLATE PC-12

Anacostia River Restoration
Prince George's County, MD
CENAB-PP-C Capability Schedule 13 July 1994

Task Name	Start Date	Duration	End Date
Start PED	3-Jan-95	0.0	3-Jan-95
E1 Milestone Meeting	17-Jan-95	0.0	17-Jan-95
Value Engineering Study	3-Jan-95	40.0 d	1-Mar-95
Surveys	15-Feb-95	60.0 d	10-May-95
Geotechnical Drilling	15-Feb-95	60.0 d	10-May-95
Fordham St Wetland P&S	11-May-95	280.0 d	20-Jun-96
Design	11-May-95	75.0 d	25-Aug-95
H&H Design	11-May-95	30.0 d	22-Jun-95
Geotechnical Design	18-May-95	40.0 d	14-Jul-95
Structural Design	25-May-95	30.0 d	7-Jul-95
Environmental Design	11-May-95	60.0 d	4-Aug-95
Civil Design	11-May-95	60.0 d	4-Aug-95
Eros/Sed Cont Plan	7-Aug-95	15.0 d	25-Aug-95
Modify P&S	1-Dec-95	40.0 d	30-Jan-96
Finalize P&S	25-Apr-96	40.0 d	20-Jun-96
Relocation Design	25-May-95	65.0 d	25-Aug-95
NW Br Restoration P&S	30-Mar-95	310.0 d	20-Jun-96
Design	30-Mar-95	100.0 d	18-Aug-95
H&H Design	30-Mar-95	60.0 d	22-Jun-95
Environmental Design	30-Mar-95	85.0 d	28-Jul-95
Civil Design	30-Mar-95	85.0 d	28-Jul-95
Geotechnical Design	11-May-95	10.0 d	24-May-95
Eros/Sed Cont Plan	31-Jul-95	15.0 d	18-Aug-95
Modify P&S	1-Dec-95	40.0 d	30-Jan-96
Finalize P&S	25-Apr-96	40.0 d	20-Jun-96
Cost Estimates	31-Jan-96	280.0 d	11-Feb-97
Initial Estimate	31-Jan-96	30.0 d	13-Mar-96
Final Estimate	21-Jun-96	30.0 d	2-Aug-96
Government Estimate	14-Jan-97	20.0 d	11-Feb-97
P&S Review/Approval	29-Aug-95	205.0 d	20-Jun-96
Sponsor Review	29-Aug-95	45.0 d	31-Oct-95
Environmental Review	1-Nov-95	20.0 d	30-Nov-95
CENAD Review (E10)	14-Mar-96	30.0 d	24-Apr-96
CENAD P&S Approval (E11)	21-Jun-96	0.0	21-Jun-96
BCO Review	29-Aug-95	225.0 d	19-Jul-96
First Review	29-Aug-95	20.0 d	25-Sep-95
Final Review	31-Jan-96	20.0 d	28-Feb-96
Backcheck Review	21-Jun-96	20.0 d	19-Jul-96
BCO Certification	22-Jul-96	0.0	22-Jul-96
Environmental Activities	1-Dec-95	70.0 d	13-Mar-96
Environmental Documentation	1-Dec-95	20.0 d	29-Dec-95
Public Review	2-Jan-96	20.0 d	30-Jan-96
Issue Final Documentation	31-Jan-96	30.0 d	13-Mar-96
Real Estate Activities	3-Jan-95	510.0 d	13-Jan-97
Rights of Entry	3-Jan-95	30.0 d	14-Feb-95
R-E Studies	31-Jan-96	40.0 d	27-Mar-96
R-E Acquisition	29-Nov-96	30.0 d	13-Jan-97
Permit Applications	21-Jun-96	4.0 m	25-Oct-96
Limited Reevaluation Report	9-Oct-96	35.0 d	27-Nov-96
Financial Assessment	14-Mar-96	60.0 d	6-Jun-96
Prepare Finance Plan	14-Mar-96	40.0 d	9-May-96
Financial Capability Analysis	9-May-96	20.0 d	6-Jun-96
Local Cooperation Agreement	14-Mar-96	180.0 d	27-Nov-96
LCA Negotiations	14-Mar-96	40.0 d	9-May-96
HQ Review/Approval	5-Aug-96	80.0 d	27-Nov-96
LCA Signing	29-Nov-96	0.0	29-Nov-96
Relocations	29-Nov-96	85.0 d	2-Apr-97
Construction	14-Jan-97	437.0 d	7-Oct-98
Advertising	14-Jan-97	40.0 d	12-Mar-97
Evaluate RFP	13-Mar-97	45.0 d	14-May-97
Construction Award	15-May-97	0.0	15-May-97
Constr Contract	15-May-97	16.0 m	7-Oct-98
Constr Management	15-May-97	14.0 m	5-Aug-98
Engr during Construction	27-Jun-97	8.0 m	12-Mar-98
Life Cycle Project Management	3-Jan-95	15.0 m	24-Apr-96
Engineering Management	3-Jan-95	15.0 m	24-Apr-96
Planning Management	3-Jan-95	15.0 m	24-Apr-96
Public Meetings	1-Nov-95	20.0 d	30-Nov-95
O&M Manual	15-Jul-98	40.0 d	9-Sep-98
Project Turnover	8-Oct-98	0.0	8-Oct-98
Project Monitoring	8-Oct-98	60.0 m	13-Jan-04

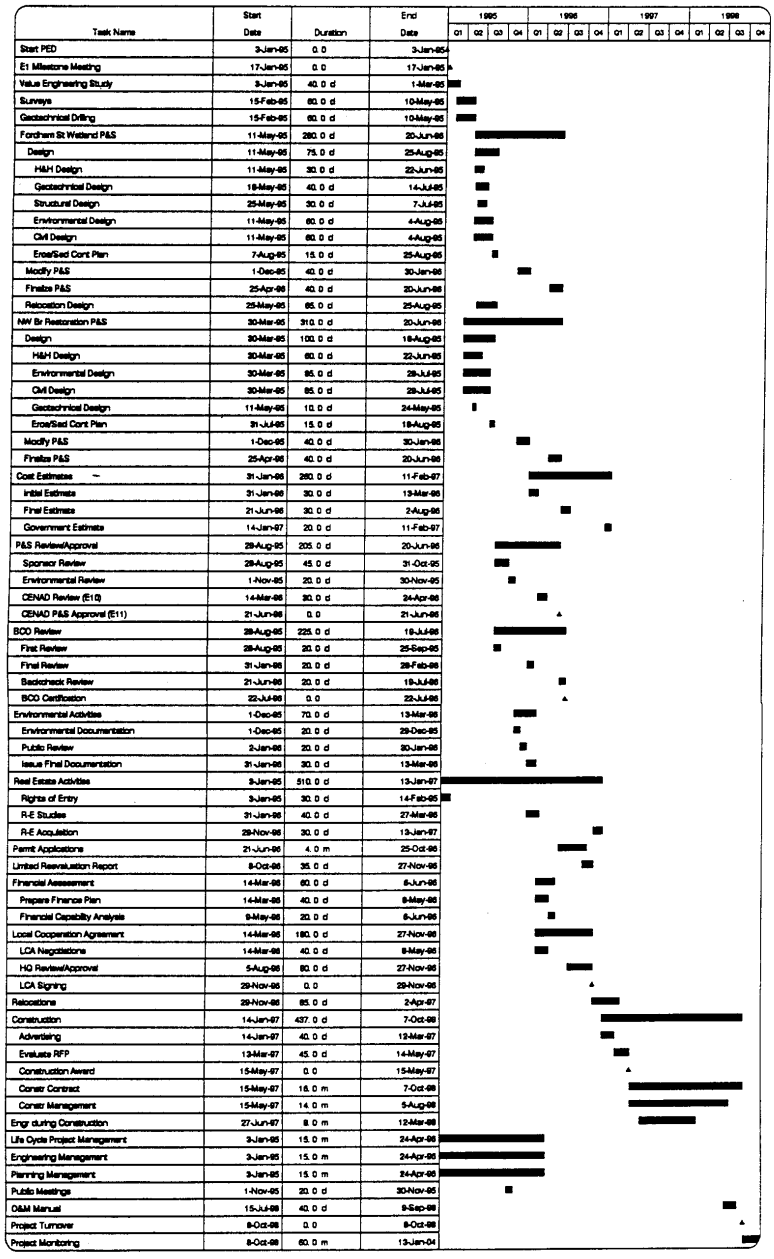
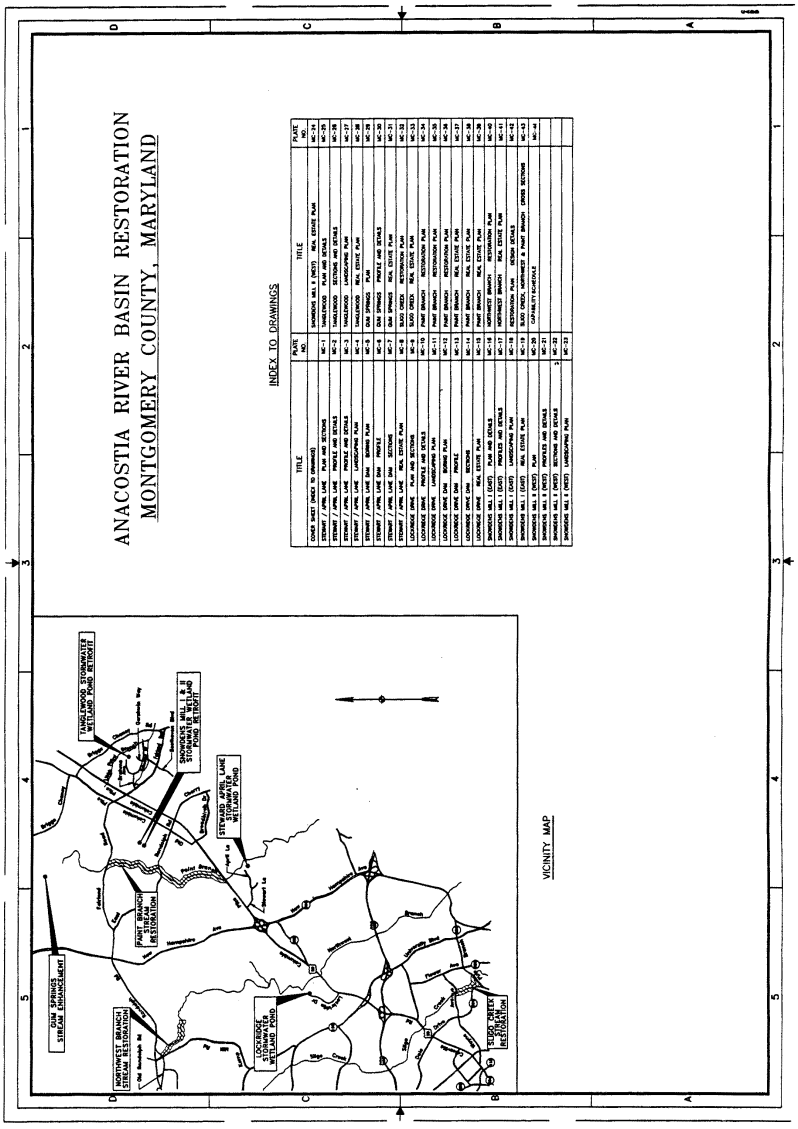
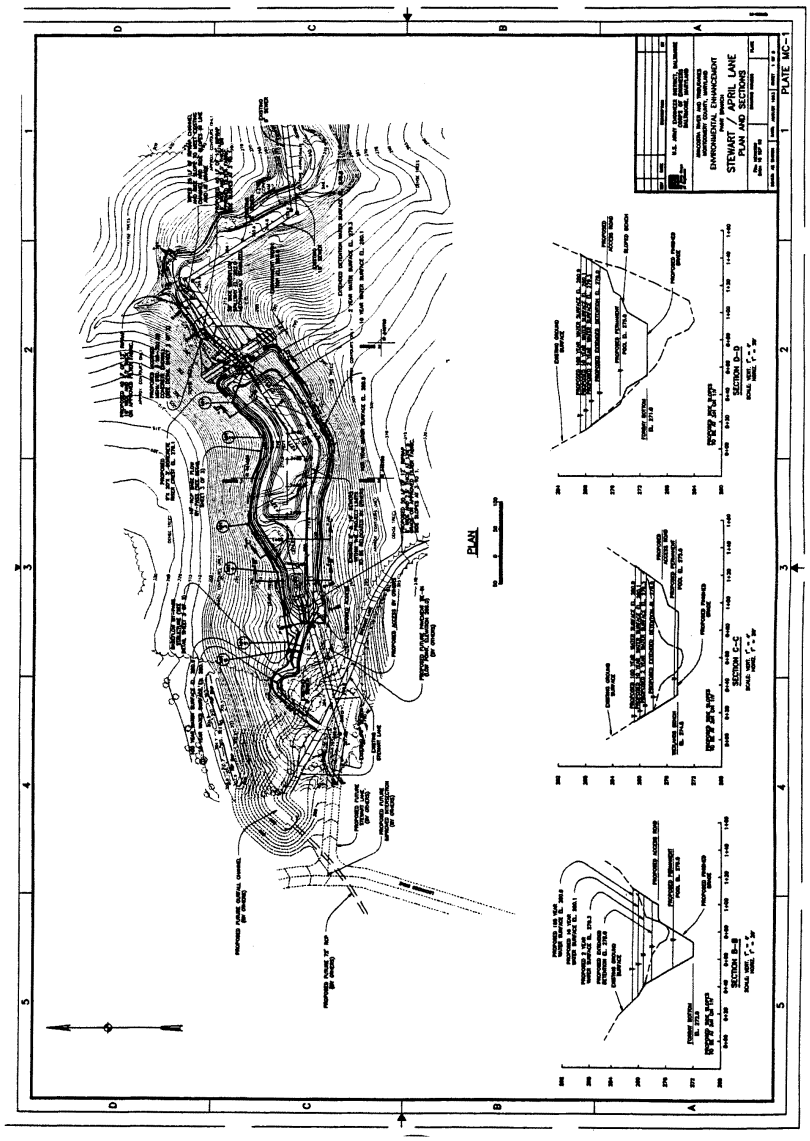
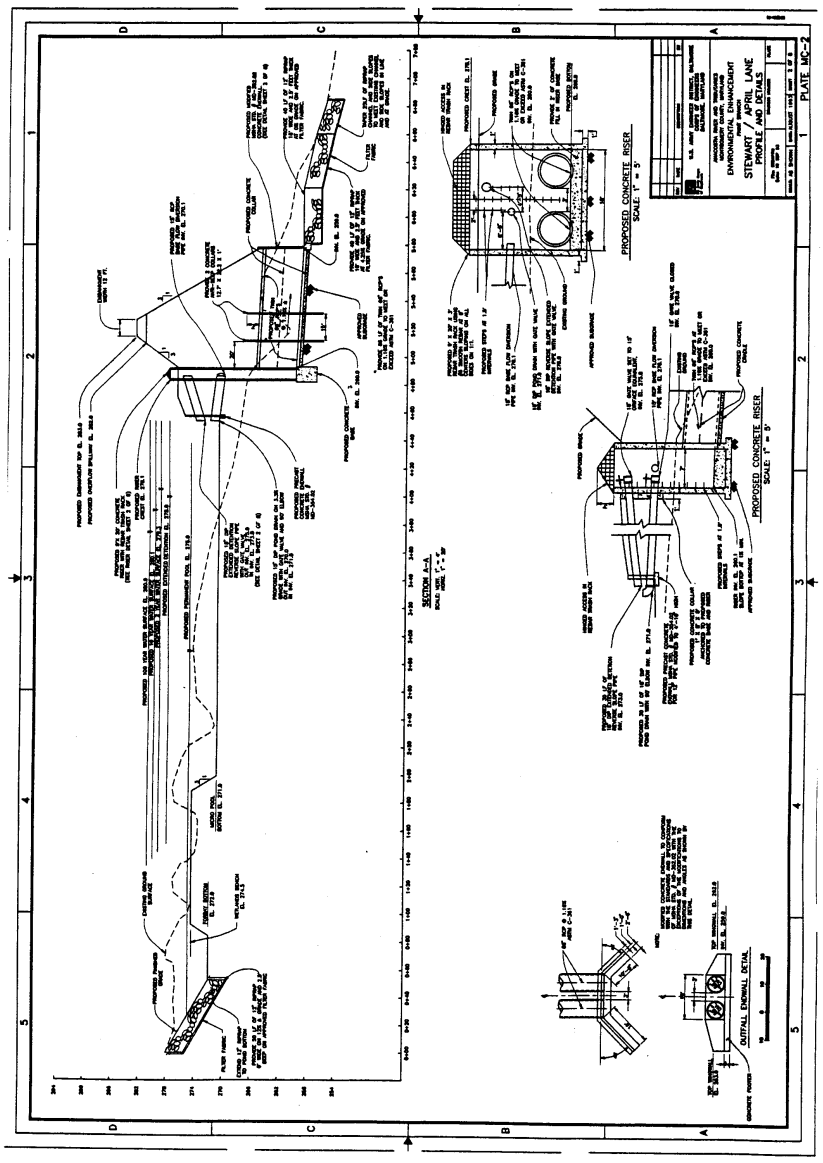
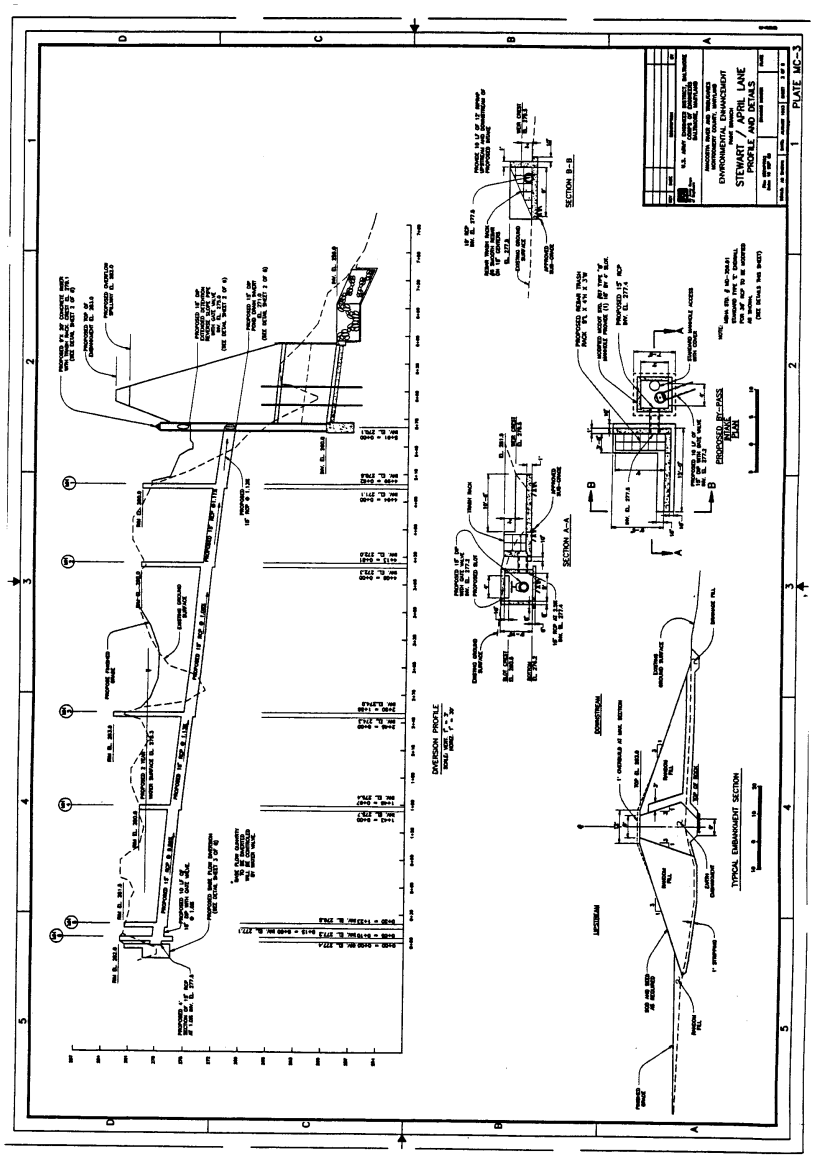


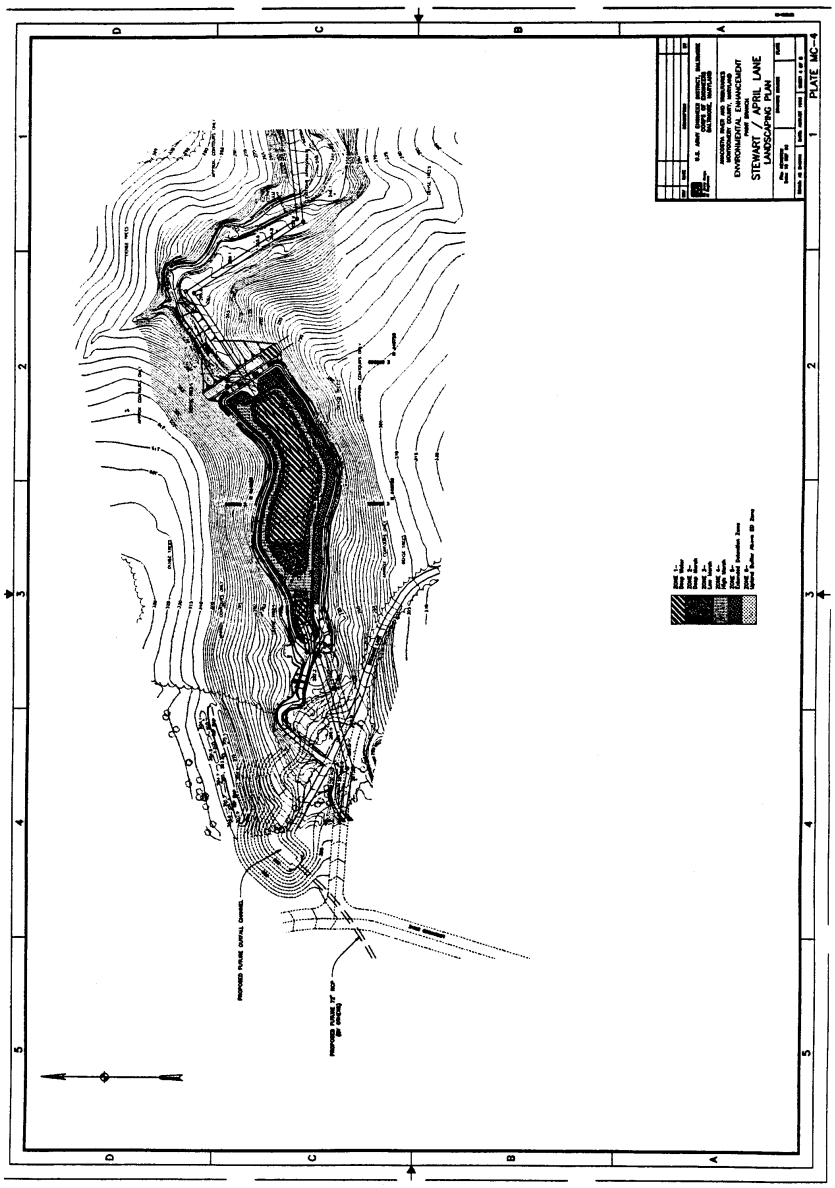
PLATE PG-13

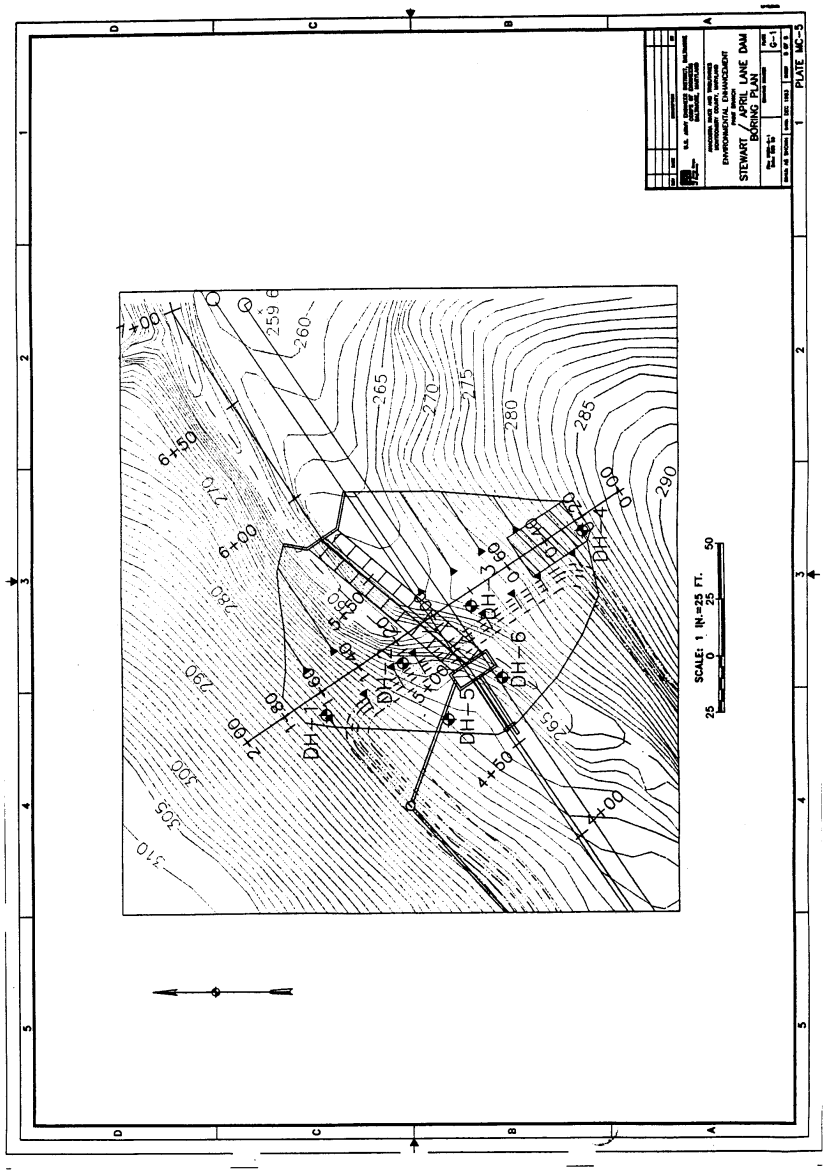

ANACOSTIA RIVER BASIN RESTORATION
MONTGOMERY COUNTY, MARYLAND
INDEX TO DRAWINGS
VICINITY MAP
OAK SPRINGS STREAM ENHANCEMENT
NORTHWEST BRANCH STREAM RESTORATION
LOCKRIDGE STORMWATER WETLAND POND
SHOMERE MILL STORMWATER WETLAND POND RETROFIT
STEWARD APRIL LANE STORMWATER WETLAND POND
PINEY BRANCH STREAM RESTORATION
TINDLEWOOD STORMWATER WETLAND POND RETROFIT
SLIGO CREEK STREAM RESTORATION

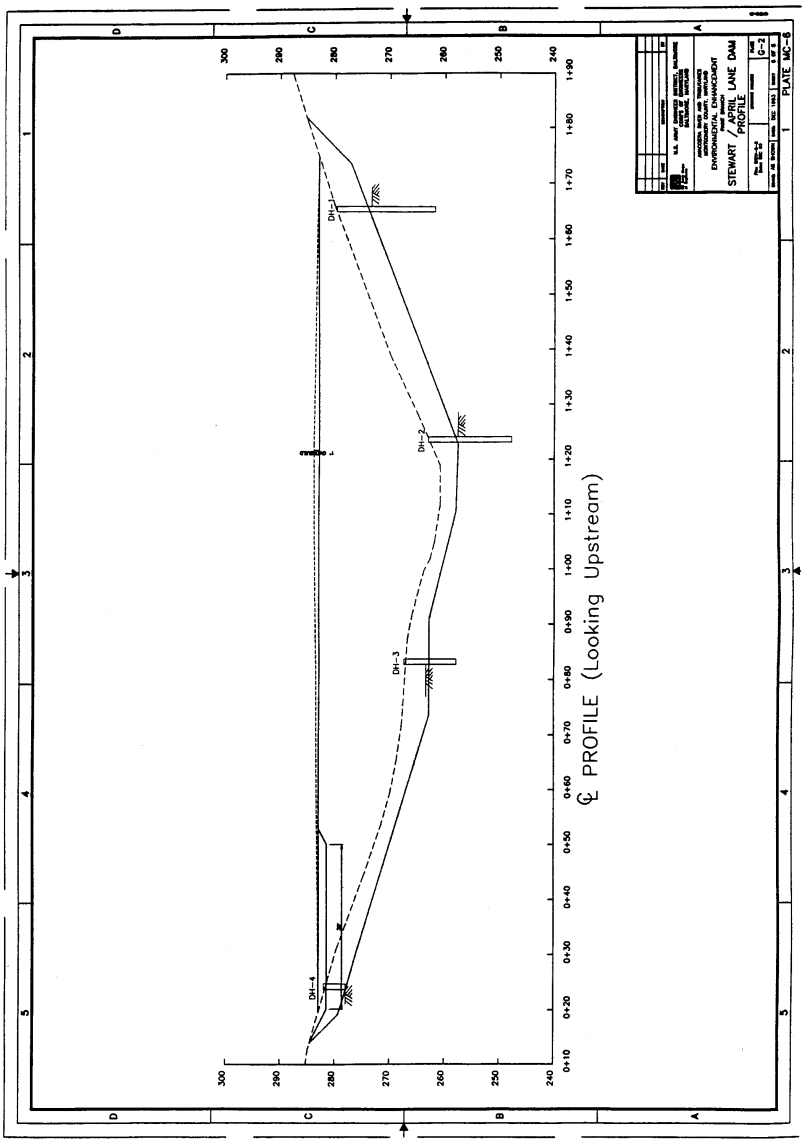

PLAN
STEWART APRIL LANE
PLAN AND SECTIONS
PLATE MC-1

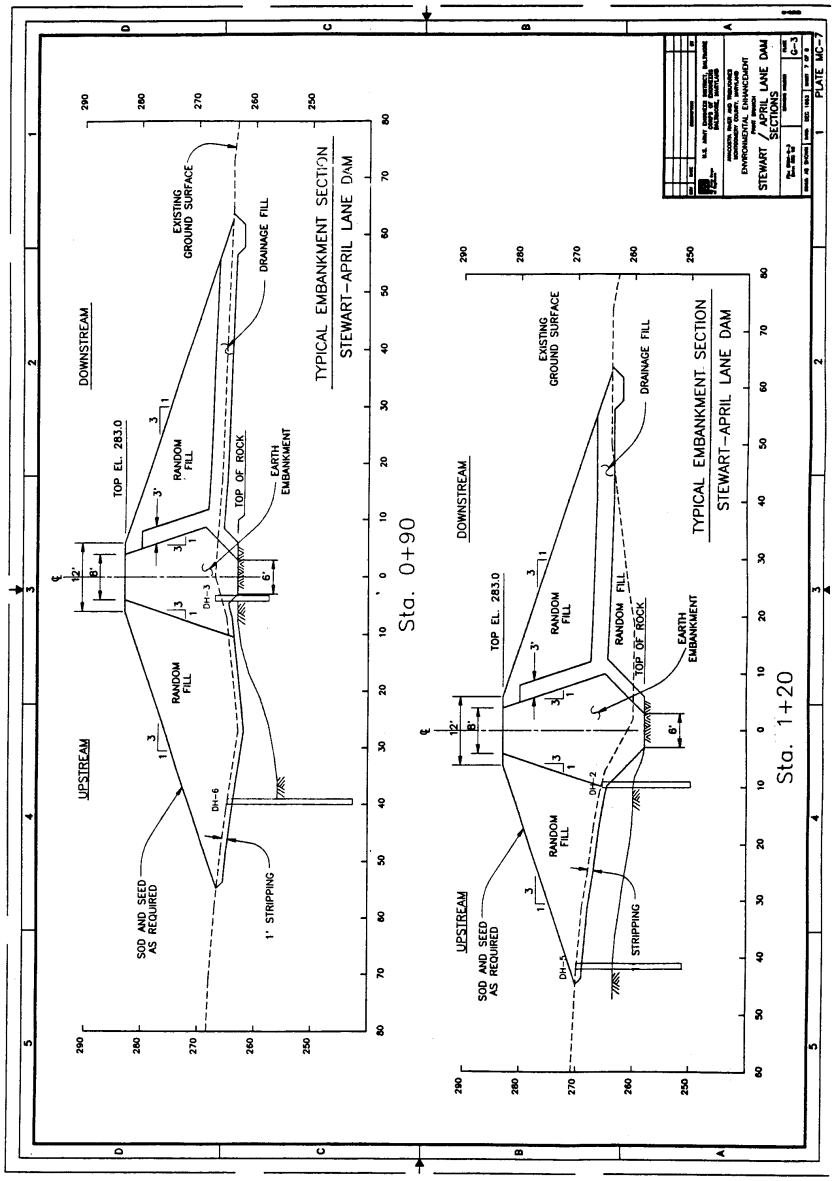

PROPOSED CONCRETE RISER
SCALE: 1" = 5'
PROPOSED CONCRETE RISER
SCALE: 1" = 5'
SECTION A-A
OUTFALL ENDWALL DETAIL
STEWART / APRIL LANE
PROFILE AND DETAILS
PLATE MC-2

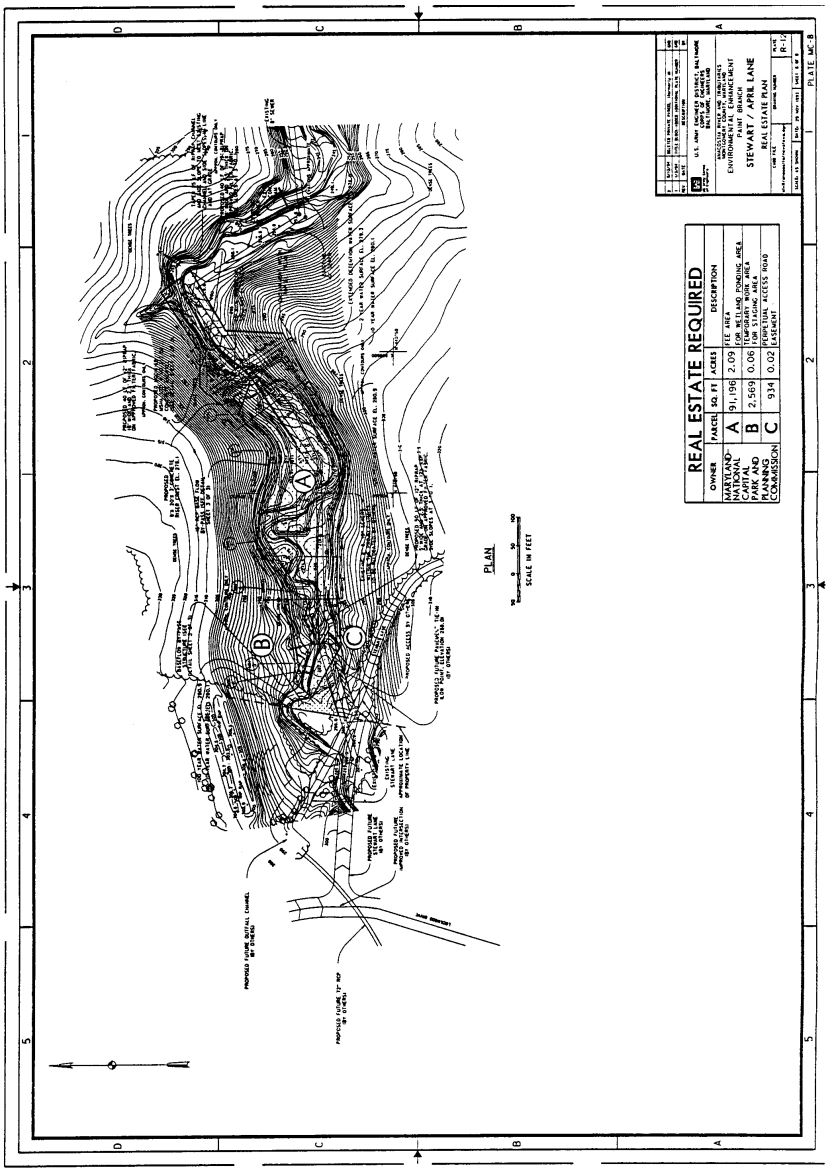

STEWART / APRIL LANE
PROFILE AND DETAILS
PLATE MC-3
DIVERSION PROFILE
SECTION A-A
SECTION B-B
TYPICAL EMBANKMENT SECTION
PROPOSED RE-PASS
REMOVE
EXISTING

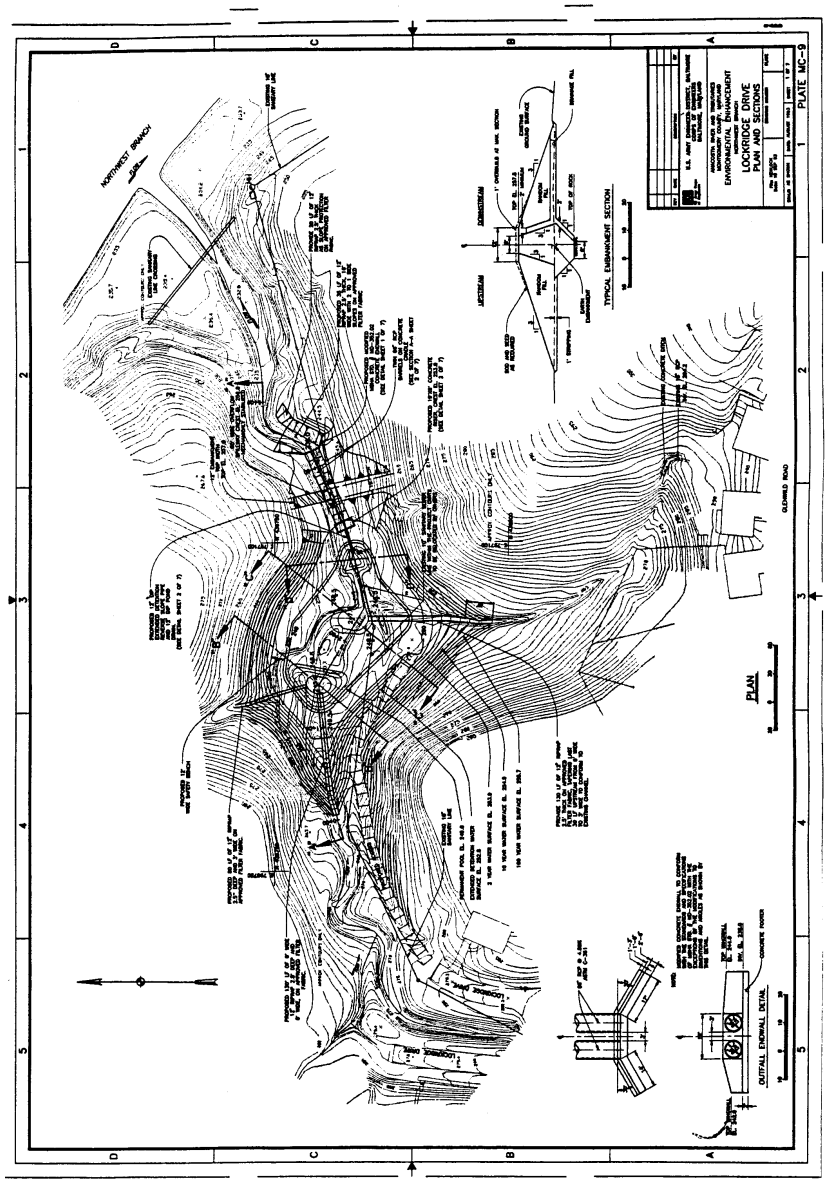

STEWART / APRIL LANE
LANDSCAPING PLAN
PLATE MC-4

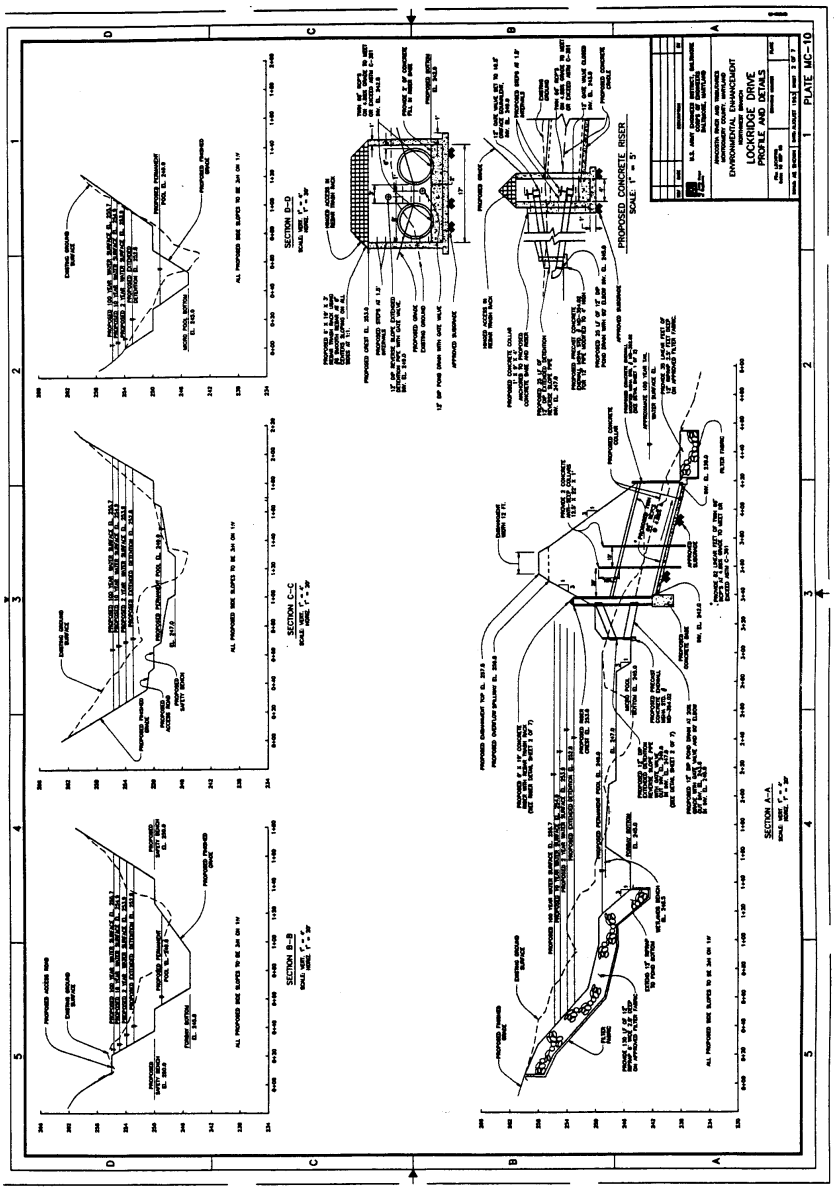

STEWART LANE DAM
BORING PLAN
PLATE MC-5
SCALE: 1 IN.=25 FT.
DH-1
DH-2
DH-3
DH-4
DH-5
DH-6
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
260
265
270
275
280
285
290
305
310

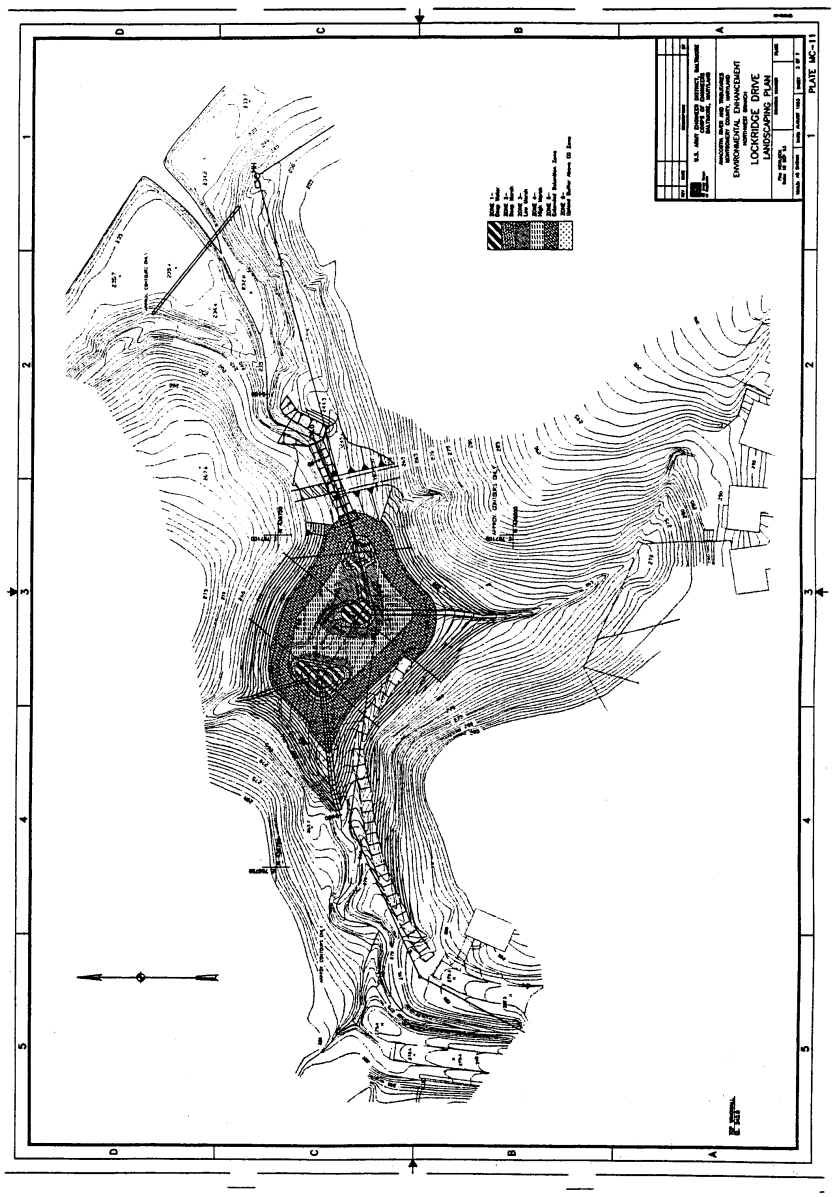

℄ PROFILE (Looking Upstream)
DH-1
DH-2
DH-3
DH-4
STEWART / APRIL LANE DAM
PROFILE
PLATE MC-6

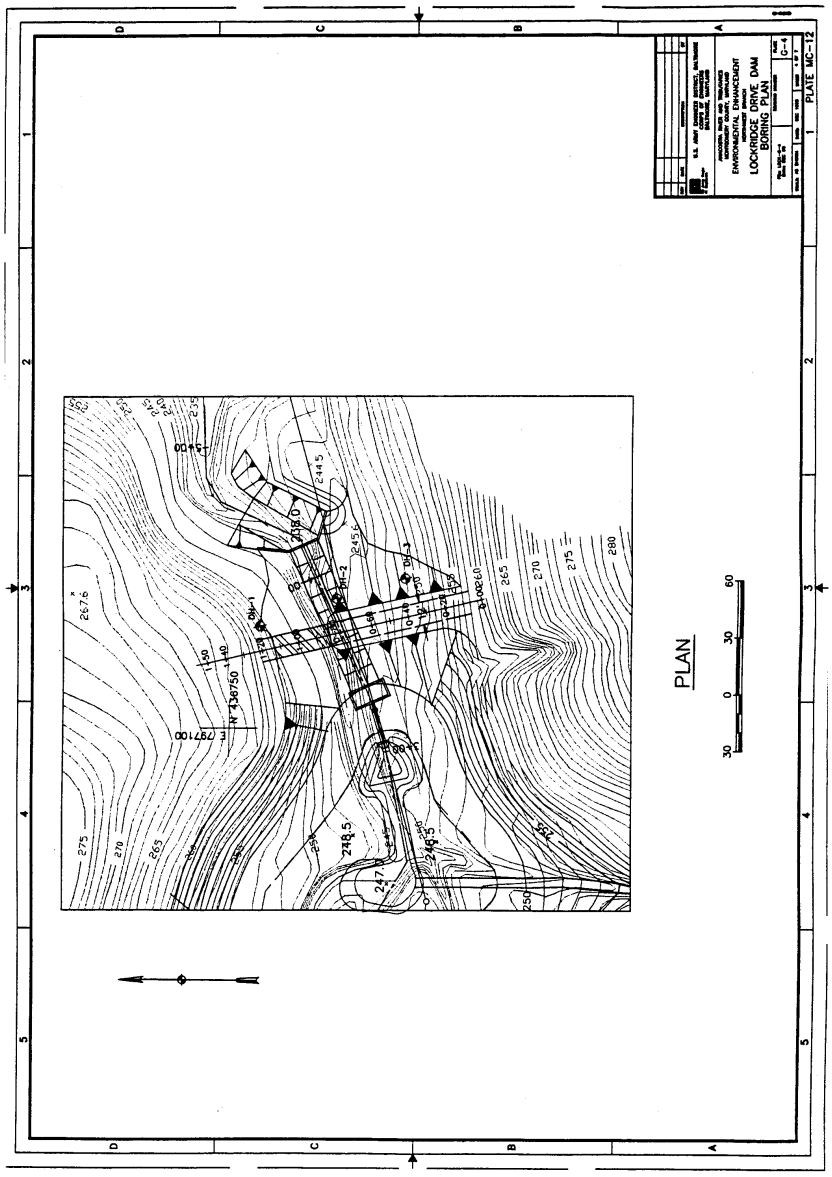

TYPICAL EMBANKMENT SECTION
STEWART–APRIL LANE DAM
Sta. 0+90
DOWNSTREAM
UPSTREAM
TOP EL. 283.0
EXISTING GROUND SURFACE
DRAINAGE FILL
RANDOM FILL
TOP OF ROCK
EARTH EMBANKMENT
SOD AND SEED AS REQUIRED
1' STRIPPING
TYPICAL EMBANKMENT SECTION
STEWART–APRIL LANE DAM
Sta. 1+20
STEWART / APRIL LANE DAM
SECTIONS
PLATE MC-7

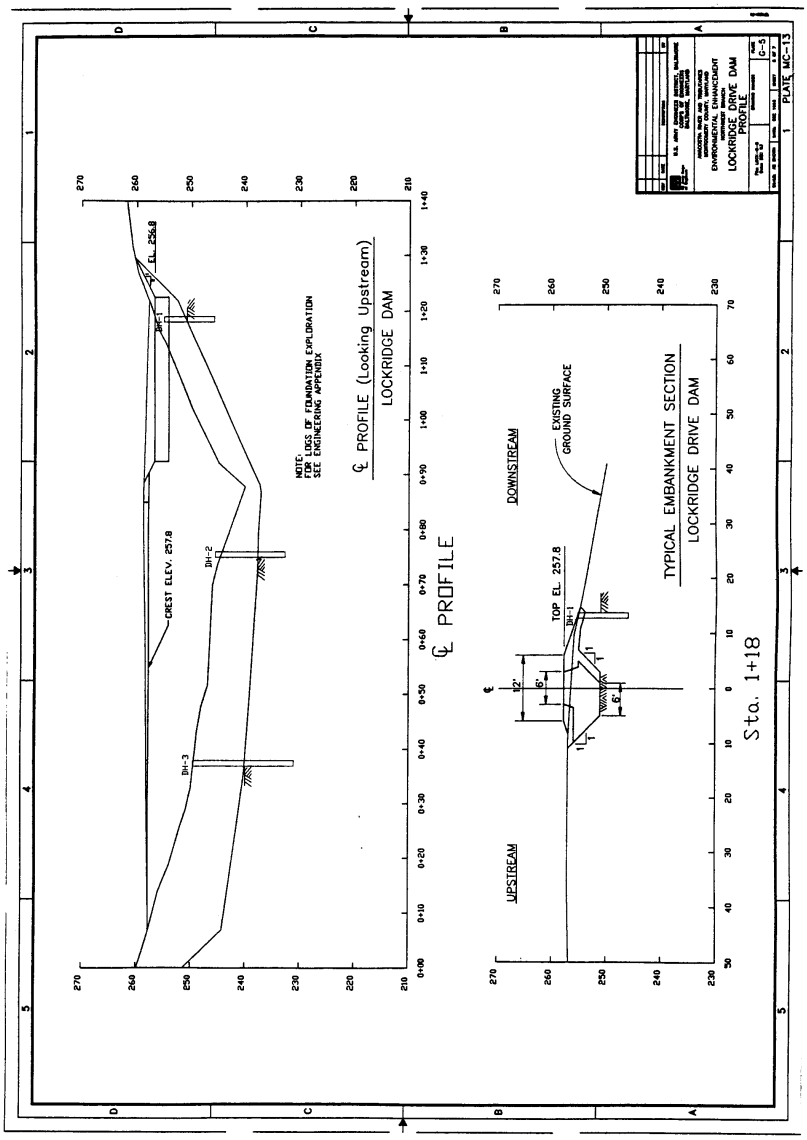

REAL ESTATE REQUIRED
OWNER
PARCEL
SQ. FT
ACRES
DESCRIPTION
MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
A
91,198
2.09
FEE AREA FOR WETLAND PONDING AREA
B
2,569
0.06
TEMPORARY ACCESS FOR STAGING AREA
C
934
0.02
PERPETUAL ACCESS ROAD EASEMENT
PLAN
SCALE IN FEET
STEWART / APPLE LANE
REAL ESTATE PLAN
PLATE MC-8

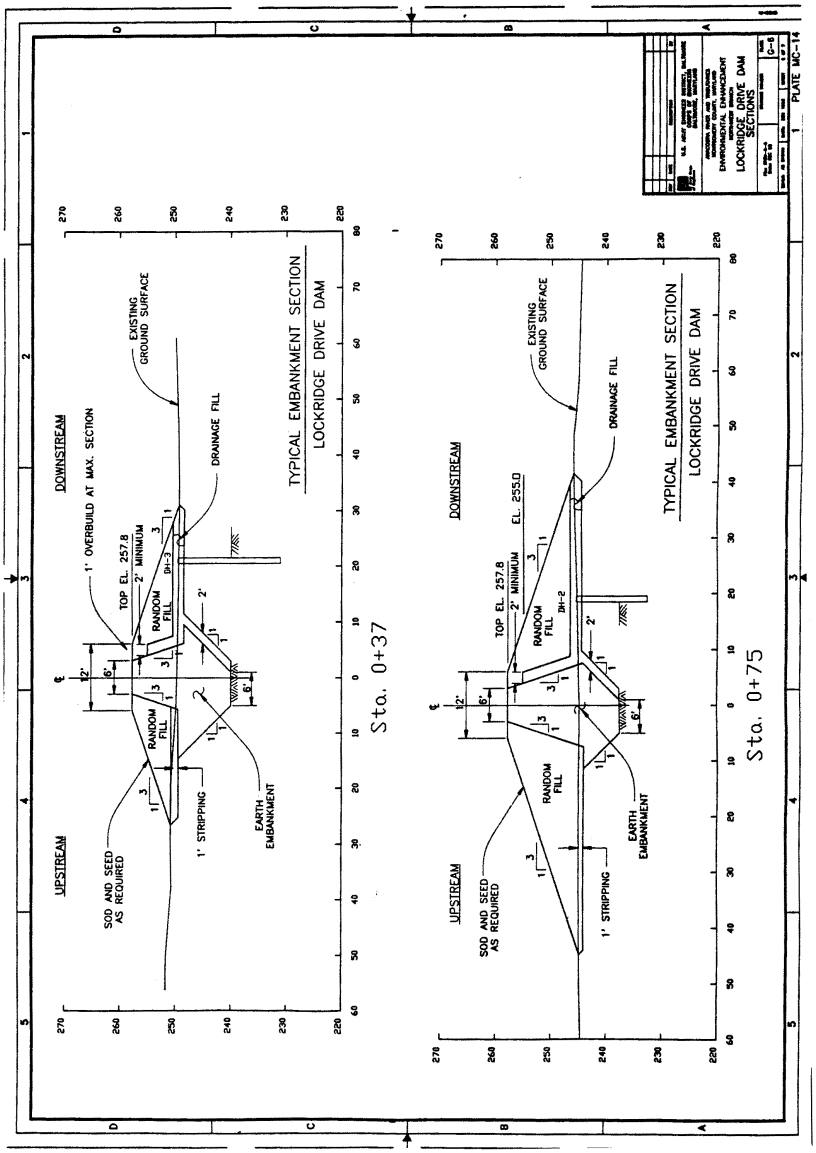

NORTHWEST BRANCH
LOCKRIDGE DRIVE
PLAN AND SECTIONS
ENVIRONMENTAL ENHANCEMENT
PLATE MC-9
PLAN
TYPICAL EMBANKMENT SECTION
OUTFALL ENDWALL DETAIL
GLENMED ROAD

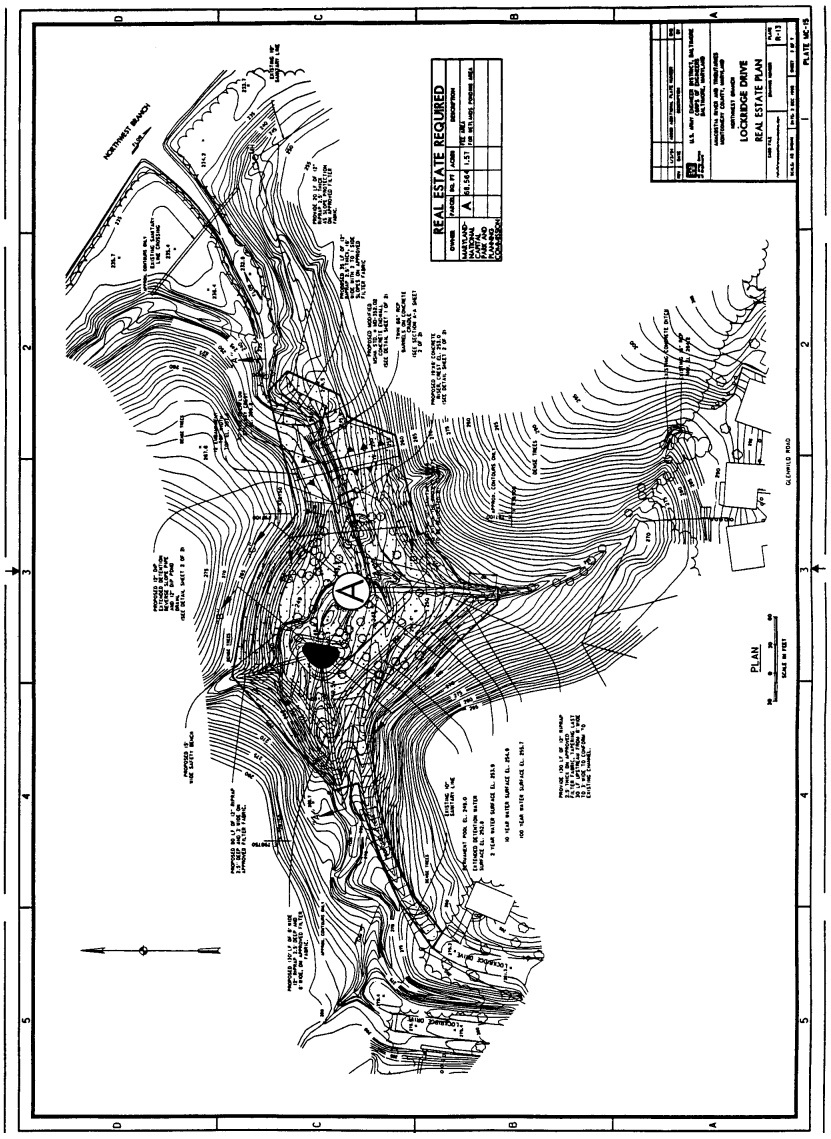

LOCKPORT DRIVE
PROFILE AND DETAILS
PLATE MC-10
PROPOSED CONCRETE RISER
SCALE: 1" = 5'
SECTION A-A
SECTION B-B
SECTION C-C
SECTION D-D

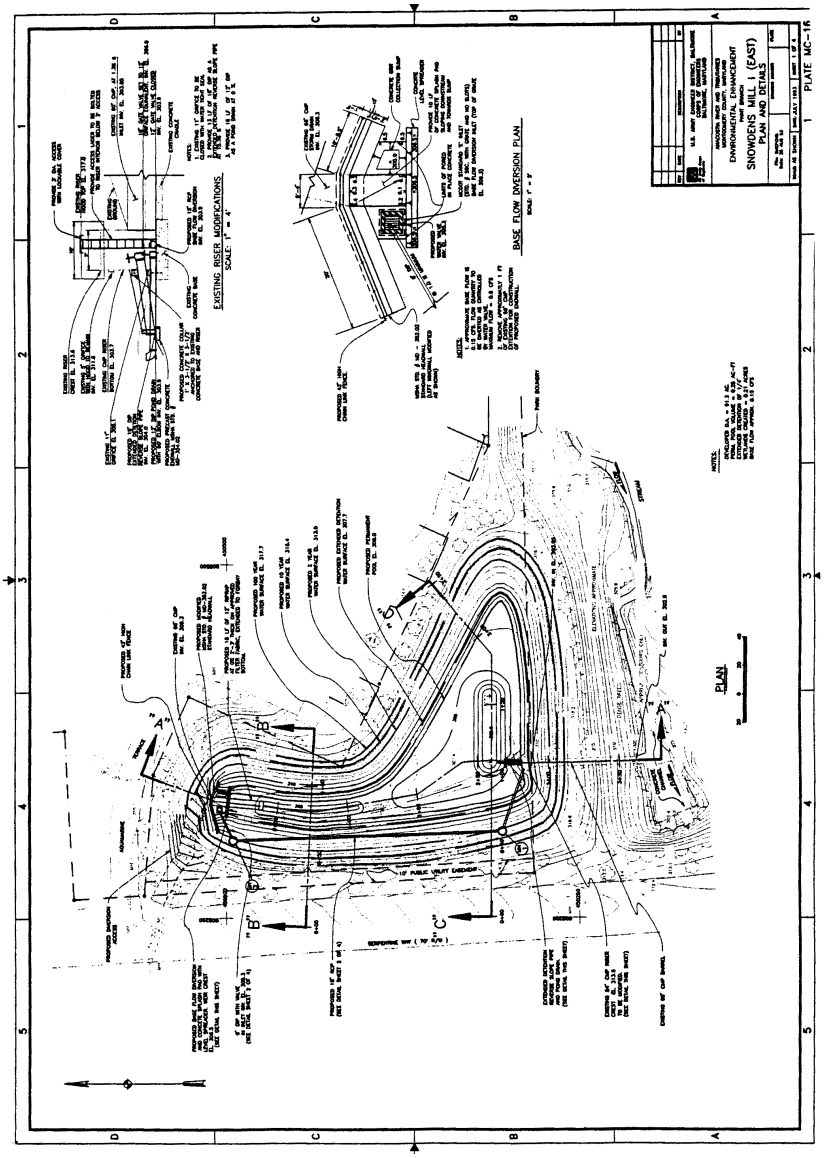

LOCKRIDGE DRIVE
LANDSCAPING PLAN
PLATE MC-11

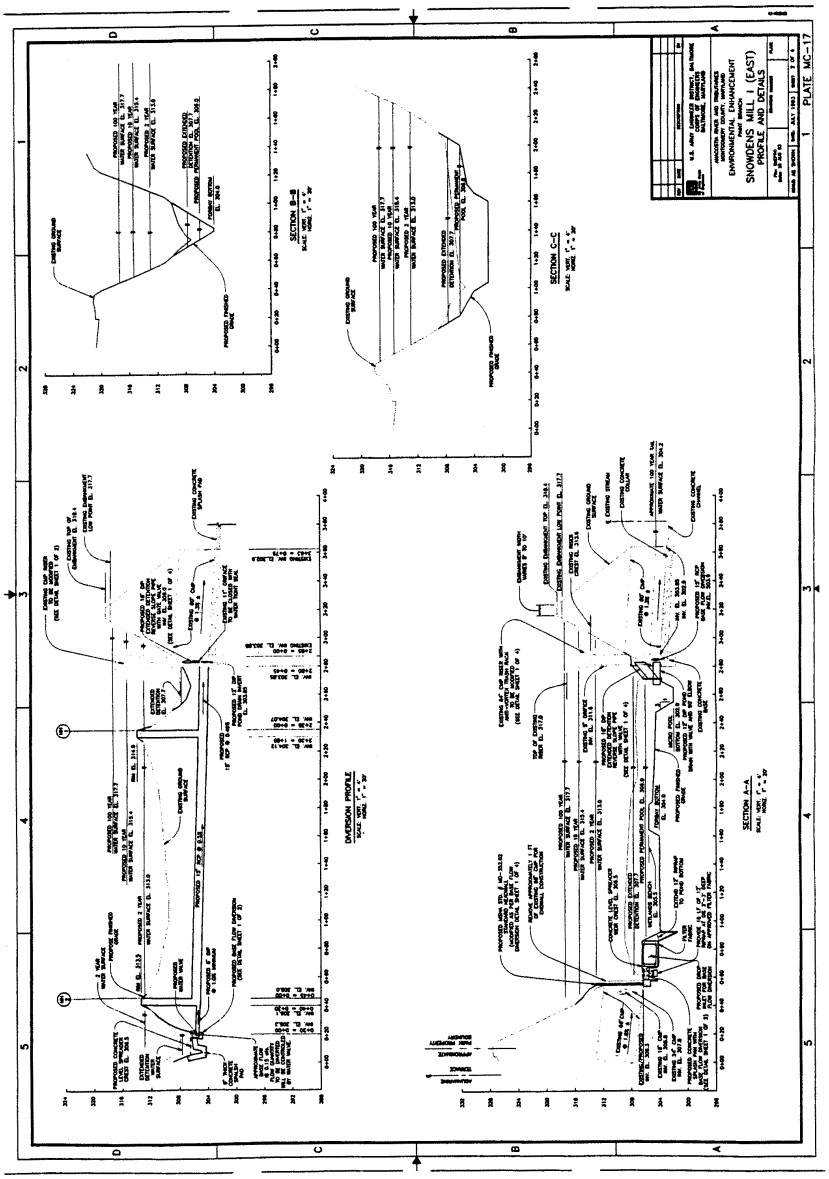

LOCKRIDGE DRIVE DAM
BORING PLAN
PLATE MC-12
PLAN
30 0 30 60
N 136750
E 797100
248.5
247.0
245.6
244.5
208.0
BH-1
BH-2
BH-3
BH-4
BH-5
BH-6
BH-7
BH-8
BH-9
BH-10
BH-11
BH-12

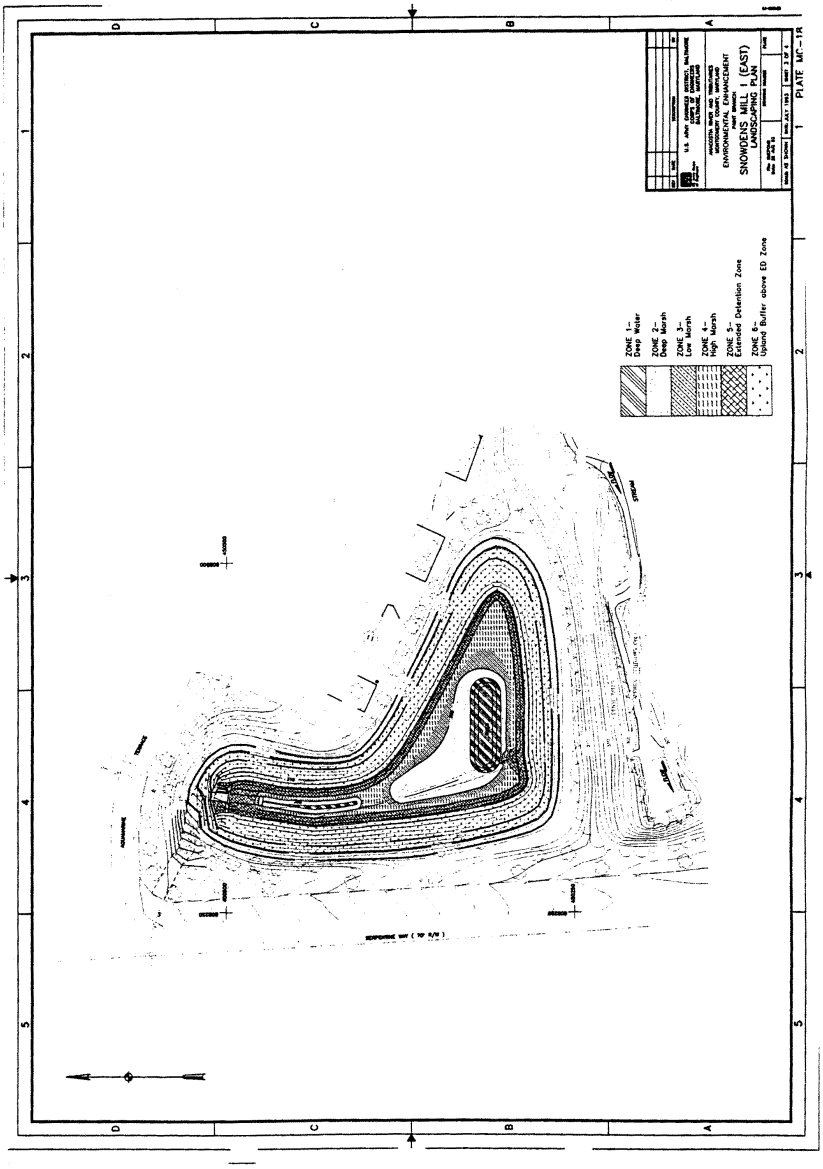

℄ PROFILE (Looking Upstream)
LOCKRIDGE DAM
CREST ELEV. 257.8
EL. 256.8
DH-1
DH-2
DH-3
NOTE:
FOR LOGS OF FOUNDATION EXPLORATION
SEE ENGINEERING APPENDIX
℄ PROFILE
TYPICAL EMBANKMENT SECTION
LOCKRIDGE DRIVE DAM
DOWNSTREAM
UPSTREAM
EXISTING
GROUND SURFACE
TOP EL. 257.8
DH-1
12'
6'
1'
1'
6'
Sta. 1+18
LOCKRIDGE DRIVE DAM
PROFILE
PLATE MC-13

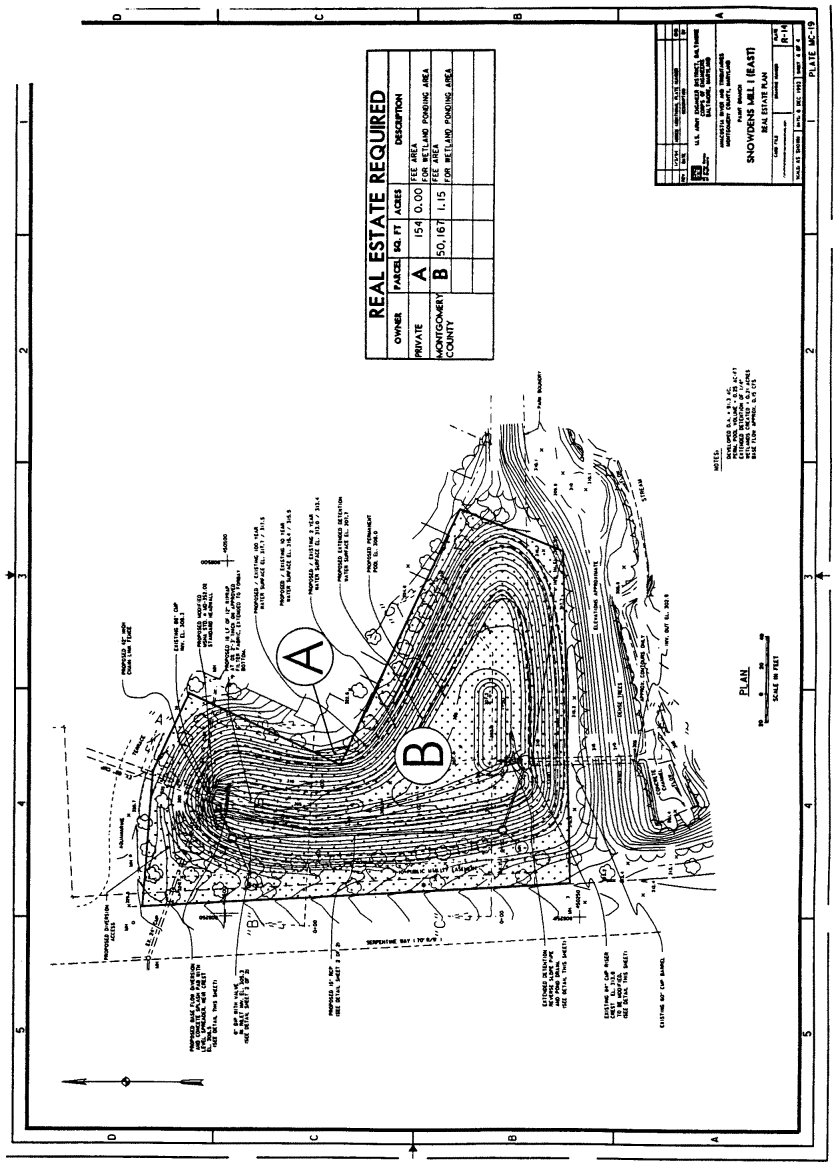

TYPICAL EMBANKMENT SECTION
LOCKRIDGE DRIVE DAM
Sta. 0+37
UPSTREAM
DOWNSTREAM
SOD AND SEED AS REQUIRED
1' OVERBUILD AT MAX. SECTION
TOP EL. 257.8
2' MINIMUM
EXISTING GROUND SURFACE
DRAINAGE FILL
RANDOM FILL
1' STRIPPING
EARTH EMBANKMENT
TYPICAL EMBANKMENT SECTION
LOCKRIDGE DRIVE DAM
Sta. 0+75
EL. 255.0
LOCKRIDGE DRIVE DAM SECTIONS
PLATE MC-14

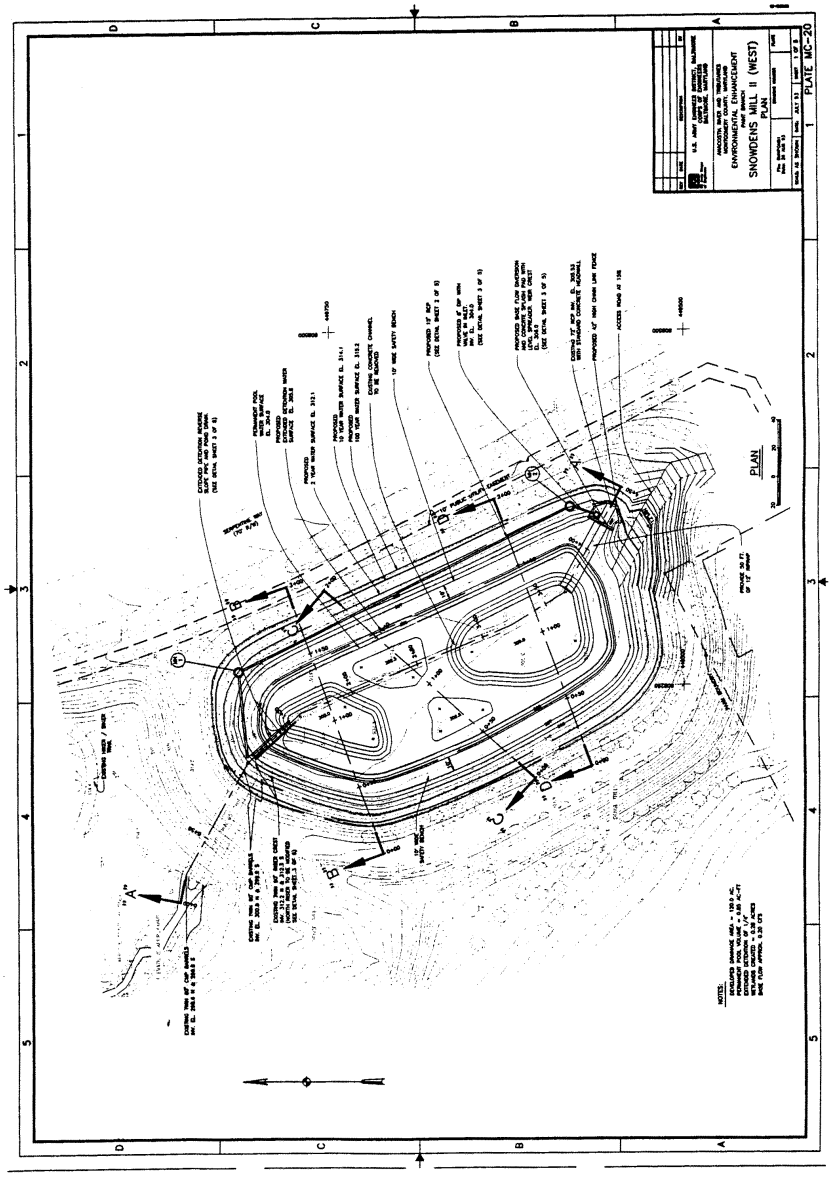

REAL ESTATE REQUIRED
LOCKRIDGE DRIVE
REAL ESTATE PLAN
PLAN
PLATE NC-15

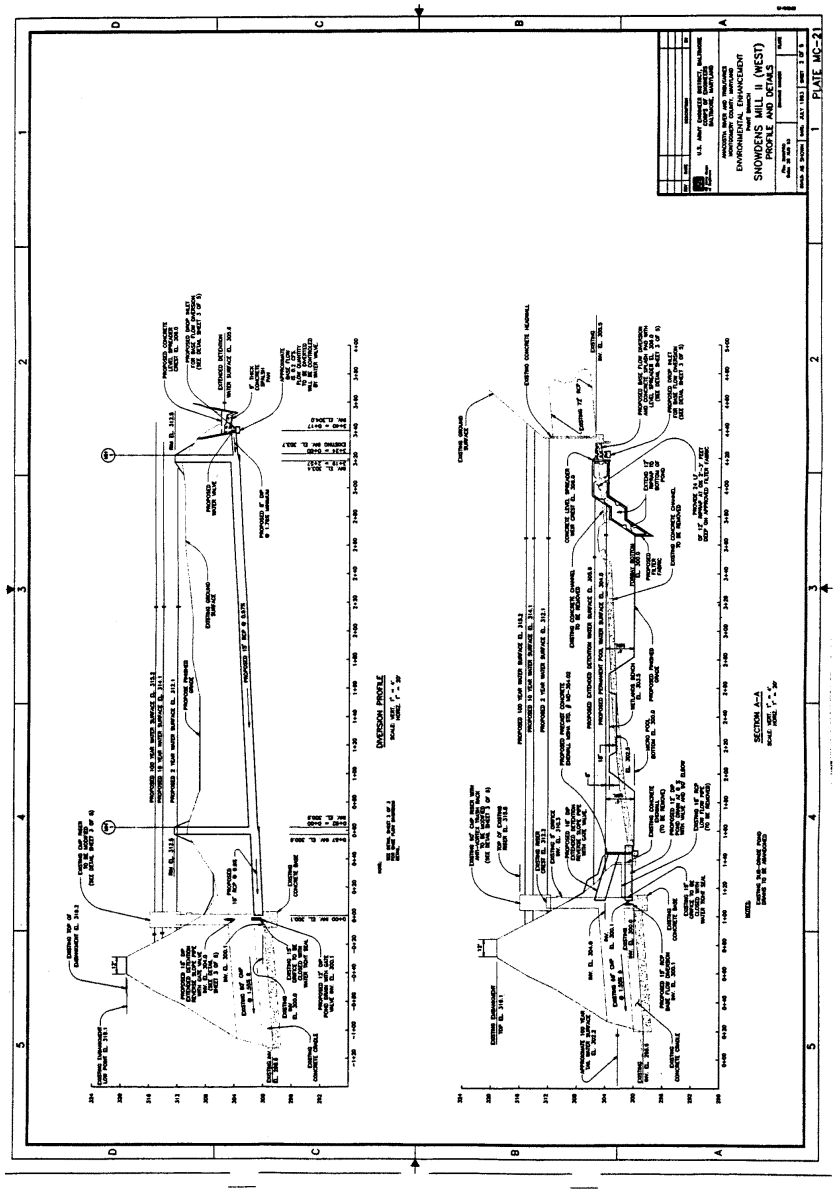

SNOWDENS HILL I (EAST)
PLAN AND DETAILS
PLATE MC-1R
EXISTING RISER MODIFICATIONS
SCALE 1" = 4'
BASE FLOW DIVERSION PLAN
SCALE 1" = 5'
PLAN
SCALE 1" = 20'

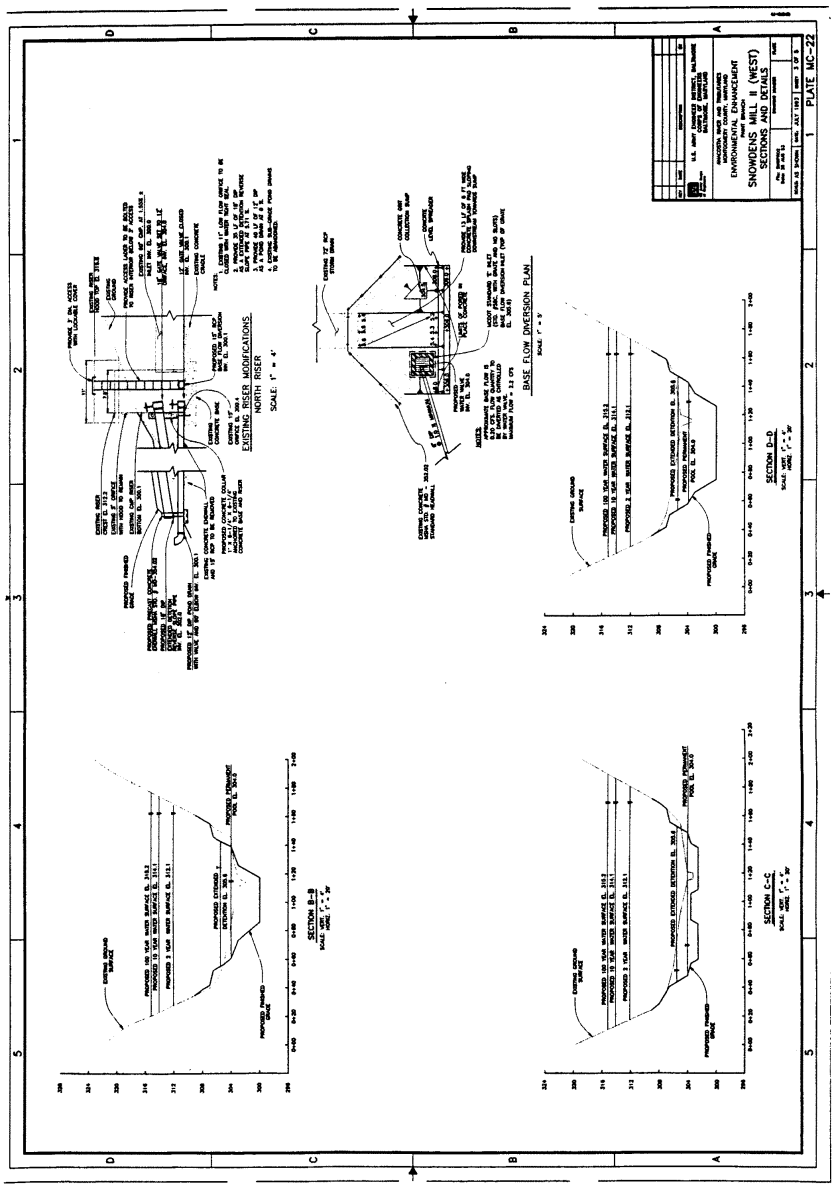

SNOWDENS MILL I (EAST)
PROFILE AND DETAILS
PLATE MC-17

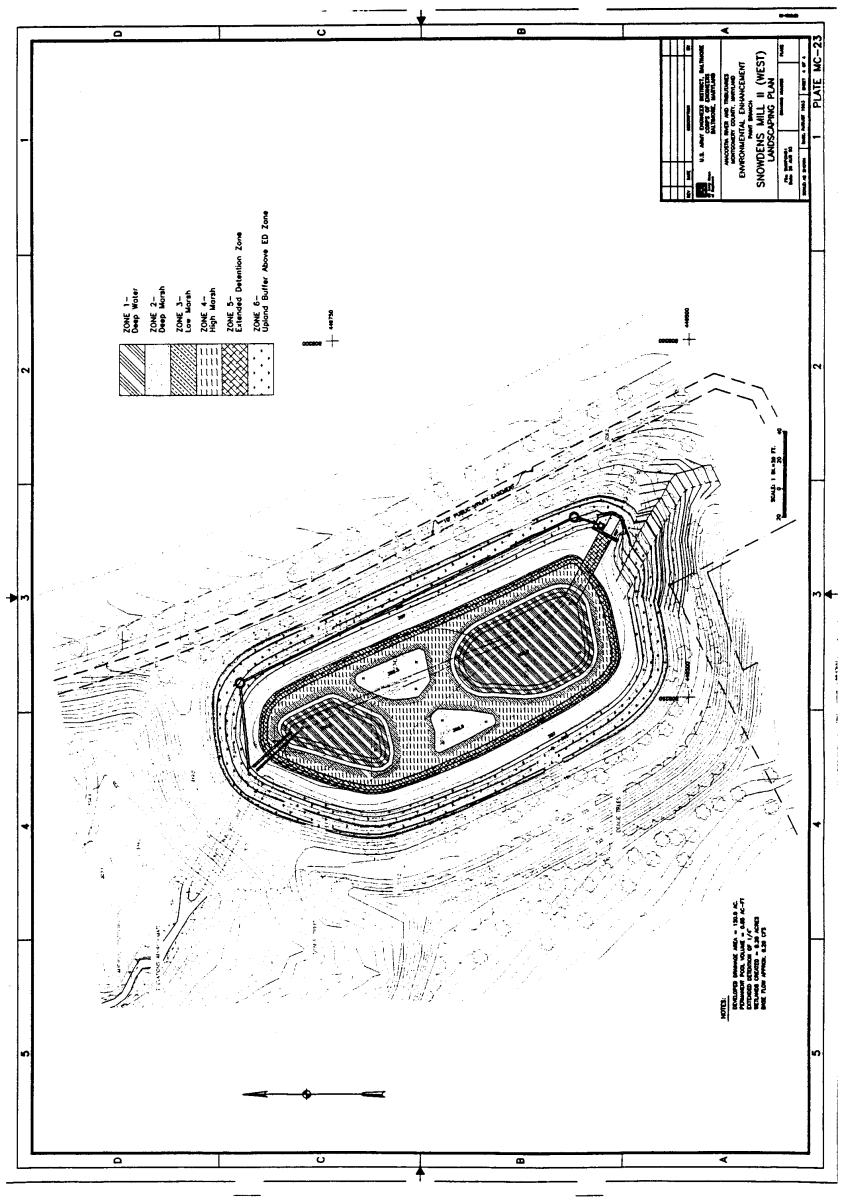

ZONE 1–
Deep Water
ZONE 2–
Deep Marsh
ZONE 3–
Low Marsh
ZONE 4–
High Marsh
ZONE 5–
Extended Detention Zone
ZONE 6–
Upland Buffer above ED Zone
ENVIRONMENTAL ENHANCEMENT
SNOWDEN'S MILL I (EAST)
LANDSCAPING PLAN
PLATE MC-18

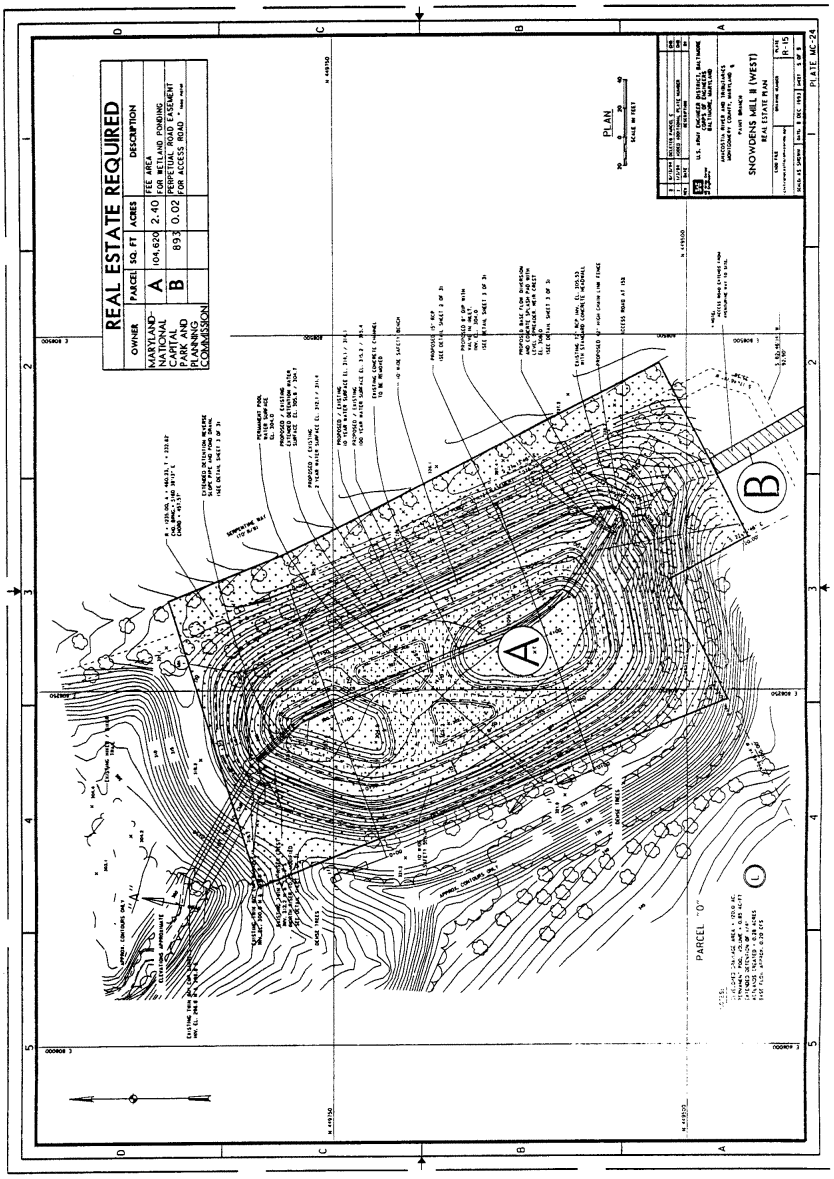

REAL ESTATE REQUIRED
OWNER
PARCEL
SQ. FT
ACRES
DESCRIPTION
PRIVATE
A
154
0.00
FEE AREA FOR WETLAND PONDING AREA
MONTGOMERY COUNTY
B
50,167
1.15
FEE AREA FOR WETLAND PONDING AREA
SNOWDENS MILL (EAST)
REAL ESTATE PLAN
PLAN
SCALE IN FEET
PLATE NC-19

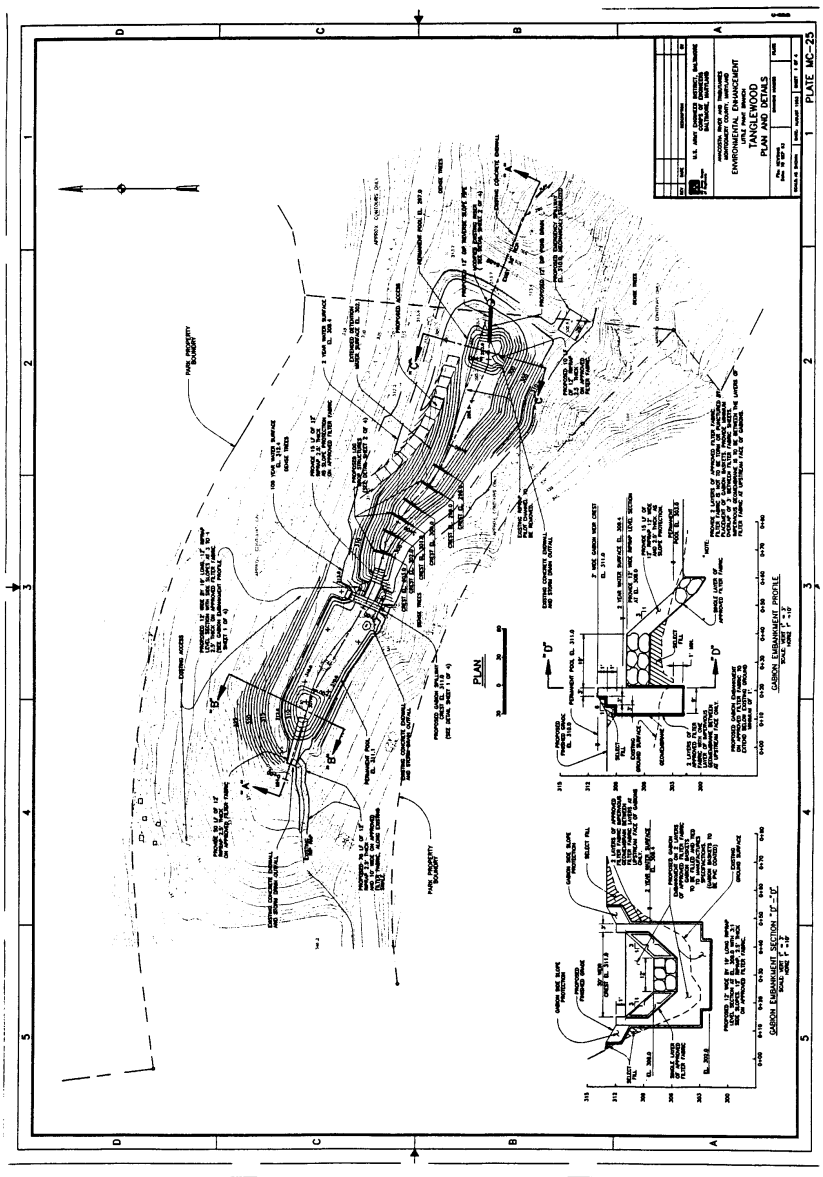

SNOWDENS MILL II (WEST)
PLAN
PLATE MC-20
PLAN

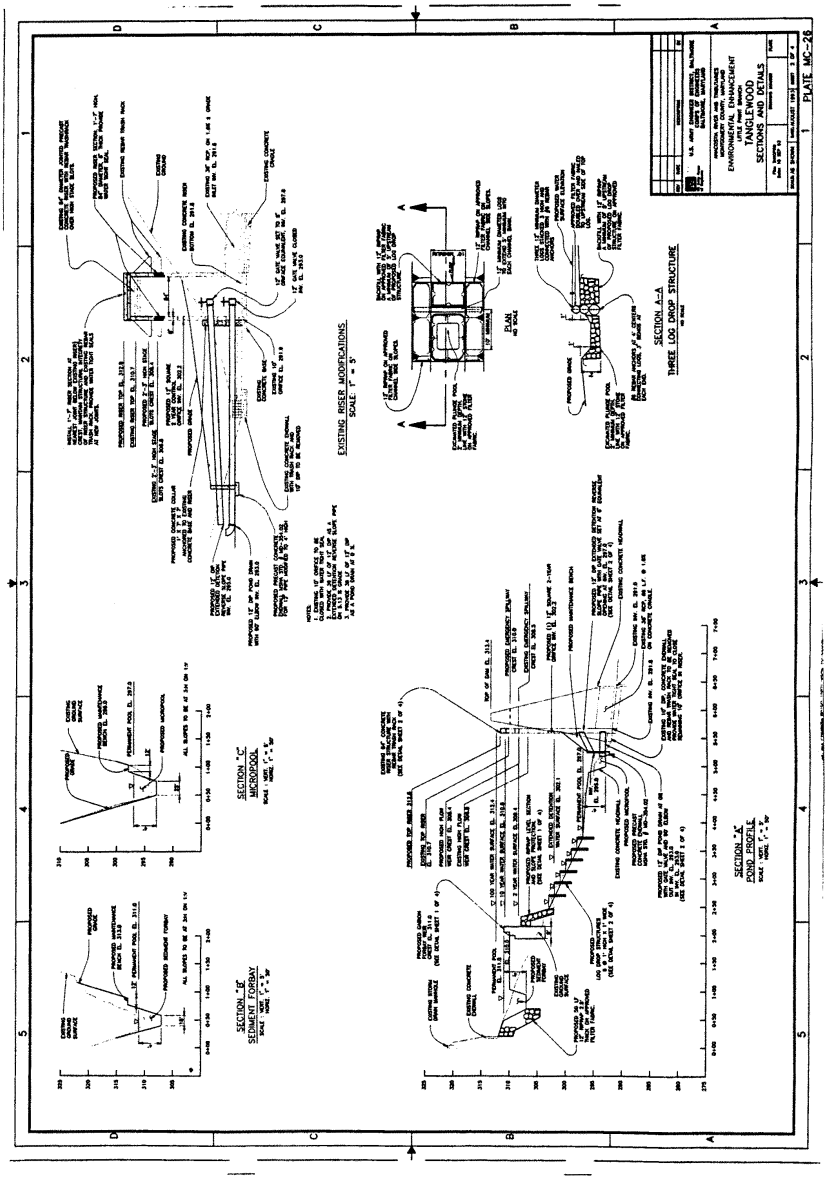

SNOWDENS MILL II (WEST)
PROFILE AND DETAILS
PLATE MC-21


SNOWDENS MILL II (WEST)
SECTIONS AND DETAILS
PLATE MC-22
EXISTING RISER MODIFICATIONS
NORTH RISER
SCALE: 1" = 4'
BASE FLOW DIVERSION PLAN
SECTION B-B
SECTION C-C
SECTION D-D


ZONE 1-
Deep Water
ZONE 2-
Deep Marsh
ZONE 3-
Low Marsh
ZONE 4-
High Marsh
ZONE 5-
Extended Detention Zone
ZONE 6-
Upland Buffer Above ED Zone
SNOWDENS MILL II (WEST)
LANDSCAPING PLAN
PLATE MC-23


REAL ESTATE REQUIRED
OWNER
PARCEL
SQ. FT.
ACRES
DESCRIPTION
MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
A
104,620
2.40
FEE SIMPLE FOR WETLAND PONDING
B
893
0.02
PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
PARCEL "D"
PLAN
SNOWDENS MILL III (WEST)
PLATE MC-24


TANGLEWOOD
PLAN AND DETAILS
PLATE MC-25
PLAN
GABION EMBANKMENT SECTION "D"-"D"
GABION EMBANKMENT PROFILE


TANGLEWOOD
SECTIONS AND DETAILS
PLATE MC-28
EXISTING RISER MODIFICATIONS
SCALE 1" = 5'
SECTION "A"
POND PROFILE
SECTION "C"
MICROPOOL
SECTION "B"
SEDIMENT FOREBAY
SECTION A-A
THREE LOG DROP STRUCTURE

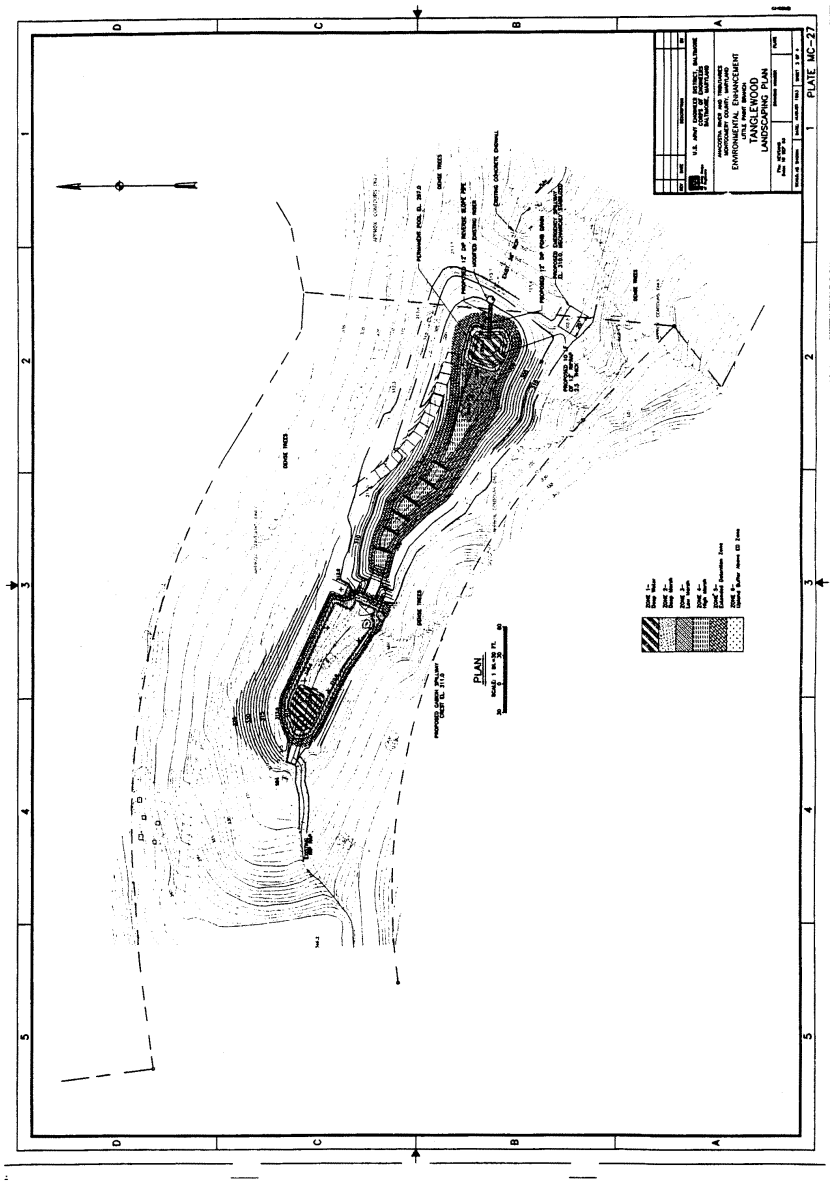
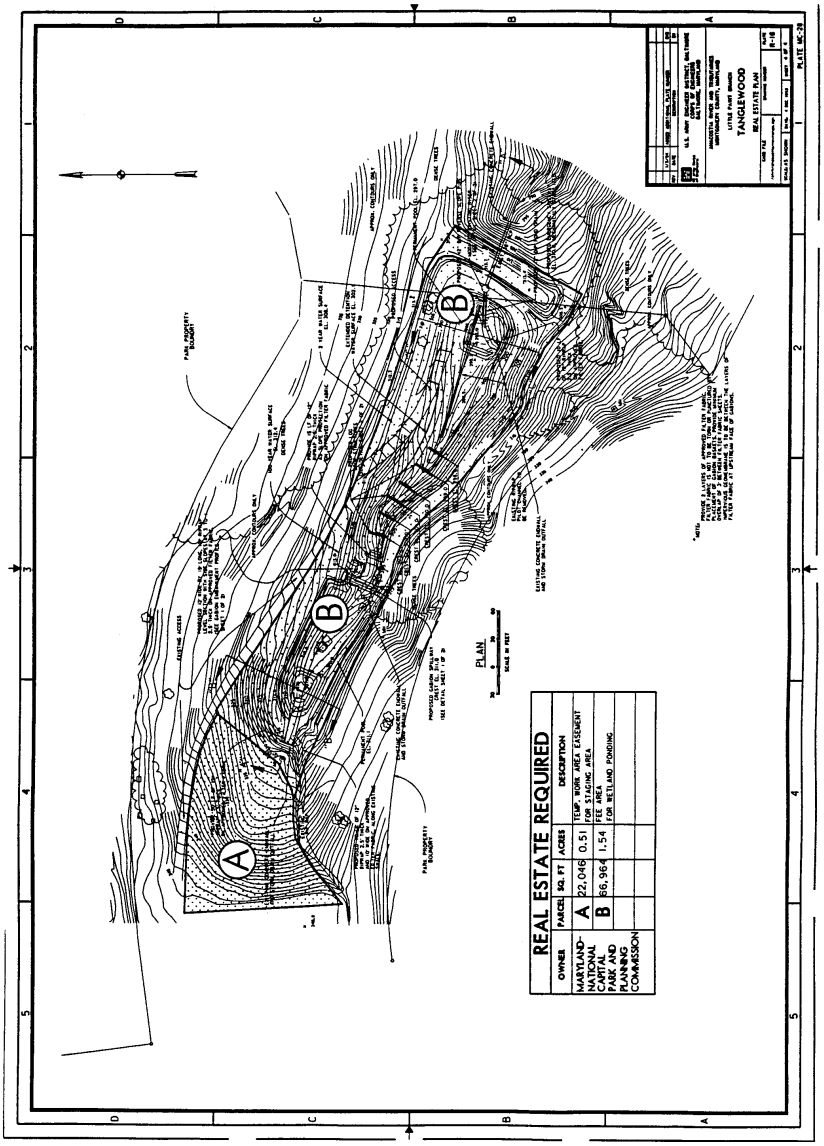
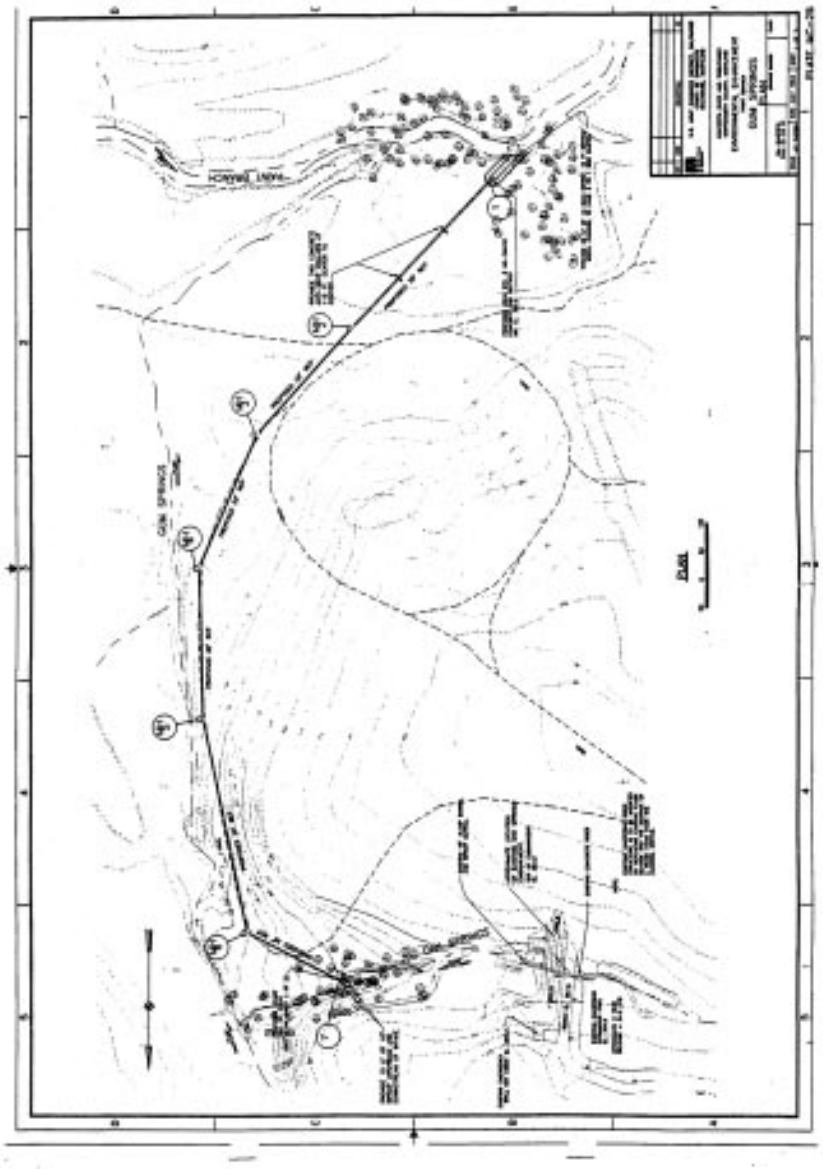
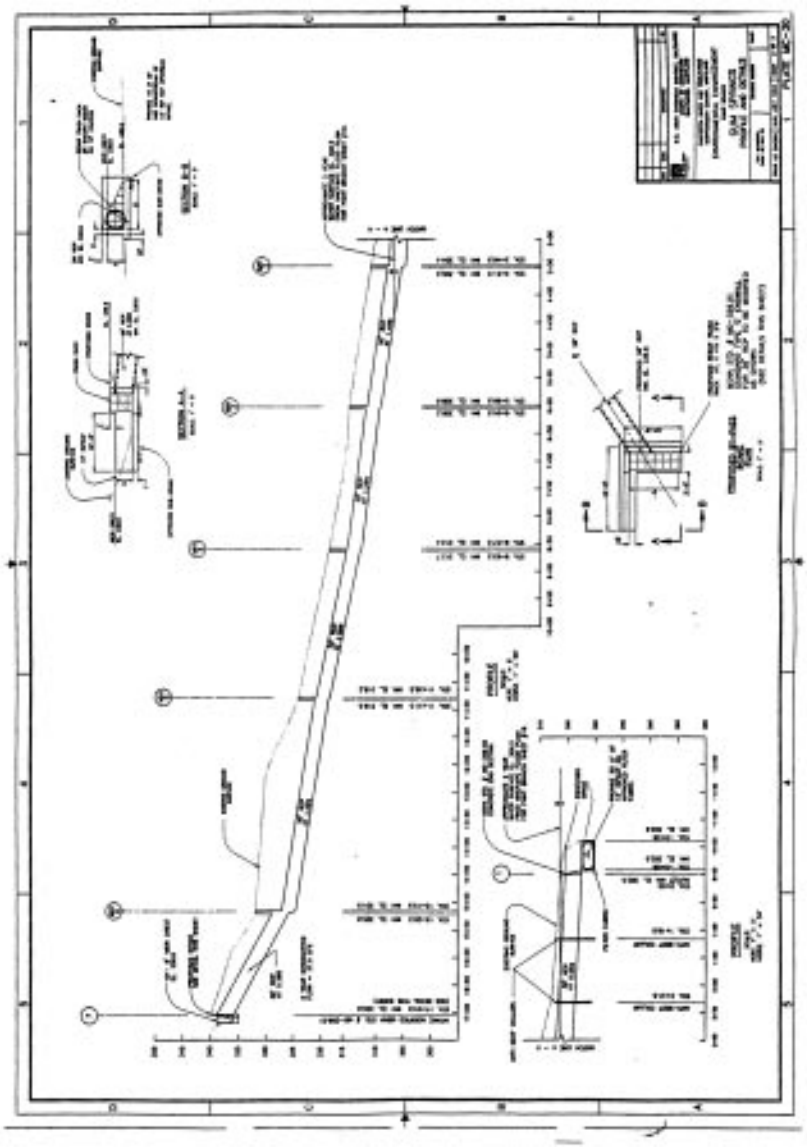
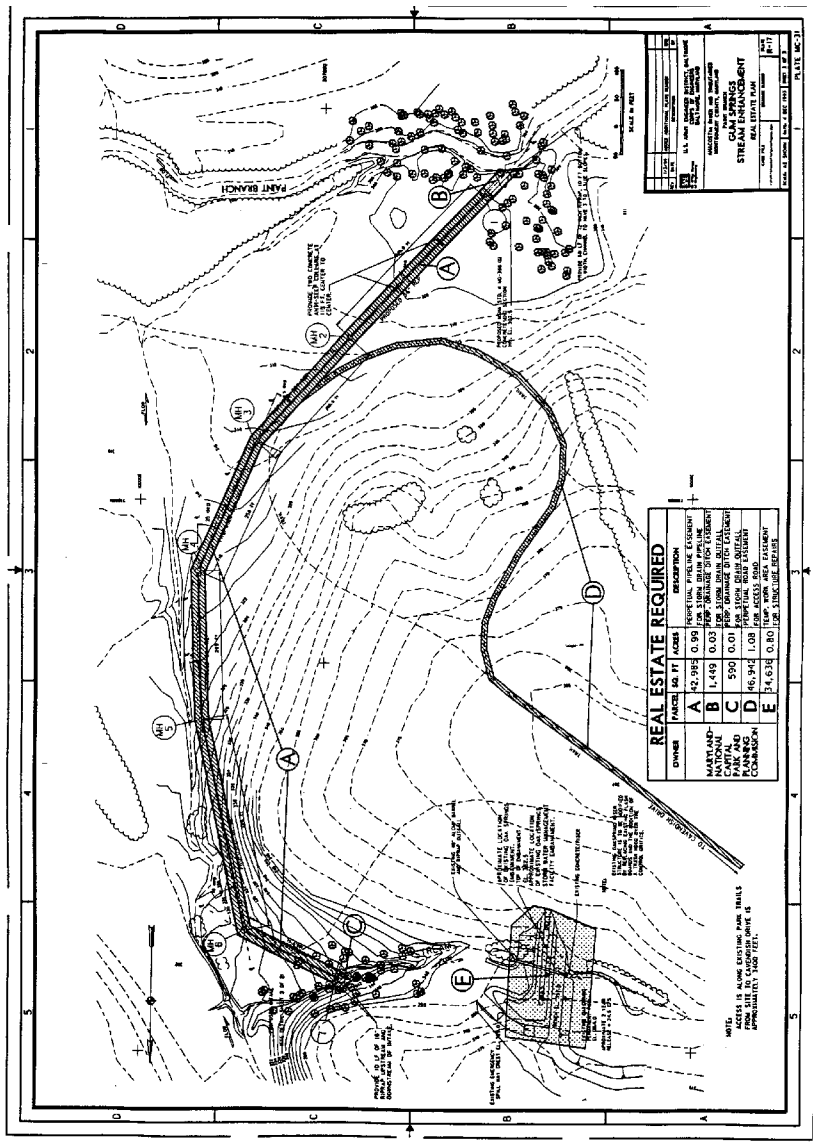


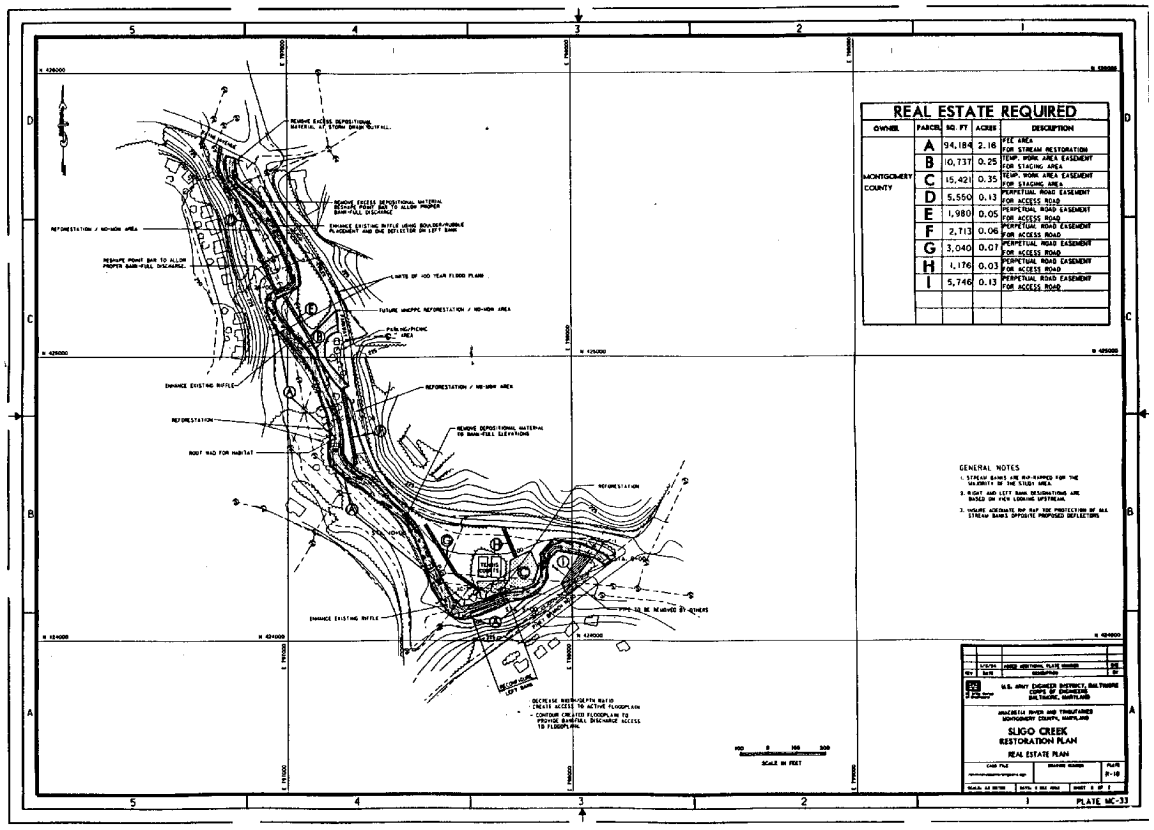
PLATE MC-27
TANGLEWOOD
LANDSCAPING PLAN
PLAN

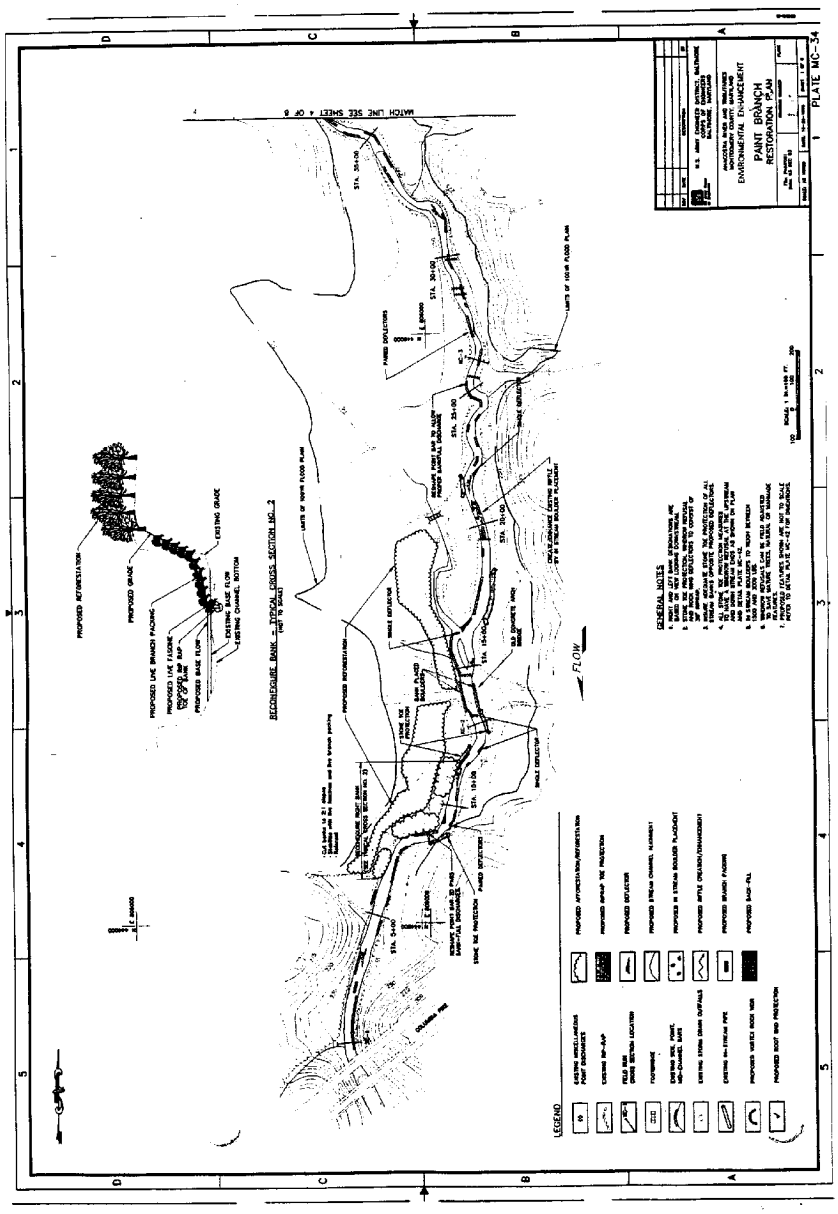

TANGLEWOOD
REAL ESTATE PLAN
PLAN
REAL ESTATE REQUIRED
OWNER
PARCEL
SQ. FT
ACRES
DESCRIPTION
MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
A
22,046
0.51
TEMP. WORK AREA EASEMENT FOR STAGING AREA
B
86,964
1.54
FEE AREA FOR WETLAND PONDING






REAL ESTATE REQUIRED
OWNER
PARCEL
AC. FT.
ACRES
DESCRIPTION
MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
A
42,995
0.99
PERPETUAL FEE & EASEMENT FOR STORM DRAIN OUTFALL
B
1,449
0.03
TEMP. DRAINAGE DITCH EASEMENT
C
590
0.01
PERPETUAL FEE & EASEMENT FOR STORM DRAIN OUTFALL
D
46,942
1.08
PERPETUAL ROAD EASEMENT
E
34,638
0.80
TEMP. WORK AREA EASEMENT FOR STRUCTURE REMOVAL
NOTES:
ACCESS IS ALONG EXISTING PARK TRAILS FROM SITE TO GAITHERSBURG DRIVE IS APPROXIMATELY 1,000 FEET.
PLATE NO. 31


REAL ESTATE REQUIRED
OWNER | PARCEL | SQ. FT | ACRES | DESCRIPTION
MONTGOMERY COUNTY | A | 94,184 | 2.16 | FEE AREA FOR STREAM RESTORATION
B | 10,737 | 0.25 | TEMP. WORK AREA EASEMENT FOR STAGING AREA
C | 15,421 | 0.35 | TEMP. WORK AREA EASEMENT FOR STAGING AREA
D | 5,550 | 0.13 | PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
E | 1,980 | 0.05 | PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
F | 2,713 | 0.06 | PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
G | 3,040 | 0.07 | PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
H | 1,176 | 0.03 | PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
I | 5,746 | 0.13 | PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
GENERAL NOTES
1. STREAM BANKS ARE RIP-RAPPED FOR THE SEGMENTS OF THE STUDY AREA.
2. RIGHT AND LEFT BANK DESIGNATIONS ARE BASED ON VIEW LOOKING UPSTREAM.
3. VOLUME ADJACENT TO RIP RAP SEE PROTECTION OF ALL STREAM BANKS OPPOSITE PROPOSED DEFLECTIONS
REMOVE EXCESS DEPOSITIONAL MATERIAL
REFORESTATION / NO-MOW AREA
ENHANCE EXISTING RIFFLE
REFORESTATION
ROOT WAD FOR HABITAT
FUTURE MNCPPC REFORESTATION / NO-MOW AREA
PARK AND PICNIC AREA
LIMITS OF 100 YEAR FLOOD PLAIN
REMOVE DEPOSITIONAL MATERIAL TO BANK-FULL ELEVATIONS
DECREASE WIDTH/DEPTH RATIO
CREATE ACCESS TO ACTIVE FLOODPLAIN
CONTOUR CREATED FLOODPLAIN TO PROVIDE DIMINISH DISCHARGE ACCESS TO FLOODPLAIN
SCALE IN FEET
U.S. ARMY ENGINEER DISTRICT, BALTIMORE
CORPS OF ENGINEERS
BALTIMORE, MARYLAND
ANACOSTIA RIVER AND TRIBUTARIES
MONTGOMERY COUNTY, MARYLAND
SLIGO CREEK
RESTORATION PLAN
REAL ESTATE PLAN
PLATE MC-33


PAINT BRANCH
RESTORATION PLAN
ENVIRONMENTAL ENHANCEMENT
PLATE MC-34
FLOW
LEGEND
GENERAL NOTES

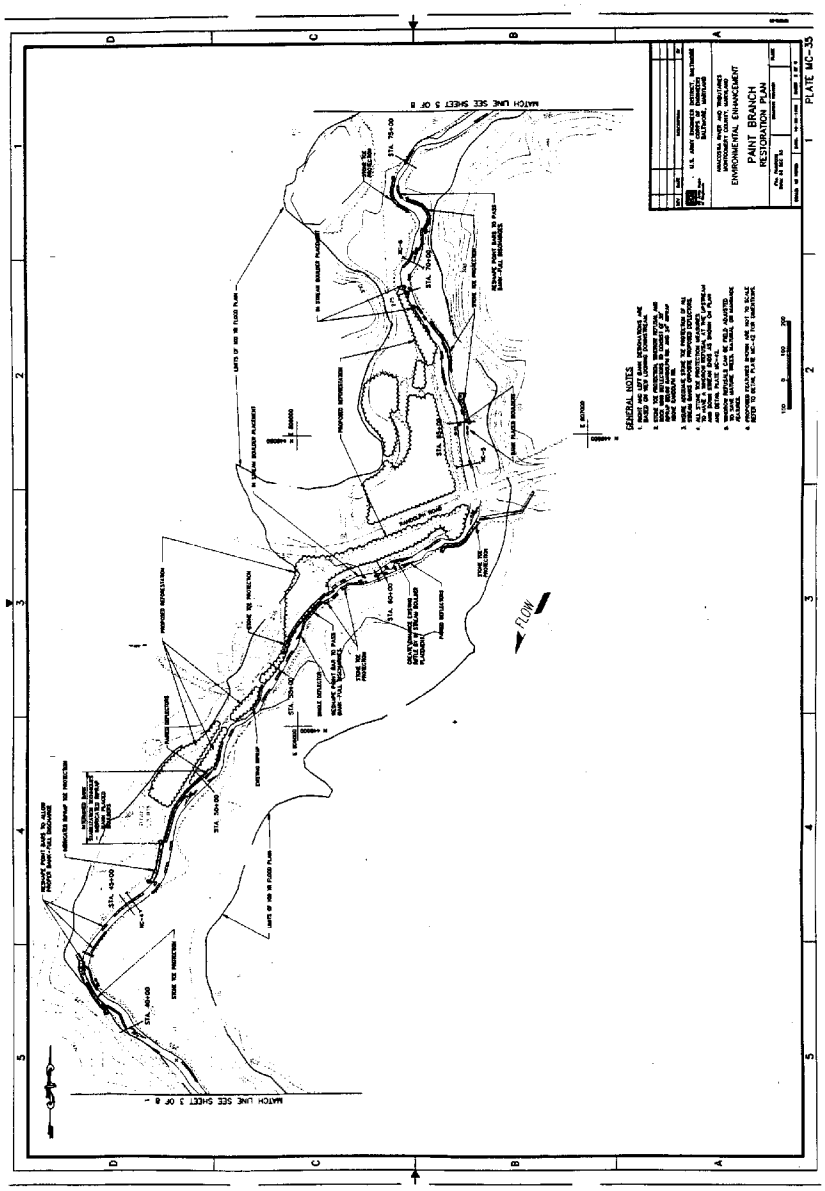
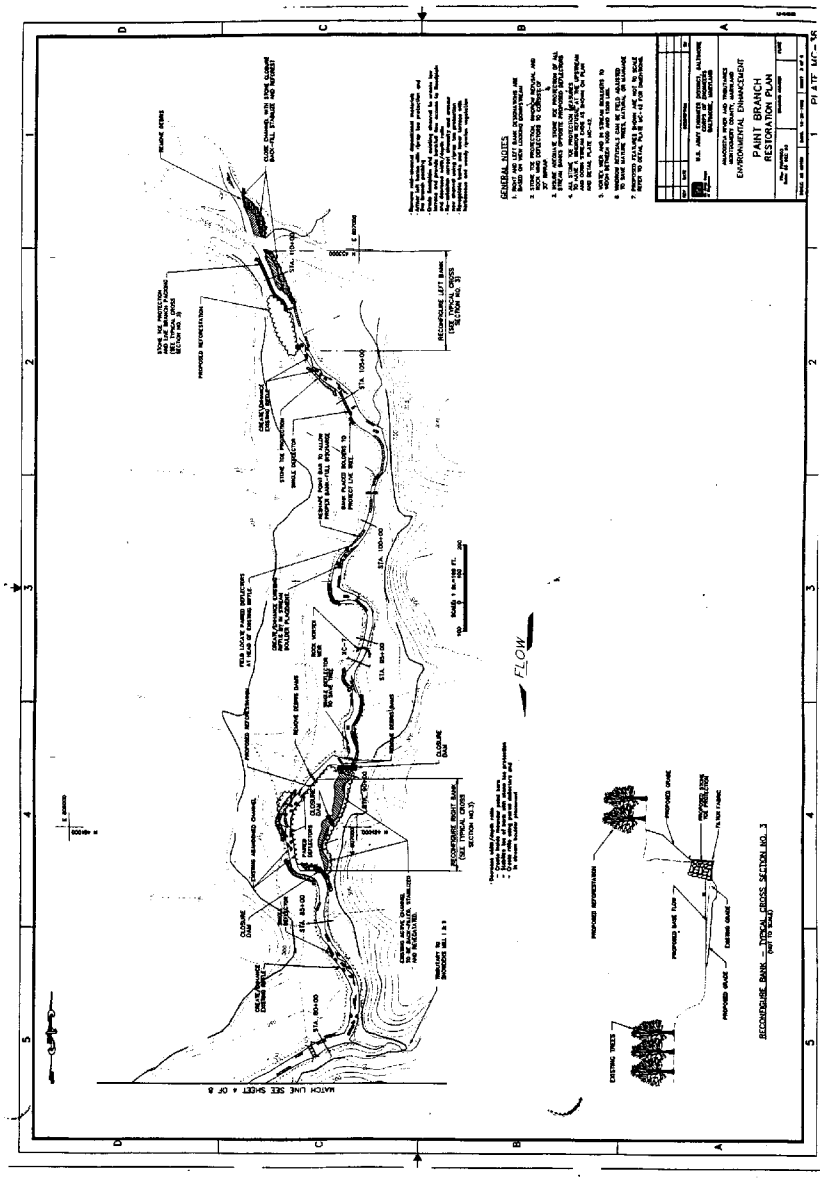
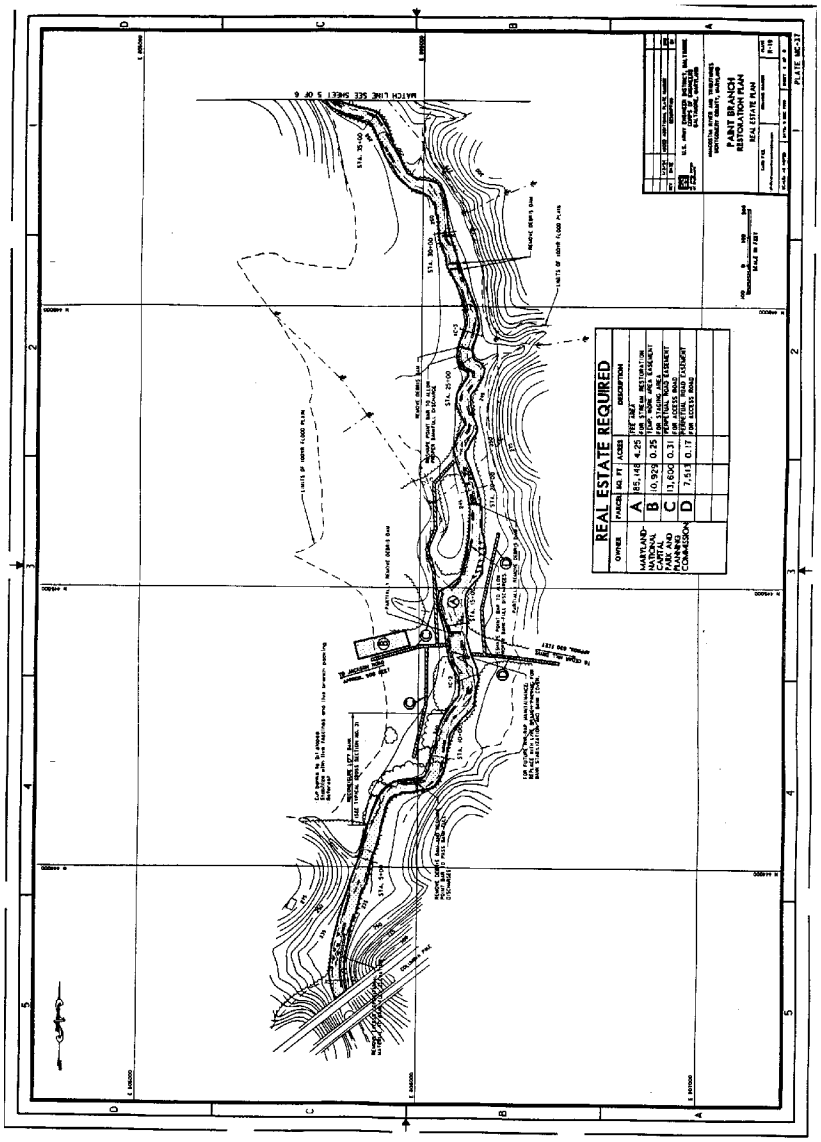
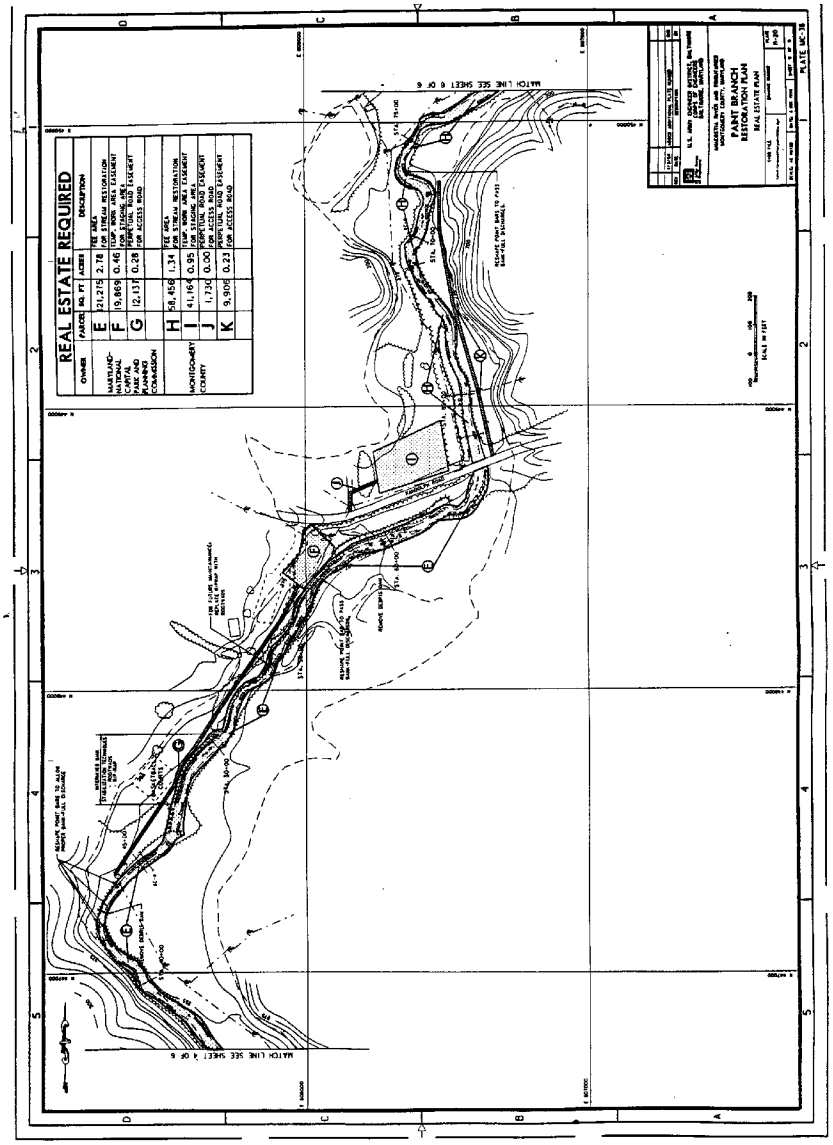
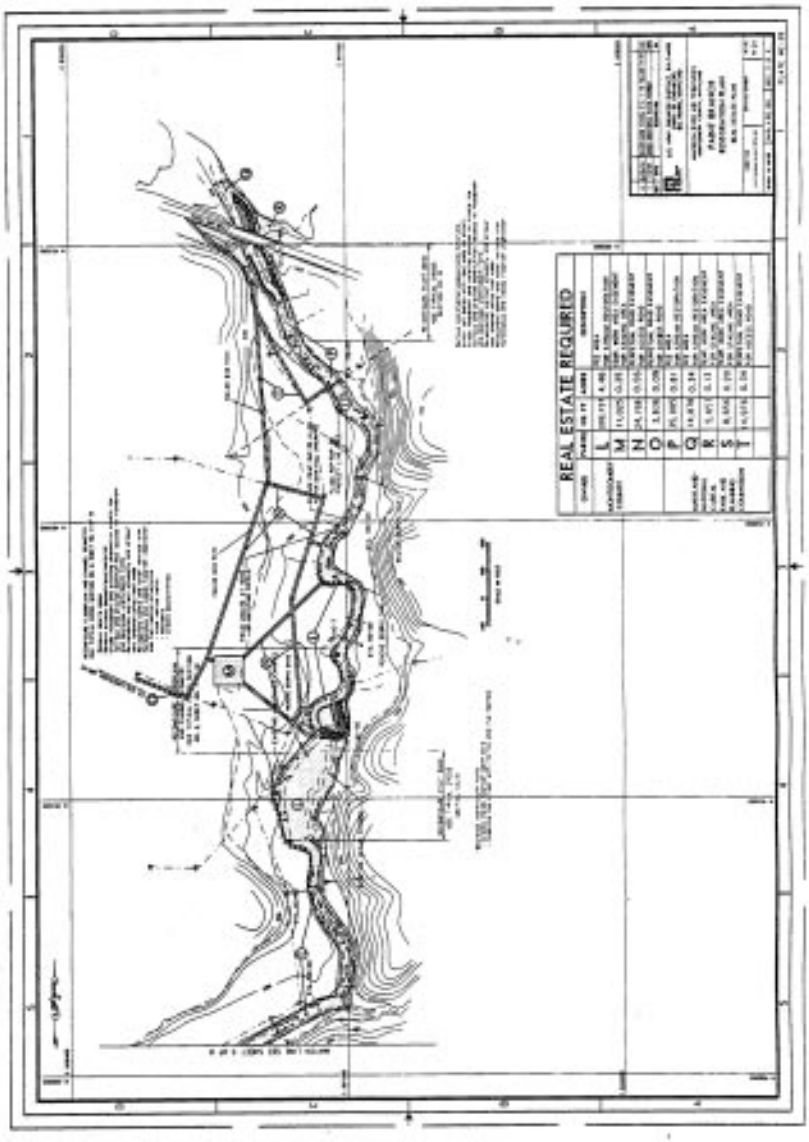


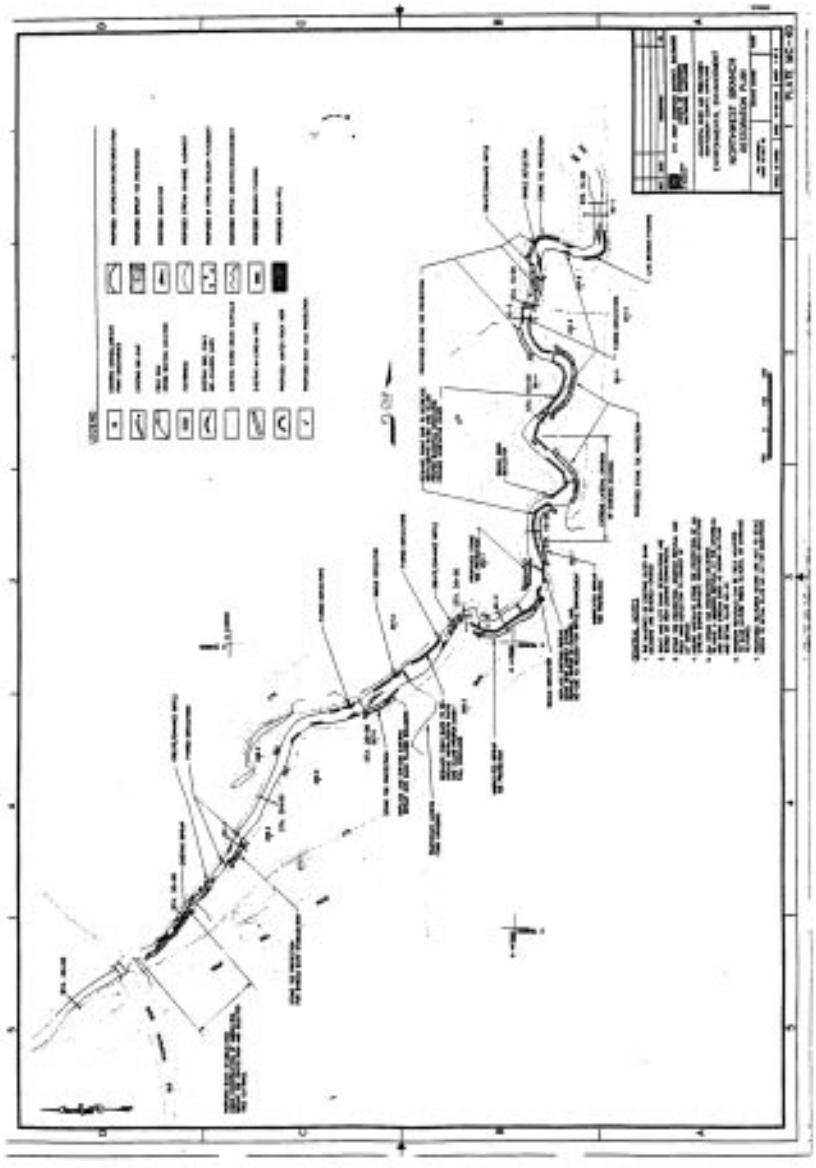
PLATE MC-35
PAINT BRANCH
RESTORATION PLAN
ENVIRONMENTAL ENHANCEMENT
GENERAL NOTES
FLOW
MATCH LINE SEE SHEET 3 OF 8
MATCH LINE SEE SHEET 5 OF 8

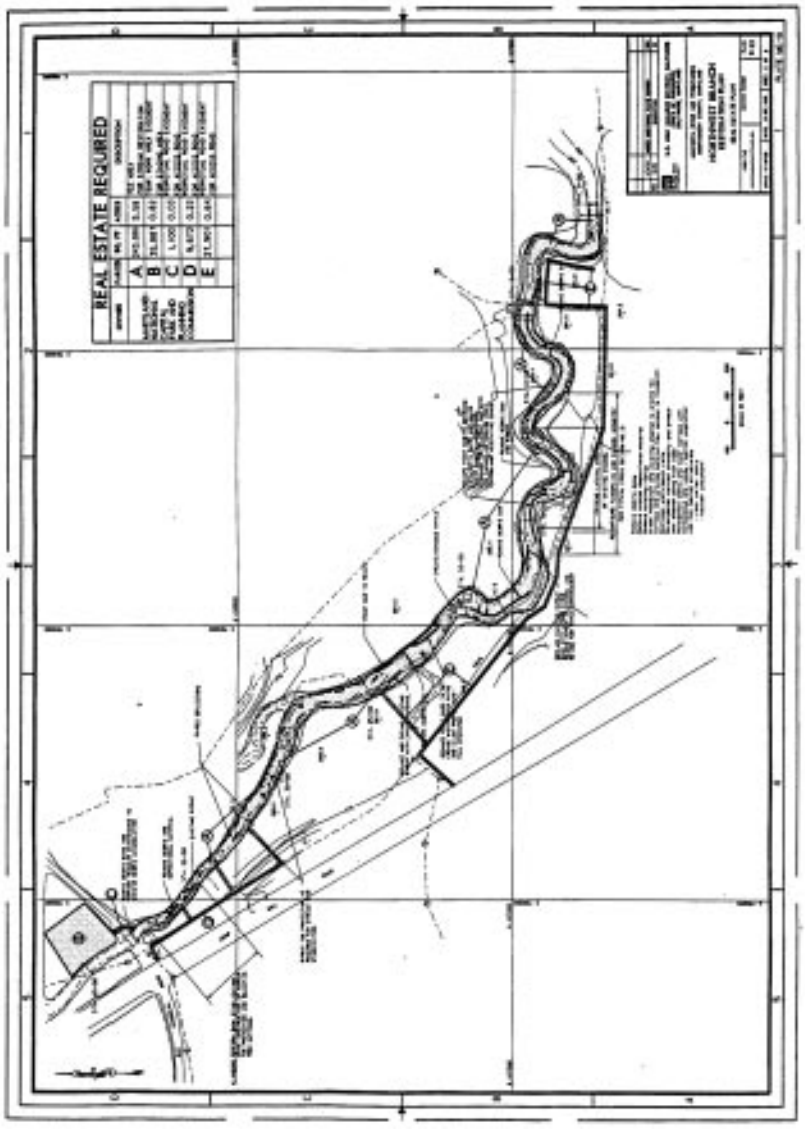

PAINT BRANCH
RESTORATION PLAN
ENVIRONMENTAL ENHANCEMENT
FLOW
GENERAL NOTES
RECONFIGURE RIGHT BANK
RECONFIGURE LEFT BANK
MATCH LINE SEE SHEET 4 OF 8

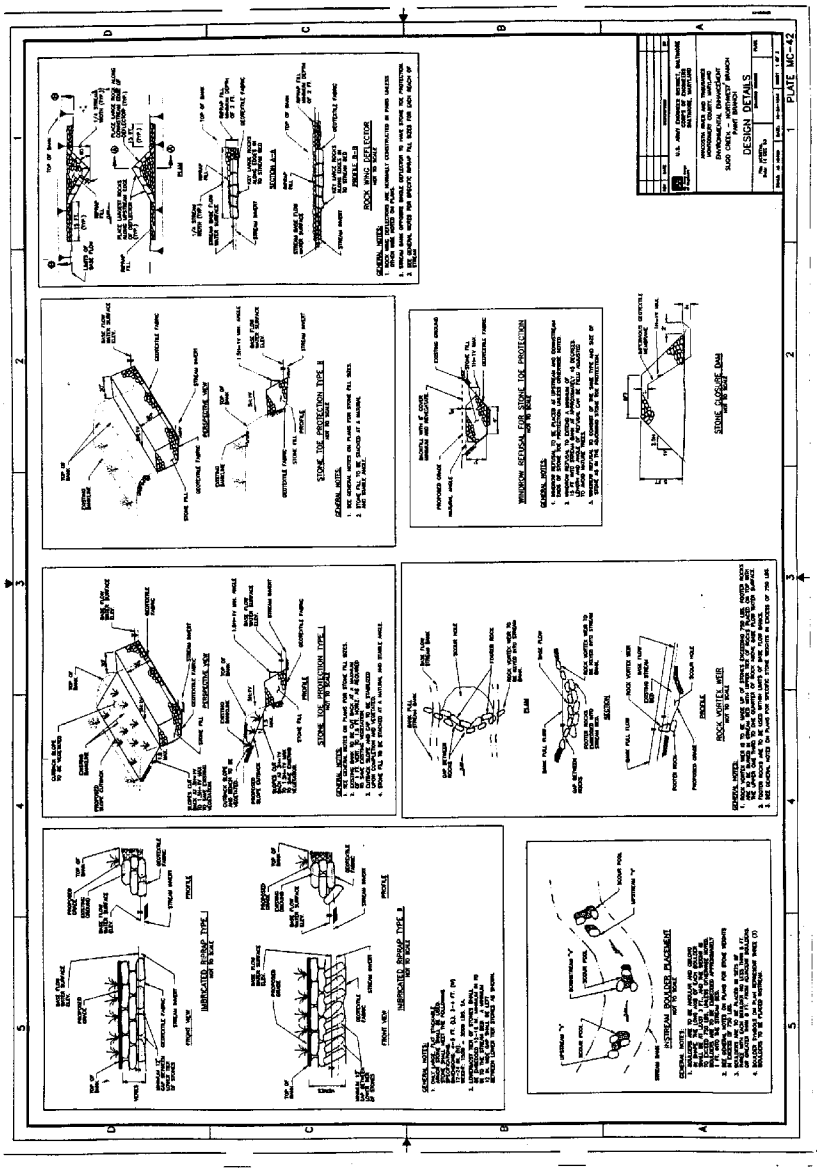

REAL ESTATE REQUIRED
OWNER
PARCEL
SQ. FT.
ACRES
DESCRIPTION
MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
A
185,148
4.25
FEE SIMPLE
FOR STREAM VALLEY PARK AND ACCESS
B
10,929
0.25
TEMPORARY CONSTRUCTION EASEMENT FOR STREAM VALLEY PARK AND ACCESS
C
13,600
0.31
FEE SIMPLE FOR ACCESS ROAD
D
7,514
0.17
TEMPORARY CONSTRUCTION EASEMENT FOR ACCESS ROAD
PAINT BRANCH
RESTORATION PLAN
REAL ESTATE PLAN
PLATE NO. 37

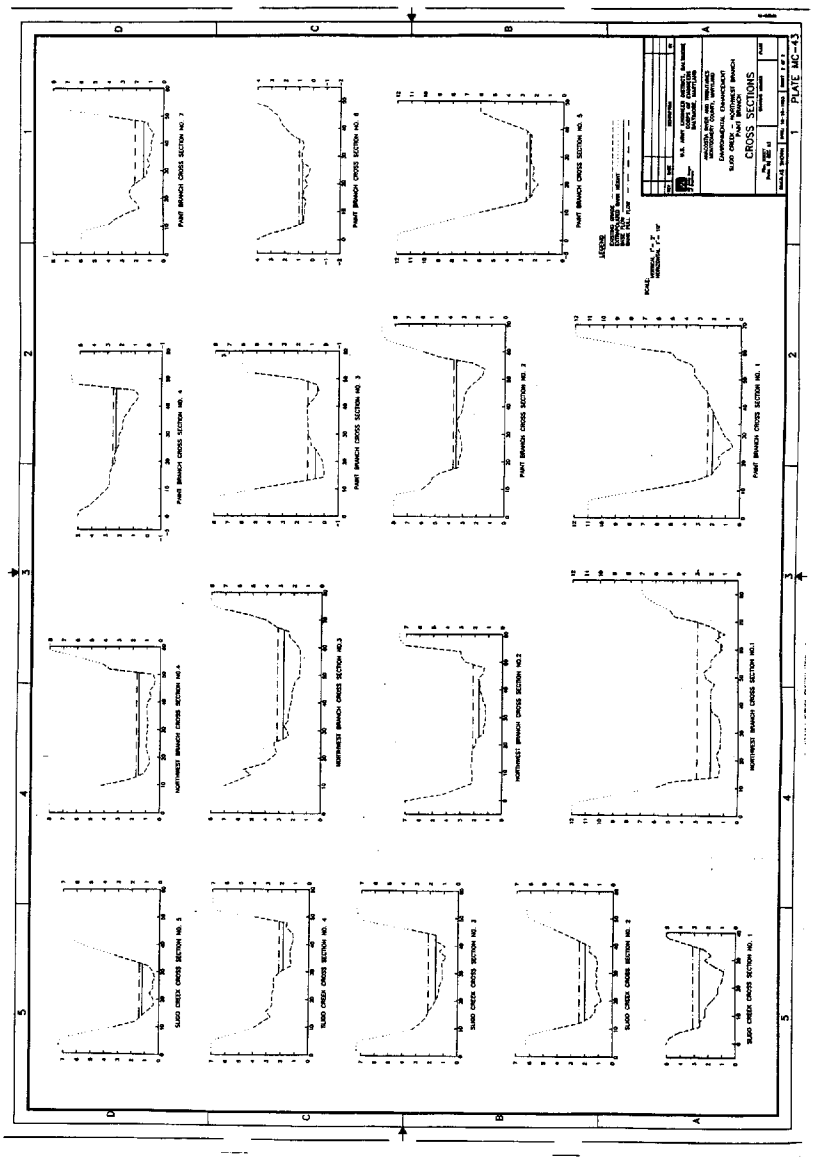

REAL ESTATE REQUIRED
OWNER
PARCEL
SQ. FT
ACRES
DESCRIPTION
MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION
E
121,275
2.78
FEE FOR RIPARIAN RESTORATION
F
19,869
0.46
TEMP. WORK AREA EASEMENT FOR STAGING AND ACCESS ROAD
G
12,131
0.28
PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
MONTGOMERY COUNTY
H
58,458
1.34
FEE FOR RIPARIAN RESTORATION
J
41,164
0.95
TEMP. WORK AREA EASEMENT FOR STAGING AND ACCESS ROAD
J
1,750
0.00
PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
K
9,905
0.23
PERPETUAL ROAD EASEMENT FOR ACCESS ROAD
MATCH LINE SEE SHEET 4 OF 6
MATCH LINE SEE SHEET 6 OF 6
PAINT BRANCH RESTORATION PLAN
REAL ESTATE PLAN
PLATE MC-78


REAL ESTATE REQUIRED




REAL ESTATE REQUIRED
A
B
C
D
E


DESIGN DETAILS
PLATE MC-42


CROSS SECTIONS
PLATE MC-43

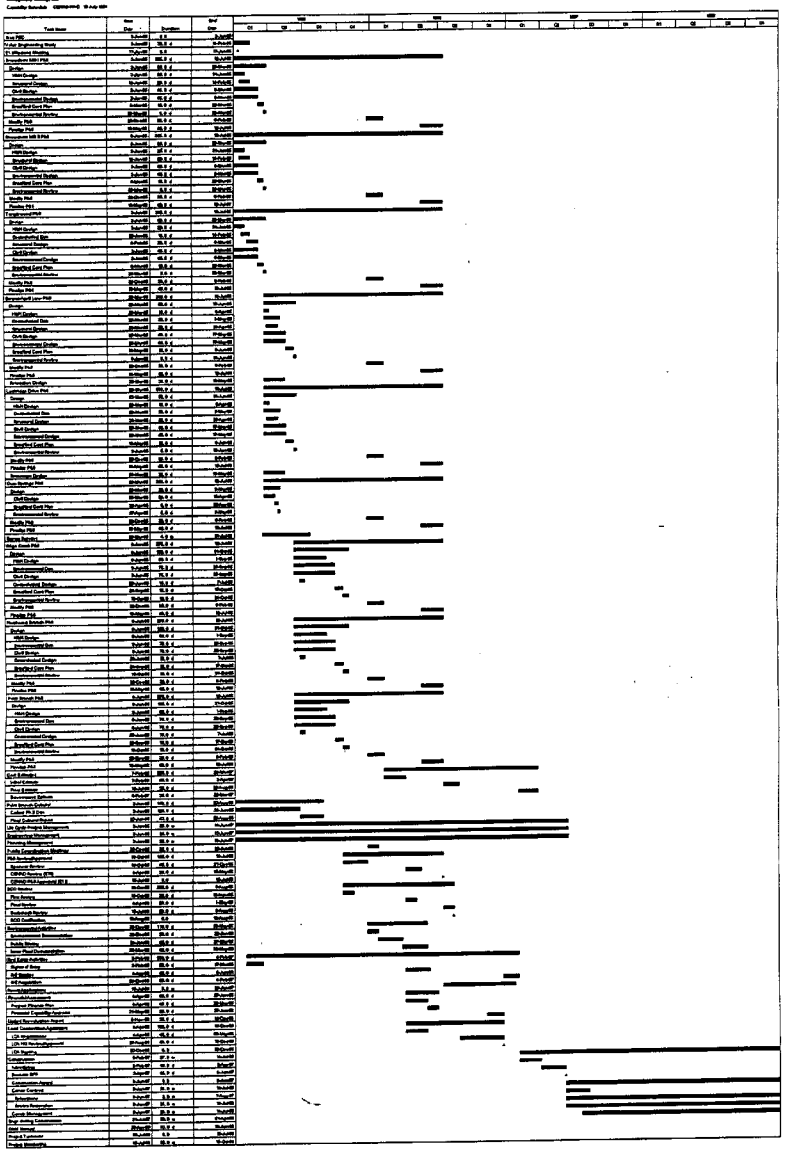


PLATE MC-44