1992 Potomac River Basin Study

PART I: THE ANACOSTIA RIVER:

Task 1: Migratory Fish Surveys and Fish Passage Coordination

Task 2: Freshwater Fisheries Evaluations and Habitat Assessments

Task 3: Stream Restoration

PART II: THE NORTH BRANCH, POTOMAC RIVER:

Task 4: Fisheries Evaluations and Water Quality Analysis

Task 5: Project Coordination

By

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Interstate Commission on the Potomac River Basin
Living Resources Section

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ABSTRACT

Encouraging progress has recently occurred in the restoration of two important yet abused tributaries of the Potomac River, the Anacostia River and the North Branch. In the Anacostia River, herring are again entering long-blocked spawning habitat, urban stormwater management has become more fine-tuned, and citizens have united to help clean up the resource. In 1992 the U.S. Army Corps of Engineers (USACE) began Anacostia Project modifications for the improvement of the environment under Section 1135 of the Water Resource Act of 1986. Removal of blockages to fish migration and improvement of fish habitat are part of this work. In the North Branch, trout are now being raised in the tail-race below the Jennings Randolph Lake Project, waters once considered biologically dead. Public interest and momentum for improving these two tributaries is also growing, as is the critical need for interstate and intergovernmental coordination of these restoration efforts.

Changes in migratory fish usage of Maryland portions of the Anacostia River tributaries were evaluated using electrofishing surveys of adults during the spring runs. Migratory fish runs of alewife herring (Alosa pseudoharengus), blueback herring (Alosa aestivalis), white perch (Morone americanus), striped bass (Morone saxatilis) and yellow perch (Perca flavescens) were monitored. The relative strengths of each migratory fish species spawning run was compared to the results of earlier survey activities. Although migratory runs in this portion of the Anacostia River remain weak, new portions of spawning habitat in the Anacostia River were found to be utilized by migratory fishes due to removal of a fish blockage in the Northeast Branch.

Assessments were made of fish communities and habitats in two flood control areas of the Northeast and Northwest Branches of the Anacostia River in preparation for fish habitat improvement. Gamefish populations were assessed using three pass depletion models applied to information from backpack electrofishing captures taken at four stations. The study areas were all found to suffer from channelization which negatively impacted fish community structure and limits gamefish growth. Habitat improvements to several Anacostia streams were performed in conjunction with the Maryland Conservation Corps

Coordination of a bi-state and federal fisheries plan was performed for a multi-species recreational fishery in the North Branch, Potomac River. Much of the effort in 1992 was directed towards developing a Reciprocal Compact for the Enforcement of Natural Resources Laws and Regulations between the States of Maryland and West Virginia because portions of their state boundaries were obscured with the filling of the Jennings Randolph Reservoir. This Compact is currently undergoing authorization by the Maryland and West Virginia state legislatures in preparation for subsequent ratification by the Congress of the United States.

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TASK 1: Migratory Fish Monitoring and Fish Passage Coordination:

The major goals of the 1992 migratory fish survey were to determine the magnitude and extent of migration of the five anadromous species currently using the Anacostia watershed; the alewife herring, blueback herring, white perch, yellow perch and striped bass.

Procedures:

Sampling at known or suspected blockages was conducted twice weekly between March 2, 1992 and May 29, 1992. The eleven locations sampled are shown in Map #1 and described in Figure #1.

Sampling consisted of electrofishing collections conducted immediately downstream of known and suspected blockages. On the Northeast Branch, collections were initiated at the most downstream blockage above the tributaries. If migratory fish were captured, sampling was then repeated at the next upstream blockage and thus proceeded until a blockage was reached at which no migratory fishes were captured. This method was used to define the upstream limits of migration.

Electrofishing collections were performed using a Smith-Root Model 15-A gas generator powered backpack electrofishing unit operating with direct current. One person operated the electrofisher while one other person netted stunned fish with a smith-Root Model EDB-83-TD dip net with a 11" x 17" (27.9 cm. x 43.2 cm.) opening, 10" (25.4 cm.) bag, 0.25" (6.4 mm.) knotless mesh bag mounted on a six foot pole. Sampling areas at each blockage were intermittently shocked for a total duration of approximately six minutes. The output power was field adjusted to account for variation in stream conductivity.

Collected fish were counted, measured for length and weight, sexed by evidence of row or milt, notes were taken on their general condition, dorsal fins were clipped to identify that they had been captured, and then they were released. Attempts were made to capture all fish sighted during electrofishing. When fish abundance was so high that capture of all individuals was not possible or desirable the fish were subsampled and records were kept on the estimated size of the school observed responding to electrofishing. Water temperature, clarity, general flow and weather conditions were recorded at each site visit.

Map. #1 = Location of Migratory Fish Sampling Sites, Anacostia River, 1992

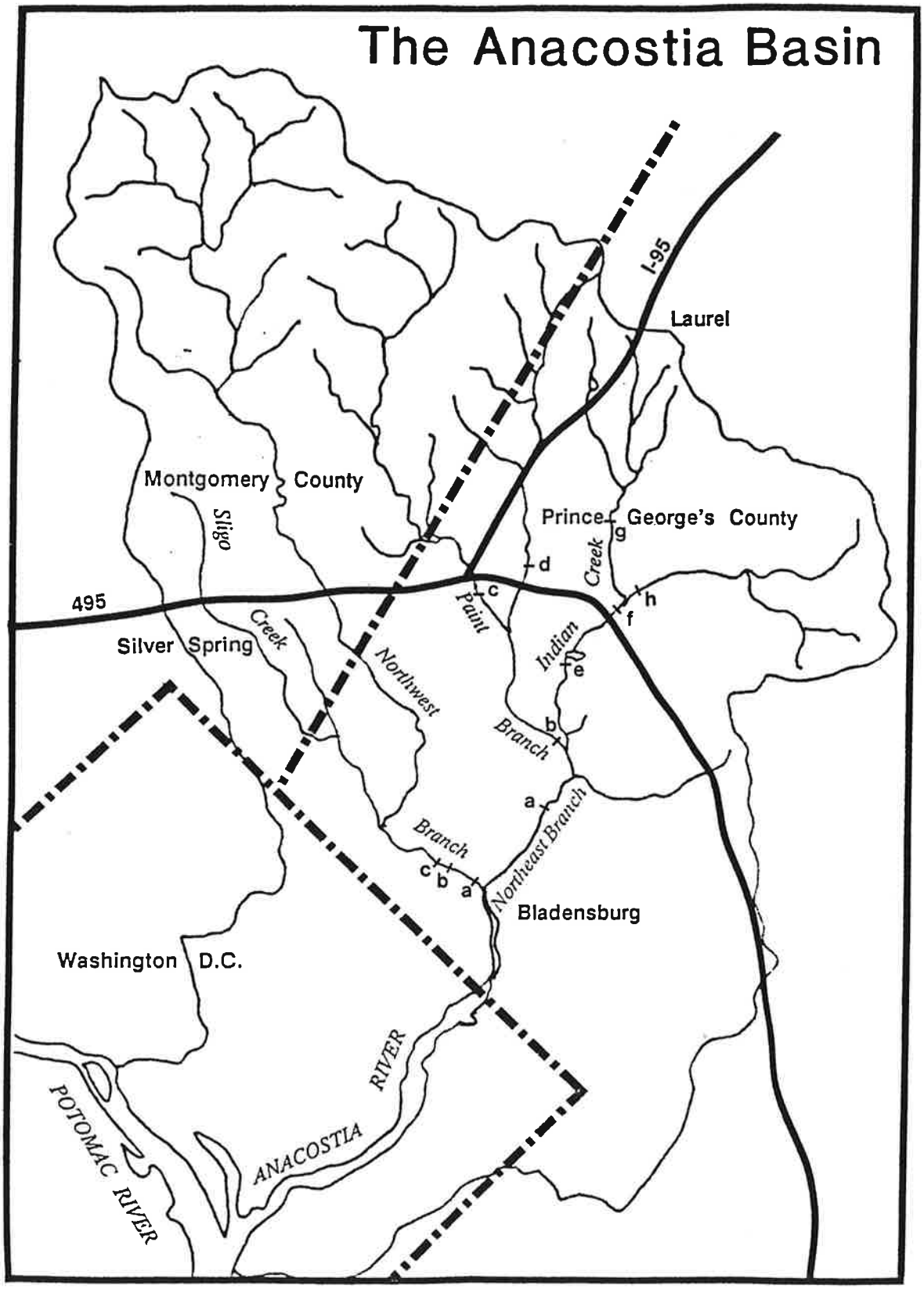


Figure 1.
Inventory and Location of Migratory Fish Sampling Sites
Anacostia River, 1992

1. **Northwest Branch**

   a. Site a, (NWBxRt1): at Route 1 bridge, downstream of concrete apron.

   b. Site b, (NWBx38thSt): 100' upstream from 38th Street.

   c. Site c, (NWBxPUMP): 500' upstream from 38th Street.

2. **Northeast Branch**

   a. Site a, (NExMNCPPC): behind the Maryland National Capitol Parks and Planning Commission Offices on Kenilworth Avenue.

   b. **Paint Branch**, Site b, (PBxCALVERT): 800' upstream from the confluence with Indian Creek.

   c. **Paint Branch**, Site c, (PBxBARC): at gabion dam 1000' downstream from I-495.

   d. **Little Paint Branch**, Site d, (LPBxSELLMA): 3000' downstream from Sellman Road at small concrete dam.

   e. **Indian Creek**, Site e, (IC x GB RD): immediately downstream from the Greenbelt Road bridge culvert.

   f. **Indian Creek**, Site f, (IC x BELT): immediately upstream from I-495 bridge culvert.

   g. **Indian Creek**, Site g, (ICxOLD BALT): 100' downstream from Old Baltimore Boulevard.

   h. **Beaverdam Creek**, Site h, (BC x EDMONST): immediately upstream from Edmonston Road.

Results:

Four anadromous species; alewife herring (Alosa pseudoharengus), blueback herring (Alosa aestivalis), white perch (Morone americanus), and yellow perch (Perca flavescens) and one catadromaous species; the sea lamprey (Petromyzon marinus), were captured during Spring sampling. Alewife were the principle species encountered, blueback herring have represented the minor herring spawner during our five year period of sampling. White perch were primarily captured in the Northwest Branch at the downstream end of the concrete spillway of the Route 1 bridge culvert (Site: NWBxRT1, Map: NWB "a"). Migratory fish runs at stations sampled between 1990 and 1992 indicate that, while still weak, stronger runs were experienced in 1992 than in the recent past (Figures 2 & 3). Alewife herring were collected further upstream in the Indian Creek tributary of the Northeast Branch than in past years. Alewife were collected upstream of the Washington beltway on Indian Creek (Site ICxBELT, Map: NEB "f"), a milestone for anadromous fish in the Anacostia River as well as the Potomac River because it was the first time this has been observed in decades. Consider for a moment that the Washington beltway represents a loop which demarcates potential spawning and nursery habitat for anadromous fish. Fish enter the loop at the Wilson Bridge, but are prevented from reaching upstream habitat by the Little Falls dam on the Potomac mainstem, by the Pierce Mill dam on Rock Creek, and by several small blockages in the Anacostia watershed. Now, for the first time in decades, herring are reaching at least one portion of their historic habitat upstream of the beltway. This was possible because of a modification to a fish barrier near Riverdale Road on the Northeast Branch in 1990.

As is normal, alewife and blueback herring migrations were temporally separated with the peak of the alewife run occurring in mid-April and the peak of the blueback herring run occurring in mid-May. During the spring migratory runs, storm events and resultant high flows were also often accompanied by dramatic rises in water temperature. Following these storm events there was usually an increase in the strength of the migratory run. Alewife migrations were strongest when water temperatures rose from below 10 C to 15 C.

Although high flows appeared to initiate stronger migratory runs, high flows did not alter the migratory fishes inability to pass the current final blockage to migration in Northwest Branch of the Anacostia basin, Maryland. At no time since 1988 have migratory fishes been captured upstream (Site: NWBxPUMPST, Map: NWB "c") from the 38th Street weir on the N.W. Branch (Site: NWBx38thSt, Map: NWB "b"). In the Northeast Branch, no anadromous fishes have been captured at either of two sampling stations (Site: Pbxbarc, Map: NEB "c" & "d") upstream of a similar weir near the mouth of Paint Branch (Site: Pbxcalvert, Map: NEB "b"), nor have any migratory fishes been captured in Upper Beaverdam Creek (Map: NEB "h"). One sea lamprey (Petromyzon marinus), a catadromous fish, was captured in Paint Branch (Site: Pbxbarc, Map: NEB "c") near Interstate 495. This is the most recent account of sea lamprey in this area.

Another encouraging sign for the Anacostia River was that yellow perch were more abundant during this year's surveys than in previous years. Twenty-one yellow perch were captured this year, ranging in size from 130 mm to 186 mm. Prior to 1992, only one yellow perch has been captured in the study area. All yellow perch have been captured in the Northwest Branch at the downstream end of the concrete spillway of the Route 1 bridge culvert (Site: NWBxRT1, Map: NWB "a"). Yellow perch may be expanding their range due to local population increases made possible through water quality improvements and the recent increases in submerged aquatic vegetation, a preferred habitat for yellow perch, on the Potomac mainstem near the Washington metropolitan area.

White perch runs were also a bit stronger in the Northwest Branch during 1992 (Figure #4). The inclined bridge culvert at Route 1 remains the most upstream site that white perch are captured. Most gravid females and milting male white perch were quite small, ranging from 10.5 cm. to 18.8 cm., with an average size of 12.7 cm.

No striped bass (Morone saxatilis) were captured during the 1992 migratory survey. However, it should be noted that three young-of-the-year striped bass were captured during our July field assessments of the Corps of Engineers flood control areas (see Task 2, page 11). They ranged in size from 65 mm to 72 mm.

As a member of the Anacostia Feasibility Study Work Group, ICPRB assisted the U.S. Army Corps of Engineers (USACE) develop migratory fish restoration plans. The Work Group's initial focus has been providing for migratory fish passage at several blockages on the river. ICPRB provided review and comment regarding the USACE's three upcoming fish passage projects; one on Paint Branch and two on the Northwest Branch, which are scheduled to be constructed in June, 1993. Field presentations on Anacostia restoration efforts were provided to USGS staff who are working on the Potomac River Project and to staff of the National Geographic Magazine.

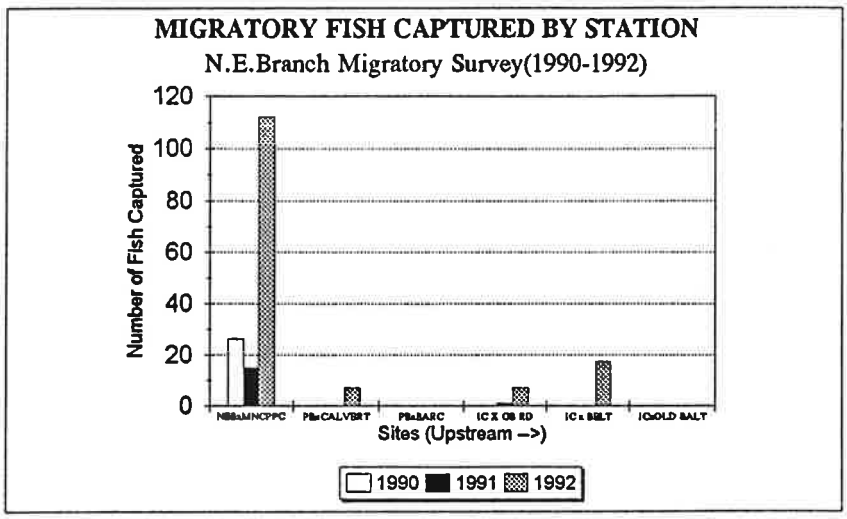


FIGURE 2.

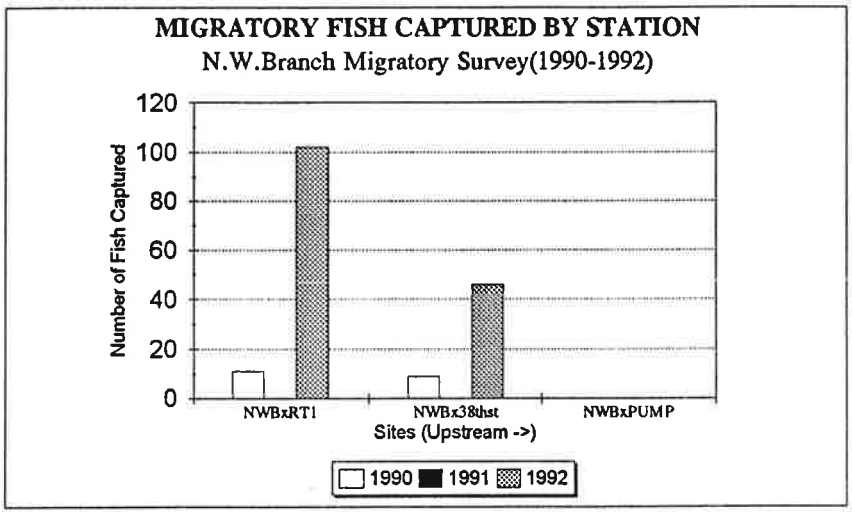


FIGURE 3.

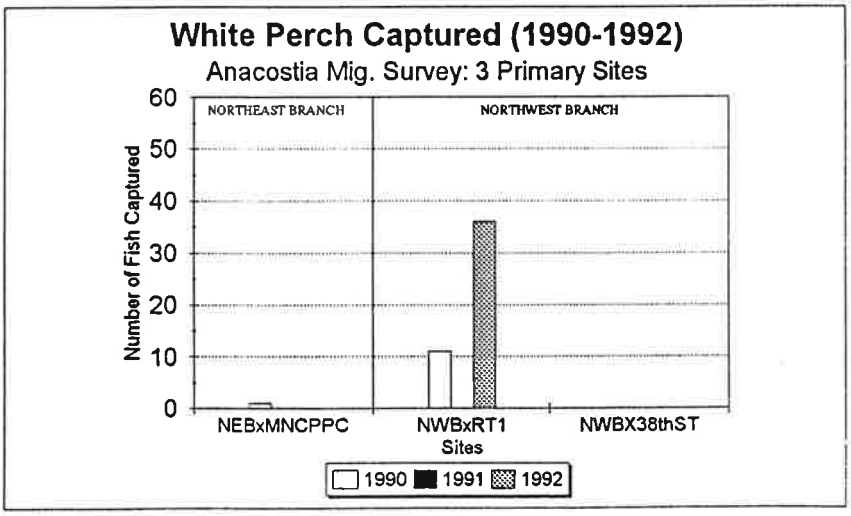


FIGURE 4.

PART I (Cont.): THE ANACOSTIA RIVER RESTORATION

TASK 2: Freshwater Fisheries Evaluations and Habitat Assessments:

The Anacostia River's Northeast and Northwest Branches have been highly impacted by flood control criteria which has resulted in degraded fisheries habitat. Near their confluence, these streams are straight, channelized, rip-rapped levees. They are almost entirely shadeless and their channels are broad and shallow due to channelization. There is little existing fish habitat. ICPRB conducted fisheries monitoring and habitat evaluations in the flood management areas of the Northeast and Northwest Branches.

Procedures:

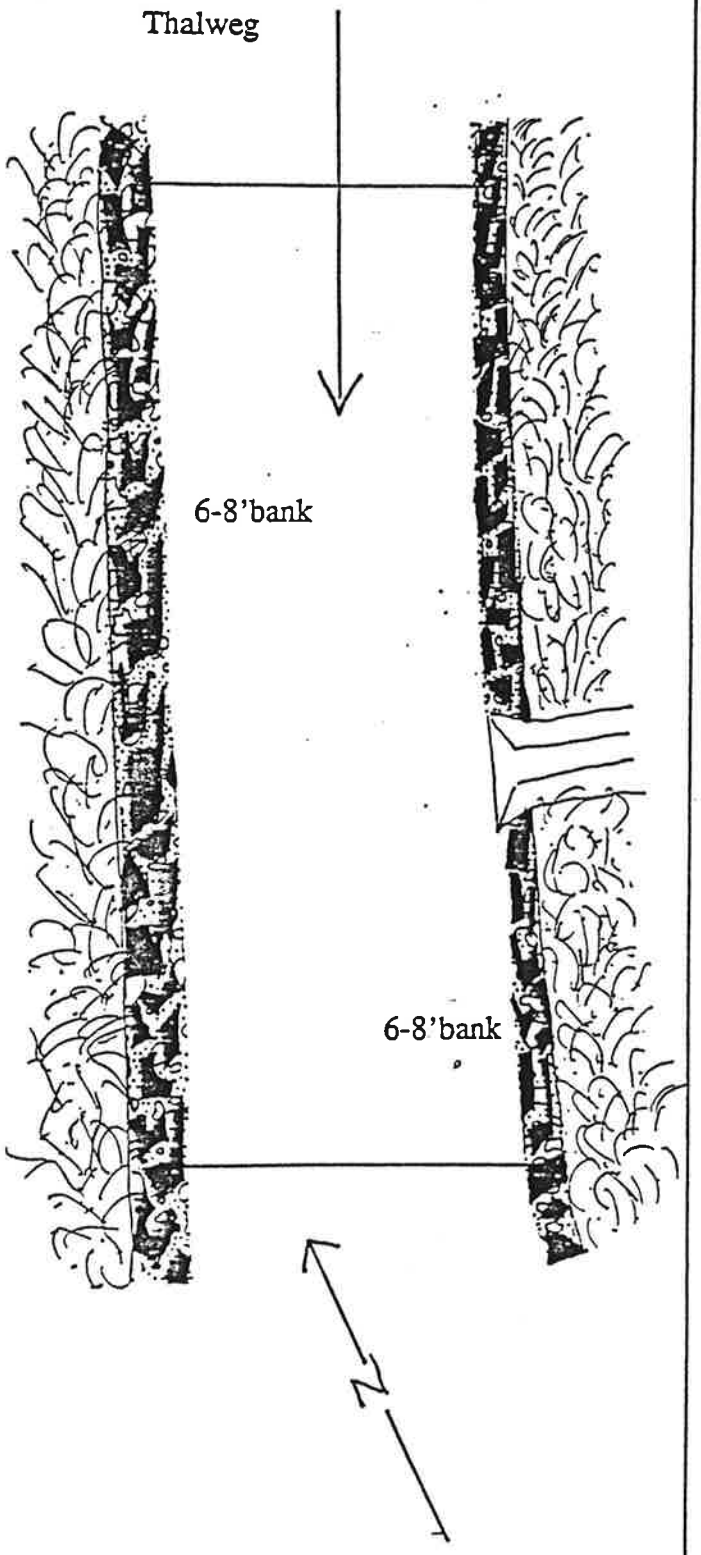
Four study sites, two each on the Northwest and Northeast Branches, were selected from the approximately four mile flood control area targeted for restoration. At each site, upstream and downstream boundaries of fifty meter sections of stream were blocked with 100' x 5', 1/4" mesh net. Three-pass electrofishing depletion samples were then performed with all fish species being collected. In the field, fish collected from each proceeding pass were individually identified, counted, with notes made on any visible abnormalities including skin lesions, fin erosion, and tumors. Gamefish species were weighed and maximum total length measurements taken. Fish were kept separate from the other collections and then released. Gamefish population estimates were based upon three pass depletion models (Zippin, 1956). Habitat conditions were also evaluated at each site during sampling. The condition of each site under study was rated as a function of its capacity to support a healthy fish community. Fisheries habitat assessments followed the approach developed by Barbour and Stribling (1991) which incorporates twelve habitat parameters (Appendix I).

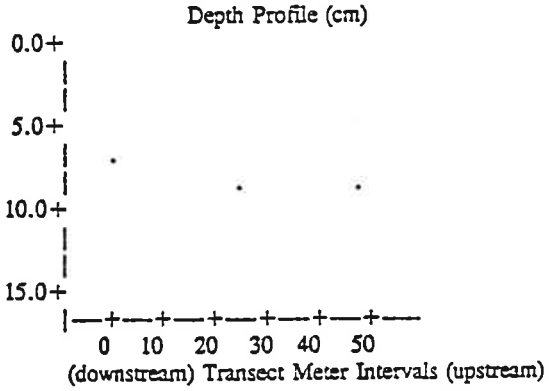
Results:

The following pages provide a synopsis of the data collected during the survey. Overhead views of each site, transcribed from field sketches made during sampling, are accompanied by habitat assessment scores, depth profiles, lists of species and numbers of individuals captured at each sampling date, population estimates and notes on site characteristics.

SITE: #1 Northeast Branch at Old Riverdale Road (NEBxRIVD1)

Site Location: approximately 600 feet downstream of Old Riverdale Rd.





Air Temperature: 27c Water Temperature: 26c

Grade: 11'/mile (1.7m/km)

Habitat Parameter	Rank	Score	Description
1.Bottom Substrate	marginal	7	10-30% mix of rubble, gravel, or other stable habitat. Habitat availability less than desirable.
2.Embeddedness	poor	4	Gravel,cobble, and boulder particles are over 75% surrounded by fine sediment.
3.Velocity/ Depth	poor	3	Dominated by 1 velocity/ depth category (usually pools).
4.Canopy Cover	poor	1	Lack of canopy, full sunlight reaching water surface.
5.Channel Alteration	marginal	4	Moderate deposition of new gravel, coarse sand on old and new bars; and/or embankments on both banks.
6.Scouring/ Deposition	marginal	5	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.
7.Pool/Riffle Ratio	poor	1	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat.
8.Lower Bank Channel Capacity	poor	2	Peak flows not contained or contained through channelization.
9.Upper Bank Stability	optimal	9	Upper bank stable. No evidence of erosion or bank failure. Side slopes generally <30%. Little potential for future problems.
10.Bank Vegetative Protection	poor	1	Less than 50% of the streambank surfaces covered by vegetation.
11.Streamside Cover	poor	1	Over 50% of the streambank has no vegetation and dominant material is soil, rock, bridge materials, culverts, or mine tailings.
12.Riparian Vegetation	poor	1	<6 meters.

Total Score 39

1992 Anacostia River Fisheries Survey

Site 1- Northeast Branch x Old Riverdale Road

Species captured	(7/16) pop. est./std. error
1. American Eel	9
2. Cutlips Minnow	5
3. Golden Shiner	2
4. Swallowtail Shiner	225
5. Satinfin Shiner	145
6. Common Shiner	1
7. Silvery Minnow	2
8. Blacknose Dace	2
9. White Sucker	2
10. Yellow Bullhead	5
11. Banded Killifish	8
12. Mummichog Killifish	8
13. Bluegill Sunfish	9
14. Redbreast Sunfish	69
15. Pumpkinseed Sunfish	1
16. Tesselated Darter	3
# of Species	16
# of Individuals	496
Species Diversity	1.51

Approximate drainage area above site = 75.0 square miles
Stream surface area = 1035 square meters (0.1035 hectares)

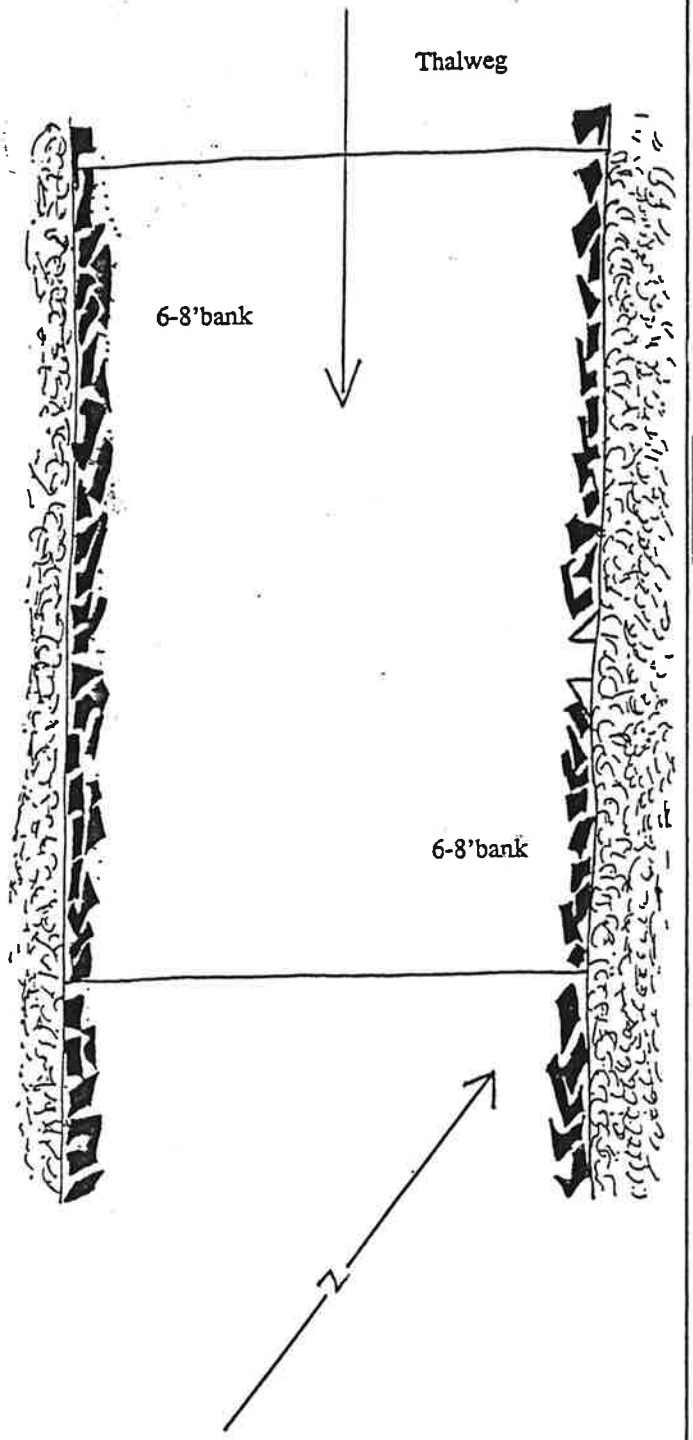
Gamefish Density	N/km	N/h	% ≥ stock	% > quality	% ≥ pref.	% > mem.
Redbreast Sunfish	1380	666	67	11	0	0
Bluegill Sunfish	180	87	37	0	0	0
Pumpkinseed Sunfish	20	10	100	0	0	0
Yellow Bullhead	100	48	100	0	0	0

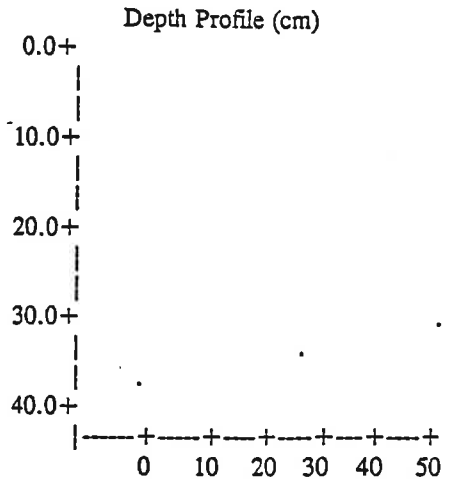
Riffle/pool ratio = all run

Anomalies: none

SITE: #2 Northeast Branch at Alternate Route 1 (NEBxALTRt.1)

Site Location: approximately 750 feet upstream of Alternate Route 1





Air Temperature: 22c Water temperature: 23c

Grade: 11'/mile (1.7m/km)

Habitat Parameter	Rank	Score	Description
1.Bottom Substrate	marginal	7	10-30% mix of rubble, gravel, or other stable habitat. Habitat availability less than desirable.
2.Embeddedness	poor	4	Gravel,cobble, and boulder particles are over 75% surrounded by fine sediment.
3.Velocity/ Depth	poor	3	Dominated by 1 velocity/ depth category (usually pools).
4.Canopy Cover	poor	1	Lack of canopy, full sunlight reaching water surface.
5.Channel Alteration	marginal	4	Moderate deposition of new gravel, coarse sand on old and new bars; and/or embankments on both banks.
6.Scouring/ Deposition	marginal	5	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.
7.Pool/Riffle Ratio	poor	1	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat.
8.Lower Bank Channel Capacity	poor	2	Peak flows not contained or contained through channelization.
9.Upper Bank Stability	optimal	9	Upper bank stable. No evidence of erosion or bank failure. Side slopes generally <30%. Little potential for future problems.
10.Bank Vegetative Protection	poor	1	Less than 50% of the streambank surfaces covered by vegetation.
11.Streamside Cover	poor	1	Over 50% of the streambank has no vegetation and dominant material is soil, rock, bridge materials, culverts, or mine tailings.
12.Riparian Vegetation	poor	1	<6 meters.

Total Score 39

1992 Anacostia River Fisheries Survey

Site 2: Northeast Branch x Alt Route 1

Species Captured	(07/29/92)
1. American Eel	15
2. Rosyside Dace	1
3. Satinfin Shiner	2
4. Spottailed Shiner	24
5. Bluntnose Minnow	1
6. Northern Hog Sucker	6
7. Brown Bullhead	6
8. Banded Killifish	13
9. Mummichog Killifish	4
10. Green Sunfish	1
11. Bluegill Sunfish	31
12. Redbreast Sunfish	198
13. Pumpkinseed Sunfish	5
14. Hybrid Sunfish	1
15. Largemouth Bass	5
16. Tessellated Darter	1
17. Striped Bass	3
# of Species	17
# of Individuals	317
Species Diversity	1.50

Approximate drainage area above site=75.0 square miles
Stream surface area = 1150 square meters (0.1150 hectares)

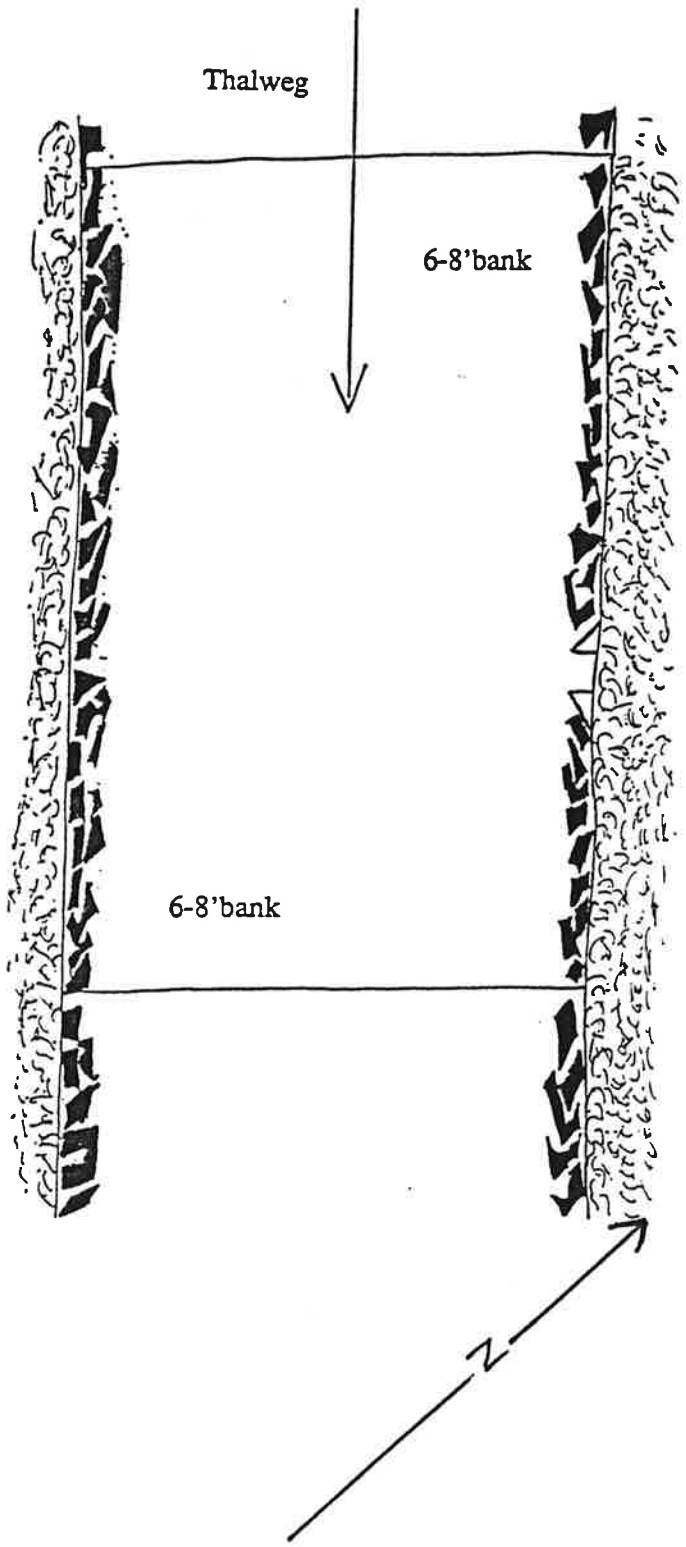
Gamefish Density	N/km	N/h	% ≥ stock	% ≥ quality	% ≥ pref.
Green Sunfish	20	9	0	0	0
Bluegill Sunfish	620	270	68	0	0
Redbreast Sunfish	3960	1722	79	0	0
Pumpkinseed Sunfish	100	43	100	0	0
Largemouth Bass	100	43	0	0	0
Striped Bass	60	26	0	0	0

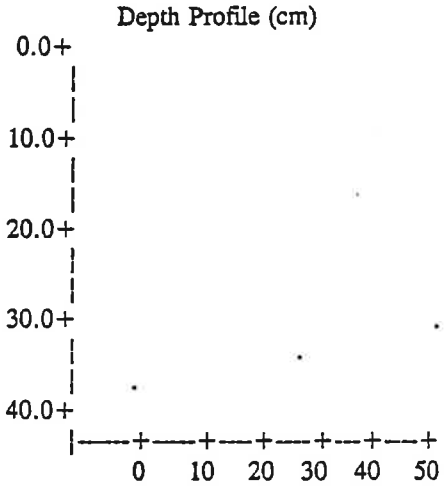
Riffle/pool ratio = all run

Anomalies: none

SITE: #3 Northwest Branch at Hyattsville (NWBxHyt1)

Site Location: approximately 1200 feet downstream of 38th Street.





Air Temperature: 22c Water temperature: 23c

Grade: 11'/mile (1.7m/km)

Habitat Parameter	Rank	Score	Description
1.Bottom Substrate	marginal	7	10-30% mix of rubble, gravel, or other stable habitat. Habitat availability less than desirable.
2.Embeddedness	poor	4	Gravel,cobble, and boulder particles are over 75% surrounded by fine sediment.
3.Velocity/ Depth	poor	3	Dominated by 1 velocity/ depth category (usually pools).
4.Canopy Cover	poor	1	Lack of canopy, full sunlight reaching water surface.
5.Channel Alteration	marginal	4	Moderate deposition of new gravel, coarse sand on old and new bars; and/or embankments on both banks.
6.Scouring/ Deposition	marginal	5	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.
7.Pool/Riffle Ratio	poor	1	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat.
8.Lower Bank Channel Capacity	poor	2	Peak flows not contained or contained through channelization.
9.Upper Bank Stability	optimal	9	Upper bank stable. No evidence of erosion or bank failure. Side slopes generally <30%. Little potential for future problems.
10.Bank Vegetative Protection	poor	1	Less than 50% of the streambank surfaces covered by vegetation.
11.Streamside Cover	poor	1	Over 50% of the streambank has no vegetation and dominant material is soil, rock, bridge materials, culverts, or mine tailings.
12.Riparian Vegetation	poor	1	<6 meters.

Total Score 39

1992 Anacostia River Fisheries Survey

Site 3: Northwest Branch #1 x Hyattsville

Species Captured	(07/17/92)
1. American Eel	16
2. Cutlips Minnow	1
3. Creek Chubsucker	1
4. White Sucker	2
5. Northern Hog Sucker	1
6. Yellow Bullhead	2
7. Brown Bullhead	1
8. Green Sunfish	2
9. Bluegill Sunfish	20
10. Redbreast Sunfish	148
11. Pumpkinseed Sunfish	5
# of Species	11
# of Individuals	199
Species Diversity	2.99

Approximate drainage area above site = 75 square miles
Stream surface area = 765 square meters (0.0765 hectares)

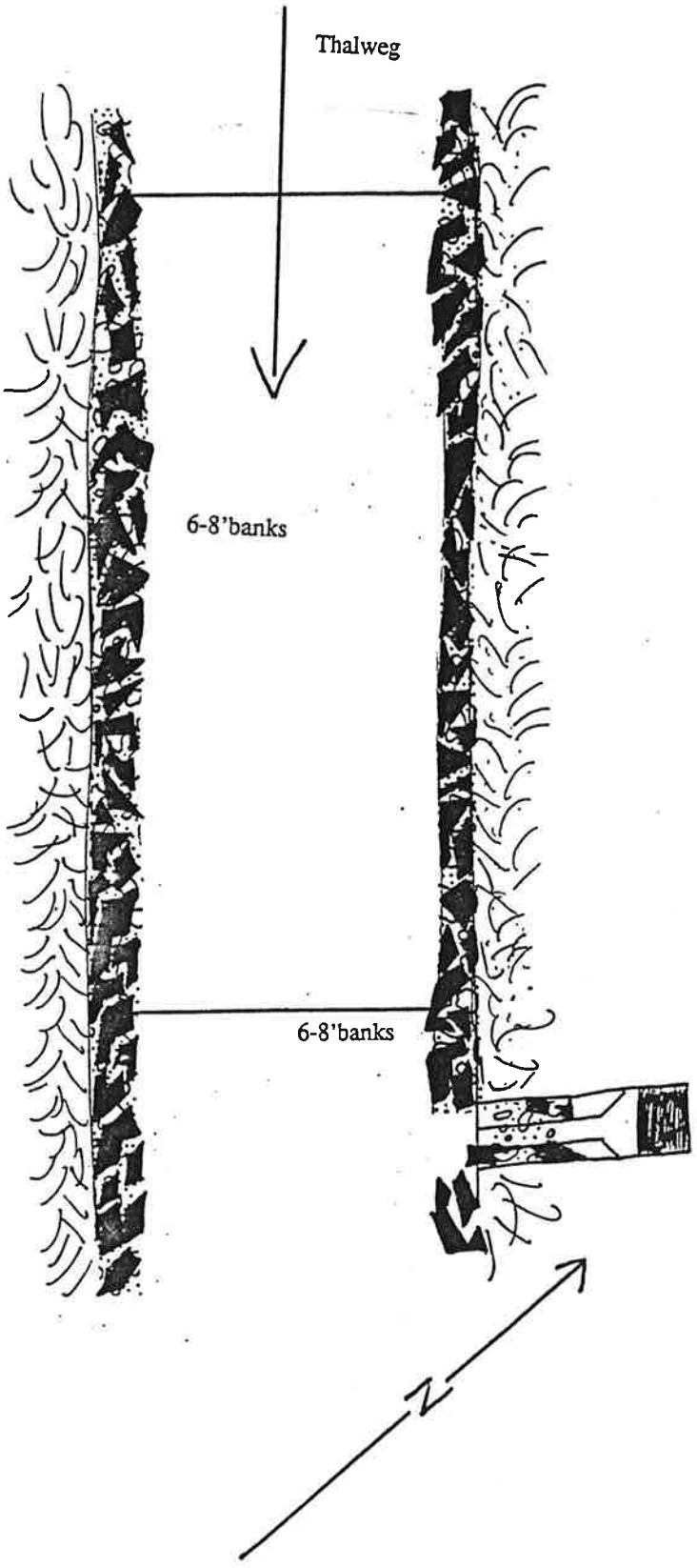
Gamefish Density	N/km	N/h	% ≥ stock	% ≥ quality	% ≥ pref.
Green Sunfish	40	26	0	0	0
Bluegill Sunfish	400	261	95	0	0
Redbreast Sunfish	2960	1935	54	0	0
Pumpkinseed Sunfish	100	65	100	0	0

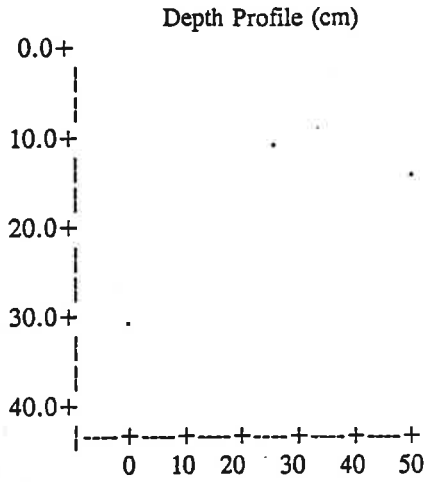
Riffle/pool ratio: all run

Anomalies: none

SITE: #4 Northwest Branch at Hyattsville (NWBxHyt2)

Site Location: approximately 300 feet upstream of Route 1.





Habitat Parameter	Rank	Score	Description
1.Bottom Substrate	marginal	7	10-30% mix of rubble, gravel, or other stable habitat. Habitat availability less than desirable.
2.Embeddedness	poor	4	Gravel,cobble, and boulder particles are over 75% surrounded by fine sediment.
3.Velocity/ Depth	poor	3	Dominated by 1 velocity/ depth category (usually pools).
4.Canopy Cover	poor	1	Lack of canopy, full sunlight reaching water surface.
5.Channel Alteration	marginal	4	Moderate deposition of new gravel, coarse sand on old and new bars; and/or embankments on both banks.
6.Scouring/ Deposition	marginal	5	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools.
7.Pool/Riffle Ratio	poor	1	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat.
8.Lower Bank Channel Capacity	poor	2	Peak flows not contained or contained through channelization.
9.Upper Bank Stability	optimal	9	Upper bank stable. No evidence of erosion or bank failure. Side slopes generally <30%. Little potential for future problems.
10.Bank Vegetative Protection	poor	1	Less than 50% of the streambank surfaces covered by vegetation.
11.Streamside Cover	poor	1	Over 50% of the streambank has no vegetation and dominant material is soil, rock, bridge materials, culverts, or mine tailings.
12.Riparian Vegetation	poor	1	<6 meters.

Total Score 39

1992 Anacostia River Fisheries Survey

Site 4: Northwest Branch #2 x Route 1

Species Captured	(07/17/92)
1. American Eel	10
2. Swallowtail Shiner	86
3. Satinfin Shiner	9
4. Spottailed Shiner	1
5. Bluntnose Minnow	1
6. Blacknose Dace	1
7. Creek Chubsucker	1
8. Yellow Bullhead	1
9. Bluegill Sunfish	20
10. Redbreast Sunfish	185
11. Pumpkinseed Sunfish	15
12. Largemouth Bass	2
13. Tesselated Darter	6
# of Species	13
# of Individuals	338
Species Diversity	1.37

Approximate drainage area above site=75.0 square miles
Stream surface area=813.3 square meters (0.0813 hectares)

Gamefish Density	N/km	N/h	% ≥ stock	% ≥ quality	% ≥ pref.
Bluegill Sunfish	0.0214	246	100	0	0
Redbreast Sunfish	0.2274	2276	71	0	0
Pumpkinseed Sunfish	0.0184	184.5	100	0	0
Largemouth Bass	0.0024	24.6	0	0	0

Riffle/pool ratio = all run

Anomalies: none

Site conditions in the study area were monotonous, i.e. straight, shallow and featureless, as is apparent from the overhead sketches of the stream reaches and depth profiles. Bottom substrate was typically imbedded gravel. Species diversity was fair, however gamefish populations were severely stunted.

Information from these surveys has been used to assist the U.S. Army Corps of Engineers plan and design fish habitat improvements in the flood management area as part of USACE's Anacostia Feasibility Study and 1135 Projects. Other components of the USACE Anacostia restoration activities were assisted through this project as well, such as wetland site evaluations and demarcation of fish habitat restoration areas, through a series of site recognizance and technical meetings held both in the field and at the ACE offices in Baltimore. A slide program was presentation to the cooperative Anacostia Watershed Small Habitat Improvement Program (SHIP) which described our "Drop-in-the-Bucket-Brigade" involving local school groups and our efforts with the Maryland Conservation Corps to clean up and restore stream sections of the Anacostia watershed.

Also contributing to these restoration efforts for the Anacostia River, we participated in the Lower Beaverdam Creek Task Force, where our primary responsibility was the coordination of a Law Enforcement Subgroup. This Subgroup was formed in response to a tire dumping incident in 1991 were an individual dumped hundreds of used tires into Beaverdam Creek. The perpetrator was located and identified through the help of eyewitnesses and he confessed to the crime yet he was fined only $50 by the Prince Georges County judge under a standard fine for the misdemeanor of littering. Adding insult to injury, the perpetrator, a District of Columbia resident, has ignored the charges, probably due to the lack of reciprocity between jurisdictions on misdemeanor charges. One of the important lessons learned from this episode was that there is a need to provide better environmental training to the law enforcement community. We cooperated with the U.S. Department of Justice, District of Maryland's Environmental Training Subcommittee of the Law Enforcement Certification Committee (LECC) to construct an augmented agenda for their March, 1993 training session that will be geared to include police. Although this session is being held for the Prince Georges and Montgomery Counties area, at our request the LECC is including several staff from the District of Columbia's Department of Consumer and Regulatory Control.

PART I (Cont.): THE ANACOSTIA RIVER

TASK 3: Stream Restoration:

During the summer of 1992, ICPRB worked with the Maryland Conservation Corps (MCC) to perform stream habitat improvements in the Anacostia tributaries.

Procedures:

Through this project, one crew chief and five college students were hired to serve both as mentors for a fourteen member MCC crew and to help plan, organize and implement small-scale stream habitat restoration projects along highly abused and degraded stream valley corridors of the Anacostia River. During the course of the work, a series of stream valley improvement projects was performed which included reforestation, creation of riverfront trails, trail maintenance, bank stabilization, debris removal and wetland plantings. Located in a highly urbanized area of the Anacostia basin, this project helped reclaim under-used and under-valued sections of stream and river while at the same time increasing public awareness and stewardship of the local urban fisheries resources.

Results:

By Peter May, Crew Chief

The Anacostia crew of the Maryland Conservation Corps had another highly successful summer. The crew pulled many tons of tires, debris, and garbage from Lower Beaverdam Creek, they cleared hiking and handicap access trails along the Anacostia mainstem, they constructed a series of check dams, planted willow whips, and filled and planted gullies to prevent erosion in Greenbelt National Park, they conducted wetland plantings at Fairlands Park, and they helped with ICPRB's biomonitoring efforts. The five member mentor group, composed of college juniors, seniors, and graduates, provided leadership, education, and guidance to corps members, many of whom are from disadvantaged neighborhoods in the area. The crew chief, the mentors, and the MCC corps members all benefitted from the experience gained from restoring the Anacostia.

The Maryland Conservation Corps (MCC) is organized under the state's Department of Natural Resources Forest and Park Service. The MCC provides environmental work experience and education to high school students aged 14-18 during its traditional 6-8 week summer program. MCC crews are active in most Maryland counties with some counties hosting several crews. Prince George's county, for its second summer, had a MCC crew working in the Anacostia River watershed and its tributaries. Crews usually consist of one adult crew chief and 10 students. However, the Anacostia crew was different in that its

sponsorship from the Interstate Commission on the Potomac River Basin (ICPRB) provided five additional mentorship positions on the crew. The mentors allowed for a broad range of projects to be undertaken and for more individual attention to be given to each crew member. Each mentor was a college senior or graduate in environmentally related fields: engineering, biology, or natural resource management. Their backgrounds enabled them to plan many projects which might not normally be undertaken by a single crew chief due to time restrictions. The mentors also enabled the crew to be divided into smaller groups that could work on separate projects and provide for closer individual attention in regard to education and motivation. In addition, smaller groups headed by one or two mentors also allowed for constant supervision in areas that could be considered hazardous.

The projects planned for the MCC Anacostia Crew summer program were aggressive. They focused on stream restoration in and near Lower Beaverdam creek, the most severely impacted tributary and one of the most environmentally degraded streams in Maryland. Our goals were to improve aesthetics and begin revitalizing the stream through removal of heavy debris and garbage preventing these materials from being further washed into the tidal Anacostia mainstem.

The Prince George's Department of Environmental Resources (PGDER), the Maryland National Capitol Parks and Planning Commission (MNCPPC), and the National Parks Service (NPS) provided key support to the development and implementation of many of the summer projects. The projects consisted of erosion control, heavy debris removal from streams, wetland emergent aquatic vegetation plantings, and interpretive trail clearing and maintenance. All projects involved extensive planning and constant contact with representatives from each of the above agencies. Key contacts will be noted throughout this report.

Education was an important element of our work. Imparting a knowledge of the area, the river, the steams, the environmental problems, causes and possible solutions gave the kids a greater sense of why we were there. The mentors were ideal for giving spot talks on interesting flora, fauna, and stream processes. They were also available to answer questions which arose. Public awareness was recognized as an important educational component of our work. Attempts were made to initiate community involvement when working in neighborhood parks by the distribution of fliers which explained the goals of the project. Several impromptu talks were given to visitors by the crew chief, mentors, as well as the MCC members, who began to recognize themselves as important resources.

Instilling a good work ethic while making the summer interesting and enjoyable was also a high priority. This proved to be a most difficult task due to the age and backgrounds of some of the kids. At their age, comfort and cleanliness were high priorities. Motivational problems arose when their priorities were juxtaposed to the heat and sweat of "slogging" muddy tires out of a dirty creek. Therefore, clean, dry, educational outings were also conducted which were important in keeping high moral, which was occasionally lacking. Another difficult task was conveying the environmental importance of our work to the kids,

many of whom initially saw money as the only motivating factor for their effort. We wanted to develop a sense of stewardship to the watershed in which they lived. By the end of the summer, all of the youths had a basic understanding of our goals and the importance of our work, although for many of them money was still the prime motivation for coming to work. Understandably, it is hard to show young people that what they do now, what they learn now, will effect them later. However, if we demonstrated to just one corps member the importance of working hard, of taking care of him/herself and their environment, then we feel that our efforts were successful.

PROJECT DESCRIPTIONS

The range of projects completed was diverse, from stream cleaning to emergent aquatic vegetation planting and fish sampling. Our primary target was Lower Beaverdam Creek and one of its tributaries, Cattail Creek. The Lower Beaverdam cleanup was staged from the H.J. Ward Park located at Englewood Avenue between Route 50 and Addison Road, which provided ease of access. Hundreds of tires and tons of debris and garbage were pulled from this stretch of stream, which began upstream at 64th Avenue and extended downstream to the Conrail Railroad bridge. The community surrounding the park was made aware of the Corps clean-up effort through fliers which were distributed door-to-door. However, there was little community involvement observed except for praise from the director of the community center.

The Earth Conservation Corps (ECC), a newly formed, privately funded group with similar functions, also worked in this stretch of Lower Beaverdam Creek earlier in the summer, yet we still put in a week and a half of work at this same site. This suggests that either new inputs of debris were brought in by heavy stream flow or old debris had been uncovered by shifting sand and gravel bars, although it is highly likely it was a combination of both these factors. Upon completion of this segment of LBC it is estimated that 90% of the large debris has been removed. There was no problem with storing removed debris on site, the activities of the recreation center were not hindered by the debris pile, and truck access for pickup and removal was not a problem. The key contact for debris removal was PGDER's Lorena Hiep. Prior site clearance from PGDER is recommended.

A small tributary to LBC, Cattail Creek, was chosen for similar reasons. It runs through park land and boarders residential areas. The project area of stream was in Palmer Park, located at Barlow Rd. and Matthenson Avenue off Landover Rd. Two staging areas provided easy access to the stream and ample space to store removed debris. The nature of debris pulled from this stretch was suburban/residential with a predominance of shopping carts, lawn mowers, and bicycles. The large community center at Palmer Park was accepting of our efforts, but they did ask for a more timely removal of the accumulated debris. The crew chief and one mentor attended a community meeting held at the center and addressed the stream cleanup question to several neighbors. They were receptive to our work and agreed to make a point of order to look into adopting the stretch of stream. The key contact for stream adoption in PG County is Karen Napolitano at PGDER.

Secondary sites were explored at LBC and Cattail Creek. At LBC, a day was spent working jointly with the EEC. The work took place below the Conrail Railroad bridge. The staging area was a 55 gallon drum recycling yard off Addison Road where access was granted by the owners, James T. Warring Sons, Inc. The debris here was decidedly industrial, with evidence of new inputs from adjacent businesses, such as Smith Recycling. While close to 300 tires were pulled from the stream, unfortunately, many more remain. Auto scrap is overwhelming in some spots.

The secondary location on Cattail Creek was located below Martin Luther King Jr. Highway off the dead end court of West Forrest St. This site also provided easy access. Fliers were distributed, but our schedule did not allow us enough time at the site to fully develop community involvement. The neighbors called the county police about our work, a sign of concern and commitment to their neighborhood. Three young kids,aged 10-14, did approach us and offered their help. After being told there would be no pay they still wanted to work. It is encouraging to see that there is interest in the environment among the youth.

A third project site was Colmar Manor Park located along the Anacostia mainstem. The projects involved trail clearing and maintenance. The park is run by MNCPPC. The key contact person was Kevin Beale of 30th Street Nature Center, who was able to provide specialized trail clearing tools. Three trails were cleared. Our main goal was to create a handicapped access trail that leads to the canoe launch in Dueling Creek. This trail required clearing dense undergrowth and trees along a steep grade. Any virgin trail clearing requires a clearly marked guide for trail direction so trees are not unnecessarily cut. Working closely with someone who knows the intended trail plan is essential. Our strategy for trail clearing was to split the crew into two groups, one at each end, and to have them work until the two groups meet. Tree cutting should be distributed evenly among those individuals who are interested. Cutting trees was extremely popular among the corps members, and can be used as an incentive to work. The corps members must be made aware of the importance of trees and vegetation, and that cutting down every tree is not a good practice.

Another trail ran along the northern stretch of Dueling Creek. It is predominantly tall grass. The intention of the trail is to be an interpretive walk along the tree line bordering the creek. The third trail was the bottomlands loop along the Anacostia. This trail required only maintenance. All of the trails have excessive poison ivy growth, therefore precautions should be taken. A possible rainy day project of building bird boxes exists at Colmar Manor, but should be arranged with Kevin Beale well in advance.

Our fourth project site, Greenbelt National Park, allowed for a variety of projects which demanded a greater level of skill. The primary project was the construction of a series of stream-flow check dams below an outflow that was being undercut by heavy storm water surges. A certain amount of engineering knowledge was required and provided by one of the mentors, Tom McFall. The design required two notched, wooden weirs backfilled with medium and large stone, with a stone apron built below the second weir. This project required days of advance planning and coordination with the NPS rangers in regards to sites

and materials. Several more of these types of structures are needed in the Park at numerous stream sites. The purpose of the weirs is to slow the water flow and thus drop suspended gravel, sand, and sediment behind the weirs backfilling the eroded area. Before attempting this type of project it is suggested that someone on the crew be familiar with check dam design and construction. A key contact for guidance on this type of project was Stuart Schwartz of ICPBR. Ranger Nancy Streeter of NPS was our key Greenbelt park contact.

The most labor intensive project at Greenbelt park was gully and rill filling. Located at the Jager track in the park, a large grass covered hill, has severe erosion problems along its steep slopes. A series of small blocks staked at constricted sites in the gullies were backfilled with top soil, seeded and hayed. Many other sites needed work. It is suggested that no more than a couple days work at a time be scheduled because the lack of shade and the strain in hauling loads of fill up a steep grade could be dangerous.

A good quarter-day project to back up these hard days was the cutting and planting of willow whips in eroded stream banks. Total whip saturation is suggested due to projected high loss of plants before rooting can take place.

A complete cleanup of heavy debris inside the park along Kennilworth Avenue took two days. The majority of the approximately 300 tires dumped at the site apparently had been there quite a while. It appears to have been a favorite tire dump in the past and, in the course of a year, more tires will probably accumulate.

Greenbelt park supports a Youth Conservation Corps (YCC) that can be counted on to work jointly on any project in the park. The YCC consisted of three high school juniors. The NPS rangers were very helpful, and, if arranged, will give a half day interpretive hike through the park.

The fifth project was two days of Emergent Aquatic Vegetation (EAV) wetland planting conducted at Fairlands Park, located off Old Gunpowder Rd. above Calverton, and at Duckpond in Adelphi off University Blvd. Fairlands Park has a new working display of many types of erosion control methods which needed EAV planting. EAV is an important component in erosion control, nutrient cycling, and wildlife support. We planted close to 500 plants of various species including primarily pickerel weed, arrow arum and marsh mallow in the area along the pond in hopes that they would establish a reproducing population which will take over the shoreline. The same type of EAV planting was done at Duckpond on a smaller scale. The key contact is Chris Wagnon of MNCPPC. Chris has suggestions for several small projects and is a good source for work projects to fill gaps in the work schedule.

Another good source of one day projects is the Old Maryland Farm at Watkins Regional Park off Central Avenue. General farm maintenance and some animal care can be expected. The park has an excellent nature center and some trails which may need clearing or maintenance. The contact is Chris Wagnon.

Several days of fish sampling under the supervision of Jim Cummins provided the crew with a radical change of pace. We worked in the lower reaches of the North East and North West branches of the Anacostia. Sampling methodologies such as backpack electroshocking of fish gave the crew a closer look at some of the life in these tributaries. There is plenty of work for the entire crew, including setting up nets, netting and bucketing fish, assisting in the counting of fish, and fish seining. Mr. Cummins knowledge of the area and its impacts on the Anacostia was a valuable source for educational talks. These talks made a lasting impression on the corps members, for the remainder of the summer the kids took pride in recalling the types of fish they sampled.

RECOMMENDATIONS FOR FUTURE PROJECTS

An excellent potential project which should be ready for summer 1993 is the Bladensburg Debris Removal Boom. Judy Glaes, who works as a sub-basin coordinator for ICPRB, is obtaining permits to stretch a boom across the Anacostia River above the Bladensburg Marina which will capture large floating debris as it enters the river from the upper reaches of the watershed. This debris would be inventoried regularly by the crew with the use of a small boat. Scheduling and time allotment for this project is unknown because it was not undertaken in 1992 due to delays in permitting.

The Anacostia Crew's summer was a productive one. With an aggressive work schedule completed, each of the projects can be considered a success. However, it should be noted that the work in these areas is far from finished. All of the projects could be duplicated in terms of the type of work performed and project areas. Unfortunately, the amount of debris in Lower Beaverdam Creek and its tributaries will continue to be a source of work for several future summer crews. Greenbelt Park's Nancy Streeter agrees that a few more check dams and erosion control projects should be undertaken in the park, and they are willing to help coordinate projects in the future. Colmar Manor will always need trails maintained. Chris Wagnon reported that EAV plantings are always a possibility. There is no shortage of work for next summer.

Scheduling these projects can be difficult. Efforts should be made to tighten the schedule, though the nature of the work does require a great deal of flexibility. Keeping close touch with the key contacts involved is very important in order to stay on schedule. This often requires several daily phone calls and, in some cases, meetings will need to be arranged. Updates and reminders to the key contacts regarding agreed upon projects are essential to keeping the schedule tight, especially if special tools or materials are needed. Contacting key personnel at least a week in advance allows enough time to make changes or to supplement new work if there is a problem or delay. Last minute changes are unavoidable, so a list of one day projects should be arranged well in advance. These "rainy day" projects need to be arranged before work begins in the summer to assure a smooth schedule. These projects fill in gaps and allow for needed flexibility. They are essential.

Greater community involvement when working on the clean ups may be achieved by distributing fliers in the expected work area a day or two in advance. The nature of some of the clean ups allowed for only one day of work. Distributing fliers on that day seemed ineffective. Arranging to speak to community groups at their meetings is another possible way to increase community involvement. A sign for the van would be good for MCC recognition and should be obtained before work begins.

The mentors need to be actively involved in the planning of daily and weekly projects. Crew chief/mentor meetings should be scheduled on Monday or Friday after work. The plans and goals for the next week need to be discussed. This time would also allow for any problems or concerns pertaining to a corps member or a project to be discussed and solved. These meetings should take place away from the kids. A morning talk with the entire crew to clarify the expected goals and to assign specific tasks is suggested.

FINAL SUMMARY OF ANACOSTIA STREAM RESTORATION PROJECTS

The MCC's Anacostia Crew undertook one of the most diverse and demanding work programs in the Corp. To organize and achieve these goals the mentors were invaluable. Without ICPRB's funding of the mentors the program would not have been nearly so successful. It is the Crew Chief's recommendation that the mentor program receive funding again next summer. The use of this MCC crew to further the restoration effort on the Anacostia River is important in ways far beyond the physical work completed. The program has allowed the corps members to gain an experience through the mentors that would have been lost without their personal attention. It is safe to say that all involved with the program this summer benefitted from a unique experience while furthering the cause of restoring the Anacostia.

CONTACT PHONE LIST

Kevin Beale	M-NCPPC	301-927-2163
Jim Cummins	ICPRB	301-984-1908
Judy Glaes	ICPRB	301-779-1745
Lorena Hiep	PGDER	301-925-5980
Nancy Streeter	NPS	301-344-3936
Chris Wagnon	M-NCPPC	301-627-2270

PART II: THE NORTH BRANCH, POTOMAC RIVER

The long term goal of the project is to aid the development of a high quality trout fishery on the North Branch of the Potomac River. An important associated goal of the project is promoting economic development and stability in the region around the Jennings Randolph Dam and the North Branch of the Potomac River drainage area. The initial fishery is a put-and-take trout fishery with the long-term objective of establishing a naturally reproducing trout fishery. To this end, ICPRB has developed a North Branch, Potomac River Restoration Strategy (Appendix II) and is coordinating a North Branch . Key components of this strategy include:

* Improving water quality and increasing biological productivity, principally through de-acidification;
* Implementation of a land protection plan which includes improving public access; and,
* Improving the support infrastructures for a recreational fishery.

TASK 4: Fisheries Evaluations and Water Quality Analysis:

Although imminent, as of this date, the North Branch Restoration Agreement has not been signed, therefore the fisheries evaluations and water quality monitoring which were to help support this planned effort have not been necessary. During this time period, however, we have found that critical fisheries management information such as angler-use patterns, preferred species, and economic impacts of the developing recreational fishery in the North Branch is sorely lacking. Therefore, ICPRB recommends that we amend this task of the project to be used to conduct a comprehensive creel survey of the project area during 1993.

TASK 5: Project Coordination:

Procedures:

Beginning in January, 1992, ICPRB convened a series of meetings of the North Branch Fisheries Management Task Force to prepare short-term and long-term fisheries work plans for this important section of the river. The Task Force is composed of members of Maryland's and West Virginia's Departments of Natural Resources, including biologist, managers, legal council, law enforcement personnel and members of the U.S. Army Corps of Engineers.

Results:

1. Characterization of the North Branch Study Area:

   A. Tailrace Area:

      Dr. Bob Bachman, Director of the Fish, Heritage and Wildlife Division, Maryland Department of Natural Resources, provided the following overview of the tailrace section of the river. Dr. Bachman stated that there have been significant improvements in water quality and biological activity in this section of the river over the last few years and that this trend appears to be continuing. These improvements have been most dramatic in the upper portions of the resource but added that each year the line demarcating good biological activity moves further downstream, as evidenced by increased fish and macrobenthic invertebrate abundance as well as increasing appearance of algae. To illustrate his point, Dr. Bachman said that brook, brown, and rainbow trout can currently be found in most sections of the tailrace all the way to Luke, and that the net-pen production has been good. He noted that, in terms of productivity, a good portion of this improvement probably is associated with the activities of the net-pen culture at the stilling basin.

      Maryland and West Virginia have a cooperative stocking program. West Virginia stocks twice a year, once in January and once in February (2000 lbs of catchable-size fish, or 3714 fish in 1991, according to follow-up information through Don Phares's office). Maryland stocks from spring to early winter, with a stocking rate of between 11,000-20,000 fish ranging from fingerlings to harvestable sizes. Sergeant Tim Doolan, Maryland DNR natural resource officer and avid angler who maintains good communication with other local anglers, commented that large trout, as large as 28-29 inches, are periodically captured, mainly between May and August and typically with spinning gear. Sgt. Doolan, Bob Bachman, and Jerry Lewis (West Virginia Department of Natural Resources) also noted that walleye are occasionally captured in the tailrace section and that these fish presumably escaped from the reservoir.

      Dr. Bachman called our attention to the fact that there are some questions as to the "best" salmonid species to target for management in the North Branch. His experiences in areas such as the Gunpowder River have shown him that different sections of the same tailrace favor different trout species, possibly related to prey-size/selection and availability. Dr. Bachman thought that a similar situation could eventually exist in the North Branch and that we should keep in mind interspecific habitat selectivity as the fishery develops.

      From a regulatory standpoint, Dr. Bachman noted that recent changes have been made in MD's designation of the river below Jennings Randolph Lake. As of January 1, 1992, there is a "No Fishing - Fish Propagation Area" from below the stilling basin to the mouth of the first downstream WV tributary (Linwood Run) which enters at the first

bend in the river below the dam. In addition, Dr. Bachman said that the area between Linwood Run and the USCOE boundary above Barnum is now designated as Catch-and-Release. Russ Newman commented that this area is currently off limits to public access and is marked with a red pole and numerous "No Trespassing" signs. Discussions followed concerning apparent conflicts and problems associated with law enforcement in this situation. Mr. Russel Newmann, Jennings Randolph Lake Project Manager, said that he felt that the USCOE would be willing to permit public access to the catch-and-release area if MD and WV would provide firm assurances that trespass signage, enforcement and other security measures would be sufficient to maintain the security criteria of the J.R. Lake Project.

B. Jennings Randolph Lake

Jerry Lewis, regional biologist, West Virginia Division of Natural Resources, provided the following summary regarding fisheries management on the reservoir. Mr. Lewis said that the lake had good populations of walleye (from state stocking programs) and yellow perch (apparently from "live well-type" stockings by anglers). Lake trout were still in the lake but their growth rates were poor. Largemouth bass may have a problem with bass tapeworms but their recruitment is adequate. Smallmouth bass were stocked but have apparently all but disappeared. The lake is unique for those managed by WV because, although it is very deep, the lake retains good dissolved oxygen levels during the summer. From a habitat standpoint, Mr. Lewis and Bert Pierce felt that the lake represented a good potential for salmonid and/or smallmouth bass management. Poor nutrient levels are a significant limiting factor in the lake. Dr. Bachman added that the new net-pen operation in the lake will add nutrients to the system. Discussions followed regarding potential lake fertilization. Russ Newmann felt that the USACE perspective on lake fertilization would be very cautious. This conservative attitude regarding lake fertilization was reflected by the group.

Access issues on the lake focused on realignment of the buoy line in order to increase angler access to the areas around Elk Lick Run and the face of the dam. Although the current buoy line restricts boat and angler access to a large area of the lake with some of the best fishing potential, Russ Newman pointed out that the existing buoy line was cost effective to install, is relatively easy to maintain, and permits simple, unobstructed visual surveillance of the area by USACE personnel. Insuring the continued safety of the public and safe operation of the reservoir are the most critical constraints to buoy realignment. While there are probably no simple answers to these problems due to the lake's depth, scheduled and unscheduled fluctuations in elevation, the tendency for some elements of the public to test predetermined and set limits of safety, and other factors, the group felt that the potential benefits to the public are there. It was recommended that we investigate technological solutions to demarcating a safe, alternative security line around the intake tower and/or along the face of the dam, keeping in mind the magnitude and sources of funding necessary for these changes.

2. Action Items:

Fisheries Management Plan: The Task Force assigned personnel to develop a Fisheries Management Plan for the Jennings Randolph Reservoir. This workgroup is composed of regional state biologists (Gerald Lewis (WV) and Ken Pavol (MD)) along with USACE's Rich Olin and Ken Lee as well as regional state natural resource enforcement agencies. The FMP will; 1) explore the potential for a conservatively based lake fertilization program, 2) include recommendations for increasing angler access through a cost effective, alternative buoy realignment, and 3) investigate the potential for extending the fishing season on the reservoir. The alternatives for access should include engineering-type specifications for buoy designs and configurations (such as a 150' or more restricted area around intake ports), and signage and/or fencing for the area around the dam face. An important component of any changes in access will be strategies for providing appropriate law enforcement to ensure dam safety and operation. Also, these law enforcement strategies should have some form of tracking, such as number of visits and a notification protocol to USACE reservoir managers and emergency response teams. Public access to the reservoir will be improved by the construction of a boat ramp and road upgrades on the Maryland side of the reservoir.

Reciprocal Enforcement Compact: A very critical element in our agenda for 1992 was the development of a bi-state compact for the reciprocal enforcement of natural resource laws and regulations on the Jennings Randolph Project area. With the filling of the Jennings Randolph reservoir, the historic, meandering boundary between the states was inundated and obscured, resulting in uncertainties with regards to whom is responsible for enforcing natural resource regulations on the various areas of the reservoir. Solutions include a) installation of a buoy system, or b) developing a concurrent jurisdiction approach. A buoy system to demarcate the existing boundary is probably technically infeasible and would certainly be very expensive. Therefore, the Task Force developed a compact to be entered between Maryland and West Virginia with the concurrence of the U.S. Army Corps of Engineers, Baltimore District, which will provide concurrent jurisdiction on the Jennings Randolph Lake Project (Appendix II). Currently, the document is being presented for authorization to both state legislatures. If approved, the document will be presented to the U.S. Congress for ratification. This situation is also interesting because it is similar to boundary inundations at other dams along the river.

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APPENDIX I
RIFFLE/RUN PREVALENCE

Habitat Parameter	Category			
	Optimal	Sub-Optimal	Marginal	Poor
6. Bottom scouring and deposition (a)	Less than 5% of the bottom affected by scouring and/or deposition. 12-15	5-30% affected. Scour at constrictions and where grades steepen. Some deposition in pools. 8-11	30-50% affected. Deposits and/or scour at obstructions, constrictions, and bends. Filling of pools prevalent. 4-7	More than 50% of the bottom changing frequently. Pools almost absent due to deposition. Only large rocks in riffle exposed. 0-3
7. Pool/riffle, run/bend ratio (a) (distance between riffles divided by stream width)	Ratio: 5-7. Variety of habitat. Repeat pattern of sequence relatively frequent. 12-15	7-15. Infrequent repeat pattern. Variety of macrohabitat less than optimal. 8-11	15-25. Occasional riffle or bend. Bottom contours provide some habitat. 4-7	>25. Essentially a straight stream. Generally all flat water or shallow riffle. Poor habitat. 0-3
8. Lower bank channel capacity (b)	Overbank (lower) flows rare. Lower bank W/D ratio <7. (Channel width divided by depth or height of lower bank.) 12-15	Overbank (lower) flows occasional. W/D ratio 8-15. 8-11	Overbank (lower) flows common. W/D ratio 15-25. 4-7	Peak flows not contained or contained through channelization. W/D ratio >25. 0-3
9. Upper bank stability (a)	Upper bank stable. No evidence of erosion or bank failure. Side slopes generally <30%. Little potential for future problems. 9-10	Moderately stable. Infrequent, small areas of erosion mostly healed over. Side slopes up to 40% on one bank. Slight potential in extreme floods. 6-8	Moderately unstable. Moderate frequency and size of erosional areas. Side slopes up to 60% on some banks. High erosion potential during extreme high flow. 3-5	Unstable. Many eroded areas. "Raw" areas frequent along straight sections and bends. Side slopes >60% common. 0-2
10. Bank vegetative protection (d)	Over 90% of the streambank surfaces covered by vegetation. 9-10	70-89% of the streambank surfaces covered by vegetation. 6-8	50-79% of the streambank surfaces covered by vegetation. 3-5	Less than 50% of the streambank surfaces covered by vegetation. 0-2
OR Grazing or other disruptive pressure (b)	Vegetative disruption minimal or not evident. Almost all potential plant biomass at present stage of development remains. 9-10	Disruption evident but not affecting community vigor. Vegetative use is moderate, and at least one-half of the potential plant biomass remains. 6-8	Disruption obvious; some patches of bare soil or closely cropped vegetation present. Less than one-half of the potential plant biomass remains. 3-5	Disruption of streambank vegetation is very high. Vegetation has been removed to 2 inches or less in average stubble height. 0-2

APPENDIX I (cont)
HABITAT ASSESSMENT FIELD DATA SHEET
RIFFLE/RUN PREVALENCE

Habitat Parameter	Category			
	Optimal	Sub-Optimal	Marginal	Poor
1. Bottom substrate/ instream cover (a)	Greater than 50% mix of rubble, gravel, submerged logs, undercut banks, or other stable habitat. 16-20	30-50% mix of rubble, gravel, or other stable habitat. Adequate habitat. 11-15	10-30% mix of rubble, gravel, or other stable habitat. Habitat availability less than desirable. 6-10	Less than 10% rubble, gravel, or other stable habitat. Lack of habitat is obvious. 0-5
2. Embeddedness (b)	Gravel, cobble, and boulder particles are between 0-25% surrounded by fine sediment. 16-20	Gravel, cobble, and boulder particles are between 25-50% surrounded by fine sediment. 11-15	Gravel, cobble, and boulder particles are between 50-75% surrounded by fine sediment. 6-10	Gravel, cobble, and boulder particles are over 75% surrounded by fine sediment. 0-5
3. <0.15 cms (5 cfs)→ Flow at rep. low	Cold >0.05 cms (2 cfs) Warm >0.15 cms (5 cfs) 16-20	0.03-0.05 cms (1-2 cfs) 0.05-0.15 cms (2-5 cfs) 11-15	0.01-0.03 cms (.5-1 cfs) 0.03-0.05 cms (1-cfs) 6-10	<0.01 cms (.5 cfs) <0.03 cms (1 cfs) 0-5
OR				
>0.15 cms (5 cfs)→ velocity/depth	Slow (<0.3 m/s), deep (>0.5 m); slow, shallow (<0.5 m); fast (>0.3 m/s), deep; fast, shallow habitats all present. 16-20	Only 3 of the 4 habitat categories present (missing riffles or runs receive lower score than missing pools). 11-15	Only 2 of the 4 habitat categories present (missing riffles or runs receive lower score). 6-10	Dominated by 1 velocity/ depth category (usually pools). 0-5
4. Canopy cover (shading) (c)(d)(g)	A mixture of conditions where some areas of water surface fully exposed to sunlight, and other receiving various degrees of filtered light. 16-20	Covered by sparse canopy; entire water surface receiving filtered light. 11-15	Completely covered by dense canopy; water surface completely shaded OR nearly full sunlight reaching water surface. Shading limited to <3 hours per day. 6-10	Lack of canopy, full sunlight reaching water surface. 0-5
5. Channel alteration (a)	Little or no enlargement of islands or point bars, and/or no channelization. 12-15	Some new increase in bar formation, mostly from coarse gravel; and/or some channelization present. 8-11	Moderate deposition of new gravel, coarse sand on old and new bars; and/or embankments on both banks. 4-7	Heavy deposits of fine material, increased bar development; and/or extensive channelization. 0-3

APPENDIX I (cont)
RIFFLE/RUN PREVALENCE

Habitat Parameter	Category			
	Optimal	Sub-Optimal	Marginal	Poor
11.Streamside cover (b)	Dominant vegetation is shrub.	Dominant vegetation is of tree form.	Dominant vegetation is grass or forbes.	Over 50% of the streambank has no vegetation and dominant material is soil, rock, bridge materials, culverts, or mine tailings.
	9-10	6-8	3-5	0-2
12.Riparian vegetative zone width (least buffered side) (e)(f)(g)	>18 meters.	Between 12 and 18 meters.	Between 6 and 12 meters.	<6 meters.
	9-10	6-8	3-5	0-2
Column Totals	____	____	____	____

Score _____

(a) From Ball 1982.
(b) From Platts et al. 1983.
(c) From EPA 1983.
(d) From Hamilton and Bergersen 1984.
(e) From Lafferty 1987.
(f) From Schueler 1987.
(g) From Bartholow 1989.

APPENDIX I

NORTH BRANCH, POTOMAC RIVER

List of Participants

1. Maryland

   A. Department of Natural Resources

      1. Bob Bachman (301-974-3061) Chief, Freshwater Fisheries
      2. Tony Abar (301-689-4136) Director, Bureau of Mines
      3. Malcolm F. Wilkerson (301-974-7231) Acting Director, Program Open Space

   B. Department of the Environment

      1. Bob Perciasepe (301-631-3084) Secretary

2. West Virginia

   A. Department of Natural Resources

      1. Bernie Dowler (304-348-2771) Asst. Chief, Wildlife Resources
      2. Bert Pierce (304-364-5659) Wildlife Division

   B. Department of Energy

      1. Pat Park (304-348-3500) Asst. Director, Abandoned Mine Lands Reclamation Program

   C. Mineral County Development Authority

      1. Kay Vaughn (304-788-3383) Executive Director

3. U.S. Army Corps of Engineers, Baltimore District

      1. John O'Hagan (301-962-4646) Chief, Operations Division
      2. Jim Johnson (301-962-4900) Chief, Planning Division
      3. Russell Newman (304-355-2346) Manager, Jennings Randolph Dam

4. The Interstate Commission on the Potomac River Basin

      1. Lee Zeni (301-984-1908) Director
      2. Phyllis M. Cole (304-257-1313) Commissioner, West Virginia
      3. Herbert M. Sachs (301-974-3547) Commissioner, Maryland
      4. Jim Cummins (301-984-1908) Associate Director\Living Resources

5. The Conservation Fund

   A. The Freshwater Institute

      1. Larry Selzer (304-876-2815) Director
      2. Bob Putz (304-876-2815) Director of Science

   B. Special Projects

      1. Kent Olson (703-525-6300) Director

BALTIMORE DISTRICT, CORPS OF ENGINEERS RESPONSIBILITIES IN THE NORTH BRANCH POTOMAC RIVER BASIN

General.

The Corps of Engineers has the overall responsibility to develop, control, maintain, and conserve the Nation's water resources in accordance with the laws and policies established by Congress and the Administration. In accordance with those laws and policies, the Corps carefully considers and seeks to balance the environmental and developmental needs of the Nation. Actions taken comply with all relevant environmental statutes, have no significant safety problem, and are in the overall public interest.

As it relates to the North Branch Potomac River basin and the Jennings Randolph Lake project, the Baltimore District has several existing authorities under which an array of planning, engineering and operations activities are conducted.

Planning Studies.

Planning studies leading to project authorization and construction are undertaken in response to either a study-specific authority or a standing authority. Study-specific authorization may be: a resolution from the House Committee on Public Works and Transportation; a resolution from the Senate Committee on the Environment and Public Works; or included in a public law. An example of a standing authority is Section 216 of the 1970 Flood Control Act which authorizes investigations for modification of completed projects or their operation.

Given an authority to undertake a planning study, the funds to conduct that study must be appropriated by the Congress and, in the case of feasibility level studies, a non-Federal sponsor is required to provide 50 percent of the study costs.

The only planning study in the North Branch Potomac River area that is presently authorized and funded is the Jennings Randolph Reallocation Study. A cost-shared feasibility level study under Section 216 (noted above) is presently underway to determine the feasibility and advisability of reallocating additional project storage to water supply. While this study will address the quantity and quality of project releases, it is not addressing acid mine drainage or downstream fisheries restoration. While presently unfunded, there are several additional authorities that could be used to conduct planning studies related to restoration of the North Branch Potomac River.

* Section 6 of the Water Resources Development Act of 1988 would allows for studies to better manage the Jennings Randolph Project in the interest of improved opportunities for recreation to include recreational fishing.

* Section 1135 of the Water Resources Development Act of 1986 authorizes the review of existing Corps projects like Jennings Randolph for the purpose of improving the quality of the environment.

* Section 22 of the Water Resources Development Act of 1974, as amended, authorizes the Corps to assist the states in cost-shared studies for the development, use and conservation of water resources.

As noted above, a planning study could also be undertaken given a specific authority and funding from the Congress.

APPENDIX II

Strategy for Fisheries Restoration and Enhancement in the North Branch, Potomac River

The Interstate Commission on the Potomac River Basin
(March, 1991)

Executive Summary

The Potomac River's water quality has improved considerably from its nadir in the 1960's. However, an important tributary, the North Branch, stands out as a significantly abused system which is still far from its biologic, economic and recreational potentials. While there is much to be proud of concerning the dramatic turnaround of the Potomac River, this recovery cannot be fully heralded until tributaries such as the North Branch are again vigorous with aquatic life.

The major objective of this strategy is to help restore the fisheries in the Potomac River's North Branch and thereby stimulate economic development and stability in surrounding areas of Maryland and West Virginia. This would be accomplished by developing a high quality trout fishery on the North Branch of the Potomac River from its headwaters to Westernport, Md., with the centerpiece being a tail-race fishery downstream from the Jennings Randolph Reservoir. The initial fishery will be a put-and-take trout fishery with the long-term objective of establishing a naturally reproducing trout fishery. Due to the multi-jurisdictional aspects of this project it is recommended that a North Branch, Potomac River Restoration Agreement be established to facilitate the attainment of this goal.

Key components of this goal include:

* Improving water quality and increasing biological productivity, principally through de-acidification;
* Implementation of a land protection plan which includes improving public access; and,
* Improving the support infrastructures for a recreational fishery.

An integral part of this strategy is to provide economic revitalization through environmental restoration. The first phase of the project has been completed. This phase included reviewing available information and conducting preliminary on-site sampling to obtain an overview of current water quality and biological resources of the North Branch and its feeder streams in the study area. Information collected during this phase has been used to identify those agencies and organizations in positions to support the restoration efforts and to help determine the optimal sites for future de-acidification techniques.

The second phase of the project, 1991-1995, will include more in-depth analyses of habitat and recreational fishery potential along with related costs and economic benefits. Acid mine-runoff amelioration steps, primarily by lime dosing of priority streams, will begin. Infrastructure planning and design will also be initiated during this phase. Concurrently, a

land protection and development strategy, which incorporates land conservation, fisheries management, law enforcement and economic costs/benefits will be developed and implemented during this phase.

Phase three of the project, 1993 - , will include comprehensive, long-term acid mine drainage abatement, the completion of the land protection and development strategy, and the infrastructure needed to fully support the trout fishery on the North Branch. The final product of the project will include a tail-race fishery modelled after other tail-race fisheries such as the White River in Arkansas. Costs for Phase III are difficult to estimate at this time. Infrastructure costs are expected to be absorbed largely by the private sector. As an example of economic benefit, the Arkansas Department of State Parks and Tourism reports that the White River fishing industry brings $143 million annually to that state.

Participation in this restoration project will include the U.S. Army Corp of Engineers, the U.S. Environmental Protection Agency, Maryland's Department of Natural Resources, West Virginia's Departments of Natural Resources and Energy, Mineral County Development Authority, The Interstate Commission on the Potomac River Basin and the Conservation Fund.

Costs Estimates for Development of
North Branch Recreational Fishing Industry

Phase II:

A. Acid Amelioration
Stream Lime Dosers (3)
Set-up $116,000
Operational Cost (70 K/yr x 5 yr).....$350,000
Sub-Total.....$466,000

B. Habitat Assessment and Project Development
$230,000 x 5 years.....$1,150,000

C. Land Acquisition and Access Improvements
Land per acre average $850
Approximately 6,000 acres.....$5,000,000
Total.....$6,816,000

Strategy for Fisheries Restoration and Enhancement in the North Branch, Potomac River

The Interstate Commission on the Potomac River Basin

(March, 1991)

NEED

The North Branch of the Potomac, located along the western edge of the Potomac basin and forming the boundary between the states of Maryland and West Virginia, flows through rugged terrain of steep sided mountains and deep valleys. The North Branch has long been one of the most troubled areas of the Potomac basin in terms of water quality. Abandoned coal mines are sources of polluting sulfuric acid and dissolved minerals that have acidified and degraded some 700 miles of the North Branch's streams, leaving many of them incapable of supporting aquatic life. Due to acid mine drainage into the waters of the North Branch, this section of the Potomac was considered biologically dead less than a decade ago.

In 1982, the Jennings Randolph Lake Project created a dam on the North Branch for water supply and flood control. An unexpected side effect of the dam was an improvement in water quality of the North Branch to levels that can support fish. The Dam Project, in addition to ensuring a reliable supply of water to the Washington Metropolitan area, enabled water managers to selectively draw water from the reservoir and discharge water of a more uniform quality to the river below. This has resulted in noticeably improved water quality. In 1989 the Maryland Department of Natural Resources was able to successfully use the dam's tailrace waters for net-pen culture of brown trout. However, acidic mine runoff and lake acidity are still critical problems which limit fisheries management of the North Branch and prevent full utilization of the North Branch's potential. The State of Maryland, in cooperation with the State of West Virginia, is currently managing the North Branch as a limited put-and-take trout area. Besides water quality problems, poor public access and inadequate support infrastructure are significant reasons that the North Branch remains under utilized.

GOAL

Nationally, approximately 60 million recreational anglers directly contribute over 28 billion dollars to the national economy. In Maryland, sport fishing annually earns the state $140.6 million which translates to 9827 jobs, $22.8

million in state sales taxes, $6.3 million in state income taxes and license revenues of $2.5 million. The figures for West Virginia are similar, earning that state $32.7 million, supporting 2591 jobs and producing $6.0 million in state sales taxes, $1.2 million in state income taxes, and $2.9 million in license revenues.

Tailrace waters have produced excellent recreational fishing industries in other parts of the country, such as those found in the White River in Arkansas and the Bighorn River in Montana. The Arkansas Department of State Parks and Tourism reports that the White River fishing industry is an approximately $143 million dollar annual business. One tributary of the White River alone brings in $300,000 per year on direct fishery related expenditures, not including lodging, food and other indirect expenses. A first class trophy trout fishery could also become a reality in the North Branch if water quality were improved and if proper access and infrastructure were available. In addition, several other factors could make the North Branch an extremely successful fishery. First, the North Branch is located in very picturesque "wild and scenic" terrain and could provide a highly sought after wilderness type of experience. Secondly, the North Branch is in convenient proximity to very large populations of Baltimore, Maryland, Washington, D.C., Richmond, Virginia and Pittsburgh, Pennsylvania. An infusion of sport fishing and tourism dollars could mean a much needed economic boost to the surrounding area of West Virginia and Maryland.

APPROACH

Although improvements in water quality in the North Branch have been made in recent years, much of the effort has been sporadic. For economic efficiency, development of a successful recreational fisheries in the North Branch will require a coordinated effort by Maryland, West Virginia, the U.S. Army Corps of Engineers, The Interstate Commission on the Potomac River Basin, and the involvement of the private sector. It will require a better understanding of the biological potentials and limitations of the watershed. Most importantly, there is a need for appropriate planning for land protection, abandoned mine reclamation, and development of the support infrastructure necessary to handle such an industry.

The Interstate Commission on the Potomac River Basin recommends the establishment of a **North Branch, Potomac River Restoration Agreement** between the U.S. Army Corps of Engineers, Baltimore District, the States

of Maryland and West Virginia, The Interstate Commission on the Potomac River, and The Conservation Fund. The purpose of the agreement will be to restore biological diversity to the Potomac River's North Branch, to create a greenway system along its corridor, and to develop a recreational fishery which can help stimulate economic development and stability in the surrounding areas. Fulfillment of these objectives can best be accomplished by the following courses of action.

COURSES OF ACTION:

* Improving Water Quality

The highest priority water quality problem in the North Branch is reducing the impacts of acid mine drainage. Biologically lethal acidic discharges severely reduce the ability to establish healthy biological communities in the North Branch and have resulted in fish kills of trout in Maryland's net pens located in the stilling basin below the Jennings Randolph Dam. Highly acidic lenses of water accumulate in the Jennings Randolph Lake and exacerbate the problem by limiting the ability of the U.S. Army Corps of Engineers dam operators to mix and release suitable waters.

Acidic waters can affect human health by increasing the solubility and toxicity of metals. Six such metals; aluminum, cadmium, copper, manganese, selenium and zinc have been found in the North Branch at levels exceeding state water quality criteria. Acidic waters in the North Branch could be leading to increased health problems resulting in human suffering, increased medical costs and loss of income. In addition to potential human health effects, highly acidic water can impose significant economic costs by depressing property values and by requiring treatment when used as processing waters by industries.

The ability to neutralize acidic waters provides a means of mitigating the adverse impacts of acid mine drainage on the North Branch. By correcting the low pH conditions, and establishing a more normal water chemistry balance, conditions can be created that are suitable for the development of a recreational fishery which can provide the basis for economic development in the region. Maryland, West Virginia and the Federal government are currently very interested in ameliorating the acid runoff problems in the North Branch. A recent joint study of acid mine runoff problems in the North Branch, sponsored by the Federal Office of Surface Mining

Reclamation and Enforcement, the Maryland Department of Natural Resources, and the West Virginia Department of Energy will provide Maryland and West Virginia with a bi-state management strategy for improving water quality in the North Branch and its tributaries. This study has determined that eighty percent of the acidic runoff problems in the North Branch are attributed to approximately thirty-five sources.

We recommend implementing a stepped approach of acid remediation in order to help spread out the costs associated with the cleanup of these sites and to reduce the time required to obtain suitable water quality. The first step would be short term and would be performed with point source lime applications at selected high priority streams. Maryland and West Virginia have tentatively identified several key sub-watersheds to the North Branch which, due to their size and impacts upon the North Branch mainstem, would serve as excellent candidates for stream liming. Three of these streams; Three Forks Run, Abram Creek, and Laurel Run (near Kempton), are located upstream from the Jennings Randolph Lake. A fourth stream, an un-named tributary near Barnum, West Virginia, is located downstream of the dam and has been identified as a good candidate for stream dosing. Dosing of these tributaries should provide maximum benefits to the North Branch in terms of stream miles treated, providing "flywheel effect" buffering capacity for storm events at the reservoir, and direct reduction in acidity in the river mainstem.

We view lime applications as a temporary yet necessary first step to rehabilitate the North Branch to the degree which can support trout populations. The second step, obtaining more desirable, long term reductions in acidity, will require more extensive remediation projects such as created wetlands, chemical treatment plants and the reclamation of abandoned strip mines and coal refuse piles to prevent further contamination. Both temporary and long term remediation measures will require substantial fiscal and technical commitments. Although most of these commitments will likely be drawn from federal and state government, there is interest in sharing costs and technology from the private sector.

Unfortunately, a roadblock currently exists in obtaining needed funding for correcting acid mine drainage in the North Branch. The Surface Mining Control and Reclamation Act of 1977 (SMCRA) provides Federal funds (grants) to states for addressing problems caused by abandoned coal mines. However, 1990 amendments to

section 402(g) (8) of SMCRA restrict expenditures of SMRCA grants in "minimum program" states (such as Maryland) solely to health and safety problems. Consequently, Maryland may not utilize SMCRA funds for abatement of acid mine drainage to address environmental problems. The 1990 amendments to SMCRA further restrict all other states (such as West Virginia) to spending a maximum of ten percent of their grants on abandoned mine drainage abatement. Thus, if the Federal Office of Surface Mining decided that the acid mine drainage problems of the North Branch were only environmental (not health and safety) in nature, Maryland would not be able to utilize any of its grant funds and West Virginia would not be able to use more than ten percent of its funds. While it is certainly arguable that the abandoned mine drainage problems of the North Branch create adverse effects to human health and safety, Legislative (Congressional) action could alleviate the fiscal uncertainty by providing the states with more discretion to spend SMCRA funds to address environmental, as well as health and safety, problems caused by abandoned coal mines. Section 402(g) (8) of SMRCA should be amended to include abandoned mine drainage as an eligible expenditure in "minimum program" states and the ten percent limitation should be raised if not eliminated altogether.

Along with the key issue of reducing the acidity of the North Branch, other important aspects of restoration will include increasing biological productivity through fertilization, lowering water temperatures and raising pH through selective dam releases by the U.S. Army Corps of Engineers which would be made possible by upstream acid remediation measures as described above, and controlling sources of toxic metals at discharge points. In addition, biological and water quality monitoring of the project area should be conducted to assess progress of the recovery.

* Land Protection and Improving Access

Most of the property surrounding the North Branch is not in public hands. Unless the lands adjoining the North Branch are available for public use, economic development of a recreational fishing industry in the North Branch would be extremely difficult and could lead to fragmentation and disarray of support facilities. Protecting and managing land use activities on adjoining land tracts would provide critically needed access to the fishery, establish important natural buffering for the area, and maintain the region's very picturesque "wild and scenic"

terrain. Therefore, at every phase of this project, it is important that appropriate agencies promote land protection along the North Branch, Potomac River. The land protection and access strategy should incorporate fisheries management, complementary or competitive park usages such as whitewater boating, hiking and camping, as well as law enforcement issues and economic concerns.

* Support Infrastructure Plan

Support infrastructure has a broad umbrella covering both direct and indirect elements of a fishery such as lodging, guide services, food services and fishing equipment shops as well as adequate road systems, emergency services, law enforcement, and public information relating to the area. A critical question in developing infrastructure for a North Branch fishery is what level of fishing effort can be managed and sustained. The Interstate Commission on the Potomac River Basin can coordinate between various state and federal agencies in preparing a fisheries management plan for the region which can serve as a basis for infrastructure planning. An estimate of how many fish and the types and numbers of anglers the river will sustain will be prepared in order to develop support infrastructure plans. As part of this task, ICPRB will coordinate a reconnaissance tour of the White River, Arkansas. Located in the south-eastern drainage of the Ozark Plateau, the White River has become a popular recreational fishing area following the establishment of a similar tailwater fishery. Along with this popularity has come economic benefits to the region. This reconnaissance tour will be used to assess the problems and successes encountered in the development of such a fishery, including points-of-view from biology, economics and infrastructure.

AGENCY PARTICIPATION

As of this date, the agencies and jurisdictions which have expressed an interest in the development of a recreational fishery in the North Branch Potomac River include the States of Maryland and West Virginia, the U.S. Army Corps of Engineers, West Virginia's Mineral County Development Authority, The Interstate Commission on the Potomac River, and The Conservation Fund. Some of the various roles and responsibilities

of these participants are outlined below[1]:

1. Water Quality Improvement:

   A. Abatement of Acid Mine Drainage and Mine Reclamation:

   Both Maryland's Department of Natural Resources' Bureau of Mines and West Virginia's Department of Energy's Abandoned Mine Lands Reclamation Program oversee mine reclamation and amelioration, including the monitoring of water quality associated with these activities. As mentioned earlier, roadblocks exist which restrict their abilities to work on acid mine drainage abatement, however, there is limited ability to implement demonstration projects which could be used to improve water quality.

   B. Dam Operation and Lake Management:

   The U.S. Army Corps of Engineers has both specifically-authorized and general responsibilities on the North Branch[2]. Their specific responsibilities revolve around the operation and maintenance of Jennings Randolph Lake for its congressionally-authorized purposes of low-flow augmentation, water quality control, flood control, water supply, and recreation. The Corps of Engineers has very active water control and water quality programs which include substantial water quality monitoring and biological sampling necessary to support reservoir regulation. Their goal is to optimize the water quality in the North Branch from their releases while still fulfilling the Jennings Randolph Project purposes.

2. Land Protection and Improving Access:

   The U.S. Army Corps of Engineers has management responsibilities on the lands surrounding and immediately below the reservoir. The Parks and Recreation Division of West Virginia's Department of Commerce, Maryland's Department of Natural Resource's Program Open Space, West Virginia's Mineral County Development Authority, and The Conservation Fund are all exploring mechanisms for protecting and improving access on the North Branch.

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[1] Please refer to Appendix I for the names of the participant's identified key individuals.

[2]See Appendix II for more specific detail on the Corp of Engineers' responsibilities.

3. Natural Resources:

The West Virginia and Maryland Departments of Natural Resources have joint responsibilities in managing the natural resources of the North Branch. These include biological and water quality monitoring, management of wild stocks, stocking of fish, protecting potential spawning areas, and promulgation and enforcement of appropriate regulations.

NORTH BRANCH, POTOMAC RIVER
STRATEGY TIMELINE

PHASE 1 1990	PHASE 2 1991-1995	PHASE 3 1993--->
Water Quality Improvements:		
--Acid Amelioration Study--><--Treatment Model-->		
	<---Temporary Acid Remediation (Stream Dosing)---------->	
	<--Experimental Fertilization---------->	
	<-----Long Term Remediation (Mine Reclamation --->	
Fisheries Development:		
<-----Preliminary Project Assessment---->		
<-----Intermittent Put-&-Take Stocking---------->		
<----------Biological & Water Quality Monitoring---------->		
	<-----Year Round Put-&-Take Stocking[3]----->	
	<------Naturally Sustaining Trout Population------>	
Land Protection:		
	<---------Infrastructure Planning------><-------Infrastructure Implementation-->	
	<----------Access Improvement (Greenway Development)--------->	

[3]It should be recognized that a managed put-&-take fishery may be required to sustain enough fishing trips to be economically feasible.

JENNINGS RANDOLPH LAKE PROJECT COMPACT

PREAMBLE

Whereas the signatory parties hereto desire to provide for joint natural resource management and enforcement of laws and regulations pertaining to natural resources and boating at the Jennings Randolph Lake Project lying in Garrett County, Maryland and Mineral County, West Virginia, for which they have a joint responsibility; and they declare as follows:

1. The Congress, under Public Law 87-874, authorized the development of the Jennings Randolph Lake Project for the North Branch of the Potomac River substantially in accordance with House Document Number 469, 87th Congress, 2nd Session for flood control, water supply, water quality, and recreation; and

2. Section 4 of the Flood Control Act of 1944 (CH 665, 58 Stat. 534) provides that the Chief of Engineers, under the supervision of the Secretary of War (now Secretary of the Army), is authorized to construct, maintain and operate public park and recreational facilities in reservoir areas under control of such Secretary for the purpose of boating, swimming, bathing, fishing, and other recreational purposes, so long as the same is not inconsistent with the laws for the protection of fish and wildlife of the State(s) in which such area is situated; and

3. Pursuant to the authorities cited above, the U.S. Army Engineer District (Baltimore), hereinafter "District", did construct and now maintains and operates the Jennings Randolph Lake Project; and

4. The National Environmental Policy Act of 1969 (P.L. 91-190) encourages productive and enjoyable harmony between man and his environment, promotes efforts which will stimulate the health and welfare of man, and encourages cooperation with State and local governments to achieve these ends; and

5. The Fish and Wildlife Coordination Act (16 U.S.C. 661-666c) provides for the

consideration and coordination with other features of water-resource development programs through the effectual and harmonious planning, development, maintenance, and coordination of wildlife conservation and rehabilitation; and

6. The District has Fisheries and Wildlife Plans as part of the District's project Operational Management Plan; and

7. In the respective States, the Maryland Department of Natural Resources (hereinafter referred to as Maryland DNR) and the West Virginia Division of Natural Resources (hereinafter referred to as West Virginia DNR) are responsible for providing a system of control, propagation, management, protection, and regulation of natural resources and boating in Maryland and West Virginia and the enforcement of laws and regulations pertaining to those resources as provided in Annotated Code of Maryland Natural Resources Article and West Virginia Chapter 20, respectively, and the successors thereof; and

8. The District, the Maryland DNR, and the West Virginia DNR are desirous of conserving, perpetuating and improving fish and wildlife resources and recreational benefits of the Jennings Randolph Lake Project; and

9. The District and the States of Maryland and West Virginia wish to implement the aforesaid acts and responsibilities through this Compact and they each recognize that consistent enforcement of the natural resources and boating laws and regulations can best be achieved by entering this Compact;

NOW, THEREFORE

The States of Maryland and West Virginia, with the concurrence of the United States Department of the Army, Corps of Engineers, hereby solemnly covenant and agree with each other, upon enactment of concurrent legislation by The Congress of the United States and by the respective state legislatures, to the Jennings Randolph Lake Project Compact, which consists of this preamble and the articles that follow:

Article I - Name, Findings, and Purpose

1.1 This compact shall be known and may be cited as the Jennings Randolph Lake Project Compact.

1.2 The legislative bodies of the respective signatory parties, with the concurrence of the U.S. Army Corps of Engineers, hereby find and declare:

1. The water resources and project lands of the Jennings Randolph Lake Project are affected with local, state, regional, and national interest, and the planning, conservation, utilization, protection and management of these resources, under appropriate arrangements for inter-governmental cooperation, are public purposes of the respective signatory parties.

2. The lands and waters of the Jennings Randolph Lake Project are subject to the sovereign rights and responsibilities of the signatory parties, and it is the purpose of this compact that, notwithstanding any boundary between Maryland and West Virginia that preexisted the creation of Jennings Randolph Lake, the parties will have and exercise concurrent jurisdiction over any lands and waters of the Jennings Randolph Lake Project concerning natural resources and boating laws and regulations in the common interest of the people of the region.

Article II - District Responsibilities

The District, within the Jennings Randolph Lake Project,

2.1 Acknowledges that the Maryland DNR and West Virginia DNR have authorities and responsibilities in the establishment, administration and enforcement of the natural resources and boating laws and regulations applicable to this project, provided that the laws and regulations promulgated by the States support and implement, where applicable, the intent of the Rules and Regulations Governing Public Use of Water Resources Development Projects administered by the Chief of Engineers in Title 36, Chapter III, Part 327, Code of Federal Regulations,

2.2 Agrees to practice those forms of resource management as determined jointly by the

District, Maryland DNR and West Virginia DNR to be beneficial to natural resources and which will enhance public recreational opportunities compatible with other authorized purposes of the project,

2.3 Agrees to consult with the Maryland DNR and West Virginia DNR prior to the issuance of any permits for activities or special events which would include, but not necessarily be limited to; fishing tournaments, training exercises, regattas, marine parades, placement of ski ramps, slalom water ski courses and the establishment of private markers and/or lighting. All such permits issued by the District will require the permittee to comply with all State laws and regulations,

2.4 Agrees to consult with the Maryland DNR and West Virginia DNR regarding any recommendations for regulations affecting natural resources, including, but not limited to, hunting, trapping, fishing or boating at the Jennings Randolph Lake Project which the District believes might be desirable for reasons of public safety, administration of public use and enjoyment,

2.5 Agrees to consult with the Maryland DNR and West Virginia DNR relative to the marking of the lake with buoys, aids to navigation, regulatory markers and establishing and posting of speed limits, no wake zones, restricted or other control areas and to provide, install and maintain such buoys, aids to navigation and regulatory markers as are necessary for the implementation of the District's Operational Management Plan. All buoys, aids to navigation and regulatory markers to be used shall be marked in conformance with the Uniform State Waterway Marking System,

2.6 Agrees to allow hunting, trapping, boating and fishing by the public in accordance with the laws and regulations relating to the Jennings Randolph Lake Project,

2.7 Agrees to provide, install and maintain public ramps, parking areas, courtesy docks, etc., as provided for by the approved Corps of Engineers Master Plan, and

2.8 Agrees to notify the Maryland DNR and the West Virginia DNR of each reservoir drawdown prior thereto excepting drawdown for the reestablishment of normal lake levels following flood control operations and drawdown resulting from routine water control management operations described in the reservoir regulation manual including releases requested by water supply owners and normal water quality releases. In case of emergency releases or emergency flow curtailments,

telephone or oral notification will be provided. The District reserves the right, following issuance of the above notice, to make operational and other tests which may be necessary to insure the safe and efficient operation of the dam, for inspection and maintenance purposes, and for the gathering of water quality data both within the impoundment and in the Potomac River downstream from the dam.

Article III - State Responsibilities

The State of Maryland and the State of West Virginia agree:

3.1 That each State will have and exercise concurrent jurisdiction with the District and the other State for the purpose of enforcing the civil and criminal laws of the respective States pertaining to natural resources and boating laws and regulations over any lands and waters of the Jennings Randolph Lake Project;

3.2 That existing natural resources and boating laws and regulations already in effect in each State shall remain in force on the Jennings Randolph Lake Project until either State amends, modifies or rescinds its laws and regulations;

3.3 That the Agreement for Fishing Privileges dated June 24, 1985 between the State of Maryland and the State of West Virginia, as amended, remains in full force and effect;

3.4 To enforce the natural resources and boating laws and regulations applicable to the Jennings Randolph Lake Project;

3.5 To supply the District with the name, address and telephone number of the person(s) to be contacted when any drawdown except those resulting from normal regulation procedures occurs;

3.6 To inform the Reservoir Manager of all emergencies or unusual activities occurring on the Jennings Randolph Lake Project;

3.7 To provide training to District employees in order to familiarize them with natural resources and boating laws and regulations as they apply to the Jennings Randolph Lake Project; and

3.8 To recognize that the District and other Federal Agencies have the right and

responsibility to enforce, within the boundaries of the Jennings Randolph Lake Project, all applicable Federal laws, rules and regulations so as to provide the public with safe and healthful recreational opportunities and to provide protection to all federal property within the project.

Article IV - Mutual Cooperation

4.1 Pursuant to the aims and purposes of this Compact, the State of Maryland, the State of West Virginia and the District mutually agree that representatives of their natural resource management and enforcement agencies will cooperate to further the purposes of this Compact. This cooperation includes, but is not limited to, the following:

4.2 Meeting jointly at least once annually, and providing for other meetings as deemed necessary for discussion of matters relating to the management of natural resources and visitor use on lands and waters within the Jennings Randolph Lake Project;

4.3 Evaluating natural resources and boating, to develop natural resources and boating management plans and to initiate and carry out management programs;

4.4 Encouraging the dissemination of joint publications, press releases or other public information and the interchange between parties of all pertinent agency policies and objectives for the use and perpetuation of natural resources of the Jennings Randolph Lake Project; and

4.5 Entering into working arrangements as occasion demands for the use of lands, waters, construction and use of buildings and other facilities at the project.

Article V - General Provisions

5.1 Each and every provision of this Compact is subject to the laws of the States of Maryland and West Virginia and the laws of the United States, and the delegated authority in each instance.

5.2 The enforcement and applicability of natural resources and boating laws and regulations referenced in this Compact shall be limited to the lands and waters of the Jennings Randolph Lake

Project, including but not limited to the prevailing reciprocal fishing laws and regulations between the States of Maryland and West Virginia.

5.3 Nothing in this Compact shall be construed as obligating any party hereto to the expenditure of funds or the future payment of money in excess of appropriations authorized by law.

5.4 The provisions of this Compact shall be severable, and if any phrase, clause, sentence or provision of the Jennings Randolph Lake Project Compact is declared to be unconstitutional or inapplicable to any signatory party or agency of any party, the constitutionality and applicability of the Compact shall not be otherwise affected as to any provision, party, or agency. It is the legislative intent that the provisions of the Compact be reasonably and liberally construed to effectuate the stated purposes of the Compact.

5.5 No member of or delegate to Congress, or signatory shall be admitted to any share or part of this Compact, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.

5.6 When this Compact has been ratified by the legislature of each respective State, when the Governor of West Virginia and the Governor of Maryland have executed this Compact on behalf of their respective States and have caused a verified copy thereof to be filed with the Secretary of State of each respective State, when the Baltimore District of the U.S. Army Corps of Engineers has executed its concurrence with this Compact, and when this Compact has been consented to by the Congress of the United States, then this Compact shall become operative and effective.

5.7 Either State may, by legislative act, after one year's written notice to the other, withdraw from this Compact. The U.S. Army Corps of Engineers may withdraw its concurrence with this Compact upon one year's written notice from the Baltimore District Engineer to the Governor of each State.

5.8 This Compact may be amended from time to time. Each proposed amendment shall be presented in resolution form to the Governor of each State and the Baltimore District Engineer of the

U.S. Army Corps of Engineers. An amendment to this Compact shall become effective only after it has been ratified by the legislatures of both signatory States and concurred in by the U.S. Army Corps of Engineers, Baltimore District. Amendments shall become effective thirty days after the date of the last concurrence or ratification.

WITNESS THE FOLLOWING SIGNATURES:

_____ _____

The Honorable William Donald Schaefer
Governor, State of Maryland

Date

_____ _____

The Honorable Gaston Caperton
Governor, State of West Virginia

Date

CONCUR

_____ _____

J. Richard Capka, P.E.
Colonel, Corps of Engineers
District Engineer
Baltimore District

Date