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Removing Impediments to Migratory Fishes in the Chesapeake Bay Watershed

Annual Progress Report 1995

Regional Center for Environmental Information
U.S. EPA Region III
1650 Arch St
Philadelphia, PA 19103

Prepared by

Chesapeake Bay Program
Fish Passage Workgroup

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Executive Summary

The Fish Passage Workgroup of Chesapeake Bay Program's Living Resources Subcommittee (LRSc) is charged with reopening blocked tributary waters of the Bay to provide access to spawning habitat for anadromous fish. This is accomplished through the construction of fish passage facilities, dam removal, reconstruction of highway culverts, or by creating breaches or notches. The Workgroup includes representatives from the District of Columbia, Maryland, Pennsylvania, Virginia, and federal agencies including the U.S. Environmental Protection Agency (US EPA), the U.S. Fish and Wildlife Service (US FWS), and the National Marine Fisheries Service (NMFS). An inter-agency agreement between the US EPA and NMFS facilitates the processing and distribution of federal funds to the jurisdictions for many of the fish passage, stocking, and survey projects. The high degree of cooperation among these jurisdictions and agencies has resulted in opening up many miles where migratory fish could potentially spawn.

Fish passage development in Bay tributaries has been underway since the late 1980s. In December, 1993 the Chesapeake Executive Council (EC) formalized short- and long-term goals for this initiative in Directive 93-4, which instructs the Chesapeake Bay Program partners to open 582.05 and 1356.75 miles of spawning habitat for shad and herring (*Alosa* spp.) by 1998 and 2003, respectively. The Chesapeake Bay Program, in turn, designated the LRSc through the Fish Passage Workgroup to accomplish these goals. In 1995, the Chesapeake Bay Program signatories opened 36.6 miles to migratory fish within the Bay watershed. 216 miles have been open to date, including 148.7 miles opened prior to the Directive. Specific accomplishments during 1995 include:

- The District of Columbia completed two projects which opened one mile of habitat to anadromous fish. They continued monitoring alosids in Rock Creek and the Potomac River. American shad eggs were collected from the Potomac River for culture.

- Maryland completed seven projects and opened 27.9 miles of habitat, assessed stream habitat in the Chester and Choptank River basins, and assessed the fish assemblage in the Wicomico River. Maryland also stocked several thousand adult herring into the Patapsco River and several million larval shad into the lower Susquehanna and Patuxent Rivers. The US FWS reared and released 1.2 million shad in the Potomac River above Little Falls.

- Pennsylvania opened no new miles in 1995, but has ongoing construction on a number of facilities. They also trapped thousands of adult shad and herring at the Conowingo Dam and transported fish to upstream spawning waters in Pennsylvania. In addition, they cultured and stocked 10 million marked shad larvae, monitored out-migrating juvenile American shad, and completed phase I & II of the Susquehanna River Tributary Blockage study.

- Virginia opened 7.7 miles of habitat by completing one fish passage project, monitored alosids in numerous rivers, and began the Rappahannock River Basin Impediment Survey.

Virginia also stocked several thousand adult herring in the upper James River. Ten million shad larvae were reared and released in the James and Pamunkey rivers.

Throughout 1995, all jurisdictions were engaged in education efforts, highlighting issues from the values of anadromous fish in urban settings to the design of fish passages. Education efforts included environmental fairs; outreach to schools; seminars for regional, state and local officials; and the production of videos, brochures and magazine articles. A Fish Passage Workshop was held in Williamsburg, VA in March, 1995 to share information on anadromous fish habitat and migration needs and techniques for design and construction of fishways.

This report also discusses fish passage projects currently in the planning, design, or construction phase in 1996 and future actions which will contribute to reaching Bay Program goals.

Introduction

In late 1993, Directive 93-4 was signed by the Chesapeake Executive Council which reaffirmed their commitment to the 1987 *Chesapeake Bay Agreement*. Bay jurisdictions were charged with opening blocked tributary habitats to spawning fish through the construction of fish passages or other means of removing impediments to migration. Ultimately, this initiative is aimed at restoring populations of anadromous species, particularly shad and river herring (*Alosa* spp.). Directive 93-4 sets up two goals. The five-year goal, which covers the period 1994-1998, is to open 582.05 miles of blocked habitat. The ten-year goal, to be completed by 2003, is to open a total of 1356.75 miles, which includes 148.7 miles opened prior to the Directive.

Previous to Directive 93-4, all three Bay states and the District had begun their own fish passage programs. The District had opened 0.6 miles; Maryland had opened 106.1 miles; Pennsylvania, 9 miles; and Virginia, 33 miles of fish spawning habitat. The jurisdictions had also been participating in other efforts, such as stocking of cultured shad, trap and transport of adult shad and river herring, surveying of stream habitats, and public education.

All jurisdictions and other agency representatives on the Fish Passage Workgroup are expanding their efforts throughout the watershed. Design, construction, and associated efforts for the restoration of anadromous fish are being made at accelerated rates. Accomplishments planned for the next few years will greatly boost the number of habitat miles opened to migratory fish, hopefully increasing their abundance.

The greatest problem with achieving fish passage goals is that all jurisdictions, as well as other state and federal agencies involved, are faced with declining budgets. As this happens, fish passage programs have been scaled back. Two other common and persistent problems that slow the success of the Fish Passage Workgroup include legal difficulties and the negotiation of fish passage agreements with public and private property owners.

This report provides a description of all the fish passage development, reintroduction efforts, and habitat assessment activities by the signatory jurisdictions. A summary of federal agency activities in 1995, as well as those activities and actions planned for 1996, are presented. Also included is a "Baywide Summary" (Chapter 6), which relates 1995 and prior year actions with the stated five and ten-year goals of Directive 93-4.

DISTRICT OF COLUMBIA

I. Fish Passage Achievements

A. Fishway Progress

During 1995, the District of Columbia's Fisheries Management Program staff in cooperation with personnel from the Interstate Commission on the Potomac River Basin (ICPRB), the State of Maryland, the National Park Service, and with funding from the U.S. Environmental Protection Agency (US EPA) removed the first two stream barriers blocking anadromous fish in Rock Creek. These barriers, an abandoned weir and an abandoned U.S. Geological Survey (USGS) gauging station, were located at 1.6 and 2.4 stream miles from the mouth of Rock Creek, respectively. (Please refer to the tables, map, and pie chart at the end of this section for a detailed written and graphic depiction of 1995 fish passage progress.).

B. Monitoring and Stream Surveys

During 1995, the D.C. Fisheries Management Branch (DCFMB) continued regular monitoring at a site established in 1993 on the lower reach of Rock Creek. Species composition and abundance were monitored. Data collected during electro-fishing surveys in 1995 indicated that adult alewife entered Rock Creek by the first week in April and adult blueback herring arrived in early May. In April, alewife were noted in the lower portion of the creek and observed as far upstream as Pierce Mill Dam. Upon inspection of three of the four barriers downstream of Pierce Mill, fish were seen concentrated below two of the barriers. Occasionally fish would surmount the barriers and move upstream. Once these barriers are removed, there will be record numbers of fish returning as far upstream as Pierce Mill Dam.

An ongoing fish sampling program, including juveniles and adults, was continued in 1995 to help inventory any migratory fish that reach the District. Two of the sampling sites are of special importance to fish passage work. One of the stations is located at Roosevelt Island, on the mainstem of the Potomac near the mouth of Rock Creek. The other is located near the upstream limit of the District's jurisdiction on the Potomac, a short distance downstream of Little Falls Dam. Little Falls Dam, a water supply facility for the Washington, D.C. area, blocks migratory fish passage to about 10 miles of Potomac River spawning and nursery habitat. Migratory fish captured during sampling at these sites help determine the potential population available to recolonize the spawning habitat above the barriers. Fish surveys will help document any improvement in the spawning success of the anadromous species, once the barriers are removed.

DCFMB staff helped ICPRB collect baseline data on 1995 anadromous populations in the vicinity of Little Falls Dam. This included icthyoplankton hauls at the dam in the spring and seine hauls upstream of the dam during the summer. This data will provide a reference against which future stock recovery success can be measured.

DCFMB personnel continued to tag striped bass captured during monthly river surveys

which are conducted within the District. Recapture of these tagged fish will complement tagging activities conducted in the surrounding jurisdictions. Also, in April 1995, several pre-spawned adult striped bass were captured during a night electro-fishing survey on the Potomac, downstream of Chain Bridge. This is slightly more than a mile below Little Falls Dam.

C. Trap, Transport, and Stocking

In 1995, there was minimal trap and transport activity within the District of Columbia. An attempt was made on May 12, 1995 to transport pre-spawned blueback herring to an area above Pierce Mill Dam on Rock Creek. However, due to a lack of pre-spawned fish found at the abandoned weir at stream mile 1.6, only three fish were moved. This site had been identified one week prior as having over 100 fish that appeared to be unable to surmount the barrier. Because this attempt to transport pre-spawned fish was made toward the end of the alosid spawning period in Rock Creek, no further attempts were made to trap and transport fish. Trap and transport is considered necessary because it appears unlikely that a functional fish passage facility will be located at the Pierce Mill Dam until large numbers of anadromous fish are arriving yearly at the base of the dam.

II. Fish Passage Support Activity

A. Public Relations and Education

In 1995, the DCFMB made extensive use of its Aquatic Resources Education Center which is located on the Anacostia River. More than 4,000 area students and adults received instruction about the diversity of anadromous and resident fish species found within the District. The center also does a nice job explaining the interrelationship of the District's aquatic resources with those of the Bay. This program has begun to instill in the population the knowledge that what happens in their own backyards can impact the Bay region as a whole.

In addition to using its Aquatic Resources Education Center to inform the public about the environment within the District of Columbia, the DCFMB has an In-School program where staff go to area schools and give presentations about the District's aquatic resources. In 1995, this presentation was given to over 2000 students and their teachers. The classes that receive this education are also given materials for teachers to take back to the classrooms.

B. Future Public Relations and Education

The District of Columbia has committed itself to educating its residents about the interrelationship between the Potomac and Anacostia Rivers and the Chesapeake Bay. To this end, the DCFMB will continue to use its staff and the Aquatic Resources Education Center to get the message out. In addition, after there is a fishway at Pierce Mill Dam, the District hopes to work cooperatively with the National Park Service to make this fishway an educational tool. It is believed that a working fishway in the nation's capitol would help illustrate the fact that there are

still opportunities to greatly improve the environment, especially in an urbanized area.

III. Future Activities

A. Planned Activities for 1996

Within the next year, the DCFMB is planning to conduct a telemetry study on alosids to determine the possibility of passage of a boulder field located about 3/4 of a mile upstream of Pierce Mill Dam. The boulder field is a one mile stretch of the creek located at the fall line and is strewn, bank to bank, with large rocks.

B. Meeting the Chesapeake Bay Program's 5-Year Goal (1993 - 1998)

The District's 5-Year Goal is the opening of 32 miles. A Denil fishway needs to be designed for Pierce Mill Dam, the largest upstream fish passage blockage on Rock Creek. In addition to its direct fish passage benefit, this fishway will be used as an educational tool. Presently, DCFMB has an active aquatic education program, and with the ability to use a Denil fishway as an instructional aid, instructors with the program will be better able to enlighten local citizens about the need for environmental awareness, even in an urban setting.

C. Meeting the Chesapeake Bay Program's 10-Year Goal (Pre 1993 - 2003)

The District's 10-Year Goal is the opening of 32.6 miles. If fish passage through the boulder field is determined to be possible, and after a fishway is built at Pierce Mill Dam, there are still six barriers which block fish passage to the Maryland State line. These barriers include five sewer crossings and one ford. Once fish passage is provided at Pierce Mill Dam, the DCFMB's ten year goal is to provide fish passage at the remaining barriers on Rock Creek, up to the Maryland state line.

Table 1

DISTRICT OF COLUMBIA
1995 FISH PASSAGE PROJECTS
COMPLETED, IN PROGRESS, PLANNED

Map 1 ID#	Project (stream & river drainage)	Passage Type	Habitat Opened (miles)	Funding Source	Status
1	Abandoned Weir, Rock Creek; Potomac River	Removal	0.8	US EPA	Completed 1995
2	Gauging Station, Rock Creek; Potomac River	Removal	0.2	US EPA	Completed 1995
3	Ford #1, Rock Creek; Potomac	Removal	0.7	DCFMB	Planned Fall 1996
4	Ford #2, Rock Creek; Potomac	Removal	1.1	DCFMB	Planned Fall 1996
5	Pierce Mill, Rock Creek; Potomac	Denil	29.2	DCFMB/US EPA	Planned

Map 1: Fishway Progress in the District of Columbia

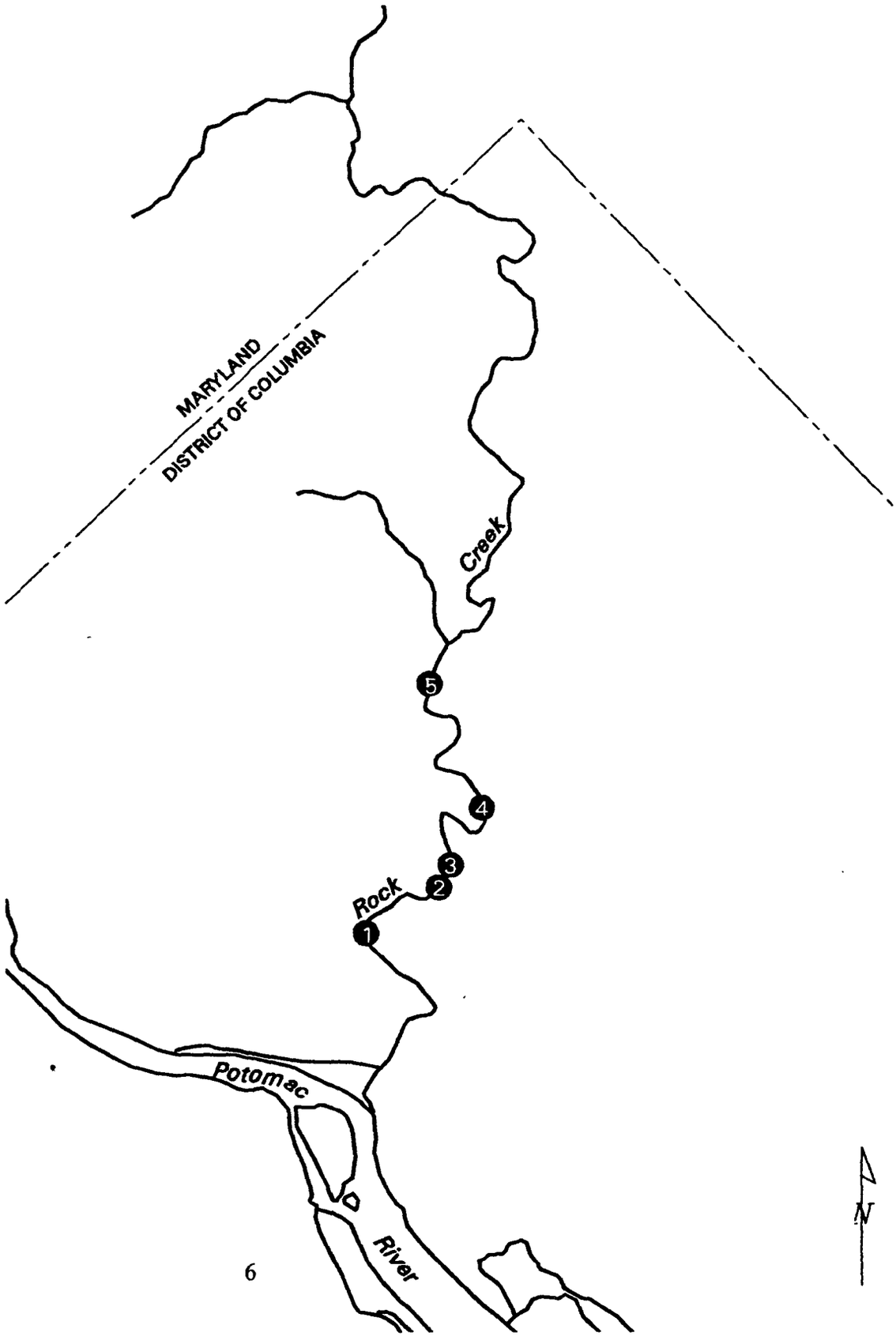
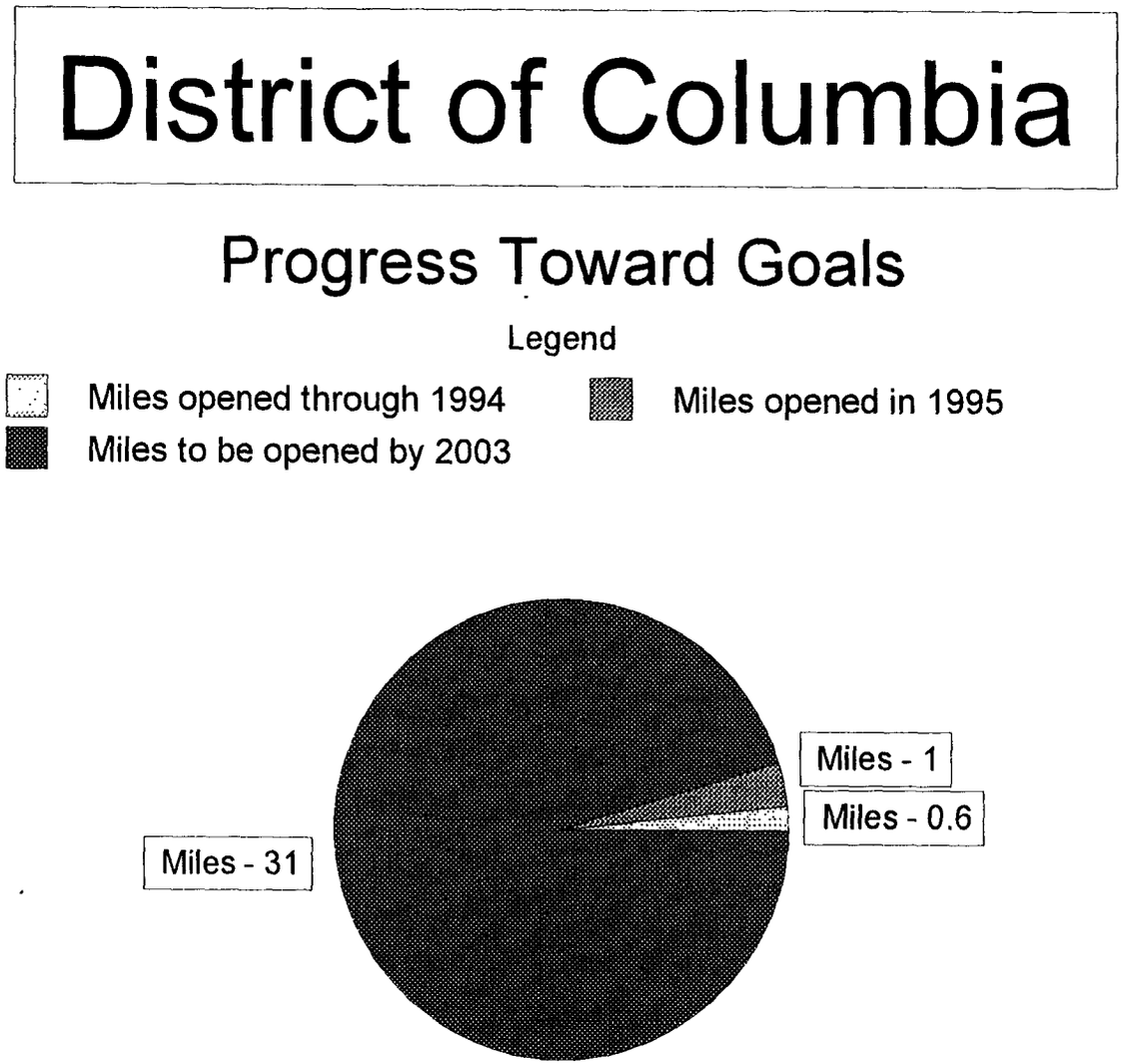


Figure 1


District of Columbia
Progress Toward Goals
Legend
Miles opened through 1994
Miles opened in 1995
Miles to be opened by 2003
Miles - 1
Miles - 0.6
Miles - 31

2
MARYLAND

I. Fish Passage Achievements

A. Fishway Progress

The Maryland Fish Passage Program, through construction of fishways, removal of barriers and the reintroduction of pre-spawning adult fish, continues efforts to reopen historic migratory spawning habitat. During 1995, Maryland made significant progress toward the commitment set forth in the Chesapeake Bay Program Directive 93-4, completing nine projects which reopened over 27 miles of stream habitat. (Refer to the tables, map, and pie chart at the end of this section for a detailed written and graphic depiction of 1995 fish passage progress.).

River System and Funding for Maryland Fish Passage Projects Completed During 1995:

- Three projects in the Anacostia River system were funded by the U.S. Army Corps of Engineers;
- Two projects, on the Magothy and Wicomico Rivers, were completed and funded through an ongoing cooperative arrangement with the State Highway Administration;
- Two projects on the Patuxent River were funded by the Maryland Department of Natural Resources (MD DNR); and
- Two projects on the Potomac River were funded by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration.

Fish Passage Types and Remedies:

- Three blockages were removed;
- Two dams were breached;
- Two Alaskan steeppass fishways were constructed;
- One road culvert was replaced with a depressed bottom culvert that allows fish passage; and
- One concrete weir and baffle system (high-speed channel) was constructed.

Since the inception of the Maryland Fish Passage Program, the 1995 accomplishments bring the total number of fish passage projects to 37 and the cumulative number of stream miles reopened to 158.

Surveys:

In addition to the above completed fish passage projects, Maryland continues to design fishways for construction. Prior to the design phase, stream gauge readings and structure surveys were conducted. Such data was collected at the following sites:

- Adkinson Race Pond Dam, Pocomoke River
- Barren Creek Dam, Nanticoke River
- Broadway Branch Dam, Choptank River

- Cypress Branch Dam, Chester River
- Herring Run Dam, Sassafras River
- Simkins Dam, Patapsco River

Conceptual Designs:

During the first stage of the design process, a conceptual design is normally completed by hydraulic engineers from the US Fish & Wildlife Service (US FWS), then approved by the Maryland Fish Passage Program. During 1995, conceptual designs were approved for the following nine projects:

- Little Falls Dam, Potomac River
- Johnson's Pond Dam, Wicomico River
- Broadway Branch Dam, Choptank River
- Midway Branch Culvert, Little Patuxent River
- Sawmill Creek 8th Avenue Dam, Patapsco River
- Gilbert Swamp Run, Route 6, Wicomico River, Western Shore
- Muddy Creek I-97, Patapsco River
- Croom Station Road Culvert, Patuxent River
- Herring Run Dam, Choptank River

Final Designs:

Once approved, the conceptual design phase is followed by a final design drawn by private contractors. During 1995, final designs were completed for the following projects:

- Simkins Dam, Patapsco River; Denil Fishway
- Unicorn Dam, Chester River; Alaskan Steeppass Fishway (50% complete design)
- Isabella Street Weir, Wicomico River; Notch Fishway

B. Monitoring and Stream Surveys

Through a Memorandum of Agreement (MOA) between MD DNR Fisheries Division and the DNR Chesapeake Bay Monitoring and Non-Tidal Assessment (MANTA - formerly the Chesapeake Bay Research and Monitoring Division), and partially funded by the U.S. Environmental Protection Agency, stream habitat assessments were conducted within selected waterways of the upper Chester River drainage basin and portions of the Choptank River. MANTA assessed both the quantity and quality of the habitat above fish passage blockages as well as the suitability of the habitat for spawning anadromous fishes. The data gathered has been compiled as a report which serves as a valuable tool in the prioritization of future fish passage projects within this watershed.

Through an Interagency Agreement (IAG) with the DNR Fisheries Division, the University of Maryland Eastern Shore (UMES) Coastal Ecology Research Lab and the National Biological Service jointly performed an assessment of anadromous and resident fishes in the Wicomico River downstream of Johnson's Pond near Salisbury, Maryland. The spring 1995 survey determined the anadromous and resident fish species found in the vicinity of a future fish passage site.

Monitoring of ichthyoplankton in the Potomac River, above the Little Falls Dam, by both the ICPRB and US FWS, resulted in 38 samples containing no migratory fish larvae. Monitoring for the presence of young-of-the-year migratory fishes above the Little Falls Dam on the Potomac resulted in 30 shore haul seine collections which contained no migratory fishes. Electro-shocking and the presence of a male American shad above the Little Falls Dam on the Potomac River, just downstream from Great Falls, indicated that at least some adult shad are reaching the dam and can ascend above it at certain flow conditions.

C. Trap, Transport, and Stocking

Ripe blueback herring gathered by MD DNR biologists from the Conowingo fish lift provided the eggs from which stocked larvae were produced at the Manning Hatchery. A total of 475,000 larvae were stocked three to four days after hatching at several points along the Patapsco River during May 1995. No naturally spawned herring larvae were stocked during 1995. A total of 6,920 pre-spawning adult blueback herring and alewife from the Susquehanna River were transported and released in the Patapsco River.

During 1995, biologists from both ICPRB and the US FWS's Harrison Lake National Fish Hatchery cooperatively worked on a stocking and monitoring program related to the Little Falls fish passage project on the Potomac River. More that 1 million American shad fry were released at Mather Gorge during the Spring of 1995, an event which received television coverage. In addition, the stocking program was featured in the Washington Post.

II. Fish Passage Support Activity

A. Public Relations and Education

During March 1995, the Maryland Fish Passage Program cohosted a conference in Williamsburg , Virginia with the Virginia Department of Game & Inland Fisheries. The conference focused on anadromous fish migration requirements and modern techniques of fishway design for small dams, bridges and road culverts. Regional, state and local officials attended the conference (see p. 31 for more detail).

The Fish Passage Program continued to provide educational outreach throughout 1995, including on-site lectures at Daniel's Dam fishway for Boy Scouts and an Environmental Science class from Dundalk Community College. Fish passage displays were provided at the Herring Run Festival, the Patapsco Outdoor Expo, the Alliance for the Chesapeake Bay Annual Meeting, the Northeast Fish & Wildlife Conference, and the annual Chesapeake Executive Council Meeting.

B. Future Public Relations and Education

Educational outreach will continue in the form of public displays at various events and presentations to interested groups. Events in which the Maryland Fish Passage Program will participate during 1996 include: the Herring Run Festival in Baltimore; the Shad Festival in

Vienna; and the Chesapeake Appreciation Days at Sandy Point State Park. Updated materials for exhibits and educational purposes are created on a regular basis. Lectures, slide presentations and on-site discussions are provided upon request. The Maryland program continues to generate interest within the news media to provide the public with information related to fish passage. A fish passage video is planned for 1996.

A volunteer network is being organized as a means of cleaning existing fishways of debris so that they are operational in time for the Spring spawning runs. Concerned citizens, local, state and federal officials have generously offered to donate their time and energy toward this effort, which will begin during the Spring of 1996.

III. Future Activities

A. Planned Activities for 1996

1) The following eight fish passage projects are targeted for construction in 1996 and will result in 97.6 miles being opened:

- **Simkins Dam**, the last blockage on the mainstem of the Patapsco River. The Denil fishway to be constructed here will open an additional 3.8 miles on the Patapsco River and will open habitat in the river from Baltimore Harbor up to the Liberty Reservoir, for a total of more than 30 miles. Funded by MD DNR.
- **Unicorn Dam**, Chester River. The Alaskan steeppass fishway to be constructed at this site will open 14.5 miles of historic spawning habitat on the Unicorn Branch of the Chester River. Funded by US EPA.
- **Dorsey Run Dam**, Patuxent River. The remedy for providing fish passage at this site will soon be agreed upon, opening 16 miles of spawning habitat. Funded by MD DNR.
- **Nassawango Creek Bridge and USGS Gauging Station Weir**, Pocomoke River. The pool and weir fishway to be constructed at this site will open 48 stream miles of spawning habitat. Funded by MD State Highway Administration
- **Turville Creek Culvert and Weir**, Atlantic (Isle of Wight Bay). A channel will be constructed within the culvert and the weir will be notched to provide passage at this site, opening 7.8 miles of stream. Funded by MD State Highway Administration. *
- **Gilbert Swamp Run Bridge** (partially demolished), Wicomico River. A channel will be constructed across the existing floor of the bridge, allowing passage of fish and reopening 6.5 miles of stream. Funded by State Highway Administration.
- **Waugh Chapel Road Culvert**, Towser's Branch, Little Patuxent River. Fishway type to be determined. Providing fish passage at this site along with the Capital Raceway culvert will reopen 1 stream mile. Funded by MD DNR.
- **Capital Raceway Culvert**, Towser's Branch, Little Patuxent River. Fishway type and miles to be reopened will be determined. Funded by MD DNR.

** The Turville Creek culvert and weir project is not in the Chesapeake Bay watershed and the miles will not be credited to the goals of the 93-4 Directive. Nonetheless, this work will surely benefit anadromous fish.*

2) The following fish passage projects are targeted for design during 1996:

- **Cypress Branch Dam**, Chester River. The Denil fishway to be constructed at this site will open 6 stream miles of spawning habitat. Funded by NMFS/NOAA.
- **Andover Branch Dam**, Chester River. The Denil fishway to be constructed at this site will reopen 18 stream miles of spawning habitat. Funded by NMFS/NOAA.
- **Broadway Branch Dam**, Choptank River. The Denil fishway to be constructed at this site will reopen 12.5 stream miles of spawning habitat. Funded by NMFS/NOAA.
- **Johnson's Pond Dam**, Wicomico River. The Denil fishway to be constructed at this site will reopen 16 stream miles of spawning habitat. Funded by NMFS/NOAA.
- **Wilson's Mill Dam**, Susquehanna River. The Denil fishway to be constructed at this site will reopen over 24 stream miles of spawning habitat. Funded by NMFS/NOAA.
- **Urieville Dam and Culvert**, Chester River. Three sections of Alaskan steeppass will be fitted on the dam and a channel will be constructed in the culvert, reopening a 35 acre lake and 3.5 stream miles above the dam. Funded by NMFS/NOAA.
- **Midway Branch, Range Road Culvert**, Little Patuxent River. Two sections of Alaskan steeppass will be fitted at this site, reopening 1.2 stream miles of spawning habitat up to Soldier's Lake. Funded by MD DNR.
- **Foreman Branch Dam**, Chester River. Tentatively, the design for this site is for the construction of an Alaskan steeppass fishway at this site which will reopen 7.1 stream miles of spawning habitat. Funding source presently unknown.

3) Monitoring and Stream Survey Work Planned for 1996:

- Through an Memorandum of Agreement (MOA) between the MD DNR Fisheries Division and the DNR Monitoring and Non-Tidal Assessments Division (MANTA), stream habitat surveys will be conducted in the following areas in Maryland:

  a) **Deer Creek** between the Wilson's Mill Dam and the Eden Mill Dam. The study area includes representative reaches of stream within the 24.5 mainstem miles and tributary streams (approximately 100 square mile drainage area).
  b) **Johnson's Pond Dam** is on the Wicomico River. The study area includes representative reaches of all streams above the lake (approximately 42 square mile drainage area).

- Through an Interagency Agreement with the MD DNR Fisheries Division, the University of Maryland Eastern Shore (UMES) Coastal Ecology Research Lab and the National Biological Service will jointly conduct a continuation of the 1995 assessment of anadromous and resident fishes in the Wicomico River, downstream of the Johnson's Pond Dam.

B. Meeting the Chesapeake Bay Program's 5-Year Goal (1993 - 1998)

Maryland's goal for the period from 1993 to 1998 is 210.05 miles. The Maryland Fish Passage Program will continue to open habitat through the removal of blockages within the state over the next three years. By the end of the year 1998, at least 30 additional projects should be completed, opening at least 210 miles of upstream spawning habitat to migratory fishes. However, 11 of these projects (representing 60 miles of stream to be opened) are not yet funded and their completion will depend upon finding a source. Efforts to seek funding for these projects is on-going within the Program. Some sites may be deleted from the 5-Year Goal due to technical, legal or financial reasons. In the event that a site is deleted, a comparable site will be added in its place.

The Maryland Fish Passage Program will continue to provide educational outreach and information to the public, technical assistance and training upon request as well as coordination with other state and local agencies.

C. Meeting the Chesapeake Bay Program's 10-Year Goal (Pre 1993 - 2003)

Maryland's full goal, for the period before 1993 and up through 2003, is 388.65 miles. The Maryland Fish Passage Program plans to continue its aggressive approach toward the removal of blockages in Maryland waterways over the next eight years. The ten year goal is a second set of projects slated for completion during the five-year period between 1998 and 2003. Projects targeted for completion will open 75 miles of stream spawning habitat. To meet the Chesapeake Bay Program Directive 93-4, Maryland will open over 400 miles of spawning habitat by the year 2003. As time progresses and new sites are investigated, the Maryland Program hopes to reopen stream miles to anadromous fish beyond the Chesapeake Bay Program's initial goal.

Table 2

MARYLAND
1995 FISH PASSAGE PROJECTS
COMPLETED, IN PROGRESS, PLANNED

Map 2 ID#	Project (stream & river drainage)	Passage Type	Habitat Opened (miles)	Funding Source	Status
1	Route 1 Culvert Anacostia River	Baffle System	1.0	USACE	Completed 1995
2	Route 208, 38th St. Dam Anacostia River	Breach	0.5	USACE	Completed 1995
3	Paint Branch Dam #1 Anacostia River	Breach	10	USACE	Completed 1995
4	MD Route 648, Cattail Creek Magothy River	Alaskan Steeppass	2.0	SHA	Completed 1995
5	Evergreen Road Culvert, Towsers Branch Patuxent River	Culvert Replacement	0.4	MD DNR	Completed 1995
6	Horsepen Branch Dam Horsepen Branch Patuxent Rive	Dam Removal	10.0	MD DNR	Completed 1995
7	MD Route 234 Budd's Creek (Western Shore)	Steeppass	4.0	SHA	Completed 1995

Maryland Fish Passage Projects (Con't).

Map 2 ID#	Project (stream & river drainage)	Passage Type	Habitat Opened (miles)	Funding Source	Status
8	Simkins Dam Patapsco River	Denil	3.8	MD DNR	Construction 1996
9	Unicorn Dam Chester River	Alaskan Steeppass	14.5	US EPA	Construction 1996
10	Dorsey Run Dam Patuxent River	Yet to be determined	16	MD DNR	Construction 1996
11	Gauging Station Nassawango Creek Bridge Pocomoke River	Pool and Weir	48	SHA	Construction 1996
12	Gilbert Swamp Run Bridge Wicomico River	Constructed Channel	6.5	SHA	Construction 1996
13	Waugh Chapel Road Culvert, Towser's Branch Little Patuxent River	Yet to be determined	1	MD DNR	Construction 1996
14	Capital Raceway Culvert, Towser's Branch Little Patuxent River	Yet to be determined	Yet to be determined	MD DNR	Construction 1996
	Turville Creek Culvert **Not in Chesapeake Bay Watershed*	Constructed Channel	7.8	SHA	Construction 1996
	Cypress Branch Dam Chester River	Denil	6	US EPA	Design 1996

Maryland Fish Passage Projects (Con't).

Map 2 ID#	Project (stream & river drainage)	Passage Type	Habitat Opened (miles)	Funding Source	Status
	Andover Branch Dam Chester River	Denil	18	US EPA	Design 1996
	Broadway Branch Dam Choptank River	Denil	12.5	US EPA	Design 1996
	Johnson's Pond Dam Wicomico River	Denil	16	US EPA	Design 1996
	Wilson's Mill Dam Susquehanna River	Denil	24	US EPA	Design 1996
	Urieville Dam and Culvert Chester River	Alaskan Steeppass	3.5	US EPA	Design 1996
	Range Road Culvert, Midway Branch Little Patuxent River	Alaskan Steeppass	1.2	MD DNR	Design 1996
	Foreman Branch Dam Chester River	Alaskan Steeppass	7.1	Unknown	Design 1996

Map 2: Fishway Progress in Maryland

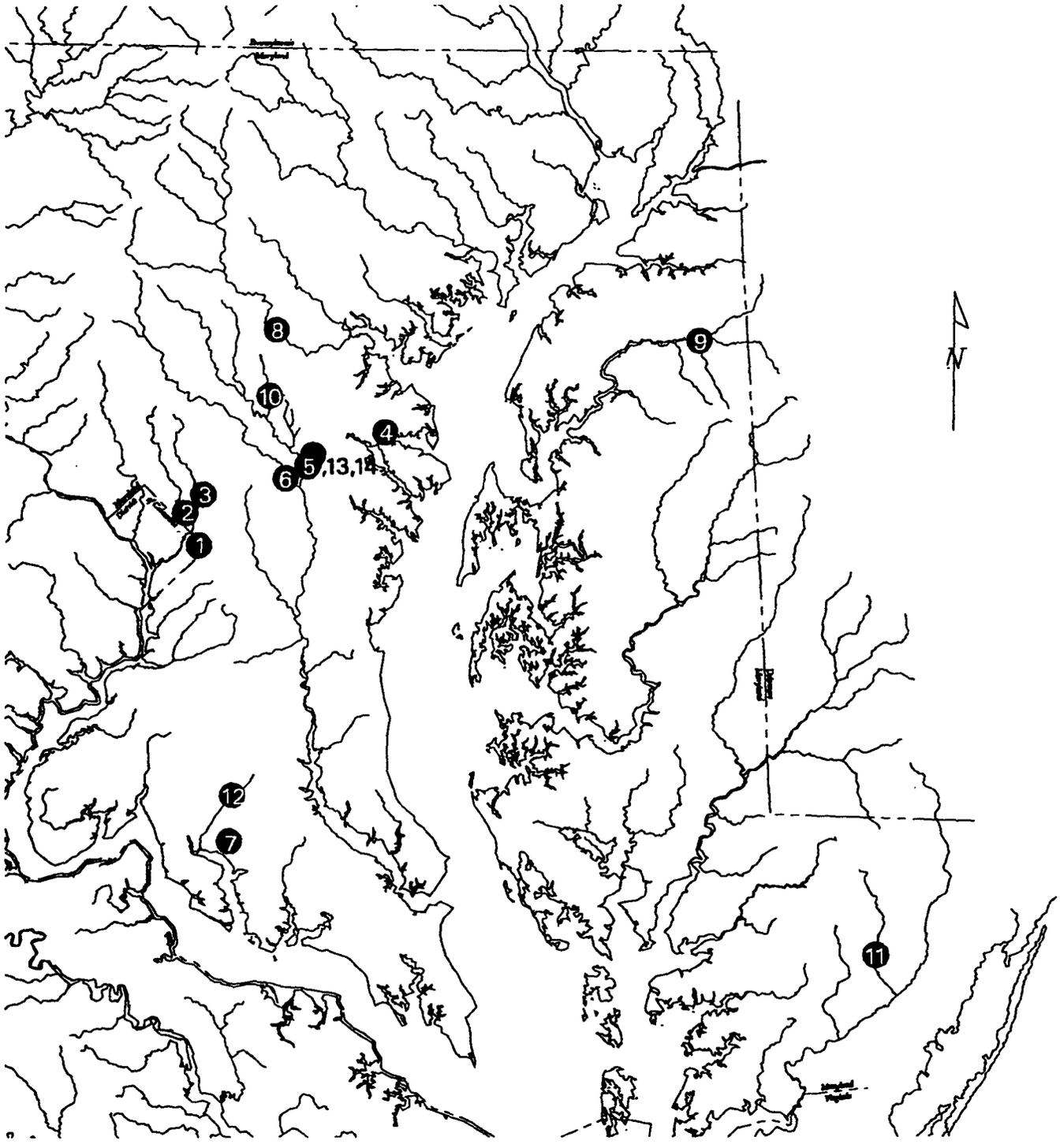
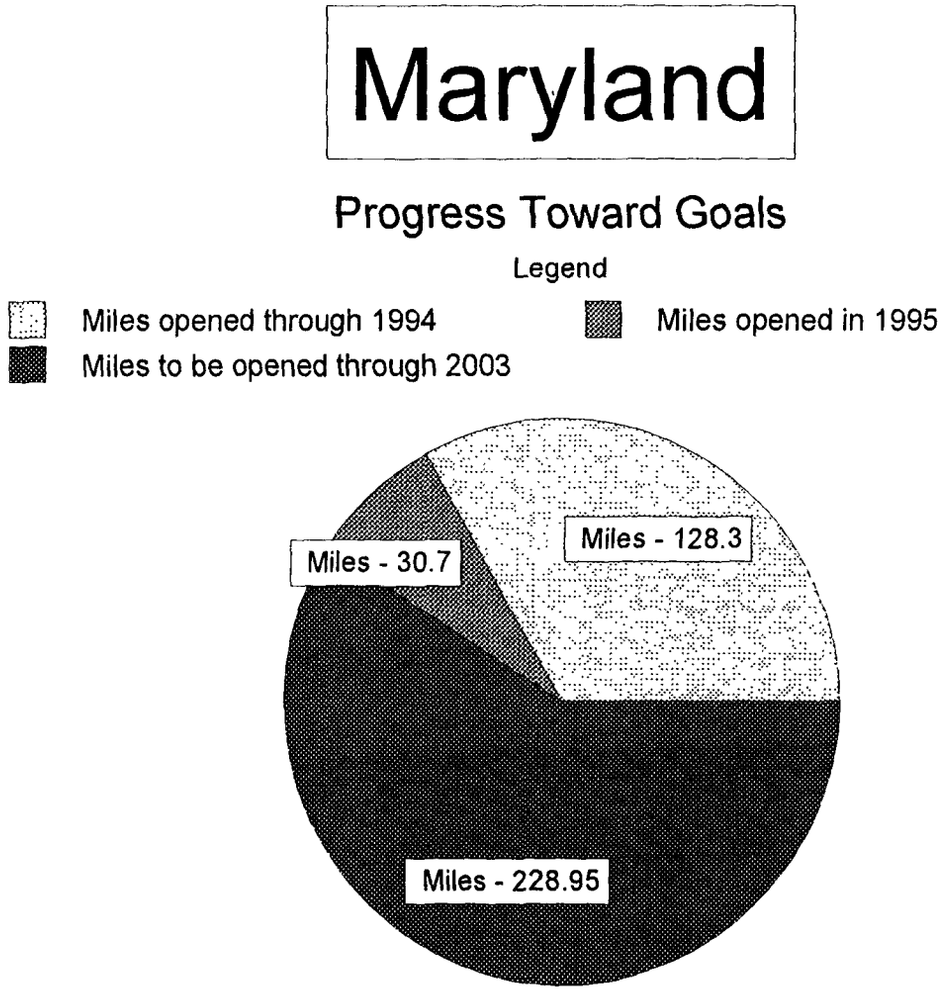


Figure 2


Maryland
Progress Toward Goals
Legend
Miles opened through 1994
Miles opened in 1995
Miles to be opened through 2003
Miles - 128.3
Miles - 30.7
Miles - 228.95

3
PENNSYLVANIA

I. Fish Passage Achievements

A. Fishway Progress

(Refer to the tables, map, and pie chart at the end of this section for a detailed written and graphic depiction of 1995 fish passage progress.).

Susquehanna River Main Stem Blockages

Holtwood, Safe Harbor and York Haven Facilities. Construction of fish lifts at Holtwood and Safe Harbor Dams is ongoing. In 1995, 60 to 65% of the construction was completed. The fish lifts are scheduled to be in service by April 1, 1997. A conceptual design for fish passage at York Haven Dam using the "open river" East Channel Dam approach has been completed. The design included three contiguous 67-foot openings with water control provided by gate works. Several gate control systems are being considered and preliminary project schedule has been completed. The project is scheduled to be in service no later than April 1, 2000.

Diversion Dam. A site inspection of the Diversion Dam by the Pennsylvania Fish and Boat Commission (PFBC) staff revealed that the existing 20-foot wide gate would permit fish passage on the west side of the island. The dam is owned by the Pennsylvania Power and Light Company. Construction of fish passage facilities is not considered necessary at this time. Multiple notches may be required at the east side of the Diversion Dam, but this cannot be properly evaluated until anadromous fish reach the site.

Fabri Dam at Sunbury. U. S. Fish and Wildlife Service (US FWS) personnel are completing the conceptual design for a vertical slot fishway at the inflatable dam located at Shikellamy State Park in Sunbury. The PFBC will meet with the Pennsylvania Department of Conservation and Natural Resources (DCNR) to revisit the implementation and funding agreement for fish passage at the dam. Construction date is pending DCNR funding approval.

Susquehanna River Tributary Blockages

Rock Hill Dam, Conestoga River, Lancaster County. Following an extensive period of public input, PFBC Board of Commissioners voted to approve the project to remove Rock Hill Dam at their October, 1995 meeting. In response to requests from permitting agencies, minor modifications were incorporated into the engineering design for the breaching, demolition and disposal of Rock Hill Dam. The acquisition of permits for the project is complete. Preparation of the detailed NOAA grant proposal for the breaching, demolition and disposal of Rock Hill Dam is underway. An Invitation for Bid package is complete and will be used to select a contractor to remove the dam. Removal is targeted for summer 1996.

U. S. Geological Service Weir (USGS), Conestoga River, Lancaster County. US FWS personnel determined that the USGS weir is not a blockage to migratory fishes. In 1997, the PFBC will begin monitoring anadromous fish attempting to pass the weir to verify US FWS findings.

City of Lancaster Water Supply Dam, Conestoga River, Lancaster County. The PFBC met with the Lancaster Water Authority (LWA) and Superintendent of Water to discuss the implementation of an inexpensive design for fish passage at the Authority's Water Supply Dam on the Conestoga River. The design was viewed as "non-practical" by the LWA due to the uncertainty of the facility's future as a water supply. No agreement was reached on a feasible fish passage design or Chesapeake Bay Program participation. The PFBC continued with negotiations and was less than optimistic that an agreement will be reached in the immediate future.

American Paper Products Dam, Conestoga River, Lancaster County. Discussions between the American Paper Products Co. and PFBC about fish passage at their dam on the Conestoga River began in 1995. The dam is the next upstream barrier above the City of Lancaster Water Supply Dam.

Castle Fin Dam, Muddy Creek, York County. Engineering design for the breaching, demolition and disposal of Castle Fin Dam is ongoing. Removal is targeted for summer 1996.

Williamsburg Station Dam, Frankstown Branch of Juniata River, Blair County. Final engineering design for the breaching demolition and disposal of Williamsburg Station Dam was complete and all permits were obtained. Removal of the dam is scheduled for the summer of 1996. Williamsburg Station Dam is the first blockage on the Frankstown Branch of the Juniata River, preceded by Warrior Ridge Dam on the Juniata River.

Marietta Gravity Water Co. Dam, Chickies Creek, Lancaster County. PFBC met with Marietta Gravity Water Company board members to discuss fish passage at their dam located in Chickies Rock Park, Lancaster County. Future discussions are planned and PFBC was optimistic an agreement will be reached.

Cave Hill Dam, Conodoguinet Creek, Cumberland County. The Carlisle Water Authority has not made a decision on refurbishment plans for their Cave Hill Dam facility on Conodoguinet Creek, Cumberland County. When a decision is reached, provisions for fish passage at the dam will be a permitting requirement. Every indication is that the city will comply. Cave Hill Dam is the third blockage on Conodoguinet Creek.

Huntingdon Water Authority Dam, Standing Stone Creek, Huntingdon County. Construction of a denil fishway at the Huntingdon Water Authority Dam was approximately 75% completed in 1995 and will be finished in the Summer of 1996.

Hykes Mill Dam, West Conewago Creek, York County. Discussions resulted in no agreement for fish passage at Hykes Mill Dam. The owner, Ray Hykes, under pressure from riparian interests, desires documented evidence of migratory fishes at the base of the dam before considering the implementation of fish passage. Due to the dams poor condition, removal has been identified as the most preferred method to achieve fish passage.

B. Monitoring and Stream Surveys

The lifts at Conowingo Dam collected a record number (61,650) returning adult American shad in the Spring of 1995. Fish lifts also collected approximately 98,000 blueback herring, 5,575 alewives and 37 hickory shad. Otolith analysis determined that 84% of adult American shad captured at Conowingo were of hatchery origin. Biomonitoring of out migrating juvenile American shad in the autumn of 1995 indicated successful reproduction, with approximately 10% of the out-migrants identified as wild fish.

The Pennsylvania State University Cooperative Fish and Wildlife Research Unit, funded by the US EPA, has completed Phase I & II of the Susquehanna River Tributary Blockage study. Thus far, the study has identified and characterized blockages on Conestoga River, Kreutz Creek, Chickies Creek, E. Conewago Creek, W. Conewago Creek, Codorus Creek, Fishing Creek, Muddy Creek, Pequea Creek and Otter Creek. Phase III will continue through September 1996, with Fishing Creek (Cumberland Co.), Swatara Creek, Yellow Breeches, Conodoguinet Creek, Fishing Creek (Dauphin Co.), Fishing Creek (Perry Co.), Sherman's Creek, and Little Juniata Creek targeted for inventory.

C. Trap, Transport, and Stocking

The trap and transport of alosids from Conowingo Dam, a Susquehanna River Anadromous Fish Restoration Cooperative-funded activity, included approximately 56,000 pre-spawn American shad in 1995. The primary release site for these fish was the Tri-County Marina upstream of York Haven. Approximately 23,000 pre-spawn adult river herring were also captured and released in the mainstem Susquehanna River, Little Conestoga Creek, and Muddy Creek.

A total of 22.1 million American shad eggs were received and incubated at PFBC Van Dyke Anadromous Fish Research Station in 1995. Of these, 55.2% were successfully hatched. A total of 10 million American shad fry were marked and stocked into the Susquehanna drainage, including 8.3 million in the Juniata River; 731,000 at Montgomery Ferry in the mainstem Susquehanna River; and, 931,000 into three lower tributaries, Conodoguinet Creek, Conestoga River and Muddy Creek. Biomonitoring determined that approximately 90% of the out-migrating juveniles captured in the fall 1995 were of hatchery origin.

II. Fish Passage Support Activity

A. Public Relations and Education

In 1995, PFBC staff displayed an exhibit on American shad restoration in the Susquehanna River at numerous events throughout Pennsylvania and Maryland. Over a dozen slide presentations on migratory fish restoration were given by staff to various sportsman, environmental, and special interests groups. The PFBC Anadromous Fish Restoration Unit gave numerous tours of the Van Dyke Research Station for Anadromous Fish in 1995.

The PFBC, in conjunction with the Chesapeake Bay Program's Communication Subcommittee, conducted a media event for the stocking of shad fry in Conodoguinet Creek, a tributary to the Susquehanna River. The event was well received and attended by local television, radio and newspaper media, as well as citizens, activists, and environmental organizations.

The new brochure on *Fish Restoration and Passage on the Susquehanna River** was completed and is currently being distributed. The 16-page brochure was cooperatively produced by the PFBC, US FWS, Pennsylvania Department of Environmental Protection, Alliance for the Chesapeake Bay, Chesapeake Bay Foundation, and the Susquehanna River Basin Commission.

*(*Fish Restoration and Passage on the Susquehanna River* is available from US Fish and Wildlife Service, 1721 N. Front St., Suite 105, Harrisburg, PA 17102)

B. Future Public Relations and Education

Initiatives to expand the PFBC public education and awareness efforts with regard to the Chesapeake Bay Program and migratory fish restoration in Pennsylvania continue. In 1996, the PFBC plans to conduct numerous media events pertaining to migratory fish restoration in the Susquehanna Basin. These include shad fry stockings in the West Branch of the Susquehanna River, North Branch of the Susquehanna River, Standing Stone Creek, Conodoguinet Creek and Conestoga River. Numerous of slide presentations and exhibits on migratory fish restoration are also scheduled for 1996.

III. Future Activities

A. Planned Activities for 1996:

- The Susquehanna River Tributary Blockage Study will identify and characterize the blockages on major tributaries to the Susquehanna River below the confluence of the Juniata River.
- Complete construction of fish lifts at Holtwood Dam and Safe Harbor Dam.
- Breach and remove Rock Hill Dam, Castle Fin Dam, and Williamsburg Station Dam, and complete construction of the fishway on Huntingdon Water Authority Dam.
- Complete fishway design for Fabri Dam and Cave Hill Dam.
- Negotiate agreements for fish passage at Marietta Gravity Water Co. Dam and American

Paper Products Company Dam.

- Continue to expand the PFBC public education and awareness initiatives, as well as develop programs to identify and acquire additional funding for the removal of tributary blockages.

B. Meeting the Chesapeake Bay Program's 5-Year Goal (1993 - 1998)

The five year goal for the Pennsylvania is 32 miles.

- Open mainstem of the Susquehanna River to migratory fishes by providing passage at the Holtwood Dam, Safe Harbor Dam.
- Provide fish passage at Marietta Gravity Water Co. Dam, and American Paper Products Company Dam.
- Provide fish passage at tributary blockages yet to be determined.

C. Meeting Chesapeake Bay Program's 10-Year Goal (Pre 1993 - 2003)

The cumulative 10-year goal for Pennsylvania is 520 miles.

- Provide fish passage at York Haven Dam, Fabri Dam, Warrior Ridge Dam, Oakland Dam, Cave Hill Dam, Hykes Mill Dam, and Lancaster Water Authority Dam.
- Provide fish passage at ten additional high-priority blockages on Susquehanna River tributaries.

Table 3

PENNSYLVANIA
1995 FISH PASSAGE PROJECTS
COMPLETED, IN PROGRESS, PLANNED

Map 3 ID#	Project (stream & river drainage)	Passage Type	Habitat Opened (miles)	Funding Source	Status
1	Holtwood Dam Susquehanna River	Lift(2)	9.0	Private	Construction ongoing
2	Safe Harbor Dam Susquehanna River	Lift	23.0	Private	Construction ongoing
3	Rock Hill Dam, Conestoga River; Susquehanna River *	Breach	18.5	US EPA	Construction summer, 1996
4	Castle Fin Dam, Muddy Creek; Susquehanna River	Breach	4.3	US EPA	Construction summer, 1996
5	Williamsburg Station Dam, Frankstown Br. Juniata; Susquehanna R.	Breach	19.3	Private	Construction summer, 1996
6	Huntingdon Water Authority Dam, Standing Stone Ck.; Raystown Br. Juniata; Susquehanna River	Denil	22.0	Local government	Construction ongoing

Pennsylvania Fish Passage Projects (Con't).

Map 3 ID#	Project (stream & river drainage)	Passage Type	Habitat Opened (miles)	Funding Source	Status
	York Haven Dam, Susquehanna R.	Gated open channel	479.3	Private	Design ongoing
	Fibre Dam, Susquehanna R.	Vertical slot	Note*	State	Design complete
	Lancaster Water Authority Dam, Conestoga River;Susquehanna R.	Gated open channel?	11.0	US EPA	Negotiations
	American Paper Products Co. Dam, Conestoga River; Susquehanna R.	Breach?	4.3	US EPA	Negotiations
	Hykes Mill Dam, W.Conewago Creek; Susquehanna R.	Breach?	22.0	US EPA	Negotiations
	Marietta Gravity Water Co., Chickies Creek; Susquehanna R.	Breach?	1.8	US EPA	Negotiations
	Cave Hill Dam, Conodoguinet Creek; Susquehanna R.	Denil?	N/A	US EPA	Negotiations

**Anadromous fish can freely pass this site until late May when the dam is inflated. Thus, it is an impediment for late arriving fish.*

Pennsylvania Fish Passage Projects (Con't).

Map 3 ID#	Project (stream & river drainage)	Passage Type	Habitat Opened (miles)	Funding Source	Status
	Warrior Ridge Dam, Frankstown Br. Juniata; Susquehanna R.	Undetermined	81.3	Private	FERC permit requirement
	No.2 Dam Swatara Creek; Susquehanna R.	Undetermined	9.2	US EPA	Planned
	Hummelstown Dam, Swatara Creek; Susquehanna R.	Undetermined	4.3	US EPA	Planned
	Dam near Union Deposit, Swatara Creek; Susquehanna R.	Undetermined	25.4	US EPA	Planned
	Brenneman's Dam, Conodoguinet Creek; Susquehanna R.	Undetermined	9.2	US EPA	Planned
	Willow Mill Dam, Conodoguinet Creek; Susquehanna R.	Undetermined	14.1	US EPA	Planned
	Dellville Mill Dam, Shermans Creek; Susquehanna R.	Undetermined	7.0	US EPA	Planned
	Oakland Dam, N. Br. Susquehanna R.	Undetermined	66.0	Private	FERC permit requirement

Map 3: Fishway Progress in Pennsylvania

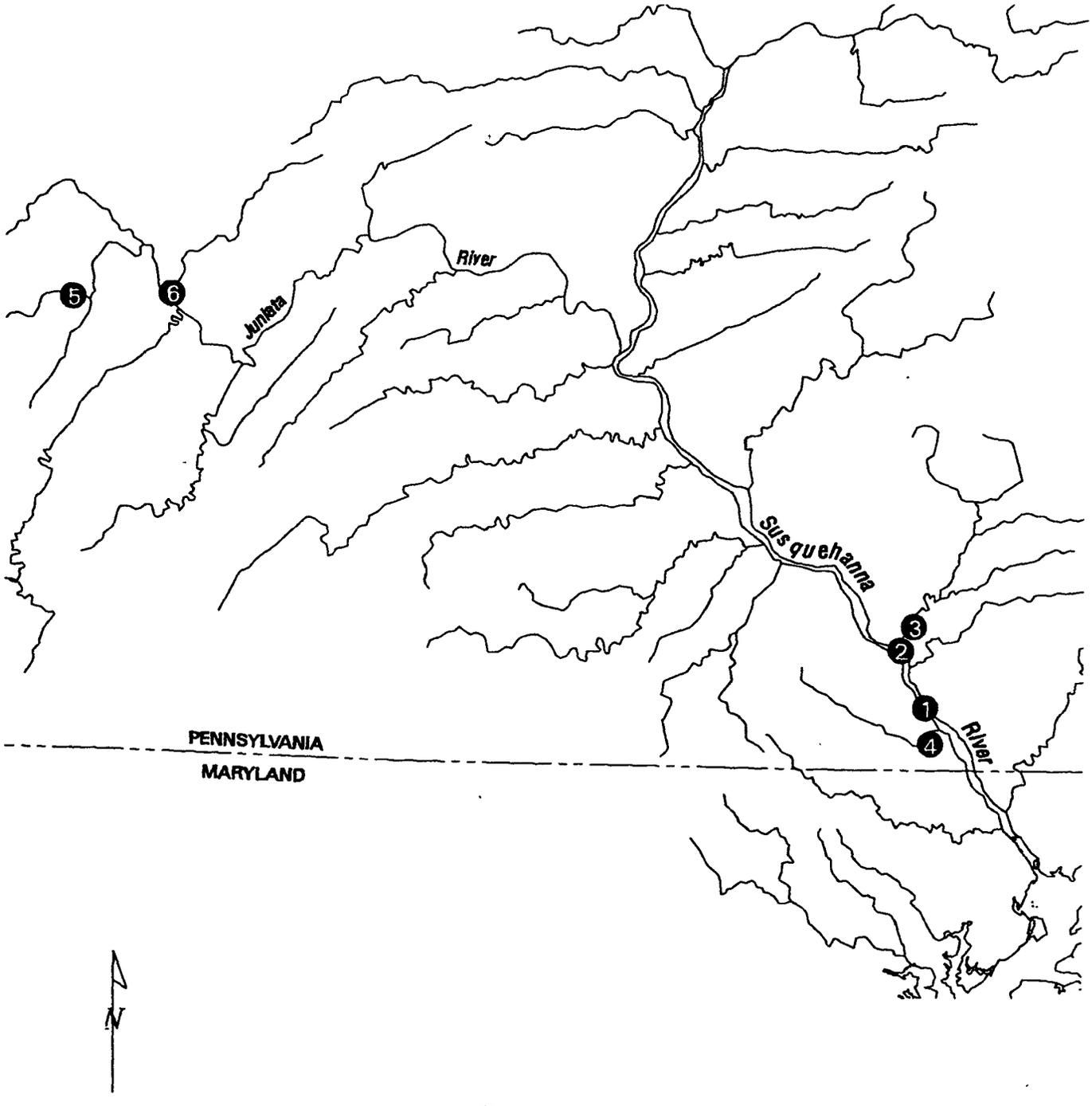
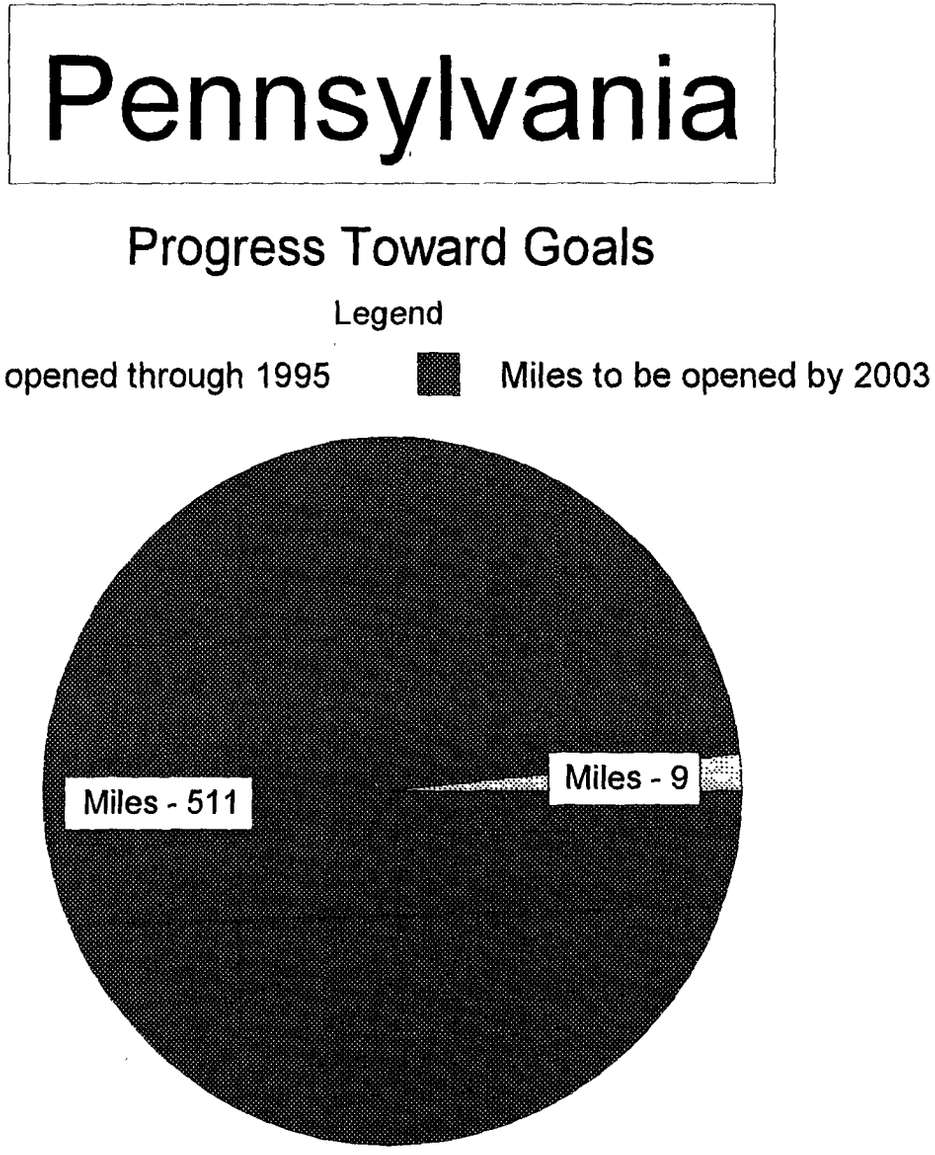


Figure 3


Pennsylvania
Progress Toward Goals
Legend
Miles opened through 1995
Miles to be opened by 2003
Miles - 511
Miles - 9

4
VIRGINIA

I. Fish Passage Achievements

A. Fishway Progress

(Refer to the tables, map, and pie chart at the end of this section for a detailed written and graphic depiction of 1995 fish passage progress.).

Ashland Mill Dam. Negotiations with the owner have temporarily been terminated due to problems over financing of the project. The Virginia Department of Game & Inland Fisheries (VDGIF) can not guarantee that the owner will not be required to spend personal funds or time on the fishway. The VDGIF plans to reopen negotiations with the owner in the future. However, Chesapeake Bay Program funds originally granted for the Ashland project have been extended and transferred to the Ruffins Pond Dam fishway project.

Ruffins Pond Dam. Chesapeake Bay Program funds originally designated for fish passage at Ashland Mill Dam were extended and transferred to Ruffins Pond Dam, which is on Massaponax Creek near Fredericksburg. There is a good herring run at this dam, which is about 1/2 mile from the confluence with the Rappahannock River. A Denil fishway is planned for this 16-foot high dam that blocks 3.5 miles of Massaponax Creek and 4.5 miles of a perennial tributary for a total of 8 miles. The dam was surveyed by VDGIF staff for US FWS to update the conceptual plans. A second no-cost time extension was granted, and by the end of 1995, Tarmac America, Inc. and the VDGIF were close to signing a "Grant Contract" for completing the project. In the meantime, Tarmac advertised a "Request for Proposals" for engineering firms.

Boshers Dam. This 10-foot high dam is the last blockage to migratory fishes on the James River in Richmond. A fishway would open 137.4 mainstem miles of anadromous fish spawning habitat, extending to Lynchburg. A conceptual plan for a vertical slot fishway was provided by the US FWS in 1994. In February 1995, the City of Richmond advertised a "Request for Proposals" for engineering firms. The VDGIF then assisted the City in choosing the engineering firm and a fee was successfully negotiated. In October 1995, the City and VDGIF signed a contract that outlines the details for the City to use Chesapeake Bay Program funds to obtain the final design for a vertical slot fishway to be built. In February 1996 the engineering firm recieved their contract from the City and initiated design.

Embrey Dam. This 22-foot high dam in Fredericksburg is the only mainstem impediment to fish passage on the Rappahannock River. Three possibilities exist for fish passage: removal, breaching, or a vertical slot fishway. In 1994, a sediment study was conducted to determine if toxic substances were present behind the dam. Early in 1995, the Virginia Department of Environmental Quality reviewed the results and determined that the sediments retained by Embrey Dam are comparable to other sediments upstream. The potential for these sediments

to fail a hazardous waste characteristic test, as defined in VR 672-20-10, is minimal. These results further support the removal of the dam. Passage would open 82 miles of the mainstem Rappahannock and an additional 76 miles of major tributaries.

Chandlers Mill Dam. This dam is on Chandlers Run, which is a tributary of Cat Point Creek in the Rappahannock drainage. Historically, strong runs of river herring occurred at the base of this dam. During reconstruction of this 10-foot dam owned by VDGIF, a Denil fishway was also included, which opened 7.7 miles of alosid spawning habitat. Construction was completed in early 1995 and the fishway was opened for the 1995 spawning run.

B. Monitoring and Stream Surveys

During the Spring of 1995, shad and herring spawning runs were monitored by VDGIF staff throughout Virginia. Electro-fishing for *Alosa* spp. was conducted at the following sites: below Boshers Dam down to the fall line/tidal interface on the James River; below Harvell Dam on the Appomattox River; below Walkers Dam on the Chickahominy River; and below Embrey Dam down to the fall line/tidal interface on the Rappahannock River. American shad (*A. sapidissima)* and blueback herring (*A. aestivalis*) were found in the James River. Blueback herring, alewives (*A. psuedoharengus*), and hickory shad (*A. mediocris*) were found in the Rappahannock, Chickahominy, and Appomattox rivers. American shad were also monitored for fry culture procedures during collection by commercial gill netters on the Pamunkey River. Age and growth rates were determined by Virginia Commonwealth University for brood stock shad. A minimal amount of juvenile *Alosa* spp. monitoring was conducted by Fish Division staff above and below Boshers Dam.

In August 1995, Virginia Commonwealth University was hired by the VDGIF with Chesapeake Bay Program funds to conduct a comprehensive survey of impediments on Rappahannock River tributaries. The first year of the Rappahannock River Basin Impediment Study will focus on first- through third-order tributaries of the lower Rappahannock River. Impediments will be characterized and biological sampling will be conducted below impediments to determine migratory fish usage. The long-term plans are to survey the entire basin over a four-year period and provide information necessary for setting fish passage priorities in the basin. Additionally, an alosid habitat model will be developed which will be useful for setting habitat restoration goals.

C. Trap, Transport, and Stocking

Virginia Department of Game and Inland Fisheries (VDGIF) Fish Division staff, in cooperation with the US FWS, conducted a trap and transport project for blueback herring in April 1995. Blueback herring were collected by electro-fishing below Walkers Dam, on the Chickahominy River, and transported in circular tanks to several stocking sites. About 2,300 herring were stocked into the James River at Maidens Landing, which is approximately 20 miles above Boshers Dam. Approximately 630 herring were stocked into Big Lickinghole Creek which is near Maidens Landing. Harrison Lake and Herring Creek (tributary of lower

James) received 1100 and 300 fish, respectively. Resulting offspring should imprint on the "upstream habitat" and return in about five years traveling through completed fishways to spawn themselves. This will aid in reestablishing the herring runs in these systems.

Fish Division staff, in cooperation with the Virginia Marine Resources Commission (VMRC), the US FWS and the Commercial Watermen of Virginia, collected American shad brood stock on the Pamunkey River. The eggs were hatched at the King and Queen fish hatchery and the fry were marked prior to stocking with oxytetracycline for identification purposes prior to stocking. Some surplus eggs were hatched at the Harrison Lake National Fish Hatchery. The James River, above Boshers Dam, received seven million fry and the Pamunkey River received about three million fry.

II. Fish Passage Support Activity

A. Public Relations and Education

- The January issue of *Virginia Wildlife* magazine was dedicated to fish passage and anadromous fish restoration. The articles were written by VDGIF, Virginia Commonwealth University, and freelance staff. Topics covered anadromous fish history in Virginia, anadromous fish biology, striped bass recovery, American shad restoration, and fish passage projects and goals.

- A 30-minute video documentary was produced and made available by VDGIF media staff. The video targets historical and current fish passage issues and the Bay restoration effort in Virginia.

- The Fish Passage Coordinator presented the Fish Passage and American Shad Restoration programs to the Suffolk chapter of the Izaak Walton League. The group responded by donating chapter funds for the Boshers Dam Fishway Project to the James River Association.

- From March 21-23, 1995, the VDGIF and the Maryland DNR co-sponsored a fish passage workshop in Williamsburg, Virginia. About 35 participants heard presentations on anadromous fish biology, fishway design criteria, fish passage fundamentals, and the permit process for fishway construction. A tour of several Virginia fish passage facilities was very beneficial and was highlighted by the seasonal opening of the Denil fishway at Harrison Lake Dam on Herring Creek and a demonstration of electro-fishing for alosids on the Chickahominy River. Interaction of the participants was very beneficial as engineers, biologists, and planners were able to discuss essential fish passage issues from a variety of perspectives.

B. Future Plans for Public Relations and Education

Plans are being made to present the anadromous fish restoration program to the "Friends of the Rappahannock River" and other groups in the Fredericksburg area to educate the public on the benefits of passage at Embrey Dam. The Fish Passage Coordinator will present the Fish Passage Program to a joint meeting of the Virginia and Tidewater chapters of the American Fisheries Society (AFS). Upon request and as opportunities arise, the anadromous fish restoration efforts will be presented to the public.

III. Future Activities

A. Planned Activities for 1996

For 1996, fish passage efforts will consist of the following:

- Complete the final design and initiate construction of a vertical slot fishway on Boshers Dam on the James River opening 137.4 miles;
- Complete the design and construction of a Denil fishway on Ruffins Pond Dam on Massaponax Creek, a tributary of the Rappahannock River opening 8 miles;
- Decide on a viable option for fish passage at Embrey Dam on the Rappahannock River; and
- Set future goals for fish passages in Virginia.

B. Meeting the Chesapeake Bay Program's 5-Year Goal (1993 - 1998)

Virginia's five-year goal is 308 miles. The projects listed in "Future Activities" above, along with the following outline show progress toward the 5-Year Goal. Williams Island Dam Notch was completed in November of 1993 and opened 2.6 miles of the James River, up to Boshers Dam. Also in 1993, a fish lift was installed on Brasfield Dam (Appomattox River), but the actual hopper has not yet been added. This lift will be completed when passage is provided at two downstream dams and will open an additional 129 miles. As part of a FERC requirement, Harvell Dam will be fitted with a Denil fishway and reopen 5.6 miles of the Appomattox River, up to the Abutment Dam. The Abutment Dam (an old Virginia Electric Power Company dam) may be passed by 1998 (negotiations have begun) which would open an additional 1.4 miles, up to Brasfield Dam. In 1995, a Denil fishway on Chandlers Mill Dam (Rappahannock drainage) opened 7.7 miles of the two principal tributaries. By the end of the Five Year Goal period, Virginia should open a total of 291.7 miles. Some miles were added (Chandlers - 7.7) but several miles have been moved back to the 10-Year Goal (Ashland Mill Dam, 9 miles; and Ashland Water Supply Dam, 28 miles).

C. Meeting the Bay Program 10-Year (1993 - 2003)

Virginia's portion of the original 10-Year Goal is 415.5 miles, which includes the miles from the Five-Year Goal. Projects completed in III A & B will be added to the following projects to work toward meeting the 10-Year Goal. Fish passage is planned at Embrey Dam, which would open 82 miles of the mainstem Rappahannock. Fishways on Ashland Mill Dam and the Ashland Water Supply Dam would open a total of 37 miles of the South Anna River. This would result in a total of 410.7 miles opened in Virginia by the end of 2003.

Table 4

VIRGINIA
1995 FISH PASSAGE PROJECTS
COMPLETED, IN PROGRESS, PLANNED

Map 4 ID#	Project (stream & river drainage)	Passage Type	Habitat Opened (miles)	Funding Source	Status
1	Chandler's Mill Dam, Chandler's Run Rappahannock River	Denil	7.7	VDGIF	Completed
2	Brasfield Dam, Appomattox River James River	Lift	129.0	Appomattox Water Authority	Construction 90% Completed
3	Bosher's Dam James River	Vertical Slot	137.4	State, Federal, Private, and Corporate	Design; Potential Construction in 1996
4	Ruffin's Pond Dam, Massaponax Creek Rappahannock River	Denil	8.0	US EPA	Potential Construction in 1996
	Harvell Dam, Appomattox River James River	Denil	5.6	Private	Design 1996
	Ashland Mill Dam, S. Anna River York River	Denil	9.0	Undetermined	Stalled Negotiations

Virginia Fish Passage Projects (Con't).

Map 4 ID#	Project (stream & river drainage)	Passage Type	Habitat Opened (miles)	Funding Source	Status
	Embrey Dam Rappahannock River	Undetermined	82.0	Undetermined	Sediment Study Completed (non-toxic)
	Ashland Water Supply Dam, S. Anna River York River	Undetermined	28.0	Undetermined	Planned
	Abutment Dam, Appomattox River James River	Undetermined	1.4	Undetermined	Negotiations
	Unnamed Dam, Mill Creek Rappahannock River	Undetermined	2.5	Undetermined	Planned
	Bridge on Walls Creek James River	Undetermined	1.2	Undetermined	Planned
	Gouldman Pond Dam Rappahannock River	Undetermined	2.0	Undetermined	Planned
	Unnamed Pond Dam, Haskins Creek Rappahannock River	Undetermined	2.0	Undetermined	Planned
	Pipe on Proctors Creek James River	Undetermined	Undetermined	Undetermined	Planned

Map 4: Fishway Progress in Virginia

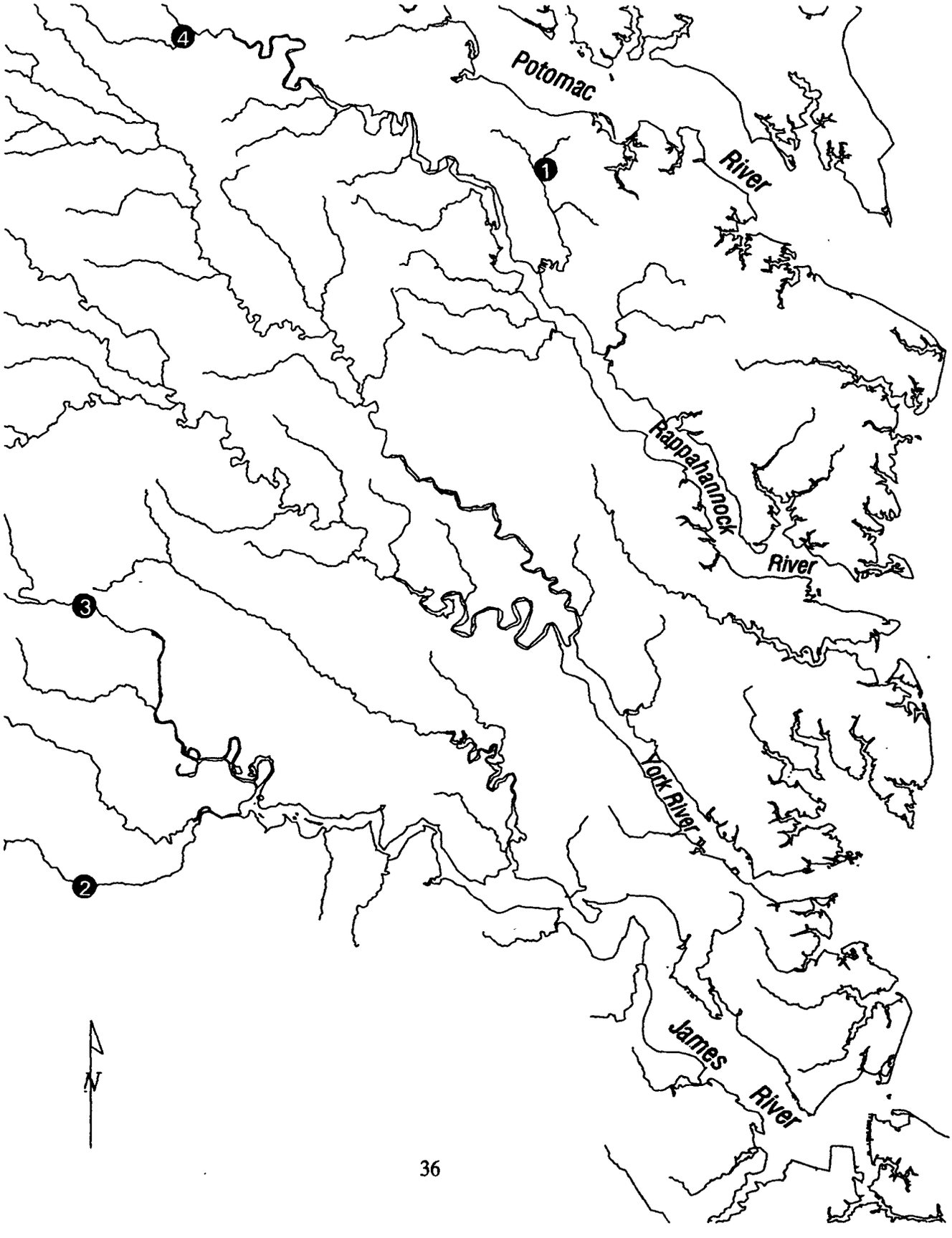
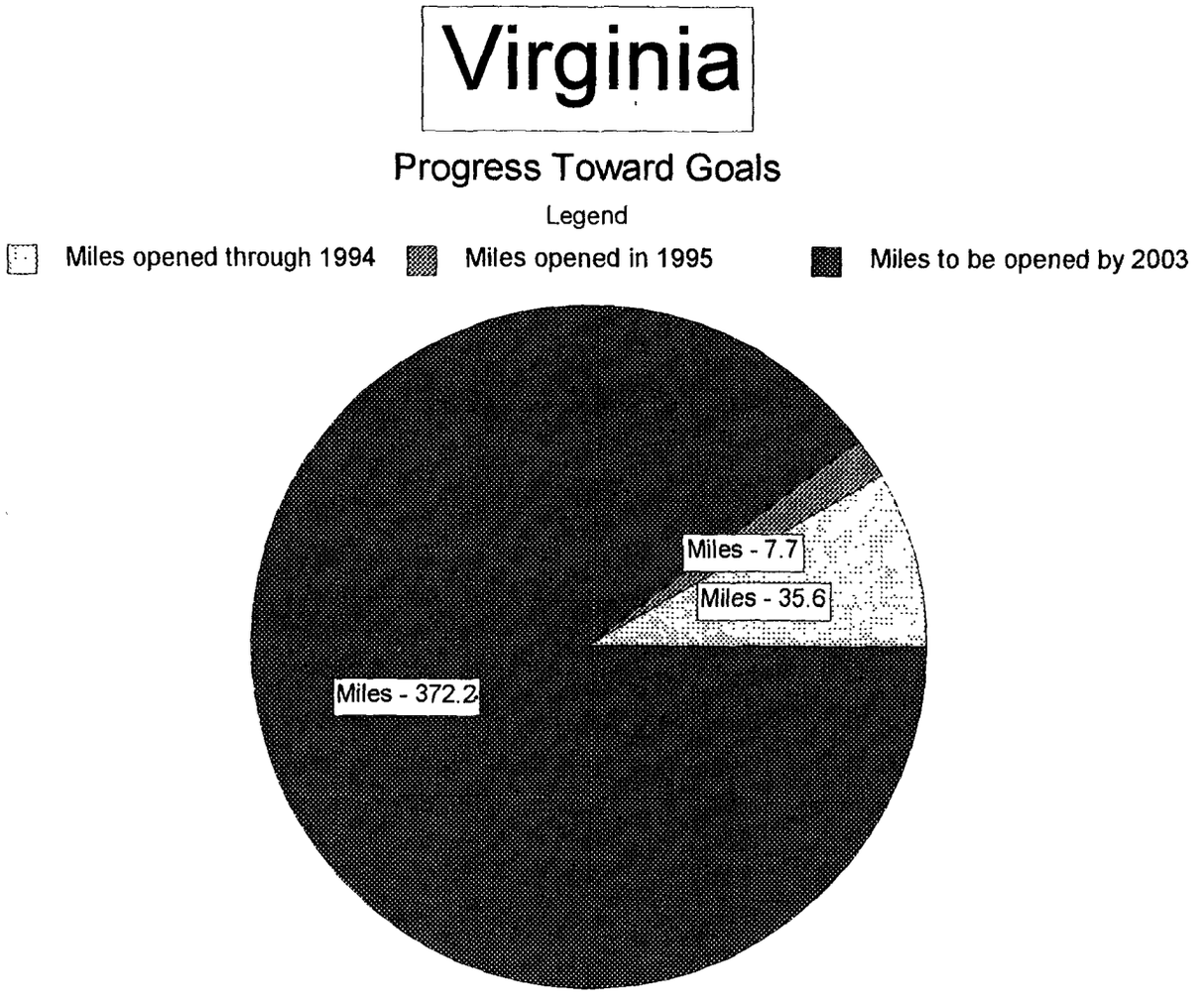


Figure 4


Virginia
Progress Toward Goals
Legend
Miles opened through 1994
Miles opened in 1995
Miles to be opened by 2003
Miles - 7.7
Miles - 35.6
Miles - 372.2

FEDERAL AGENCIES

U. S. Environmental Protection Agency (US EPA)

In fiscal year 1995, the US EPA allocated $955,000 for fish passage activities in the Bay watershed. These activities included the design and construction of the fish passages, and stream blockage surveys upstream of planned and/or constructed fish passage sites. The surveys assess anadromous fish species spawning habitat potential. The overall goal of these projects is to provide American shad, blueback herring, alewife, striped bass, as well as other anadromous species, with access to historical spawning areas.

In April 1995, the Northeast Region of the NMFS entered an Interagency Agreement (IAG) with the US EPA for "Fisheries and Habitat Restoration in Chesapeake Bay." Under the provisions of this IAG, a total of six grant applications involving fish passage initiatives were received from the MD DNR, the PFBC and the VDGIF. Although the District of Columbia was identified to receive monies, fiscal constraints stopped them from applying for the funds, and their allocation went to the VDGIF. Project work focuses on the Susquehanna, Choptank, Patapsco, Patuxent, James, and Rappahannock river watersheds. Another IAG was signed between the US EPA and the US FWS to fund monitoring and the stocking of American shad at Little Falls Dam on the Potomac River. Upon completion, the fish passage construction activities are anticipated to open over 100 additional river miles to anadromous fish migrations.

The following is a list of the projects funded by the US EPA throughout the Chesapeake Bay watershed in 1995.

District of Columbia

- Abandoned Weir, Rock Creek, Potomac River. Fish passage design
- Gauging Station, Rock Creek, Potomac River. Fish passage design

Maryland

- Andover Branch Dam, Chester River. Fish passage design and construction.
- Broadway Branch Dam, Choptank River. Fish passage design and construction.
- Cypress Mill Fish Passage, Chester River. Fish passage design and construction.
- Johnson's Pond, Wicomico River. Fish passage design and construction.
- Unicorn Dam, Chester River. Fish passage design and construction.
- Urieville Dam, Morgan Run, Chester River. Fish passage design and construction.
- Wilson's Mill Dam, Susquehanna River. Fish passage design and construction.
- Stream Habitat Assessment Surveys upstream of planned and constructed fish passages in the upper Chester River and the Choptank River.
- Maryland Fish Passage Coordinator.

Pennsylvania

- Rock Hill Dam, Conestoga River. Fish passage design.
- Castle Fin Dam, Muddy Creek. Fish passage design.
- Hammons Dam, Muddy Creek. Fish passage design.
- Stream Survey downstream of York Haven Dam.
- Pennsylvania Fish Passage Coordinator.

Virginia

- Bosher's Dam, James River. Fish passage design.
- Rappahannock River Stream Survey.
- Ruffin's Pond Dam, Massaponax Creek, Rappahannock River. Fish passage design.
- Fish Passage Workshop.
- Virginia Fish Passage Coordinator.

Multi-jurisdiction and Agency Project

- Little Falls Dam, Potomac River. Stocking, modeling, monitoring, and design.

U. S. Department of Commerce, National Oceanic and Atmospheric Administration / National Marine Fisheries Service (NOAA/NMFS)

NMFS continues to participate in American shad restoration efforts for the Susquehanna River as a technical and policy member of the Susquehanna Anadromous Fish Restoration Cooperative. NMFS reviews and provides input to the activities included in an annual work plan.

Habitat and Fisheries Engineering staff from the NMFS Northeast Region reviewed and provided preliminary comments on the proposed Denil fishway for Harvell Dam, located on the Appomattox River in Petersburg, Virginia. Fishway construction at this dam is critical, because it is the first dam in a series of four, and it currently blocks all anadromous fish spawning runs each spring. Final plans for the fishway are in preparation.

NMFS habitat staff reviewed and provided comments regarding a silver American eel passage study at four hydro stations on the South Fork and mainstem of the Shenandoah River in Virginia. NMFS, as well as the US FWS and VDGIF recommended that nighttime shutdowns be considered in the fall to protect migrating adults from injury from turbines when river flows are low. As a result, nighttime shutdowns will be implemented from September 15 through December 15, each year, during the migration season.

Habitat staff from NMFS NE Region assisted the Maryland Department of Natural Resources in their efforts to restore spawning runs of river herring to the non-tidal portions of Swan Creek, a tributary to the Chesapeake Bay. The restoration project is part of a joint federal/state program for comprehensive management of the Swan Creek watershed. Physical and chemical in-stream data were collected during the spring river herring run at randomly selected stations along the stream. The results of the data analysis will determine whether additional

expenditure of funds is warranted for modifying three in stream barriers in Swan Creek to allow for passage of adult herring.

NMFS personnel from the NOAA Chesapeake Bay Office and the Oxford Cooperative Lab assisted Virginia Game and Inland Fisheries staff in trap and transport activities in central Virginia. Approximately 2,100 mature blueback herring (*Alosa aestivalis*) were electro-fished and collected below Walker's Dam, on the Chickahominy River, over a two-day period. The fish were transported by tank truck to Maidens Landing (20 miles upriver from Boshers Dam) and stocked in the James River. Offspring of the stocked fish should return to the James River as mature adults upon completion of the Boshers Dam fishway in 1996.

Vane Terminals has contributed $150,000 to the Maryland Fish Passage Program (MDFPP) to be used in funding construction of a Denil fish ladder at Simpkins Dam on the Patapsco River mainstem. The contribution represents compensatory action for an authorized fill of approximately one acre of open water habitat in Baltimore Harbor for constructing a ship chandlery. The monetary contribution to MDFPP was recommended by NMFS habitat staff as an alternative to on-site compensation for the unavoidable loss of Harbor habitat during the U.S. Army Corps of Engineers regulatory review of the project. The contribution should put MDFPP close to having the funds necessary for initiating construction of the Simkins Dam ladder.

U. S. Fish and Wildlife Service (US FWS)

Fish Passage and Stocking Activities

The US FWS Chesapeake Bay/Susquehanna River Ecosystem Team has given high priority to characterizing the quality of 200 miles of anadromous fish spawning and nursery habitat each year during 1995-1998. This is accomplished through field surveys, modeling techniques, and by assessing impacts of stocked cultured larval shad and adult shad and herring transplants. In 1995, the US FWS Virginia Fisheries Coordinator and Harrison Lake National Fish Hatchery worked in cooperation with VDGIF, VMRC, and ICPRB to collect American shad eggs. 2.4 million American shad were marked and stocked above blockages in the James and Potomac rivers (1.2 million each). They also collected 3,000 adult blueback herring from the Chickahominy River and stocked these above Harrison Lake Dam on the Herring Creek drainage. The Virginia Fisheries Coordinator also wrote a *Strategic Plan for the Restoration of American Shad to the Potomac River Upstream of Little Falls Dam**, and drafted a cooperative agreement for anadromous *Alosa* restoration in Virginia.

The US FWS Susquehanna River Coordinator worked with PFBC, Maryland DNR, and operators of four Susquehanna River dams to direct shad and herring restoration activities. 1995 activities include recording trap and transfer of adult alosids from Conowingo Dam to upstream spawning waters, shad egg collections, and hatchery operations which produced 10 million shad fry in 1995. US FWS biologists and engineers participated on four Susquehanna River fish passage technical advisory committees, resulting in operational modifications at Conowingo Dam to enhance downstream passage of juvenile alosids; construction oversight for fish lifts being built at Holtwood and Safe Harbor dams; and, design and development of a gated opening passage concept for the York Haven project to be built by April 2000.

The Federal Activities Branch of the US FWS Chesapeake Bay Field Office routinely reviewed all federally licensed and permitted projects in the Bay watershed to assure that fish passage considerations were accommodated when appropriate. This included fish passage designs for the Harvell hydroelectric project on the Appomattox River, which are nearing final approval. Night-time shutdown of four hydroelectric facilities on the Shenandoah River to assist outmigration of American eels was also recommended.

US FWS engineers participated in 26 meetings and field investigations involving fish passage projects in the Chesapeake Bay drainage. Engineering staff also provided technical assistance with preparing and reviewing conceptual designs for 32 fish passage projects in the Bay area.

* *Strategic Plan for the Restoration of American Shad to the Potomac River Upstream of Little Falls Dam* is available from US FWS, Virginia Fisheries Coordinator Office, 11110 Kimages Rd., Charles City, VA 32030; phone 804-829-5322; fax 804-829-6067; email r5ffa_hlnfh@mail fws.gov.

Outreach and Education

US FWS personnel from throughout the watershed participated in several outreach events aimed at informing the public about the importance of fish passage and culture programs to restore anadromous fishes to historic habitats. The US FWS Chesapeake Bay Office worked with staff from Harrison Lake National Fish Hatchery, Susquehanna River Coordinator, and the Bay Program's Communications Subcommittee to organize a springtime media "blitz" about fish passage, including separate events at Richmond, Washington D.C., Baltimore, and Harrisburg. Media attention reached over one million people and emphasized federal, state and local cooperation in removing barriers to fish migration and restoring spawning runs of shad and herring.

The US FWS fish passage display was exhibited at numerous Bay events. Fish passage and restoration articles were promoted in many articles provided to ten Bay area newspapers, with a combined circulation of over one million. Service personnel were closely involved with production and distribution of the 16-page color brochure titled "*Fish Restoration and Passage on the Susquehanna River*". US FWS engineers provided training on fish passage design at the Workshop on Fish Passage at Small Barriers held in Williamsburg, VA in March, 1995.

6
Baywide Summary of Progress

The Chesapeake Bay Program's Executive Council signed Directive 93-4 on December 27, 1993. This directive charged the Bay's jurisdictions to open 1,356.75 miles of migratory fish spawning habitat along the major tributaries to the Chesapeake Bay by 2003. An interim goal of 582.05 miles was set for the year 1998. This directive has focused the goals and activities of the Fish Passage Workgroup for the past two years.

The Workgroup is moving steadily toward attaining these goals. By the end of 1995 a total of 211.3 miles of anadromous fish spawning and nursery habitat (38.7 in 1995) has been opened. Significant design work has been done in all the jurisdictions and over 100 additional miles should be opened in 1996 throughout the Bay watershed.

The following tables illustrates the "Baywide Success" in terms of miles opened. This includes all parameters of the agreement and the miles opened before the agreement.

Table 5

Baywide Fish Passage Progress

States/District	Miles Opened Before 9/93	Miles Opened 9/93 - 12/95	Five Year Goal 1993 - 1998	Ten Year Goal Pre 1993 - 2003
District	0.6	1.0	32.00	32.60
Maryland	106.1	51.3	210.05	388.65
Pennsylvania	9.0	0.0	32.00	520.00
Virginia	33.0	10.3	308.00	415.50
Totals ➡	148.7	62.6	582.05	1356.75

It is important to note that meeting the Directive's fish passage goals will not necessarily result in increased abundance of anadromous stocks. Other necessary efforts include control of harvest, habitat protection, trap and transport, stocking, proper design of facilities, and the proper management of fishways. These activities have been, and are, expanded throughout the watershed by the Fish Passage Workgroup.

Figure 5

Executive Council Directive 93-4
1356.05 Miles Opened by 2003

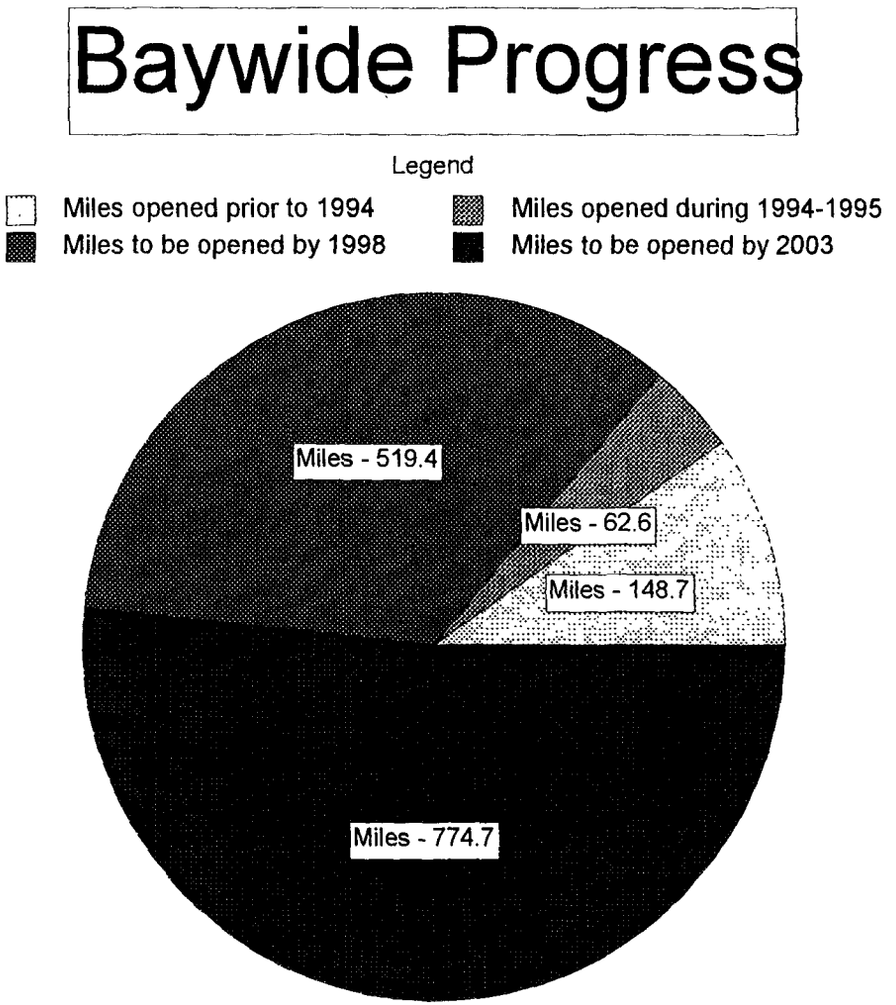
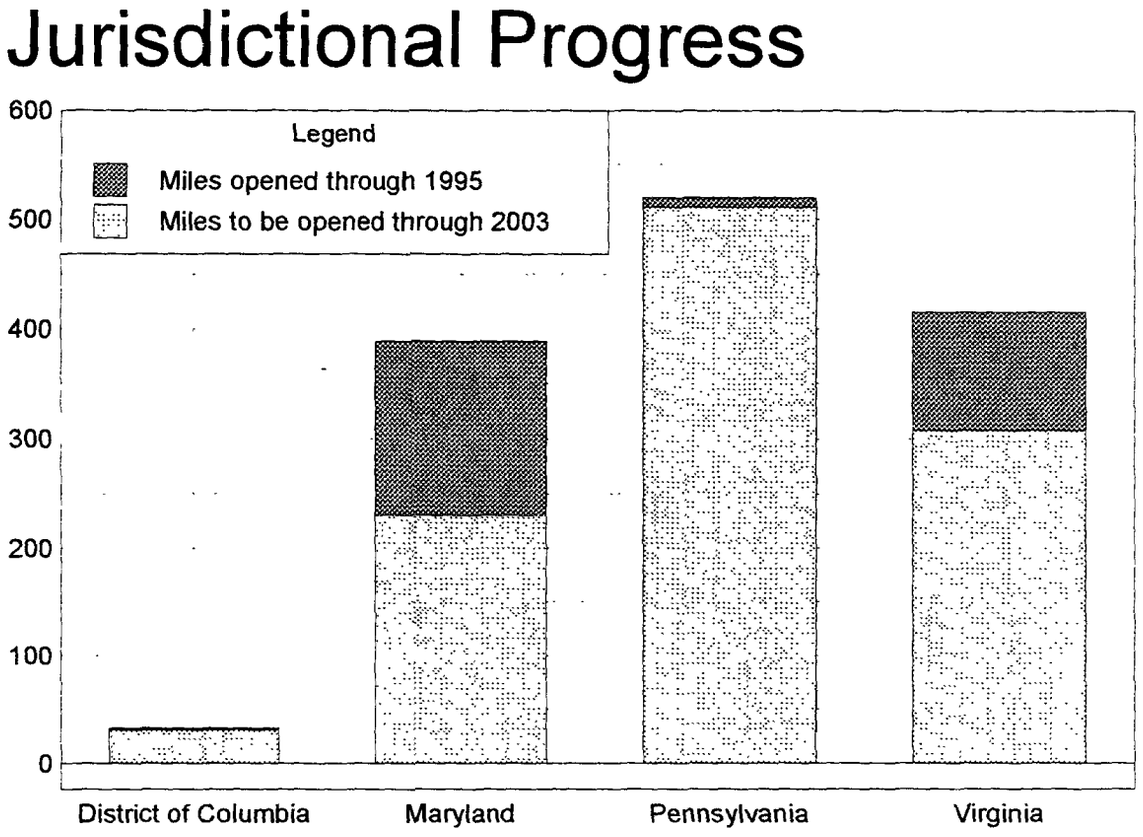


Figure 6

Executive Council Directive 93-4
1356.05 Miles Opened by 2003



Appendix A

Constructed Fish Passage Projects Preceding 1995*

State/District	Project	Fish Passage Type
District of Columbia		
	Ford # 3, Rock Creek, Potomac River	Removal
Maryland		
	Dam #1 on Northeast Branch, Anacostia River	Notch
	Culvert, Rt. 495 East Loop, Paint Branch, Anacostia River	Pool and Weir
	Culvert, Rt. 495 West Loop, Paint Branch, Anacostia River	Alaskan Steeppass
	Whitemarsh Run Rt. 40 Culvert, Bird River	Alaskan Steeppass
	Van Bibber Dam, Winter's Run, Bush River	Denil
	Weir on Morgan Creek, Chester River	Denil
	Beaverdam Creek Weir, Choptank River	Notch
	Tuckahoe Creek Dam, Choptank River	Denil Fishway
	Elkton Dam, Big Elk Creek, Elk River	Denil Fishway
	Railroad Bridge, Little Elk Creek, Elk River	Removal
	Fort Meade Dam, Little Patuxent River	Denil
	Railroad Tressel, Dorsey Run, Little Patuxent	Remove
	Culvert, Dorsey Run, Little Patuxent River	Replace Culvert
	Sewer Line, Little Patuxent River	Replacement
	Lake Waterford Dam, Lake Waterford, Magothy River	Pool and Weir
	North East Dam, North East River	Breach
	Bloede Dam, Patapsco River	Denil Fishway
	Daniels Dam, Patapsco River	Denil Fishway

	Deep Run Dam, Patapsco River	Removal
	Sawmill Creek Culvert, Patapsco River	Pool and Weir
	Stony Run Dam, Patapsco River	Removal
	Trail Culvert, Sawmill Creek Patapsco River	Pool and Weir
	Union Dam, Patapsco River	Breach
	Hoghole Run Rt. 6 Culvert, Port Tobacco River	Steeppass
	Railroad Trestle, Dorsey Run, Patuxent River	Removal
	Western Branch Rt. 214 Dam, Patuxent River	Removal
	Bacon Ridge Branch Weir, South River	Removal
	North River Culvert, South River	Replacement
	Connowingo Dam, Susquehanna River	Fishlift (2)
Pennsylvania		
	Hepburn Stree Dam, West Branch Susquehanna River	Vertical slot
Virginia		
	Battersea Dam, Appomattox River, James River	Natural Breach
	Walkers Dam, Chickahominy River; James River	Denil (2)
	Harrison Lake Dam, Herring Creek; James River	Denil
	Manchester Dam, James River	Breach
	Browns Island Dam, James River	Breach

**These projects were constructed following or were included in Directive 93-4.*

Appendix B

Fish Passage Workgroup Members

Chair

Richard St. Pierre
Susquehanna River Coordinator
US Fish & Wildlife Service
1721 N. Front St., Suite 105
Harrisburg, PA 17102
717-238-6425

Members

Carin Bisland	U.S. Environmental Protection Agency (US EPA)/Chesapeake Bay Program Office (CBPO)
Scott Carney	Pennsylvania Fish and Boat Commission (PA FBC)
William Goldsborough	Chesapeake Bay Foundation (CBF)
Rick Hoopes	PA FBC
Robert Kelsey	U.S. Fish & Wildlife Service (US FWS)
Larry Leasner	Maryland Department of Natural Resources (MD DNR)
Larry Lubbers	MD DNR
Richard Quinn	US FWS
Jon Siemien	D.C. Fisheries Branch
Albert Spells	US FWS
Todd Stiles	National Oceanic and Atmospheric Administration (NOAA)
John Stremple	National Marine Fisheries Service (NMFS)
Alan Weaver	Virginia Department of Game & Inland Fisheries (VDGIF)
Joe Wolfe	U.S. Army Corps of Engineers