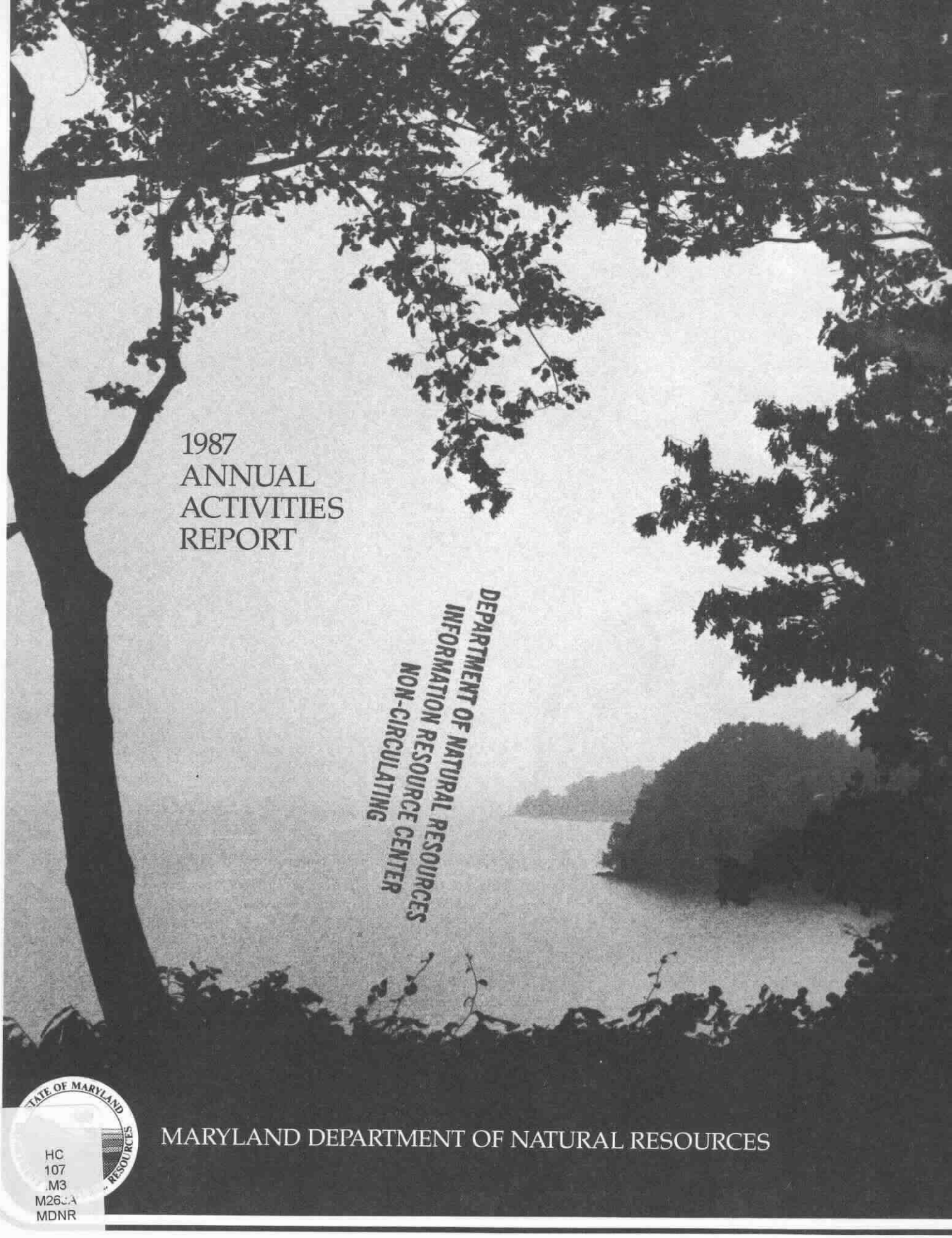
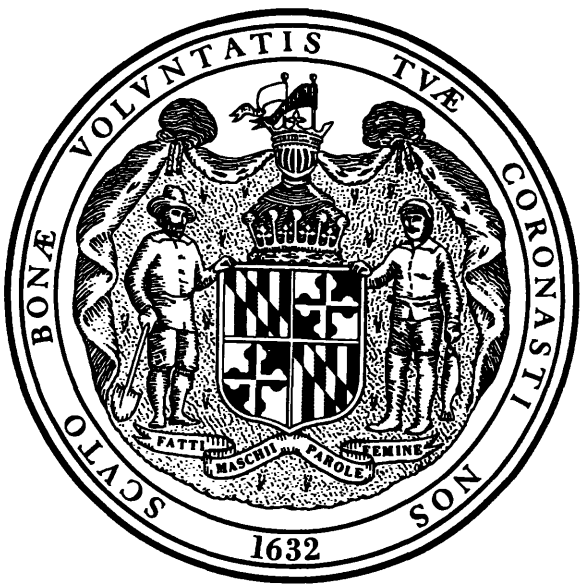


1987 ANNUAL ACTIVITIES REPORT

MARYLAND DEPARTMENT OF NATURAL RESOURCES



STATE OF MARYLAND
WILLIAM DONALD SCHAEFER
GOVERNOR
LOUIS L. GOLDSTEIN
COMPTROLLER OF THE TREASURY
LUCILLE MAURER
TREASURER
DEPARTMENT OF NATURAL RESOURCES
TORREY C. BROWN, M.D.
SECRETARY

MARYLAND DEPARTMENT OF NATURAL RESOURCES

1987 ANNUAL ACTIVITIES REPORT

Cover: Elk Neck State Park
Photos by DNR staff

Maryland Department of Natural Resources

William Donald Schaefer
Governor

Tawes State Office Building
Annapolis, Maryland 21401

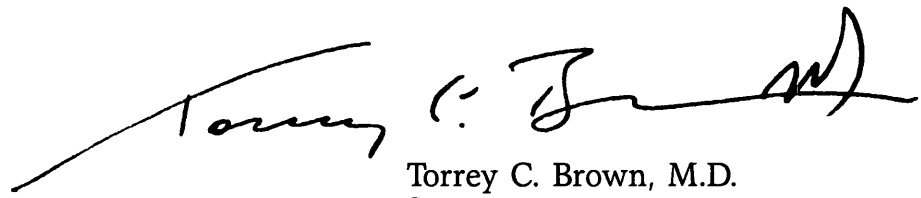
Torrey C. Brown, M.D.
Secretary

John R. Griffin
Deputy Secretary

FOREWARD

This Annual Activities Report catalogues the various activities carried out by the men and women of the Department of Natural Resources during fiscal year 1987. These activities, directly and indirectly, benefited the citizens of Maryland, as well as effectively managed the state's natural resources.

Many community and citizen groups, volunteer organizations, the boards and commissions of DNR, and individuals gave of their time and expertise on behalf of the objectives of the Department. Their efforts are recognized and appreciated. I extend to them my heartfelt thanks.



Torrey C. Brown, M.D.
Secretary

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OFFICE OF THE SECRETARY

EXECUTIVE DIRECTION

The Secretary, Deputy Secretary and Assistant Secretaries of the Department of Natural Resources provide the establishment, coordination, administration and direction of overall departmental policy. The Office of the Secretary has final responsibility for management policy; it maintains liaison with various legislative bodies as well as communication with the public. The Office of the Secretary furnishes support services to all elements of the Department of Natural Resources.

LEGAL SECTION

The Legal Section is supported by ten Assistant Attorneys General. One serves as Counsel to the Secretary of Natural Resources and is responsible to the Attorney General for the direction and supervision of the section. The legal staff represents agencies of the Department involved in litigation, and supplies legal advice inherent in the normal functioning of the Department. This includes the approval of contracts and regulations, and representing the agency at administrative hearings.

During Fiscal Year 1987, the legal staff continued its active role in the formulation and enforcement of laws protecting and preserving the State's natural resources. It handled cases in the federal courts, initiated legal action at the State Circuit Court level and prosecuted violations in the State District Courts. In addition, assistance and legal advice was rendered in administrative proceedings at federal and state levels.

FISCAL AND SUPPORTIVE SERVICES

The Fiscal and Supportive Services Program, in the Office of the Secretary, provides assistance and direction to the Department in the areas of financial management, personnel services and data management processing. The program is responsible for administering the department's $138 million plus budget, providing fiscal information to agency administrators and maintaining fiscal controls over income and expenditures.

Dr. Torrey C. Brown presenting the Governor's proclamation declaring Disabled Citizens' Week (October 24 to October 31, 1987) in Maryland's State Forests and Parks to Howard Nickelson, Chairman of the 504 Committee with Peggy Greenwell, a 504 member also.

During the coming fiscal year, Fiscal and Supportive Services plans to review the financial accounting and control systems with the goal of integrating the individual parts into one system. Areas of general concern are budgeting, procurement, accounts payable, fixed assets, payroll, grants management, working fund disbursements, cash receipts and accounts receivable.

Supportive Services

The Supportive Services project is responsible for controlling Real and Personal property purchased or otherwise received by the department. As of June 30, 1987, the value of land and buildings, to which the Department holds title, exceeds $279 million. During FY 1987 inventory records for 21,500 items, valued at more than $25 million, were maintained.

Mail Distribution

During FY 1987, the department's mailroom handled more than 5,000,000 pieces of mail and 25,000 parcels.

Procurement

This project is responsible for processing service, maintenance and construction contracts, requisitions and purchase orders in accordance with Title 21, State Procurement Regulations. This unit also reviews personal service and timber sale contracts. During FY 1987 there were 1421 commodity orders with an approximate value of $5,700,000; 1525 commodity contract orders processed by units of DNR and reviewed by Procurement valued at $500,000; 639 service, maintenance, construction and personal service contracts with an approximate value of $21,446,000. Also, personal service contracts for seasonal and temporary employees were processed totaling nearly 2,500.

Information Management

The Information Management Section, in the Office of the Secretary, maintains a central review authority over all Data Processing Activities of the Department. In addition, the Section is directly responsible for all administrative/financial computer applications

located in the Office of the Secretary's Fiscal and Supportive Services and Licensing and Consumer Services.

During the coming fiscal year, the Data Processing Section will work to strengthen its support capabilities throughout DNR.

LICENSING & CONSUMER SERVICES

Licensing and Consumer Services administers the State Boat Act and the licensing provisions under the Natural Resources Article for DNR's Tidewater Administration and Forest, Park and Wildlife Services. The unit titles and registers all boats; records security interest in boats; issues commercial and sport licenses and permits; collects shellfish taxes and licenses boat and shellfish dealers. In addition, Licensing and Consumer Services is responsible for collecting the boat excise tax on all vessels purchased within Maryland or possessed in Maryland for principal use in this State. The five Natural Resources Regional Service Centers are under the supervision of this unit. This program is also responsible for the Boat Act Fund, the Boat Dealer Assurance Fund, the Publication Sales Fund and the sale of the "Guide for Cruising Maryland Waters" and certain other Department publications.

The six Licensing and Consumer Services Offices collected gross revenues of $28,186,260 representing 1,284,555 transactions, a 24 percent increase in revenues over FY 1986. Included were 36,167 applications for Maryland boat titles collecting $18,146,768 in boat excise taxes; 137,362 applications for boat registrations totalling $1,477,937; 6,420 applications for documented yacht stickers for $32,039; also 907,486 applications for fishing and hunting licenses and stamps resulting in revenues of $6,635,622. Licensing and Consumer Services processed 17,792 applications for commercial fishing licenses totalling $717,414.

A total of $157,544 was collected for the recordation of security interest with $63,048 deposited to the account of the Comptroller of the Treasury, $52,840 available to be distributed to Maryland counties and $41,296 to offset costs of collection and recordation. Gross revenues from publications were $133,375 of which $114,705 was generated from the sale of the "Guide to Cruising Maryland Waters."

Licensing and Consumer Services staff processed 137,362 boat registrations. Also processed were 4,225 oyster and clam dealer reports accounting for over 1,618,854 taxed bushels of shellfish (1,075,658 harvested bushels) and $577,960 in severance, import and export taxes. The Licensing and Consumer Services staff provides daily direction and interaction between the department and the 613 licensed boat dealers, 235 fish dealers, 24 Clerks of Court, 7 hunting and fishing license distributors, 170 hunting and fishing license consignment agents and 522 hunting and fishing license cash agents, as well as the general public.

Licensing and Consumer Services staff at the five Regional Service Centers, in addition to the issuance of titles, registrations and licenses, provides comprehensive administrative support to the regional managers and field personnel of all DNR units in the centers. The Regional Service Center in Southern Maryland collected $6,643 on behalf of the Potomac River Fisheries Commission through sales of Potomac River Fisheries Commission licenses. The money is deposited directly to the Potomac River Fisheries Commission's account.

In addition, $197,737 in miscellaneous permits and sales was collected.

The net revenue from recreational fishing and hunting licenses was $6,454,706.

Revenues collected during FY 1987 were used to support the activities of the Tidewater Administration, the Forest, Park and Wildlife Service, the Natural Resources Police and the Office of the Secretary. Total cost for FY 1987 to accomplish these services was $2,440,022.

During FY 1987 Licensing and Consumer Services implemented Chapter 828, Acts of the 1986 General Assembly. The law transferred the responsibility for collection of tax on all vessels principally used in Maryland to DNR. During FY 1987 Licensing and Consumer Services collected $70,466 in penalties and $32,756 in interest.

Licensing and Consumer Services opened a new office in Calvert County, servicing Calvert, St. Mary's, Charles and Prince George's Counties. The southern office is located at Hallowing Point in Prince Frederick and operates with a staff of four. Within the next year, Licensing and Consumer Services will open a sixth regional office in east Baltimore to service the city, eastern Baltimore County and upper Anne Arundel County.

During FY 1987, Licensing and Consumer Services added a new unit with the responsibility for collecting excise tax on federally documented vessels reported as sold by individual sellers. This unit is also responsible for collecting taxes on inappropriately numbered vessels. In addition, a unit responsible for the assessment, monitoring and collection of penalty and interest has been added. This section developed procedures for filing liens against personal property for the collection of unpaid assessments. The Boat Dealer Section was expanded to include a unit for monitoring reports by dealers of vessels sold for use out of state.

During the past year Licensing and Consumer Services has worked to inform the public and the licensed dealers of the new legislation regarding penalty and interest. As public awareness increases, the revenue generated from penalty and interest is expected to decrease while compliance with titling and validation requirements rises.

Over the next five years, Licensing and Consumer Services plans to reduce or eliminate the time lag in license issue by improving the electronic receipt system upgrading data entry capabilities, and revising forms and procedures to reduce the current labor intensive process. Licensing and Consumer Services plans to continue the aggressive education program familiarizing all agents, dealers, users and employees of the licensing and tax process. Capability to provide information statistics for use by the Maryland Department of Natural Resources and state and county planning agencies will be approved.

Through the use of news media, and by enhancing education programs, Licensing and Consumer Services hopes to increase public awareness of license requirements.

Judging the 1988 Maryland Trout Stamp Contest

PERSONNEL ACTIVITIES FY 1987	
PERSONNEL TRANSACTIONS PROCESSED (Appointments, Reclasses, etc.)	5133
RECLASSIFICATION STUDIES	436
Desk Audits	72
CONTRACTS	
Personal Services Salary Certification	207
SPECIFICATIONS REVISED	19
SUGGESTIONS PROCESSED	6
BLOOD PROGRAM	
Drives	5
Donors	510
Units Produced	495
Disbursement	21
INTERVIEW & MOVING EXPENSE REQUEST	8
APPLICANT ACTIVITY	
Correspondence	2,555
Walkins	600
Interviews	125
Telephone Inquiries	3,210
Employee Reviews	85
EXAMINATIONS REQUESTED	13
EMPLOYEE GRIEVANCES (4th and 5th Step Hearing)	27
NEW EMPLOYEE ORIENTATIONS	3
STATE ACCIDENT FUND ACTIVITY	
First Report of Injuries Processed	186
Workmen's Compensation	
Hearings Coordinated/Attended	4
Bills Processed	430
MISCELLANEOUS CAMPAIGNS (Flu inoculations, various employee benefit programs)	3
UNEMPLOYMENT INSURANCE HEARINGS	5

PERSONNEL

Personnel is responsible for all personnel services for the Department.

Highlights:

Coordinated several benefit programs for employees including deferred compensation and health insurance.

Conducted two training sessions for 50 managers/supervisors on personnel regulations and procedures, employee counselling, grievance handling, worker's compensation, and employment procedures.

Participated in the organization of an employees' association for the Department.

Coordinated a successful Annual Salary Review resulting in salary adjustments for 73 classifications and the establishment of 7 new classifications used by the Department.

Office of EEO and Manpower

This office advises and serves the Department and its agencies on affirmative action and equal employment opportunity. It is responsible for the day to day operation of the Equal Employment Opportunity and Affirmative Action Program. The staff coordinates all reports, studies and other administrative duties dealing with equal employment opportunity and provides periodic reports to units of the Department. It works with the Personnel Office to develop training materials, guides and seminars to inform the Department's employees of their responsibilities in the Equal Employment Opportunity Program. Also works with Federal and State EEO Commissions.

PUBLIC AFFAIRS OFFICE

During 1987, concerted efforts were made to reach important community groups and local leaders. The office director and staff participated in several special events assisting Governor William Donald Schaefer and the DNR Secretary in outreach activities in various parts of the state. A newly developed travelling exhibit was modified several times to suit different audiences and a display tent aided in these efforts.

In addition, radio and television public service announcements were prepared stressing water and boating safety, alcohol avoidance, handicapped services, etc., all issues of vital importance to the public and DNR.

An exhaustive study was conducted exploring the feasibility of a statewide magazine devoted to the state's natural resources, their protection and enhancement. A joint project with "Maryland Magazine," published by the Department of Economic and Community Development, was explored.

A special educational project was developed in cooperation with the National Aquarium in Baltimore. It is a 10 minute audio supported slide lecture on the Chesapeake Bay and its environmental problems. Supplemented by a special publication, this audio-visual package will be distributed through education channels to Maryland public schools, grades 3 through 6.

The year also witnessed the development of several new DNR publications designed for the general public, the establishment of an internal newsletter, "The DNR Update", and the completion of planning for the establishment of a DNR Information Center in Annapolis. The Center will be open to the public and contain DNR publications, films, slides, still photos and video tapes.

The office (and Department) gained a new, important capability when it hired a fulltime contractual photographer. The photographer will be available to record all official DNR program activities and the end products should significantly improve the Department's Audio/Visual library.

Helen Avalynne Tawes Garden

Because the Capital Programs Administration moved from the Tawes State Office Building, in February, the Tawes Garden Project and staff was transferred to the Public Affairs Office.

Construction of the garden's Eastern Shore boardwalk and sand dunes was completed in FY 1987. American beachgrass and bayberries were planted. These improvements were funded in part by the garden's Stevie Lyttle Fund (an account of District II of the Federated Garden Clubs of Maryland).

The Tawes Garden Gift Shop opened on September 15th, an important milestone for the garden providing a continuous source of income and it is proving to be an effective means of fundraising. It is hoped that the small shop, operated by volunteers, will be expanded in FY 1988 and carry a more varied selection of merchandise.

At its June 15th meeting, the Tawes Garden Advisory Board appointed Mrs. John Huston as its new Chairman. Former Chairman Mrs. Vaughan Huse retains her seat on the Board and continues herchairmanship of the gift shop.

In FY 1987, fifty-one guided tours took 565 visitors through the garden. Special events, including concerts and the Governor's tree planting in observance of Arbor Day, drew more than 900 people. Over $1,500 was received in contributions.

Helen Avalynne Tawes Garden Maintenance

CAPITAL PROGRAMS ADMINISTRATION

The Capital Programs Administration consists of five programs in addition to the General Direction Program: Land Planning Services, Program Open Space, Shore Erosion Control, Land Management and Recreation Services and Capital Development.

The administration provides planning services for State parks, natural resources management areas and recreational facilities; administers Program Open Space funds under the provisions of the Outdoor Recreation Land Loan of 1969 and federal funds provided by the U.S. Department of Interior's Land and Water Conservation Fund; provides shore erosion control service to public and private landowners; operates properties that have been identified for enterprise development, major capital improvement or innovative natural resource management; and, provides engineering, architectural and administrative services to agencies within the Department of Natural Resources for the design and construction of new facilities.

LAND PLANNING SERVICES

Land Planning Services provides planning, evaluation, mapping, graphic, environmental review and capital budget services for the acquisition, development and management of public lands and scenic rivers administered or managed by the Department.

The activities of Land Planning Services are accomplished through five projects: Resource Planning; Scenic and Wild Rivers; Acquisition Graphics and Research; and Capital Budget Planning and Environmental Review.

Resources Planning

The Resource Planning Project is responsible for the development of master plans for new State parks, revisions to existing plans for established parks and the development of interim use management plans for recent acquisitions of properties. This project also prepares detailed analyses and conceptual studies for potential acquisitions and conducts environmental review for other Department projects.

During FY 1987 the Resources Planning Project completed a number of projects including: Gems of the Severn Report, Draft Master Plan for Soldiers Delight, Draft Master Plan for the Northern Central Railroad Trail, revised development plan for the Steppingstone Museum area of Susquehanna State Park, Concept Plan for Black Walnut Point, revised development plan for Greenwell State Park.

Citizen advisory committees were formed for two ongoing planning efforts: the St. Mary's River State Park and the Choptank River Bridge Fishing Piers.

Other projects in progress during FY 1987 include:

- Hart-Miller Island Master Plan
- Patuxent River Natural Resources Management Area Properties:

  Kings Landing/Cammack Property

  Cox Property

  Peed and Wiedemyer Properties
- Savage River plan for 1989 Whitewater World Championships
- Lower Patapsco Redevelopment Plan
- Rocks State Park revised development plan.

Scenic and Wild Rivers

The Scenic and Wild Rivers Program prepares an inventory and study of all Maryland rivers; prepares resource management plans for designated rivers that comprise the Scenic and Wild Rivers System of Maryland; promotes the preservation and protection of natural values associated with designated rivers; and administers the Youghiogheny Wild River Project and Regulations. This program coordinates planning activities with local citizen advisory groups and governing bodies to develop river conservation and land use recommendations.

Completed planning projects for FY 1987 included:

- The Maryland Rivers Study: Tributaries of the Chesapeake Bay

Continuing planning projects include:

- The Maryland Rivers Inventory
- Anacostia River Project
- Deer Creek Project
- Severn River Project
- Monocacy Scenic River Management Plan
- Wicomico River/Zekiah Swamp Management Plan
- Youghiogheny Scenic and Wild River Management Plan

Capital Budget Planning

The Capital Budget Planning project is responsible for preparing the Department's annual Capital Budget and Five Year Capital Improvements Program. Long-range capital development needs are assessed and a list of future development projects is prepared and maintained. In addition, funded projects are reviewed during the design phase to assure that the project design is consistent with the intent of the original plans and program.

The Capital Budget for DNR normally includes projects that fall into the following development categories:

- Miscellaneous Improvement Fund
- Operational Support Facilities
- Replacement, Renovation, and Alteration
- New Development (planned facilities)
- Shore Erosion Control
- Historic Rehabilitation

Acquisition Graphics and Research

This project is responsible for the research of property records (deed, surveys and land patents) and the preparation of boundary lines and reference lists for privately owned properties authorized for acquisition by the Department. These activities are coordinated with other Department, State and federal agencies. In addition, the project provides mapping and graphics services, and is responsible for the preparation of the Department's biannual acreage report.

Project boundary maps, special project maps, and aerial photography projects completed in FY 1987 were:

- St. Marys River State Park - Map impact area of proposed county road
- South Mountain State Park - Remapping
- Rocks State Park - Preliminary phase project boundary map
- Potomac State Forest - Final phase of project boundary map
- Savage River State Forest - Whitewater race area ownership mapping
- Youghiogheny River - Determine river view points and develop profiles for establishing corridor
- Seneca State Park - Remapped area of proposed Great Seneca Highway
- Green Ridge State Forest - Wild lands mapping and acreage computation
- Concord Point Park - Project boundary map
- Savage River State Forest - Topographic basemaps
- Garrett County - ORV maps

Acquisition Graphics staff provides technical research and support to DNR's Legal Section to help resolve property disputes between DNR and private property owners with land bordering DNR areas. An overall analysis of the problem including property research, field visits, and meetings with landowners, culminates in a final report recommending methods of resolution.

Property research projects completed in fiscal year 1987 were:

- Patapsco State Park
- South Mountain State Park
- Rocks State Park
- Savage River State Forest
- Green Ridge State Forest
- New Germany State Park

Program Open Space

The mission of Program Open Space is to provide public recreation and open space areas within Maryland. It coordinates state acquisition and development for forest, park and wildlife projects, and administers state and federal grants to Maryland's subdivisions for local recreation areas and open space.

Fiscal year 1987 was an important year for the future of Program Open Space and for the future of Maryland's outdoors. The following significant accomplishments gave a forecast of trend-setting goals to improve and enhance Maryland's parks, recreation, and open spaces over the next several decades:

Governor Schaefer sponsored and the General Assembly approved bills that:

- Extended Program Open Space into the 21st Century, and
- Raised the legislated "cap" of $24 million to $29 million in fiscal year 1988 and to $39 million in fiscal year 1989.
- The fourteen member 1968 Legislative Council on Recreational Areas, generally known as the Clark Commission, was given a special tribute on May 5, 1987, for its work in creating Program Open Space eighteen years ago in 1969.
- The Department of Natural Resources, in cooperation with the Maryland Recreation and Parks Association, began a campaign to raise funding for an educational film on Maryland's parks, recreation, and open spaces to help promote a new land ethic in the people who use and enjoy public parks and open spaces.
- The President's Commission on Americans Outdoors on January 28, 1987, submitted its report recommending 66 suggestions to enhance each state's outdoor recreation and conservation legacy over the next 30 years. In this report, Program Open Space was recognized as a "National Model" to accomplish natural land preservation in a state that is experiencing rapid growth.

The FY 1987 Program Open Space appropriation by the Maryland General Assembly totaled $24 million. By law, one-half of these funds are designated for State land acquisition, Agricultural Land Preservation Easements, and a direct grant to Baltimore City for park acquisition, development, or maintenance. The remaining $12 million is distributed to the local subdivisions for local park acquisition and development.

State Share Activity

During FY 1987, Program Open Space continued to make progress in meeting the Department's acreage goal of 395,944 acres. Approximately 2,600 additional acres were acquired in fiscal year 1987, leaving a balance of 74,265 acres to be acquired.

Ocean City Beach Replenishment and Hurricane Protection Project

In addition to the land acquisition responsibilities, Program Open Space has embarked on a major cooperative effort with the Town of Ocean City to restore portions of the Ocean City beach. A team of negotiators, attorneys, and a project manager are pursuing the donation of property easements along the declining beachfront areas. Presently, there are 234 parcels of land involving more than 4,200 property owners. Approximately 70 easements are yet to be acquired. The necessary property rights should be obtained by March 1988, and the state and town will then begin the actual beach construction. This project will provide a 165-foot wide beach, hurricane bulkhead protection at the boardwalk, and a 98-foot wide vegetated dune running from the end of the boardwalk to the Delaware line.

Local Share Activity

In FY 1987, there were 38 acquisition grants approved for the county and municipal governments, with a total

Program Open Space assistance of $5,695,332. The completion of these projects will result in an additional 854 acres of local park land. There were also 83 development projects or amendments approved by the Board of Public Works with a total assistance of $7,295,804. Since 1970, Program Open Space has provided $191.8 million to the local governments for park grants. At the end of fiscal year 1987, the unencumbered balance was $19,932,316, an obligation percentage of 90 percent.

Land and Water Conservation Fund

Program Open Space also administers the annual apportionment of Federal Land and Water Conservation Funds. Each year since 1966, with the exception of 1982, the U.S. Department of the Interior has apportioned a sum of money to the State of Maryland to be used for the acquisition and development of park and natural resource areas throughout the state. To receive federal funding, the state must submit a detailed project application that conforms with the state's Comprehensive Outdoor Recreation Plan. Upon completion of an approved project, the state receives fifty percent reimbursement of the costs incurred to acquire or develop a specific park site.

Through FY 1987, the State of Maryland received apportionments totaling $6,143,901. Of that amount, $62,023,901 has been obligated on 367 park acquisition and development projects throughout the State, an obligation of 99 percent.

In FY 1987, Maryland was reimbursed $5,038,895 from the Federal Land and Water Conservation Fund. Local governments expended $609,819 on local park acquisition and development, and Maryland invested an additional $2,002,712.41.

Tawes Garden

The Tawes Garden was transferred to DNR Public Affairs Office when the Capital Programs Administration moved from the Tawes Building.

Program Open Space Goals

The following are Program Open Space goals for the next five years:

- With the assistance and cooperation of the Department of General Services, Program Open space will expedite the annual rate of land acquisition to meet state goals for open space and public recreation, park, and conservation lands.
- Study, recommend, and implement programs to assist in purchasing easements for buffer strips along the shorelines of Chesapeake Bay and its tributaries.
- Purchase or pursue the donation of easements for sensitive forest, agriculture, and wetland areas as identified by the Maryland Heritage Program.
- Improve acreage and financial record keeping system on Program Open Space by utilizing computers and word processing equipment.
- Stress the importance of environmental quality, public open space, conservation lands, and public recreation areas through promotional and educational efforts.
- Assist with the development of coalitions and support groups to implement the recommendations of the President's Commission on Americans Outdoors.

Shore Erosion Control

The Shore Erosion Control Program provides assistance to reduce shoreline erosion on the Chesapeake Bay, its tributaries and the Atlantic coastal region. The program provides technical and financial assistance to public

Non-structural shore erosion control project

and private waterfront property owners.

Technical assistance, provided free of charge, is in the form of on-site visits to assess erosion problems, recommending actions the property owner can take to reduce erosion, providing permit information, designing protective structures and managing construction contracts for state-funded projects.

Interest-free loans for qualified property owners is provided by this program. Under the program's Revolving Loan Fund, a qualified property owner may receive a 25-year loan covering one hundred percent of the first $50,000.00 of construction costs, fifty percent of the next $20,000.00, twenty-five percent of the next $20,000.00 and ten percent of that portion of the construction costs over $90,000.00

In conjunction with design and construction tasks, hydrographic and topographic data is obtained at proposed sites for use during the project design phase. During the construction, an inspector visits the project site frequently to ensure compliance with the plans and specifications.

GOALS

One Year

- Fully utilize all appropriated and loan payback funds
- Reduce elapsed time between start of project design and project completion
- Reduce elapsed time between the request and provision of technical assistance actions
- Fully implement the inspection program for completed projects
- Complete the design and obtain bids for the Ocean City Beach Replenishment project

Five Year

- Improve information activities to ensure all appropriate Maryland citizens and groups are aware of services provided
- Pursue additional funding that will allow construction of up to 4 miles of protective structures per year
- Complete the Ocean City Beach Replenishment and Hurricane Protection Project

SHORE EROSION CONTROL FY 1987 ACCOMPLISHMENTS

Technical Assistance Actions	242
SEC Loan Applications Received	67
Engineering Contracts Awarded	26
Construction Projects Bid	28
Construction Contracts Awarded	18
SEC Loans Processed	20
Number of Projects Completed	16
Number of SEC Loans Involved	20
Amount of SEC Funds Loaned	$860,100
Total Cost of Construction Completed	$907,263
Length of Shoreline Protected by:	
Timber bulkheads	1,437.5 feet
Stone revetments	1,943.5 feet
Stone groins	685.0 feet
Total	4,066.0 feet
	.77 miles

LAND MANAGEMENT & RECREATION SERVICES

The Land Management and Recreation Services program consists of four primary projects: Land Management, Real Property Review and Evaluation, Recreation and Leisure Services and Enterprise Development.

Land Management

The Land Management Project is responsible for the operation of properties that have been identified for enterprise development, major capital improvement, or innovative natural resources management. These properties presently include the Merkle Wildlife Sanctuary, Somers Cove Marina, Fair Hill and the Patuxent River Natural Resources Management Areas, and Black Walnut Point.

At the Fair Hill Natural Resources Management Area, a new 2,000 seat capacity grandstand was completed in time for the running of the November 1, 1986 Breeder's Cup event. This event received national television coverage and attracted national and international participants. The Fair Hill Breeder's Cup steeplechase race was the largest purse in the history of the sport. In addition, two other steeplechase races were held at Fair Hill with an overall attendance of 20,000. To organize and operate significant horse oriented competitions at Fair Hill, the Fair Hill Equestrian Events, a non-profit organization was formed. In 1986, under the direction of this organization, the United States Four-in-Hand Driving Championship, the Fair Hill Horse Trial Championships, and screening trials for pairs driving were held in support of the Olympics Equestrian Team effort. In addition to these horse oriented events, the annual Cecil County Fair was held at the Fair Hill Natural Resources Management Area attracting approximately 50,000 people. Other events held include the Scottish Games and several horse and pony shows.

In November 1987 construction was completed on the Visitors Center at the Merkle Wildlife Sanctuary. Exhibits and programs are being developed to provide information to the public on the sanctuary's history, characteristics of Canada Geese that winter at the property, and the principles of wildlife management. A grand opening is

planned for the Spring of 1988. The annual "Goose Greet" was held in October attracting approximately 50 people. A bridge connecting the Maryland National Capital Patuxent River Park with the Sanctuary was started in 1986 with a completion date estimated to be the summer of 1987. This will be the public access to a "driving" tour through the area.

A new 50 slip pier at the Somers Cove Marina in Crisfield was completed bringing the capacity to 320 boat slips. This pier was funded by, and under the supervision of, DNR's Tidewater Administration's Waterway Improvement Program. The facility ranks as one of the best marinas on the east coast and will be expanded in the coming years to provide additional slips to annual and transient boaters. The Somers Cove Marina was host to two annual events: the annual Crab Derby and the J. Millard Tawes Clam Bake.

In December of 1986, 58 acres of land located on Tilghman Island, known as Black Walnut Point, was purchased by DNR to serve as an environmental education center.

This project is also responsible for managing approximately 2,600 acres of land along the Patuxent River. Construction is underway to convert a former tenant house into the Patuxent River Natural Resources Management Area office.

Recreation and Leisure Services

Recreation and Leisure Services offers technical assistance in planning and conducting recreation activities to agencies of state, local and municipal governments, as well as private corporations, organizations and the general public. This project responds to requests regarding grant sources, program development, lectures and workshops.

A Therapeutic Recreation Advisory Board, consisting of outstanding therapeutic recreation specialists and educators in Maryland was formed. This unit hosted a conference entitled "Public/Private Partnership-Innovative Approaches to Park and Recreation Development."

A Directory of County and Municipal Recreation and Park Boards and Commissions is compiled annually. It identifies administrators and directors of all recreation and park departments at state, county, and municipal levels of government and includes a roster of all recreation and parks Advisory Boards and Commissions.

The Office of Recreation and Leisure Services co-sponsored, with Salisbury State College and Pepsi Cola Bottling Company of Salisbury, the 6th Annual Invitational Wheelchair Athletic Games, held at the college campus.

Enterprise Development

This new project promotes the development of state lands by private concerns to generate benefits and revenue for both public and private sectors. These enterprises ensure the preservation and integrity of our natural resources while enhancing their recreational potential and fiscal productivity.

Real Property Review and Evaluation

This project is responsible for the overall review, coordination and execution of all housing, agricultural, grazing, miscellaneous and long-term leases, as well as all rights of way, easements and change of use agreements for DNR. The section also maintains all Real Property Records and Inventory, does reappraisals and processes Real Property gifts, disposals, razings, and office space requests.

FY 1987 Accomplishments

Processed 50 requests for new Rights of Way, Easements, Change of Use

Filed for, and physically posted, 73 Duck Blind Areas in four counties on the Patuxent River Natural Resources Management Area

Coordinated 200 Department of State Planning, State Clearing House Reviews

Reviewed, coordinated and approved 100 Lease Agreements

Inspected and reappraised 100 Department of Natural Resources structures

CAPITAL DEVELOPMENT

The Capital Development program provides engineering, architectural, and administrative services to Department of Natural Resources agencies for the construction of new facilities. During fiscal year 1987, 23 design and 20 construction projects, totaling more than $3 million, were completed.

The Design and Construction Division's major projects included:

- Patapsco Valley State Park - two comfort stations
- Point Lookout State Park - one comfort station
- Susquehanna State Park - roads, parking lot and shelter at Steppingstone Museum
- New Germany State Park - shower building
- Deep Creek State Park - shower building
- Merkle Wildlife Sanctuary - Visitor's Center

The In-House Construction Division's major projects included:

- Regional Police Facility at Tuckahoe
- Fair Hill N.R.M.A. - grandstand

CHESAPEAKE BAY CRITICAL AREA COMMISSION

BACKGROUND

The Chesapeake Bay Critical Area Commission was created by the Chesapeake Bay Critical Area Law in 1984. The Law recognized that the land immediately adjacent to the Bay had the greatest potential for affecting water quality and fish, plant, and wildlife habitat in the Bay, and defined the Critical Area as a strip of land along the tidal shoreline up to 1,000 feet from the water's edge to the heads of tide or from the landward boundary of any adjacent wetlands.

The purpose of the Law and of the Commission is to provide Maryland with a strategy for protecting the water quality and natural habitat of the Bay with respect to future land use in the specifically designated 1,000-foot area. The 26-member Critical Area Commission is the designated body that drafted this strategy through criteria, to guide development in the Critical Area. These criteria were promulgated on December 1, 1985, by the Commission, passed by the General Assembly, and signed by the Governor on May 13, 1986. Since that time, 16 counties and 44 municipalities have been using the criteria in the development of their respective local Critical Area Programs.

ACCOMPLISHMENTS

According to the Law, by August 6, 1987, the 60 affected local jurisdictions are required to submit their Programs to the Commission.

On January 1, 1987, a report to the Governor and General Assembly was published recommending State Policies and Goals for Chesapeake Bay Shorefront Access and Reforestation and Forest Preservation Within the Critical Area. This was in accord with Section 8-1816 of the Critical Area Law. Two sets of regulations were proposed by the Commission: Section 8-1811 of the Critical Area Law requires the Commission to adopt regulations identifying those classes of applications for project approval of which it wishes to receive notice. Section 8-1814 requires the Commission to promulgate regulations affecting State or local agency development not subject to project approval by the local jurisdiction under an approved program.

FUTURE EFFORTS

By June 11, 1988, it is anticipated that all 60 local Programs will be approved or adopted by the Commission. The Commission will then function in an oversight capacity, reviewing projects of which it receives notice from the local government, to see that the Programs are being carried out according to the manner in which they were approved.

St. Mary's county-wetlands

THE CHESAPEAKE BAY TRUST

Patuxent River non-tidal wetlands

The Chesapeake Bay Trust is a non-profit organization created by the General Assembly in 1985 to promote public awareness and participation in the restoration and protection of the Chesapeake Bay.

To accomplish its mission, the Trust solicits financial contributions from the private sector and distributes those contributions in the form of financial support grants to aid the Bay program.

The principal reason for the creation of the Trust was to allow private citizens and the business community to join as partners with government in the task of restoring the nation's largest estuary.

The Trust is governed by a 15-member Board of Trustees, including five ex officio positions consisting of the President of the Senate, the Speaker of the House, and leaders of the Departments of Natural Resources, Agriculture, and Environment.

The remaining 10 members are appointed by the Governor to staggered four-year terns and represent business, education, conservation, and local government.

MAJOR FY 1987 ACTIVITIES

During FY 1987, the Trust received contributions totalling $460,313 which, when added to the $107,267 received during its first year, brings the total raised since the Trust's inception to $567,580.

Grants approved by the Board of Trustees during FY 1987 totalled $156,736 and ranged from an award of $650 to the Washington County Soil Conservation District for development of an audio-visual presentation on the impact of soil and water conservation on the health of the Bay to the approval of $25,000 for the Save Our Streams organization for its volunteer program to reduce mud pollution from construction sites.

Fourteen applicant organization received project approval, and two groups received aid under the Trust's designated giving program.

Other grants went to stream monitoring efforts, shoreline restoration and protection, media education, studies of the osprey and its effect on fish populations, a Bay education project for Maryland school teachers, and research on the impact of nutrients on Bay grasses.

A total of 26 formal proposals were received during the year as were numerous expressions of interest that are expected to lead to grant applications in the future.

Among this year's support efforts were three separate contributions to fund work crews of the Maryland Conservation Corps which comprises disadvantaged as well as advantaged young people who work on soil erosion, stream improvement, debris removal and other conservation projects.

A highlight of Trust activities was its participation in the celebration of Chesapeake Bay Day, on May 17, 1987, in conjunction with the Annual Bay Bridge walk and the Governor's Bay Bridge Run. Nearly $50,000 was raised to benefit the Trust from the day's activities which included a Bayfest in Sandy Point State Park.

Fundraising continues to be the major priority of the Trust as many more proposals are received than there are funds available.

ENERGY ADMINISTRATION

The Energy Administration's mission is to evaluate and facilitate the production and conservation of energy while minimizing adverse environmental effects. This is accomplished by determining the environmental impact of existing and proposed power plants, promoting public and private participation in energy conservation, maintaining balance fuel allocation within the State during times of shortage in accordance with the needs of the consumer, regulating the environmental impacts of active coal mining, and reclaiming abandoned coal mines. These tasks are the responsibility of three operating programs within the Administration: the Power Plant Research Program, the Bureau of Mines, and the Maryland Energy Office.

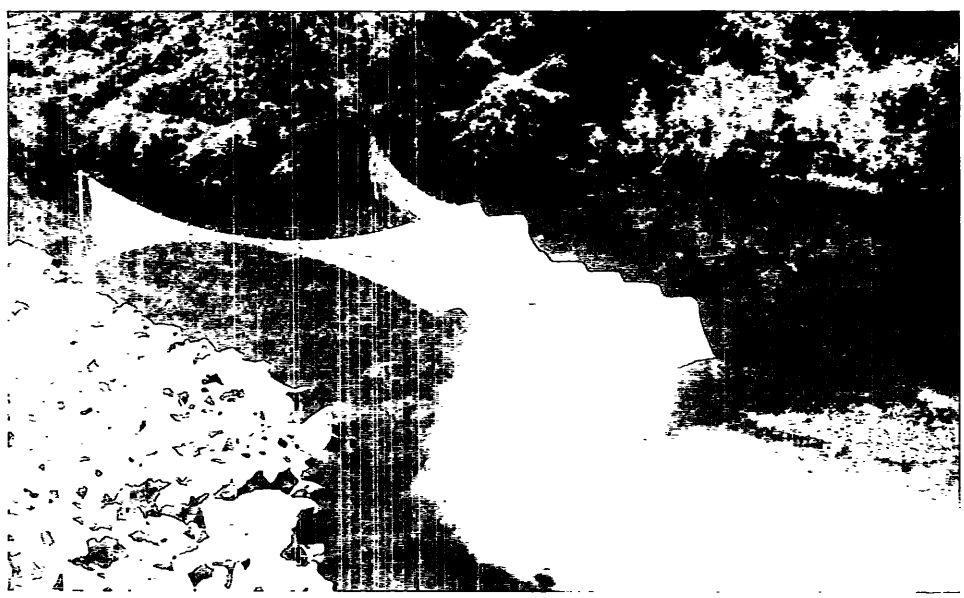
POWER PLANT RESEARCH PROGRAM

The Power Plant Research Program conducts environmental research and provides technical information and recommendations to regulatory agencies concerning actions necessary to minimize the environmental impact of the siting and operation of power plants and associated facilities, without imposing unreasonable costs on the production of electricity. Ongoing activities include the following:

- Prediction of the impact of future power plants at proposed sites.
- Environmental review of all proposed high voltage transmission lines.
- Assessment of the environmental impact of operating power plants.
- Preparation of long-range forecasts of future electric power demands.
- Evaluation of generic issues related to the environmental impact of power plant siting and operation.

MAJOR FY 1987 ACTIVITIES

- Completion of the Preliminary Site Evaluation Report on PEPCO's proposed coal gasification/combined cycle plant to be constructed at its Dickerson site.
- Monitoring of test wells to determine the impact of Calvert Cliffs, Chalk Point, and Morgantown Power Plants on groundwater resources of Southern Maryland.
- Analyses of precipitation and meterological data to determine sources of acid rain falling in Maryland.
- Completion and publication of the first annual report on Acid Deposition in Maryland, a comprehensive review of acid rain and its impacts on the State.
- Completion of a study to determine concentrations of toxic materials on the surface of the waters of the Bay.
- Initiation of a study to evaluate the potential effectiveness of "spot pricing" of electricity in providing economic benefits to Maryland utilities and ratepayers.
- Completion of studies on the effects of low pH and elevated levels of aluminum, such as those found after rain storms in Maryland coastal streams, on larval blueback herring and shad.
- Ongoing assessment of the Chalk Point and Wagner Power Plants to evaluate the need for modifying cooling systems.
- Sampling of environmental media from the Susquehanna River and Chesapeake Bay to determine the radiological impact of the Three Mile Island Nuclear Station, the Peach Bottom Atomic Power Station and the Calvert Cliffs Nuclear Power Plant.
- Ongoing participation in Federal Energy Regulatory Commission (FERC) relicensing of the Conowingo Dam to resolve contentions concerning flow regimes, water quality, anadromous fish restoration, and fish passage facilities.
- Continuation of long-term monitoring programs to evaluate the effects of the operation of the



Stream Liming P.P.R.P. Mattawoman Creek — Charles County

Calvert Cliffs, Morgantown, Chalk Point, R.P. Smith, and Dickerson power plants on nearby biological communities.

- Continuation of studies to evaluate the suitability of the Baltimore Gas & Electric Company's proposed Perryman site.
- Evaluation of several small scale hydroelectric projects, and presentation of recommendations to FERC.
- Preparation of sulfur dioxide emissions projections for Maryland utilities as part of acid deposition assessment activities.
- Initiation of a study to examine the technological feasibility and cost of various sulfur dioxide emissions control methods which might be used at Maryland power plants.
- Completion of a survey in which volunteers sampled stream chemistry characteristics related to sensitivity to acid deposition at over 500 locations in Maryland.
- Initiation of a demonstration project to evaluate the effectiveness of automated liming technology to maintain suitable habitat for early life stages of fishes.
- Analysis of air quality impacts from the proposed expansion of Easton Utility's generating facilities.
- Review of several utility proposals for construction of transmission lines.
- Coordination of the state's response to the Nuclear Regulatory Commission's shut down of the Peach Bottom Atomic Power Station and the utility's proposals for dealing with the problems at the facility.
- Preparation of updated load forecasts for the Potomac Electric Power Company.
- Preliminary assessment of utility coal pile management practices and potential impacts in Maryland.
- Assessment of the potential impacts associated with the Brandon Woods by-product disposal site.
- Initiation of a study to examine potential water quality consequences of leachates from coal-water mixtures.

BUREAU OF MINES

The Bureau of Mines (BOM) administers programs concerned with environmental control of active coal mines and reclamation of abandoned coal mines.

Active Mines

The Bureau evaluates mining plans for proposed deep and surface coal mines. Environmental controls are established and permits are issued before mining operations can begin. Active mines are monitored for compliance with the mining law, regulations, and approved mining permits.

During FY 1987, the Bureau issued a total of 37 permits or permit amendments for 729 acres: 7 original surface mines, 1 loading and processing plant, 2 significant amendments, 14 insignificant amendments and 13 incremental bonding amendments. Pending at the end of the fiscal year were 14 permits: 2 original surface mines, 5 significant amendments, 2 insignificant amendments, 1 original deep mine, 1 deep mine amendment and 3 loading and processing plants.

The State Land Reclamation Committee reviewed 70 permits when conducting their annual mining progress reviews and evaluated 76 areas to determine whether the revegetation standards were met for bond release. The Committee also visited forfeited mine land sites to review the reclamation accomplished under contract by the Bureau. The Committee is also continuing to promote the planting of trees and shrubs on reclaimed mine land.

Abandoned Mines

The Bureau administers two programs to reclaim abandoned coal mines in Maryland. The programs are similar in scope and goals, but utilize separate funding sources, expending both state and Federal funds. In the state funded program, monies collected from a surcharge on coal mined in Maryland are used for reclamation of abandoned mines which cause severe environmental problems. During FY 1987, state funds were utilized for nine abandoned mine projects, totaling $294,467.

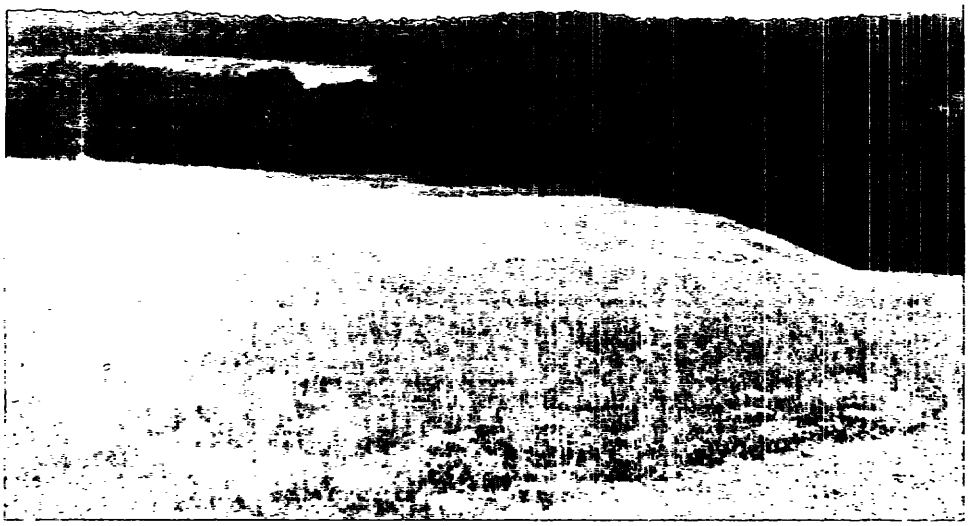
In the Federally funded program, grants to the State are used for abatement of the adverse impacts of past coal mining practices. During FY 1987, the Bureau requested and received

Comparative Activity

	FY 1987	FY 1987
Active Mines*	124	118
Tons of Coal Mined	3,405,000	3,376,000
Acres Permitted	165	729
Acres Reclaimed**	853	497
Inspections	1,932	1,731
Notices of Violations	93	68
Cessation Orders	29	22
Forfeited Mines Reclaimed	1	3
Abandoned Mine Projects	18	14

*Includes permits awaiting bond release
**Based on 85 and 86 calendar years

Amish road site before reclamation



Amish road site after reclamation

Federal funding totaling $1,138,243, for five abandoned mine reclamation projects. Construction was conducted on 5 projects costing $468,569 during FY 1987.

Goals

Within the next year, the BOM expects to revise regulatory program regulations to comply with changes mandated by federal regulation amendments.

In the next 5 years, the regulatory program regulations will be evaluated and modified to enhance environmental protection while reducing some of the provisions burdensome both to the state and mine operators.

MARYLAND ENERGY OFFICE

The Maryland Energy Office conducts energy conservation programs to benefit all sectors of Maryland's population. A wide variety of programs provide alternatives which meet the future energy needs of Maryland. Workshops answer requests for technical information, saving Maryland homeowners energy, time and money. Seminars for industrial energy consumers produce cost savings that improve the health of industry across the state. Waste management and recycling programs save energy and preserve the environment. Local governments and nonprofit organizations use the money they save, with help from the Energy Office, to provide better service to their constituents

The MEO is responsible for administering a number of federally funded programs; the State Energy Conservation Plan, the Energy Extension Service, the Residential Conservation Service, and the Institutional Conservation Program. The office also coordinates the bulk purchase and storage of heating oil for use by state agencies, and is responsible for emergency energy planning within the State.

State Energy Conservation Plan

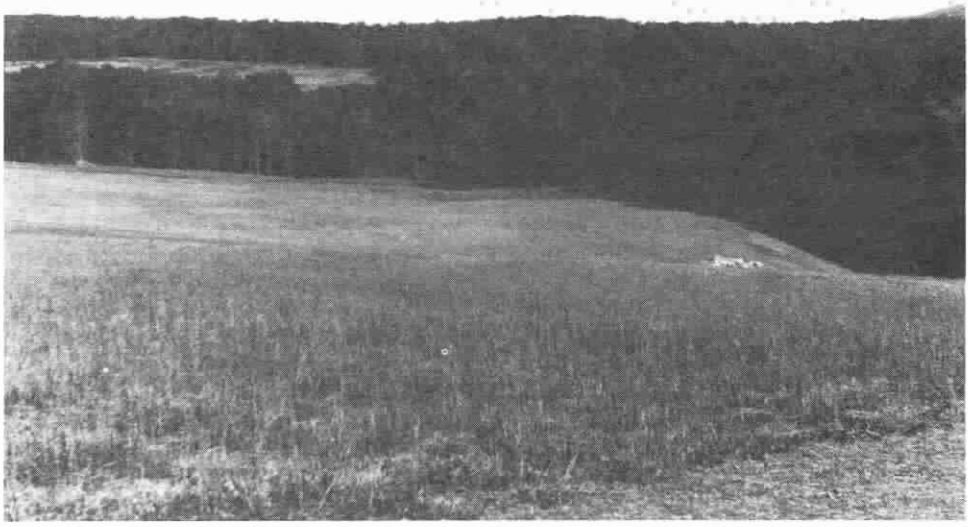
The State Energy Conservation Plan encompasses a wide variety of energy conservation efforts. MEO sponsors workshops for industrial and commercial energy consumers and operates a toll-free energy hotline (1-800-492-5903) to answer the energy questions of Maryland citizens.

The Residential Conservation Service provides energy audits to home owners throughout the State for $15 or less. Utility companies are required by federal law to provide this service. The Maryland Energy Office administers the program under federal regulations. Since the program's inception in 1981, over sixty-three thousand homes across the State have been audited, over seven thousand in the last year.

A Consumer Guide, produced by the MEO, is given to each residence audited and provides information on energy conservation materials and improvements to help the homeowner make decisions on recommendations given in the energy audit. The MEO also maintains a Community Energy Resource Directory for distribution to residential energy consumers.

An important aspect of the Maryland Energy Office's role is emergency energy planning. A statewide advisory panel worked with the MEO managers to develop a State Energy Contingency Plan which describes and analyzes a variety of energy emergency measures from which the Governor may wish to select in the event of a short-

Amish road site before reclamation



Amish road site after reclamation

age. The Office is responsible for implementing a state fuel set aside program, if ordered by the Governor, to provide fuel for vital public services. In past oil shortages, the MEO administered the odd even gasoline plan and now maintains a draft plan which the Governor could implement in an emergency.

Three conferences, for local government officials, were held by the Maryland Energy Office. In October, a workshop, held in Princess Anne, covered various technical topics such as energy audits, street lighting, and sewage treatment. The second conference, held in Frederick in February, included sessions on financing energy conservation, converting waste to energy, designing for low energy use and fuel purchasing. The third workshop, in April, was held in Washington, D.C., following a nationwide energy conference.

Through a program of cooperative buying, the Maryland Energy Office helped the Department of General Services save over a million dollars on heating oil in 1986 by making bulk purchases of oil for fourteen state institutions.

In a program similar to the heating oil program, the MEO assisted the Mass Transit Administration (MTA) in buying diesel fuel for buses, saving the MTA three quarters of a million dollars.

The MEO also assisted the Maryland Energy Assistance Program (MEAP) of the Department of Human Resources (DHR) in a demonstration project last year in cooperation with Baltimore City oil vendors. Low income citizens receiving MEAP grants get a ten percent discount from suppliers on oil bought with MEAP funds. This pilot program resulted in savings of $400,000 for low income citizens.

The Maryland Energy Office began another pilot program last year to provide energy conservation assistance to industrial energy consumers. The program provided free engineering expertise to industries without full time engineering help. Last year nine companies received advice on low cost measures that will reduce their energy consumption. The MEO also selected a contractor to conduct energy audits for small businesses. One hundred audits were conducted under this program.

The Maryland Energy Office also worked with the University of Maryland Cooperative Extension Service to reach agricultural energy users and promote energy conservation in the farming community.

The Waste Management programs of the Maryland Energy Office are designed to conserve energy and resources in a variety of areas. A major component is auto and truck part recycling.

The MEO works directly with state agencies, local government, and other public and private institutions to encourage the use of recycled paper.

The MEO has expanded its efforts in the promotion of Alternative Technology in the state.

The MEO held a series of four workshops on Solar Energy which attracted two hundred and fifty participants. A survey two months later, indicated that thirty-two percent of attendants had already made use of the knowledge gained at the workshop.

Institutional Conservation Program

The Institutional Conservation Program makes federal funds available for energy conservation in schools and hospitals throughout the state, by providing financial assistance, on a matching basis, for institutions to conduct engineering analyses of their buildings and to implement energy conservation measures recommended in the engineer's report.

Grants were awarded to four schools and two hospitals in the state to conduct engineering analyses in twenty-six buildings. Forty-nine schools and thirteen hospitals in Maryland received grants to complete one hundred forty-six energy conservation projects in one hundred nineteen buildings. Typical projects include: adding insulation, converting domestic hot water systems, relamping, heating control modifications and adding separate chillers.

Energy Extension Service

The Energy Extension Service continued its innovative efforts to conserve energy through outreach and education. The non-profit energy audit program has helped 37 non-profit organizations reduce their energy bills by an average of 24%.

The Small Town Energy Education Program (STEEP) assists small towns in identifying municipal energy problems and provides technical energy assistants to resolve these problems.

Every year the regional coordinators speak to hundreds of Marylanders through the telephone hot line and seminars about ways to solve their energy problems.

HAZARDOUS WASTE FACILITIES SITING BOARD

The Hazardous Waste Facilities Siting Board is an independent eight-member commission created to give the State a means of locating new facilities for the recycling, treatment and disposal of hazardous waste. In its decisions the Board must consider site suitability and statewide needs, and must consult with affected governments and the public.

Site suitability, by the Board's legislative mandate, includes a wide range of social and environmental considerations. Statewide needs and problems address waste generation, source-reduction, recycling and appropriate technologies. The findings govern what types of facilities the Board will accept for consideration and constitute the State facilities plan. In Maryland, as in most states, commercially-available facilities have not developed as expected.

A major function of the Board is to promote awareness of issues by citizens, government and industry.

The Board has a corresponding but separate responsibility for low-level radioactive waste.

The Process: Application to the Board is an Option in Developing a Facility.

The Board is one of three components in new facility development. The Board itself may override local-government zoning or restrictions. The Maryland Department of the Environment and the US EPA have permitting and regulatory authority which are not changed by Board action. Either private firms or the Maryland Environmental Service may propose facilities. The location may be approved by the Board. The Board does not seek out sites; it acts on applications submitted to it.

A new facility does not automatically require Board approval. A developer may negotiate directly with county or municipal government. As an alternative to local approval, the Board resembles a special purpose zoning appeals board whose authority discourages arbitrary rejection of a worthy project. For the developer who does apply, however, the Board's requirements are rigorous. The Board may approve a facility only after presentation of the proposal to the public, opportunity to comment upon and contest the proposal, and public hearing.

Site Suitability is Broadly Stated in Law

The Board must consider the following factors as a part of site suitability:

- Health and safety of the public, with particular mention of drinking water quality and site safety following active operation
- Quality of the natural environment
- Social values
- Seasonable and beneficial use of land and natural resources
- Local land use preferences as expressed in planning and zoning provisions
- Equitable geographic distribution of new facilities, considering where waste is generated and where facilities are located

The breadth of the Board's mandate indicates that it was established to promote siting decisions in the overall public interest, not to provide a check on regulatory agencies. The Board's requirements for recognizing and protecting the social values of the host community are among the most thorough in the US and Canada.

Needs of the State

The General Assembly required the Board to consider statewide needs and problems, mentioning in its 1980 Act such timely alternatives as source reduction, reuse, resource recovery, and incineration. The Board must also consider the effect on industry, economic development, and employment and the cost of treatment and disposal.

Facilities needs are periodically studies, reported and formalized in regulations. Evaluations consider facilities in neighboring states. Besides tracking generation from regulatory reports, assessments have involved waste reduction experiments, direct contact with generators, advocacy of recycling measures, and studies of various technologies. The Board's work in planning and waste reduction has drawn national attention, and the Executive Director chairs a board to coordinate a national data base on waste reduction and recycling.

Members and Program

The Board is appointed by the Governor to staggered four-year terms. Biographies and program information are available from the Board Office, 60 West Street, Suite 200A, Annapolis, MD 21401 (301)/974-3432).

MARYLAND ENVIRONMENTAL SERVICE

The Maryland Environmental Service is unique in its status as both a state agency of the Department of Natural Resources, and as a non-profit public

Since its creation in 1970, MES has been providing services in the areas of water supply, wastewater treatment, energy and resource recovery from wastes, sewage sludge management, compost marketing, and hazardous waste management. These services are offered to state government, municipalities, county governments, and the private sector.

The Service was created in response to a need for the State of Maryland to offer planning, operating, management, and engineering services to the State's smaller communities and industries having difficulties developing and operating water supply and wastewater treatment facilities.

In fiscal year 1987, the Service was an $18,700,000 enterprise. The Service is essentially self-supporting, with approximately 75 percent of its income currently derived from fees paid by corporate clients.

State general funds pay the cost of operating state owned water supply and wastewater treatment facilities for parks, hospitals, and correctional institutions, and provide limited planning and technical services for local governments and state agencies.

The Service has been granted substantial autonomy from the Department of Natural Resources in its internal management and external operations. The Service sells revenue bonds for Service related projects, enters into contracts and leases, and charges fees for its varied services.

The corporate affairs of the Service are managed by a seven-member Board of Directors appointed by the Secretary of Natural Resources with the approval of the Governor, and consent of the Senate.

ADMINISTRATION SERVICES

This division is responsible for project development, administration, data processing, and for setting the overall policies and goals of the Maryland Environmental Service. Legal services, programming and computing, legislative liaison, contract administration, and state and corporate personnel and benefits administration are specific functions of this program. The Maryland Environmental Service's corporate Board of Directors is also part of this division.

FINANCE

The Finance division is responsible for financial accounting, and control and procurement for all operations.

During fiscal year 1987, the Finance division continued to implement basic financial systems, held responsibility for preparing budgets, formulating financial management reports, determining costs and overhead recovery rates to be charged to customers, participating in contract negotiations with potential customers, coordinating grant administration, and preparing the payroll.

ENGINEERING SERVICES

The Engineering Services division provides engineering capabilities within Maryland Environmental Service for planning, design, and construction. In addition, the division operates and maintains special projects for dredged materials containment, hazardous waste disposal, leaf composting, and restoration of sludge disposal operations.

In fiscal year 1987, Engineering Services continued to operate and maintain the Hart Miller Island Dredged Material Containment Facility, the designated disposal site for the 50 million cubic yards of dredged material expected from the upcoming dredging of the Baltimore Harbor shipping channels. At the end of fiscal year 1987, this facility had received over 20 million cubic yards of dredged material.

The Engineering Services division operated the Hawkins Point Hazardous Waste Landfill intermittently for the disposal of chromium waste from Allied Corporation.

The Maryland Environmental Service, via its contractor, continued to operate the Baltimore County Resource Recovery Facility (BCRRF) in Cockeysville, Maryland. During fiscal year 1987, the BCRRF processed an average of 573 tons of municipal solid waste per day. Of this, 17 tons/per day of ferrous metals were recovered for sale. Also, an average of 82 tons per day of refuse derived fuel (RDF) was produced and sold to Baltimore Gas & Electric.

In Montgomery County, the Service continued to operate the leaf composting facility near Dickerson. Nearly 70,000 cubic yards of leaves were received at the Dickerson Facility in fiscal year 1987. All of the compost product derived from these leaves was sold by the Maryland Environmental Service's marketing staff.

A remedial investigation and feasibility study was begun at the former Joppa Sand & Gravel Co. property, a defined hazardous waste site in Harford County near Joppatowne.

The Service continued its contractual agreements with the Washington Suburban Sanitary Commission to monitor sludge disposal operations. The Service also monitors sludge disposal and sludge composting operations for the District of Columbia.

The Service is involved in an aggressive Capital Improvement Program to upgrade all state owned wastewater treatment and drinking water supply facilities. Construction of the thirteen million dollar Dorsey Run Advanced Wastewater Treatment Facility is near completion and scheduled to be in operation in fall 1987.

Capital Improvement Projects include 16 institutions such as the Bowie State College wastewater facility and the Crownsville Hospital Center water supply. The Service administers feder-

ally funded (EPA) projects involving innovative and alternative wastewater systems.

OPERATIONS AND MAINTENANCE

The Operations and Maintenance division employs licensed personnel to operate and maintain 101 wastewater and water treatment facilities across the State. Fifty-eight of these plants are state owned, 23 are owned by counties or towns, and 20 are privately owned.

In addition, the division operates a small scale sewage sludge composting facility on Kent Island, inspects operations at the methane-recovery facility at the Brown Station Road Landfill in Prince George's County, conducts twice-yearly inspections of water and wastewater facilities at 23 State parks, and operates a solid waste incinerator on Smith Island and is responsible for the Service's safety program.

Wastewater and Water Treatment Facilities

The division is responsible for operating, maintaining, and manning all state owned wastewater and water treatment facilities. In addition, the division contracts to operate, maintain, and manage water and wastewater treatment plants belonging to counties, towns, and private industries and businesses.

Laboratory Services and Water Quality Control

This section experienced tremendous growth in fiscal year 1987, almost doubling its staff. In January 1987, the Crownsville Regional Laboratory opened and started analysis of samples from Maryland Environmental Service operated facilities.

More than 12,000 samples were processed during the year monitoring wastewater treatment plants, water treatment plants, groundwater monitoring sites, and hazardous waste facilities.

The section's sewage sludge management program met the new regulations governing sludge disposal at all Service operated facilities. Permits were obtained and controlled for all wastewater facilities. In fiscal year 1987, over 30 new sludge permits were received, including one sludge composting permit.

Maintenance Section

The Maintenance Section provides electrical and mechanical repairs for all facilities. It administers the statewide preventive maintenance program and drafts and administers statewide contracts for supplies and services.

Operator Training

During fiscal year 1987, operators and supervisors received over 1,700 hours of training on a wide variety of subjects, including preventive maintenance, safety, laboratory procedures, process control, and use of specialized equipment.

Apprenticeship Program

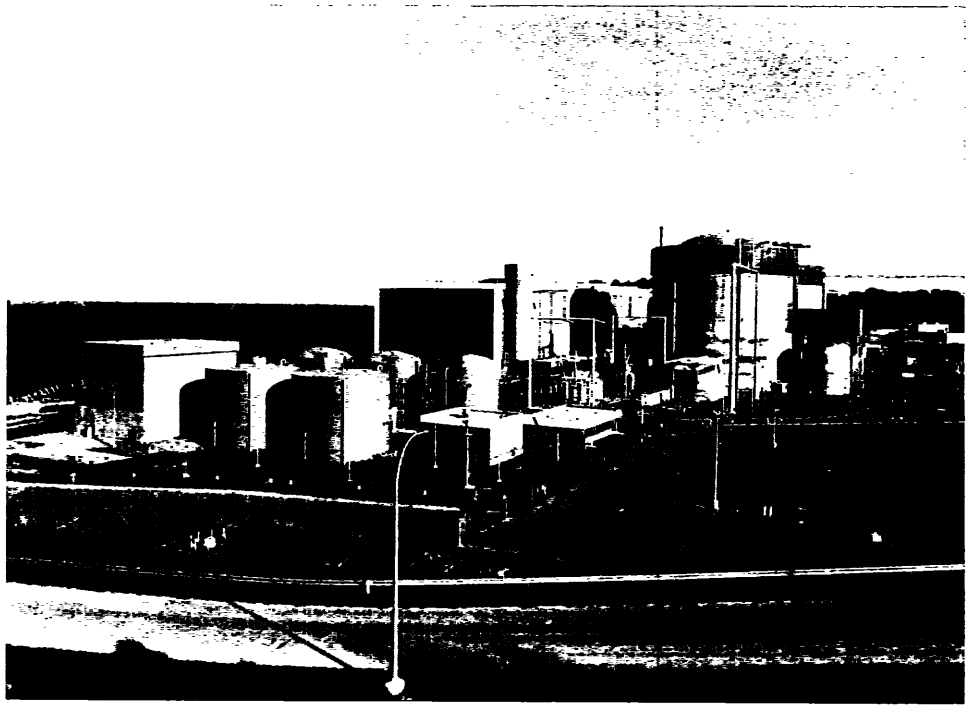
In cooperation with the Department of Employment's Apprenticeship and Training Council, the Operations and Maintenance Division hired its first apprentice plant operators. The two-year apprentice program is designed to enable apprentices to become certified operators through a combination of on-site instruction, classroom work, and on-the-job training.

Special Projects

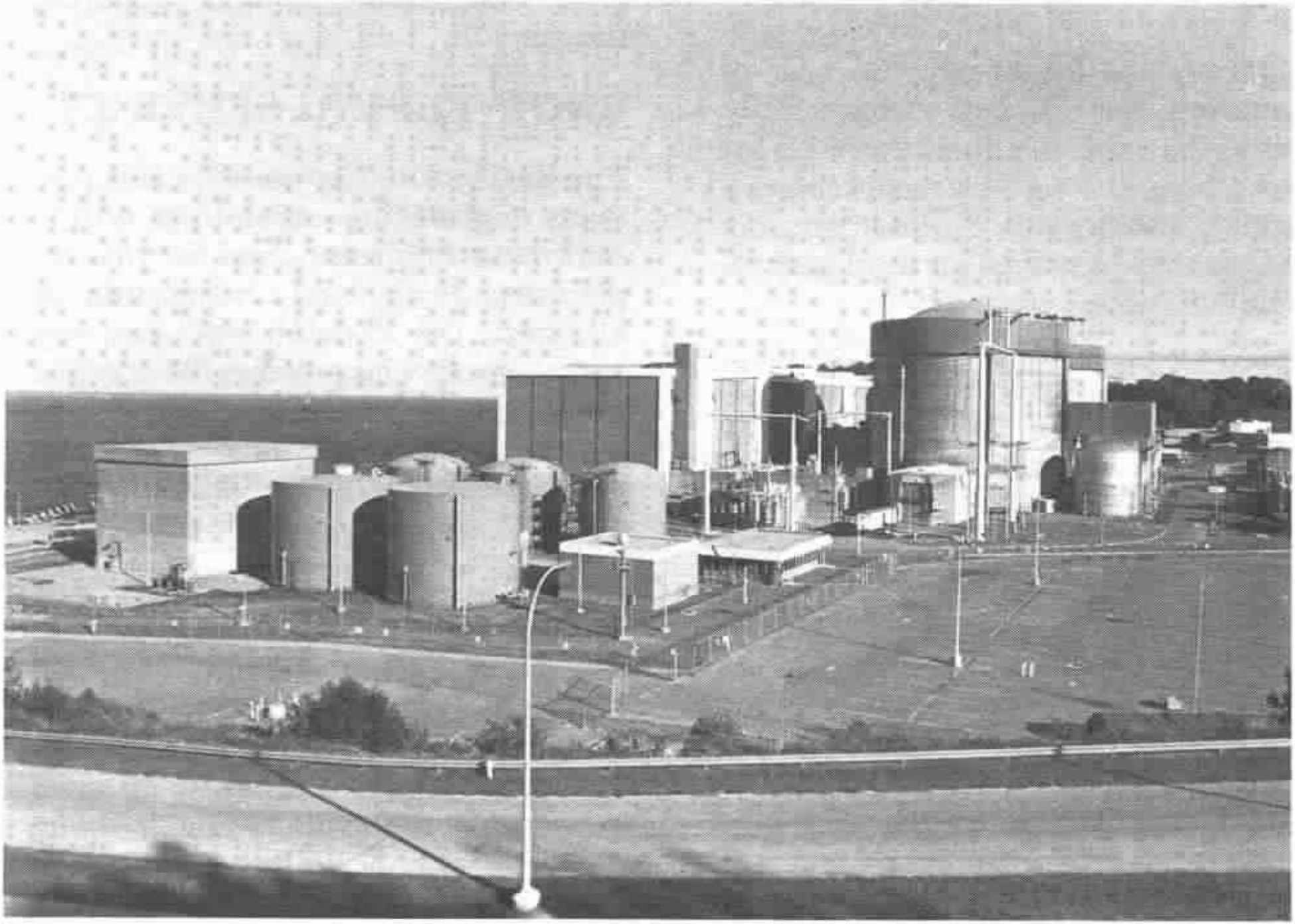
During FY 1987, construction was 95% complete on the new Dorsey Run Advanced Wastewater Treatment Facility, a $14,000,000 project, scheduled to start up in September 1987. This plant will include nitrification/denitrification, phosphorous removal and state-of-the-art sludge incinerator.

Under contract with Queen Anne's County, the division began operating its first sewage sludge composting facility in Stevensville. The compost will be used as a fertilizer and soil conditioner at the Adkins Arboretum in Tuckahoe State Park.

The division works with the Engineering Services division in an aggressive program of major capital improvements to state owned water and



Sewage Treatment Plant at Calvert Cliffs Nuclear Power Plant



wastewater treatment facilities. These improvements will greatly increase the efficiency and reliability of many of the aging plants operated by the Service.

TECHNICAL SERVICES

The Technical Services division conducts planning and feasibility studies for waste management projects, provides assistance for solid waste recycling programs and technical assistance consultation with local governments on waste management problems, and carries out projects and studies assigned to the Maryland Environmental Service by the State. This division also manages project siting studies and coordinates activities under the Maryland Used Oil recycling program.

During fiscal year 1987, the division continued operating a center providing information on where to deposit used motor oil, metals, paper, glass, and other materials for recycling. The center can be reached toll-free in Maryland, 1-800-492-9188. The center's activity increased this year because of a sharp decline in the number of service stations and garages willing to accept do-it-yourself used oil.

The Maryland Recycling Directory was distributed to encourage more people to recycle, reducing the quantity of solid waste needing disposal.

MARKETING

The promotion of the Maryland Environmental Service, the generation of new business and continued business, and the sales of products developed by the Agency and its clients are the responsibilities of the Marketing Division.

Fiscal year 1987 was a very successful year for the sale of MES' organic products, CompPRO$_R$ and Maryland Environmental Service Leaf Compost.

ComPRO$_R$ is an organic product composted by the Washington Suburban Sanitary Commission (WSSC) at the Montgomery County Composting Facility. It is a soil conditioner and a fertilizer, which is purchased by construction contractors, institutions, golf courses, landscapers, nurseries and State agencies.

The popularity of ComPRO$_R$ continues to grow. The demand for product was three times the volume produced in fiscal year 1987.

Maryland Environmental Service Leaf Compost is an organic product developed and sold by the Maryland Environmental Service for Montgomery County at the Dickerson Leaf Composting Facility.

Leaf Compost creates a rich soil conditioner which is utilized by home owners and landscapers. This process relieves valuable landfill space that had historically been used by discarding leaves with solid waste.

In fiscal year 1987, 15,800 cubic yards of Leaf Compost were sold and its demand is expected to far exceed supply in fiscal year 1988.

MARYLAND ENVIRONMENTAL TRUST

The Maryland Environmental Trust was established by the General Assembly in 1967 to conserve, improve and perpetuate the state's natural, scenic and cultural qualities. Activities of the "Keep Maryland Beautiful" program were also transferred to the Trust in 1967. Programs and policies of the Trust are defined and supervised by a volunteer Board of Trustees consisting of 12 citizens and three ex-officio members (Governor, President of the Senate, Speaker of the House).

For fifteen years, the Trust's major program has been the acquisition of easement donations (development rights) on properties of recognized public conservation value. Private properties protected by conservation easements include farmland, woodland, waterfront, marshes, streams and ponds, scenic views, wildlife and plant habitats, historic properties, archeological sites, and properties of educational or recreational value. The Trust has accepted conservation easements on 132 properties statewide encompassing approximately 25,000 acres. Easements accepted by the Trust are reviewed and approved by the Board of Public Works prior to recordation.

The Trust received 87 easement inquiries in FY 1987. A total of twenty easements covering 4,373 acres were documented, accepted and recorded in FY 1987. Four of the easement properties are adjacent to prior easement sites. Twelve have frontage on Bay tributaries, five have historic homes, and sixteen have productive agricultural land. Approximately 80% of the FY 1987 easement acreage is attributable to the Trust's Chesapeake Bay Initiative.

Easement highlights for the year included a 1,172 acre property preserving three productive farms in Kent County, a 333 acre Queen Anne's County waterfront farm containing significant archeological resources associated with the prehistoric settlement of "Indiantown", and a 211 acre farm, located on Cecil County's scenic Octoraro Creek, featuring an historic house of the Federal period and habitat for five rare plant and animal species.

Governor Schaefer, along with the "Keep Maryland Beautiful" Committee of the Trust, presented the Margaret Rosch Jones Award to the Irvine Natural Science Center during a ceremony proclaiming April 20-26 as "Keep Maryland Beautiful Week."

Along with the presentation of the Margaret Rosch Jones Award, the Governor and the KMB Committee awarded two environmental education mini-grants.

This year's mini-grant recipients were the Easton High School Ecology Club and the Northwestern Frederick County Civic Association.

The Trust is supported by eleven local volunteer committees and affiliates in Allegany, Baltimore, Charles, Dorchester, Howard, Kent, Montgomery, Prince George's, St. Mary's, Somerset, and Worcester counties.

Goals

- Accelerate easement outreach and solicitation efforts, particularly in the Chesapeake Bay area.
- Revise and update brochures and MET land preservation booklets to reflect new state laws and incentives, to address changes in federal tax laws and regulations, and to compare MET's easement program with other state easement programs for the benefit of property owners.
- Develop continuous easement monitoring program using.
- Work with the National Coalition for Scenic Beauty to develop a proposal for a scenic roads program.
- Develop a program for landowners who would be interested in managing their properties for diversity of natural vegetation.
- Work with the Department of Education to develop an environmental education resource catalog.
- Revise MET easement policy document.

MET easement site in Harford County - Little Gunpowder Falls

MARYLAND FOREST PARK AND WILDLIFE SERVICE

The Maryland Forest, Park and Wildlife Service provides forest management and recreational needs for the people of Maryland, and is responsible for the maintenance, management and protection of birds, land based reptiles, amphibians and mammals, including game and non-game species and threatened and endangered wildlife. Its operational elements are: General Direction, Cooperative Forestry, Forest and Park Management, Wildlife Management, and Natural Heritage.

GENERAL DIRECTION

General Direction provides direction, administrative support and services including: budget, personnel, purchasing, training, motor vehicle fleet management, radio communications, safety, equal opportunity, public information and planning and program development functions to serve the unit's program areas.

On Arbor Day, April 1, 1987, each third grade student in Maryland's public schools received a pine seedling as part of a continuing program to increase public awareness of the importance of Maryland's forestry resources. Governor William Donald Schaefer, Comptroller Louis L. Goldstein, and Annapolis Mayor Dennis Callahan planted a white oak, offspring of the Wye Oak, Maryland's State Tree, in the Tawes Garden on Arbor Day. School children from several schools attended the ceremony.

The Wildlife Conservation Stamp and Print Program completed a successful second year. Sales of stamps and prints featuring a pair of ruby-throated hummingbirds by artist John Taylor, totaled approximately $14,000. The third stamp and print of the series depicts a pair of bluebirds, again by Taylor.

In November, the Maryland Forest, Park and Wildlife Service hosted the Southern Association of Fish and Wildlife Agencies' annual conference in Baltimore.

PLANNING AND PROGRAM DEVELOPMENT

This group is responsible for Forest Resources and Wildlife Comprehensive Planning, Environmental Review, new program development and legislation pertaining to forests, parks and wildlife. The Maryland Fish and Wildlife Information Network (MFAWN) was improved and expanded during FY 1987.

Environmental review of private land projects continued habitat creation and mitigation, benefiting more than 100 acres.

Twenty-six thousand issues of "Maryland Wildlife Management — a Comprehensive Plan for the 80's" were distributed.

COOPERATIVE FORESTRY PROGRAM

The Cooperative Forestry Program provides technical assistance to private landowners, municipalities and other governmental units for the management of their forests and individual trees. The program's goal is to improve and maintain the economic, aesthetic, recreational, environmental and social contribution of trees, forests and related resources for the benefit of Maryland's citizens. The program has five major elements: Forest Resource Management, Forest Protection, Chesapeake Bay Forestry Initiative, Urban and Community Forestry and Forest Products Utilization and Marketing.

FOREST RESOURCE MANAGEMENT

Resource management assistance is available to the 95,800 forest landowners in the state. Assistance provided includes management planning, technical advice, and procedures for plan implementation, afforestation of open lands, and restoration of lands harvested for forest products. In 1986 over 32,000 acres were placed under management and 4,600 acres were planted.

At the state nursery in Anne Arundel County, for the 1986 planting season, over 5,000,000 seedlings were sold for reforestation and afforestation within the state. The nursery produces sapling size trees for planting within public road rights of way and on other government owned properties. Over 1,000 saplings were sold in 1986 for roadside and other plantings. A special project of nursery personnel is the production and sale of Wye Oak seedlings. The Wye Oak, a native white oak, is the State Tree, and is currently the National Champion White Oak. Since 1976, over 10,000 Wye Oak seedlings have been sold to state residents and individuals throughout the country. This past year 3,000 Wye Oak seedlings were grown and sold.

FOREST RESOURCE PROTECTION

The Resource Protection goal is to reduce forest land loss from wildfire, insects and disease. In 1986, the MFPWS responded to 1,153 wildfires that burned more than 4,906 acres, a reduction of 10,710 in acres burned, from the previous year. The reduction was a result of more favorable weather and continuing efforts in fire prevention, training and suppression.

A fire suppression training course was developed, in cooperation with the Maryland Fire and Rescue Institute, for presentation to local fire departments. A total of $33,250 of Rural Community Fire protection funds were allocated to rural fire companies to purchase fire fighting equipment.

Protection from insects and disease was provided by advising individuals, homeowners and forest landowners on techniques of control. Assistance was also provided to the Department of Agriculture in surveying and controlling major insect infestations. The three primary insects infesting the state's forest are pine sawfly, southern pine beetle and gypsy moth. In 1986, 91,000 acres were aerially sprayed to prevent heavy defoliation by the gypsy moth.

CHESAPEAKE BAY INITIATIVE

The forestry initiative for the Bay restoration program received a major boost in the 1986 budget. Twelve (12) Bay Watershed Forester positions were added to the initiative to strengthen the effort to protect, preserve, and manage forest land within the critical area. The Bay Watershed Foresters are to assist county and municipalities in the preparation of critical area protection plans, conduct urban and community forestry programs, and provide forest resource management assistance to private landowners. In 1986 the major emphasis, to continue through 1987, was to provide technical assistance to counties in the preparation of forest protection plans.

Included in the 1986 forestry initiative budget was $100,000 for critical area counties for urban and community forestry projects. Three counties and the City of Baltimore received grants for projects such as urban buffer establishment and the use of vegetation to mitigate stormwater flow.

URBAN AND COMMUNITY FORESTRY

One objective of the Urban and Community Forestry Program is to enhance the quality of life in urban and suburban regions through the preservation, protection and management of trees and forests. Services available to individuals, communities and county governments include street tree inventories and management plans, technical assistance in the development process and assistance in tree planting.

This program administers the roadside tree protection law which requires a permit for the removal or treatment of any tree growing within a public right-of-way.

Other activities include: administration of the State tree expert licensing law, conducting of the State tree expert licensing law, conducting the Tree City U.S.A. program of the National Arbor Day Foundation, and providing a variety of information and educational programs to private and public groups.

FOREST RESOURCE UTILIZATION

Forest Resource Utilization emphasizes economic development through promoting the use of Maryland grown wood. In Southern Maryland, through the Rural Conservation and Development program, a demonstration project promoting the use of tulip poplar as a construction material was developed. A demonstration home will be constructed using the truss-frame process with tulip poplar wood. The project will provide another market for the local industry and further assists landowners with managing their forests.

The promotion of wood as a construction material for bridges and secondary roads is another project.

Wood as an energy source continues to be a high priority of resource utilization.

FOREST AND PARK MANAGEMENT PROGRAM

The Forest and Park Management Program administers and operates more than 280,000 acres which makes up Maryland's state forests, parks, scenic preservations, historic monuments, natural environment areas and natural resource management areas. Operating and managing these lands which attract six million visitors a year, requires expertise in disciplines including forestry, horticulture, maintenance, construction, history, interpretation, recreation, law enforcement, search and rescue and emergency medical services. Polular visitor activities including camping, picnicking, swimming, hiking, boating, fishing, hunting, skiing, snowmobiling, off road vehicling and horseback riding.

Personnel also look after more than 1,150 buildings and 400 miles of roads and parking lots, maintain miles of sewer, water and electric lines, swimming pools, beaches, monuments, boating facilities and vacation cabins.

Throughout the year FP&WS hosts numerous events including: cross-country ski races, Easter services, syrup demonstrations, canoe trips, backpack traditional camping and nature programs. In FY 1987 a traveling puppet show reached an audience of 10,000 at parks, libraries, hospitals and other community locations.

The nationally recognized Outward Bound Program was provided with environmental education programs and logistical support. Also in FY 1987, and in conjunction with Baltimore City, over 400 inner-city children in week

Staff of Maryland Forest, Park and Wildlife Service met with Howard Nickelson, chairman of the 504 Committee, to discuss accessibility in Maryland state forests and parks. Left to right are Nickelson, Ross Kimmel, Jay Geesaman, Dan Benton, Daryl DeCesare, Bill Miller, Allan Stafford, Chuck Harris, Tom Haines and Roger Riley.

Visitors enjoy Swallow Falls State Park

long camps on park sites, learned about and played in the out-of-doors. Activities included swimming, camping, hiking, horseback riding, archery, canoeing and nature study.

Along with the help of private industry, statewide historic structures are maintained. Through an innovative program of curatorship, resident curators maintain and/or restore historic buildings for present and future generations.

Visitors to state forests, even during the driest period in history have continued in increasing numbers. Among the visitors was the unwelcomed arrival of the gypsy moth and the southern pine bark beetle. The forest, a multi-use resource, produced opportunity for auto touring, nature study, photography, riding, cycling, packing, climbing, skiing, fishing, hunting, white water racing and snow-mobiling while providing wood fiber and jobs for industry and income to the State.

WILDLIFE MANAGEMENT PROGRAM

The primary goal of the wildlife program is to conserve, protect, or improve the natural environment upon which all wild creatures depend for food, shelter and reproduction. This approach ensures that wildlife will be around for future generations to enjoy.

The wildlife program manages wildlife for the benefit of both consumptive (hunters) and non-consumptive (bird-watchers, nature enthusiasts, etc.) users. More than 3 million dollars were generated to support the program from the sale of 171,209 hunting

FOREST AND PARK USE ATTENDANCE

Green Ridge State Forest	233,876
Potomac/Garrett State Forests	76,691
Savage River State Forest	82,727
Assateague State Park	776,503
Big Run State Park	14,243
Calvert Cliffs State Park	23,100
Cedarville State Forest	55,010
Cunningham Falls State Park	538,961
Dans Mountain State Park	30,800
Deep Creek Lake State Park	90,931
Elk Neck State Park	259,073
Fort Frederick State Park	75,412
Gambrill State Park	323,548
Gathland State Park	48,493
Greenbrier State Park	223,087
Gunpowder Falls State Park	763,315
Herrington Manor State Park	95,984
Janes Island State Park	142,031
Jonas Green State Park	17,100
Martinak State Park	44,226
Matapeake State Park	45,063
New Germany State Park	28,949
Patapsco Valley State Park	507,227
Patuxent River State Park	9,100
Pocomoke River State Park	240,102
Point Lookout State Park	302,823
Rocks State Park	58,470
Rocky Gap State Park	319,070
St. Mary's River State Park	12,161
Sandy Point State Park	657,141
Seneca Creek State Park	87,590
Severn Run NEA	8,213
Smallwood State Park	128,525
Soldiers Delight State Park	53,179
South Mountain State Park	71,759
Susquehanna State Park	114,915
Swallow Falls State Park	127,953
Tuckahoe State Park	75,821
Washington Monument State Park	97,203
Wye Oak State Park	29,889
TOTAL	6,890,264

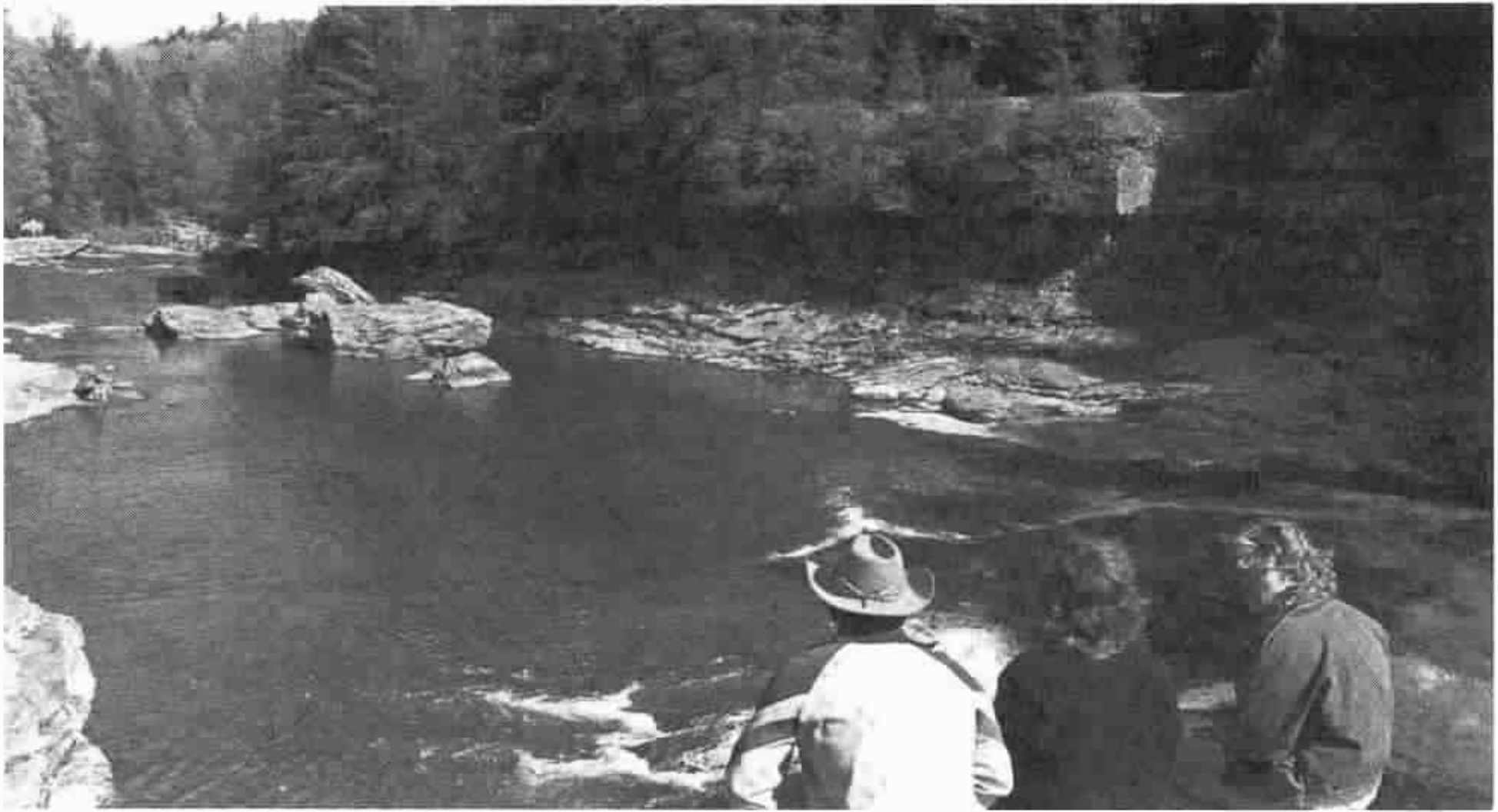
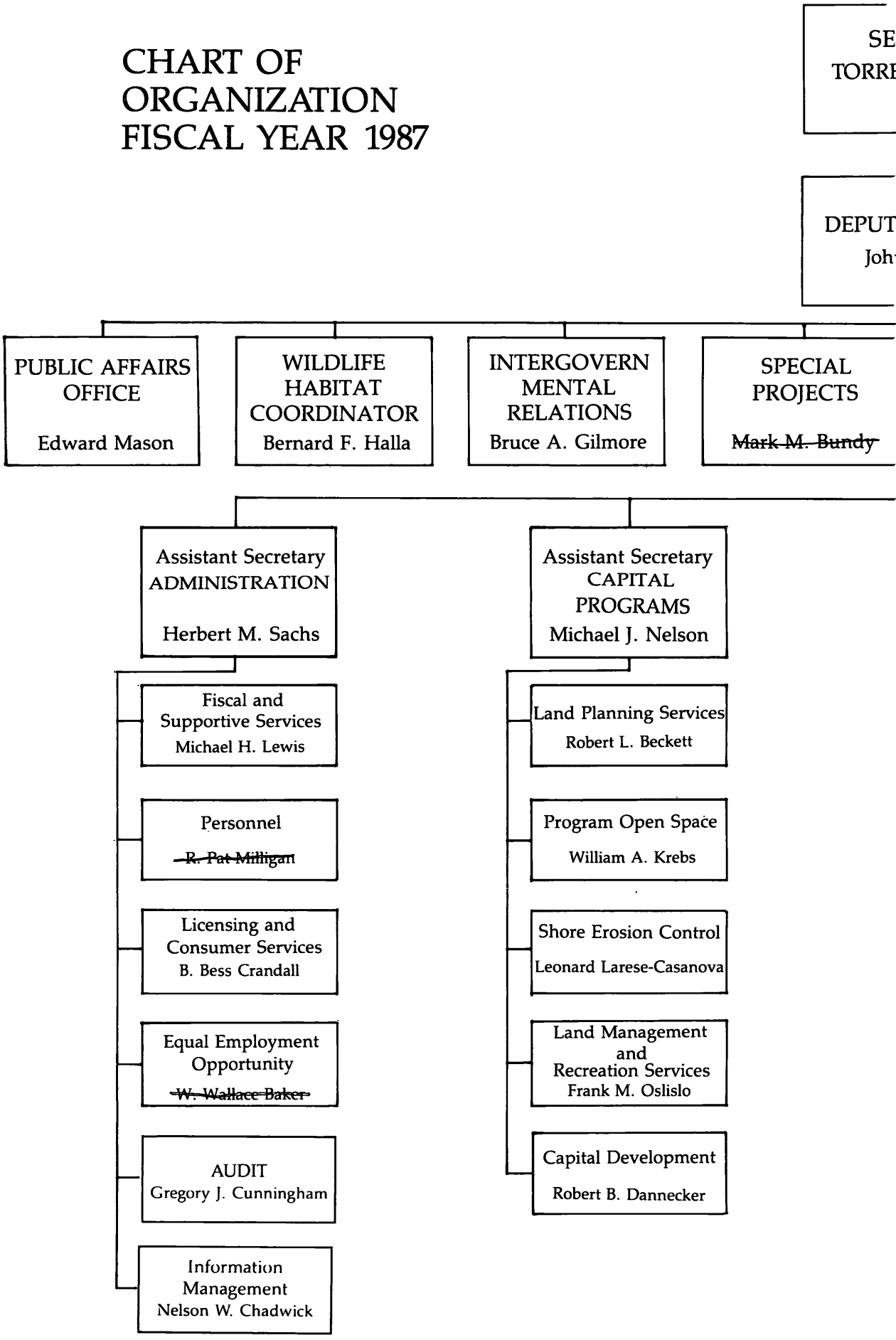
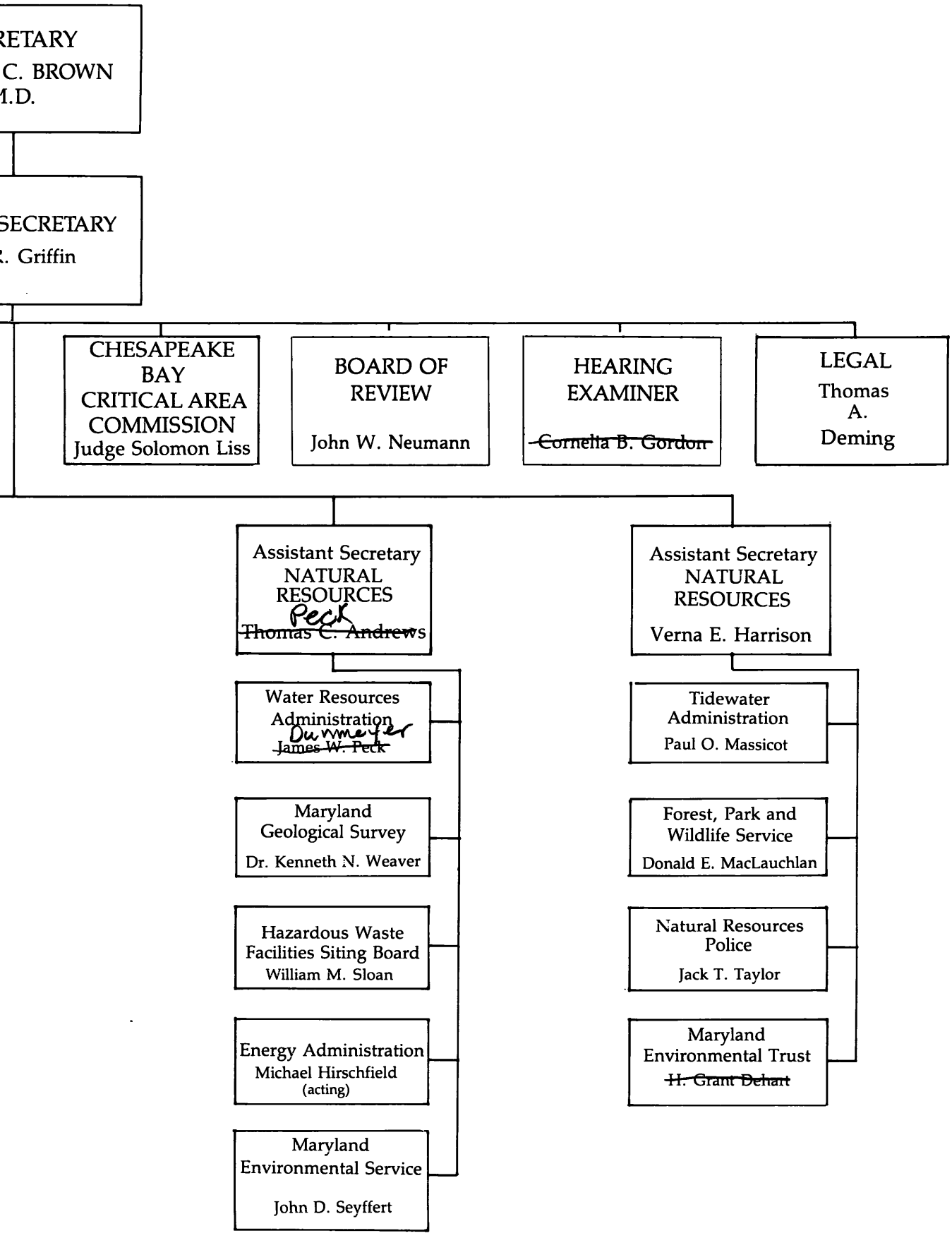


CHART OF ORGANIZATION FISCAL YEAR 1987




RETARY
C. BROWN
M.D.
SECRETARY
R. Griffin
CHESAPEAKE BAY CRITICAL AREA COMMISSION
Judge Solomon Liss
BOARD OF REVIEW
John W. Neumann
HEARING EXAMINER
~~Cornelia B. Gordon~~
LEGAL
Thomas A. Deming
Assistant Secretary NATURAL RESOURCES
Peck
~~Thomas C. Andrews~~
Water Resources Administration
Dunmeyer
~~James W. Peck~~
Maryland Geological Survey
Dr. Kenneth N. Weaver
Hazardous Waste Facilities Siting Board
William M. Sloan
Energy Administration
Michael Hirschfield
(acting)
Maryland Environmental Service
John D. Seyffert
Assistant Secretary NATURAL RESOURCES
Verna E. Harrison
Tidewater Administration
Paul O. Massicot
Forest, Park and Wildlife Service
Donald E. MacLauchlan
Natural Resources Police
Jack T. Taylor
Maryland Environmental Trust
~~H. Grant Dehart~~

licenses and various stamps. Five wildlife management programs and the field services section develop and implement the program's operations. A reorganization of staff programs this year allowed the creation of one program exclusively devoted to habitat management.

FOREST WILDLIFE PROGRAM

This program is responsible for management of wild turkeys, whitetailed deer, sika deer, black bear, ruffed grouse, gray squirrel, eastern fox squirrel and red (Piney) squirrel. These species provide more than one million hunter-days of recreation and many millions of hours of nonconsumptive use. Investigations are conducted to determine mortality rates of the whitetailed deer and wild turkey. Population trends of deer, grouse, squirrels and turkeys were studied. A black bear population study was initiated in Garrett County.

Maryland's 1986-87 deer season harvest, totaling 24,726 deer was a record harvest. Muzzleloader deer hunters were able to take an extra deer during the muzzleloader season. Turkey hunters set a new record by harvesting 1,203 birds. Last year's total was 974.

Recent successes with the Eastern wild turkey relocation project are contributing to the restoration of this species throughout the State. Thirty-nine turkeys were moved from Southern and Western Maryland and stocked in Queen Anne's and St. Mary's Counties. Because of the success of the trap and transplant program the spring gobbler season was opened in Worcester County for the first time in many years.

FURBEARER/UPLAND WILDLIFE PROGRAM

This newly organized program manages 14 species of furbearers, as well as 3 species of upland game (rabbits, quail and pheasants). Furbearer pelt sales total approximately 3 million dollars annually, while the upland species provide over 400,000 man days of consumptive use yearly. Both groups contribute significantly to nonconsumptive enjoyment of wildlife in Maryland.

River otters were moved from Maryland into West Virginia. The otter were live trapped in Somerset County and moved to two drainages in West Virginia. Preliminary results are encouraging, with reproduction suspected.

A study, using radio telemetry techniques, was initiated to reach the bobcat population in Western Maryland. Beaver were removed from nuisance sites and relocated specifically to enhance waterfowl habitat with some excellent wetland areas "created" by these natural engineers.

Standard surveys and inventories were conducted to determine population trends of important fur species.

A pheasant telemetry study was conducted to determine nesting patterns of the ringneck in Maryland. The Garrett County pheasant release was monitored, showing encouraging results for the third nesting season for these wild trapped and translocated birds. Preliminary work was done to attempt a trial release of a different strain of ringneck that Michigan recently acquired from wild stock in mainland China. These may be the first pheasants taken directly from the wild in China for centuries!

Data from the 14-year research study on upland game habitat at Millington Wildlife Management Area is being analyzed. Initial results show that the study was very helpful in determining the responses of rabbit and quail populations to farming practices.

Standard surveys and inventories were conducted to determine the population trends of these upland species.

NONGAME AND ENDANGERED SPECIES PROGRAM

This program is responsible for more than 400 species of wild animals not classified by law as game animals. This includes birds, mammals, reptiles and amphibians.

Maryland and the Chesapeake Bay continue to provide significant yearround habitat for bald eagles. The number of nesting pairs and productivity continue to increase. In 1987, 121 young eagles were produced in the state by 84 nesting pairs.

Five pairs of peregrine falcons nested successfully in the state this year. Fourteen young were produced. A sixth unsuccessful nesting attempt occurred on the Francis Scott Key Bridge in Baltimore.

In the spring, Delmarva fox squirrels were trapped and translocated to 3 different release sites. Six squirrels were provided to Pennsylvania, for reintroduction to their former range in that state. Another 6 were provided to Delaware and 7 were released at a site in Somerset County.

This year was the final year of field work for the Maryland and DC Breeding Bird Atlas Project. This was a 5 year cooperative research effort between the Department, the Maryland Ornithological Society and other birdwatching groups. The purpose of the project was to document the distribution of Maryland's breeding avifauna.

Intensive monitoring of our colonial nesting waterbirds was conducted again in 1987. Colonial nesting waterbirds are those species which nest collectively in groups called colonies, and include herons, egrets, gulls and terns. This year a small colony of brown pelicans was found nesting in the State. This was the first time in Maryland's history that this species has nested here.

WILDLIFE HABITAT PROGRAM

The Wildlife Habitat Program was recently established to coordinate the many land management activities in Maryland that affect wildlife. Included are programs conducted specifically to promote wildlife through habitat management, as well as programs having other objectives and where wildlife is a by-product of this activity.

This program is responsible for providing wildlife habitat expertise to the Critical Area Program and assistance to landowners, municipalities, and counties ensuring that the Critical Area mandates associated with wildlife are met.

The Habitat Program is responsible for coordinating wildlife habitat plans on state owned land. Plans are formulated and are updated periodically to promote a broad spectrum of wildlife species and to ensure that require-

ments of all wildlife species are included in the plans.

There has been a constant and significant loss of wildlife habitat on private land in the state. A program is needed to encourage the creation, preservation, and intensive management of this habitat, including the development of initiatives to encourage landowners to manage for wildlife habitat on their land.

MIGRATORY BIRD PROGRAM

The wildlife species considered in the migratory game bird program include eight species of dabbling ducks, eleven of diving ducks, five of seaducks, three of geese, two of swans, and the American coot, all combined in a category termed Waterfowl; plus the common moorhen, six species of rails, jacksnipe, common crow, mourning dove and the American woodcock.

Because of the large number of geese that winter here, Maryland has made a large contribution to the Atlantic Flyway Canada Goose Project. In Maryland, approximately 1,100 geese were marked with neck collars and leg bands during the 1986-87 banding season, for a total of 8,800 banded during the last four winters. Three Canada goose observers recorded more than 1,336,000 goose observations during the winter of 1986-87, of which 10,451 were neck-collared geese. The objective of this study is to determine the variation in numbers, movements, harvest and survival of the birds and to suggest management strategies to meet the management goals set for Canada geese by the Atlantic Waterfowl Council. The data from this study and other population parameters prompted a modification of Canada goose harvest regulations in 1986. These changes should increase the survival rate of adult Canada geese and increase Maryland's wintering goose population.

Other surveys were conducted to monitor population trends and status of migratory birds. The aerial midwinter waterfowl survey indicated a minimum of 130,000 ducks, 377,400 Canada geese, 48,000 snow geese, and 26,000 tundra swans were wintering in the State. Aerial and ground surveys were conducted in April to monitor long-term trends in breeding waterfowl, mourning doves and woodcock. Approximately 700 black ducks and 1,300 mallards were captured and banded to monitor polpulation dynamics and the effects of changes in hunting regulations.

The submerged Aquatic Vegetation Survey in the Maryland portion of the Chesapeake Bay indicated essentially no change in Bay grasses during the spring and summer of 1986. Approximately 5.6% of more than 600 stations sampled had rooted aquatic grasses.

Funds generated from the sale of Maryland Waterfowl Stamps are used for waterfowl habitat development and to buy ducks for release. Under this program, 18 ponds were constructed in the Fishing Bay Wildlife Management Area totaling 60 acres and water control structures were installed in 4 ponds to provide water level management near Beverly-Triton Beach, Anne Arundel County. Thirty other habitat projects are planned for completion within two years. Approximately 28,000 7-week old game farm mallards were released throughout the State in high quality brook habitat. A sample of these birds were banded to monitor harvest rates and distribution.

WILDLIFE FIELD SERVICES

The wildlife field services section provides the hands-on work for implementing studies and surveys, maintaining the state's 36 wildlife management areas and disseminating information to Maryland residents. Duties range from monitoring bears to ear-tagging rabbits. Turkey, pheasant, quail and osprey have been trapped and relocated to unoccupied habitat. Much effort is spent improving wildlife habitat on management areas.

The wildlife management areas, with more than 102,750 acres scheduled for acquisition and 83,200 now in possession are used heavily by hunters and nature-observers.

The demand for land on which to hunt is great. The Cooperative Wildlife Management Area (CWMA) program was created to help meet that demand. Under this program, field services staff post boundaries, parking areas, remove trash and control hunter access for the landowner who agrees to allow hunting on his property. There are more than 40 CWMA totaling approximately 50,000 acres.

Another major responsibility of the Field Services staff is providing information to the public. Topics range from hunting laws to injured songbirds. Field offices receive thousands of calls annually from citizens with problems caused by wild animals.

Other callers request information on how to improve wildlife habitat on their property. Field services staff also make presentations to conservation, civic and youth groups.

Personnel from this section have helped train animal control units throughout the State in handling rabid animal complaints. This section continues to cooperate with the Department of Health and Mental Hygiene and various county animal units in the control of rabies problems.

NATURAL HERITAGE AND THREATENED/ ENDANGERED SPECIES

Natural Heritage staff systematically collects, records and analyzes information about the State's biotic diversity, and as a result maintains the most extensive computerized data base of species and habitat information in Maryland. Program responsibilities include: the identification of representative elements of Maryland's natural heritage, including rare and endangered species habitats and natural areas; monitoring of these species and habitats to assess problems or threats to their continued existence, and, protecting these significant resources through information exchange and environmental reviews, coordination with land management agencies, and the development of acquisition and easement priorities.

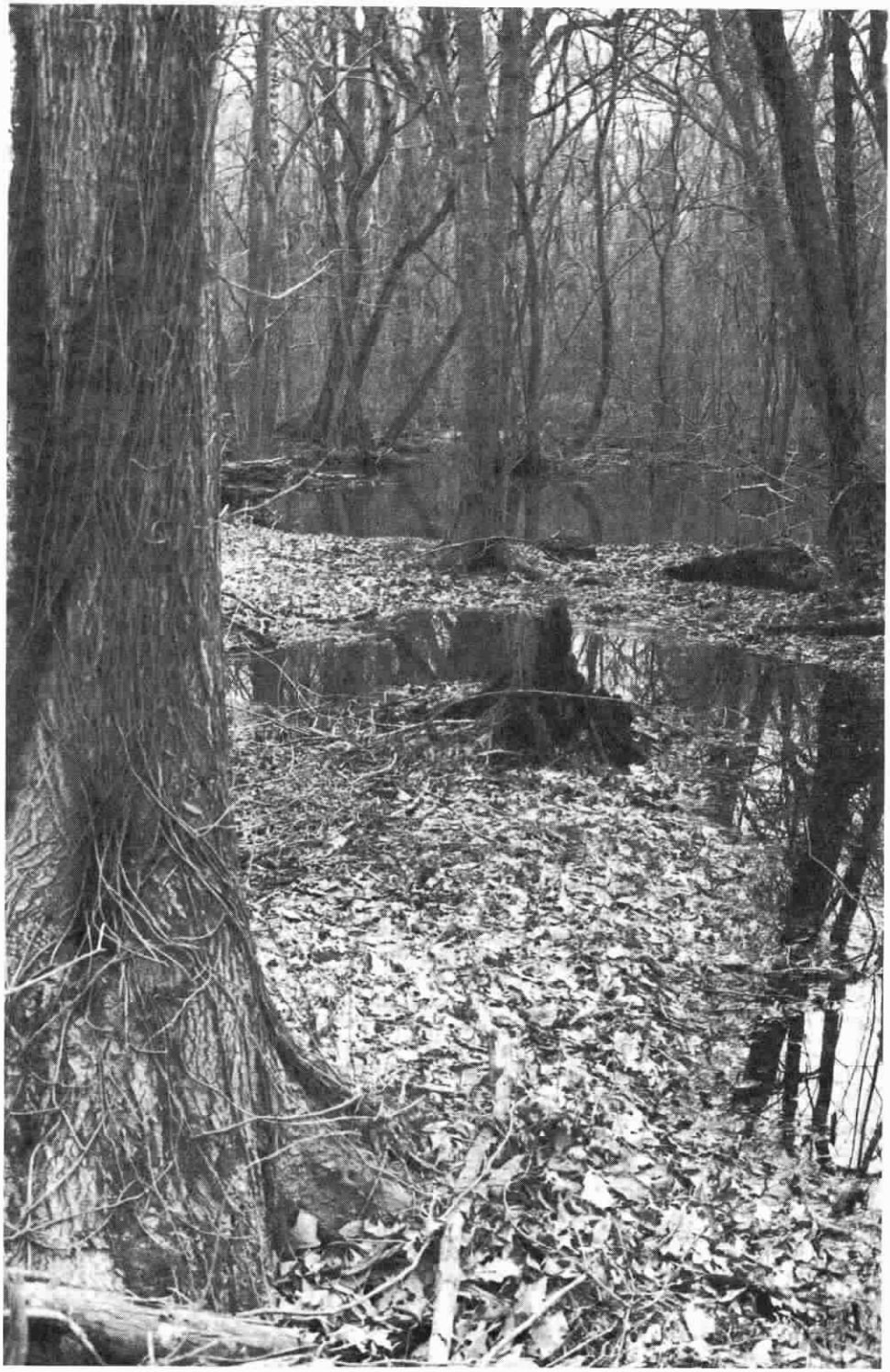
The Natural Heritage Program identifies important natural areas for acquisition or protection. In addition, the program is cooperating with many private and public conservation groups, such as the Maryland Environmental Trust and the Chesapeake Bay Foundation, to facilitate their identification and protection of significant habitats.

The Natural Heritage Program conducts statewide environmental reviews and assessments for land-use

plans and developments. These reviews include detailed inventories of natural resources including: rare and endangered species, habitat quality and condition, and limitations for use of the area.

During FY 1987, the Heritage staff demonstrated the program to numerous citizens' groups, government agencies, private organizations, as well as resource management professionals from several nations. Over 2,000 information requests were filed, with approximately 60% of these from local jurisdictions and the private sector. Other requests included federal government agencies, non-profit groups, utilities, and academia.

Patuxent River flood plain



MARYLAND GEOLOGICAL SURVEY

GENERAL DIRECTION

The Maryland Geological Survey conducts topographic, geologic, hydrologic, and geophysical surveys, and prepares topographic, geologic and other types of maps to meet specific needs. Through scientific investigation and analysis, the Survey seeks to obtain a better understanding of the geology, archeology, and water and mineral resources of the state, and to apply this knowledge to practical problems related to the earth sciences.

Survey publications are the primary means of providing information to the public. Geological and archeological exhibits at fairs and outdoor events are also used to inform the public of Survey activities.

Through its Director, the Survey is represented in intrastate and state-federal advisory activities.

The Maryland Geological Survey Commission advises the Director on any matters within the Survey's jurisdiction. The Commission met three times during the year.

During FY 1987, the Survey published the following technical reports, maps, and pamphlets:

- R.I. 45
  Simulation of Ground-Water Flow and Base Flow in Weathered Crystalline Rock, Upper Cattail Creek, Howard County, Maryland, Willey, R.E. and Achmad, G.
- R.I.
  Evaluation of the Water Supply Potential of Aquifers in the Potomac Group of Anne Arundel County, Maryland, Mack, F.K. and Achmad, G.
- B.D.R. 16
  Hydrolic Data for Cecil County, Maryland, Willey, Richard E., McGregor, Ronald A., de Grouchy, Joanne and Tompkins, Michael D.
- O.R.F. 86-02-2
  Stratigraphy, Hydrology, and Water Chemistry of the Cretaceous Aquifers of the Waldorf/La Plata Area, Charles County, Maryland, Wilson, John M.
- O.F.R. 8
  Interstitial Water Chemistry of the Chesapeake Bay Sediments; Methods and Data (1978-1981), Hill, James M., Cookwright, Robert D., Blakeslee, Patricia J., and McKeon, Gail.

Ecphora quadricostata, Maryland's official fossil shell.

- Geologic Map of Talbot County, Owens, James P. and Denny, Charles S.
- Geologic Map of Cecil County, Higgins, Michael W. and Conant, Louis C.
- Geologic Map of the Union Bridge Quadrangle, Edward, Jonathon.
- Radon and Your Home (pamphlet), Brooks, J.R.
- Earthquakes in Maryland (pamphlet), Reger, J.P.
- Topographic Map of Dorchester County.
- Topographic maps of Allegany, Carroll, Garrett and Harford counties were reprinted.

HYDROGEOLOGY AND HYDROLOGY

Projects of the Hydrogeology and Hydrology Program are carried out under the auspices of the U.S. Geological Survey Cooperative Agreement. The program is responsible for maintaining a statewide water-data network and the investigation of the hydrologic and geologic characteristics of Maryland water resources. The water-data network provides information on minimum, maximum, and average streamflows for planning water supply and sewage facilities, water power projects, dams, bridges, and other public and private works; and on groundwater levels in selected wells throughout the state.

In addition to the statewide network activities, specific projects are undertaken to determine ground-water and streamflow characteristics and rates of replenishment. During FY 1987, investigations were underway in areas of Anne Arundel, Calvert, Carroll, Cecil, Charles, Garrett, Harford, Queen Anne's, Somerset, Washington, and Worcester Counties.

Streamflow Gaging Network

During FY 1987, the U.S. Geological Survey maintained 95 continuous-record stream-gaging stations, including seven quality-of-water sites, and five sediment sites. In addition, 11 crest-stage gages and 21 low-flow stations were operated. Data from these stations for the 1986 water year were compiled and published in "Water Resources Data for Maryland and Delaware", U.S. Geological Survey Water-data Report MD-DE-86-1.

Ground-Water Data Network

This project maintains a continuous inventory of groundwater levels in aquifers and selected springs of the state and relates changes in ground-water levels to withdrawals and precipita-

tion. The regional distribution of observations wells is: 14 wells in the Appalachian Region, 19 in the Piedmont Province, 53 in the Western Shore, 11 in the Baltimore Industrial Area, and 59 in the Eastern Shore — altogether 156 wells.

Basic Data Report No. 17 was prepared and contains hydrographs and record tables for the state network wells for the period 1943 to 1986.

Efforts to utilize some of the existing observation wells to monitor non-point sources of pollution, such as road salting and agricultural chemicals were initiated.

The following investigations were in progress or completed in FY 1987:

Anne Arundel County

In FY 1987, Maryland Geological Survey Report of Investigations No. 46 — "Evaluation of the Water-Supply Potential of Aquifers in the Potomac Group of Anne Arundel County, Maryland" was published. The report discusses the hydrogeology and water-supply potential of the aquifers in the Potomac Group in Anne Arundel County and neighboring areas of Baltimore County, Baltimore City and Prince George's County.

Work in the Glen Burnie area on a detailed study of the power Patapsco aquifer is in progress. The object of the study is to quantify the effects additional pumpage will have on groundwater levels, streamflow, and brackish-water encroachment in Sawmill Creek and Marley Creek Basins.

Arrangements were made with Anne Arundel County to continue the long-term monitoring of 40 observations wells and a gage on Sawmill Creek.

Charles County (Waldorf Area)

The objectives of this study are to define the areal distribution and thickness of the Patapsco aquifers, determine their hydrologic properties, estimate available quantities of water from them, and define their chemical quality. In addition, an attempt will be made to quantify the amount of inter-aquifer leakage occurring between the Magothy and Patapsco aquifers.

Frederick County

Bulletin 33 — "Water Resources of Frederick County" was approved for publication. The report will provide the hydrologic background necessary for planning, developing, and other activities.

Cecil County

In FY 1987, Basic Data Report No. 16 — "Hydrologic Data for Cecil County, Maryland" — was published.

A first draft of the county water resources report, Bulletin 34, was completed and will be circulated for technical review early in FY 1988.

Washington County

Data collection was completed this past year. More than 2,400 wells and springs have been placed into the computerized data base, and preliminary tables prepared. Water level tables and hydrographs were prepared for 58 wells, and discharge hydrographs were prepared for 27 springs. Tables of water appropriations were also prepared.

Queen Anne's County (Kent Island Area)

A report discussing the "Hydrogeology, Brackish-Water Occurrence and Simulation of Flow and Brackish Water Movement in the Aquia Aquifer in the Kent Island Area, Maryland" was prepared for technical review. It discusses the results of a 3-year study to evaluate the distribution and rates of movement of brackish water in the Aquia Aquifer.

Somerset County

The field work for this county groundwater study was largely completed in FY 1987. The report will discuss the hydrogeologic framework of the watertable and artesian aquifers, water quality of the major aquifers, distribution of brackish water in the major aquifers, and ground-water availability with emphasis on the Princess Anne and Crisfield areas.

Worcester County (Ocean City Area)

During the year, pumpage, water-level, and/or chloride data were obtained from observation wells monitoring the Manokin aquifer system at Ocean City and nearby locations, such as Assateague Island, Ocean Pines, West Ocean City, Isle of Wight, and Fenwick Island, Delaware. These data were combined with other historical records to generate a series of hydrographs showing the relationship between water level, chloride, and pumpage at Ocean City.

Harford County (Coastal Plain Area)

Progress, in the first year of the Harford County Coastal Plain project, included compilation of existing data, and collection of data required for the interpretive phase of the project. Data was compiled from files at the U.S. Geological Survey, various county and State agencies, and private consultants. About 150 wells were inventoried in the field, and data, including water levels, altitude, water quality, pumpage amounts and lithology, was collected. Twenty water-quality samples were taken from wells screened in the major aquifers to identify ground-water quality trends and determine ground-water flow regimes.

Stormwater Infiltration

As part of the Chesapeake Bay initiatives, stormwater runoff from parking lots and shopping malls is being diverted into infiltration basins. This should increase recharge to the water table, but the effects of ground water quality is uncertain. Runoff from such facilities often contains elevated levels of metals, salts, and organic chemicals. Runoff, soilwater, and ground water samples from three geologically diverse sites are now being analyzed to determine what impact stormwater infiltration has on ground water quality

Other Active Projects

During the year, the effect of groundwater pumpage on water levels in the vicinity of three Southern Maryland power plants was monitored. Project activities at the Calvert Cliffs, Chalk Point and Morgantown facilities were carried out in cooperation with DNR's Power Plant Research Program.

The effects of deep mining on the hydrology and water quality of an area is being investigated at the Mettiki Coal Mine in southwestern Garrett County.

Dredged Sediment Monitoring

The fifth year investigative report on the distribution and fate and dredged sediment from the approach channel to the C&D Canal was published in January 1987. High resolution acoustic surveying, in conjunction with the collection of sediment samples, successfully identified the extent and concentration of suspended sediments in the disposal plume, as well as the volume of the recently deposited dredged sediment on the Bay bottom. Monitoring activities conducted during a seven month period subsequent to deposition determined that the volume of the deposited sediment was reduced between 33% and 55% as a result of both consolidation and resuspension processes. Data for this continuing effort have been collected for the sixth year.

Geologic History of Chesapeake Bay

This cooperative study, being conducted in cooperation with the U.S. Geological Survey and the Virginia Institute of Marine Science, continued for its third year. High resolution seismic records were obtained in September along nearly 700 kilometers of track lines using two systems simultaneously. Analyses indicate that two Chesapeake Bays existed prior to the present systems. Each system developed in response to fluctuations in sea level during the Quaternary glaciations and left distinctive channel systems in the sedimentary record.

Beach Studies Along Ocean City and Assateague Island

The program continued to profile the beach at Ocean City at selected locations. Seventeen locations, many of which have been profiled semiannually since 1972, provide profile data used for comparative studies.

The program continued to work with the Maryland Forest Park and Wildlife Service at Assateague State Park in an on-going effort to stabilize the dunes. During FY 1987, the Survey established several new bench marks in the park to replace those lost during Hurricane Gloria (September 1985).

Non-Energy Resources Project

This project is conducted in cooperation with the Minerals Management Service of the U.S. Department of the Interior. The distribution has been mapped in the second year of study of surficial sediments along Maryland's inner continental shelf. Maps showing the percent of sand, mud, and gravel in the surficial sediments were prepared. High-resolution seismic profiles mapped the presence of several persistent seismic reflectors. Twenty-nine vibrocores collected in the fall of 1986 aided in the interpretation of the seismic reflectors.

Initial interpretation of the vibrocores and seismic profiles have identified a major mud unit close to shore, a fluvial system trending shore-parallel, and numerous tidal inlet channels. A gravel field mapped from the surficial sediment appears to coincide with the fluvial system.

Geochemistry of the Bay Sediments

In the past year, two projects have been initiated to study the sedimentary environments of the Bay. The first is directed at examining the water quality history of the Bay, as recorded in the inorganic sulfur species in the sediments has been completed. The second project is directed at examining the occurrence and effects of naturally produced gas on the sedimentary environment of the Bay. Mapping of the distribution of the gas in the Bay is nearly complete.

DIVISION OF ARCHEOLOGY

The archeology program is responsible for research in Maryland archeology, for coordinating professional and amateur archeological activities in the state, and for administering the permit system for archeological investigation on state lands. The Division maintains a reference library containing records of all known archeological sites and investigations in the state, and curates an extensive collection of historic and prehistoric artifacts from all sections of the state.

At right, the "Discovery," research vessel of the Maryland Geological Survey, and the "Sonic Boom" in Mackall's Cove of St. Leonard's Creek in Calvert County. The joint expedition of the Survey and the National Geographic Society studied shipwrecks in Chesapeake Bay.

At year's end Open-File Report 87-02-3 was "in press". This report is a "Summary of Hydrogeologic Data from a Test Well (1,725 ft.) at Tuckahoe State Park, Queen Anne's County, Maryland".

During FY 1987 over 100 hydrogeologic inquiries from private individuals, consultants, and other state offices were handled by the Program.

ENVIRONMENTAL GEOLOGY AND MINERAL RESOURCES

This program is responsible for geologic and environmental mapping and research, topographic map revision, mineral and energy resources investigations, and dissemination of geological information. These studies provide the basic geologic framework for delineating and managing the state's mineral, energy and land resources.

The following investigations were in progress or completed in FY 1987:

Geologic Mapping

Geologic field mapping continued in the Manchester & Littlestown Quadrangles (Carroll County), Smithsburg Quadrangles (Allegany County) and Barton Quadrangle (Garrett County).

Field work was initiated in the Centreville Quadrangle (Queen Anne's County).

Ready for press: Frostburg-Avilton Quadrangle (Allegany-Garrett Co.), Finksburg Quadrangle (Carroll Co.), and Caroline County Geologic Map.

Topographic Mapping

The Dorchester County Topographic Map was published and those in Allegany, Carroll, Garrett and Harford County were reprinted on a limited basis to carry over until the revised maps currently in compilation are published. Field work was initiated in Carroll County. Compilation/field work continued in Harford and Prince George's Counties. Maps in Allegany, Garrett, Queen Anne's and Kent Counties are ready for publication.

Mineral Resources and Other Studies

An updated Directory of Mineral Producers — 1986 is ready for publication and a 1987 List of Publications was published.

A joint cooperative program with the U.S. Geological Survey continued, with the MGS preparing geological constraint maps and mineral resources maps in Southern Maryland. Sand and Gravel resources and mined land inventory maps of Charles, Calvert and St. Mary's Counties were compiled on mylars for blueline reproduction on demand. Office work continued on the land use constraint maps and physiographic maps of Charles and St. Mary's Counties. Field work for the physiographic map of Calvert County was initiated.

Geologic information/consultation is provided, at semimonthly meetings with the State Highway Administration, for the proposed geologic display at the planned tourist center and rest stop at Sideling Hill in Washington County, 6 miles west of Hancock.

National Cartographic Information Center (NCIC)

The Survey continues to serve the needs of Maryland map users as the state's NCIC affiliate office. As part of that service, the affiliate office distributes a semi-annual cartographic information newsletter to over 300 interested parties.

Offshore Atlantic Coast

No wells were drilled on the federal MidAtlantic Outer Continental Shelf in FY 1987. A 5 year Leasing Program (1987-1992) was finalized by the U.S. Department of the Interior (Minerals Management Service) and includes a proposed sale, in the Mid-Atlantic area, in October 1989.

Western Maryland Gas

Gas continued to be produced from six wells in two gasfields in Garrett County. An exploratory well was drilled near McHenry in the same county.

At year's end, the Maryland Board of Public Works was to consider leasing state lands for oil and gas exploration, together with the federal government who jointly owns mineral interests, in select state tracts.

COASTAL AND ESTUARINE GEOLOGY

The Coastal and Estuarine Geology Program has the responsibility for basic and applied geological investigations in the coastal zone of Maryland. The overall objectives are to determine the processes altering the shorelines of Maryland and to characterize the physical and chemical aspects of the recent sediments of the Chesapeake Bay.

Hart and Miller Islands Monitoring

The Program has monitored the environmental effects of the construction and operation of the Hart and Miller Islands Containment Facility for the past six years. Twice a year, surficial sediment samples and/or cores collected from 30 stations around the dike are analyzed for grain size composition and trace metal content. During the construction phase of the project, sedimentological and geochemical measurements indicated that older (Pleistocene) material dredged from the site was deposited as a fluid mud layer south and east of the dike. Since then, operation of the facility has not appreciably altered the external sedimentary environment.

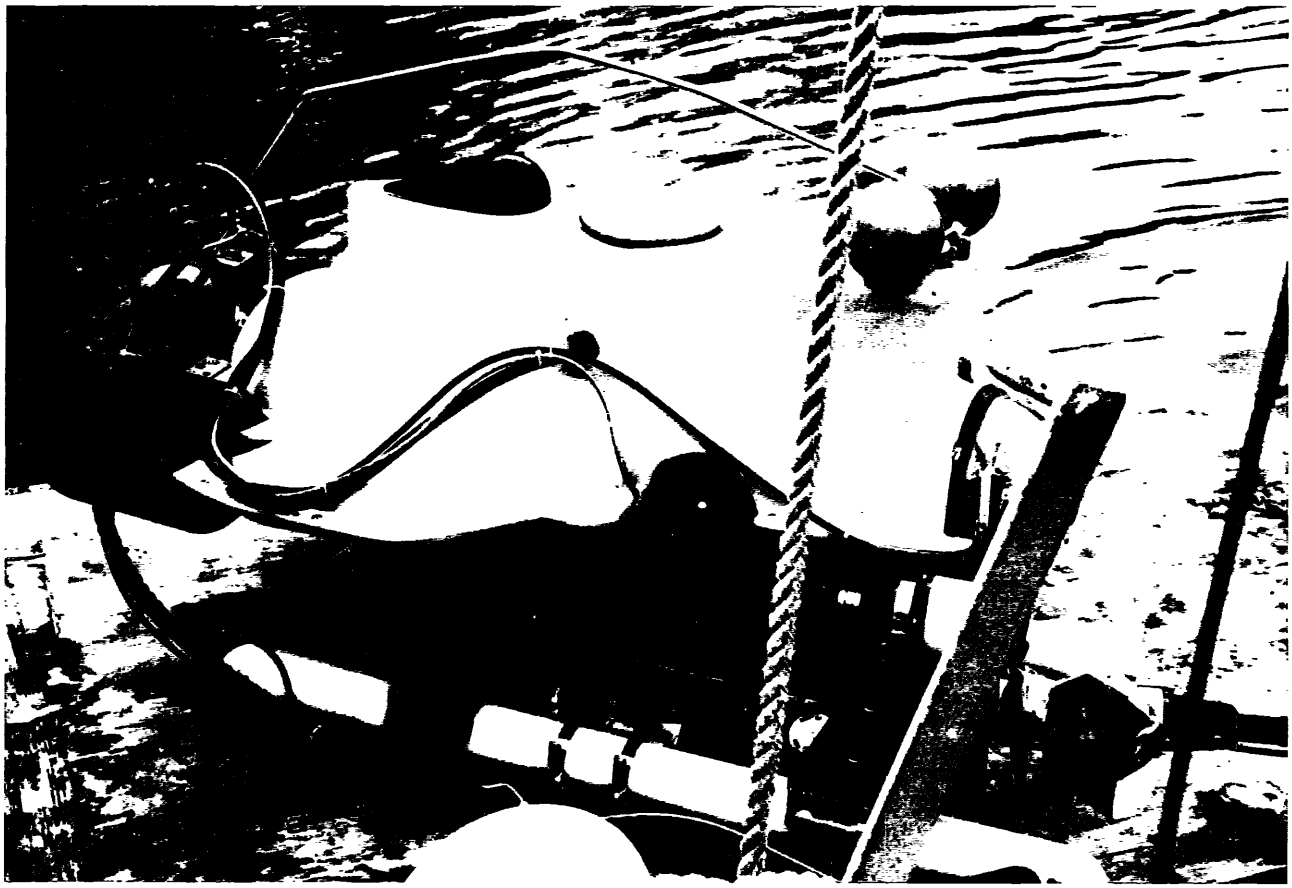
The Program also surveys the recreational beach created between Hart and Miller Islands, documenting beach erosion and recommending measures for its control.

Field Operations

The Research Vessel Discovery logged 1,008 hours of operation in FY 1987. Scientific operations were performed in the Chesapeake Bay and Atlantic Ocean by the Maryland Geological Survey, DNR's Tidewater Administration, Department of Health and Mental Hygiene, University of Maryland (Horn Point Lab), and the United States Geological Survey.

During Chesapeake Appreciation Days, a panel display on the Discovery gave the public an opportunity to see the types of research performed on board.

The Coastal and Estuarine section of the Geological Survey also has a 17 foot Boston Whaler which was used in support of shallow water scientific investigations, coring, and beach profiling.



The "Searover" is a robot capable of seeing and hearing activity around shipwrecks. Successfully deployed, these remote operated vehicles (ROVs) have viewed the "Titanic," and in our Chesapeake Bay, the "New Jersey." ROVs can operate in a variety of depths to assist underwater archaelogists in their studies.

Barton Prehistoric Sites

The 17th Annual Field Session in Maryland Archeology took place in Allegany County along the North Branch of the Potomac River during FY 1987. The ten-day excavation program, sponsored by the Archeological Society of Maryland, Inc., and supervised by the Division of Archeology staff, was attended by some 80 volunteers and visited by more than 50 western Maryland residents. Excavations on a portion of the river terrace known to contain prehistoric sites revealed buried features, such as pits, dating to the Early Woodland period (1000 B.C. to A.D. 100). Off the edge of the terrace, artifacts and buried soil horizons were found to much greater depths — at least 1.5 meters — before the water table interfered with digging. Here, an as yet undefined pottery type was found, some of it from "underwater", and several occupation levels were defined. Charcoal samples from these buried strata should allow radiocarbon dating of the horizons. Additional work is planned for next season.

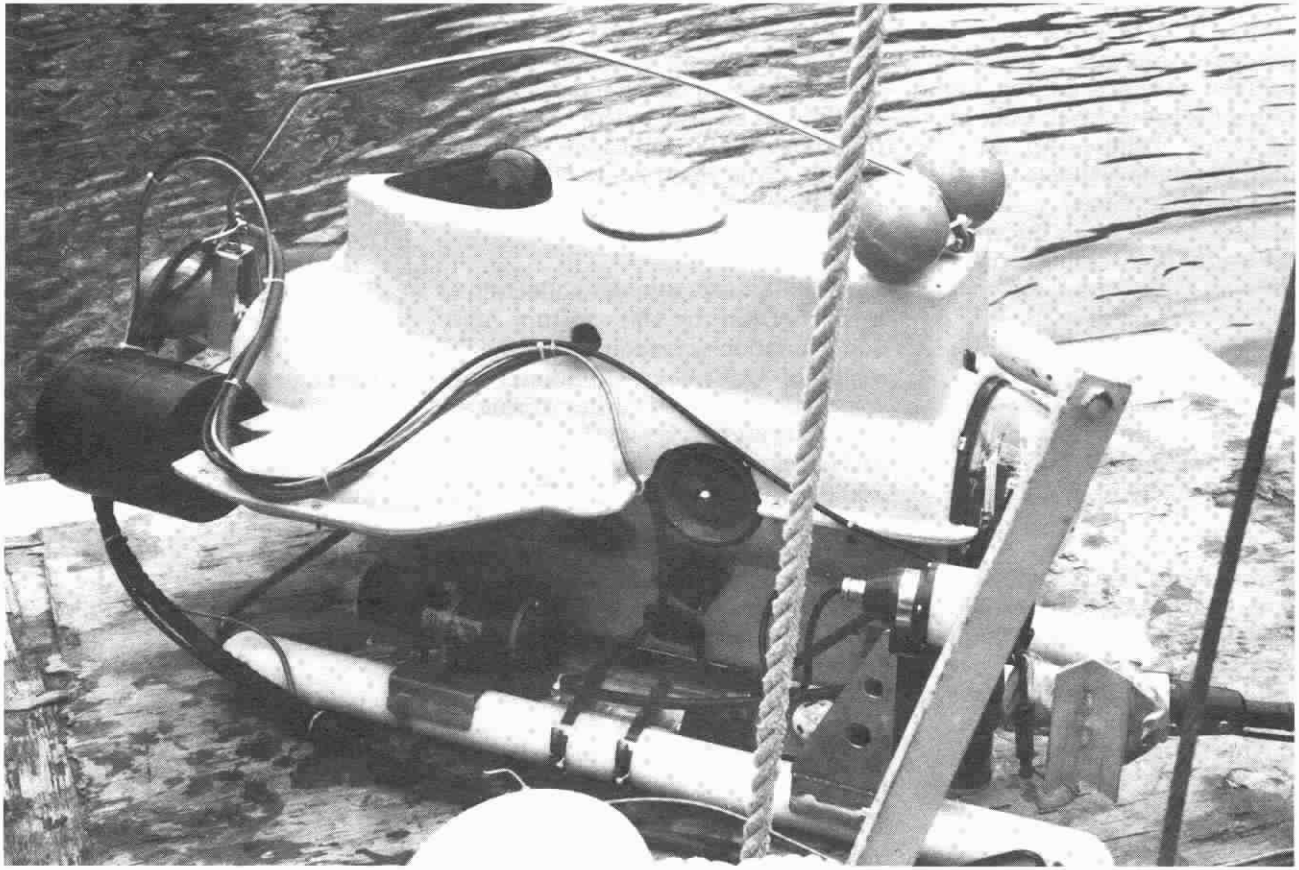
Underwater Archeology

A robotic and remote mapping exploration of the steamboat NEW JERSEY, which sank in the Chesapeake Bay in 1870, was jointly sponsored during FY 1987 by the Maryland Geological Survey and the National Geographic Society, in cooperation with several other state, federal and private organizations. An array of largely new, experimental, and prototype equipment produced electronic images of the NEW JERSEY, while the robot's mechanical arm retrieved wood and sediment samples from the shipwreck. Among the experiments carried out was a test of the new SHARPS (sonic high accuracy ranging and positioning system) mapping technique. This system links ship-board computer, underwater transmitters/receivers, and a diver-held electronic gun to map underwater features.

Highway Studies

Under the Geological Survey's cooperative agreement with the Maryland State Highway Administration, the Division of Archeology undertook 15 field reconnaissance studies, located in 10 Maryland counties, during FY 1987. Sixteen highway project completion reports were issued as part of the Division of Archeology's File Report series during the year.

Much of the Phase II/III highway archeology program was focused on analysis of previously-recovered materials during the past year. Integral to this analysis was the development of a computerized artifact database, including programs for generating artifact distribution maps and collection catalogs. Several innovative analyses were also employed on the various projects. Corroded metal buttons recovered from the mid-19th century Harford Furnace site were examined using xeroradiography, a nondestructive process which allowed clear definition of barely discernible decorative patterns on the buttons. X-ray diffractometry was also employed to determine the material composition of the



buttons. For prehistoric stone artifacts recovered from sites in Allegany and Prince George's Counties, Division staff developed lab procedures for demonstrating the presence/absence of blood and tissue residues on these tools. Some 12% of the artifacts tested were found to have blood residues present on their surfaces; this information will be useful in assessing artifact function.

Other Activities

More than 250 archeological sites were recorded in the Maryland Archeological Site Survey during FY 1987, bringing the total number to 5,872.

"Radiocarbon Dating of Archeological Samples from Maryland", the fourth in the Geological Survey's Archeological Studies series, was completed and sent to the printer in FY 1987; two issues of the Division's newsletter, Current Maryland Archeology, were also published. Information leaflets on general Maryland archeology, prehistoric artifacts from Maryland, and volunteer opportunities in Maryland archeology continue to be distributed, both in conjunction with the Division's travelling exhibit, "Maryland Archeology: Journey Through Time", and via other outlets.

During FY 1987, a major collection of artifacts from the 18th century Addison plantation was acquired by the Division of Archeology. Combined with materials recovered earlier during excavations undertaken at the site by the Division, the collection exceeds 250,000 specimens.

Also in FY 1987, the Division of Archeology initiated a 9 month archeological study of selected Department of Natural Resources lands along the middle and lower Patuxent River. Consisting of archival research, archeological field survey, and data analysis, the project aims to provide DNR with a preliminary inventory of archeological sites on these lands, an assessment of their significance, an evaluation of the sites' interpretive and research potential, an assessment of future archeological needs related to these properties, and an initial management plan for archeological resources.

The Advisory Committee on Archeology, composed of five citizen archaeologists, counsels the Maryland Geological Survey on archeological matters. It met in September and December 1986 and in April 1987 to review and make recommendations on the work of the Division of Archeology.

A nine foot section of the fifteen foot Upper Miocene-Lower Pliocene Age Bald Cypress log unearthed near Brandywine.

NATURAL RESOURCES POLICE FORCE

The Maryland Natural Resources Police Force is one of the oldest Maryland state agencies and one of the oldest state level law enforcement agencies in the United States. It began in 1868 with the formation of the Maryland Oyster Police, who were charged with the enforcement of Maryland's oyster laws. In 1870, enforcement of Maryland's waterfowl laws were added to their duties and the first fishing laws were added in 1874. In 1896, the Maryland State Game Warden and Deputy State Game Wardens were formed to bring uniformity to state game law enforcement.

These two groups underwent numerous name changes and several major realignments until they were combined in 1972 to form the Maryland Natural Resources Police (NRP) an agency, and the primary law enforcement arm, of the Maryland Department of Natural Resources.

During FY 1987, the NRP had an authorized strength of 209 sworn officers and 13 police cadets.

The NRP are specifically charged with the enforcement of all the Natural Resources Laws of the State, including any and all regulations adopted pursuant to the Natural Resources. Article of the Annotated Code of Maryland. The NRP have all the powers conferred upon police officers by the State and may exercise their powers anywhere within the State.

The NRP has supported the Chesapeake Bay Initiatives and continues to provide information to those agencies and individuals primarily responsible for the initiatives.

The NRP has two main programs: Field Operations and General Direction. Field Operations is directly responsible for the main on-line law enforcement activity and General Direction provides administrative, logistical and special investigative support.

FIELD OPERATIONS

Field Operations is the on-line enforcement activity and in FY87 was re-organized into four regional jurisdictions covering Western and Nothern Maryland, Southern Maryland, the Upper Eastern Shore, and the Lower Eastern Shore.

The force operated 38 large patrol boats for patrol and search-and-rescue operations. There were six Mobile Enforcement Teams.

The two basic forms of activity performed by NRP officers are Marine, covering all activity on, in, and adjacent to the Chesapeake Bay and its tributaries, and Inland, covering activities such as hunting and trapping, wildlife protection and fishing and boating on non-tidal waters.

Information, Assistance and Emergency Responses

The Natural Resources Police handled over 116,000 telephone calls for service or information. Of these calls, 17,331 were received at the officer's homes, 48,900 in the Regional Offices and over 50,000 at the Communications Center at Annapolis Headquarters. The public visited officers at their homes on business on 945 occasions and the Regional offices on 3,946 occasions.

Enforcement and Protection

Natural Resources Police Officers assigned to Field Operations worked 306,125 man-hours including 22,635 man-hours of overtime; drove 1,391,691 miles on patrol, spent 50,545 man-hours patrolling by boat; patrolled on foot for more than 25,735 man-hours and flew over 527 patrol hours.

These officers issued 7775 citations and 8968 warnings in FY 1987. The total of 16,743 violations noted shows a net decrease of 10% from last year.

The courts have given very good support to the rockfish moratorium, assessing over $19,000 in fines against 72 defendants charged with rockfish violations.

During the year, the NRP noted 2,168 hunting violations, including 165 jack-

In FY87, the Natural Resources Police responded to 1453 Emergency Response calls. These include:

Disabled boats	159
Disabled vehicles	173
Emergency Medical Assists	31
Emergency Transportation	14
Boats towed to port	720
Boats escorted to port	45
Boats freed from grounding	175
Pumped sinking boats	23
Firefighting	12
Rescue persons in boats	2
Rescue persons in water	18
Rescue persons stranded	4
Search for overdue boats	31
Search for missing person	27
Search for accident/drowning victim	19

lighting violations, 3,312 fishing violations. There were 8,256 boating violations, 872 oyster violations, and 1776 violations which involved the Criminal Code, the Motor Vehicle Code or some other article of the Annotated Code.

The NRP routinely investigates and assists other agencies in the investigation of criminal activity not included in the Natural Resources Article. NRP involvement in these matters continues to grow. The most common cases are theft, breaking and entering, and vandalism. NRP officers have also been involved in the investigation of murders, suicides and drug incidents, and have searched for fugitives and missing persons.

COOPERATIVE TRI-STATE ENFORCEMENT

There were a number of interesting cases this year. The following is one of the most significant.

At 6 a.m. on April 6, 1987, State and Federal wildlife enforcement officers started serving arrest warrants and filing charges against approximately 50 wildlife poachers, licensed guides, and other individuals, in three simultaneous but separate undercover operations in Maryland, Virginia and Delaware.

The operation was a closely coordinated effort, among special operations units in the states involved in cooperation with the Federal authorities; to combat the widespread illegal commercialization of wildlife.

During the course of the investigation, Maryland Natural Resources Police officers penetrated a ring of individuals, who boasted of killing large numbers of deer in recent years, and accompanied them on hunts. Deer, red foxes, geese, and rabbits were killed illegally in Maryland and Delaware and, in some cases, transported across state lines for interstate purchase and sale, in violation of state law and the Federal Lacy Act.

Violations included hunting deer and rabbits at night, with spotlights from motor vehicles and all-terrain vehicles, hunting out of season, using illegal weapons, failure to tag and fraudulent tagging of deer, purchase of fur without a license, and performing taxidermy on Canada geese, other waterfowl, hawks and owls without appropriate state and federal licenses and selling them unlawfully, and even possession and distribution of controlled substances (cocaine and marijuana).

On the Delmarva Peninsula, 444 charges were filed against 31 individuals in Maryland and Delaware in a separate undercover investigation conducted jointly by the Maryland Natural Resources Police, Delaware Division of Fish and Wildlife, Delaware State Police and the U.S. Fish and Wildlife Service. This investigation began in September 1985 to look into reports of large-scale commercial sale of furs, deer meat and waterfowl.

In still another separate case in Maryland, the U.S. Fish and Wildlife Service and the Natural Resources Police concluded a two-year undercover investigation with the filing of federal charges against 11 commercial hunting guides and 3 hunting services on Maryland's upper Eastern Shore. The charges included hunting after hours, use of illegal weapons, exceeding bag limits, fraudulent tagging, purchase and sale of waterfowl, and the unlawful sale of mounted Canada geese and other waterfowl.

SUPPORT SERVICES ACTIVITY NOTES

Maintenance and Supply

Three contractual employees relieved the boat crews from the annual maintenance of the patrol vessels and resulted in a smoother operation at reduced costs. Other civilians have replaced officers at the Matapeake Facility. The boat and engine shop section completed 327 inboard job orders and 394 outboard job orders.

Surplus equipment was sold at auction on April 25, 1987. The sale grossed $65,309.00. Confiscated firearms were sold to licensed dealers by sealed bid grossing $5,284.00.

OUTDOOR EDUCATION PROGRAMS

The Outdoor Education Program now encompasses Hunter Education and Boating Education. The consolidation of the program allows more efficient use of existing resources. The program has hired two recreation specialists who are assisting the program director in implementing the new Boating Safety Education Law.

Boating Safety Education

The 1987 general assembly passed the new Boating Safety Education Law requiring all persons born after July 1, 1972 to take a basic boating safety education course in order to operate a motorboat. This bill becomes effective July 1, 1988.

The boating education program oversees projects involving home-study courses, school system education, classroom instruction utilizing volunteer instructors, as in the hunter education program, certification and approval of other boating courses offered, and whitewater rescue training and rescue services.

Hunter Education

The Hunter Education Program continues to be a successful volunteer program training future hunters. The program conducted 250 classes, a total of 5,024 students, and certified 4,758 persons.

Hunting Accidents

There were 29 hunting accidents reported in Maryland during FY 1987 which included 2 fatalities.

HOVERCRAFT PROGRAM

At the end of the year the NRP were awaiting delivery of a new Hovercraft which will become a permanent part of the fleet. The new craft is being built by Slingsby Aviation Ltd. of Kirkbymoorside, England. It is 36 feet long, of composite fiberglass construction and capable of operating in all but the most severe weather conditions. A cargo capacity of 4,500 pounds provides seating for 22 passengers, or 4 litter patients plus a crew of 2.

A variety of missions are anticipated for the craft including search-and-rescue, emergency medical services, ice breaking, and conservation enforcement in areas inaccessible to conventional boats and vehicles.

A pilot program is being developed by the Natural Resources Police, in

cooperation with the Maryland Institute of Emergency Medical Services Systems (Shock Trauma), to provide advanced life support (ALS) on the Chesapeake Bay. The 1 year pilot program will enable Maryland to provide the latest in emergency medical treatment to boaters on the Bay. A number of NRP officers currently trained and certified as Emergency Medical Technicians (EMT) will receive upgrade training and certification to Cardiac Rescue Technicians (CRT). This training, combined with the capabilities of the hovercraft, will make the Emergency Medical Services available to Maryland boaters.

Operation S.W.A.M.P.

In its second year, the Natural Resources Police Program OPERATION S.W.A.M.P. (Safer Waterways through Alcohol Monitoring Patrols) is proving its worth by reducing alcohol related boating accidents. The 33% drop in boating fatalities last year is considered a result of the program which targets special "high risk" areas known to have significant histories of alcohol related boating accidents and boating fatalities. The program utilizes specially trained teams of officers in a high saturation patrol situation which has been given considerable advance publicity. There is NO use of alcohol check points; enforcement is based solely on observable violations. The pilot program worked so well that special teams are now in all regions and able to cover more areas. A detailed operations manual has been prepared which covers nearly every conceivable aspect of this activity.

Captain Frank Wood Receives SSBLA Award

Captain Frank Wood was recognized by the Southern States Boating Law Administrators for his outstanding contributions to boating safety through enforcement and education. Captain Wood was recognized specifically for his work as the officer-in-charge of OPERATION S.W.A.M.P.

New Officers and Expansion

In FY 1987 NRP received authorization for an additional 14 officer positions in FY 1988. Ten will go to marine enforcement and three to inland enforcement activities.

Officer of the Year

Corporal Rick Morris was selected Natural Resources Police Officer of the Year. Corporal Morris joined the Force in July 1976 as a Cadet and graduated from the Natural Resources Police Academy in 1978.

Corporal Morris was nominated and selected as Officer of the Year based on his accomplishments on and off duty and his outstanding performance in the enforcement of Jacklighting and Waterfowl Laws.

Retirements and Promotions

Lieutenant Colonel Paul C. Wentzell, Chief of Field Operations, retired on March 1, 1987, after 29 years of State service. He joined the agency when it was the Department of Tidewater Fisheries and his background was in marine enforcement.

Major James M. Hurley was promoted from Eastern Shore Area Commander to Lieutenant Colonel, Chief of Field Operations, to succeed Chief Wentzell. Chief Hurley is a full Colonel, Military Police, Maryland National Guard and is a graduate of the F.B.I. National Academy.

Captain Willis L. Dennis, Commander of Support Services, was promoted to Major to reflect the increase in his assigned duties and responsibilities over the past few years.

WATER RESOURCES ADMINISTRATION

The Water Resources Administration is responsible for the protection, management and development of Maryland's water resources and accomplishes its mission through four programs: General Direction, Watershed Protection, Water Management and Resource Protection.

The Water Resources Administration operated under the following organization for FY 1987:

General Direction;

Watershed Protection Program including Waterway Permits Division, Sediment and Stormwater Division, and Enforcement Division;

Water Management Program including Dam Safety Division, Water Supply Division, and Flood Management Division;

Resource Protection Program including Surface Mining Division, Wetlands Division, Oil Control Division, and Technical Services Division.

GENERAL DIRECTION

The General Direction supervises and coordinates the policies and operations of the Administration, coordinates public notices and hearings, and carries out public information activities.

The Water Resources Advisory Commission met four times in FY 1987 to discuss activities and policies of the Administration including revisions of the watershed permit regulations and proposed amendments to the water appropriation law.

WATERSHED PROTECTION PROGRAM

The divisions in this program for FY 1987 were Waterway Permits Division, Sediment and Stormwater Division and Enforcement Division.

Program Administration

The Chesapeake Bay Initiatives provided a $1.4 million grant fund for distribution to local jurisdictions for the support of personnel responsible for Stormwater Management Plan review inspection, and enforcement as required by the Stormwater Management Law.

To assist in local program implementation, the Administration provided grant-in-aid funds to the following

Anne Arundel County
Allegany County
Baltimore County
Calvert County
Carroll County
Charles County
Dorchester County
Frederick County
Garrett County
Harford County
Howard County
Kent County
Montgomery County
Prince George's County
Queen Anne's County
St. Mary's County
Talbot County
Wicomico County
City of Annapolis
Baltimore City
Bowie
Cambridge
City of Frederick
Ocean City
Rockville
City of Salisbury

Students of Queen Anne's County High School helped plant the special wetlands vegetation in the completed stormwater management pond.

WATERWAY PERMITS DIVISION

The Waterway Permits Division reviews permit applications for projects affecting non-tidal streams and floodplains, and conducts site inspections and technical evaluations of proposed projects for permit decisions. Advisory services were provided to prospective applicants on measures and alternatives to minimize adverse effects on the environment.

Revisions to the "Rules and Regulations Governing Construction on Non-Tidal Waters and Floodplains" became effective. A permit is now required for projects to be located in the channel of a natural trout stream with a drainage area less than 100 acres provided construction activity occurs during a time when there is a flow in the stream.

The Division received a total of 1,046 permit applications for FY 1987. This is an increase of 28.5% over FY 1986 and reflects in part the increase in construction activities.

The Division's activities included:

Type of Project	Applications Received	Permits Issued
Maintenance and Repairs	180	141
Temporary Construction	231	199
Waterway Construction	435	287
Waterway Obstruction/Dams	1	0
Small Ponds	23	14
Preliminary Project Plan Review	175	60

SEDIMENT AND STORMWATER DIVISION

The Division sponsored a three day conference for consultants, engineers, developers, home builders, local regulators and administrators, inspectors and soil conservation personnel to address issues arising from the sediment and stormwater program. Over 400 persons attended.

Sediment Control Section

The Sediment Control Section directs the State Erosion and Sediment Control program by reviewing local programs; developing Statewide guidelines; and conducting the "Responsible Personnel Training Program", an erosion and sediment control educational effort.

The "Responsible Personnel" training program promotes an understanding of the benefits of clean water and offers training to construction industry field personnel and local government agencies. A supervisor certified under the State program is required on all construction sites. Over 8,000 have received certification since the program was initiated. Approximately 1,700 persons were trained in FY 1987.

Under the Chesapeake Bay Initiatives, WRA has increased responsibility for enforcement and monitoring sediment control plans statewide. Local jurisdictions may request enforcement authority. A major activity in conjunction with the Enforcement Division is conducting extensive reviews of each local program requesting these authorities. Twelve counties and five municipalities have been granted delegation. The Water Resources Administration is responsible for inspection and enforcement in all jurisdictions that have not applied or have been denied delegation.

Stormwater Management Section

The Stormwater Management Section directs a statewide program to reduce stream channel erosion, pollution, siltation and sedimentation by maintaining the pre-development runoff characteristics of a watershed after development has been completed. All local jurisdictions were required to adopt a stormwater management ordinance and establish a stormwater management program.

WRA staff developed a model ordinance and assisted local jurisdictions in meeting requirements of the Stormwater Management Law.

The division conducted reviews of stormwater management programs in Prince George's, Allegany, Garrett, St. Mary's, Harford, Kent, Caroline and Dorchester Counties and Baltimore City. The reviews, mandated by State law, evaluate administrative procedures and in-field implementation of stormwater controls.

Design and construction was completed on a shallow marsh stormwater management pond at Queen Anne's County High School. The pond is being monitored as a demonstration project to detect water quality differences.

Another innovative stormwater design project is underway in Prince George's County.

Plan Review Section

The Plan Review Section evaluates sediment and stormwater plans for all State projects.

Projects reviewed for FY 1987:

Department of Transportation	
State Highway Administration	412
Department of General Services	186

ENFORCEMENT DIVISION

The Enforcement Division staff of 30 inspectors carried out statewide responsibilities for enforcing compliance with sediment control plans. The State currently monitors and enforces compliance with sediment control plans in the following twelve counties: Worcester, Wicomico, Somerset, Talbot, Caroline, Queen Anne's Cecil, Calvert, St. Mary's, Charles, Carroll and Garrett.

The Enforcement Division was also responsible for ensuring compliance with other WRA permits and approvals including sediment control, stormwater management plans, waterway construction and small pond permits.

The Enforcement Division conducted 19,954 inspections on job sites in FY

1987 and investigated 987 citizen complaints.

The Division was awarded approximately $1,500 in settlements on several actions against those in violations of the sediment control laws.

WATER MANAGEMENT PROGRAM

The divisions in this Program for FY 1987 were Flood Management Division, Dam Safety Division and Water Supply Division.

FLOOD MANAGEMENT DIVISION

The Flood Management Division administers the Flood Hazard Management Act of 1976 which mandates comprehensive planning and design of flood management projects and provides for a grant program to aid local subdivisions in the implementation of projects for mitigating flood hazards. Technical assistance is provided on watershed modeling, flood management planning methods of mitigating flood hazards and damage, local flood warning systems and local flood management ordinances. The Division coordinates and promotes the National Flood Insurance Program in Maryland. Under the Federal Emergency Management Agency's Community Assistance Program, evaluation and assistance visits of forty communities participating in the National Flood Insurance Program were conducted.

Technical assistance to State agencies and local governments is being provided by the Division during the multi-year, federally funded Hurricane Evaluation Study. This study will identify potential hurricane damage areas and develop evacuation plans.

Six capital project applications were received from jurisdictions. Funding was approved for the following projects:

Baltimore County: countywide automated flood warning system, $51,750;

Prince George's County: acquisition of flood-prone homes — Henson Creek, $600,000; Piscataway Creek, $1,500,000; Southwest Branch, $140,000;

Baltimore County: acquisition of flood-prone homes — Gunpowder Falls, $1,000,000;

Allegany County: acquisition of flood-prone homes — Wills Creek, $100,000;

Three technical studies were initiated: Carroll Creek, City of Frederick; Crisfield, Somerset County; and Grays, James and Swan Creeks, Harford County.

DAM SAFETY DIVISION

The Dam Safety Division is responsible for managing the safety of the State's 310 existing dams, and for issuing permits for new dams. The activities of the Division include: issuing permits to repair dams, conducting periodic safety inspections of dams, making construction site visits, assisting local civil defense agencies in the preparing of Emergency Warning Plans, enforcing dam safety violations, and providing technical assistance to Maryland dam owners.

In FY 1987 the Division published the Maryland Dam Safety Manual, which will be sent to all Maryland dam owners and operators.

Seminars were held at several locations to increase public awareness of dam safety. Over 250 attendees were registered. The Division also completed safety inspections of 87 facilities, reviewed 11 permit applications, and provided technical assistance to 7 dam owners.

Although there were no major dams under construction in FY 1987, the Division issued several permits including one for the proposed Red Run Dam planned for the high growth Owings Mills area of Baltimore County.

WATER SUPPLY DIVISION

The goal of the Water Supply Division is to direct the development, management and conservation of the State's water supply resource to protect the resources while encouraging the greatest feasible use. The Division includes two sections: the Water Appropriation and Use Permits Section, and the Water Supply Planning and Engineering Section.

Water Appropriation and Use Permit Section

The Water Appropriation and Use Permit Section regulates the withdrawal and use of water in the state to protect the quantity and quality of the resource and to provide reasonable protection to other users of the resource. The Section evaluates permit applications to ensure that adequate quantities of water are available for proposed uses, to protect ground water supplies and instream values during low river flow and to lessen potential conflicts among water users. There are currently more than 12,000 active water appropriation permits on file. An additional 1,200 surface and ground water appropriation permits were processed annually by the section.

Major FY 1987 cases handled by the Water Appropriation and Use Section include:

Issuance of new ground water appropriation permits to the City of Annapolis for 5.7 million gallons per day;

Issuance of surface water appropriation permits to the City of Frostburg for the proposed new Piney Creek Reservoir;

Analysis of the impacts associated with the proposal to dewater the Beaver Creek West Limestone Quarry adjacent to the Albert M. Powell Trout Fish Hatchery;

Issuance of surface water appropriation permits to the Washington Suburban Sanitary Commission and the Fairfax County Water Authority for increased withdrawals from the Potomac River;

Investigations of water supply and problems associated with the Maryland American Water Company's surface water appropriation permit for Winters Run near Bel Air;

Issuance of a ground water appropriation permit for 3.5 million gallons per day to Anne Arundel County from the Patapsco aquifer near Annapolis.

Water Supply Planning and Engineering Section

The Water Supply Planning and Engineering Section analyzes area wide effects of collective water appropriation in view of a region's future water supply and demand. The Planning and Engineering Section identifies regional water supply resource problems and formulates management alternatives. The engineers and planners have developed and utilized computer ground water and management models in forming plans for development and conservation of regional water supply resources. Implementation of those plans occurs through the water appropriation permit process. An important component of the Section's work has been establishing and maintaining a water use data system. The system is based on water use reports submitted to the Department biannually by all permittees appropriating more than 10,000 gallons a day. Other responsibilities of the Planning and Engineering Section include: water supply reservoir planning and development, mitigation of consumptive water losses through non-structural and structural techniques, initiation of local water conservation programs and coordination of water supply planning activities with the neighboring states, the U.S. Army Corps of Engineers, the Interstate Commission on the Potomac River Basin and Susquehanna River Basin Commissions.

Major FY 1987 activities of the Water Supply Planning and Engineering Section include:

Publication of Northeastern Cecil County Concept Document directing the ongoing water supply development and management plan for the area;

Publication of the Northeastern Worcester County, Maryland and Southeastern Sussex County, Delaware Concept Document directing the ongoing water supply development and management plan for these coastal areas;

Implementation of a ground water monitoring program in West Ocean City which samples 12 private residences and 3 recently constructed observation wells to detect increasing trends in chloride levels;

Development of the Maryland Method, a procedure used during the evaluation of proposed surface water withdrawals and reservoir development projects to establish flow-bys for the protection of the aquatic environment;

Publication of the Maryland Water Withdrawal and Use Report for 1985, which provides a detailed account of water use in the State including size and location of withdrawals, size and location of use and type of use.

RESOURCE PROTECTION PROGRAM

The divisions in this program for FY 1987 were Wetlands, Surface Mining, Oil Control and Technical Services.

WETLANDS DIVISION

This division issues wetland permits and approvals for the regulation of dredging, filling and related activities in private wetlands; makes written recommendations to the Board of Public Works on the issuance of wetlands licenses for work in state wetlands, including storm drain systems outletting into tidal waters; enforces the wetlands licenses and permits and pursues resolution of wetlands violations and other Water Resources Administration administered statutes and regulations. The Division administers the monitoring of overboard dredge material disposal projects and comments on matters affecting tidal and nontidal wetlands throughout the State. The permitting and licensing procedures for these activities involve site inspections, technical evaluations, interagency coordination and public hearings. The Division provides advisory services to prospective applicants on modifications or alternatives to proposed works that would minimize adverse effects on the environment.

The Wetlands Division continues to oversee preparation and conduct of integrated studies assessing the environmental impacts of the Hart-Miller Islands Containment Facility.

In cooperation with the Coastal Resources Division of the Tidewater Administration, the Wetlands Division works to promote local protection of nontidal wetlands.

The Division acted on 765 projects requiring state and private wetland licenses affecting 2,195 acres of State wetlands. Another 339 projects were reviewed for license requirements and the applicants were advised that no license was necessary. An additional 18.3 acres of vegetated wetlands were established for shore erosion control and as mitigation for otherwise environmentally acceptable works. Encroachments were limited to no more than 10 feet channelward of the mean high water line in approximately 84% of the projects proposed for shore erosion control.

Work was also initiated to provide new tidal wetland boundary maps based on available 1985 photography. The new map system will use electronic scanning and computer data storage and retrieval.

SURFACE MINING DIVISION

The Surface Mining Division seeks to assure environmental safeguards in the operation and reclamation of nonfuel surface mines and prevent hazards to public safety from such activities. The Division issues licenses and permits. It establishes permit conditions, reviews and evaluates mining and reclamation plans, and makes an annual review of each permit. Funds received from license fees, permit fees and other sources are held in the Surface Mine Land Reclamation Fund to be used for reclamation of abandoned non-fuel surface mines. At the end of FY 1987 there were nearly 2,300 acres of land being used for surface mining by approximately 230 licenses operators.

Reclamation under the abandoned mine reclamation fund was initiated for the following sites in Fy 1987: Magruder-Raulin in Prince George's County; A.V. Williams in Baltimore County and a site in the Anacostia River Basin in Prince George's County.

The Division utilized its enforcement personnel to ensure surface mine operator compliance with permit conditions.

OIL CONTROL DIVISION

The Oil Control Division issues Oil Operations Permits, Oil Vehicle Operator's Certificates and Oil Transfer

Licenses and carries out follow-up field enforcement work related to these activities. The Division is supported by the Maryland Oil Disaster, Containment, Cleanup and Contingency Fund. This special fund is maintained by license fees.

The Division has developed and obtained equipment to respond to, contain, and clean up oil spills on inland waters and open waters of the Chesapeake Bay and its tributaries, and ground water contamination from leaking underground storage tanks.

A 24 hour duty roster is maintained to respond to oil spill emergencies.

The Division responded to 661 spills, including 1,100 underground spills, in FY 1987.

The Division stores spill equipment and absorbent materials statewide for use by local fire departments and other state, county and local agencies to combat minor oil spills.

The Division implemented an oil vehicle operators training and certification program including study manual and test. Drivers of oil tank trucks and transport in Maryland area required to receive certification. Two thousand, two hundred sixty-five drivers were certified in FY 1987. Over 6,000 have been certified since the program began in 1985.

Training and instruction was provided statewide to help industry and others prevent and control oil spills. Several presentations of the program were made to volunteer and paid firemen, high school students, State highway personnel and petroleum industry personnel.

The Ad Hoc Committee on Oil Spills met seven times to discuss and advise the Division on oil control policies and new equipment. The committee spent considerable time working on the control and prevention of leaks from underground storage tank systems.

As of January 28, 1987, the deadline for testing underground tanks 15 years or older expired. An estimated 8,500 tanks have been tested, 1,200 reported failing. Of those, 720 were found leaking. These were removed or replaced. Efforts are continuing to locate untested tanks.

TECHNICAL SERVICES DIVISION

The Technical Services Division provides various services and support to WRA and other DNR agencies. The Division is organized into three sections based on the type of service provided. The laboratory services section maintains capability for a wide range of laboratory work including chemical, physical and bacteriological analyses of water, wastewater, oil, sediments and aquatic life.

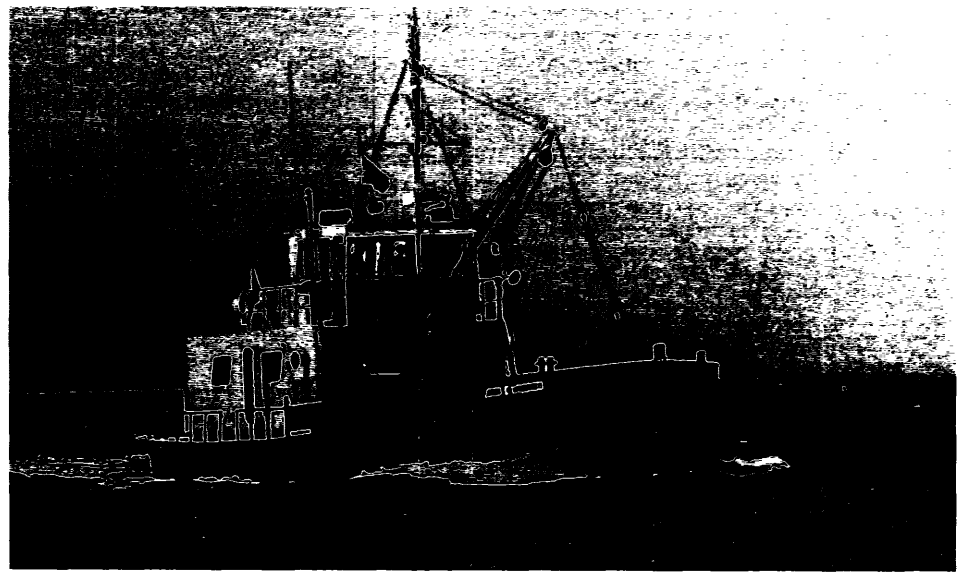
Another section of the Technical Services Division is the surveying and drafting team. Surveys are conducted for clarification of boundaries for permitting and enforcement of various WRA permits and licenses; development of site plans for construction of parks and buildings or for as-built drawings of existing structures; plans for reclamation of surface mining sites; and collection of data for computer models used in flood studies. This unit also works closely with the well drilling crew in locating and mapping elevations and distances of monitoring wells.

The Geotechnical Investigations Section of the Division is assigned responsibility for drilling test borings and constructing monitoring, observation and recovery wells. These services are requested by other WRA divisions in connection with monitoring seepage at dams, determining the extent of ground water contamination, collecting data on soil suitability for building construction, obtaining soil samples and conducting percolation tests. Recently, the section's expertise has been devoted to the investigation of underground leads from petroleum storage tanks.

TIDEWATER ADMINISTRATION

The Tidewater Administration encompasses the Waterway Improvement Division, the Coastal Resources Division and the Fisheries Division. These three working programs deal with the resources of the Bay and its tributaries, boating, aquatic life and land-water interface and freshwater fisheries throughout the state.

The primary responsibility of the Tidewater Administration is to manage resource restoration and enhancement projects in order to restore and protect traditional fishery species of Maryland waters, to support recreational boating, and to implement Maryland's coastal zone management program.



Buoy tender/icebreaker M.V. John C. Widener

GENERAL DIRECTION PROGRAM

This program is responsible for the overall direction, supervision and coordination within the Administration.

ADMINISTRATION AND SUPPORT

Provides administration to all phases of the operation, including budgets, contracts, personnel and purchasing.

Boards and Commissions Coordinations

Serves as liaison between multi-state efforts to productively manage bays, rivers and other estuaries, including all of the boards and commissions that affect the Chesapeake Bay or its tributaries. Several commissions include representatives from states in the drainage basin whose waters flow into Maryland and others concerned with Maryland's ocean and interstate fisheries which have a significant economic impact on the State.

Tidewater Vessels

The State yacht, Maryland Independence, is the flagship of State vessels. This 112' custom built vessel is used for the promotion of the Chesapeake Bay and the State of Maryland. Numerous cruises were conducted throughout the year and the vessel took part in many festivals around the State.

Other vessels in this group include the skipjack Anna McGarvey, and the vessel Declaration.

Fort Washington Marina

Fort Washington Marina was taken over by the State of Maryland in October of 1987. This full service marina, located on Piscataway Creek, in Prince George's County, provides access to the Potomac River for Marylanders. The marina will be reconstructed to provide more modern facilities for those Marylanders who enjoy using the Potomac River. The new construction is expected to take approximately three years and will begin in the fall of 1988.

Oxford Laboratory

This is a unique effort between the federal government and the state. The laboratory provides scientific research and management activities in fisheries related fields. The Oxford Laboratory combines federal and state employees' efforts to work jointly on problems affecting the Chesapeake Bay. Though the laboratory is still in its infancy, under this new concept it is expected to become a model for the entire nation.

HYDROGRAPHIC OPERATIONS

Hydrographic Operations is responsible for hydrographic engineering services to establish, maintain and chart regulatory buoys and aids to navigation, survey and chart pound nets, oyster seed planting areas and private oyster leases, maintain and establish new horizontal control throughout the Bay area, act as support to the Potomac River Fisheries Commission, and to break ice during the winter for commercial shellfish operations.

Hydrographic Operations responds to requests for the placement of regulatory, navigational, and special buoys in the Chesapeake Bay and its tributaries. These requests are from other Waterway Improvement Programs, DNR Police, Fisheries, Maryland Department of Health and Mental Hygiene, State Parks, Counties and Municipalities for the placement of channel markers, shoal/hazard, speed limit, swimming and restricted areas, as well as buoys for special projects and events such as Chesapeake Appreciation Days.

DREDGING

The Dredging Program is responsible for state waterway projects involving dredging and protection of harbors and channels that are not maintained by the U.S. Army Corps of Engineers. Activities include development of hydrographic and topographic surveys at proposed channel areas, determining the need for protective structures at project sites, commenting on the design of all State funded dredging/ breakwater projects and conducting surveys of previously completed channel dredging sites.

In Fiscal Year 1987, 10 projects were completed at a total cost of $792,975.

The Dredging Program currently has 63 active funded projects in various stages of development with an estimated construction value of $10,863,435.

WATERWAY GRANTS & PROJECT PLANNING

During FY 1987, the Waterway Improvement Division continued planning efforts for the regional boating facilities at Fort Washington Marina, Dundee Creek Marina, Ocean City Marina, and Somers Cove Marina. Construction projects were completed at the Severn River Railroad Bridge, Somers Cove, Kings Landing, St. Mary's Lake and St. Clements Island. Additional construction projects were completed at Assateague, Elk Neck, Herrington Manor, Janes Island, and Shad Landing State Parks.

Engineering for a bulkhead and piers has begun at Fort Washington Marina, and for other projects at Somers Cove Marina, Solomons Island, Deep Creek Lake, Rocky Gap and Smallwood State Parks. Debris and derelict boat removal projects were completed. Total projects completed in FY 1986 were 39 local grants within 34 project areas and 10 State projects at a construction value of $627,906.57 and $785,779.00 respectively.

As of June 30, 1987, there were a total of 215 local grant projects and 26 State projects in various stages of engineering and construction.

Public information was provided through photographic display panels and staff members tending exhibit booths at fairs, boat and marine shows, and other DNR water-related programs.

MARINE SERVICES

Marine Services provides general waterway maintenance of channels, harbors, and areas of the Chesapeake Bay not maintained by the U.S. Army Corps of Engineers. Activities include: removal of debris and derelict vessels from the Chesapeake Bay and its tributaries; installation of public-owned facilities such as piers, bulkheads, boat launching ramps and small dredging operations associated with the above projects. Winter activities also include ice-breaking operations.

During FY 1987 eight State vessels were hauled at the Cambridge Terminal railway for annual maintenance and repairs.

Construction was completed on a 460 foot pier and landing at Colton Point. Also completed were repairs due to storm damage at St. Clements Island and the City Dock in Annapolis. Additional projects completed included repairs to the pier berthing the Governor's yacht in Annapolis; opening the flood gates at Frank Bentz Pond in Frederick County to drain the area prior to dredging; removal of 41 loads of gravel from the Wetlands at Point Lookout; and the removal and replacement of pilings and finger piers at Somers Cove Marina. At Fort Washington, interim maintenance began in

Local Waterway Grant Project Areas:

Baltimore City
- Marine Police Unit
- Thames Street Pier
- Towers Marina

Baltimore County
- Baltimore County Police
- Baltimore County Debris Removal

Calvert County
- County Service Contract

Caroline County
- Choptank

Cecil County
- Charlestown Wharf
- Port Deposit Marina Park

Charles County
- Friendship Landing
- Gilbert Run Park Boat Ramp

Dorchester County
- Crapo/Kirwin Boat Ramp
- Elliott Island Bulkhead
- Long Wharf
- New Bridge Boat Ramp
- County Service Contract

Harford County
- Broad Creek
- City of Havre de Grace Pier
- Concord Point Lighthouse Pier

Kent County
- Bogles Wharf
- High Street Boat Ramp/Bulkhead
- Long Cove
- Quaker Neck
- County Service Contract

Queen Anne's County
- County Service Contract

St. Mary's County
- County Service Contract

Somerset County
- Crisfield Small Boat Harbor Boat Ramp
- Deal Island
- Jenkins Creek Boat Ramp
- Rumbley Bulkhead

Wicomico County
- Bivalve Harbor
- Sharptown

Worcester County
- James T. Sturgis Park Bulkhead

order to provide safe use of the facility while it is being renovated. Five thousand three hundred and thirty cubic yards were dredged at Bivalve Channel and Harbor, and on the Choptank River at Denton.

FISHERIES DIVISION

The Chesapeake Bay is one of the most productive estuaries in the world. Maryland's portion of the bay has historically been a major producer of oysters, blue crabs and soft shell clams. It is also the spawning ground for the majority of the east coast's stock of striped bass. The state's goal is to maintain optimum condition of fisheries stocks for purposes of harvest and ecological balance.

The Fisheries Division, with six administrative programs, has a broad range of responsibilities. It monitors species abundance and the environmental conditions affecting their populations. It also regulates harvesting activities and administers programs to increase production of oysters and fish. To achieve these goals it conducts research and education programs to ensure the available funds are spent in the most effective manner.

RECREATIONAL/ COMMERCIAL FISHERIES AND SPECIAL PROJECTS

The Fisheries Statistics and Modeling Project (FSMP) continually evaluates the harvest estimation system. Landing data is also recorded.

Commerically harvested fish species are sampled for sex, and size composition data. These data are used for developing and implementing fish management plans.

FSMP is the custodian for all of the Fisheries monitoring data collected by the Fisheries Division. Steps were begun in 1985 to ensure that DNR data will be routinely available through the EPA Chesapeake Bay Program Computing Center.

The 1985 Maryland Saltwater Sportfishing Survey was completed. Results will be summarized in the FY 1988 Annual Report.

Stream Classification

Through Maryland's water use classification system, all waterways are assigned to one of four classes. Each class is intended to protect a general use, such as shellfish harvesting or self-sustaining trout populations. The classification of a waterway dictates, in part, the conditions of discharge permits, and other regulated activities.

The concept of water use classification is being re-examined to incorporate the concepts embodied in the 1984 Chesapeake Bay Initiatives. Specifically, the project is examining ways to enhance the ability of the regulatory system to protect areas which currently support living resources, as well as, the waterways which will improve the future as a result of the Chesapeake Bay restoration program.

Special Projects

Anadromous Sportfish Stream Restorations

Projects are developed to mitigate the negative impacts to streams which are critical for spawning by anadromous sportfish.

Cooperative studies have been undertaken with other agencies to assess the effect of acid precipitation on streams. Stream pH and other water quality changes are being assessed in several anadromous fish spawning streams.

The effects of precipitation and acid deposition on early life stages of the fish is being assessed and remedial stream water quality management techniques have been implemented to enhance anadromous fish spawning.

Stream barriers are being inventoried and assessed for effects on anadromous fish passage, and plans are being made for removal of critical blockage.

American Shad Restoration

One pond, approximately 1.6 acres, is being constructed on the banks of the Susquehanna River at Havre de Grace to raise American shad for stocking and to help in restoring the upper Chesapeake Bay spawning populations of this valuable fish species.

Gwynns Falls Restoration

Baltimore City, Baltimore County, DNR Tidewater Administration Urban Fishing Project and Save Our Streams, Inc., combined dollar and staff resources to begin to restore the developed Gwynns Falls watershed to a condition suitable for recreational fishing and other uses. The goal is to create a self sufficient neighborhood effort to restore and maintain these recreational uses. Efforts in FY 1987 have produced options to prevent residential runoff, disposal of small scale toxics, water conservation, and sediment control.

Save Our Streams Interaction

Since its inception in 1970, this program has attempted to directly involve the public in resource preservation and enhancement activities. Citizens are taught to assess the water quality and health of streams. Activities are designed to show how to improve and protect the aquatic habitats. Over the past 15 years, more than 10,000 people have participated in the program.

Volunteers have used the knowledge provided through this project to reduce mud pollution from thousands of construction sites.

Habitat Investigation

Investigations in the long term problems of diminished reproductivity and viability of fisheries due to habitat degradation is the main focus of this project. These investigations deal with striped bass, oysters and clams, and also with lesser known fish species, of equal importance in the Bay's ecosystem, such as menhaden and bullheads. Fish and shellfish samples are prepared and examined macroscopically and microscopically.

The most intensive survey undertaken was the collection, examination, and evaluation of striped bass eggs and larvae from the Choptank River, and upper Chesapeake Bay. Developmental, environmental, nutritive, pathological, and virological aspects of thousands of individual larval striped bass were documented. Environmental parameters were monitored for comparison with the larval collections and evaluations.

Maryland hatcheries shipped striped

bass larvae, and each parent fish spawned to produce larvae was examined and declared free of the virus disease IPN prior to shipment of larvae.

The presence and intensity of both infectious and non-infectious diseases in oysters, hard-shell clams, and soft-shell clams is monitored by laboratory staff. One hundred and twenty major oyster bars and clamming areas were sampled in FY 1086, and more than 2,000 oysters and clams were examined.

Laboratory work was shifted to the former National Marine Fisheries Services pathobiology lab at Oxford, Maryland under a new DNR/NMFS cooperative agreement.

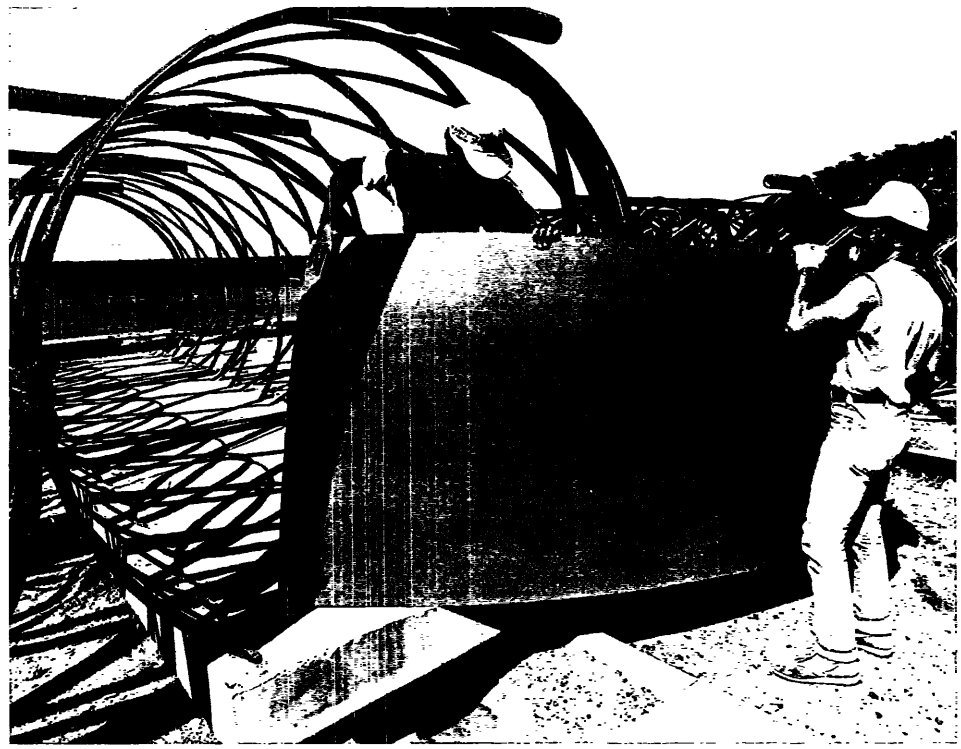
Recreational and Commercial Fisheries Enhancement

DNR's Recreational Fisheries Program was created in FY 1985 to implement projects supported by the Chesapeake Bay Sport Fishing License. The primary goal of the program is to improve the quality of sport fishing on the Chesapeake Bay and its tributaries. This goal is achieved through replenishment and conservation of sport fish stocks, enhancement of recreational fishing, habitat protection and creation, and research on tidal fishery resources.

Personnel of the Sport Fish Tournaments and Publications Project prepared displays and staffed exhibits for five major outdoor shows with attendance in excess of 500,000 persons. In addition, seminars, small shows and outdoor writers association programs were assisted and administrative help given to six major fishing Association Tournaments and other similar events.

Brochures, pamphlets, information sheets and booklets containing commercial laws and regulations for finfish, oysters,crabs, clams and fish harvest techniques and conservation were printed and distributed.

Participation in the Maryland Sport Fishing Tournament by residents and tourists has been excellent. For the 23rd year, over 4,000 fresh water and salt water citations, patches and date bars have been issued.



Assembly of fiberglass fish reef at Patuxent Naval Air Station

The Fisheries Advisory Service publishes the Tidewater Fisheries News on a monthly basis and writes and distributes materials on particular fisheries issues. This program conducts conferences, workshops and seminars for the seafood and marina industries. The Service was assigned responsibility for working with fishing groups to site access areas, and for aquatic resource education development.

The Artificial Reef Project constructed a state-of-the-art reef at Cedar Point, Patuxent River; a midwater reef off Holland Point; enlarged the reef near Tolchester in the Upper Bay; and completed site preparations for three reefs to be constructed in Fall 1987.

The Urban Fishing Project enhances fishing opportunities for urban fisheries. Engineering was completed on 600-800 fishing pier at Point Lookout State Park, with construction to be completed by Spring 1988. Over 10,000 pounds of catfish were stocked in more than 20 community ponds for the promotion of sport fishing at youth fishing rodeos — held cooperatively by community organizations.

Additional sport fishing enhancement off Ocean City saw the sinking of an 80 foot barge as an offshore reef and the acquisition of a 300 foot submarine for a fish reef.

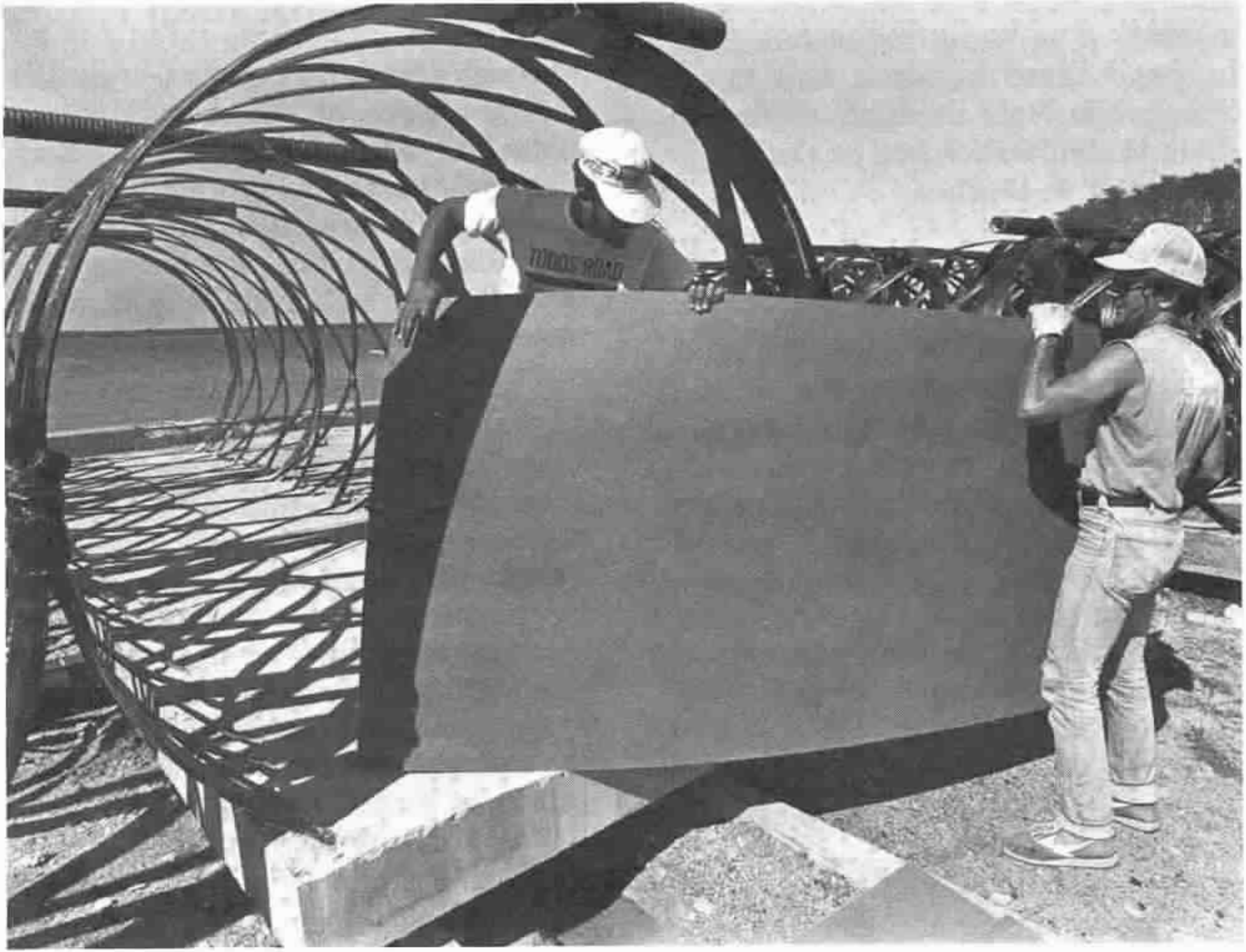
Maryland Conservation Corps

During its fourth summer of operation, the Maryland Conservation Corps employed over seven hundred and fifty people spread throughout all twenty-three counties of the state and Baltimore City. Sixty-four crews composed of ten or more corpsmen successfully labored at seventy sites that will have some impact on the Bay and its tributaries.

Work projects included soil erosion control and repair, stream cleaning, installation of stream improvement devices, trail clearing and maintenance, and other conservation projects related to the Bay.

The experiential education gained from working five days a week for seven or more weeks at minimum wage was a part of the job readiness component of the program which also included lessons on how to get a job, fill out applications, go through an interview and the basics of job etiquette.

Three days of the program were spent



on environmental education with an emphasis on understanding the Chesapeake Bay. A day was spent at a regional outdoor education center, where the corpsmembers learned about the environment they were working in and how their jobs related to the Bay cleanup. Another day was spent aboard the "Lady Maryland," a replica of an old schooner, learning the Bay's history and other important facts about the Bay firsthand. A third day was spent on the Bay aboard a charter fishing boat. The corpsmembers learned the recreational and commercial values of the Bay and how they could act to protect those resources. For many of these people this was their first experience on a boat and the highlight of their summer.

SHELLFISH

The oyster harvest for the 1986-87 season was approximately 958,000 bushels. This figure represents a decrease from the 1.5 million bushels harvested last year, and is the lowest harvest on record. The continuing low harvest is attributed to the impact of both MSX and Dermo diseases and poor reproduction. The disease, MSX, continues to be a persistent problem in many areas of Maryland waters and DNR anticipates a continued long term condition where salinities will be favorable for the disease. Surveys are being conducted to determine the extent of mortalities caused by disease with the samples of shellfish being taken to the Oxford Cooperative Laboratory for analysis.

The Oyster White Paper Committee is being re-convened to study and recommend methods which may help the DNR manage the oyster fishery in such a way as to lessen the impact of disease on harvest.

This past year, 1986, the spat set was good throughout the Chesapeake Bay, however, it was not as good as the exceptional set that occurred during 1985. The set was sufficient to provide enough spat on shell that the Department was able to transplant approximately 640,000 bushels of seed oysters from seed areas to growing areas. Additionally, over 5 1/2 million bushels of dredge shell were planted along with 214,000 bushels of fresh shells.

The Department of Natural Resources is now in its second year of its five year contract with C. J. Langenfelder Company to continue dredging and transporting dredge shells to the oyster bars of Maryland.

A major study is continuing to determine the impact of dredging on Upper Bay fisheries.

Another effort was initiated last year to increase fresh shell plantings. This effort continued through the winter of 1986-87.

The oyster hatchery program at Deal Island that began operations during 1986 continued into production during 1987. Both eyed larvae and spat on shells are being produced at the hatchery facility. They are being used for research operations and for planting on oyster bars.

During this past winter, the State of Maryland acquired the Aqua Foods International facility located at Piney Point, Maryland, with the intent of using it as an oyster growout facility. Estimates are being prepared by Departmental engineers to determine the costs necessary to develop an oyster hatchery.

Soft Clams

Soft clam landings increased to 153,211 bushels, valued at $4.4 million, in 1986-87 as a result of a strong 1985 year class which began entering the fishery in the fall of 1986. From Fall 1986 through the end of the year landings reflected market demand rather than resource availability with most production coming from Upper Bay areas in Anne Arundel, Kent and Queen Anne's Counties.

Monitoring of the soft clam disease, neoplasin; was continued in 1986, although present in most harvesting areas, prevalence ran below the 1984 and 1985 levels.

Maryland Conservation Corps Crew at Hunting Creek in Frederick County building Stream Improvement Devices

FISHERIES ENVIRONMENTAL REVIEW PROJECT

The Environmental Review Program reviews projects forwarded by Federal, State and other agencies for determination of their potential effects on aquatic habitat.

Programs reviewed include applications for wetland and watershed permits, environmental impact statements, proposed regulations, surface mining permits and water quality certifications, and proposals for study and monitoring dealing with

subjects such as acid rain and stream channelization.

Project staff take part in inter-agency mosquito control work, inter-agency insecticide committee work and other coordinative functions.

FINFISH HATCHERIES

Coldwater Hatchery Project

During Fiscal Year 1985, Coldwater Hatchery personnel produced and stocked record size trout, exceeding the exceptional production of the previous year. Public trout fishing was enhanced by the release of 221,603 catchable size (9 to 15 plus inches) trout weighing a total of 126,681 pounds into 42 streams and 28 impoundments. The combined production of the Albert H. Powell Hatchery and Cushwa Rearing Station was 147,452 trout weighing 87,249 pounds. Bear Creek Rearing Station produced 74,151 trout weighing 39,432 pounds.

Warmwater Hatchery Project

The second very successful year of a cooperative State/Federal (U.S. Fish & Wildlife Service) project has been completed. Striped bass fry were produced at the Manning Hatchery and transported to U.S. Fish and Wildlife Service Hatchery facilities for grow out. These hatcheries returned 317,583 advanced striped bass fingerlings for stocking into Maryland tidal waters. A total of 364,000 striped bass were stocked in Bay waters in the fall.

The Patuxent River received, during the Summer of 1986 and this year to date, 15,000 marked striped bass fingerlings from the Manning Hatchery and Potomac Electric Power Company. The Patuxent was also stocked with 100,000 largemouth bass fingerlings. With the stocking of over 300,000 tagged advanced striped bass fingerlings this fall, a special five year fisheries revitalization program for the Patuxent River will be completed. During this five year project the Patuxent River will have received 2.2 million striped bass and striped bass hybrids and 450,000 largemouth bass from our hatchery effort.

The hatchery program supported the freshwater fisheries program by producing largemouth bass, smallmouth bass, bluegill, redear, and forage species utilizing the Joseph Manning Hatchery and culture stations located at Unicorn and Lewistown.

FRESHWATER FISHERIES PROGRAM

COLD WATER FISHERIES PROGRAM

The Cold Water Fisheries Program is responsible for proper management of the cold water fisheries resource of the State. This resource consists of naturally occurring populations as well as stocked individuals of brook, brown, and rainbow trout, their associated biota, and the habitat in which they live. The primary objective of the Program is to preserve and enhance the cold water fishery resource while at the same time maximizing opportunities for public recreational trout fishing within existing economic and environmental limitations.

To meet this objective the staff of the Cold Water Fisheries Program conducts studies of trout population dynamics and environmental conditions. These studies have documented the presence of naturally reproducing trout populations in over 470 miles of 135 streams of the State.

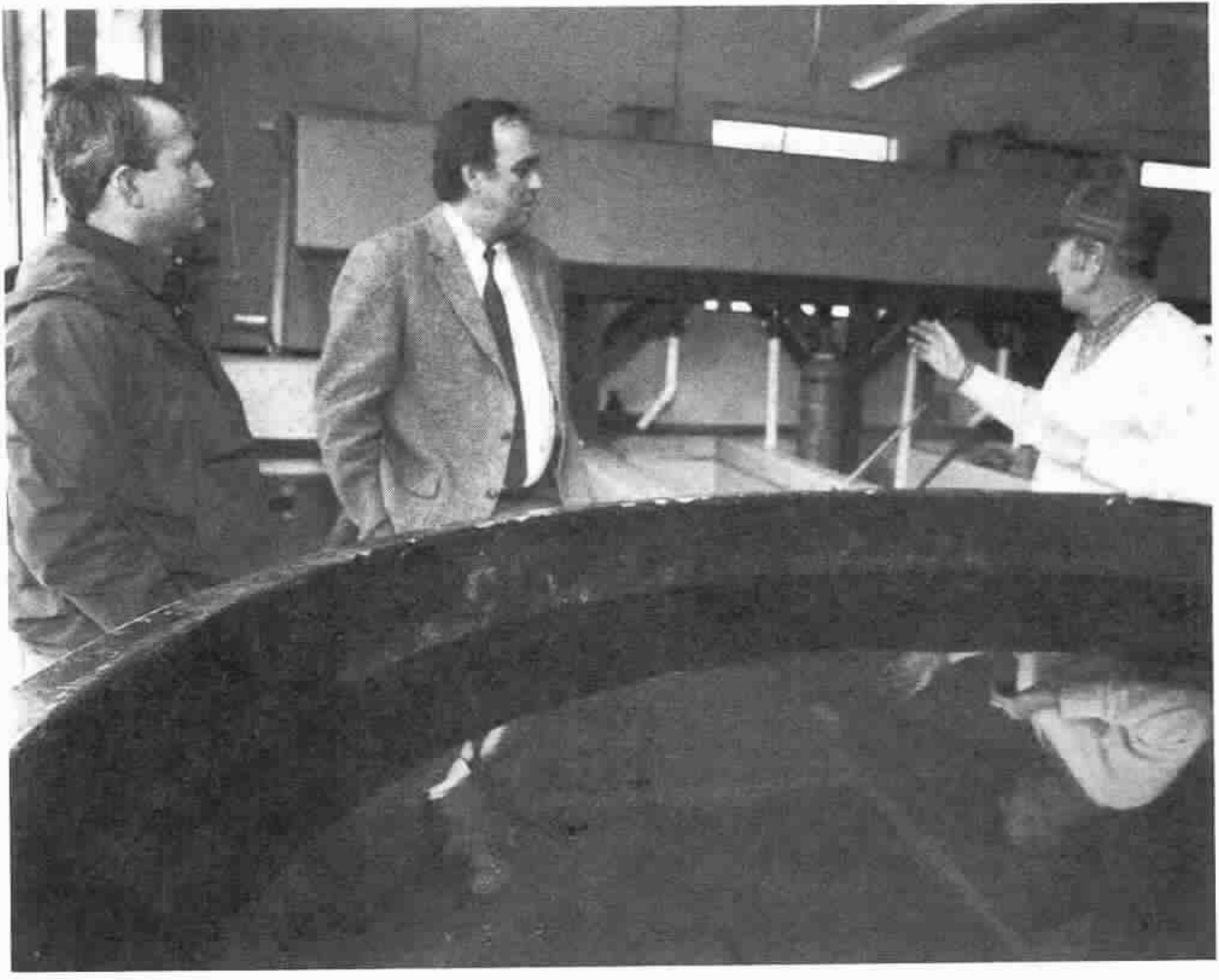
During Fiscal Year 1987, major effort was directed toward intensive ecological studies of the following watersheds: Youghiogheny River (Garrett Co.), Savage River (Garrett Co.), Beaver Creek (Washington Co.), Hunting Creek (Frederick Co.), Little Seneca Creek (Montgomery Co.), Paint Branch (Montgomery Co.), Gunpowder River (Baltimore Co.), and Severn Run (Anne Arundel Co.).

An experimental project to establish a trout population by implanting fertilized trout eggs into the Gunpowder River (Baltimore County) was also initiated.

Other activities of the Program include, but are not limited to, the following: habital restoration, stream categorization, development and implementation of fishery management plans, and environmental review of proposed development plans.

Approximately 198,750 catchable size rainbow trout were stocked into 78

B. Florence, Dr. Brown and J. Stringer at the Joseph Manning Hatchery at Cedarville



selected streams and impoundments to provide put and take trout fishing. In addition, fingerling trout were stocked to provide put, grow, and take trout fishing. Emphasis for fingerling trout stocking was placed upon the Youghiogheny River.

WARMWATER FISHERIES PROJECT

The Warmwater Fisheries Project manages 10 gamefish, 15 panfish, and 65 rough and forage fish species. Gamefish species include:

- largemouth bass
- smallmouth bass
- walleye
- northern pike
- striped bass
- striped yellow hybrids
- yellow perch
- tiger muskie
- channel catfish

The walleye population in Deep Creek Lake is still expanding and is furnishing the best walleye fishing in Maryland. Walleye, which were stocked in Savage River Reservoir in 1984 for the first time, reached legal size of 14 inches in FY 1987. Other waters that provide fishing for walleye include:

- Potomac River
- Susquehanna River
- Youghiogheny Reservoir
- Triadelphia Reservoir
- Loch Raven Reservoir
- Liberty Reservoir
- Rocky Gorge Reservoir

The largemouth bass populations in the upper Chesapeake Bay, Wicomico River, Potomac River, Nanticoke River, and the Patuxent River tidal waters were surveyed during FY 1987. The Wicomico River tidewater bass population is being maintained by recruitment from other waters. Survival rates for largemouth bass spawned in upper Chesapeake Bay tidal waters were significantly higher during 1986 than in previous years but it appears that continued stocking will be needed to maintain the population. Growth rates and fish condition of Patuxent River tidal bass were as good or better than other areas of the Chesapeake Bay, but very poor recruitment and reproductive success was found during 1986 in the Patuxent River.

Because the average size of smallmouth and largemouth bass caught at Deep Creek Lake during bass tournaments was declining, regulations prohibiting the harvest of bass from April 1 to June 15 were implemented in 1987 to stop the harvest of trophy sized bass during the spawning season.

Natural reproduction and growth of smallmouth bass was excellent in the non-tidal portion of the Potomac River during the spring of 1986.

Major studies conducted in FY 1987 included:

1. Evaluation of walleye introductions in Deep Creek Lake, the Potomac River, and Savage River Reservoir.
2. Evaluations of the largemouth and smallmouth bass populations in Deep Creek Lake and the Potomac River.
3. Evaluations of the slot length limit for largemouth bass in St. Mary's and Little Seneca Lakes.
4. The upper Chesapeake Bay largemouth bass management program.
5. Studies of catfish in the Patuxent River.

Lake surveys and fishery management reports for Liberty Reservoir and Cunningham Falls lakes, including water quality data, fish population data, and management plans were completed in 1987 and are available upon request.

ESTUARINE/MARINE FISHERIES PROGRAM

The Estuarine Fisheries Program is responsible for monitoring, stock analysis, and recommendations on management of finfish populations in Maryland tidewater and marine environments. The program coordinates, with a number of other DNR agencies, university scientists, and federal agencies, to provide data and fish samples, and to share information.

The objective of the Fisheries Management Plans (FMP) Project is the development of species-specific plans for the long term management of the fish species. The source documents for two key species, white perch and yellow perch, were completed and are currently in rough draft. Each document presents information on the biology, economics, and estimated relative abundance for both the species and the fisheries. The FMP project participated in preparation of a seafood technology report which focuses, in part, on developing methods to enhance seafood production and an aquaculture report which focuses on the policy for developing and enhancing aquaculture enterprises in the State of Maryland. The project continued to develop data bases for the understanding of patterns of commercial harvest of key finfish species. These data will provide one basis for proper management of a number of species

The following numbers of warmwater fish species produced in the Manning Hatchery, Lewistown Work Center, and Unicorn Work Centers were stocked in Maryland waters during FY 1987:

Species	Size	Numbers
largemouth bass	spring fingerlings	208,800
largemouth bass	fall fingerlings	3,500
smallmouth bass	fall fingerlings	1,500
bluegill	fall fingerlings	115,600
bluegill	adult	11,250
golden shiner	fingerlings	8,400
fathead minnow	fingerlings	1,003,000
walleye	fry	2,450,000
walleye	fingerlings	3,750
emerald shiner	adult	1,300

The moratorium on striped bass in Maryland remained in effect. Stock assessment of the winter population of striped bass indicated that since the implementation of the moratorium in 1985, there has been an increasing proportion of larger Bay resident striped bass. This is due, in part, to the successful 1982 year class and subsequent year classes which have been protected from capture. Spring spawning stock studies in four spawning areas indicate a continual decline in the abundance of older spawning females. However, the spring 1987 study shows a marked increase in the abundance of 1982 year class females over their first appearance on the spawning grounds in 1986. Despite still incomplete maturation of all female members of this year class, they are numerically dominant spawners.

The annual estuarine juvenile finfish survey monitors reproductive success of tidewater species. The summer survey is conducted monthly at 22 sites from the Potomac River to the Susquehanna River. In the spring of 1986 reproduction of most species was poor. However, white perch and spot increased in numbers over the 1985 survey. The index of striped bass juvenile abundance in 1986 was 4.1 which is about half the long term average.

The American shad fishery remained closed. In the summer of 1986, 15 juvenile shad were collected in the Susquehanna Flats. Ten of these shad were marked as being from the release of 5.12 million 18 day old hatchery produced shad fry. These fry had been released below Conowingo Dam at Lapidum Landing. There was no evidence of out-migration of young shad which had been stocked above Conowingo Dam. In the Spring of 1987 the population estimate of adult shad in the upper Bay increased to 26,700 from the 1986 estimate of 20,850. Blueback herring and alewife herring reproduction in six river systems in 1986 was relatively good. In the spring of 1987, the Tred Avon, Miles, and Wye River systems were surveyed for the spawning anadromous fish.

In the summer of 1986, the Marine Fisheries Project documented unusual numbers of silver perch juveniles in the coastal bays. This species is normally more abundant in southerly waters. The coastal bays trawl survey also showed an increase in large spot, crabs and anchovies.

White perch and yellow perch populations in the Choptank River are being intensively studied under Chesapeake Bay Stock Assessment Committee (CBSAC) funding. An unusual aggregation of sea trout juveniles was documented in the river at Denton. Relatively higher salinities resulting from reduced rainfall are probably responsible for the extension of trout this far upriver. In an effort to refine the techniques of determining age and growth of white perch, a sample of known age fish were marked with a chemical which is incorporated into the bony parts of the fish. These fish will be examined later to determine the degree of growth subsequent to the mark laid down in the bony parts.

Stock assessment of blue crab and weakfish in the Bay was continued in 1986. The objectives of this project are to determine the abundance and distribution of adult and juvenile blue crabs and weakfish and identify possible relationships between their juvenile abundance and future adult stock size.

COASTAL RESOURCES DIVISION

The Coastal Resources Division coordinates Maryland's Coastal Zone Management Program (CZMP). The Division uses federal funds to provide financial assistance to local governments and State agencies for coastal management and to improve the data base for better decision making. It ensures that State and local projects take into consideration preservation and protection of coastal resources.

The CZMP is dependent upon existing State laws, regulations and of the State's sixteen coastal counties and the City of Baltimore. These laws provide the legal and administrative bases for activities in the coastal zone. Through signed agreements, the jurisdictions and six departments concerned with coastal zone management — Agriculture, Economic and Community Development, Health and Mental Hygiene, Natural Resources, the Department of Environment, State Planning and Transportation, have agreed to carry out the goals of Maryland's Coastal Zone Management Program.

Direction and Coordination

This section provides overall direction to the activities of the Division. Fiscal management activities and the Public Participation Section are included in this unit. The Maryland Coastal Zone Management Program newsletter Coast & Bay Bylines is published quarterly. Staff support is also provided to the Coastal Resources Advisory Committee (CRAC).

RESOURCE ENHANCEMENT

This program is concerned with the management of freshwater wetlands; submerged aquatic vegetation; estuarine research and education sites; and shoreline erosion sites which may be stabilized through nonstructural methods. The staff is responsible for undertaking technical research analysis and pilot projects to determine their potential use in managing coastal resources.

The following sub-programs, the first three of which are Chesapeake Bay Initiatives, are part of the Resource Enhancement Program: Non-Tidal Wetland Protection; Submerged Aquatic Vegetation; Non-Structural Shore Erosion Control; Estuarine Research Reserve Program; and Special Investigations.

NONTIDAL WETLANDS

Non-tidal wetlands protection activities focused upon continued development of a statewide mapping and data base system for monitoring wetlands. National Wetland Inventory maps for the entire western shore region and the upper half of the eastern shore have been converted to digital format for use in the data base system. Software programs for initial manipulation of the data base have been completed. Six training and education workshops were held for the benefit of local governments and consultants to assist them with field identification and delineation of non-tidal wetlands. Several presentations were made to government and private groups to explain the non-tidal wetlands initiative and to discuss the values of and need to protect these resources. Staff conducted 64 on-site investigations to review and comment upon project proposals where activities had the potential to impact non-tidal wetlands.

SUBMERGED AQUATIC VEGETATION PROGRAM

The Submerged Aquatic Vegetation (SAV) Program is comprised of three major components: research, resource monitoring and management. The major focus of the research component is the SAV transplanting projects which are being implemented by the University of Maryland and Harford Community College in the Susquehanna Flats, Elk River, Sassafras River and the Choptank River. The twenty transplanting projects provide information on the water quality conditions which are necessary for the growth of SAVs. This information will be used to develop resources related to water quality standards for the Chesapeake Bay. Other research projects address the following issues: the reproductive biology of SAV; the historical and present abundance of SAV seeds in Chesapeake Bay sediments; and the competitive abilities and biological requirements of Hydrilla.

The resource monitoring component includes aerial reconnaissance of SAV in the Chesapeake Bay and ground-truthing projects. There are two major aerial reconnaissance projects: 1) a multiagency funded overflight; and (2) an evaluation of using remote sensing to replace the overflight. The ground-truthing of the overflight and remote sensing efforts is being accomplished with the help of the Maryland Charter Boat Captains, the Citizens Program for the Chesapeake Bay, the United States Fish and Wildlife Service, and the Chesapeake Bay Foundation. The cooperative management program, within the Potomac River, of a nuisance exotic species of SAV (hydrilla verticillata) continued in 1987 between the State of Maryland, the Commonwealth of Virginia, Washington Metropolitan Council of Governments, the District of Columbia, and the United States Army Corps of Engineers.

NON-STRUCTURAL SHORE EROSION CONTROL

Non-structural Shore Erosion Control (NSSEC) program activities included selection of a total of 26 projects for design and installation of shoreline stabilization projects on privately owned lands. These projects represent a total of 6,613 linear feet of shoreline. The average cost for a private property project is equivalent to $63.50 per linear foot of shoreline, for product design, site preparation and planting of inter-tidal marsh vegetation to stabilize eroding shorelines. Two State projects were undertaken on state-owned lands representing 3,650 linear feet of shoreline, at an average cost of $61.30 per linear foot.

CHESAPEAKE BAY NATIONAL ESTUARINE RESEARCH RESERVE

Sites being considered for designation as reserves were ranked according to a list of criteria developed during the year. DNR staff then held meetings with site property owners and the general public to explain the reserve program and to gauge interest in it. Based on the rankings and public support, five sites were nominated to NOAA in June 1987 for consideration: Jug Bay and King's Landing/Cammack on the Patuxent River, Horn Point and Adkins Marsh/Kington Landing on the Choptank River, and Otter Point Creek on the Bush River. Management plans and an EIS will be prepared during the coming year for those sites approved by NOAA.

NOAA held an evaluation of the State's reserve program in March 1987, and found that the program had improved substantially from the previous evaluation.

LAND AND WATER ACTIVITIES

Activities of this project include:

- Shoreline Improvement Grant Program
- 306A Grants
- Recreational Boating

The Shoreline Improvement Grant Program, created by the General Assembly in 1984 as part of the Chesapeake Bay Initiatives, obligated $2,000,000 in 1986 for projects which will improve the shoreline of the Chesapeake Bay. The funds are used for grants up to 75% of the cost of projects undertaken by local governments which border the Bay and its tributaries.

The Recreational Boating Program coordinates boating activities for DNR and is responsible, along with other agencies in the Department, for the development of policies for the boating industry. This Program also staffs the Boat Act Advisory Committee which provides review and comment to the Secretary of DNR on safety standards for boats and speed limits. A new issue of the Guide for Cruising Maryland Waters was prepared.

As of July 1, 1986, the Department of Natural Resources was given responsibility for the collection of boat Excise Taxes. A computer program was developed by CRD to keep track of all out-of-state registered boats and documented boats not displaying validation stickers that are using Maryland waters as their State of principal use.

Section 306A Grants are awarded to local jurisdictions for projects in the Coastal Zone. These include projects such as a riverfront park in Princess Anne and a re-forestation project along the Patuxent River in Anne Arundel County. Other projects include a boardwalk at the south end of Ocean City and park land acquisition in Leonardtown.

PROJECT EVALUATION AND ENVIRONMENTAL REVIEW

The responsibilities of the Project Evaluation and Environmental Review Program fall into three general categories: Project Review, including Federal Consistency determination pursuant to Section 307 of the Federal Coastal Zone Management Act (CZMA); providing local technical assistance; and overall coordination activities as indicated in the Coastal Zone Management Program (CZMP) Memoranda of Understanding.

Due to the broad nature of the CZMP, the types of projects reviewed include erosion control, dredge and fill, municipal and industrial waste disposal, filling within the 100-year floodplain, shoreline residential development, and transportation.

A special aspect of project review activities are those involving a Federal action. The CZMA requires that Federal activities in the coastal zone be consistent to the extent practicable, with a state's CZMP. Based on the state's review, the appropriate Federal agency must be notified as to the

projects consistency within the Maryland CZMP.

During the past year the program reviewed approximately 950 projects, the majority consisting of U.S. Army Corps of Engineers permits and Clearinghouse projects.

Two forms of assistance are provided to local governments, (1) technical and financial aid through annual contractual agreements, and (2) technical support in the review of local plans and projects.

A primary effort in the next few years will be the implementation of the Chesapeake Bay Critical Areas Act.

MONITORING & DATA MANAGEMENT

This program is responsible for implementing two of the Chesapeake Bay Initiatives — the Regional Data Center and Living Resource Monitoring.

The Chesapeake Bay program Computer Center is located at the EPA Annapolis Liaison Office. It is funded by Maryland, Virginia, Pennsylvania, and the U.S. Environmental Protection Agency. In addition to funding, Maryland provides current and historical fisheries and habitat monitoring data.

The Living Resources Monitoring Program objectives are: (1) to collect information concerning the abundance and habitat quality of economically important living resources; (2) to provide information necessary to determine the effectiveness of pollution control measures in protecting and restoring the living resources of Chesapeake Bay; (3) to assess the effects of habitat quality on survival and reproductive success of economically important living resources; and (4) to store all data on the State/Federal Regional Data Center Computer, where it is made available to the Chesapeake Bay user community.

The monitoring program has participated in two major field studies. (1) Since 1983, data has been collected on the abundance and survival of early life stages of anadromous fish and the quality of spawning habitats. (2) An investigation of oyster mortality in relation to habitat conditions was initiated in 1986. This study includes intensive monitoring of oyster survival and hydrography in the Choptank River in cooperation with the University of Maryland. In 1987, the project was dovetailed with comprehensive interagency studies of dissolved oxygen dynamics in central Chesapeake Bay. The discovery of high oyster mortalities in the Choptank River in early summer 1987 alerted state biologists and managers to what appears to be a Baywide malady of the MSX parasite.

The program provides scientific coordination, data management and report preparation for monitoring of the environmental impacts of the Hart-Miller Islands dredged material containment facility. The program is also conducting computer modeling studies of the effects of Conowingo Dam operation on salinity in the upper Chesapeake Bay.

Program staff have assisted with the technical and management aspects of the Chesapeake Bay Restoration through participation on several subcommittees and work groups. Much of the staff work on the document Habitat Requirements for Chesapeake Bay Living Resources, a product of the Living Resources Task Force, was provided by monitoring and Data Management.

To aid in understanding problems of living aquatic resources, the program has supported research on the physiological responses of striped bass and oysters to water quality, food quality and parasitic disease. A model of the Chesapeake Bay ecosystem, developed by University of Maryland researchers with support from the program, has illuminated several important ways in which the multitude of different animals, plants and bacteria that inhabit the Bay affect each other.

STATE OF MARYLAND EXPENDITURES 1987

TOTAL $8,314,069,222

Public Safety and Correction	$451,850,000	(5.0%)
General Services	$31,737,000	(0.4%)
State Reserve Fund	$50,000,000	(0.6%)
Financial & Revenue Administration	$147,908,000	(1.6%)
Executive & Administrative Control	$63,885,000	(0.7%)
Judicial Review & Legal	$113,862,000	(1.3%)
Legislative	$27,810,000	(0.3%)
Public Debt	$395,963,000	(4.4%)
Civil Divisions	$100,107,000	(1.1%)
NATURAL RESOURCES	$141,369,000	(1.6%)
Employment and Training	$88,486,000	(1.0%)
Economic and Community Development	$80,861,000	(0.9%)
Transportation and Highways	$1,592,619,000	(17.8%)
Human Resources	$604,018,000	(6.7%)
State Planning	$5,297,000	(0.1%)
Agriculture	$29,548,000	(0.3%)
Licensing and Regulation	$202,673,000	(2.3%)
Health and Mental Hygiene	$1,556,721,000	(17.4%)
Budget and Fiscal Planning	$5,688,000	(0.1%)
Personnel Administration	$27,692,000	(0.3%)
Education	$3,248,666,000	(36.1%)

DEPARTMENT OF NATURAL RESOURCES 1987 EXPENDITURES

TOTAL EXPENDITURES $141,369,000

Maryland Geological Survey	$2,978,000	(2.1%)
Tidewater Administration	$39,523,000	(28.0%)
Office of the Secretary	$10,220,000	(7.2%)
Hazardous Waste	$293,000	(0.2%)
Natural Resources Police	$11,039,000	(7.8%)
Energy Administration	$4,508,000	(3.2%)
Capital Programs Administration	$33,586,000	(23.8%)
Maryland Environmental Trust	$293,000	(0.2%)
Forest, Park and Wildlife Service	$26,496,000	(18.7%)
Water Resources Administration	$7,061,000	(5.0%)
Maryland Environmental Service	$5,372,000	(3.8%)

In a Natural Resources Emergency or for assistance, telephone (301) 267-7740 twenty-four hours a day or (301) 974-3181 during working hours.

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