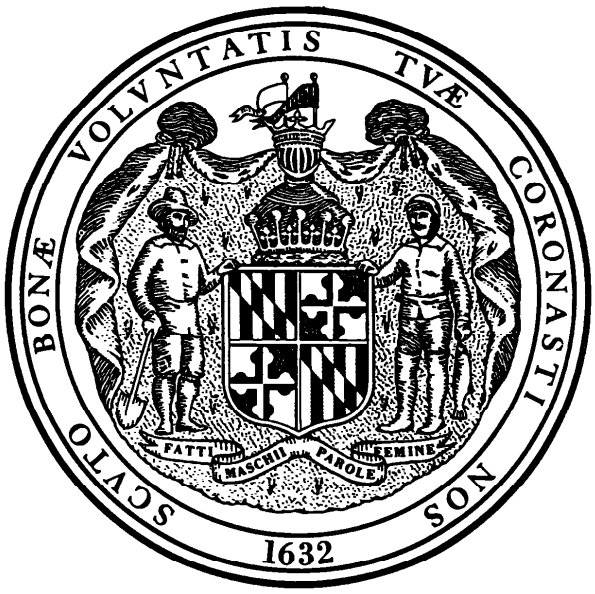
1986 ANNUAL ACTIVITIES REPORT

MARYLAND DEPARTMENT OF NATURAL RESOURCES



STATE OF MARYLAND

HARRY HUGHES

GOVERNOR

LOUIS L. GOLDSTEIN

COMPTROLLER OF THE TREASURY

WILLIAM S. JAMES

TREASURER

DEPARTMENT OF NATURAL RESOURCES

TORREY C. BROWN, M.D.

SECRETARY

MARYLAND DEPARTMENT OF NATURAL RESOURCES

1986 ANNUAL ACTIVITIES REPORT

THE COVER: Great Blue Heron at Blackwater National Wildlife Refuge.

TORREY C. BROWN, M.D.
SECRETARY

JOHN R. GRIFFIN
DEPUTY SECRETARY

STATE OF MARYLAND
DEPARTMENT OF NATURAL RESOURCES
TAWES STATE OFFICE BUILDING
ANNAPOLIS 21401

FOREWORD

The natural resources of the State of Maryland are vital to our welfare and economic progress. Our lands, waters, and the air above, are critical to all of us, whether we dwell in the city, work on the land, or, earn our living from the rich marine resources of our State.

In the past through neglect or lack of understanding, we have allowed many of nature's blessings to be abused and mistreated. We are now hard at work to undo the mistakes of the past and ensure that the State's resources we enjoy are also left for future generations.

This report gives an account of our efforts during 1986 to protect and enhance our natural resource heritage for the benefit of all Maryland citizens.

Torrey C. Brown, M.D.
Secretary

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EXECUTIVE DIRECTION

The Secretary, The 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 1986, 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 and processing. The Program is responsible for administering the Department's $120 million plus budget, providing fiscal information to agency administrators and maintaining fiscal controls over income and expenditures. During FY '86, the Timecard Distribution System, which enhances the collection of federal funds and management, information was expanded to additional units.

In FY '87 the Disbursements Enhancement Project, initiated by the Comptroller of the Treasury, will become fully operational and the working fund system will be automated. During the coming fiscal year, Fiscal and Supportive Service 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 disbursements, cash receipts and accounts receivable. By implementing improved data processing support, the level of service to the Department can be enhanced and productivity can be increased.

Special, Federal and Capital Fund Management

During FY '86 financial records were maintained on 116 Shore Erosion projects totalling $2,418,000; 80 Waterway Improvement projects totalling $3,981,000; 209 Outdoor Recreation Land Loan projects totalling $9,719,000; 69 General Construction Loan projects totalling $6,307,000 and Federal Grant projects totalling $15,596,000.

Mail Distribution

During FY 1986 the department's mailroom handled more than 4,850,000 pieces of mail and 25,000 parcels.

Supportive Services

This project is responsible for controlling Real and Personal property purchased or otherwise received by the Department. As of June 30, 1986, the value of Land and Buildings to which the department holds title exceeds $246,000,000. During FY '86 inventory records for 21,500 items valued at approximately $23,500,000 were maintained, 1,500 vehicles and 700 watercraft are registered and titled. These services are also responsible for maintaining monthly motor vehicle report forms.

Procurement

This project is responsible for the processing service, maintenance and construction contracts, requisitions and purchase orders in accordance with Title 21, State Procurement Regulations. This unit reviews personal service and timber sale contracts and revises and updates the DNR Supervisor's Manual. During FY '86, 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 totalling nearly 2,500.

Data Processing

The Data Processing 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.

Data Processing activities are dispersed throughout the Department. The Maryland Environmental Service (MES) operates an IBM System 36 minicomputer. In the Tawes Building, all units share a Four Phase/Motorola minicomputer system. Cathode Ray Tubes (CRT's) on the system have the capability of doing local intelligent data entry and word processing, with data communications to the An-

napolis Data Center's (ADC) IBM 3081 mainframe computer. The Department has approximately 80 computer applications of various sizes and complexities in operation at the ADC. The data for these applications are keyed locally on the Four/Motorola minicomputer and transmitted via leased phone lines to the ADC. Printed reports are produced on the Four Phase/Motorola line printer. Word processing printers, located in various units, are also connected to the minicomputer system.

In addition to the procurement of 36 micro-computer systems and a significant upgrade to the Department's Four Phase system in FY 1986, plans are being completed to procure, in FY 1987, a modern Department-wide integrated system.

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

"Start the race!" at Kent Island Yacht Club.

LICENSING AND CONSUMER SERVICES

Licensing and Consumer Services administers the State Boat Act and the licensing provisions under the Natural Resources Article for the Tidewater Administration and the Forest, Park & Wildlife Service. The section 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. The five Natural Resources Regional Service Centers are under the supervision of this section. This unit 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 Adopt-A-Rockfish mandate expired in 1986 with a total of $36,622 in revenues collected and 6439 certificates issued during the life of the program.

The six Licensing and Consumer Services Offices collected gross revenues of $21,318,187 representing 1,105,025 transactions. This is a 14% increase in revenues over 1985. Included were 32,193 applications for Maryland boat titles resulting in $11,133,077 in boat title taxes collected; 129,022 applications for boat registrations resulting in revenues of $1,389,172; 6,347 applications for documented yacht stickers totaling $31,715; also 863,508 applications for various recreational fishing and hunting licenses and stamps resulting in revenues of $6,523,020. Of the 863,508 recreational fishing and hunting licenses and stamps, 198,106 were the recently created Chesapeake Bay Sport Fishing Licenses. Licensing and Consumer Services processed 17,930 applications for commercial fishing licenses with revenues totaling $715,881. A total of $115,845 was collected for the recordation of security interest with $46,518 deposited to the account of the Comptroller of the Treasury, $38,765 available to be distributed to the counties and $30,562 for offsetting costs of the collection and recordation. Gross revenues from publications were $134,995 of which $132,095 was generated from the sale of the "Guide For Cruising Maryland Waters".

Licensing and Consumer Services staff processed 129,022 boat registrations of which 12,975 were issued for three years free-of-charge. Also processed were 4,084 oyster and clam dealer reports which accounted for over 2,621,406 taxed bushels of shellfish (1,494,380 harvested bushels) and $855,815 in severance, import and export taxes. The Licensing and Consumer Services staff provides daily direction and interaction between the Department and the 575 licensed boat dealers, 252 fish dealers, 24 Clerks of Court, 7 hunting and fishing license distributors, 214 hunting and fishing license consignment agents and 467 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, provide comprehensive administrative support to the Regional Managers and field per-

sonnel of all units of the Department located at the centers. The Regional Service Center in Southern Maryland collected $10,416 on behalf of the Potomac River Fisheries Commission through sales of Potomac River Fisheries Commission Licenses and deposited the money directly to the Potomac River Fisheries Commissions account.

In addition, Licensing and Consumer Services collected and deposited to the State's accounts $402,885 in miscellaneous permits and sales.

Of the recreational fishing and hunting licenses recorded as sold, 36,890 were returned by retail agents resulting in $185,902 in refunds. The net revenue from recreational fishing and hunting licenses is $6,336,686.

Of revenues collected during FY 1986, $19,814,210 was 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.

Licensing and Consumer Services' total costs for FY 1986 to accomplish these services was $2,134,201.

During the FY 1987, L&CS plans to implement fully Chapter 828, Acts of the 1986 General Assembly, which establishes an excise tax on vessels in lieu of the previous title, sales and use tax, and transfers the taxing responsibility for all motor vessels from retail sales tax to the Department of Natural Resources. The Department will continue to collect the excise tax (formerly the title tax) on vessels to be titled. This legislation also established a penalty and interest on those taxes not paid within 30 days from the date the tax liability occurred which may be assessed against licensed dealers or the purchaser, depending on the transaction.

The 1986 implementation of a revised fishing license allowing purchase of the license by mail was very successful and helped increase fishing license sales by 18%, the number of consignment agents selling licenses rose from 214 to 253. This format, with a minor change to allow for a smaller fishing license, will be continued during 1987.

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. L&CS plans an aggressive education program familiarizing all agents, dealers, users and employees of the licensing and tax process. Improved capability to provide information statistics for use by the Maryland Natural Resources Police and Department of Natural Resources managers is planned.

Through the use of news media and by enhancing education programs, Licensing and Consumer Service plans to increase public awareness of license requirements. Further plans include efforts to simplify licensing procedures to provide maximum service to the public by the most cost effective and efficient means possible.

PUBLIC AFFAIRS OFFICE

The year was marked by activities designed to strengthen and coordinate the Department's communications efforts to improve public understanding of DNR's mission and the many issues associated with the development and protection of Maryland's natural resources.

This included the appointment of a new office director, changing office designation from Natural Resources Assistance and Information to Public Affairs Office.

During the year, a number of initiatives were undertaken to enhance DNR's public identity and understanding of its programs including design of a new logo for the Department and its agencies; a new travelling exhibit describing the department and its various components; and significantly improved photographic and video coverage of significant events and activities.

Major public affairs projects conducted during the year included media activities associated with the Ocean City Beach Replenishment and Hurricane Protection Project, coastal zones, rockfish, oysters and other Chesapeake Bay restoration activities, safe boating, wildlife protection campaigns; exhibit participation in the Maryland Association of Counties Conference, Patuxent River Discovery Day, Chesapeake Appreciation Days, Baltimore Harbor Expo and strengthened coordination with advisory and local interest groups.

Bagpipe player at Baltimore Inner Harbor.

PERSONNEL ADMINISTRATION

This administration is responsible for all personnel services for the Department.

PERSONNEL ADMINISTRATION ACTIVITIES	
PERSONNEL TRANSACTIONS PROCESSED (Appointments, Reclasses, etc.)	5897
RECLASSIFICATION STUDIES:	492
Desk Audits	54
CONTRACTS —	
Personal Services Salary Certification *14 month total	81
SPECIFICATIONS REVISED	6
SUGGESTIONS PROCESSED	3
BLOOD PROGRAM —	
Drives	4
Donors	393
Units Produced	367
Disbursement	91
INTERVIEW & MOVING EXPENSE REQUEST —	10
APPLICANT ACTIVITY —	
Correspondence	1226
Walk-ins	650
Interviews	150
Telephone Inquiries	2752
Employee Reviews	96
EXAMINATIONS REQUESTED	11
EMPLOYEE GRIEVANCES (4th and 5th Step Hearing)	28
NEW EMPLOYEE ORIENTATIONS	6
STATE ACCIDENT FUND ACTIVITY	
First Report of Injuries Processed	184
Workmen's Compensation Hearings Coordinated/Attended	3
Bills Processed	376
MISCELLANEOUS CAMPAIGNS (Flu innoculations, various employee benefit programs)	5
UNEMPLOYMENT INSURANCE HEARINGS	3

Highlights:

Coordinated and participated in the planning of a human relations training program which was given to approximately 500 law enforcement personnel.

Coordinated a very successful Annual Salary Review which resulted in salary adjustments for approximately half of DNR employees.

Participated on interdepartmental task force to develop Departmental policy to assume all testing, promotional and outside (open), and selection responsibility for the Natural Resources Police Force.

Coordinated, trained staff to conduct and supervised the administration of a simultaneous, three site, three part (physical demonstration, oral and written) examination for Cadet (NRP), involving about 100 staff.

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 to units of the Department, periodic reports. 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.

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 resources 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, 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, Wild and Scenic Rivers, Acquisition Graphics and Research, Capital Budget Planning and Natural Heritage and Environmental Review.

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 reviews for other Department projects.

Two master planning efforts, including the formation of citizen advisory committees, commenced during fiscal year 1986. The citizen advisory committees, Department staff, elected officials and representatives of local and federal governments participate in the development of master plans.

During fiscal year 1986, Resource Planning was involved in plan preparation for the following major projects:

Back River Neck Peninsula
Choptank River Bridge Fishing Pier
Gunpowder Falls State Park—Days Cove Area
Hart-Miller Island
Patuxent River Natural Resources Management Areas
  Kings Landing/Cammack Properties
  Merkle Wildlife Sanctuary
  The Peed and Wiedmeyer Properties
St. Mary's River State Park
Severn River—"Gems of the Severn" Report
Smallwood State Park
Soldiers Delight Natural Environment Area
Susquehanna State Park—Steppingstone Museum

Wild and Scenic Rivers

The Wild and Scenic Rivers project prepares resource management plans for the rivers that comprise the Wild and Scenic River system of Maryland; promotes the wise use of the rivers' land and water resources; improves resource conservation measures; prepares an inventory and study of other Maryland rivers and administers the Youghiogheny Wild River Regulations. This project coordinates planning activities with local citizen advisory groups and governing bodies to develop river and related land use recommendations.

Completed planning projects for fiscal year 1986 included:

The Maryland Rivers Study—Executive Summary
The Anacostia Project

Continuing planning projects include:

Monocacy River
Youghiogheny River
Potomac River Safety Master Plan
Wicomico River/Zekiah Swamp
Maryland Rivers Inventory—Phase III—Tributaries of the Chesapeake Bay

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 fiscal year 1986 were:

Patapsco Valley State Park—Project Boundary Map
Garrett County—ORV Trails Map
Seneca Creek State Park—Topography and mapping
Youghiogheny River Scenic Corridor—Line of Sight Profiles
Ocean City—Project and Property Line Maps
Isle of Wight—Project Boundary Map
Bush Declaration—Project Boundary Map
Green Ridge State Forest—Continental Trust Maps
South Mountain State Park—Aerial Photography
Garrett Country—Aerial Photography

Acquisition Graphics staff expend 40% of their time providing technical research and support to the Department's Legal Office to resolve the growing number of property disputes which occur between private owners

bordering on Department areas. This support takes the form of an overall analysis of the problem including property research, field visits, and meetings with landowners, culminating in a final report recommending methods of resolution.

Property research projects completed in fiscal year 1986 were:

Idylwild W.M.A.
Gunpowder Falls State Park
Savage River State Forest
Hallowing Point Boat Ramp
Patuxent River N.R.M.A.
Patuxent River State Park
Smith Island
Elk Neck State Park
Dans Mountain W.M.A.
Youghiogheny River Scenic Corridor
South Mountain State Park
Rocks State Park
Potomac State Forest

Capital Budget Planning

The Capital Budget Planning staff is responsible for the preparation of the Department's annual Capital Budget and Five Year Capital Improvements Program. Projects are added to the program annually to meet the facility needs of the Department. Also, many projects originate from master facility plans for the development of new State parks and other areas administered by the Department.

The types of projects included in the Capital Budget Program are: shore erosion control; replacement and renovation of existing facilities; operational support facilities; park and recreational facilities; and stabilization and rehabilitation of historic structures.

The Capital Budget and five year Capital Improvements Program for fiscal year 1988 was submitted to the Department of State Planning on July 1, 1986 for review and consideration and recommendation to the Governor for inclusion in the State Capital Budget for presentation to the Maryland General Assembly for legislation authorization.

Natural Heritage and Environmental Review

Natural Heritage staff systematically collects, records, and analyzes information about the State's biotic diversity and as a result maintains the State's most extensive computerized data base of species and habitat information. Heritage Program responsibilities include: the identification of representative elements of Maryland's Natural Heritage, including habitats for rare and endangered species and natural communities; monitoring 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 Heritage Program is cooperating with many private conservation groups, such as The Nature Conservancy, to facilitate their identification and protection of significant habitats.

The Natural Heritage Program conducts environmental reviews as requested for DNR projects and lands. These reviews include detailed inventories of natural and manmade resources, rare and endangered species, natural conditions and processes, attributes and limitations for use of the area.

During fiscal year 1986, the Heritage staff demonstrated the program to citizen's groups, governmental agencies, and private organizations. Over 2,000 data requests were filled. Approximately 40% of these were from divisions of state government. Other requests included federal government agencies, non-profit groups, county governments, consulting firms and academia.

Mulberry Fields shoreline on the Potomac River, St. Mary's County

PROGRAM OPEN SPACE

The mission of Program Open Space is to provide public recreation and open space areas within Maryland. It coordinates acquisition and development, administers state and federal grants to Maryland's subdivision for local recreation areas and open space, and coordinates development and maintenance of the Helen Avalynne Tawes Garden.

The fiscal year 1986 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 fiscal year 1986, Program Open Space continued to make progress in meeting the Department's acreage goal of 395,944 acres. Approximately 5,000 additional acres were acquired in fiscal year 1986, leaving a balance of 73,000 acres yet 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 beach front areas. Presently, there are 225 parcels of land involved with over 4200 property owners. The necessary property rights should be obtained by October, 1987 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 boardwalks to the Delaware line.

Local Share Activity

In fiscal year 1986 there were 43 acquisition grants approved for the county and municipal governments, with a total Program Open Space assistance of $5,722,320. The completion of these projects will result in an additional 864 acres of local park land. There were also 102 development projects or amendments approved by the Board of Public Works with a total assistance of $6,865,390. Since 1970 Program Open Space has provided $179 million to the local governments for park grants. At the end of fiscal year 1986 the unencumbered balance was $15,900,760; an obligation percentage of 86 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.

According to the Annotated Code of Maryland, Sections 5-901 and 5-903, a local governing body in Maryland and the Maryland National Capital Park and Planning Commission are entitled to receive an amount equal to one half of the federal funds allocated to the State of Maryland through the Land and Water Conservation Fund. To comply with this law, the annual allocation is split fifty/fifty between the State and the local governments. Each county receives an apportionment according to a formula created by a committee appointed by Governor Tawes in 1965.

To alleviate the submission of numerous small local projects to the Federal Government, the State submits several major projects to recover the entire annual allocation. The local governments receive their share by submitting a project application to DNR which complies with Program Open Space guidelines and State and local comprehensive plans.

Through fiscal year 1986, the State of Maryland received apportionments totaling $61,594,465. Of that amount $59,378,327 has been obligated on 365 park acquisition and development projects throughout the State; an obligation rate of 96 percent.

In fiscal year 1986 Maryland was reimbursed $5,221,110 from the Federal Land and Water Conservation Fund. Local governments expended $1,146,584 on local park acquisition and development and Maryland invested $2,933,094.

HELEN AVALYNNE TAWES GARDEN

Plans for the garden's Eastern Shore development were completed in FY 1986. Construction of a boardwalk and sand dunes is in progress and should be completed in early 1987. The garden staff will then place plants, native to Coastal Maryland, on the peninsula. These improvements are funded in part by the garden's Stevie Lyttle Fund, an account of District II of the Federated Gardens Clubs of Maryland.

The garden's Advisory Board has planned a sales area, within the Visitor Center, to generate revenue to help support the garden. The gift shop is set to open in fiscal year 1987.

Plans for a Japanese garden at the Tawes State Office complex were the result of a cultural exchange between the State of Maryland and the Kanagawa Prefecture in Japan. A concept plan and detailed drawings were prepared by Japanese landscape architects. Because of more pressing

financial needs, no funding for this construction (at an estimated cost of $400,000) was requested from the 1986 session of the General Assembly.

Visitor Center programs were initiated in FY 86. Forty-eight natural resources-related programs were conducted involving 660 people. Eighty-nine guided tours took 1,275 visitors through the garden. Special events including concerts and a bill-signing ceremony drew more than 1,000 people. Over $2,500 was received in contributions.

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 in 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.

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 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.

Financial aid in the form of 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 of construction costs, fifty percent of the next $20,000, twenty-five percent of the next $20,000 and ten percent of that portion of the construction costs over $90,000.

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 86
ACCOMPLISHMENTS

Technical Assistance Actions	395
SEC Loan Applications Received	104
Engineering Contracts Awarded	32
Construction Projects Bid	24
Construction Contracts Awarded	18
SEC Loans Processed	32
Length of Shoreline Protected by:	
Timber bulkheads	3,265.03 feet
Stone revetments	12,082.47 feet
Total	15,347.50 feet
	2.91 miles
Number of Projects Completed	31
Number of SEC Loans Involved	60
Amount of SEC Funds Loaned	$2,840,516
Total Cost of Construction Completed	$3,334,270

Maryland Governor Harry Hughes, second right, and Ocean City Officials, discuss city's Beach Replenishment and Hurricane Protection project, a cooperative undertaking of local, State and Federal agencies to safeguard the city's beach front.

LAND MANAGEMENT AND 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 include the Merkle Wildlife Sanctuary, Somers Cove Marina and the Fair Hill and Patuxent River Natural Resources Management Areas.

At Fair Hill, a Concept Plan has been produced recommending development of the property as an equestrian center offering diverse public activities. Construction of a privately funded thoroughbred training facility is underway. Steeplechase race meets are held four times each year at Fair Hill and a new grandstand, with a 2,000 seat capacity, for these races is also under construction.

A $400,000 visitors center at the Merkle Wildlife Sanctuary is nearing completion. The center will provide information to the public on the sanctuary's history, the characteristics of the thousands of Canada Geese that winter at the property, and the principles of wildlife management.

The Somers Cove Marina, containing 272 boat slips, is located in Crisfield. Another 50 boat slips, to be built by the Waterway Improvement Division of Tidewater Administration, are scheduled for the Marina in FY 1987.

This project is also responsible for managing more than 2,000 acres of land along the Patuxent River. A management plan to address recreation opportunities, soil conservation, wildlife habitat improvement and forestry management is being prepared.

This project is responsible for executing all leases, rights of ways, easements and use agreements for properties of the Department. The section also maintains a Real Property Inventory for the Department and processes all requests for disposal, razing or change in use of properties.

Somers Cove Marina at Crisfield, Maryland

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, to private corporations, organizations and the general public. This project responds to requests regarding grant sources, program development, lectures and workshops.

Two publications to serve recreation and park professionals, academic institutions and the public are published. "Recreation Reflections", a bi-monthly newsletter, reports events and new developments in recreation and leisure services. A "Directory of County and Municipal Recreation and Park Boards and Commissions" is compiled annually. It identifies administrators and directors of all recreation departments at State, Local and Municipal levels of government and includes a roster of all Recreation and Parks Advisory Boards and Commissions.

In addition, a program has been developed that will assist government and private agencies in providing recreation opportunities and services to Maryland's special populations.

Enterprise Development

This is a new project that 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.

Some projects which have been under consideration are: the construction of a resort/conference center in Western Maryland; development of an equine training center at Fair Hill; and restoration of the Mt. Airy Mansion at Rosaryville State Park into an historic country inn.

Capital Development

The Capital Development program provides engineering, architectural and administrative services to agencies within the Department for the design and construction of new facilities. During fiscal year 1986, 14 design and 22 construction projects, totaling more than $3.5 million, were completed. Major projects included: renovations of the Herrington Manor Bathhouse and the Bennett Building; the Natural Resources Police Regional Office at Johnson; the Seneca State Park day use area; the Deal Island Oyster Hatchery; and the Hallowing Point Regional Service Center.

Chesapeake Bay Critical Area Commission

Background

The Chesapeake Bay Commission was created by the Chesapeake Bay Critical Area Law in 1984. 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 a specifically designated Critical Area. The Law recognizes that the land immediately adjacent to the Bay has the greatest potential for affecting water quality and fish, plant and wildlife habitat in the Bay, and has 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 Critical Area Commission is the designated body to draft this strategy through criteria to guide development in the Critical Area. These criteria are to be used by the 16 coastal counties and the 44 affected municipalities in the development of their respective critical area programs. The Commission, which consists of 25 members appointed by the Governor, had until December 1, 1985, to promulgate the criteria. The criteria were promulgated and were passed by the General Assembly and signed by the Governor on May 13, 1986.

Accomplishments

The criteria and 4 amendments to the Critical Area Law passed the General Assembly and were signed into Law in May, 1986.

Sixty letters were sent to the affected jurisdictions asking each whether or not it intended to develop its own Critical Area Program. By June 27, 1986, all jurisdictions responded favorably to the Commission.

The Commission is proceeding to secure Scopes of Work from each local government so that program development can begin.

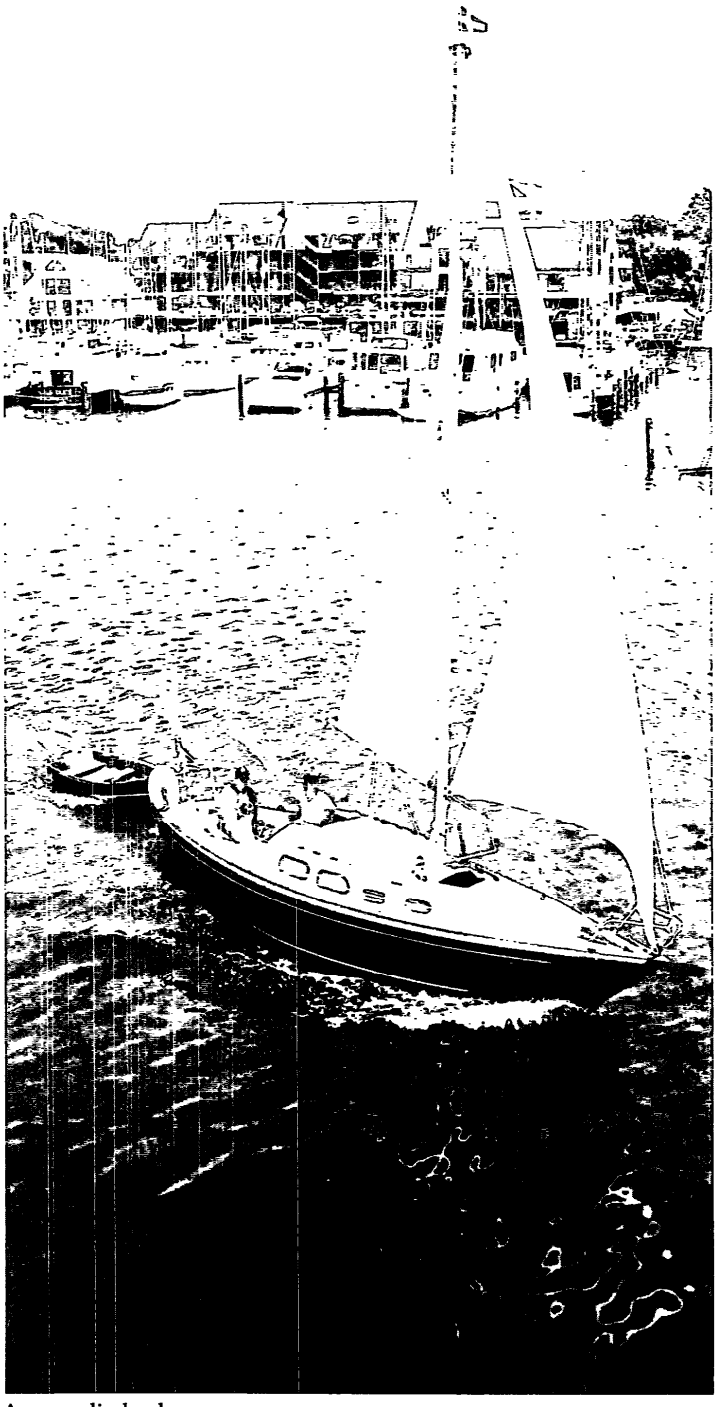
A Handbook describing the application of the criteria, as well as several guidance papers, have been developed for use by the local jurisdictions and are available from the Commission.

Future Efforts

Under the Law, all jurisdictions are to have developed and submitted to the Commission their local programs by February, 1987. However, if good progress is shown, jurisdictions have until early August, 1987, to complete their work.

Once a program is submitted to the Commission, a 5 member panel, comprised of Commission members, is to hold a hearing in that affected jurisdiction.

It is anticipated that 10 percent of the local jurisdictions will have completed their programs for review during the fiscal year.



Annapolis harbor.

Hazardous Waste Facilities Siting Board

The Hazardous Waste Facilities Siting Board is an independent eight-member commission created in 1980 to ensure that the State had a means of locating new hazardous waste management facilities. The Board's mission is to protect health and environment in providing new treatment, disposal and recycling facilities. In performing this function, the Board must also consider the economy, employment, social values, and the beneficial use of land and natural resources.

The Board is appointed by the Governor to staggered four-year terms. One member is nominated by the Maryland Association of Counties, one by the Maryland Municipal League, and one by the Maryland Chamber of Commerce. Two must be members of the scientific community, and three are drawn from the general public. Membership is also distributed geographically. The Board employs a full-time Executive Director and expert consultants on particular subjects.

The Process: Application to the Board is an Option

The Board is one of three components in new-facility development; the Health Department and U.S. EPA have permitting and regulatory authority which is not changed by actions of the Board. Either private firms or the Maryland Environmental Service may propose locations and develop facilities. A decision to approve or deny a facility location may be made 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 provides a balance of authority and resembles a special-purpose zoning appeals board. The Board's authority makes it difficult for a local government to reject a developer who has a solid design and who is sensitive to environmental and community impact. For the developer who does apply, the Board's requirements are rigorous. The Board may approve a facility only after presentation of the developer's proposal to the public, careful study, opportunity to comment upon and contest the proposal, and public hearing.

Program Includes Planning, Communication and Participation

The Board must consider site suitability and statewide needs in any siting decision; and it must consult with affected governments and operate in an open manner. The current program reflects these requirements and the experience of the Board.

Needs of the State

The needs of the State for treatment and disposal facilities have been studied, reported and formalized in regulations. A new study is underway with the report due in early 1987. Assessments of industry's options consider facilities in Maryland and neighboring states, shifts to preferred methods, and recycling. The Board's needs assessment, besides tracking generation and disposition reported to the Health Department, have involved waste-reduction experiments, direct contact with generators, and publicity on recycling measures. Board members and staff have visited facilities in Maryland and other states and have invited presentations on developing and alternative technology.

Program Plan

The Board's program plan, which was adopted in its present form in March, 1985, includes the following objectives:

- Maintain the Board as the State's statutory authority to locate needed hazardous waste and low-level radioactive waste facilities. The Board provides both site-approved power if and when needed, and the incentive for political subdivisions to consider a facility-development proposal seriously.
- Accept and process any application according to law and regulation.
- Carry out studies and exercises that contribute to the Board's expertise and readiness to evaluate an application.
- Establish and maintain a level of awareness by citizens, government and commerce that will permit informed response to an application, to determinations of treatment and disposal needs or to other Board actions.
- Conduct periodic reviews of the State's hazardous waste treatment and disposal needs, considering generation, availability of management services inside and outside Maryland, and trends in generation and services.
- Conduct analogous activities for low-level radioactive waste, which the Act says shall be treated separately, at a lower level.

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 assessing the environmental impact of existing and proposed power plants and determining actions to reduce the impact at an accepting cost, promoting public and private participation in energy conservation, maintaining balanced 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 which are 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.

Maryland Power Plant

- Assessment of the environmental impact of operating power plants.
- Determinations of actions necessary to minimize the environmental impacts of power plants and transmission lines.
- Preparation of long-range forecasts of future electric power demands.
- Conducts environmental research related to the environmental impact of power plant siting and operation.

Major FY 86 Activities

- Initiation of studies to evaluate 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 rainwater and stream chemistry in three coastal plain streams to evaluate potential impacts of acid deposition.
- Analyses of precipitation and meteorological data to determine sources of acid rain falling in Maryland.
- Completion and publication of the biennial Cumulative Environmental Impact Report which reviews the impacts of existing and proposed power plants in Maryland.
- Initiation 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 effectiveness of potential methods for reducing peak demand for electricity in Maryland.
- Analysis of the potential impacts of conversion of BG&E's Wagner Unit #2 from oil to coal-burning on the air quality of the region.
- Review of applications for the Chalk Point and Wagner Power Plants to determine the need for modifying cooling systems.
- Sampling of environmental media from the Susquehanna River and Chesapeake Bay to determine the radiological impact of the Peach Bottom Atomic Power Station and the Calvert Cliffs Nuclear Power Plant.
- 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 Calvert Cliffs, Morgantown, Chalk Point, R.P. Smith, and Dickerson power plants on nearby biological communities in Chesapeake Bay and its tributaries.
- 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.

• Completion of studies of the potential for imminent acidification of Deep Creek Lake, with the conclusion that the lake appears to have adequate buffering capacity for the conceivable future and is not in danger of acidification.

• Preparation of updated load forecasts for the Baltimore Gas and Electric Company and Delmarva Power and Light Company.

• Analysis of 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.

MARYLAND ENERGY OFFICE

The Maryland Energy Office conducts energy conservation programs to benefit all sectors of Maryland's population. Through the efforts of the Maryland Energy Office, a wide variety of programs provide alternatives which meet the future energy needs of Maryland. These programs serve all sectors of the state's economy. By holding workshops and answering requests for technical information the Energy Office saves Maryland homeowners energy, time and money. Seminars for industrial energy consumers have resulted in 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 non-profit organizations use the money they save with help from the Energy Office to provide better service to their constituents.

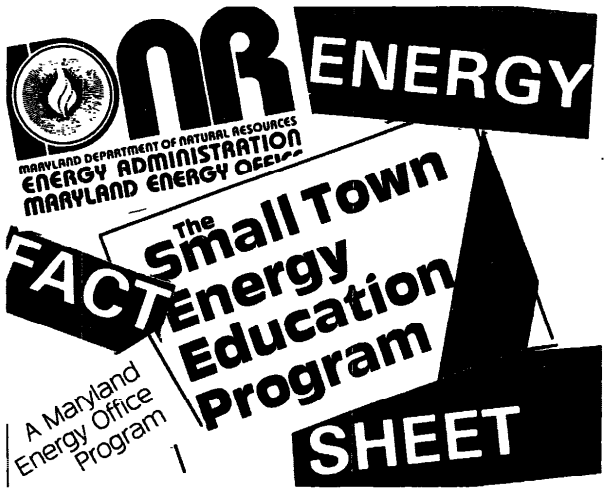
The MEO is responsible for administering a number of federally funded programs; the State Energy Conservation Plan, the Energy Extension Service, the Residential Conservation Service, and the Institutional Conservation Program. The office also coordinates the bulk purchase and storage of heating oil 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 fifty-six thousand homes across the State have been audited, over nine thousand in the last year.

A *Consumer Guide* produced, by the MEO, is given to each residence audited. This booklet provides information on energy conservation materials and improvements to help the home-owner make educated decisions about the recommendations in the energy audit. The MEO also maintains a Community Energy Resource Directory for



distribution to residential energy consumers. This directory is an aid in locating sources to help solve energy problems.

The *Maryland Energy Saver* is the newsletter of the Maryland Energy Office. Twelve issues were published in the past year. Over 1,800 copies of each issue were distributed to people interested in the activities of the MEO.

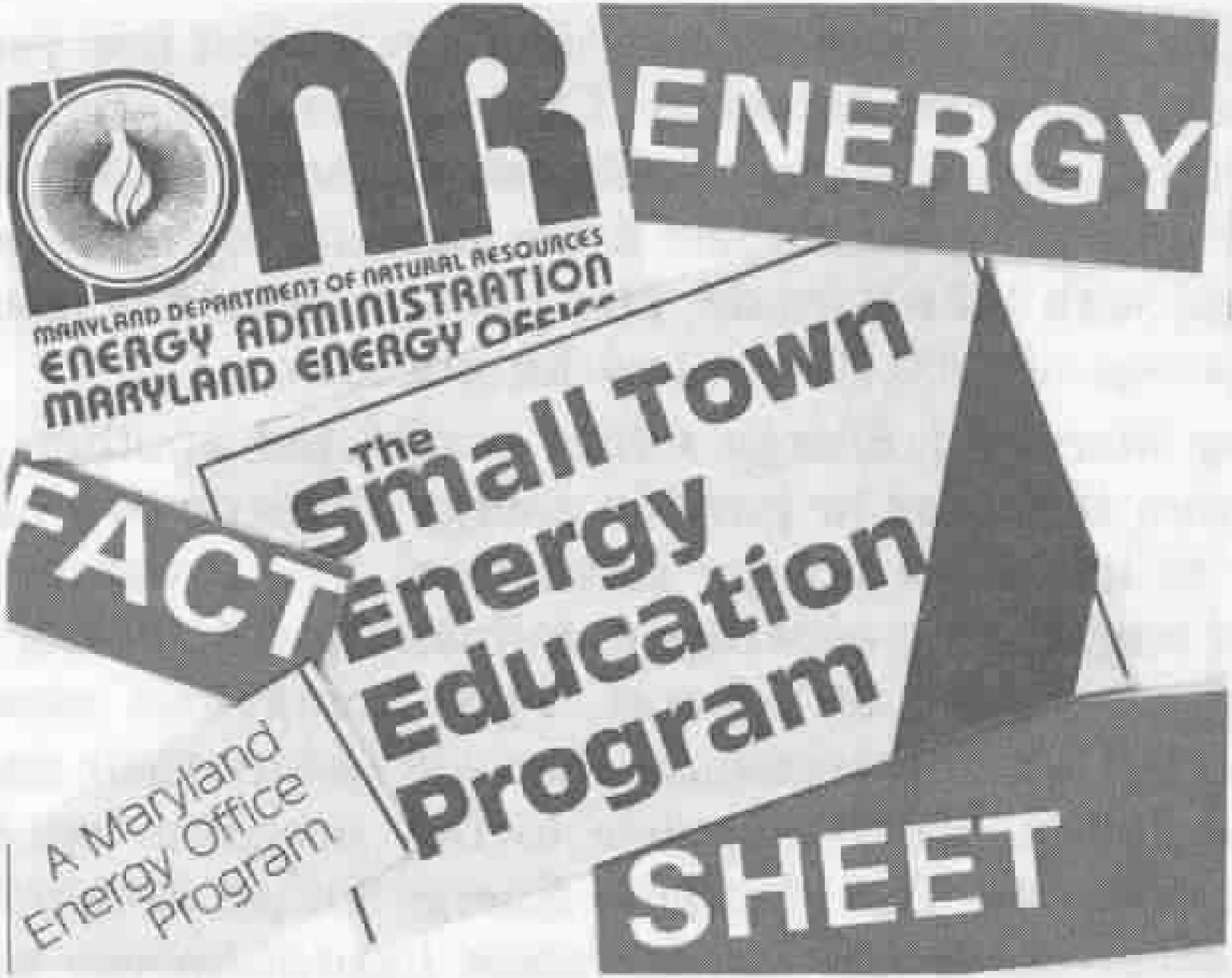
An important aspect of the Maryland Energy Office's transportation involvement is emergency energy planning. A state-wide advisory panel worked with the MEO managers to develop a State Energy Contingency Plan which describes and analyzes a variety of energy emergency measures from which the Governor may wish to select in the event of a shortage. The Office is responsible for implementing a state fuel set-aside program if the Governor so orders. This plan is designed to provide fuel for vital public services. In past oil shortages the MEO has administered the odd-even gasoline plan and now maintains a draft plan which the Governor could implement in an emergency.

Two conferences, for local government officials, were held by the Maryland Energy Office. In April, the spring workshop covered various technical topics such as energy audits, street lighting, and sewage treatment. It was held in Baltimore, attracted nearly one hundred people. The second conference, held in Baltimore in September, was jointly sponsored by the MEO and the City of Baltimore, with support from the Urban Consortium Energy Task Force; and included sessions on financing energy conservation, converting waste to energy, designing for low energy use and fuel purchasing.

The Maryland Energy Office helped the Department of General Services save over a million dollars on heating oil in 1985. Through a program of cooperative buying, the state made bulk purchases of oil for fourteen state institutions.

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

The MEO also assisted the Maryland Energy Assistance Program (MEAP) of the Department of Human Resources


DNR
MARYLAND DEPARTMENT OF NATURAL RESOURCES
ENERGY ADMINISTRATION
MARYLAND ENERGY OFFICE
ENERGY
FACT SHEET
The Small Town Energy Education Program
A Maryland Energy Office Program

(DHR). MEAP began a demonstration project this year in cooperation with Baltimore City oil vendors. Suppliers delivering oil to low income citizens receiving MEAP grants must give these customers a ten percent discount on oil bought with MEAP funds. This pilot program has resulted in savings of $400,000 for low income citizens.

The Maryland Energy Office conducted another pilot program this year to provide energy conservation assistance to industrial energy consumers. The program provided engineering expertise to industries without full time engineering help at no cost. Nine companies received advice on low cost measures that will reduce their energy consumption. Early response to this program has been very favorable. The Maryland Energy Office developed a fact sheet on energy conservation improvements which was distributed through trade organizations to more than one thousand small businesses. The MEO also selected a contractor to conduct energy audits for small businesses. One hundred audits were conducted under this program.

The program also works with The University of Maryland Cooperative Extension Service to reach agricultural energy users. The Cooperative Extension Service, using funds from the MEO, employs an Extension Agricultural Engineer to promote energy conservation in the farming community. This agent uses the existing extension network to reach people. The Extension Engineer also encourages wood use as a fuel alternative.

The Waste Management programs of the Maryland Energy Office are designed to conserve energy and resources in a variety of areas.

The MEO works directly with state agencies, local governments, and other public and private institutions to encourage the use of recycled paper. The MEO also communicates with recycled product suppliers to ensure an adequate supply for all purchasers.

A major component of Maryland's Waste Management Program is auto and truck recycling. The Maryland Energy Office encourages consumers to use recycled auto and truck parts and conducted energy audits in two auto and truck recycling facilities in the state to assist them in maintaining a cost effective operation.

The MEO has expanded its efforts in the promotion of Alternative Technology in the state. A main component of the expansion was the production of a film called *Ingenuity at Work*. The film highlighted several projects funded under the federal Alternative Technology grants program and focused on four successful projects demonstrating technology that can be used by others. It will be shown throughout the state and will be made available for use in other states.

The MEO held a series of eight workshops on the topic of Solar Energy and Super Insulation which attracted seven hundred participants. A survey of workshop participants two months later indicated that thirty-two percent of attendants had already made use of the knowledge gained at the workshop. In conjunction with these workshops, the MEO has developed a computer program to analyze building plans. Using information about the house size, number of windows, source of energy, potential amount of insulation, and a number of other variables, the program predicts construction costs, energy costs, and paybacks for a variety of conservation practices and, further, calculates the economic feasibility of solar energy.

During the past year, the Maryland Energy Office began a pilot program to assist local governments in controlling rising energy costs. The Small Town Energy Education Program (STEEP) is designed to satisfy the energy conservation needs of individual municipalities by conducting a needs assessment.

The Maryland Energy Office also offers energy audits to non-profit institutions at no charge. Twenty of these audits have been conducted and another twenty-five are planned.

Institutional Conservation Program

The Institutional Conservation Program makes federal funds available for energy conservation in schools and hospitals throughout the state. This grant program provided financial assistance on a matching basis for institutions to conduct engineering analyses of their buildings and to implement the energy conservation measures recommended in the engineer's report. Through a special program, the state provides the necessary matching funds for state owned schools and hospitals.

In May, grants were awarded to six schools and two hospitals in the state to conduct engineering analyses in twenty-seven buildings. On July 1st, twelve schools and eight hospitals in Maryland received grants to complete eighty-one energy conservation projects in forty-nine buildings. Typical projects include: adding insulation, converting domestic hot water systems, relamping, heating control modifications and adding separate chillers. These grant awards committed a total of $1,018,075 of federal money to Maryland schools and hospitals. The state matching fund program contributed another $227,107 to state owned institutions, community colleges and public school districts.

Energy Extension Service

The Energy Extension Service continues its efforts to conserve energy through outreach and education.

Thermoscan Analysis is a technique used to determine where heat is escaping from a building. An infrared picture of the structure shows where heat loss occurs. This method was used to uncover heat loss in residences in six Maryland towns. The project was conducted by the Maryland Municipal League with funds provided by the Maryland Energy Office. Residents whose homes had been photographed were invited to attend a workshop to see their home and to learn about methods for reducing heat loss.

The Maryland Energy Office developed an educational program to reach elementary school children. The Blue Sky Puppet Theatre performed "Lights Out on the Bunny Brothers" for more than 28,000 school children in six counties in Maryland.

BUREAU OF MINES

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

Comparative Activity

	FY 85	FY 86
Active Mines*	108	124
Tons of Coal Mined	2,865,000	3,405,000
Acres Permitted	661	165
Acres Reclaimed**	915	853
Inspections	1,729	1,932
Notices of Violations	121	93
Cessation Orders	49	29
Forfeited Mines Reclaimed	1	1
Abandoned Mine Projects	12	18

*Includes permits awaiting bond release
**Based on 84 & 85 calendar years

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 the past fiscal year, the Bureau approved two original permit applications for 115 acres; issued two original permits for 40 acres; and three permit amendments for 125 acres. Pending at the end of the fiscal year were seven original strip mine permits for 923 acres, two amended permits for 61 acres, two deep mine permits for 6,398 acres, and four loading and processing plants for 17 acres.

The State Land Reclamation Committee, seeking to promote the planting of trees and wildlife shrubs on mined land, voted to cost share up to fifty percent for their planting costs. The Committee is also cooperating with the State Forest Tree Nursery to expand the number of species available to strip mine operators.

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 86, State funds were utilized for five abandoned mine projects, totaling $212,447.

In the Federally funded program, grants to the State are used for reclamation of the adverse impacts of past coal mining practices. During FY 86, the Bureau requested and received Federal funding totaling $1,070,976, for five abandoned mine reclamation projects. Construction was completed on seven projects costing $578,000, during FY 86. Reclamation efforts included the backfilling, regrading and revegetation of approximately 95 acres, 2,700 lineal feet of stream channel sealing to prevent acid mine drainage production, and a deep mine sealing project to prevent unauthorized entry into an abandoned deep mine.

Bureau of Mines is active in reclaiming abandoned mines and environmental oversight of active mines.

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 twelve 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 109 properties statewide encompassing approximately 21,000 acres. Easements accepted by the Trust are reviewed and approved by the Board of Public Works prior to recordation.

The Trust received 96 easement inquiries in FY 86. A total of eleven easements covering 944 acres were documented, accepted and recorded in FY 86. Four of the easement properties are adjacent to prior easement sites. Eight have frontage on Bay tributaries, three have historic homes, and seven have productive agricultural land. Approximately 80% of the FY 86 easement acreage is attributable to the Trust's Chesapeake Bay Initiative. The Initiative, since inception, has resulted in the acceptance of easements on 2,466 acres, including 8.1 miles of bay and tributary shoreline. By protecting waterfront, easements contribute to water quality and living resources goals, and at the same time, offer scenic recreational amenities to the boating public.

Easement highlights for the year included a 170 acre Queen Anne's County waterfront farm which provides habitat for the endangered Delmarva fox squirrel, a 206 acre Miles River waterfront farm in Talbot County supporting bald eagles, and a 139 acre farm located on Talbot County's scenic Leeds Creek featuring a mid-19th century Federal style house.

A new property tax credit law was enacted by the General Assembly in FY 86 which encourages landowners to protect their properties with conservation easements. The law provides for a state and local property tax credit when an easement is donated to the MET. The credit, equal to 100% of the taxes due on unimproved land, is available for 15 consecutive years following the donation of an easement. Maryland is perhaps the first state to promote open space preservation using a tax credit mechanism of this type.

Trust staff conducted home meetings, participated in conferences and exhibits and met with other groups to review the easement program, tax regulations and other related conservation matters. A reference room is maintained with environmental documents and films for public use.

The "Keep Maryland Beautiful" Committee of the Trust, along with Governor Hughes, presented the Margaret Rosch Jones Award to the Severn River Association on April 1, 1986. The Association was recognized for several environmental projects completed in the prior year, including sediment control monitoring and the testing of water quality at several community swimming areas along the Severn.

The KMB Committee also announced the recipients of the Trust's environmental education mini-grants in April. Mini-grants were awarded to the Ecology Corps of Dorchester County and the Elms Environmental Center of St. Mary's County. Each group received $500 for environmental education projects which began during the summer of '86.

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 Chesapeake Bay area. Strengthen co-operative efforts with Chesapeake Bay Foundation
- Revise and update brochure and MET land preservation booklet to reflect new state laws and incentives, and to address changes in federal tax laws and regulations
- Develop continuous easement monitoring program, using where possible the assistance of trustees, area representatives, local affiliates, and volunteer conservation groups
- Continue to publish and distribute *LandMarks*, directed toward land conservation issues
- Establish a revolving conservation fund for bargain-sale purchase of fee interest in properties with open space value
- Consider development of a demonstration project to purchase conservation easements on selected properties at bargain-sale prices
- Revise MET policy document.

Maryland Forest, Park and Wildlife Service

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

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, all third grade students in Maryland's public schools received a pine seedling as part of a continuing program to increase public awareness of the importance of our valuable forestry resources. Teachers were given educational resource materials.

The Wildlife Conservation Stamp and Print program completed a successful first year. Sale of stamps and prints, which featured a pair of Northern (Baltimore) Orioles by artist John Taylor, totaled approximately $14,000. The second stamp and print of the series depicts a pair of ruby-throated hummingbirds, again by Taylor. A Wildlife Sponsor Kit was developed to boost stamp sales. The kit, which sells for $10.00, includes the new stamp, a hummingbird feeder, a full-color poster, and discount coupons from various businesses. All proceeds from stamp, print and sponsor kit sales are being used for non-game and endangered species management.

"Tracks 'N Trails", a quarterly newsletter for Maryland's sportsmen, completed a successful first year. Response to a survey, published in the fourth issue, indicated that readers were pleased with the publication. The Director's column and articles on pending legislation were favorites. "Tracks 'N Trails" is distributed to more than 2,000 sportsmen and other individuals interested in conservation.

The Catch-A-Poacher Program, a cooperative program of the Forest, Park and Wildlife Service, the Natural Resources Police and Maryland citizens, has been well-received. Conservation groups and concerned citizens contribute to a reward fund, which is used to reward individuals who supply the Natural Resources Police with information leading to the arrest and conviction of game and fishing law violators. Nine rewards totaling nearly $500 have been issued. More than $6,000 have been donated to the fund.

PLANNING AND PROGRAM DEVELOPMENT

This group is responsible for Forest Resources and Wildlife Comprehensive Planning, Environmental Review and new Program Development. To provide an informational data base on Maryland's fauna, a Federal grant has been utilized to develop a computerized Fish and Wildlife Information Network (WFAWN). A data base manager was hired to develop an interim data base. The manager and the data base have been moved to Annapolis from Virginia Polytechnic Institute and a resident data base is being developed. Information on 500 species is currently in the system and will eventually be utilized by biologists in this unit, other DNR units and State agencies, as well as, local and Federal governments and consultants. The orderly, and standardized format will enhance fish and wildlife considerations in land and water use planning and the management decision-making process by providing technically sound species data in a timely manner.

Particular emphasis was placed on review of the Waterfowl Habitat Restoration Program projects on private and non-state lands. Environmental review coordination with permit agencies has aided approval of these habitat creation and enhancement projects, totaling around 100 acres. Environmental review and assessment of public and private projects as they might affect forest and wildlife resources and Bay Critical Area habitats continued.

The Environmental Review section established a new and comprehensive internal review process. This will result in a formal review of all of the Service's land management activities ensuring that activities are evaluated in light of competing resource management options.

Wildlife Comprehensive Planning entered into its second year of operation. Cutbacks on project administration and an increased effort in furbearer research highlighted two significant changes in FY 86.

A publication "Maryland Wildlife Management—A Comprehensive Plan for the 80's", is currently being used in 17 counties and Baltimore City as a supplementary text in school system science and ecology curriculums.

COOPERATIVE FORESTRY PROGRAM

The Cooperative Forestry Program provides assistance to private forest landowners, municipalities and other governmental units in the management of their forests and individual trees. The program has five major functions: Forest Resource Management, Forest Protection, Chesapeake Bay Initiative, Urban-Community Forestry and Forest Resource Utilization.

Resource Management

Resource Management assists 95,800 forest landowners throughout the State. Management assistance to these

landowners begins with a plan prepared by a project forester, which directs overall operation of the forest and continues with technical advice in carrying out the operation. In 1986, project foresters prepared 676 management plans on 33,647 acres. Timber stand improvement practices improved the growth rate and quality of the remaining trees on 3,749 acres. Site preparation readied an additional 2,344 acres for forestation.

The Buckingham Forest Tree Nursery at Harmans produced more than 3 million tree seedlings in fiscal 1986. These young trees were sold to private landowners for planting 3,225 acres of open land and cutover forest lands. In addition, 931 sapling size trees were produced and sold to municipalities for roadside tree plantings. An additional 15 acres have been cleared to meet the anticipated demand for forest buffer plantings.

Several new selections of superior loblolly pine were made during the year. Scion wood from these were collected and grafted for planting into a scion bank at Pocomoke State Forest to ensure their availability for future breeding. Superior white pine seed was collected from the U.S. Forest Service seed orchard in North Carolina for testing in Maryland. Also, in cooperation with the University of Maryland, grafts of superior pitch pine were made to establish a superior pitch pine seed orchard and for crossing with loblolly pine.

A unique reforestation program was begun in the median strip of I-70 in Washington County. Seedlings of superior Virginia pine and loblolly X pitch pine hybrids were planted in rows on about 9 acres of open land. The planting will eventually reduce maintenance costs by eliminating mowing and may be a future source of wood fiber. More plantings are scheduled for the future.

Resource Protection

The Resource Protection goal is to reduce forest land lost from fire, insects and disease. For the first six months of calendar year 1986, the Maryland Forest, Park and Wildlife Service responded to 957 wildfires which burned 4,641 acres. These fires were a result of the worse recorded drought in this century. According to the National Weather Service, 13.99 inches of rain fell through June, 8.91 inches below average. The lack of precipitation resulted in tinder dry forest conditions and required the department to enact burning bans during the months of April and May. At the request of the Anne Arundel County Fire Administrator, Forest Park and Wildlife personnel and equipment were temporarily reassigned to A.A. Co. volunteer fire departments to assist in wildfire suppression activities. Debris burning, closely followed by incendiary, continue to be the primary causes, accounting for 52.4% of total fires.

Control techniques, to protect forests from insect and disease, are provided to homeowners and forest land owners. Assistance in both surveying and controlling major insect infestations is provided to the U.S. Department of Agriculture. The 1986 Cooperative Suppression program for gypsy moth resulted the aerial spraying of 91,488 acres. Spraying was conducted in 15 of Maryland's 23 counties from Allegany to Worcester Counties.

Southern Pine Beetle activity is increasing steadily on the Eastern Shore. The increase is most likely due to the mild winter of 1985–86 and the drought conditions of the spring of 1986.

Aerial sketch mapping was conducted in Somerset and Worcester Counties which determined significant numbers of dead and dying trees as a result of the Southern Pine Beetle. Six thousand nine hundred and thirty (6,930) acres in Worcester and 350 acres in Somerset County were found to have the largest populations.

A survey of pine trees in Caroline, Dorchester, Somerset, Talbot, Wicomico and Worcester Counties was conducted to detect the presence of sawfly eggs to determine defoliation for 1986. The egg survey indicated that the occurrence of sawfly defoliation in 1986 will be about the same as it was in 1985 on the Eastern Shore of Maryland. Based upon the egg mass survey results, heavy defoliations are predicted in areas of Dorchester, Talbot and Wicomico Counties.

Chesapeake Bay Initiative

The Chesapeake Bay Initiative effort includes defining and mapping the Critical Land Areas currently forested adjacent to the Bay and its tributaries, and providing technical assistance, including the preparation of forest management plans, to landowners. During fiscal year 1986, a total of 76 forest management plans, encompassing 6,839 acres, were prepared. Sediment control plans on 1,937 acres, and woodland housing development site reviews on 2,864 acres were done. Timber sale assistance was provided to 15 landowners on 247 acres within the Critical Area. To reduce sedimentation and nutrification along major tributaries, 97 acres of trees were planted along 8,000 lineal feet of shoreline.

Aerial photography, for mapping the forest land located within the 16 Critical Area counties, was ordered. Two watershed foresters were hired to work in the Susquehanna River Watershed area of Cecil and Harford Counties.

Urban and Community Forestry

Increased awareness of Urban and Community Forestry occurred in 1986. More cities have been requesting assistance to manage their urban forests through street tree inventories, management and tree planting plans. The number of cities and counties achieving the Tree City USA designation through the National Arbor Day Foundation nearly doubled in 1986. Maryland now has twelve (12) Tree Cities.

Work with developers, builders, architects, and city planners during developmental planning and large scale forestry projects continues as an important service. Urban forestry plays an integral role in the Critical Area criteria for the Chesapeake Bay, urban forestry best management practices must be implemented to aid in the reduction of erosion, sedimentation and runoff from urbanized areas

as well as enhance wildlife habitat. An urban forestry/ critical area grant program will offer financial incentives to counties, municipalities, homeowner associations and developers to implement these practices. Information and education was expanded to include an urban forestry poster and accompanying brochure on "Trees For More Livable Communities". A series of inserts are being developed to cover all aspects of an urban forestry program. An Urban Forestry Handbook for Homeowners is also being designed.

Supervision of utility line clearance crews to ensure the proper care of roadside trees continued in FY 1986. Construction of new lines and routine trimming kept tree inspectors busy. Roadside tree training programs continue to emphasize the need for consistency in trimming and removal of trees.

Approximately 400 tree experts are now licensed in the State of Maryland.

Forest Resource Utilization

The Forest Resource Utilization section has changed its emphasis from technical assistance to marketing and industrial development. A five-year plan was prepared to guide the section in this new direction. The development of new markets, foreign and domestic, for Maryland wood products is the main priority. Current projects seek to increase the use of hardwoods, especially yellow poplar, in housing construction; increase the use of laminated wood component bridges on rural and secondary roads; and to increase the use of low value, low quality hardwoods as an energy source.

The effort to educate the forest industry on opportunities to increase the use of Maryland's forest products was expanded to include foreign markets. Another educational effort informs the general public of the value of the forest products industry to Maryland's economy. A series of statewide meetings were held to train the forest products industry on requirements of the new sediment and erosion control regulations.

The field work for the ten year forest resource survey conducted by the U.S. Forest Service was completed in late 1985. The analysis of the data is under way. The final report should be published in late 1987.

A Maryland woodland scene

FOREST AND PARK MANAGEMENT PROGRAM

The Forest and Park Management Program administers and manages Maryland's state forests, parks, scenic preservations, historic monuments, natural environment areas and the Deep Creek Lake, Monocacy and Wye Island Natural Resource Management Areas.

This program provides recreational opportunities, preserves natural resources and ensures multiple use and sustained yield of forest resources.

Caring for these lands and resources requires expertise in forestry, horticulture, maintenance, construction, history and administration.

Each year approximately six million people use these areas. Popular activities include camping, picnicking, swimming, hiking, boating, hunting, equestrian events, skiing and use of ORV trails.

Knowledge of law enforcement, first aid and nature interpretation is essential. The rangers are fully certified, armed law enforcement officers empowered to enforce all State laws on DNR lands. Law enforcement activities include traffic violations, family disputes, disorderly conduct, illegal hunting, larceny and, of growing concern, the distribution or use of drugs.

The goal of park law enforcement is to inform and educate the general public of the laws, rules and regulations which protect the visitor and the resource. This traditional approach works very well in Maryland's state parks and forests. Nevertheless, serious crime is handled fairly and firmly when it takes place.

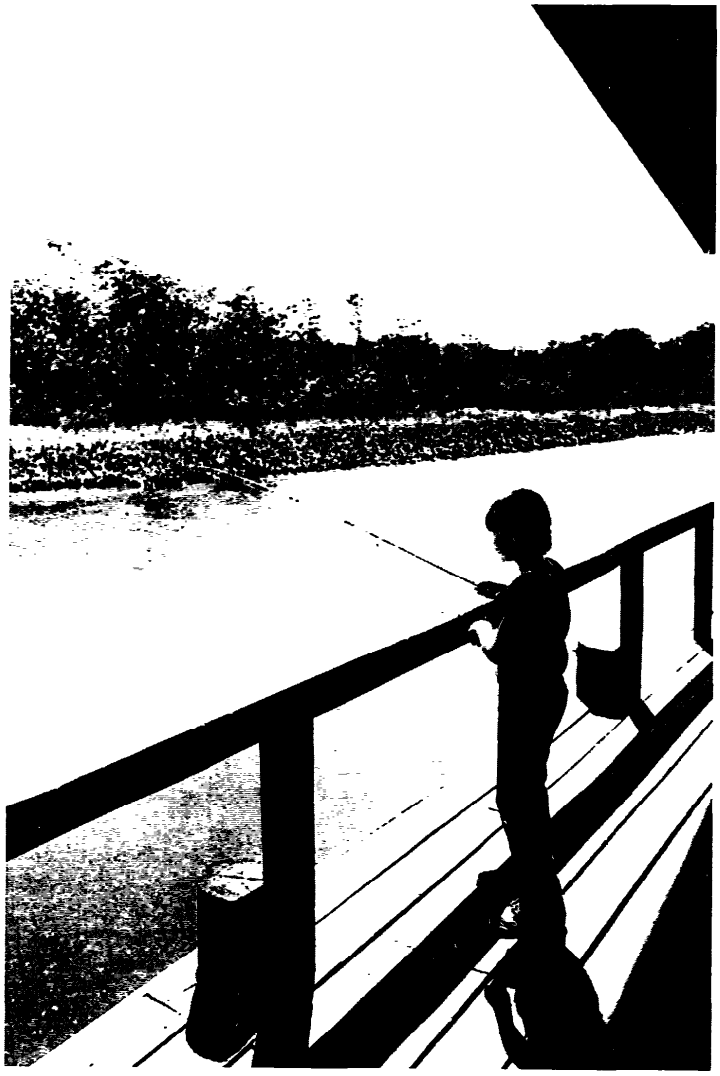
Another important aspect of the Service is assisting visitors encountering problems. Annually, more than 1,000 first aid cases are handled, as well as, help rendered for disabled boats and cars, locating lost people and providing help during natural disasters.

The Service's maintenance program looks after more than 1,150 buildings and more than 400 miles of roads and parking lots. In addition, there are many miles of sewer, water and electric lines, swimming pools, beaches, historic monuments, boat ramps and water chlorination systems which require maintenance.

Throughout the year, interpretive programs designed to increase awareness of the natural and cultural resources were conducted in State parks, State forests, schools and communities throughout the State. Special events in the State parks include cross-country skiing tours and races, Easter sunrise services and Easter egg hunts, guided trail hikes and canoe trips, Civil War Days, military reenactments, firelock matches, the Civilian Conservation Corps reunion, craft days and festivals.

The Service administers a number of historic structures and has been successful in enlisting private investment to rehabilitate and preserve several of them. Two new resident-curatorships were approved in 1985, for a total of six, representing about a million dollars of donated restoration services.

A young angler at Martinak State Park.



Camp Concern, in its second season, is a cooperative effort with Baltimore City. Four camps hosted 500 inner-city youth. Activities included camping, canoeing, hiking and horseback riding.

Outward Bound programs were hosted at Savage River State Forest and Sandy Point State Park. More than 40 participants were involved in backpacking, repelling and bay activities.

Many of the State parks and forests operate concession programs to provide a needed service to the visitor. Sales exceeded one million dollars. With the advent of new products, merchandizing techniques, volume purchasing and the renovation of existing facilities, the concession program has become a significant source of revenue as well as a service to the visiting public.

Through the efforts of the Forest, Park and Wildlife Service and the Deep Creek Lake Advisory Commission, regulations governing the use of Deep Creek Lake in Garrett County were put into effect. This is the result of a cooperative lease agreement between P.E.N.E.L.E.C. and the Department of Natural Resources. Much work remains to be done as implementation of the regulations affects future requests for lake privileges.

FOREST AND PARK USE ATTENDANCE

Green Ridge State Forest	210,250
Pocomoke/Wicomico State Forests	62,100
Potomac/Garrett State Forests	131,487
Savage River State Forest	170,599
Assteague State Park	680,251
Big Run State Park	13,838
Calvert Cliffs State Park	24,045
Cedarville State Forest	66,739
Cunningham Falls State Park	524,684
Dans Mountain State Park	26,239
Deep Creek Lake State Park	116,573
Elk Neck State Park	297,127
Fort Frederick State Park	68,485
Gambrill State Park	231,641
Gathland State Park	44,767
Greenbrier State Park	172,934
Gunpowder Falls State Park	670,404
Herrington Manor State Park	479,806
Janes Island State Park	128,146
Jonas Green State Park	17,718
Martinak State Park	49,552
Matapeake State Park	45,000
New Germany State Park	23,381
Patapsco Valley State Park	386,572
Patuxent River State Park	8,971
Pocomoke River State Park	305,000
Point Lookout State Park	255,697
Rocks State Park	82,555
Rocky Gap State Park	104,088
St. Mary's River State Park	13,234
Sandy Point State Park	449,325
Seneca Creek State Park	106,293
Severn Run NEA	8,514
Smallwood State Park	103,882
Soldiers Delight State Park	31,351
South Mountain State Park	70,412
Susquehanna State Park	88,499
Swallow Falls State Park	108,032
Tuckahoe State Park	55,814
Washington Monument State Park	80,055
Wye Oak State Park	29,795
TOTAL	6,543,855

Summer fun at Sandy Point Park.

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) users. More than 3 million dollars were generated to support the program from the sale of 171,209 hunting licenses and various stamps. Five wildlife management programs and the field services section develop and implement the program's operations.

Forest Wildlife Program

This program is responsible for management of wild turkeys, white-tailed deer, sika deer, ruffed grouse, gray squirrel, eastern fox squirrel and red (Piney) squirrel. These species provide more than one million hunter-days of recreation. Investigations are conducted to determine mortality rates of the white-tailed deer and gray squirrel. Population trends of deer, grouse, squirrels and turkeys were studied.

Maryland's 1985–86 deer season harvest, totaling 18,749 deer, was just below last year's record. A special 6 day hunt was held in Dorchester County to help reduce damage to crops caused by deer. Turkey hunters set a new record by harvesting 974 birds. Last year's total was 820.

Recent successes with the Eastern wild turkey relocation project are contributing to the restoration of this species throughout the State. Thirty-six turkeys were moved from Southern and Western Maryland and stocked in Somerset and Kent Counties. To speed up the restocking process, a swap of 24 quail and 10 turkeys was arranged with the Pennsylvania Game Commission. Because of the success of the trap and transplant program, a spring gobbler season will be held in Worcester County in 1987 for the first time in many years.

Furbearer Program

This program manages 18 species of furbearers in Maryland. Furbearer pelt sales total approximately 3 million dollars annually.

A red fox pelt primeness study was conducted to determine whether Maryland's fox trapping season coincided with the time when fox pelt condition was at its best. A study of the effectiveness of padded-jaw leg hold traps on reducing injuries to muskrats was completed with favorable results. The study was undertaken in conjunction with the Woodstream Corporation and the New Jersey Division of Fish, Game and Wildlife. Finally, the Fur Dealer Reporting System was streamlined to encourage more timely and accurate submission of vital fur buying records.

Additional surveys and inventories will be undertaken to determine population trends of important fur species, such as raccoon, fox, otter and muskrat. Surveys are also planned to determine the population status of the bobcat, a species which appears to be recovering in Maryland.

Waterfowl Program

The wetland wildlife species considered in the waterfowl 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 gallinule, six species of rails and jacksnipe. Some of the surveys and projects conducted to monitor and benefit Maryland's waterfowl follow.

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 2,000 geese were marked with neck collars and leg bands during the 1985–86 banding season, for a total of 7,700 banded during the last three winters. Three Canada goose observers recorded more than 2 million goose observations during the winter of 1985–86, of which 15,645 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 Flyway Council. The data from this study and other indicators prompted the move to modify the Canada goose season. The changes should increase the survival rate of the geese and increase Maryland's over-wintering population.

Other surveys were conducted to monitor population trends and condition of waterfowl. The aerial midwinter waterfowl survey indicated a minimum of 130,000 ducks, 545,000 Canada geese, 54,000 snow geese, and 30,000 tundra swans were wintering in the State. Aerial and ground surveys were conducted in April to monitor long term trends in breeding waterfowl populations. Black ducks and mallards were trapped to monitor population dynamics and nearly 2,000 tissue samples were collected from hunter-killed ducks to assess the levels of lead in wild waterfowl resulting from the ingestion of lead shot.

The submerged Aquatic Vegetation Survey in the Maryland portion of the Chesapeake Bay indicated a modest increase in bay grasses during the spring and summer of 1985. Approximately 5.7% 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, a 440 acre impoundment was completed on the Greens Island section of Fishing Bay Wildlife Management Area. This project also reserved funds from Ducks Unlimited and will improve the habitat used by wintering and migrating ducks. 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 the best available brood habitat. A sample of these birds were banded to monitor harvest rates and distribution.

Banding a Bald Eagle. Left to right: Gary Taylor, Maryland Department of Natural Resources; Keith Kline, U.S. Fish and Wildlife Service; Dave Buehler, Virginia Polytechnic Institute and State University.

Nongame and Endangered Species Program

This program is responsible for more than 400 species of wild animals not classified by law as game animals. Non-game and endangered species possession permits, and scientific collecting permits are responsibilities of this program.

Maryland continues to provide significant year-round habitat for bald eagles, and nesting pairs and productivity have increased. In 1986, 65 nesting pairs fledged 102 young eagles, a record total.

Five pairs of peregrine falcons nested in the Chesapeake Bay region in 1986. All nests were located on man-made structures, including the Bay Bridge, an office building in Baltimore and three nesting towers.

Restoration efforts for the endangered Delmarva fox squirrel continued by trapping and translocating squirrels to a new release site in Wicomico County. Six squirrels were given to Delaware to help re-establish the population there.

Other projects in this program include the Maryland and District of Columbia Breeding Bird Atlas and a colonial nesting bird survey. Field study for the breeding bird atlas, which involves state personnel and volunteer bird watchers documenting the breeding distribution of Maryland's avifauna, is about 90% complete. The inventory and monitoring of colonial nesting waterbirds, including herons, egrets, gulls and terns, are the results of concerns of habitat degradation due to land development.

Upland Wildlife Program

The upland wildlife program is responsible for the management of rabbits, quail, pheasants, doves, woodcock and crows. Upland game hunters spend in excess of 600,000 man-days afield annually.

Research studies were conducted on habitat requirements for upland species in relation to farming operations on Millington Wildlife Management Area. Translocation of native pheasants to Garrett County was completed with a release of 10 birds in the spring of 1986. A pheasant nesting survey was initiated to investigate nesting habitat requirements and nests success rate. Trends surveys were continued on all upland species.

A hunter-use survey of licensed hunters in Maryland was conducted to obtain estimates of number of hunters, efforts expended and harvest for selected game species.

The "Acres for Wildlife" project continued to protect, improve or create upland wildlife habitats on private lands and rights-of-way and create an awareness of what upland wildlife habitat actually is and the need to manage it.

Wildlife Field Services

The wildlife field services section is a statewide network of managers, biologists, technicians, and aides which 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 in unoccupied habitat. Much effort is spent improving wildlife habitat on management areas, such as timber stand improvement, blowing potholes in high-phase marshes, vegetation control through mowing and applying herbicides, creating woodland openings, and erecting nest structures.

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 office's 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.

The Maryland Natural Resources Police Force is specifically charged with the enforcement of all the National Resources laws of the State. They have all the powers conferred upon police officers with the State and may exercise their powers anywhere within the State. By necessity, the Natural Resources Police also perform lifesaving and rescue services on the waters of the state and in remote areas.

The Natural Resources Police is one of the oldest state agencies. It began in 1868 as the Maryland Oyster Police, and in 1896 the Maryland State Game Wardens were established. These two groups, after years of continuous service and various name changes, were combined to form the Natural Resources Police Force in 1972.

The Natural Resources Police explain and administer DNR policies to and for the general public and the success of these policies frequently depends on the relationship between the Police and the public.

This year, FY 1986, the Natural Resources Police Force has been under the command of Colonel Jack T. Taylor, who assumed temporary command on July 1, 1985 upon the retirement of Superintendent Roy W. Rafter. Colonel Taylor was confirmed as the new Superintendent on September 10, 1985.

There are two main divisions, General Direction and Field Operations. General Direction consists of the Headquarters staff and the Support Services Section.

FIELD OPERATIONS

Field Operations is the on-line enforcement activity and in FY 1986 was organized into five regional jurisdictions covering Western, Central and Southern Maryland on the Western Shore and two regions, Upper and Lower on the Eastern Shore.

The force operated 38 large patrol vessels equipped with radar and LORAN-C for patrol and Search-And-Rescue operations, over 100 outboard motor boats and 100 motor vehicles, including Mobile Enforcement Teams which use a vehicle towed boat. There were 203 sworn officers and a corps of 13 police cadets.

The two basic forms of activity performed by Field Operations are Marine covering all activity on and adjacent to the Chesapeake Bay and its tributaries, and, Inland covering activities involving such areas as hunting, fishing, trapping, wildlife protection and boating on inland waters. Officers are cross trained in both basic activities.

Information, Assistance and Emergency Responses

The Natural Resources Police handled more than 121,800 telephone calls for service or information during the year. Officers received over 18,700 calls at their homes, the five Regional Offices received approximately 53,100 and the Annapolis Headquarters Communications Center handled over 50,000. Additionally, the public visited officers' homes on business 892 times and the Regional Offices 2,600 times.

In FY 1986, the Natural Resources Police responded to 1,677 Emergency Response calls. These include:

Disabled boats	207
Disabled autos	169
Emergency Medical Assistance	33
Emergency transportation	17
Boats towed to port	764
Boats escorted to port	50
Boats freed from grounding	253
Pumped sinking boats	34
Firefighting	7
Rescued persons in boat	4
Rescued persons in water	14
Rescued persons stranded	8
Searched for overdue boat	25
Searched for mission person	28
Searched for drowning/accident victim	54

Thirty-three persons were given emergency medical assistance by our EMT qualified officers. Emergency rescue responses assisted 4,073 persons, expending 2,832 man hours. There were 696 non-emergency assistance, including 259 assists to other agencies, 120 incidents of transportation help, which assisted another 630 persons and NRP personnel worked at 225 public events involving direct or indirect contact with another 119,000 persons expending 3,600 man hours.

Additional assignments; public information, education, speaking engagements, and demonstrations of equipment and procedures occurred on 208 occasions totalling 5,161 man hours.

Enforcement and Protection

Field Operations personnel worked 300,509 man hours including 18,292 hours of overtime; drove 1,355,410 miles on patrol, spent 54,996 hours patrolling by boat, 32,00 hours on foot, and 443 from the air.

Natural Resources Police officers issued 8,973 citations and 9,569 warnings in FY 1986. The total of 18,542 shows a net increase of 4.5% over last year although citations (arrests) are down 6.7%. Warnings are up 19.1%. Officers responded to 4,414 complaints.

The continued strong enforcement of the conservation and boating safety laws, with emphasis on resource protection and reduction of boating accidents/injuries, has continued to receive strong support from the District Court System in most jurisdictions.

The courts have supported the Rockfish Maratorium with convicted violators receiving fines ranging from $100 to $500 per fish.

Persons convicted of jacklighting, and other forms of deer poaching, have received penalties ranging from $200 to $2,000 fines, loss of hunting weapon, extended probations (exceeding 1 year) and loss of hunting privileges for from 2 to 5 years.

Some of the more interesting cases include:

A deer possession case in Allegany County resulted not only in the conviction of three defendants on the deer charge but they were also charged with perjury. On appeal to the Circuit Court, the deer possession convictions were upheld and the jail term increased. The perjury case resulted in convictions with jail terms and 18 months supervised probation for all three defendants.

A deer poacher in Baltimore County, upon apprehension, was discovered to be on parole from North Carolina. The defendant was convicted on the deer violation and required to serve jail time in North Carolina for parole violation.

A Charles County court convicted a man of stealing crabs from another's pots and he was forbidden by the Court to go onto the Potomac River for 3 years.

A Queen Anne-County court convicted a clammer, as a second offender, for clamming within 150 feet of a natural oyster bar and fined him $500 and costs, sentenced him to 60 days in jail, suspended the sentence and placed him on 18 months supervised probation.

In Somerset County District Court the use of LORAN-C equipment in establishing accurate locations has been fully established as a law enforcement tool. Following the conviction of a defendant for fishing with monofilament net with the actual location established by the LORAN-C equipment, 22 Virginia crab dredgers, caught in Maryland waters, elected to pay $4,640 in fines on 59 citations rather than stand trial. LORAN-C was used by the NRP boats to determine the position of the crabbers.

Natural Resources Police noted 2154 hunting violations (both fresh and salt water) of which 2524 were for fishing without a license and 222 for illegal possession of fish (all species and categories *except rockfish*) and 65 for illegal possession of striped bass (rockfish). There were 8600 boating violations with the most common ones (PFD's, speeding, and registration not on board) accounting for 4557 or 53%.

There were 785 oyster violations with 533 for possession of unculled or undersized oysters, and 1214 crabbing violations with 840 cases of undersized crabs. There were also 950 violations involving the Criminal Code, the Motor Vehicle Code or other articles of the Annotated Code.

A close working relationship is maintained with the Maryland State Police, the various Sheriff's departments and County Police, as well as, the U.S. Coast Guard, the U.S. Fish and Wildlife Service, the Drug Enforcement Administration, the U.S. Customs Service and the U.S. Army Corp of Engineers and, more recently, with law enforcement agencies from other states.

The Natural Resources Police routinely investigate and assist other agencies in the investigations of criminal activity. Involvement in these activities continues and is a significant part of Maryland's over-all law enforcement effort. The more common cases are theft, breaking and entering, vandalism and illegal possession of property, but, Natural Resources Police officers have also been involved in the investigation of murders, suicides and drug incidents, and have searched for fugitives and missing persons.

Hovercraft

The Natural Resources Police have tested a Hovercraft for its application in marine law enforcement, Search and Rescue capability and emergency rescue response. The results have been favorable and the purchase of a larger Hovercraft is underway.

Alcohol Enforcement Program

A significant reduction in the number of boating accidents and fatalities proves the value of this three year old program. Boat accidents are down 12% and fatalities are down 25%. High risk areas have been under closer scrutiny and more concentrated law enforcement activities. Toward the end of the Fiscal Year 1986 and at the beginning of the 1986 boating season, the "Operation SWAMP" (Safer Waterways thru Alcohol Monitoring Patrols) program began. The program established a data base and concentrated on alcohol related enforcement in areas with high levels of boat accidents and fatalities.

Public education was the most beneficial result of SWAMP. A colorful brochure dealing with alcohol and boating, funded by Anheuser-Busch, was distributed by officers on patrol and at public events. A slide program entitled "Think before you drink" was purchased for the five regional headquarters and was shown more than 50 times at public events. Progress in the battle against alcohol related boat accidents and fatalities, (which in 1985 accounted for 83% of the total), has been made.

NRP Open House

The Natural Resources Police held an Open House at Sandy Point State Park on April 26 and 27, 1986 in an effort to enhance the NRP public image, to inform the public of its mission and to provide an opportunity for the public to meet and talk with NRP officers in a non-enforcement setting.

Artifacts and pictures (some from 1868) detailing the force's history, displays of patrol equipment, confiscated weapons and gear, waterfowl, the aircraft, and the hovercraft were a part of the museum like exhibit. Events included demonstrations of Search and Rescue procedures, canine enforcement, primitive weapon hunting, falconry, and crab picking. Among the public services offered were fingerprinting children, rides on patrol boats and the hovercraft, and a press conference at which Dr. Brown spoke on Maryland's Alcohol and Boating Program.

About 16,000 persons attended the open house and 1000 stood in line to ride on the hovercraft, 700 rode on patrol

boats and 470 children were fingerprinted. The public comment was overwhelmingly positive.

Officer of the Year

Officer George T. Williams of Somerset County was selected as the NRP Officer of the Year. He was cited for his activities in canine handling and his special skills in investigating and apprehending deer and waterfowl poachers.

SUPPORT SERVICES

Maintenance and Supply

This project is responsible for the operation of a central maintenance and supply depot located at the Matapeake Facility in Stevensville and provides services for the operating units of the National Resources Police enforcement programs. It also provides supply and maintenance service for many other units within DNR.

This section is responsible for a wide range of investigations, from criminal to internal, and applicant background checks. It is the clearing-house for interstate and nationwide inquiries; supervises covert operations and provides administrative and inter-agency liaison support for field units involved in criminal investigations.

Personnel, from this section, worked with Upper Eastern Shore Region officers in the successful arrest and prosecution of two suspects on seven counts of felony theft of boats, motors and boat-related articles. The sentence included jail sentences, community services, supervised probation and restitution of $3,248 to the victims. In another case, which began in September 1984, criminal investigators worked with the Attorney General's office investigating, obtaining indictments and prosecuting a Cecil County boat dealer on 76 counts of theft, forgery and/or "misappropriation by a fiduciary" concerning sales of boats. On five occasions, the defendant failed to comply with a Grand Jury order for documents and was eventually jailed for contempt. He was found guilty on all counts and was sentenced to 7 years imprisonment, to serve 18 months and be placed on 5 years supervised probation; plus 500 hours of community service at a rate of at least 10 hours weekly, fined a maximum $1,000 plus costs, and to make restitution to the State of Maryland, DNR Licensing and Consumer Services in the amount of $10,217.41 and to pay to another victim $1,242.00.

The NRP Officer involved was commended by the Attorney General's office for his efforts in this case.

Other investigations handled this year included homicide, rape, drug related, arson and fraud cases. Covert operations also continued with a number of successful prosecutions. A major staff study analysis of covert operations was prepared this year to develop an improved program which will be implemented over the next several years.

Police Academy

This project is responsible for the operation of the Natural Resources Police Academy located at the Matapeake Multi-Use Facility in Stevensville, Kent Island, and provides training to the Entrance-Level Officers as well as In-Service Training to the Field Enforcement Officer as mandated by the Maryland Police and Correctional Training Commission and is also responsible for the supervision of the Cadet Training Program. These training programs ensure that the total complement of Officers and Cadets are highly trained and able to perform their duties in an efficient, professional and responsible manner.

There was no entrance level training course conducted this year. However, Academy staff oversaw the training of 177 inservice officers, 216 persons in Police Instructor Training Courses, 9 persons in cadet training and 3 environmental trainees for a total training time of 21,300 man hours.

DNR's Natural Resources Police testing new recruits.

WRA Detachment

The Water Resources Administration detachment of 2 Natural Resources Police Officers continues to provide police support to the WRA Enforcement Section. The detachment made 76 cases and won cases resulting in $23,000 in fines.

Boat Accident Investigations

The accident investigator reported the following:

Boat Accidents	186
Boating Fatalities	18
Boating Injuries	89
Property Damage	$1,110,488

Fires cost boat owners $498,350, collisions $355,339 and sinkings $170,028. Typical fatal accidents this year occurred on a summer Saturday between 4 and 8 p.m., the victim fell overboard while riding in an open boat, between 16 and 26' long, which was operated by an individual with more than 100 hours of boat operating experience. Eighty-three percent of all boating accidents involved alcohol, and, in 8 of the 18 Maryland fatalities alcohol was involved.

Outdoor Education Section

This section oversees the Hunter Education and Boating Safety Education Programs.

Hunter Education

This program is responsible for the mandatory training law, which became effective July 1, 1977, and requires all first time hunters to complete a prescribed course of instruction in conservation, competency and safety in handling firearms.

This year, under the supervision of five Natural Resources Police Officers, volunteer Hunter Education Instructors trained and certified 5982 student hunters.

There were 27 hunting accidents in Maryland this year, up from 25 the year before, but for the first time in many years there were *no* fatalities.

Maryland's program has been recognized by the National Rifle Association and the International Association of Fish and Wildlife Agencies as one of the ten best in North America.

Boating Safety Education

This program is directed toward the development and coordination of Boating Safety Education courses throughout the State, with emphasis on the boating public of school age. In 1976, the Natural Resources Police joined efforts with the Maryland State Department of Education to develop a boat and water safety education program for the schools in Maryland. The Boating Safety Course is also available as a home study course for those persons unable to attend class and each year thousands of persons, from Maryland and many other states, take advantage of Maryland's course. Many insurance companies offer a discount on boat owner's insurance to those individuals who show proof of successful completion of a Boating Safety Course. This year 5,416 persons requested the Basic Boating Course home study books.

Forty-one formalized classroom instructional programs were conducted, successfully training over 200 students. Boating safety programs in the schools reached over 4000 students, from kindergarten through high school, and training for special groups included members of the Maryland National Capital Parks and Planning Commission and the Allens Pond Park Rangers.

Members of the Boating Safety Education office were cited by the U.S. Army Corps of Engineers and the National Water Safety Congress for their outstanding efforts in the field of Water and Boating Safety Education.

Aviation

This program provides airborne surveillance and rescue services to the enforcement unit and other agencies of the Department of Natural Resources. The aircraft employed by this project is a twin-engine Aero Commander 500 A and a single-engine Piper Super Cub PA-18.

The unit flew 716 hours including 340 hours of enforcement flights resulting in 113 arrests and 21 warnings, and 15 hours of search-and-rescue operations.

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. The Survey prepares reports on the extent and character of the geology, mineral, and water resources of the State, and supervises provisions relating to archeology. It also is concerned with archeological resources, and disseminates information about the Archeology of Maryland.

Through scientific investigation and analysis, the Survey seeks to obtain a better understanding of the geology, archeology, water resources, 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. These functions include representing the State at the Association of American State Geologists, Interstate Mining Compact Commission, Interstate Oil Compact Commission, Maryland Mining Council, State Topographic Mapping Committee, Land Reclamation Committee, Outer Continental Shelf Policy Committee, and geological matters involving the Department of Energy's high level nuclear waste storage program.

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

In cooperation with the Delaware State Boundary Commission, Maryland Dept. of Transportation and the National Geodetic Survey, the Middle Point monument on the Delaware-Maryland Boundary was reset into its historic position after having been toppled by vandals. Maryland and Delaware also executed an agreement which defined the Transpeninsular Line as restored to be the correct and accepted boundary between the two States.

In June, 1986 the Survey moved to its newly renovated quarters at 2300 St. Paul Street. The new home of the Survey originally housed the gymnasium, biology and physiology departments of Goucher College. It had been purchased by the State and used as the laboratories of the State Department of Health and Mental Hygiene. The complex is made up of two buildings connected by a two-story bridge. The buildings were designed by Stanford White and constructed in 1888–89. They are listed on the National Register of Historic Places. Certain construction work is still being done and laboratories and site work are still to be completed.

HYDROGEOLOGY AND HYDROLOGY

Projects of the Hydrogeology and Hydrology Program are carried out under the auspices of the U.S. Geological Survey—Maryland Geological Survey Cooperative Agreement. Through this agreement funds budgeted by the State and participating intrastate agencies are generally matched by the Federal government on a 50/50 basis.

The Hydrogeology and Hydrology Program is responsible for the maintenance of 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 stream flows for the planning of water supply and sewage facilities, water power projects, dams, bridges, and other public and private works; and ground-water levels, in selected wells throughout the State. This network allows monitoring of the hydrologic effect of long-term changes in pumpage, land-use patterns, and precipitation.

In addition to the Statewide network activities, site-specific projects are undertaken to determine ground-water and streamflow characteristics and rates of replenishment. Applied research projects of this type are often supported by special matching funds from County or State cooperators. During FY'86, investigations were underway in areas of Anne Arundel, Calvert, Carroll, Charles, Garrett, Queen Anne's, Somerset, Washington, and Worcester Counties.

Stream-Flow Gaging Network

During the year operation and maintenance of 87 continuous-record stream-gaging stations were continued. In addition, 11 crest-stage gages, 23 low-flow stations, and 6 sediment sites were operated. Data from these stations for the 1985 water year were compiled and published in "Water Resources Data for Maryland and Delaware", U.S. Geological Survey Water-Data Report MD-DE-85-1.

Ground-Water Data Network

This project maintains a continuous inventory of ground-water levels in aquifers and selected springs of the State and relates changes in ground-water levels to withdrawals and precipitation. The regional distribution of observation wells is:

	Wells
Appalachian Region	16
Piedmont Province	18
Coastal Plain Province	
Western Shore	52
Baltimore Industrial Area	14
Eastern Shore	50
TOTAL	150

Supplementing the regular network are several hundred additional wells, which are periodically measured as part of other projects.

The following investigations were in progress or completed in FY'86:

Anne Arundel County

At the end of FY'86, 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 "in press". 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. A multi-aquifer flow model was developed to simulate projected water demand (118 million gallons per day) in the area by the year 2000. The model was used to predict the effect of that pumpage on water levels in each aquifer. The results indicated that deep cones of depression would be developed in some aquifers, but that the well fields could provide the quantities needed.

Work continued in the Glen Burnie area, where a detailed study of the lower Patapsco aquifer is in progress. The object of the study is to quantify the effects that additional pumpage will have on ground-water levels, stream-flow, and brackish-water encroachment in Sawmill Creek and Marley Creek Basins.

Charles County (Waldorf Area)

During the year the results of three test wells at two sites near Waldorf became available for analysis. At the St. Paul site an upper Patapsco observation well was constructed to supplement the existing lower Patapsco well already available at the site. At the St. John's site an upper Patapsco observation well was constructed. Also at this site, the county supported the drilling of a deep (1,696 ft) test well to evaluate the Patuxent aquifer as an alternate supply. Results of a 24-hour pumping test suggest that, although the aquifer contains fresh water, its transmissive properties are marginal.

Maryland Geological Survey Open-File Report No. 86-02-2—"Stratigraphy, Hydrogeology, and Water Chemistry of the Cretaceous Aquifers of the Waldorf/LaPlata Area, Charles County, Maryland" was issued at the end of FY'86. The report summarizes data from a previously drilled lower Patapsco test well located at the St. Paul site. In addition, it erected a hydrogeologic framework for the Waldorf area that is being used to develop a multi-aquifer flow model.

Frederick County

During the year, Maryland Geological Survey issued Basic Data Report No. 15—"Ground-Water and Surface-Water Data for Frederick County". The report contains surface-water data, including streamflow measurements and chemical analysis of water collected at 25 sites; ground-water data, including locations and descriptions of 1,898 wells and 130 springs; chemical analysis from 45 wells and 2 springs; and water-levels measured in 58 observation wells.

During FY'86 the County Water Resources Report (Bulletin 33) was completed and is being prepared for publication. The report will cover ground-water resources, surface water resources, hydrologic budgets, and water availability.

Queen Anne's County (Kent Island Area)

Field work for this project ended in FY'86. Hydrogeologic, water-level, and water-quality data were obtained during the project to define the areal and vertical extent of Bay-water encroachment into the Aquia aquifer. A ground-water flow model of the Aquia aquifer was developed and successfully calibrated during this year. This model will be used to establish potentiometric head values and boundary conditions for a cross-sectional solute-transport model aligned across Kent Island in the vicinity of the Bay Bridge. This model, when calibrated, will simulate the movement of the salt-water plume under present and future pumpage conditions.

Somerset County

This study was undertaken to estimate the ability of the ground-water resource to meet current and proposed demands for water.

A network of 55 observation wells has been established so that ground-water levels throughout the county can be measured. Maps showing the high and low water levels in each aquifer are being prepared. The ability of the aquifers to transmit water has been estimated by analyzing pumping tests performed on selected wells. By combining these estimates with information from the water-level maps, an approximation of the quantity of water that the aquifers can yield will be made. Current and proposed amounts of water that the major ground-water users pump have been compiled for the county and for those areas of high water use that border the county. The ability of the aquifers to meet these demands for water will be evaluated as the study progresses.

Water-quality sampling of 75 wells throughout the county has been started and the concentrations of the major inorganic chemical constituents of each sample will be determined. From this information, maps showing the general distribution of the chemical constituents will be constructed. Also, those areas in which degradation of water quality may occur from changing patterns of land use or increased pumpage will be identified.

Stormwater Infiltration

As part of the Chesapeake Bay Initiatives, stormwater run-off from parking lots and shopping malls is being diverted into infiltration basins. Such practices should increase recharge to the water table, but the effects on ground-water quality is uncertain. Runoff from such facilities often contains elevated levels of metals, salts, and organic chemicals. Construction of monitoring and sampling stations is nearly complete at infiltration basins located at the Annapolis Plaza Mall and the North Carroll Shopping Plaza near Greenmount and at a porous pavement park and ride site near Prince Frederick. During the next four years, run-off, soil-water, and ground-water samples from these geologically diverse sites will be analyzed to determine what impact stormwater infiltration may have on ground-water quality.

Washington County

The year was chiefly concerned with data collection. Water-well completion reports and ground-water appropriation permits from State files were reviewed. About 950 wells and springs were inventoried in the field to obtain exact locations, geologic and topographic settings, elevations, pumpage, and water levels in cases where access to the well was feasible. From this data base about 35 observation wells and 3 springs were set up to obtain continuous and/or synoptic water-level measurements. In addition, the hydrographs from 8 continuous and 7 low-flow partial-record stream gaging stations were analyzed. Water samples from about 20 stream sites in the county were collected for analysis.

Rediscovering Maryland's past. The foundation of a dairy house is uncovered near Salisbury on Maryland's Eastern Shore.

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. A report is in preparation that will include graphical displays of these data.

Initial discussions were underway in FY'86 to explore the feasibility of drilling two or three offshore wells into the Manokin aquifer system to determine how close salty water is to the Ocean City well fields.

Other Active Projects

During the year the effect of ground-water 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 are carried out in cooperation with the Power Plant Siting Program.

The effects of deep mining on the hydrology and water quality of an area is being investigated at the Mettiki Coal Mine in south-western Garrett County. Changes in streamflow, ground-water levels and water quality are being documented at several sites and related to mining methods (room and pillar vs. long wall), mine geometry and rate of expansion, volume of acid mine drainage (AMD) extracted, and treatment and disposal practices of AMD.

Preparation of the Cecil County water resources report was delayed because of the unexpected resignation of the project chief to accept an out-of-State position with the U.S. Environmental Protection Agency.

The Maryland Geological Survey supervised the drilling of a 1,725-ft test boring at Tuckahoe State Park in Queen Anne's County, the proposed site of a Department of Natural Resources fish hatchery. Subsequently, a 1,340-ft production well was constructed and tested. A preliminary analysis of the test results suggests that ground-water at the site is of sufficient quantity and quality to meet design requirements for the hatchery.

ENVIRONMENTAL GEOLOGY AND MINERAL RESOURCES

This program has the responsibility for geologic and environmental mapping and research, topographic map revision, mineral and energy resources investigations, and dissemination of geological information. Studies provide the basic framework for delineating and managing the State's mineral and land resources. A relatively new approach in environmental mapping is the Mineral Resource and Mined-Land Inventory Maps and maps of the Geologic Factor Affecting Land Modifications.

The following investigations were in progress or completed in FY'86.

Geologic and Environmental Mapping

Geologic field mapping continued in the Lonaconing and Barton 7.5 minute quadrangles (Allegany/Garrett Counties), and the Manchester Quadrangle (Carroll County). Field work was initiated in the Smithsburg Quadrangle (Washington County) and the Flintstone Quadrangle (Allegany County). The Hereford Quadrangle (Baltimore County) was published, as was the Dorchester County Geologic Map. Maps are under review for publication in the Union Bridge and Finksburg Quadrangles (Carroll County). The Cecil County map is at the publishers. Office compilation/field work continues in Calvert and Caroline Counties as well as the Cumberland/Cresaptown, Avilton/Frostburg, and Westernport geologic quadrangles in Western Maryland and the Woodsboro, Littlestown & Westminster geologic quadrangles in Frederick/Carroll Counties.

Topographic Mapping

The Baltimore, Somerset and Worcester County Topographic Maps were published. Field work was initiated in Harford and Garrett Counties. Compilation/field work continues in Allegany and Prince Georges Counties. Maps in Dorchester, and Queen Annes Counties are ready for publication.

Mineral Resources and Other Studies

A revised and simplified Directory of Mineral Producers was published as an Information Circular. Work continued on a consolidated stratigraphic chart of Maryland and on a physiographic mapping and terrain analysis project in the Blue Ridge Physiographic Province of Frederick County. An information circular describing map products of the Survey needs updating and drafting for publication. An update of the List of Publications was published.

A joint cooperative program continued with the U.S. Geological Survey preparing geological constraint maps and mineral resources maps in southern Maryland's Charles and St. Mary's Counties. Sand and gravel resource maps of Charles, Calvert & St. Mary's Counties were nearing completion at year's end. Field work was essentially completed on maps of geologic constraint on land use and physiographic maps for Charles and St. Mary's Counties.

Pamphlets were published on the Building Stones of Maryland, Miocene Sharks Teeth, Calvert Cliffs, and Dinosaurs in Maryland. The text of a completely new pamphlet, "Earthquakes and Maryland" is currently in the word processor, and drafting is essentially completed. The Survey's collection of Maryland rock and mineral specimens and description handouts for school children were updated and expanded.

A study of coal bed stratigraphy, distribution, and economic importance and a study of upper Mississippian-aged strata continues in Western Maryland. A study is underway on the geologic history and structure of the Piedmont in Carroll County of central Maryland. A study was initiated on the Geology of the Antietam Campaign

(Washington County), which will provide the geologic setting for the famous Civil War Battle of Antietam.

The proceedings from the 20th Forum on the Geology of Industrial Minerals, held in Baltimore in May 1984 and hosted by the MGS, were published. The special publication "Frederick-Montgomery-Howard County Resurvey of 1980" also was published.

A "Study of Mining Constraints and Mineral Resource Availability in Maryland", should be published in FY 87.

The MGS is providing geologic information and consultation for a geologic display at the tourist center and rest stop, to be built by the State Highway Administration, at the Sideling Hill road cut in Washington County on the National Freeway (U.S. 48) 6 miles west of Hancock, Maryland.

National Cartographic Information Center (NCIC)

The Survey continues to serve the needs of Maryland Cartographic 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 Mid-Atlantic Outer Continental Shelf (OCS) in FY 86. An offshore sale had been scheduled for October, 1985, but less than enthusiastic exploratory interest among oil companies was a factor in cancelling this sale.

Western Maryland Gas

Gas continued to be produced from six wells in two gas fields in Garrett County. An exploratory well was drilled near McHenry, also in Garrett County.

A number of oil companies as well as the federal government, who jointly own mineral interests in state lands, have requested leasing of state lands for oil and gas exploration in several areas around the State. Various agencies of DNR are involved, with the MGS acting as geologic advisor.

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.

Geologic History of Chesapeake Bay

During the second year of a five year cooperative study with the U.S. Geological Survey and the Virginia Institute of Marine Science field operations centered on the region of the Bay between the Patuxent and Potomac Rivers. High resolution seismic and side scan sonar records were obtained along nearly 500 kilometers of track lines from this area and the northern portion of Tangier Sound. Preliminary analysis indicates that a number of paleochannels related to the late Quaternary history of sea level changes are present in the region. Results from the first year's field work in the Bay mouth region have been analyzed and presented at a Geological Society of America meeting. The third year's field effort, to cover the northern portion of Virginia southern Tangier Sound and Pocomoke Sound has been scheduled for September/October 1986 and will involve a vessel and support personnel from the Cape Fear Research Institute.

Dredged Sediment Monitoring

The fourth year investigative report on the distribution and fate of dredged sediment in the Northern Chesapeake Bay has been published. The high resolution acoustic profiling system acquired in support of this study has proved to be a valuable tool for tracking dredged sediment. Both high concentrations of suspended sediments in the disposal plume and recently deposited dredged sediments on the bottom were successfully identified. It was determined that the volume of deposited sediment was reduced as a result of both consolidation and resuspension processes. Data for the fifth year of this continuing effort have been collected and analysis is proceeding.

Sedimentology of Chesapeake Bay

The grain size distributions of Bay bottom sediments, sampled during the Chesapeake Bay Earth Science Study, were analyzed by a statistical technique known as factor analysis. The method was successfully applied to two disparate groups of samples—(1) all samples collected from Eastern Bay and the mouth of the Choptank River and (2) all samples consisting of at least 90% mud collected from the main stem of the Bay. The results of the first analysis will appear as a Survey publication; the results of the second have been submitted for publication to *Estuarine, Coastal and Shelf Science.*

Carbon and Sulfur Content of Chesapeake Bay Sediments

The concentrations of carbon and sulfur in Bay bottom sediments, determined during the Chesapeake Bay Earth Science Study, roughly delineate geochemical environments within the Bay. A discussion of distributions of these two elements in the Maryland portion of the Bay will appear in an article to be published in the *Journal of Sedimentary Petrology* (September, 1986).

Field Operations

The R/V Discovery logged approximately 1,052 hours of operation in support of our own scientific field operations as well as for several other agencies in the Chesapeake Bay and the Atlantic Ocean.

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 ad-

ministering the permit system for archeological investigations on State lands, as provided for in the Maryland Archeological Resources Act of 1968. 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. Its resources are available to the public, government agencies, and professional archeologists.

Pemberton Hall

The 1986 Field Session in Maryland Archeology was held at Pemberton Hall, an 18th century plantation in Wicomico County. The ten-day field session, sponsored by the Archeological Society of Maryland, Inc., and supervised by the Division of Archeology, attracted the participation of some 75 avocational and professional archeologists. Among the more notable features uncovered during excavations in the sideyard of the mansion was the 12 by 12½-foot brick foundation of a dairy. Data on this and other features will be incorporated into interpretive reconstructions planned for Pemberton Historical Park.

Underwater Archeology

During FY'86, the Division of Archeology embarked on a program to inventory the State's submerged archeological resources. Using early maps and atlases and records of the Merchant Vessels of the United States, nearly 800 structures (wharves, landings, lighthouses, ferries, and bridges) and some 300 shipwrecks have been documented.

The Division also met with other State officials, members of the Underwater Archeological Society of Maryland, and representatives of the sport diving community to seek means for ensuring the protection of the wreck of the mid-19th century steamer New Jersey, located in the Chesapeake Bay off the mouth of the Choptank River.

Highway Studies

Archeological investigations of proposed highway projects has continued since 1975 with funding provided by the State Highway Administration. At the 1986 Association of Transportation Archeologists conference, held in conjunction with the annual Society for American Archaeology meetings in New Orleans, the ten-year-old MGS-SHA cooperative agreement was one of six state programs highlighted.

During FY'86, field reconnaissance studies were completed on 12 highway projects, located in 11 Maryland counties. Five highway project completion reports were issued as part of the Division of Archeology's File Report series during the year. The Division also monitored a consultant's Phase III excavations at the early 18th century Oxon Hill Manor site in Prince Georges County. Included among the Division's own intensive archeological studies was a data recovery project at the mid-19th century Harford Furnace site. Excavations centered on the remains of a stone-footed, central chimney dwelling of an apparent high-status individual, perhaps either the ironmaster or a foreman. In Allegany County, test excavations were carried out at four prehistoric sites located in connection with the National Freeway project. Most noteworthy of these was the Wallizer site, a large Monongahela village. Subsurface testing revealed postmolds, trash-filled pits, and primarily limestone-tempered pottery. Charcoal samples submitted for radiocarbon assay yielded dates of A.D. 1355 ± 95 and A.D. 1155 ± 50 for this site.

Other Activities

The number of archeological sites recorded in the Maryland Archeological Site Survey increased from 5,409 to 5,613 during FY'86. Also, the Division initiated a program to computerize its site files. By year's end, nearly 30% of the site forms had been encoded, and data from 8 counties had been entered on the computer.

The third in the Geological Survey's Archeological Studies series, Bibliography of Maryland Archeology: 1981–1984 Supplement, and three issues of the Division's newsletter, Current Maryland Archeology, were published in FY'86. The newsletter covers all aspects of Maryland archeology and is distributed free to archeologists, government officials, and interested members of the public. The Division also distributes information leaflets, including a brochure which serves as an introduction to Maryland archeology and the role of the Survey's Division of Archeology, a guide to characteristic prehistoric artifacts in Maryland, and a directory of volunteer opportunities in Maryland archeology.

One Towson State University student served as an intern during the year and, along with three volunteers, assisted Division staff with collection curation. One of the volunteers is also assisting with reorganization of the Division's library/reference room. This facility serves as the primary research repository for archeological data in Maryland; noteworthy recent acquisitions include extensive historic and original topographic survey maps.

The Division continues to maintain close and active relationships with professional and amateur archeological organizations including Archeological Society of Maryland, Inc., Underwater Archeological Society of Maryland, Council for Maryland Archeology, Eastern States Archeological Federation, and Middle Atlantic Archeological Conference.

Temporary exhibits on Maryland archeology were installed at two locations during the year. At the Cecil County Detention Center, an interpretive display of Woodland period (1000 B.C. to A.D. 1600) artifacts recovered from the Hollingsworth Farm (now the site of the correctional facility) was set up in the lobby. At the Friends Museum in Garrett County, the Division assembled an exhibit of Late Woodland artifacts excavated from the Friendsville Village site in the Early 1970's.

The Advisory Committee on Archeology, composed of five citizen archeologists, counsels the Maryland Geological Survey on archeological matters. It met in August and November 1985, and in February 1986 to review and make recommendations on the work of the Division of Archeology.

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 utility corporation.

Since its creation in 1970, it 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 have been available to the State government, local 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 1986, the Service was an $18,660,000 enterprise. The Service is essentially self-supporting, with approximately 81 percent of its income currently derived from fees paid by corporate clients.

State 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.

Corporate revenues are derived from fees for services charged non-State clients, and represent the major share of the total operating revenues.

The Service has been granted substantial autonomy from the Department of Natural Resources in its internal management and external operations. The Service is able to sell revenue bonds for Service related projects, enter into contracts and leases, and is able to charge fees for its varied services.

The corporate affairs of the Service are managed by a seven-member Board of Directors, including the Director, Deputy Director, Secretary, and Treasurer of the service, and three appointed citizens of Maryland. The Board of Directors is appointed by the Secretary of Natural Resources with the approval of the Governor.

ADMINISTRATION

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, computing, legislative liaison, contract administration, State and corporate personnel and benefits administration are specific functions of Administration.

The Maryland Environmental Service Corporation's Board of Directors is included in this division, as well as administration of grants and loans under the Solid Waste Facilities Loan of 1983 and 1986. The data processing section is developing and implementing an integrated data processing system consisting of microcomputers connected to an IBM System 36 minicomputer, which is linked to the State's mainframe computer.

FINANCE

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

During fiscal year 1986, the Finance division continued to implement basic financial systems, such as accounting, purchasing, billings and receivables. This division also 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 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 sites.

In fiscal year 1986, the Engineering division continued to operate and maintain the Hart-Miller Island Dredged Material Containment Facility. Hart-Miller Island is 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 1986, this facility had received over 8 million cubic yards of dredged material. Engineering's responsibilities include providing full-time inspection of the unloading and handling operations, crust management, laboratory services, on-site water quality monitoring, security, and the equipment and personnel for interior dike maintenance.

The Service operated the Hawkins Point Hazardous Waste Landfill intermittently for the disposal of chromium waste from Allied Corporation. This facility is expected to receive contaminated demolition debris from Allied during fiscal year 1987.

The Service, via its contractor, continued to operate the Baltimore County Resource Recovery Facility (BCRRF) in Cockeysville, Maryland. During fiscal year 1986, the BCRRF processed an average of 573 tons of municipal solid waste per day. Of this, 17 tons/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. Due to recently completed renovations at BG&E's C.P. Crane power generating station, Maryland Environmental Service hopes to more than triple the amount of RDF burned in fiscal year 1987.

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 1986. All of the compost product derived from these leaves was sold by the Service's marketing staff.

The Service will soon begin a remedial investigation and feasibility study at the former Joppa Sand & Gravel Co. property, a defined hazardous waste site in Harford County near Joppatowne. The study will determine the extent of any required corrective action to protect the environment.

The Service continued its contractual agreements with the Washington Suburban Sanitary Commission to monitor sludge disposal operations, grease disposal operations and code enforcement for the use of fire hydrants to supply outside water haulers service to contractors. 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 well underway and scheduled for completion in the summer of 1987. This state-of-the-art facility will remove nitrogen and phosphorus on a year round basis. It will serve the House of Correction complex in Jessup and will replace a temporary facility built in the early 70's.

Other Capital Improvement Projects include 16 other institutions such as the Bowie State College wastewater facility, the Crownsville Hospital Center water supply and Montrose School wastewater facility. The Service also administers federally funded (EPA) projects. These projects usually involve innovative and alternative wastewater systems such as the small diameter pressure sewer at Point Lookout and the Bermeo Infiltration Pond at the Horn Point Environmental Lab.

OPERATIONS AND MAINTENANCE

Maryland Environmental Service's Operations & Maintenance Division provides licensed personnel to operate and maintain approximately 100 water and wastewater treatment plants.

These facilities are divided into three categories according to their ownership: State-owned, local government owned and privately-owned facilities.

In addition, this division is involved in the operation and maintenance of small scale composting facilities, solid waste incineration, a methane recovery operation at a solid waste landfill, and holds responsibility for the safety and health functions of the Service.

State Wastewater Treatment Facilities

The Service operates all the major wastewater treatment plants for the State of Maryland. Operating budgets are included in the various departments as part of their total expense to carry out their functional responsibilities at each of their facilities.

FY'86 SUMMARY OF THE FACILITIES BY DEPARTMENT:	NO. OF PLANTS
Department of Public Safety & Correctional Services	6
Department of Health & Mental Hygiene	8
Department of Natural Resources	11
Charlotte Hall Veterans Home	1
Bowie State College	1
TOTAL	27

State Water Treatment Facilities

The Service also operates all the major water treatment plants for the State of Maryland. Budgets are handled the same as the wastewater plants.

FY'86 SUMMARY OF THE FACILITIES BY DEPARTMENT:	NO. OF PLANTS
Department of Public Safety & Correctional Services	3
Department of Health & Mental Hygiene	7
Department of Natural Resources	10
Charlotte Hall Veterans Home	1
St. Mary's College	1
TOTAL	22

Other Water & Wastewater Facilities

In addition to the State facilities, the Service operates facilities for other clients. These clients and the number of facilities is summarized in the following chart:

FY'86 CLIENTS	WATER	WASTEWATER
Counties	0	8
Towns	3	6
Private	7	25

Inspection Services

The Service continued to provide three inspections at twenty-four (24) State facilities which are not directly operated by the Service. These inspections are conducted each year. The reports provide system status, operating and improvement recommendations and safety comments.

Laboratory Services and Water Quality Monitoring Services

This section handled over 3,000 samples in the Fiscal Year 1986 to properly monitor the wastewater treatment plants effluent and over 350 samples at the water plants to ensure proper drinking water.

This group monitored sampling wells at five groundwater monitoring sites and 11 sludge entrenchment sites for which over 3,000 tests were performed and processed. They maintained effluent discharge statistical monitoring and permit compliance utilizing computers. The Operations & Maintenance Division also provided monitoring for several hazardous waste facilities.

The Program handled permit applications and renewals for over 100 facilities. This includes all NPDES permits, monitoring and compliance reports. Also, sludge handling permits were obtained and controlled for all the wastewater facilities. In fiscal year 1986, almost 90% of these facilities received new or revised permits and several facilities had more than one permit submitted. Those permits covered over 650 tons of sludge which was applied to lands from Service operated plants.

Training

The training of our licensed personnel is critical and a requirement of the State's certification regulations. In fiscal year 1986, over 1,000 hours were given to our staff of 110 personnel. This training included preventive maintenance, laboratory analyses, process control, CPR and specialized equipment training.

Special Projects FY'86

A need-to-know manual was prepared in cooperation with the Maryland Center for Environmental Training for water distribution system. This manual will be utilized by the State's Board of Certification for distribution to all operators to improve their training.

Design was completed for the sophisticated Dorsey Run nitrification/denitrification wastewater treatment facility to serve the House of Correction in Jessup. When completed in fiscal year 1987, this plant will replace an at-capacity, temporary facility.

Other State-owned wastewater treatment plants are in varying stages of improvement or replacement, such as Cheltenham Boy's Village, Bowie State College, Southern and Poplar Hill Pre-Release Units, Montrose School and the Crownsville Hospital Center.

Other significant developments within the Operations and Maintenance Division during fiscal year 1986 were: creation of a full-time sludge management coordinator position to prepare a sewage sludge composting demonstration project on Kent Island in partnership with Queen Anne's County; comprehensive sludge management plan for all Service operated wastewater treatment plants; and a second composting demonstration project with Talbot County.

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 1986, the Service contracted with the University of Maryland to provide technical assistance to small quantity generators of hazardous waste under a grant from the U.S. Environmental Protection Agency.

The Maryland Recycling Directory was reissued and the division continued responsibility for the Maryland Used Oil Recycling program and toll-free recycling information service.

Assistance was given to St. Mary's County and the Tri-County Council of Southern Maryland on solid waste management and energy recovery from wastes.

A study requested by the legislature, researching the possibility of an "amnesty days" program for the collection of household hazardous waste, was completed in January 1986, and submitted to the legislature for review.

MARKETING

The marketing division is responsible for the promotion of the Service, sale of products developed by the Agency and its clients, and the generation of new business and continued business.

Fiscal year 1986 was a very successful year for the sale of our organic products, ComPRO$_R$ 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. ComPRO$_R$ is available in bulk and in bags at garden centers and hardware stores. The Maryland Environmental Service provides the Sales and Marketing Service for WSSC and wholesales ComPRO$_R$ to retailers.

The Maryland Environmental Service Leaf Compost sales were greater in the second half of FY'86 than in the entire calendar year 1985. This new product is being widely received by a similar market as ComPRO$_R$. The product is developed and sold by the Maryland Environmental Service for Montgomery County at the Dickerson Leaf Composting Facility. The Service has several large volume users for this product.

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, in order to meet the increased responsibilities under the Chesapeake Bay Legislation, adopted the following organization as of July 1, 1984:

- 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.

Citizen complaints, monitoring and inspection for Erosion and Sediment Control and Waterway Permits may be referred to the Enforcement Division, 1-800-DNR-SOIL in Baltimore and Annapolis 269-2641. Citizen complaints, monitoring and inspection activities for Wetlands and Surface Mining may be referred directly to the appropriate Division.

The Water Resources Administration responds 24 hours a day to *OIL SPILL* problems in Maryland. Call 301-269-3551 during business hours, Monday through Friday or 301-269-3181 evenings, weekends or holidays.

GENERAL DIRECTION

The overall direction, supervision and coordination of the policies and operations of the Administration are carried out in this program. Coordination of public notices and hearings, and a public information office are parts of this program.

The Water Resources Advisory Commission met four times in FY 1986 to discuss activities and policies that included waterway permit regulation revision, revision of the oil program fee system and updates on the sediment and stormwater management program. Four long-time commissioners retired during this fiscal year. Four new members were appointed to the five member commission.

WATERSHED PROTECTION PROGRAM

The divisions in this program are Waterway Permits Division, Sediment and Stormwater Division and Enforcement Division.

Program Administration

The Chesapeake Bay Initiatives provided a $1.6 million grant fund for distribution to local jurisdictions to support local personnel responsible for Stormwater Management Plan review inspection, and enforcement services 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	Prince George's County
Allegany County	Queen Anne's County
Baltimore County	St. Mary's County
Calvert County	Talbot County
Carroll County	Wicomico County
Charles County	City of Annapolis
Dorchester County	Baltimore City
Frederick County	Bowie
Garrett County	Cambridge
Harford County	City of Frederick
Howard County	Ocean City
Kent County	Rockville
Montgomery County	City of Salisbury

The FY 1987 budget includes an appropriation of $1,600,000 for the continuation of the Stormwater Management Grant Program.

Teams, organized by the Watershed Protection Program, went to western Maryland to expedite approvals for emergency repair work made necessary because of the flooding from extreme weather conditions in November. The teams included members of the Enforcement Division, Sediment & Stormwater Division, Surface Mining Division and the Flood Management Division.

Waterway Permits Division

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

Major activities during FY 1986 included:

- Established a library of WRA approved hydrologic and hydraulic studies for permitting activities.
- Reviewed and evaluated the application for the issuance of the permits necessary for the Jones Falls Expressway repair.
- Published *Guidelines for Waterway Construction* to assist permit applicants in addressing such issues as sediment control for instream construction and stream restoration and enhancement.

As a result of the emphasis on the Bay Initiatives, the Division is increasing its quality control review of erosion and sediment control details associated with floodplain and channel construction. The Division is responsible for review and approval of plans for State and federal projects that require a Waterway Construction Permit, as well as those projects that are exempt from local SCD approval under COMAR 08.05.01.04.

The Division received a total of 814 permit applications for FY 1986. This is an increase of 20% over FY 1985 and reflects in part the increase in construction activities.

The Division's activities included:

Type of Project	Number
Maintenance and Repairs	163
Temporary Construction	197
Waterway Construction	275
Waterway Obstruction/Dams	4
Small Ponds	18
Preliminary Project Plan Review	157
Applications Received and Withdrawn	25

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. Speakers were also provided on the state-of-the-art in sediment and stormwater controls. Over 300 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 understanding the benefits of clean water and offers training to construction industry field personnel and local government agencies. Effective July 1, 1983, a supervisor certified under the State program is required on all construction sites. Since the program's inception, 8,000 have received certification. Approximately 1000 persons were trained in FY 1986.

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. Ten 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.

The sediment control section also initiated an update of Standards and Specifications for Erosion and Sediment Control.

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 run-off characteristics of a watershed after development has been completed. All local jurisdictions are required to adopt a stormwater management ordinance and establish a stormwater management program.

A model ordinance was developed by the Stormwater Section and local jurisdictions receive assistance in meeting requirements of the Stormwater Management Law.

The Division conducted reviews of stormwater management programs in Calvert, Cecil, Worcester, Charles, Baltimore, Carroll and Wicomico Counties. The reviews, mandated by State law, evaluate administrative procedures and infield implementation of stormwater controls.

Plan Review Section

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

Projects reviewed for FY 1986:

DOT, SHA	457
DGS	233

Enforcement Division

The Enforcement Division has 30 inspectors to enforce compliance statewide, 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 Counties.

The Enforcement Division is 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 has conducted 21,154 inspections on job sites in FY 1986 and investigated 1,268 citizen complaints.

The Division has issued the following numbers of notices for violations:

Floodplains	89
Sediment Control	792
Stormwater	45

The Oil Control Division has developed and obtained equipment to respond to spill emergencies on inland waters and waters of the Chesapeake Bay.


WATER
RESOURCES
ADMINISTRATION
SPILL RESPONSE TEA

WATER MANAGEMENT PROGRAM

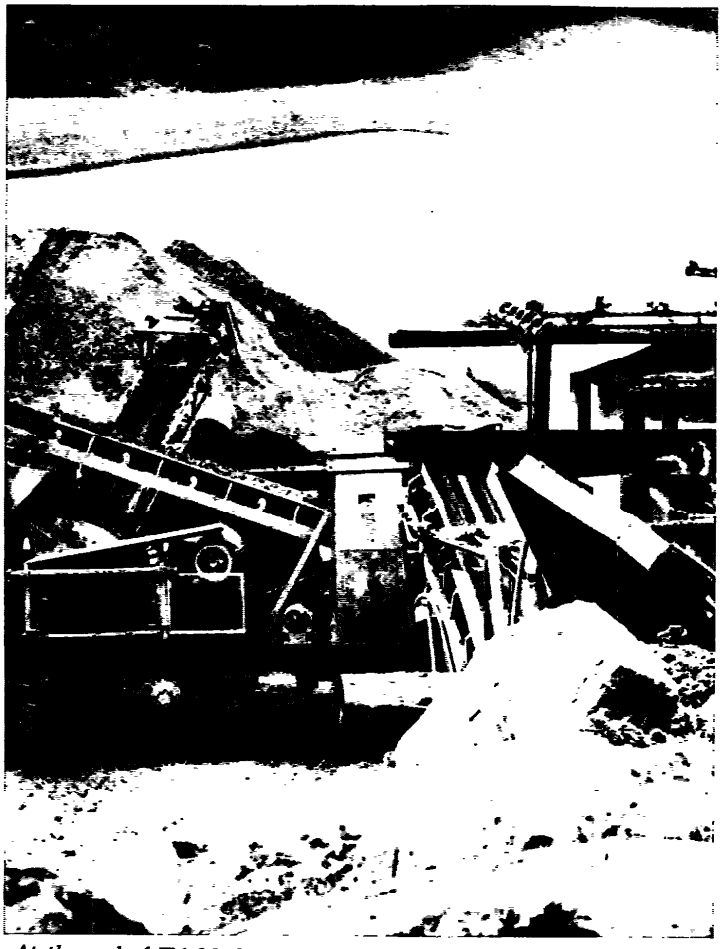
The divisions in this Program are Flood Management Division, Dam Safety Division and Water Supply Division.

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, 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. The Interagency Flood Hazard Mitigation Team, developed to respond to floods causing property damage, was organized and trained in 1985. Under the Federal Emergency Management Agency's Community Assistance Program, evaluation and assistance visits of forty-five communities participating in the National Flood Insurance Program were conducted.

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

- Allegany County: Wills Creek, Home Acquisition—$100,000



At the end of FY 86 there were nearly 9220 acres of land being used for surface mining by 234 licensed operators.

- Prince George's County: Henson Creek, Home Acquisition—$1,080,000
- Prince George's County: Piscataway Creek, Home Acquisition—$1,157,000
- Baltimore County: Gunpowder Falls, Home Acquisition—$1,000,000
- Baltimore County: County-wide Flood Warning System—$51,750
- Prince George's County: Southwest Branch Channel, Levee, Home Acquisition—$489,750
- Baltimore City: Gwynns Falls, Flood Levee System—$181,400
- Baltimore City: Gwynns Falls, Floodplain Mapping—$25,000
- Prince George's County/Laurel: Bear Branch, Detention and Channel—$99,200

Five technical watershed studies were initiated or completed:

- Fishing Creek, Frederick County
- Church Creek, Anne Arundel County
- Carroll Creek, City of Frederick
- Lilly Run, Town of Havre de Grace
- Five small watersheds, Allegany County
- Six small watersheds, Howard County

Dam Safety Division

The Dam Safety Division conducted a total of 99 inspections in FY 1986.

Beginning April 1986, the Dam Safety Division began reviewing applications for Waterway Obstruction Permits for dams and related structures.

The Division is reviewing a proposal to construct a new water supply reservoir for Frostburg on Piney Run to replace an older structure.

The Division and Power Plant Siting completed and distributed *Inventory of Maryland Dams and Assessment of Hydropower Resources.*

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. A significant accomplishment for this Division in FY 1986 was the development of the first comprehensive regulations for the appropriation and use of surface and ground waters.

Water Appropriation and Use Permit Section

The Water Appropriation and Use Permit Section regulates (through the issuance of permits) 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 in excess of 12,000 active water appropriation permits on file. An additional 1,500 surface and ground water appropriation permits are being processed annually by the Section.

Major FY 1986 cases handled by the Water Appropriation and Use Section include permits associated with large surface water withdrawals for snowmaking at a proposed ski resort in Frederick County and industrial and commercial facilities in the Potomac River Basin. Large ground water withdrawals for municipal and industrial purposes were reviewed for the City of Annapolis and Anne Arundel, Charles, Frederick, St. Mary's and Wicomico Counties. The Section also implemented a strategy to mitigate actual and potential saltwater intrusion into ground water on Kent Island and at West Ocean City.

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 groundwater and management models in forming plans for development and conservation of regional water supply resources. Implementation of those plans occur 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 Commission.

Major FY 1986 activities of the Water Supply Planning and Engineering Section include development of a new analytical procedure for establishing environmental flowbys on surface water withdrawals, formulation of computer-based water budgeting, techniques for gaging stream flow frequencies, development of computer ground water models for use in analysis of small to medium-sized ground water appropriations, analysis of freshwater inflow and consumptive water loss strategies in the Potomac River and Susquehanna River basins, publication of a handbook for developing local water conservation programs, initiation of water conservation efforts in eight counties and holding a statewide conference on water conservation.

RESOURCE PROTECTION PROGRAM

The divisions in this program include 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, provides comment on matters affecting tidal and nontidal wetlands throughout the State. The permit 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.

Thirty Watershed Enforcement Division inspectors conducted 21,154 inspections on job sites for compliance with sediment, stormwater and watershed laws and regulations.

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 non-tidal wetlands.

The Division acted on 644 projects impacting 22.36 acres of State wetlands. Favorable recommendations were made on 58,780 feet of bulkheads and 80,986 feet of stone or rubble revetment. An additional 4.31 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 89.3% of the projects.

Surface Mining Division

The Surface Mining Division seeks to ensure environmental safeguards in the operation and reclamation of non-fuel surface mines and public safety during and after these 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 1986 there were nearly 9,220 acres of land being used for surface mining by approximately 234 licensed operators.

Reclamation under the abandoned mine reclamation fund was initiated at the following sites in FY 1986: Halethorp Farm Ponds in Anne Arundel County.

The Division worked with enforcement personnel of the Resource Protection Program 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, Clean-up and Contingency Fund through 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 Water Resources Administration responded to 1154 spills, including 240 underground spills, in FY 1986.

The Water Resources Administration stores spill equipment and absorbent materials statewide for use by local fire departments and other State, county and local agencies for controlling minor oil spills.

The Division implemented an oil vehicle operators training and certification program including a study manual and test. Drivers of oil tank trucks and transports in Maryland are required to receive certification from the Department of Natural Resources, Water Resources Administration. Three thousand twenty-one drivers were certified in FY 1986.

Training and instruction was provided statewide to help industry and others prevent and control oil spills. Thirty-four 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 in Open Water met seven times to discuss and advise the Administration on oil control policies and new equipment. The committee spent considerable time working with the Water Resources Administration on the control and prevention of leaks from underground storage tank systems.

Total Number of Site Complaints and Notices of Violations	229
Cases Tried for Violations	21
Total Fines Assessed	$1800

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. Forty-five surveys were undertaken in FY 1986.

The geotechnical investigations section of the Division is assigned responsibility for drilling of 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 groundwater 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 leaks from petroleum storage tanks. The geotechnical section crew responded to 26 requests for assistance.

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.

It is the primary responsibility of the Tidewater Administration to manage resource restoration and enhancement projects to restore and protect traditional fishery species of Maryland waters; to support recreational boating, and to work with local governments evaluating activities in the coastal zone.

GENERAL DIRECTION PROGRAM

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

Administration and Support

Provides administration in 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. All of the boards and commissions that affect the Chesapeake Bay or its tributaries and include representatives from states in the drainage basin whose waters flow into Maryland. There are also Boards and Commissions concerned with Maryland's ocean and interstate fisheries which have a significant economic impact on the State.

Tidewater Vessels and Facilities

The vessel FIFTY-FIFTY was sold in FY 1986. To replace it, the State leased from private enterprise two different vessels while a new vessel is being constructed. In Fiscal Year 1986 DNR accepted the skipjack ANNA McGARVEY. It is becoming an integral part of DNR's fleet. The vessels are used for the promotion of the Chesapeake Bay and other Maryland waters. Numerous cruises were conducted throughout the year and the vessels took part in the many fairs and festivals around the State.

The facilities under control of the group include 69 Prince George Street, Cambridge Boat Yard, Matapeake Water Port and the State Pier in Annapolis.

WATERWAY IMPROVEMENT DIVISION

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, and to break ice during the winter for shellfish operations.

Hydrographic Operations responds to requests for the placement of regulatory, navigational and special buoys in the Chesapeake Bay and its tributaries. The Fisheries Division requested the installation of additional clam, oyster, crab line, dredge line and territorial limit buoys/markers. The office also receives requests from other Waterway Improvement Projects, the DNR Police, the Maryland Department of Health and Mental Hygiene, State Parks and Counties/Municipalities for the placement of channel markers, shoal/hazard, speed limit, swimming and restricted areas as well as buoys for special projects/events such as Chesapeake Appreciation Days.

A summary of the placement of buoys/markers in FY 1986 follows:

Regulatory	1421
Aids to Navigation	288
Special	141

Hydrographic Operations performed the following work: surveys, pound net locations and construction of new triangulation stations:

Survey Corners of Private Oyster Leases	350
Survey Shell and Seed Plantings	53
Pound Net Location Surveys	36
Construct New Triangulation Stations	45
Marked Permanent Speed Limit Boundaries	128

All oyster lease charts have been updated and rescaled bringing the total to 68 new lease charts. Since the moratorium was lifted on leasing in June, 1985, we have processed 75 new leases. We now have a total of 916 leases for 9,029 acres.

Design plans are being prepared for the construction of a new 80 ft. buoy tender/ice breaker to replace the 49 ft. M/V *H.J. Elser*. Plans for the new vessel are scheduled in September, 1986.

In FY 1986 because of the very mild winter, only two days were spent ice breaking.

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.

During Fiscal Years 1963 through 1985, 143 projects were completed at a cost of $8.5 million. In Fiscal Year 1986, 10 projects were completed at a total cost of $539,000.00.

The Dredging Program currently has 47 active funded projects in various stages of development with an estimated construction value of $7,690,350.00.

Waterway Grants & Project Planning

During FY 1986, the Waterway Improvement Division continued planning efforts for the regional boating facilities at Fort Washington Marina, Elk Neck, Gunpowder and Smallwood State Parks. Construction projects were completed at two Calvert County boat ramps: Solomons and Hallowing Point, along with additional construction projects at Janes Island, Rocky Gap, Deep Creek and Seneca Creek State Parks. Local grant project areas include the following:

Baltimore County	City of Baltimore Police
Caroline County	Ganey's Wharf
	Federalsburg Marina
Cecil County	Port Deposit Pier
	Service Contract
Dorchester Co.	Crouse Park Bulkhead
	Franklin St. Boat Ramp
	Great Marsh Boat Ramp
	Trenton Street Boat Ramp
	Long Wharf Dock
	Farm Creek Boat Ramp
	Elliott Island Boat Ramp
	County Service Contract
Harford County	Railroad Bridge
	Waterman's Wharf
Kent County	Bogles Wharf
	Long Cove Bulkhead
	County Service Contract
Queen Anne's Co.	Southeast Creek Boat Ramp
	Romancoke Bulkhead
	Shipping Creek Boat Ramp
	Thompson Creek Bulkhead
	Crumpton Landing Boat Ramp
	Goodhand Creek Boat Ramp
	County Service Contract
Somerset County	Webster Bulkhead
	Rumbley Boat Ramp
	County Service Contract
St. Mary's Co.	Colton Point
Talbot County	Cummings Creek Bulkhead
Wicomico County	Nanticoke Boat Ramp
Worcester County	Byrd Park Bulkhead
	Ocean City Bulkhead
	Cypress Park Utilities
	Maple Street Bulkhead
	Laurel Street Bulkhead

Other construction projects were commenced at Somers Cove Marina, St. Mary's River, Sandy Point and Herrington Manor State Parks. Also, completed were 6 debris and derelict boat removal projects which included 49 boat removal and 151 pier piles and tree trunks. Total projects completed in FY 1986 were 47 local grants within 36 project areas and 8 State projects at a construction value of $1,070,000 and $1,715,400 respectively.

As of June 20, 1986, there were a total of 130 local grant projects and 31 State projects in various stages of construction. Funds remaining for these projects total $4,420,637.00 and $7,778,166.00 respectively.

Since the inception of the Waterway Improvement Program in 1966, 794 local grants and 90 State projects have been completed for the benefit of the general boating public at a construction cost of 24.3 million dollars.

Public information has been enhanced by publishing *A Guide to Public Piers and Boat Ramps on Maryland Waters*, expanded 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 1986, seven State vessels were hauled at the Cambridge Terminal railway for annual maintenance and repairs. Two rear main sills were replaced on the marine railway.

Construction was completed on a storm damaged pier at St. Clements Island. Construction of the 460 foot pier and landings at Colton Point have commenced and will be completed by August 1, 1986. Also, completed were 608 linear feet of double pile bulkhead at Tanners Creek. Nine thousand one hundred cubic yards were dredged at Bivalve Channel and Marine, and Oyster Harbor. A Wetlands reconstruction project that included the removal of 780 cubic yards of spoil from the marsh edge was completed at Point Lookout State Park.

Fish sampling at Lock Point on Potomac River. DNR's Don Cospen, left, Jim Uphoff, right.

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, 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 and the *Citizen's Guide to Maryland's Coastal Zone Management Program* was reprinted this year. 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 non-structural 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 Wetlands Protection; Submerged Aquatic Vegetation; Non-Structural Shore Erosion Control; Estuarine Research Reserve Program and Special Investigations.

Non-tidal wetlands protection activities focused upon continued development of a statewide mapping and data base system for monitoring wetlands. With the exception of Charles County, all Western Shore county-wide wetland maps were produced and distributed to each county planning office. Four 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. Two new staff members were hired to assist with the implementation of the Non-tidal Wetlands Initiative. Staff conducted over thirty on-site investigations of project sites where proposed activities had the potential to impact non-tidal wetlands.

Submerged aquatic vegetation (SAV) management activities focused upon SAV transplanting projects undertaken by the University of Maryland and Harford Community College. Demonstration projects for transplanting were held at 18 sites in the Susquehanna Flats region and at 10 areas along the Choptank, Severn and Wye Rivers. Another major effort for the year involved the program's assistance in ground-truthing EPA's aerial reconnaissance survey of SAV in the Chesapeake Bay with the Maryland Charter Boat Captains, the Citizens Program for the Chesapeake Bay and the Chesapeake Bay Foundation. A cooperative agreement for the management, within the Potomac River, of a nuisance exotic species of SAV (Hydrilla verticillata) was signed on June 6, 1986 between the State of Maryland, the Commonwealth of Virginia, Washington Metropolitan Council of Governments, the District of Columbia and the U.S. Army Corps of Engineers.

Non-structural Shore Erosion Control (NSSEC) program activities included selection of a total of 21 projects for design and installation of shoreline stabilization projects on privately owned lands. These projects represent a total of 6.158 linear feet of shoreline. The average cost for a private property project is equivalent to $53.15/foot, for site preparation and planting of inter-tidal marsh vegetation to stabilize eroding shorelines. Seven State projects were undertaken on state-owned lands representing 8,845 linear feet of shoreline, at an average cost of $50.00 per foot.

Chesapeake Bay National Estuarine Research Reserve System (CBNERRS) activities centered upon conducting an on-going scientific investigation at the Monie Bay site on the effects of using man made ponds for wildlife management. Other actions included site planning, hiring a new manager, submission of a draft pre-acquisition grant application to NOAA and the formulation of a new strategy for program implementation.

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.

In carrying out these activities, close coordination is maintained with other units of DNR.

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 project's consistency with the Maryland CZMP.

During the past year the Program reviewed approximately 700 projects, the majority consisted of U.S. Army 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.

The local contractual agreements ensure active involvement in the CZMP. In general, the following types of activities have been undertaken: 1) Improvement of procedures in the day to day review of projects from an environmental standpoint; 2) The incorporation of Program objectives into comprehensive plans, zoning, and subdivision ordinances; and 3) Undertaking special projects.

Primary efforts in the next few years will be implementation of the Chesapeake Bay Critical Area Act.

Land and Water Activities

Activities of this project include:

- Shoreline Improvement Grant Program
- Outer Continental Shelf
- Recreational Boating

The program also reviews dredging projects and undertakes dredging studies relating to spoil site selection. The program coordinates project review for all sediment and erosion control studies, and studies and projects involving stormwater management with the Water Resources Administration. A variety of special project designs and reviews that fit into no distinct category such as engineering, marsh creation designs, bridge design, groin and shore erosion design, construction, etc., have been undertaken this year.

The Shoreline Improvement Grant Program, created by the General Assembly in 1984 as part of the Chesapeake Bay Initiaties, 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.

Funded projects must accomplish one or more of the following objectives: 1) restoration or improvement of existing public waterfront property; 2) abatement or eroding shoreline; 3) establishment or creation of environments or habitats for wildlife or aquatic resources; 4) development of facilities for public access to the shoreline for recreational and educational purposes; 5) restoration of waterways and streams; and 6) debris removal. Fifteen diverse projects were selected from around the Bay totaling the authorized amount of $2,000,000.

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 boaters and speed limits. A new issue of the Guide for Cruising Maryland Waters was prepared. The Guide incorporates all public launching ramps, course headings and over 200 marine locations with available facilities for boaters.

During FY'86 documentation was prepared for DNR opposing Environmental Protection Agency's proposed incineration of PCB's in the Atlantic. Coastal Energy Impact Program (CEIP) funds were used to perform research on water quality and fisheries stocks that may be affected from Polynuclear Aromatic Hydrocarbons (PNA's) contaminants from fossil fuel sources. Funds were also used to reconstruct historic structures at Flag Ponds in Calvert County and the Calvert Marine Museum. An energy-related impact analysis was also completed by Harford County for their Perryman-Riverside Community Plan.

Monitoring and Data Management

This Program is responsible for implementing two of the Chesapeake Bay Initiatives—the Regional Data Center and Living Resources 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, 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 activities based upon the living resources of Chesapeake Bay; 3) To determine habitat quality factors affecting the reproductive success of economically important living resources; and 4) To store all data on the State/Federal regional data base (VAX 11/780) and make data available to other users.

To meet these objectives, data bases for fisheries have been coordinated so that field monitoring data can be entered into the computer. Information has been gathered on striped bass adult populations, striped bass early life history, and Young of the Year Index. Habitat data has been gathered for important anadromous fish spawning areas in Upper Chesapeake Bay and the Choptank, Potomac and Nanticoke Rivers. This includes information on egg and larval abundance, larval condition, water quality, rainfall and climate which is being used to examine correlations between habitat conditions and larval survival. An oyster habitat monitoring project has been initiated on the Choptank River. The focus is on the relationships between oyster survival, and hydrographic, and water quality conditions, especially dissolved oxygen. Research activities supported include a study of oyster larval nutritive sources in natural habitats and ecosystem modeling of the Chesapeake Bay.

In cooperation with the Citizens Program for the Chesapeake Bay, a volunteer citizen-monitoring project has

been established on the Choptank River. Volunteers are measuring basic water quality and rainfall weekly at ten sites on the river.

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 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 that available funds are spent in the most effective manner.

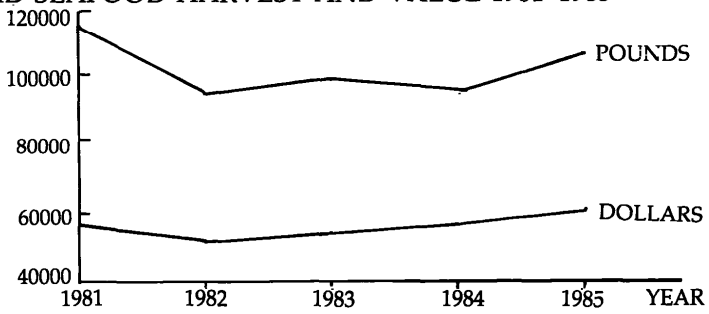
The goal is to maintain optimum condition of fisheries stocks for purposes of harvest and ecological balance, and to encourage the greatest return for the citizens of Maryland.

Recreational/Commercial Fisheries and Special Projects

Fisheries Statistics and Modeling

Maryland landings for 1985 were estimated to be 101.7 million pounds with a dockside value of $56.0 million. These figures represent increases of 10.6 million pounds (11.7%) and $1.5 million (2.8%). The increases are primarily the result of an increase in blue crabs harvested. The figure below shows total harvest and value for the period 1981–1985.

MD SEAFOOD HARVEST AND VALUE 1981–1985



The Fisheries Statistics and Modeling Project (FSMP) is continually evaluating the harvest estimation system.

Commercially harvested fish species were sampled to collect age, sex, and size composition data. These data are considered vital in developing and implementing fish management plans.

FSMP is the custodian for all of the Fisheries monitoring data collected by 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. The full report will be published during FY87.

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 reexamined with the goal of incorporating 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 existing areas supporting living resources as well as the waters which will improve in the future as a result of the Chesapeake Bay Initiatives.

Projects are developed to mitigate adverse impacts and enhance productivity of waterways for fisheries potentials. Anadromous fish streams and certain sportfish species have benefited through technical assistance provided by project staff.

Special Projects
Anadromous Sportfish Stream Restorations

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 anadromous fish spawning streams.

The effect of precipitation and acid deposition on early life stages 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 anadromous fish passage, stream classification, and possible mitigation.

American Shad Restoration

Five rearing ponds with 3.2 total surface acres are being constructed on the banks of Big Elk Creek in Cecil County. One pond of approximately 3 acres is being constructed on the banks of the Susquehanna River at Havre de Grace. Both facilities will raise American shad for stocking and 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 for a self sufficient neighborhood energized effort to restore and maintain these recreational uses. Efforts in FY1986 have produced an RFP for biological fisheries habitat evaluations, options to prevent residential runoff, disposal of small scale toxics, water conservation, and sediment control. Public surveys has been conducted and education opportunities have been offered. Volunteer recruitment has been less than desired, and tactics are being

modified for FY 1987. Fund raising techniques have been explored.

Save Our Streams Interaction

Since its inception in 1970, this program has attempted to directly involve the public in resource preservation and enhancement activities. The primary focus has been to minimize the effects of water quality factors upon living resources. People are taught to identify the relative quality of aquatic habitats. Activities are designed to show how to improve and protect the aquatic habitats by working through various local, state, and federal agencies. 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. The project conducted intensive studies of aquatic habitat quality throughout the State in FY 1986.

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 dealt with the pre-eminent species of the Bay such as 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 using state-of-the-art laboratory procedures.

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. The bioassay component was a major success in providing a transportable system that can maintain larval striped bass during environmental challenges of more than 60 days.

Maryland hatcheries shipped over 11 million striped bass larvae, and each parent fish spawned to produce larvae had to be examined and declared IPN—free prior to shipment of larvae.

Cooperative investigations with the DHMH-OEP, into suspected contamination of some species of fish in urbanized areas were begun last year and continued this fiscal year.

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 1986, and more than 2,000 oysters and clams were examined.

Recreational and Commercial Fisheries Enhancement

The Department of Natural Resources 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 will be achieved through replenishment and conservation of sport fish stocks, enhancement of recreational fishing and needed research on tidal fishery resources.

A tidewater sport fishing survey, conducted in cooperation with the National Marine Fisheries Service, was completed in FY 1986. The survey assessed participation of sportfishermen and harvest of bay sport fishes, and the impact upon bay sport fishing by the new Chesapeake Bay Sport Fishing License, the striped bass moratorium and the promotional Catch A Fortune Fishing Contest.

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 even though the striped bass moratorium has been in effect. For the 21st year, over 4,000 fresh water and salt water citations, patches and date bars have been issued.

The Fisheries Advisory Service publishes the Tidewater Fisheries News on a monthly basis and writes and distributes materials on particular fisheries issues. The Advisory Service 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 Urban Fishing Project contracted with Baltimore City to construct an 80×10 fishing pier at Middle Branch, Patapsco River.

The Baltimore Metropolitan area was surveyed to determine areas with fishing potentials. Gwynns Falls has several small impoundments with potential, especially the five acre Gwynn Oak Pond being renovated by Baltimore County and enhanced for fishing by this project.

Designated areas where the Chesapeake Bay Sport Fishing License is not required were posted and new requests are reviewed for inclusion.

Chuck Murray examining dried plankton.

MARYLAND CONSERVATION CORPS

The Maryland Conservation Corps employed 464 disadvantaged youths and 150 advantaged youths through the Award of Excellence program which required that the candidates for the program have above average grades, a real interest in the natural resources field as a career and be willing to work at minimum wage. In addition, 78 adults were hired as crew chiefs, field coordinators and naturalists.

The participants worked at 54 work sites throughout the 23 counties of the state and Baltimore City on projects that included soil erosion repair, installation of stream improvement devices, debris removal, and other conservation projects.

A job readiness component was continued in the program, providing the participants with information on how to get and keep a job.

Naturalists were hired this year to conduct environmental education programs on site to all participants. In conjunction with that program all the participants in the program spent a day on the Chesapeake Bay on charterboats learning more about the Bay, fishing and learning to appreciate it. For many this was their first experience on a boat or the Bay.

SHELLFISH PROJECT

The oyster harvest for the 1985–86 season was just under 1.5 million bushels. This figure represents a slight increase from harvest of last year. The continuing low harvest is still attributed to the impact of disease and poor reproduction occurring over the last few years.

The disease MSX is still present in higher salinity areas of Maryland waters and DNR anticipates a continued long term condition of high salinities will result in additional mortalities for MSX. Surveys to determine the impact of the disease during this recent period of exceptionally high salinity are underway.

There was an excellent spat set in the Chesapeake Bay during 1985; after three or four years of relatively low sets. The high spat set was sufficient to provide enough spat on shell to transplant approximatley 461,000 bushels of seed oysters from seed areas to growing areas. Additionally, 5½ million bushels of dredged shells were planted, along with 350,000 bushels of fresh shells.

This was the first year of the new five year contract with the Langenfelder Company to continue their dredging and shell transporting operation in the upper Bay. The continuation of the contract and obtaining necessary permits are contingent upon the outcome of a study being conducted in the dredging area to determine environmental impacts. A major effort was initiated this year to obtain as many fresh shells for planting as possible. As a direct result of this effort the majority of available shells were planted on oyster bars. The oyster hatchery program at Deal Island began operations during 1986. Both eyed larvae and spat on shells are being transplanted from the hatchery facility to planting grounds consisting of sanctuaries and public bottom. The sanctuary concept is that we establish areas for planting shells and spat, close the areas to harvest, and allow the population to become established. Currently, DNR has established six sanctuaries; three seed sanctuaries and three shell sanctuaries.

Soft clam landings were 80,871 bushels, reflecting a generally low population of the soft clams. One of the problems with the soft clam is the virus disease Neoplasia. Studies to determine the impact of that disease in soft clams, are being carried out.

Hard clam landings have also declined in the last few years. The current harvest, of 10,772 bags, is the result of the decline in harvest pressure and a reduced demand for these clams.

Watermen's Compensation Project

The Watermen's Compensation Program (WCP) was developed to assist watermen and charter boat captains who were dependent on striped bass for all or part of their income. The program provided employment opportunities designed to allow captains to offset the loss of income due to the striped bass harvest moratorium.

The program began in January 1985 and has provided some work for over 130 charter boat and commercial captains. Work has included striped bass stock assessment;

hatchery refurbishment; striped bass brood stock collection; weakfish trout assessment; white perch studies; a "Day on the Bay" program for disadvantaged youth; and the "Catch-A-Fortune" sportfishing contest tagging effort.

Fisheries Environmental Review Project

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

Program reviewed include applications for wetland and watershed permits, environmental impact statements, proposed regulations, surface mining permits and water quality certificates, and, also, 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.

The Critical Area Law of 1984 has generated an additional workload of more than 900 individual cases in FY 1986.

FINFISH HATCHERIES

Coldwater Hatchery Project

During Fiscal Year 1985, Coldwater hatchery personnel produced and stocked record numbers and size trout; exceeding the exceptional production of the previous year. Public trout fishing was enhanced by the release of 239,541 catchable size (9–15 plus inches) trout weighing a total 126,594 pounds (63.3 tons) into 42 streams and 28 impoundments. The combined production of the Albert H. Powell Hatchery and Cushwa Rearing Station was 153,800 trout weighing 85,480 pounds. Bear Creek Rearing Station produced 85,741 trout weighing 41,114 pounds.

Warmwater Hatchery Project

The first and 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 183,991 advanced striped bass fingerlings for stocking into Maryland tidal waters.

The Patuxent River received, during the Fall of 1985 and this year to date, 10,000 marked striped bass fingerlings from the Manning Hatchery and 42,000 fingerlings produced at Manning and grown out and marked by Potomac Electric Power Company. The Patuxent was also stocked with 62,500 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 1.88 million striped bass and striped bass hybrids and 304,790 largemouth bass from our hatchery effort.

The hatchery program supported the inland management program (see Inland Management Report) by producing largemouth bass, smallmouth bass, bluegill, redear, and forage species utilizing the Joseph Manning Hatchery and culture stations located at Unicorn and Lewistown.

Cold Water Fisheries Project

The Cold Water Fisheries Project is responsible for managing the cold water fishery resources of the State, which include brook trout, brown trout, and rainbow trout. Project personnel attempt to maximize public trout fishing opportunities within existing economic and environmental limitations and strive to preserve and enhance the naturally reproducing trout populations of the State.

The staff of the Cold Water Fisheries Project conducts studies of water quality, habitat conditions, and trout population dynamics under Federal Aid Project F-36-R, "Survey, Inventory, and Management of Maryland's Cold Water Fisheries Resource". Program staff completed a report of the work performed during the period 1980 through 1984 and documents the presence of naturally reproducing trout populations within 134 streams of the State totaling 461.6 miles.

Other activities of the Cold Water Fisheries Program included, but were not limited to the following: stream restoration work on the Big Run tributary to the Savage River (Garrett Co.) utilizing volunteer labor from Trout Unlimited; intensive trout population studies of Hunting Creek (Frederick Co.), Savage River, Jones Falls (Baltimore Co.), and Owens Creek (Frederick Co.), development and formal adoption of Cold Water Fisheries Management Policies; development of a Trout Stream Categorization and Management Strategy; assessment of flood damage to the Savage River; preparation of a plan for acquisition and development of the Fountain Rock Spring property (Frederick Co.) for use as a State trout production facility; cooperated with the Maryland Department of Transportation relative to a study of the Paint Branch watershed (Montgomery Co.) and the possible impact of road construction upon the brown trout population which exists within the stream; and, development of water release guidelines for the newly constructed Little Seneca Creek Reservoir.

A new record for Trout Stamp sales was set for the third year in a row. During Fiscal Year 1986, a total of 60,915 Trout Stamps were sold. This was an increase of 8,211 (15.6%) over Fiscal Year 1985.

Good weather and good winds in Annapolis Harbor.

WARMWATER FISHERIES PROJECT

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

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

The walleye stocking program at Deep Creek Lake has resulted in an abundant walleye population which is furnishing good fishing for this species. Natural reproduction of walleye was first confirmed in 1982 and has taken place each year since. The success of the naturally reproducing walleye population accounts for the present high density. Because of the success of natural reproduction, no walleye have been stocked in Deep Creek Lake since 1983.

Walleye stocked in the Potomac River between Williamsport and Harpers Ferry from 1980 to 1985 are continuing to furnish a modest fishery and have been caught in the Washington, D.C. area. Surveys conducted in FY 1986 confirmed that some natural reproduction is occurring.

The popularity of black bass tournaments at Deep Creek Lake, the Potomac River, and upper Chesapeake Bay area, noted in 1984 and 1985, continues.

Waters providing fishing for walleye in FY 1986 were:

Deep Creek Lake	Rocky Gorge Reservoir
Potomac River	Tridelphia Reservoir
Susquehanna River	Loch Raven Reservoir
Youghiogheny Reservoir	Liberty Reservoir

Smallmouth bass were stocked in two streams and largemouth bass were stocked in seven streams, 15 impoundments, and 135 farm ponds.

The following numbers of warmwater fish species produced in the Manning Hatchery, Lewistown Work Center, and Unicorn Work Center were stocked in Maryland waters during FY 1986.

SPECIES	*SIZE*	*NUMBERS*
Largemouth bass	Spring Fingerlings	77,815
Largemouth bass	Fall Fingerlings	17,231
Smallmouth bass	Fall Fingerlings	1,000
Bluegill	Fall Fingerlings	151,283
Redear sunfish	Fall Fingerlings	5,800
Golden shiner	Fingerlings	36,500
Fathead minnow	Fingerlings	250,000
Spotfin & Spottail shiner	Fingerlings	3,500

Federal Aid Project F-29-R report, covering fisheries studies during the period 1981 to 1985, was completed this year. Included are the results of studies to measure and evaluate physical and chemical characteristics of Maryland lakes and ponds for species suitability and ability to sustain fish populations. Data on species composition, relative abundance, feeding habits and age and growth for 23 lakes was obtained for preparation of management plans on surveyed water.

A statewide survey initiated during 1980 to provide information on physical and chemical characteristics, species composition, distribution, relative abundance of benthic macroinvertebrates and fish was completed for 13 river systems. Also included in the report are monitoring studies with information on:

1 Evaluation of walleye introductions in Deep Creek Lake and the Potomac River.
2 Evaluations of the largemouth and smallmouth bass populations in Deep Creek Lake and the Potomac River.
3 Evaluations of striped bass and striped bass hybrid introductions.
4 Evaluation of the slot length limit for largemouth bass in St. Mary's Lake.
5 The upper Chesapeake Bay Largemouth Bass Management Program.

Warmwater Fisheries personnel assisted the Estuarine Fisheries Program in conducting striped bass surveys and in the Hatchery Program in stocking trout and rearing and stocking of warmwater species and striped bass.

ESTUARINE/MARINE FISHERIES PROJECTS

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 annual estuarine recruitment survey has monitored reproductive success of tidewater species since 1954. The survey covers the summer and extends over 22 sites from the Potomac to the Susquehanna. Reproduction of white perch, striped bass, herring and shad continued to be poor in 1985. Relatively larger numbers of young bluefish, sea trout, and spot were observed perhaps due to increased Bay salinity as a result of low recruitment survey.

The striped bass moratorium, implemented on January 1, 1985, continued in effect. The Interstate Striped Bass Management Plan, of the Atlantic States Marine Fisheries Commission, was amended again to recommend complete protection for females of the 1982, and all subsequent yearclasses, until 95% of the females of a given yearclass have had the opportunity to spawn at least once. This plan is to be implemented, in all affected jurisdictions, by a gradually increasing size limit until a final minimum size of 33 inches is reached in 1987. Recovery will be signaled by a three year running average of 8 in the Maryland striped bass juvenile index as determined by the recruitment survey.

Since implementation of the moratorium, winter stock assessment studies have shown proportionately larger sized resident fish than were present during the period when the fishery was active. In part, this is due to the protection offered the 1982 and subsequent yearclasses.

Spring spawning stock studies in the C & D Canal, Upper Bay, Choptank River and the Potomac River con-

tinue to document declining numbers of large spawning females in all systems. The 1982 yearclass females recruited to the spawning stocks for the first time in the Spring of 1986. Despite incomplete recruitment, and only partial protection from the moratorium, these females were numerically dominant among those sampled. However, because of their small size, they were not major egg producers.

In 1984 Congress appropriated $1.5 million to the National Oceanic and Atmospheric Administration (NOAA) to undertake Chesapeake Bay resource assessments and to collect fishery statistics. To accomplish part of this task, NOAA established a Stock Assessment Committee for the Chesapeake Bay. The committee is composed of federal, Maryland, Virginia, and Pennsylvania representatives. Projects approved and funded by this committee include a blue crab and sea trout assessment study which began in July 1985.

In January of 1986, a white perch and yellow perch project, funded by the Committee, began in the Choptank River to determine the age, size, and sex composition of the stock, and the relative abundance and distribution of adult and juvenile stocks.

The American shad fishery closure was extended. There was no evidence of increased reproduction in 1985. No migrating shad from juvenile stocking above Conowingo Dam were captured in the Susquehanna River trawl and seine samples in November, suggesting significant turbine-induced mortalities of migrating juveniles. In the Spring of 1986, the population estimate of adult spawners increased to 20,850 which is up from the 1985 Spring estimate of 11,100. In an effort to develop a more reliable index of yearly production of young of two species of herring and American shad, a midwater trawl project was initiated in five rivers in the summer of 1985. Several years of data must be evaluated before its accuracy can be determined. During the Spring spawning season in 1986, tributary streams in the Nanticoke, Pocomoke, and Wicomico Rivers were surveyed for the presence of spawning herring. In general, runs of herring were relatively larger this year.

The Marine Fisheries Project continued its seasonal coastal bay sampling in the summer of 1985. Blue crab, spot, and summer flounder abundance continues to decline. Increased numbers of northern puffers have been observed. Sampling in the wake of hurricane Gloria indicated rapid recovery of the resource from increased turbidity, shoaling, and freshwater input. Data from this 14 year survey is being computerized to increase accessibility for other researchers. This is the third year that brown pelicans have been observed on the coastal bays. There is no evidence of nesting, but their numbers and length of stay have increased yearly. Their food appears to be primarily mullet and anchovy. Personnel from the marine unit participated in a bluefish tournament in Ocean City. The entries were verified for freshness with a G R Torreymeter. A crab pot study compared the effectiveness of prepared bait against natural bait (menhaden). The natural bait pots caught more crabs but the prepared bait pots did not need to be baited as often. Bait cost per crab was approximately equal between the two bait types.

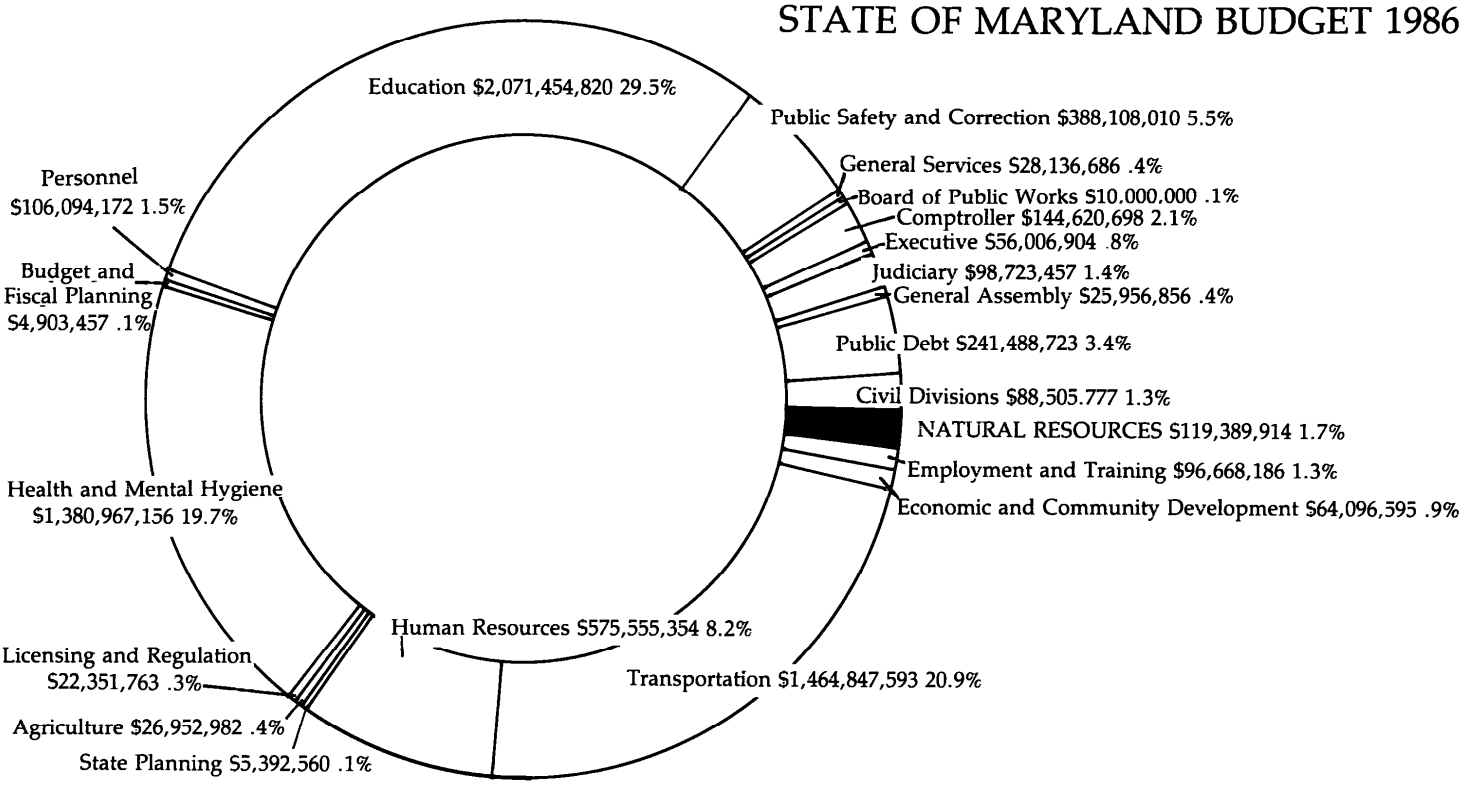
The objective of the Fisheries Management Plans (FMP) Project is the development of species-specific plans for the long term management of the fish species. These plans involve the analysis of fisheries economic information, species biological and population data, and sociological descriptions of the fishery and the fisherman. Habitat and water quality criteria are also incorporated into each plan.

The American eel plan (FMP) is completed and is in the early stage of in-house review. Despite its commercial importance, the eel has been infrequently studied and essentially unregulated. The plan demonstrates that the eel population has undergone a shift in size class distribution which may be a symptom of high fishing pressure.

The American and hickory shad FMP has been completed and is currently in the final stages of administrative review. The plan recommends a comprehensive restoration program for the depleted American shad stock. In addition, the plan recommends additional surveys so that a juvenile-adult relationship can be developed. The blueback and alewife river herring FMP is near completion, and will be completed by December 1986.

Additional accomplishments in the FMP project include the establishment of a computer data base for analyzing license data; and the development of a sociological/demographic survey of watermen.

STATE OF MARYLAND BUDGET 1986



DEPARTMENT OF NATURAL RESOURCES 1986 BUDGET

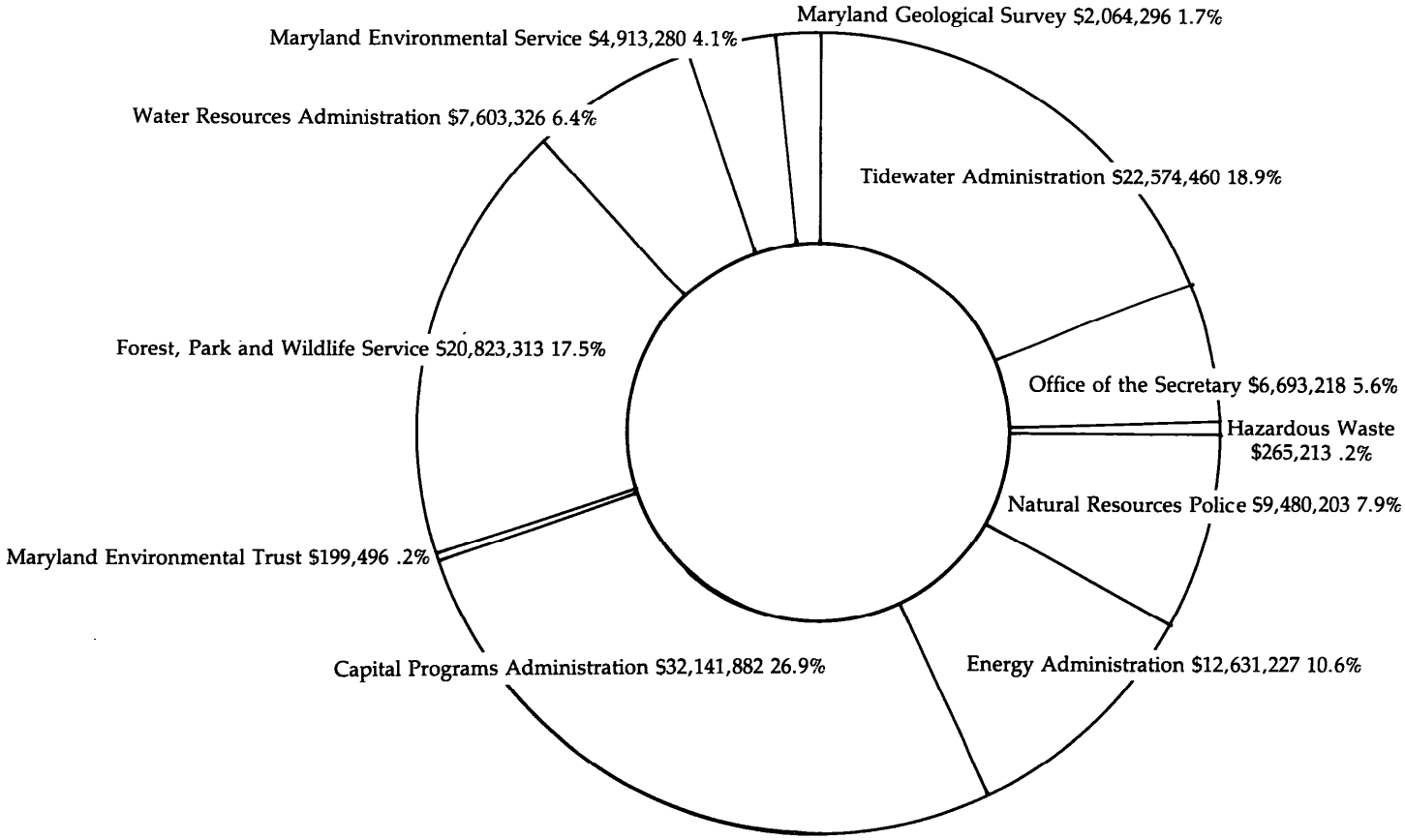
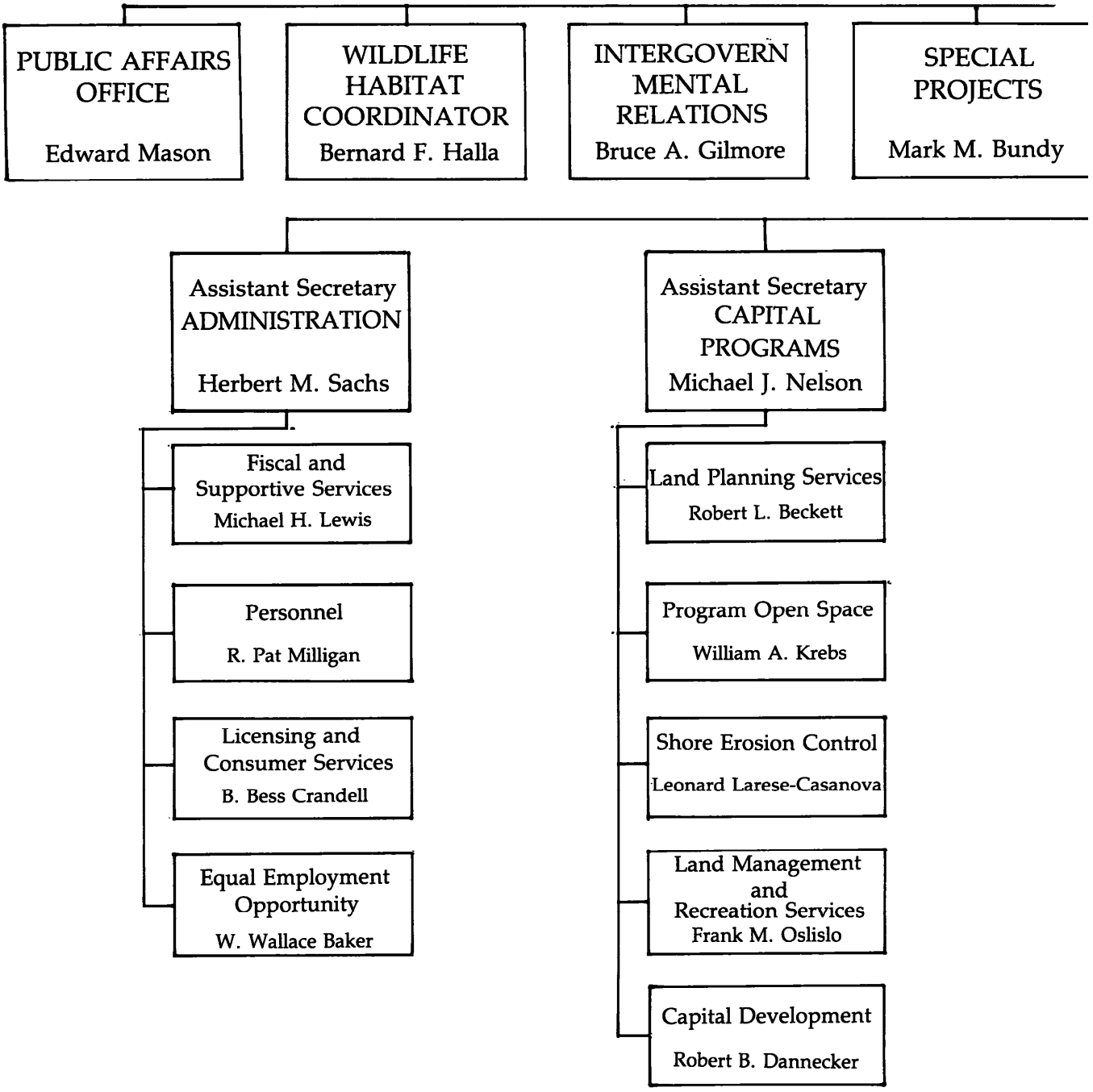
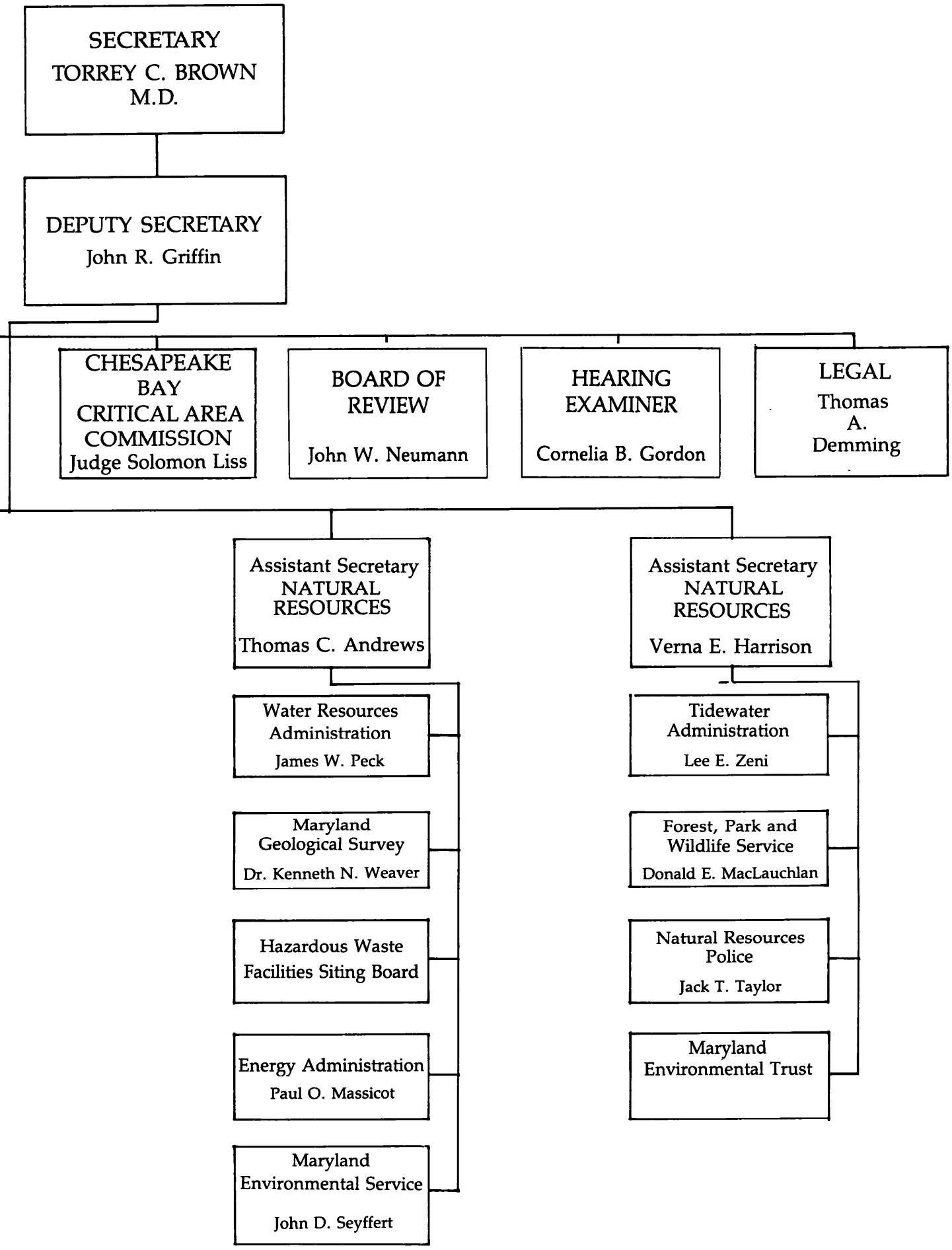


CHART OF ORGANIZATION
FISCAL YEAR 1986

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Photos by John Elder, Victor B. Giordano and DNR staff.

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