

1988
ANNUAL
ACTIVITIES
REPORT



**DEPARTMENT OF NATURAL RESOURCES
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MARYLAND DEPARTMENT OF NATURAL RESOURCES



STATE OF MARYLAND
WILLIAM DONALD SCHAEFER
GOVERNOR

LOUIS L. GOLDSTEIN
COMPTROLLER OF THE TREASURY
LUCILLE MAURER
TREASURER

DEPARTMENT OF NATURAL RESOURCES
TORREY C. BROWN, M.D.
SECRETARY

**MARYLAND DEPARTMENT
OF NATURAL RESOURCES**

**1988 ANNUAL
ACTIVITIES REPORT**





Maryland Department of Natural Resources

William Donald Schaefer
Governor

Tawes State Office Building
Annapolis, Maryland 21401

Torrey C. Brown, M.D.
Secretary

John R. Griffin
Deputy Secretary

FOREWORD

During FY 88, the 1750 employees, volunteers and committee members of the Department of Natural Resources continued DNR's mandate to improve the health and productivity of the Chesapeake Bay ecosystem in accordance with the two Chesapeake Bay agreements, signed in 1983 and 1987.

Other noteworthy achievements include: initiation of the Ocean City Beach Replenishment and Hurricane Protection Project; hosting the 1988 Savage International and National Whitewater Championships at Savage River; opening the Visitor's Center at Merkle Wildlife Sanctuary; the Acquisition of Black Marsh; the establishment of the old Choptank River Bridge as a fishing pier; stocking 221,603 trout and 853,341 striped bass to help restore the species and maintain those fisheries; moving more than 5 million bushels of oyster shells and planting over 900,000 bushels of seed oysters; implementation of the Boating Safety Education Act by training instructors, conducting nearly 200 classes and certifying approximately 4,000 people; through the Chesapeake Bay Trust Board, approval of an expenditure of \$67,750 to assist development of an environmental education center at Gunpowder Falls State Park; completion of \$33 million worth of land acquisition projects; completion of the Non-Tidal Wetlands Task Force report outlining a proposed non-tidal wetlands regulatory and management program for Maryland; completion of the surface mining reclamation project creating the Robert Stetham Memorial Park and Recreation Facility in Charles County; approval of more than half of the critical area programs and start of oversight role of local projects in the critical area.

These activities helped to fulfill DNR's mandate to effectively manage the State's natural resources for the benefit of Maryland's citizens.

A handwritten signature in black ink, appearing to read "Torrey C. Brown".

Torrey C. Brown, M.D.
Secretary

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OFFICE OF THE SECRETARY

... provides the establishment, coordination, administration, and direction of overall departmental policy

EXECUTIVE DIRECTION

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

LEGAL SECTION

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

During FY 88, 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 financial management and control. The program is responsible for administering the department's more than \$160 million budget, providing fiscal information to agency administrators and maintaining fiscal control over income and expenditures.

During the coming fiscal year, Fiscal and Supportive Services will review the financial accounting and control systems with the

goal of integrating the individual parts into one system. Areas of general concern are budgeting, procurement, accounts payable, fixed assets, payroll, grants management, working fund disbursements, cash receipts and accounts receivable.

Supportive Services

The Supportive Services project is responsible for controlling Real and Personal property purchased or otherwise received by the department. At the end of FY 88, the value of land and buildings, to which the Department holds title, exceeds \$539 million. During FY 88 inventory records, for 28,600 items valued at more than \$39 million, were maintained.

Mail Distribution

During FY 88, the department's mailroom handled more than 5,500,000 pieces of mail and 30,000 parcels.

Procurement

This project is responsible for processing service, maintenance and construction contracts, requisitions and purchase orders in accordance with Title 21, State Procurement Regulations. This unit also reviews personal service and timber sale contracts. During FY 88 there were 1563 commodity orders with an approximate value of \$6,270,000; 1675 commodity contract orders processed by units of DNR and reviewed by Procurement valued at \$600,000; 703 service, maintenance, construction and personal service contracts with an approximate value of \$23,591,000. Also, personal service contracts for seasonal and temporary employees were processed totaling nearly 2,750.

Information Management

The Information Management Section, in the Office of the Secretary, maintains a central review authority over all Data Processing Activities of the Department. In addition, the Section is directly responsible for all administrative/financial computer applications located in the Office of the Secretary's Fiscal and Supportive Services and Licensing and Consumer Services.

During the coming fiscal year, the Data

Processing Section will work to strengthen its support capabilities throughout DNR.

LICENSING AND CONSUMER SERVICES

Licensing and Consumer Services (L&CS) is comprised of a central office in Annapolis and five Regional Service Centers located across the state and is responsible for issuing: commercial fishing, sportfishing and hunting licenses; boat dealer and seafood dealer licenses; boat certificates of title and number; recording security interests on vessels; collecting boat excise tax, oyster and clam severance tax and oyster export taxes, issuing wildlife, off-road vehicle and other special permits as provided for in the Natural Resources Article. The unit is also responsible for the Boat Act Fund, the Boat Dealer Assurance Fund, the Publication Sales Fund, which includes the sale of the "Guide for Cruising Maryland Waters," and certain other Department publications.

The Licensing and Consumer Services staff provides coordination between the Department and the 622 boat dealers and 274 fish dealers whom it licenses, the 24 Clerks of Court, 7 hunting and fishing license distributors, 208 hunting and fishing license consignment agents, and 465 hunting and fishing license cash agents, as well as the general public.

L&CS staff at the five Regional Service Centers, in addition to the issuance of titles, registration and licenses, provides comprehensive administrative support to the regional managers and field personnel of all DNR Units in the centers.

Gross Revenue Collected

During FY 88, the six Licensing and Consumer Services offices collected gross revenues of \$31,922,103, representing 1,450,547 transactions, a 13 percent increase in revenues over FY 87. Revenues collected during FY 88 were used to support the activities of the Tidewater Administration, the Forest, Park and Wildlife Service, the Natural Resources Police and Office of the Secretary. Total cost for FY 88 for L&CS to accomplish these services was \$2,440,022.



Pocomoke River Canoers

Boat Title, Taxes and Registration

Licensing and Consumer Services processed 148,580 applications for boat registrations and 7,685 applications for documented yacht stickers. Fees collected for registration and documented yacht stickers totaled \$1,597,941 and \$38,386, respectively.

A total of \$162,210 was collected for the recordation of security interests on titled vessels. Of this amount, \$64,884 was deposited to the account of the Comptroller of the Treasury, \$54,070 available for distribution to Maryland counties and \$43,256 to offset costs of collection and recordation.

Licensing and Consumer Services is responsible for collecting the boat excise tax on all motorized vessels used principally in Maryland. In FY 88 boat excise tax collected on numbered and documented vessels totaled \$21,222,985, an increase of 17 percent over FY 87. Penalty and interest collected as the result of delinquent tax payments totaled \$524,794. Reports received from the Natural Resources Police, Maryland citizens and other sources resulted in assessments and collection of \$919,324 in boat excise tax, \$21,248 in penalty and \$63,889 in interest for total revenues of \$1,004,461.

Sport Licensing (Hunting and Fishing)

Nine hundred seven thousand, four hundred eighty-six applications for various fishing and hunting licenses and stamps were processed by the Sport Licensing Division resulting in net revenues of \$6,784,822.

Commercial Fishing

Licensing and Consumer Services staff processed 21,874 applications for commercial fishing licenses and collected \$684,753 in commercial fishing license fees.

The Southern Regional Service Center, in Prince Frederick, collected \$5,285 on behalf of the Potomac River Fisheries Commission through sales of Potomac River Fisheries Commission's licenses. The money is deposited directly to the Potomac River Fisheries Commission's account.

Oyster and Clam Taxes

Licensing and Consumer Services staff processed 2,577 oyster and clam dealer reports accounting for over 647,541 taxed bushels of shellfish resulting in total severance, import and export tax collections of \$321,158.



Publications

Gross revenues from publications totaled \$81,806, of which 56,119 was generated from the sale of the "Guide to Cruising Maryland Waters."

Miscellaneous Permits and Sales

L&CS collected and deposited to the State's accounts \$71,748 in miscellaneous permits and sales.

During the period September 1 through October 31, 1987 L&CS participated in the Tax Amnesty Program which offered amnesty from the 10% penalty and criminal prosecution for persons who remitted past due boat excise tax plus interest during the period. L&CS staff participated in a sweeping advertising campaign, including radio, television and printed ads. During the 2-month amnesty period, L&CS collected \$1,145,141 in tax and interest from 490 boat owners.

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

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

Through the use of news media and continuing education programs, Licensing and Consumer Services will work to increase public awareness of license requirements.

PERSONNEL SERVICES

Personnel

The personnel office provides assistance to the agencies in the areas of benefits administration, employee-employer relations, recruitment, testing, and classification. During FY 88 the office was moved to new offices on C-3 of the Tawes Complex.

With the assistance of our Data Processing Section, the office began implementation of a new computerized personnel system to effect timely information access.

Equal Employment Opportunity

The Office of Equal Employment is responsible for administering the affirmative action and equal employment opportunity program for the Department. Duties include investigation of discrimination complaints, affirmative action plan development, training, recruitment, employee counseling and community relations.

This office was recently reactivated after a year of inactivity due to the transfer of the former Director and the abolishment of the resultant vacancy. During this period, the personnel

ACTIVITY SUMMARY:

PERSONNEL TRANSACTIONS PROCESSED (Appointments, Reclasses, etc.)	4,198
RECLASSIFICATION STUDIES	464
Desk Audits	30
PERSONNEL SERVICES SALARY CERTIFICATION	188
SPECIFICATIONS REVISED	21
SUGGESTIONS PROCESSED	2
BLOOD PROGRAM	
Drives	4
Donors	341
Units Produced	308
Disbursement	2
INTERVIEW & MOVING EXPENSE REQUEST	3
APPLICANT ACTIVITY	
Correspondence	392
Walk-ins	200
Interviews	100
Telephone Inquiries	588
Employee Reviews	50
Examinations Requested	12
Examinations Administered	2
EMPLOYEE GRIEVANCES (2nd and 3rd Step Hearing)	28
STATE ACCIDENT FUND ACTIVITY	
First Report of Injury Processed	254
Hearings Attended	1
Bills Processed	508
MISCELLANEOUS CAMPAIGNS (Flu inoculations, various employee benefit programs)	3
UNEMPLOYMENT INSURANCE HEARINGS	4

office assumed responsibility for reviewing structured interview questions and monitoring appointments.

In the upcoming year, the focus will be on developing a monitoring system to assure compliance with State and Federal laws and regulations; assisting units in developing strategy plans to address under-representation of minorities and females in the workforce; and completion of self-evaluation and transition plans as required by Section 504 of the Rehabilitation Act of 1973

Human Resources & Staff Development

HRSD offers assistance in the following areas: Career Counseling, Myers/Briggs Analysis, Audio Tape/Video Tape Training programs, MOSH requirements, Training needs assessment, Team Building, Basic skill training, Technical Training assistance, and AIDS information. HRSD administers the Supervisory Training Program (CORE), all non-departmental Training requests, the tuition reimbursement program and the Executive Development Program.

PUBLIC AFFAIRS OFFICE

During FY 88, the Public Affairs Office initiated publication of a four-color magazine "OUTDOORS IN MARYLAND." Published in cooperation with "MARYLAND MAGAZINE" of the Department of Economic and Employment Development (DEED), the magazine has a circulation of over 50,000, with additional distribution to Maryland schools under the auspices of Governor William Donald Schaefer. The quarterly publication features articles, photographs and photo essays on topics of Maryland outdoors, wildlife, conservation, and public use. A special edition dealt with the Chesapeake Bay. "Outdoors in Maryland" received a special award from the Maryland, Delaware, D.C., Press Association and the Talbot Denmond Memorial award for best magazine story on conservation and the environment.

A number of special public programs to highlight Chesapeake Bay Restoration efforts were initiated. One of the most successful, the "Maryland Green Shores" program, encouraged the planting of trees, shrubs and grasses to help protect the Bay. School-age children participated in a contest to design an emblem. Hardee's restaurant chain sponsored the program.

ACTIVITY SUMMARY:

CORE TRAINING	360 supervisory personnel
DEVELOPMENT OF CAREER PLANS	68 employees
OUT-SERVICE TRAINING REQUEST PROCESSED	785
TUITION REIMBURSEMENT REQUESTS PROCESSED	88
GOVERNMENT EXECUTIVE INSTITUTE	3 employees
MYERS/BRIGGS TYPE INDICATOR	6 employees
UNIT ASSISTANCE REQUESTS	8

In connection with the Ocean Beach Replenishment project, an extensive public education campaign was conducted with brochures, exhibits, displays, radio/television announcements and other promotional materials. It was designed to create public understanding for the project. During FY 88, despite extensive and prolonged construction on Maryland's most popular beach and resort area, there was no unfavorable reaction. The program was launched by Governor William Donald Schaefer and key officials.

Through the Public Affairs Office, the DNR was represented in a number of state-wide and local special events with exhibits, displays and presentations designed to foster public understanding and support of the DNR's conservation, water safety and other projects.

In news related articles, the office prepared and distributed upwards of 300 press releases, conducted press briefings on the status of the oyster, rockfish and a proposed golf course at Rocky Gap State Park among others. In addition, the office produced several dozen radio news actualities and television public service announcements dealing with safe boating matters and park access for the handicapped.

Also during FY 88, the Public Affairs Office conducted the Migratory Waterfowl Stamp Design Contest, the Maryland Trout Stamp Contest, and at the request of the Tidewater Administration, set up the first competition for Chesapeake Bay Sport Fishing License Stamp Design Contest.

This office also published the DNR Annual Report, the listing of Boards, Committees and Commissions of DNR, and, in cooperation with the Maryland Department of the Environment, the

Maryland Department of Agriculture and the Maryland State Department of Education, Maryland's Chesapeake Bay Program Annual Report.

Helen Avalynne Tawes Garden

In mid-July, the garden's new naturalist started work and began planning the 1987 Natural Resources Club, four days of activities for 9-12 year old children. Subsequently, a variety of programs for all ages was planned.

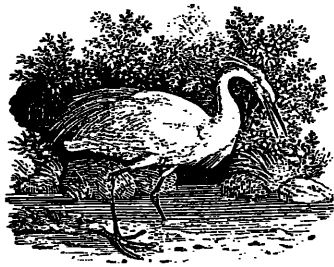
The garden was included in a new hardbound book entitled Gardens for all Seasons—the Public Gardens and Arboreta of Maryland, published by Vandamere Press. The 151 page book describes 33 gardens and contains numerous color plates.

In the spring, the Tawes Garden Gift Shop was enlarged to twice its original size and continues to do well.

In May, 150 people gathered to honor Norma and James B. Coulter, former Secretary of Natural Resources, at the dedication of the award-winning garden's Eastern Shore peninsula.

Young Wood and Black Ducks were purchased for the garden in the closing days of FY 88. In a penned area for a few weeks, the ducks will be set free once they learn to fly and perhaps they will make the garden their home.

In FY 88, eighty-one guided tours took 865 visitors through the garden. Special events, including concerts and receptions, drew 1,100 people. Thirty-one programs attracted 375 participants, and nearly \$2,500 was received in contributions.



CHESAPEAKE BAY CRITICAL AREA COMMISSION

BACKGROUND

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

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

ACCOMPLISHMENTS

During 1988 the Commission held 50 of 60 required local hearings in the affected jurisdictions prior to voting on the local Program as state in Section 8-1809 of the Law.

The Commission approved three-fourths of the local Programs submitted to it during FY 88.

In FY 88 the Commission promulgated, in final form, regulations identifying those classes of applications, for project approval at the local level, for which it wishes to receive notification fulfilling Section 8-1811 of the Law.

The Commission also promulgated regulations, in final form, pursuant to Section 8-1814 of the Law for State and local agency proposals, which are not subject to review by local jurisdictions, under their approved Programs, but which are subject to Commission review and approval.

A series of guidebooks for local governments, developers, and public use, covering topics such as: the criteria and how to apply them; the use of Transferable Development Rights; Non-Tidal Wetlands; how to meet the 10 stormwater management criterion; what are forest interior dwelling birds; and a guidance paper on counting growth allocation, was completed by the commission in FY 88.

The Economic Baseline Study, and an assessment of the One Dwelling Unit per 20 Acres criterion were finished also.

FUTURE EFFORTS

The Commission hopes to accomplish program approval by early Fall 1988, and see all programs implemented by the end of the calendar year.

Review of projects, and program amendment workshops to be held on special criterion, and working with the Oversight Committee of the Legislature will be the focal points for the Commission activity in FY 89.

... a strategy for protecting the water quality and natural habitat of the Bay





THE CHESAPEAKE BAY TRUST

... to promote public awareness and participation in the restoration and protection of the Chesapeake Bay

BACKGROUND

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

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

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

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

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

MAJOR FY 88 ACTIVITIES

During FY 88, the Trust received contributions totalling \$165,252, bringing the total raised since the Trust's inception to \$732,832.

Grants and expenditures approved by the Board of Trustees during FY 88 totalled \$124,500. Grants ranged from an award of \$3,000 to the Chester River Association for development of an audio-visual presentation documenting land and water resources in the Chester River watershed, to an award of \$10,775 to the National Aquarium in Baltimore for the development of instructional materials about the Bay for use in Maryland schools.

The Board also authorized the expenditure of \$67,750 to assist development of an environmental education area at Gunpowder Falls State Park.

Other grants went to an educational campaign of radio public service announcements to Bay area homeowners, an aquarium exhibit in Calvert County to interpret the ecology of the Patuxent River, and a wetlands construction and education project in Baltimore city.

Among this year's designated support efforts was a \$14,000 gift of the Potomac Electric Power Company to fund a crew of the Maryland Conservation Corps which comprises young people who perform erosion control, stream improvement, and other conservation projects.

The Conservation Corps received additional support of \$9,000, raised by a "Homebuilders for the Bay" campaign conducted by members of the industry in the Maryland area.

An highlight of Trust activities was the celebration of Chesapeake Bay Day, on May 22, 1988, in conjunction with the Bay Bridge Walk and the Governor's Bay Bridge Run. An estimated 65,000 persons took part in the day's activities featuring a Bayfest in Sandy Point State Park. More than \$43,000 was raised by the Bayfest and Bay Bridge Run events.

LEGISLATIVE SUPPORT

Future support for grant-making activity of the Trust is expected to result from a measure enacted by the 1988 General Assembly.

This legislation permits Maryland taxpayers to make voluntary contributions to a newly-created "State Chesapeake Bay and Endangered Species Fund" beginning with the 1989 filing season.

Donations to the Fund will be divided evenly between the Chesapeake Bay Trust and the Endangered Species Conservation Program of the Department of Natural Resources.

Fund raising continues to be a major priority of the Trust, as does the recruitment of additional civic and community organizations to perform Bay restoration projects.

For further information, contact the Chesapeake Bay Trust, 60 West Street, Suite 200-A, Annapolis, Maryland 21401 (301) 974-2941.



CAPITAL PROGRAMS ADMINISTRATION

... responsible
for land
acquisition,
planning,
development,
and shore
erosion control

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

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

LAND PLANNING SERVICES

Land Planning Services provides planning, evaluation, mapping, graphic, environmental review and capital facilities planning services for the acquisition, development, and management of public lands and scenic rivers administered or managed by the Department. The activities of Land Planning Services are accomplished through five projects: Resource Planning, Scenic and Wild Rivers, Acquisition Graphics and Research, and Capital Budget Planning and Environmental Review.

Resources Planning

The Resource Planning Project is responsible for the development of master plans for new state parks, revisions to existing plans for established parks, and the development of interim use management plans for recent acquisitions of properties. This project also prepares detailed analyses and conceptual studies for potential acquisitions, and works on many special planning projects. Resources Planning also is responsible for a substantial computer based Geographic Information System currently in the pilot stage for the Patuxent River Watershed.

During FY 88, the Resources Planning

Project completed a number of projects including:

- Draft Concept Plan, St. Mary's River State Park
- Phase I—Deer Creek Corridor Analysis and Revised Development Plan—Rocks State Park
- Site Analysis Black Marsh
- Site Evaluation—Nature Interpretive Center—Soldier's Delight N.E.A.
- Development Plan—Days Cove Section of Gunpowder Falls State Park
- Somers Cove Marina Planting Plan

Other projects in progress during FY 88 include:

- Patuxent River Mine Reclamation Report
- Acquisition plan for Patuxent River N.R.M.A.
- Patuxent River Properties Map—Publicly Owned Lands on the Patuxent
- Master Plan Black Marsh
- Beach Stabilization—Park Development and Planting Plan -Rock Hall
- Trail Design & Enhancement Study Cyl-hern Arboretum
- Patuxent River Natural Resources Management Area Properties Master Plan
- Lower Patapsco Redevelopment Plan

Scenic and Wild Rivers

The Scenic and Wild Rivers Program, the only state river conservation program, is legally mandated to inventory and study all the water of Maryland; prepare river conservation and resource management plans for designated rivers that comprise the Scenic and Wild Rivers System of Maryland; promote the preservation and protection of natural resources associated with designated rivers; coordinate planning activities with local citizen advisory groups and government bodies to develop river conservation and land use recommendations; and administer the Youghiogheny Wild River Project and Regulations. The program has more recently expanded to provide technical assistance to river communities interested

in the wise management of their river resources.

Completed planning projects for FY 88 included:

- The Maryland Rivers Study: Tributaries of the Chesapeake Bay
- Gems of the Severn

Continuing planning projects include:

- The Maryland Rivers Study: Tributaries of the Potomac River
- Anacostia River Implementation Project
- Deer Creek Implementation Project
- Severn River Implementation Project
- Monocacy Scenic River Conservation Management Plan
- Patuxent Scenic River Management Plan
- Wicomico River/Zekiah Swamp Conservation Management Plan
- Youghiogheny Scenic and Wild River Conservation Management Plan
- Public Outreach and Education

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 DNR. These activities are coordinated with other DNR, state and federal agencies. In addition, the project provides mapping and graphics services, and is responsible for the preparation of DNR's biannual acreage report.

Project boundary maps, special project maps, and aerial photography projects completed in FY 88 were:

- South Mountain State Park—Remapping
- Rocks State Park—Research phase project boundary map
- Savage River State Forest—Whitewater race area ownership research and mapping
- Youghiogheny River—Determine river view points and develop profiles for establishing corridor

- Savage River State Forest—Topographic base maps review and corrections
- Youghiogheny River—Update maps and reference lists with revised scenic corridor line and review all property ownerships
- DNR Wildlands—Develop maps of the eight DNR Wildlands areas
- Garrett County Consolidation Plan—Property research and mapping of parcels to be released
- South Mountain State Park—Appalachian Trail Action plan—preliminary stage

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

Property research projects completed in FY 88 were:

- Patapsco State Park
- New Germany State Park
- Gunpowder State Park
- South Mountain State Park
- Savage River State Forest
- Severn Run N.E.A.
- Pocomoke State Forest
- Cedarville State Forest
- Garrett State Forest—land patent

CAPITAL BUDGET PLANNING AND ENVIRONMENTAL REVIEW

The Capital Budget Planning Project is responsible for preparing the DNR's annual Capital Budget and Five Year Capital Improvements Program. This requires an annual update and assessment of the needs and trends for recreational and operational facilities, as well as an evaluation of the status of current projects and the assessment of new projects to be added to the program.

In FY 88, emphasis was given to developing new information and data for identifying future capital improvement needs. This included the preparation of an RFP for a "Ten Year Capital Improvements Plan."

In FY 88, this project coordinated all environmental review activities for the Capital Programs Administration including the review of reports, studies, policies, and other actions to assess environmental impacts on DNR's lands and facilities.

PROGRAM OPEN SPACE

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

The following significant accomplishments during FY 88 give a forecast of trend-setting goals to improve and enhance Maryland's parks, recreation, and open spaces over the next several decades:

During FY 88, Governor Schaefer sponsored a bill approved by the General Assembly, raising the legislated "cap" on Program Open Space from \$29 million in FY 88 to \$39 million for FY 89. This allocation provided:

- \$16,000,000 for local governments
- \$15,000,000 for Department of Natural Resources lands
- \$1,000,000 for Baltimore City Direct Grant
- \$5,000,000 for Agricultural Land Preservation
- \$1,000,000 for Heritage Conservation Fund
- \$1,000,000 for Bond Deauthorization

Congressman Morris Udall (D-Arizona) sponsored a bill calling for the creation of the American Heritage Trust Fund of



1988, a self-sustaining dedicated fund providing \$1 billion annually to enhance the declining Federal Land and Water Conservation Fund. If passed, Maryland would receive an estimated \$6,000,000 annually to supplement Program Open Space. Program Open Space has worked diligently with many other states to educate and inform people statewide about this Trust Fund proposal. Congressional co-sponsors from Maryland include: United States House of Representatives—Roy Dyson, Ben Cardin, Beverly Byron, and Constance Morella. United States Senate—Paul Sabanes and Barbara Mikulski.

The Department of Natural Resources, in cooperation with the Maryland Recreation and Parks Association, continued the campaign to raise funding for an educational film on Maryland's parks, recreation, and open spaces to help promote a new land ethic in the public parks and open space users. During the period, over \$100,000 was raised and/or pledged to help finance the cost of this film.

The Federal Commission on Americans Outdoors, in its January 1987 report, recommended and encouraged states and local governments to join with counter-parts and private, corporate, not-for-profit groups, and the general public to look ahead for a generation to enhance our out-of-doors for enjoyment of people and for protection of the resource. In support of that recommendation, Program Open Space and the Forest, Park and Wildlife Service hosted a state-wide "Task Force" on the future of parks, recreation, conservation, and open space in Maryland. Its recommendations will be published during FY 89.

Because of the emphasis placed on providing outdoor recreation and natural areas amidst urban growth, considerable attention has been given to the recommendations of the Federal Commission on Americans Outdoors. Consequently, numerous new initiatives and exciting outdoor recreation, park, and conservation projects are being proposed and planned all over Maryland. Program Open Space, because of its mission to fund these kinds of projects, continues to play a major role in the development of many of these new efforts. The "Prairie Fire" called for by the Federal Commission on Americans Outdoors, began to burn brighter and brighter during each month of FY 88.

Program Open Space cooperated with the Department of State Planning to help complete and review a new state-wide Land Preservation Plan and twenty-four updated county wide Recreation and Open Space Plans.

State Share Activity

During FY 88, Program Open Space continued to make progress in meeting the DNR's acreage goal of 395,944 acres. Approximately 5,158 additional acres were optioned in FY 88, a balance of 69,107 acres to be acquired.

Local Share Activity

In FY 88, there were 30 acquisition grants approved for the county and municipal governments, with a total Program Open Space assistance of \$4,124,001. The completion of these projects will result in an additional 461 acres of local parkland. The Board of Public Works approved 73 development projects or amendments for a total assistance of \$5,170,610. Since 1970, Program Open Space has provided \$223.4 million to the local governments for park grants. At the end of FY 88, the unencumbered balance was \$24,747,311, an obligation rate of 89 percent.

Land and Water Conservation Fund

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

Through FY 88, the State of Maryland received apportionments totaling \$62,475,247. Of that amount, \$62,230,826 has been obligated on 367 park acquisition and development projects throughout the State, an obligation of 99 percent.

In FY 88, Maryland was reimbursed



Cutter head on South Dredge, Ocean City Beach Replenishment Project

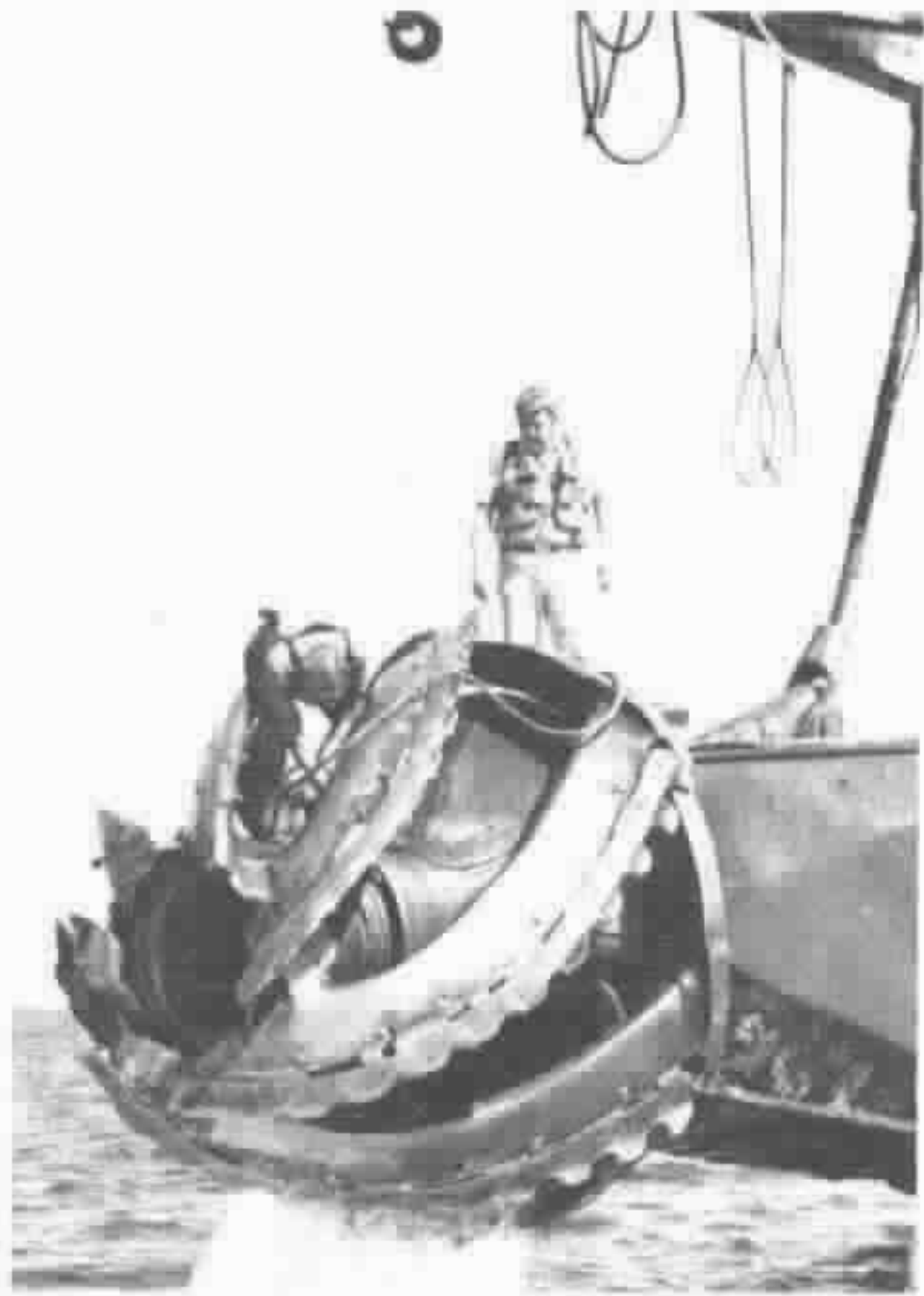
\$1,760,154 from the Federal Land and Water Conservation Fund. Local governments expended \$593,647 on local park acquisition and development projects.

Ocean City Beach Replenishment and Hurricane Protection Project

In addition to the land acquisition responsibilities, Program Open Space was involved with 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. There are 234 parcels of land involving more than 4,200 property owners. The majority of the necessary property rights were obtained by December 1987. Construction bids were awarded in January 1988 and the State and Town of Ocean City began pumping sand in May. This project will provide a 220-foot wide beach, hurricane bulk-head protection at the boardwalk, and a 98 foot wide vegetated dune running from the end of the boardwalk to the Delaware line.

New Directions

The Initiatives Development and Education Administration within Program Open Space has been established to help instill and encourage a greater out-



door ethic in the people of Maryland. This State effort is joining with similar efforts in other states creating a national effort to help further preservation, conservation, wise management and enjoyment of natural lands, public parks and open spaces.

Special Projects

Program Open Space is coordinating the development of the Days Cove area of Gunpowder State Park. This cooperative venture between DNR and several private companies will be a model for future enterprise projects. After years of negotiation and planning the State has reached an agreement with private businesses that will accomplish the following:

- Provide mining of valuable sand and gravel resources
- Transfer ownership of the land to DNR for a park
- Provide millions of dollars of private money for public park development
- Return the land to its original contours after mining and enhancing the area for use as a park
- Cut the average park development time from 15 years to about 5 years
- Protect thousands of acres of critical plant and wildlife habitat within the confines of an extremely urban area.

Bay Access Guide

In fulfilling the requirements of the Governor's Bay Agreements and to meet an existing need, Program Open Space staff is working with the Commonwealth of Virginia, District of Columbia and other State agencies to develop a comprehensive guide to public land adjacent to the Chesapeake Bay. The guide will contain detailed maps, users information and interesting bits on the historic and biological significance of the bay. This project represents one of the eight major components of the Bay Agreements.

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.
- Stress the importance of environmental quality, public open space, conservation lands, and public recreation areas through promotional and educational efforts.
- Assist with the development of coalitions and support groups to implement the recommendations of the Federal Commission on Americans Outdoors.
- Provide educational materials and insight concerning the merits of the bills before Congress to enhance the Land and Water Conservation Fund through the American Heritage Trust Fund of 1988.

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.

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 \$60,000.00 of construction costs, fifty percent of the next \$20,000.00, twenty-five percent of the next \$20,000.00 and ten percent of that portion of the construction costs over \$100,000.00

SHORE EROSION CONTROL ACCOMPLISHMENTS

Technical Assistance Actions	187
SEC Loan Applications Received	54
Engineering Contracts Awarded	32
Construction Projects Bid	34
Construction Contracts Awarded	34
SEC Loans Processed	40
Number of Projects Completed	24
Number of SEC Loans Involved	39
Amount of SEC Funds Loaned	\$1,975,393.58
Total Cost of Construction Completed	\$2,779,650.99
Length of Shoreline Protected by:	
Timber bulkheads	1,206.0 feet
Stone revetments	7,581.67 feet
Stone groins	740.0 feet
Total	9,527.57 feet
	1.80 miles

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.

For non-structural shore erosion control measures, there are matching grants available which provide funds to assist private property owners in stabilizing suitable, eroding shorelines by means of vegetative plantings; demonstration projects of innovative techniques are done on State lands for viewing by the general public.

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 construction for the Ocean City Beach Replenishment project
- Fully integrate the Non-Structural Shore Erosion Control activity into the Shore Erosion Control Program

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

LAND MANAGEMENT & RECREATION SERVICES

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



1988 Whitewater Championships, Savage River

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

The October 31, 1987 Fair Hill Breeder's Cup Steeplechase was run at the Fair Hill Natural Resources Management Area. This event received national television coverage, attracted national and international participants, and was the largest purse in the history of the sport. In addition, two other steeplechase races were held at Fair Hill with an overall attendance of 20,000. In 1987, under the direction of the Fair

Hill Equestrian Event Organization, the United States Four-in-Hand Driving Championship, the Fair Hill Horse Trial Championships, and screening trials for pairs driving were held in support of the Olympics Equestrian Team effort. The annual Cecil County Fair was also held here with approximately 70,000 people attending. Other events held include the Scottish Games and several horse and pony shows.

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



Driving Tour, including the 1000' bridge connecting the Maryland National Capital Patuxent River Park with the Sanctuary, was held May 7, 1988—Patuxent River Discovery Day. This will be the public access to a "driving" tour through the area. The annual "Goose Greet" was held in October attracting approximately 150 people.

Another new 50 slip pier at the Somers Cove Marina in Crisfield was completed bringing the capacity to 370 boat slips. This pier was funded and construction supervised by DNR's Tidewater Administration's Waterway Improvement Program. The facility ranks as one of the best marinas on the east coast and will be expanded in the coming years to provide additional slips to annual and transient boaters. The Somers Cove Marina was host to two annual events, the annual Crab Derby, and the J. Millard Tawes Clam Bake.

This project is also responsible for managing approximately 2,500 acres of land along the Patuxent River. Construction is underway to convert a former tenant house into the Patuxent River Natural Resources Management Area office.

Recreation and Leisure Services

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

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

A Directory of County and Municipal Recreation and Park Boards and Commissions is compiled annually.

The Office of Recreation and Leisure Services co-sponsored, with Salisbury State College and Pepsi Cola Bottling Company of Salisbury, the 7th Annual

Invitational Wheelchair Athletic Games, held at the college campus.

Enterprise Development

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

Real Property Review and Evaluation

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

FY 88 Accomplishments

- Processed 100 requests for new Rights of Way, Easements, Change of Use

- Filed for, and physically posted, 75 Duck Blind Areas in four counties on the Patuxent River Natural Resources Management Area
- Coordinated 200 Department of State Planning, State Clearing House Reviews
- Reviewed, coordinated, and approved 100 Lease Agreements
- Inspected and reappraised 100 Department of Natural Resources structures

ENGINEERING SERVICES

The Engineering Services program provides engineering, architectural, landscaping, and administrative services to DNR agencies for the construction of new facilities. During FY 88, 26 design and 24 construction projects, totalling more than \$4 million, were completed.

The Design and Construction Division's major projections included:

- Green Ridge State Forest Shop and Office Building
- Potomac/Garrett State Forest Office
- Herrington Manor State Park Cabin Renovations



Town of Chesapeake Beach, Shore Erosion Project, southern half of stone revetment and back-drop



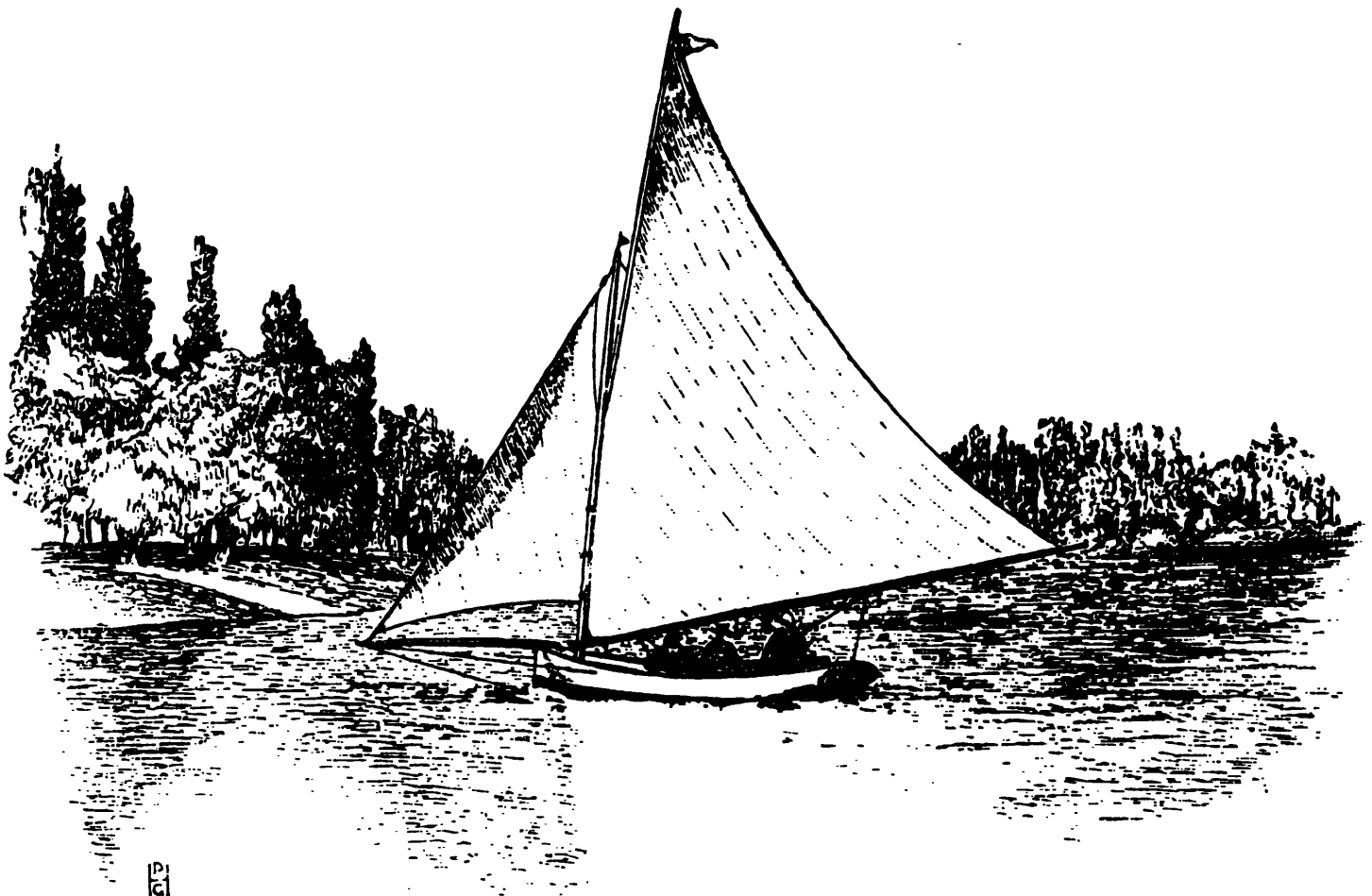
- New Germany State Park Cabin Renovations
- Sandy Point State Park Handicapped Playground (nationally recognized)
- Savage River State Forest Whitewater Races

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

- Gunpowder State Park Storage Building
- Wellington W.M.A. Chemical/Oil Storage Building
- Cedarville State Forest Shop Addition
- Fair Hill N.R.M.A. Storage Barn
- LeCompte W.M.A. Chemical/Oil Storage Building



Route 3 at Severn Run, Old Severn River Bridge



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HAZARDOUS WASTE FACILITIES SITING BOARD

. . . . a means of locating new facilities for recycling, treatment and disposal of hazardous waste

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

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

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

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

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

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

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

Site Suitability is Broadly Stated in Law

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

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

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

Needs of the State

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

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



MARYLAND FOREST, PARK AND WILDLIFE SERVICE

. . . . provides forest and wildlife management, and recreational needs for the people of Maryland

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

GENERAL DIRECTION

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

On Arbor Day, April 6, 1988, each third grade student in Maryland's public schools received a pine seedling as part of a continuing program to increase public awareness of the importance of Maryland's forestry resources.

The Wildlife Conservation Stamp and Print Program completed a third successful year. The subject was bluebirds. Publications throughout the state donated more than \$100,000 of print advertising for the program.

The Maryland Forest, Park and Wildlife Service published "Guide to Public Hunting Lands in Maryland." The publication features forty-eight of Maryland's public lands which provide hunting opportunities on more than 120,000 acres. The publication sells for \$6.00.

Forest Fire Prevention Week, April 10-16, 1988 was proclaimed by Governor Schaefer to bring attention to the danger of natural fuel cover fires. A poster, featuring the Governor and Smokey Bear was one of the tools used to publicize the week. Many activities were held around the State.

Maryland state parks were promoted cooperatively with the "Maryland, You Are Beautiful" campaign.

Theme characters helped promote state parks at the Bay Bridge Walk. "Bonus Buck" coupons from the Governor were distributed at the walk and at Bayfest.

"Tracks 'N Trails," the sportsmen's newsletter that reaches more than 3,000 citizens, resumed publication in March.

The Maryland Forest, Park and Wildlife Service and the Maryland Tree Farm Committee hosted the first Tree Farm Celebration and Dinner, honoring Maryland's tree farmers, in recognition of 1988 as the 40th year of tree farming in Maryland.

Planning and Program Development

This group is responsible for forest resources and wildlife comprehensive planning, environmental review, program development and legislation pertaining to forests, parks, and wildlife.

Maryland's Forest Resource Plan, "Program Direction for Management 1988-1990," was completed and printed. Seventy-five hundred (7,500) copies were prepared and are available to the public by writing to the Forest, Park and Wildlife Service. The publication addresses the policies and activities directed at protecting, managing, and utilizing our forest resources.

A significant new program was launched this year to revise the management plans for all state forests and wildlife management areas. The State Land Management process will gather information from the public and professionals to formulate plans for managing these properties into the next century.

Private lands environmental review focused activities on non-tidal wetland and highway projects. Non-tidal wetlands work centered on designing and reviewing small wildlife projects.

The Internal Review Program continued working towards its goal of establishing a uniform methodology for the review of activities on our lands. The collection of information on sensitive habitats, and the review of an oil and gas leasing program were among the most significant accomplishments.



Maple sugaring, Cunningham Falls State Park

Cooperative Forestry Program

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

Forest Resource Management

Assistance to Maryland's 95,000 forest landowners can differ greatly depending on the goals they have set for their property. Services offered to help them realize these goals include resources management plans, reforestation plans, afforestation of open lands, and advice for plan implementation. In 1987, more than 45,500 acres were placed under management and 6,500 acres were planted. To aid these landowners with timber harvests, 242 sediment control plans were written. Additionally, 94,800 feet of logging roads and skid trails were laid out and 116,000 feet were stabilized.

The Buckingham Forest Tree Nursery at Harmans, in Anne Arundel County,

provided more than 4,299,000 seedlings for the 1988 planting season. A special project of the nursery is the production and sale of Wye Oak seedlings. The Wye Oak, a native white oak, is the State Tree. It is also the national champion white oak. Since 1976, over 12,000 Wye Oak seedlings have been sold to individuals throughout the country. This past year 2,500 Wye Oak seedlings were grown and sold.

This year celebrates the 40th year the American Tree Farm System has been active in Maryland. The Tree Farm System was designed to recognize landowners who effectively manage their property to help supply our country's forest products needs. Each month a different aspect of tree farming has been highlighted. Tax benefits, maple syrup, fire prevention, forest pests, forest recreation, clean water, and wildlife benefits have been featured to date.

Logging erosion and sediment control training has continued.

At Cedarville, a nature trail is being planned to demonstrate management techniques that can result in wildlife/aesthetic benefits.

The consultant/industrial foresters' meeting was held at the beginning of the year. Water was a major topic of discussion. The agenda dealt with such areas as Army Corps of Engineer Section 404 permits, non-tidal wetland updates, Chesapeake Bay Critical Areas, and logging sediment control plans.

From June 1987 to May 1988, the Susquehanna River Project completed 14 management plans for 1,011 acres and 68,000 feet of shoreline. Follow through will include an additional 14,300 feet of buffer areas to be planted in trees.

The West and Rhodes River Watershed Project last year planted 17 acres into trees, and did timber stand improvement on 55 acres.

Forest Resource Protection

The Resource Protection goal is to reduce forest land loss from wildfire, insects and disease. In 1987, the Maryland Forest, Park and Wildlife Service responded to 857 fires that burned 7,296 acres, a 25% reduction from 1986. The reduction was a result of continuing efforts in fire prevention, training and suppression. Unfortunately,

the dry weather during 1988 led to a 48% increase in the number of acres burned.

Forest fire prevention education continues to be one of the most important activities of the Maryland Forest, Park and Wildlife Service. More than 200,000 pieces of forest fire prevention material were distributed.

Through authorization of the Rural Community Fire Protection Program, \$33,250 in cost-shared grants were offered to 42 eligible rural volunteer fire companies in 1987. This money was used to purchase fire fighting and safety equipment.

Protection from insects and disease was provided by advising individuals, homeowners, and forest landowners on methods of control. Assistance was also provided to the Department of Agriculture in surveying and controlling major insect infestations. The three primary insects infestations are gypsy moth, southern pine beetle and pine sawfly. In 1987, 142,000 acres were aerially sprayed to prevent heavy defoliation by the gypsy moth.

Chesapeake Bay Forestry Initiative

The goal of the forestry initiative, one of the Chesapeake Bay Initiatives approved by the 1984 General Assembly, is to retain existing forest land. The initiative was later broadened to include the establishment of forested buffers. This Forestry Initiative staff provides technical assistance to three target groups: landowners, land developers, and county and municipal governments, as well as 216 days of technical assistance to the local jurisdictions to help with the development of the Forest Preservation Plan of their Critical Area Resource Protection Plan. Other accomplishments include the preparation of 159 forest management plans encompassing 17,017 acres and planting 738 acres of trees along 112,000 feet of shoreline. A demonstration forest buffer planting was established at Sandy Point State Park with the help of Governor Schaefer to kick off Green Shores, a program dedicated to creating forested buffers throughout Maryland.

Bay watershed foresters reviewed 192 development site plans totalling more than 11,389 acres.



Another project implemented, under the Bay Initiatives, is the Urban Forestry Grant Program. Funded by this grant, tree plantings, to help improve water quality, are underway in Baltimore City, Baltimore, Anne Arundel, and Calvert County.

Urban and Community Forestry

The Urban and Community Forestry Program continued to enhance the quality of life in urban and suburban areas of the state through the preservation, protection, and management of trees and forested areas. Special projects involved tree landscaping at the University of Maryland-Baltimore Campus and five Maryland Cemeteries. Street tree inventories, management plans and technical services continue to be needed for effective care and maintenance of trees and for development and assistance in tree planting.

Administration of the roadside tree protection law requires permitting and supervision of the care or removal of trees growing in the public right-of-ways. Balancing the need for utility clearance and tree health requires the expertise of personnel trained in both sciences.

The Seventeen Year Locust inflicted considerable damage on roadside planting stock at the Buckingham Tree Nursery. This may result in reduced quantities for future plantings along our public right-of-ways.

Other activities included administration of the Tree Expert Licensing Law and conducting the testing for qualification as a Maryland tree expert, coordinating the Tree City USA program with the National Arbor Day Foundation, and providing information and education programs to private and public groups.

Forest Resource Utilization

Program emphasis concentrated on assisting the forest product industry in marketing. Industry directories are being updated. In cooperation with the Maryland Forests Association, a publication designed to inform the public of the many contributions of Maryland's forests to the state's economy is being developed.

Modern timber bridge technology is gaining acceptance statewide; state and

county governments are writing specifications and bidding contracts on several projects. By using native hardwood timber to build bridges, a new market is made for under utilized species, thus providing incentive for forest management by private forest landowners.

Wood energy continues to be a focus of this program. As a result, new wholesale firewood producers have been formed, a state correctional institution and a private college have implemented wood energy systems.

The Pride of Baltimore II project required staff assistance in locating acceptable timber, coordinating manufacturing of hull planking and serving as advisors on concerns relating to wood technology.



Green Shores tree planting - Bay Fest - with Governor Schaefer

Natural Heritage and Threatened/Endangered Species

Natural Heritage staff systematically collects, records and analyzes information about the state's biotic diversity, and as a result maintains the most extensive computerized data base of species and habitat information in Maryland. Program responsibilities include: the identification of representative elements of Maryland's natural heritage, including rare and endangered species habitats and natural areas; monitoring of these species and habitats to assess problems or threats

to their continued existence, and protecting these significant resources through information exchange and environmental reviews, coordination with land management agencies, and the development of acquisition and easement priorities.

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

The Natural Heritage Program conducts statewide environmental reviews and assessments for land-use plans and developments. These reviews include detailed inventories of natural resources including: rare and endangered species, habitat quality and condition, and limitations for use of the area.

During FY 88, the Heritage staff demonstrated the program to numerous citizens' groups, government agencies, private organizations, as well as resource management professionals from several nations. Over 2,000 information requests were filed, with approximately 60% of these from local jurisdictions and the private sector. Other requests included federal government agencies, non-profit groups, utilities and academia.

FOREST AND PARK MANAGEMENT PROGRAM

The Forest and Park Management Program administers and operates more than 280,000 acres which make up Maryland's state forests, parks, scenic preservation sites, historic monuments, natural environment areas, and natural resource management areas. Operating and managing these lands, which attract 8 million visitors a year, requires expertise in disciplines including forestry, horticulture, maintenance, construction, history, interpretation, recreation, law enforcement, search and rescue, and emergency medical services. Popular visitor activities include camping, picnicking, swimming, hiking, boating, fishing, hunting, skiing, snowmobiling, off-road vehicling, and horseback riding.

Personnel maintain more than 1,150 buildings and 400 miles of roads and



parking lots, maintain miles of sewer, water and electric lines, swimming pools, beaches, monuments, boating facilities, and vacation cabins.

In doing so, the program spent over \$295,663 to accomplish 47 contracts for maintenance and repair to recreational facilities. Also, about \$102,000 was spent on labor and materials to maintain and repair camp pads, picnic areas, and shower buildings.

Fifteen (15) service-run concessions generated \$1,150,000 in revenue. Boat rentals, snackbars and campstores provide needed services to the park visitors and return a profit which assists with forest and park operations.

Throughout the year, the Forest, Park and Wildlife Service hosts numerous events including: Crosscountry ski races, Easter egg hunts, maple syrup demonstrations, canoe and backpack trips, as well as various programs for campers. In FY 88, several programs stand out including: both a residential and day camp for Baltimore City children, a Junior Ranger program for all children ages 7-13, a "Time Out" program for families with small children, and a Water Festival held over several weekends at Greenbrier State Park with special efforts to accommodate the disabled. For the first time, a trail runner was hired to be on the Appalachian Trail in Maryland to talk with and assist hikers. All programs in parks were given additional publicity with the publication of "Park Line", a quarterly newsletter focusing on park activities and available to all park visitors.

Also, over 10,000 people enjoyed the 1988 Maryland Canoe/Kayak Classic Whitewater Race at Savage River State Forest. The event involved a variety of DNR agencies working in conjunction

with the private organization, Whitewater, Inc. The Maryland Forest, Park and Wildlife Service provided assistance in site planning and preparation and served as the lead agency for internal security and operations.

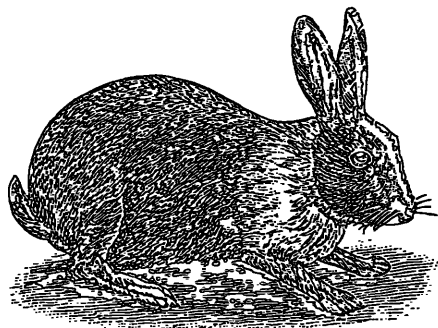
In 1987, rangers of the Maryland Forest, Park and Wildlife Service made over 3,000 criminal arrests and issued more than 3,000 traffic citations. Rangers wrote 5,447 incident reports which documented 1,175 assistance reports, 6 battered spouse cases, 40 assaults, 12 breaking and enterings, 171 disorderly

conduct incidents, 71 drug cases, 34 DWI arrests, 237 thefts, 138 missing persons, 3 rapes, over 1,1000 DNR cases, 53 rescues, 35 sex offenses, 558 vandalisms, and 231 cases involving weapons.

Over 143,821 acres of state forest and park land is open to public hunting. Wye Island Natural Resources Management Area and Tuckahoe State Park provide public goose hunting on a managed basis. Both of these areas are very popular with the hunting public.

FOREST AND PARK USE 1987 ATTENDANCE

Pocomoke State Forest	76,646
Green Ridge State Forest	276,187
Potomac/Garrett State Forests	125,855
Savage River State Forest	134,549
Assateague State Park	1,071,528
Big Run State Park	14,062
Calvert Cliffs State Park	96,828
Cedarville State Forest	62,815
Choptank River Fishing Pier	51,561
Cunningham Falls State Park	717,826
Dans Mountain State Park	74,540
Deep Creek Lake State Park	122,908
Elk Neck State Park	428,023
Fort Frederick State Park	106,479
Gambrill State Park	463,887
Gathland State Park	61,353
Greenbrier State Park	175,270
Gunpowder Falls State Park	875,259
Herrington Manor State Park	78,619
Janes Island State Park	162,786
Jonas Green State Park	29,410
Martinak State Park	50,952
Matapeake State Park	50,746
New Germany State Park	39,681
Patapsco Valley State Park	807,978
Patuxent River State Park	2,529
Pocomoke River State Park	237,157
Point Lookout State Park	364,759
Rocks State Park	132,552
Rocky Gap State Park	306,978
St. Mary's River State Park	11,893
Sandy Point State Park	580,266
Seneca Creek State Park	136,933
Severn Run NEA	20,948
Smallwood State Park	159,342
Soldiers Delight State Park	54,586
South Mountain State Park	81,643
Susquehanna State Park	132,510
Swallow Falls State Park	103,346
Tuckahoe State Park	73,678
Washington Monument State Park	70,782
Wye Oak State Park	20,878
TOTAL	8,646,528



Every year fee waivers or fee reductions for entrance to state parks are given to over 100 youth groups, non-profit organizations, and therapeutic recreation groups for weekday activities. The parks also provide free entry to senior citizens and disabled individuals.

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

State forest management continued to be influenced by the invasion of the Southern Pine Bark Beetle on Pocomoke State Forest and the Gypsy Moth on the Savage River, Green Ridge, and Potomac-Garret State Forests. Even so, the forests are example of multi-resource management which produce opportunities for auto touring, nature study, photography, riding, cycling, backpacking, climbing, skiing, fishing, hunting, whitewater racing, and snowmobiling while providing fiber and jobs for industry and income to the State.

WILDLIFE MANAGEMENT PROGRAM

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

The wildlife program manages wildlife for the benefit of both consumptive (hunters) and non-consumptive (bird-watchers, nature enthusiasts, etc.) users. More than 3 million dollars were generated to support the program from the sale of 171,209 hunting licenses and various stamps. Five wildlife management programs and the field services section develop and implement the program's operations. A reorganization of staff programs during FY 88 allowed the creation of one program exclusively devoted to habitat management.

Furbearer/Upland Game Program

This program actively manages 14 species of furbearers open to legal taking, as well as one monitored with a closed

season. Furbearer pelt sales fluctuate due to world market conditions but generally hit the 3 million dollar mark annually while providing a minimum of 550,000 man-days of recreation. Three species of upland game are actively managed, providing over 400,000 man-days of consumptive use. Both groups contribute significantly to non-consumptive enjoyment of wildlife in Maryland.

Radio telemetry studies on bobcats in Garrett County and ring-necked pheasants in Carroll and Frederick Counties are continuing successfully. The cat study is designed to provide an estimate of population density for this elusive predator. The goal of the pheasant research is to examine the nestling ecology of these birds, especially in relation to winter habitat.

This program continues to monitor the influx into Maryland by the Eastern coyote. Coyotes were rare or absent east of the Mississippi River in 1890. They since have invaded every eastern state and Canadian province except Maryland and Delaware. It appears the inevitable invasion into our state has started as animals are being reported with some frequency in most Maryland counties bordering Pennsylvania. The Eastern coyote differs from its western cousin in that it has picked up genetic material from both wolves and domestic dogs during its range expansion through the East, rendering it larger and more variably colored than its western counterpart.

Initial findings resulting from the 14-year study at Millington Wildlife Management Area were presented to the Southern States Small Game Workshop. The study compared quail and rabbit population responses to changing farming practices.

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

Non-Game and Endangered Species Program

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

Maryland's bald eagle population continued to increase again in FY 88. For

the third consecutive year, over 100 young eagles were produced in the state. In FY 88, 95 pairs of eagles nested, producing 135 young.

Ten eagles, 6 bald and 4 golden, were found dead in Dorchester County as a result of poisonings. Investigations by the U.S. Fish and Wildlife Service and the State are still in progress.

Six pairs of peregrine falcons nested successfully in the state this year. Sixteen young were produced. A new pair was observed at the Governor Nice Memorial Bridge, but no evidence of nesting was found.

Intensive monitoring of our colonial nesting waterbirds continued in FY 88. Colonial nesting waterbirds are those species which nest collectively in groups called colonies, and include herons, egrets, gulls and terns. Foraging studies of black skimmers was continued.

Habitat protection projects for bald eagles, colonial waterbirds, and forest interior breeding birds were undertaken through the Critical Area Program.

Forest Wildlife Program

The Forest Wildlife Program is responsible for management of the following wildlife species: Eastern wild turkey, white-tailed deer, sika deer, black bear, ruffed grouse, gray squirrel, Eastern fox squirrel and red (Piney) squirrel. These species provide more than 1.3 million man days of hunting recreation and an unknown number of hours of visual enjoyment.

Maryland's 124,500 deer hunters harvested a record 26,768 during the 1987-88 deer season. Turkey hunters also set a new record by harvesting 580 birds in the fall and 1,018 birds in the spring.

One hundred five turkeys were relocated into unoccupied areas in four more counties; Baltimore, Howard, Caroline, and Talbot. All releases of wild trapped birds from past years have done well with reproduction reported in all areas.

Investigations are conducted annually on population parameters and mortality rates of deer and turkeys. Population trends and hunters use of all forest wildlife species are monitored each year. A mortality and movement study of sika deer was initiated in Dorchester County.

An intensive effort to determine an estimated population, distribution, habitat preference and reproductive potential of the Garrett County bear population was initiated in spring of 1987. Fifteen individual bears, nine males and six females, were trapped and tagged. All six females were fitted with radio collars to facilitate locating winter dens. During March, winter den sites were located and reproductive information was documented.

Wildlife Habitat Program

The purpose of the Wildlife Habitat Program is to coordinate the many land management activities in Maryland that affect wildlife.

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

Plans are formulated and are updated periodically to promote a broad spectrum of wildlife species and to ensure that requirements of all wildlife species are included in the plans.

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

Migratory Bird Program

The migratory bird program is responsible for the management of eight species of dabbling ducks, eleven of diving ducks, five of seaducks, three of geese, two of swans, and the American coot. In addition to these waterfowl, the program is also responsible for the Common Moorhen, six species of Rails, Snipes, Common Crow, Mourning Dove and the American Woodcock.

The Atlantic Flyway has completed the neck collaring portion of the Canada Goose project. Field observations of marked birds have continued, though, providing important information on movements, survival, and social groupings on the wintering grounds. This information has played a critical role in adjusting seasons for 1988-89. Further restrictions in harvest regulations were

proposed to reverse the decline of wintering Canada geese in Maryland. In 1981, it was estimated that over 600,000 birds, wintered here, while in 1987-88 that number dropped below 377,000. The data indicates mortality rates which exceed those necessary for a stable population. Data also show that most birds wintering in Maryland have a great deal of fidelity to the area and that only a small portion of state population declines can be attributed to short-stopping. Other surveys conducted included resident Canada geese, aerial mid-winter waterfowl surveys, aerial and ground breeding waterfowl, mourning dove, and woodcock surveys. Past season trapping efforts focused on Canvasbacks, Black ducks and Canada geese in order to develop population dynamics data for these important species.

The Submerged Aquatic Vegetation survey was again conducted on the Maryland portion of the Chesapeake Bay. Over 600 stations were checked.

Maryland Waterfowl Stamp funds are being used on a matching basis with Ducks Unlimited M.A.R.S.H. funds for habitat improvement projects. Projects included are a 400 acre impoundment on Fishing Bay Wildlife Management Area, a 40 acre impoundment at Idylwild Wildlife Management Area, construction and placing of 500 wood duck boxes on public land. Program staff also provided oversight for the replacement of water control structures at Deal Island impoundment on Deal Island Wildlife Management Area. One hundred and seventy five acres of phragmites infesting marshes were controlled to restore native vegetation on public land. Approximately 28,000 7-week old game farm mallards were released throughout the State in high quality brood habitat. A sample of these birds were banded to monitor harvest rates and distribution.

Wildlife Field Services

The Wildlife Field Services section provides the hands-on work for implementing studies and surveys, maintaining the state's 37 wildlife management areas and disseminating information to Maryland residents. Duties range from monitoring bears to ear-tagging rabbits. Turkey, pheasant, quail and osprey have been trapped and relocated to unoccupied habitat. Much effort is spent improving wildlife habitat on management areas.

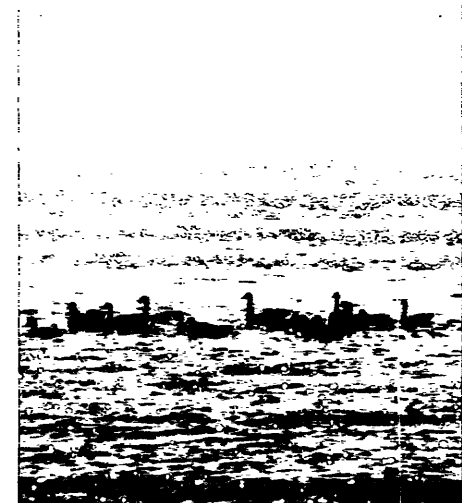
The wildlife management areas, with more than 83,123 acres scheduled for acquisition and 104,138 now in possession, are used heavily by hunters and nature-observers.

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

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

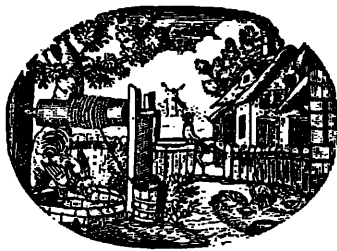
Other callers request information on how to improve wildlife habitat on their property. Field services staff also make presentations to conservation, civic and youth groups.

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



Canada Geese, Cook Point





MARYLAND ENVIRONMENTAL SERVICE

. . . . services in areas of water supply, wastewater treatment, and solid and hazardous waste management

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, MES has been providing a wide range of services in the areas of water supply, wastewater treatment, and solid and hazardous waste management. These services are offered to state government, municipalities, county governments, and the private sector.

MES was created in response to a need for the State of Maryland to offer planning, finance, construction, operating, management, and engineering services to the State's smaller communities and industries, many of whom would otherwise have difficulties in complying with state and federal EPA requirements and in developing and operating water and wastewater treatment facilities.

State general funds pay the cost of operating state-owned water supply and wastewater treatment facilities for parks, hospitals, and correctional institutions. The agency is essentially self-supporting, with its income derived from fees paid by state agencies, local governments and private enterprise.

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

The corporate affairs of MES are managed by a seven-member Board of Directors appointed by the Secretary of Natural Resources with the approval of the Governor.

ADMINISTRATION AND FINANCE

This division is responsible for setting the overall policies and goals of the Maryland Environmental Service and for the Agency's own support functions — including personnel, purchasing, data processing, budgets, finance, accounting, public information, marketing and legal services. The Maryland Environmental Service's Board of Directors is also part of this division.

In FY 88, George B. Perdikakis was named

Director of the Maryland Environmental Service. Perdikakis, who has extensive experience in local government, succeeds John D. Seyffert who had been Director since 1983.

A reorganization was initiated at MES. Executive Direction is now being administered under three divisions: Administration and Finance, Engineering Services, and Operations and Maintenance.

A uniform project numbering system was established in conjunction with the MES reorganization, and the state and corporate payrolls were synchronized.

ENGINEERING SERVICES

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

Solid Waste Management

In March, 1988, MES entered into a contract with Caroline, Queen Anne's, and Talbot counties as developer and operator of a new regional solid waste landfill. This landfill will relieve the capacity and operational limitations at several existing county landfills. MES also entered into a contract with Garrett County to assist in the closure of the Round Glade Landfill and in the development of a new landfill.

Dredged Material Management

In FY 88, Engineering Services continued to operate and maintain the Hart-Miller Island Dredged Material Containment Facility, the designated disposal site for the 50 million cubic yards of dredged material associated with the deepening of the Baltimore Harbor shipping channels. At the end of FY 88, this facility had received over 33 million cubic yards of dredged material.

Composting and Organic Products

In Montgomery County, MES continued to

operate the leaf composting facility near Dickerson. Nearly 70,000 cubic yards of leaves were received at the Dickerson Facility in FY 88. All of the compost product derived from these leaves was sold by MES. MES is currently conducting pilot studies for composting other yard wastes (grass & brush), in cooperation with Montgomery County, for further expansion of the sites composting operations.

FY 88 was a successful year for the sale of MES organic products, ComPRO[®] and Maryland Environmental Services Leaf Compost. The demand for both products far exceeded their supply. In FY 88, 39,123 cubic yards of ComPRO[®] and 10,864 cubic yards of leaf compost were sold.

Hazardous Waste Management

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

A remedial investigation and feasibility study was completed at the former Joppa Sand & Gravel Co. property in Harford County near Joppatowne. The study determined there were low levels of hazardous substances that needed to be capped. MES acquired approximately 60,000 cubic yards of earth in preparation for revegetation. In FY 89, the property will be graded and finished with ground cover and tree plantings. The site will ultimately become a passive use state park.

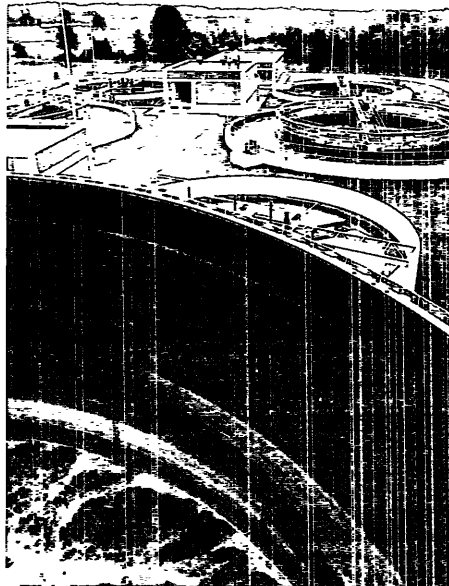
Sludge Management

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

Capital Improvement Program

MES is involved in an aggressive capital improvement program to upgrade all state-owned wastewater treatment and drinking water supply facilities. Construction of the \$13 million Dorsey Run Advanced Wastewater Treatment Facility is complete and in operation. MES is also the grantee and administrator of EPA Wastewater Grants. During the past year, two con-

struction projects progressed to start-up and operation. The two projects included new wastewater facilities at the University of Maryland Environmental and Estuarine Study Center at Horn Point, and extensive improvements to the wastewater treatment facilities at the Poplar Hill Pre-Release Unit in Wicomico County.



Dorsey Wastewater Treatment Plant

Water and Wastewater Treatment Facility Projects

MES entered into contract with the Town of Elkton to design and construct improvements to its wastewater treatment plant to correct chronic problems. With funding provided by the State, improvements to the Freedom District wastewater treatment plant were designed and constructed by MES staff allowing the wastewater treatment plant to comply with the advanced treatment of the new discharge permit.

Engineering conducted a complete evaluation of the Mattawoman wastewater treatment facility for the Charles County Department of Public Works. The final report was well received by the county and the recommendations made in the report were implemented. MES also conducted a complete evaluation of the Smith Island wastewater treatment facilities. This report was instrumental in the award of a State grant to the Somerset County Sanitary District for the repair and renovation of the facilities.

Technical Services

In the area of technical services, MES continued to coordinate activities under the Maryland Used Oil Recycling Program and provided information on where to deposit metals, paper, glass and other materials for recycling. The Maryland Recycling Directory was updated and distributed to encourage recycling and reduction in the quantities of solid waste needing disposal.

OPERATIONS AND MAINTENANCE

MES's Operations and Maintenance division employs licensed personnel to operate and maintain 106 wastewater and water treatment facilities across the state. Fifty-eight of these plants are state-owned, twenty-eight are owned by counties or towns, and twenty are privately owned.

In addition, the division inspects operations at the methane recovery facility at the Brown Station Road Landfill in Prince George's County, conducts twice-yearly inspections of water and wastewater facilities at 24 State parks, operates a solid waste incinerator on Smith Island, and manages the agency's safety program.

Wastewater and Water Treatment Facilities

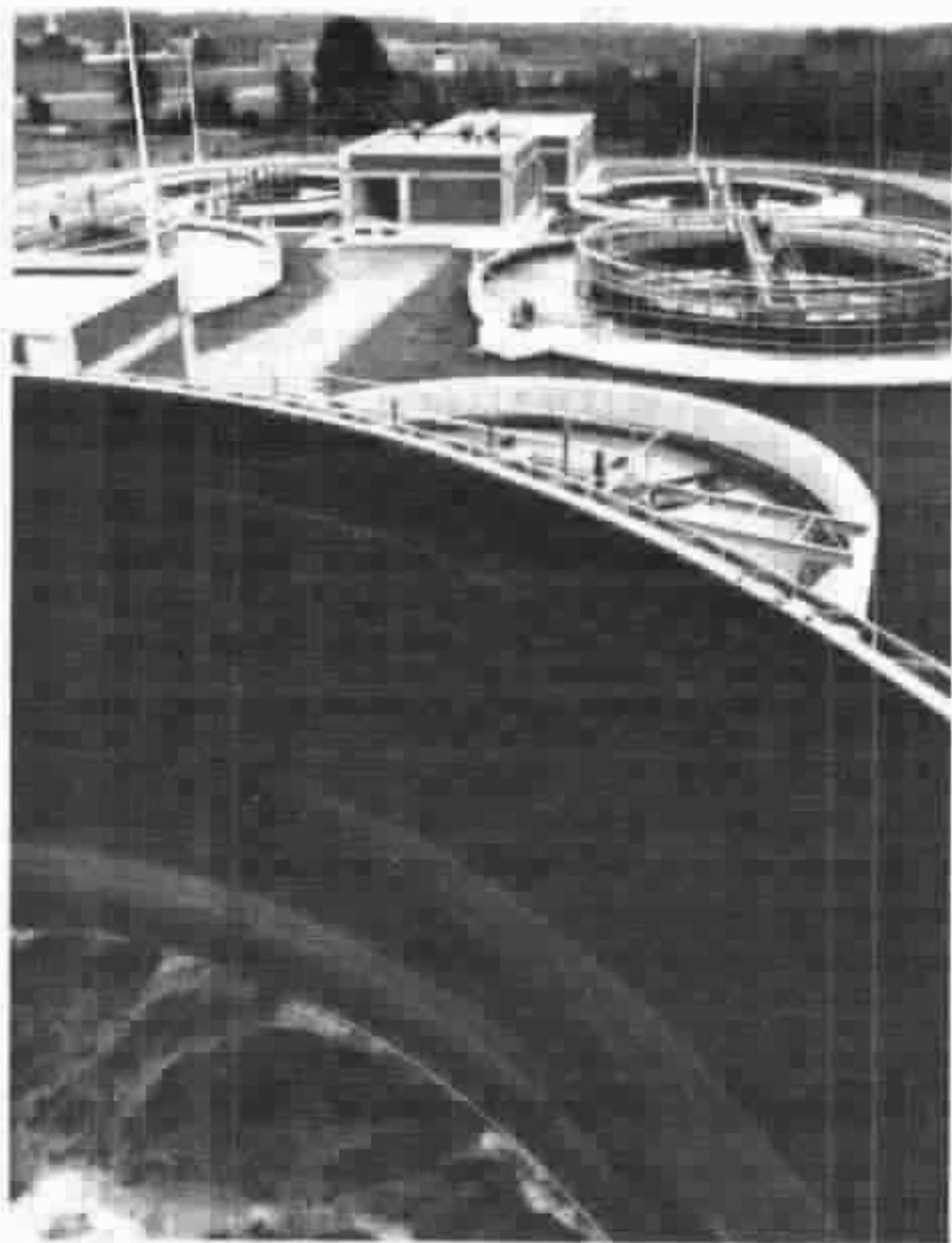
The division is responsible for operating, maintaining, and manning all state-owned wastewater and water treatment facilities. In addition, the division contracts to operate, maintain and manage water and wastewater treatment plants belonging to counties, towns, private industries, and businesses.

Laboratory Services and Water Quality Control

In April, 1988, the Dorsey Run Laboratory started operations. This laboratory has state-of-the-art equipment for material analysis.

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

The section's sewage sludge management program met the new regulations governing sludge disposal at all MES operated facilities. Permits were ob-



tained and controlled for all wastewater facilities. In FY 88, over 15 new sludge permits were received, 15 NPDES permits and 2 Air Management Administration permits were obtained.

Maintenance Section

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

Operator Training

During FY 88, operators and supervisors received over 1,210 hours of training on a wide variety of subjects, including preventive maintenance, safety, laboratory procedures, process control, and use of specialized equipment.

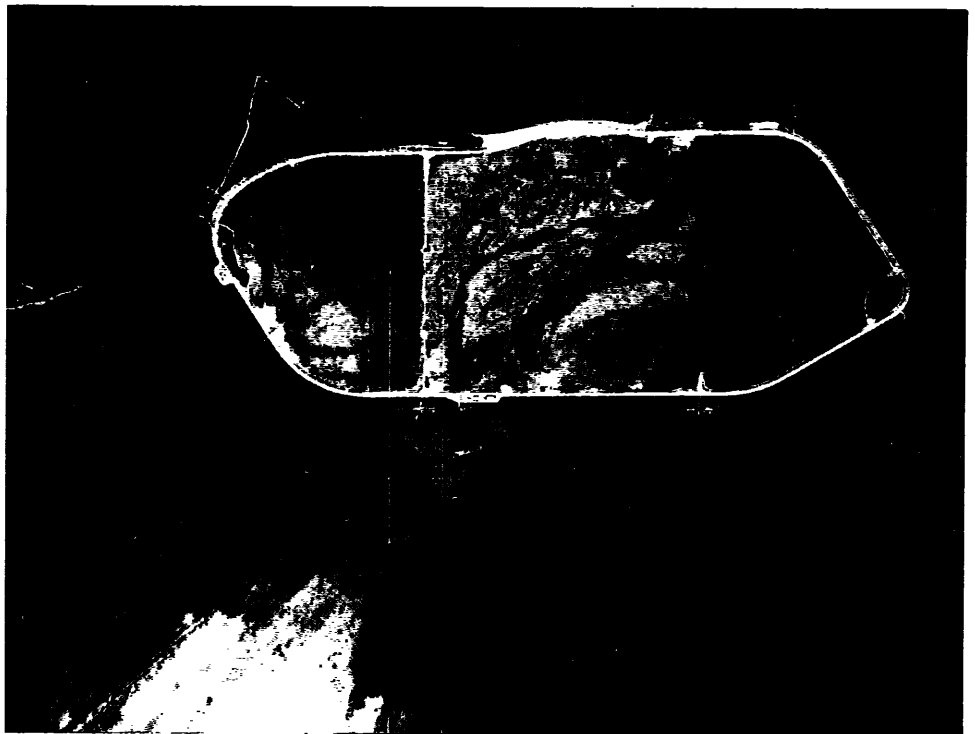
Apprenticeship Program

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

Special Projects

During FY 88, construction was completed on the new Dorsey Run Advanced Wastewater Treatment Facility, a \$14,000,000 project which began in April 1988. This plant includes nitrification/denitrification, phosphorous removal, and state-of-the-art sludge incinerator.

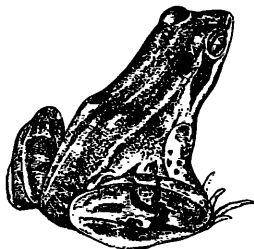
The division works with the Engineering Services division in an aggressive program of major capital improvements to state owned water and wastewater treatment facilities. These improvements will greatly increase the efficiency and reliability of many of the aging plants operated by MES.

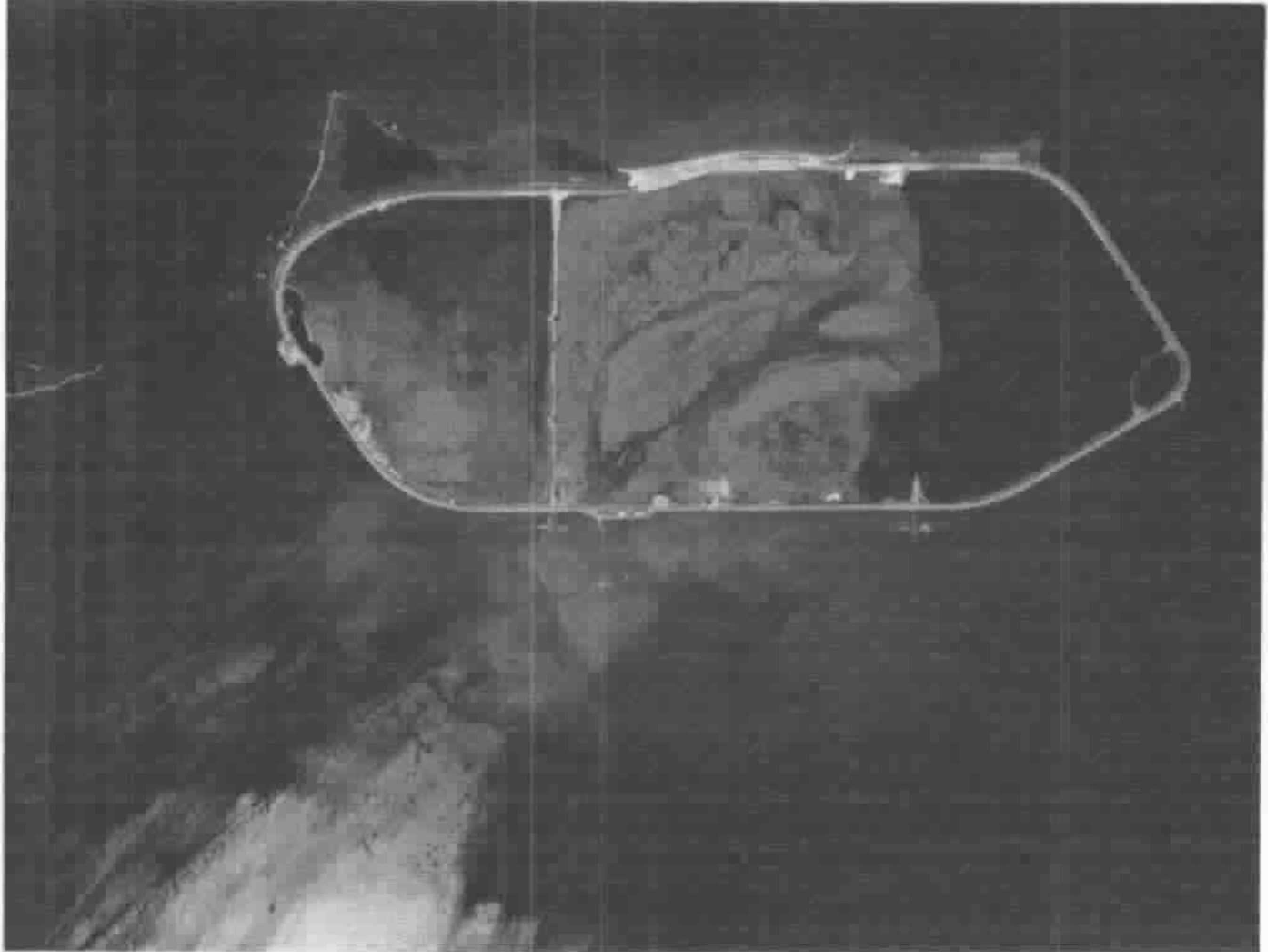


Located in the Chesapeake Bay at the mouth of Back River, the Hart - Miller Island Dredged Material Containment Facility represents a key element in Maryland's long range dredged material management plan.



Used oil collection center on Chinquapin Round Road in Annapolis.





MARYLAND USED
OIL COLLECTION
FACILITY



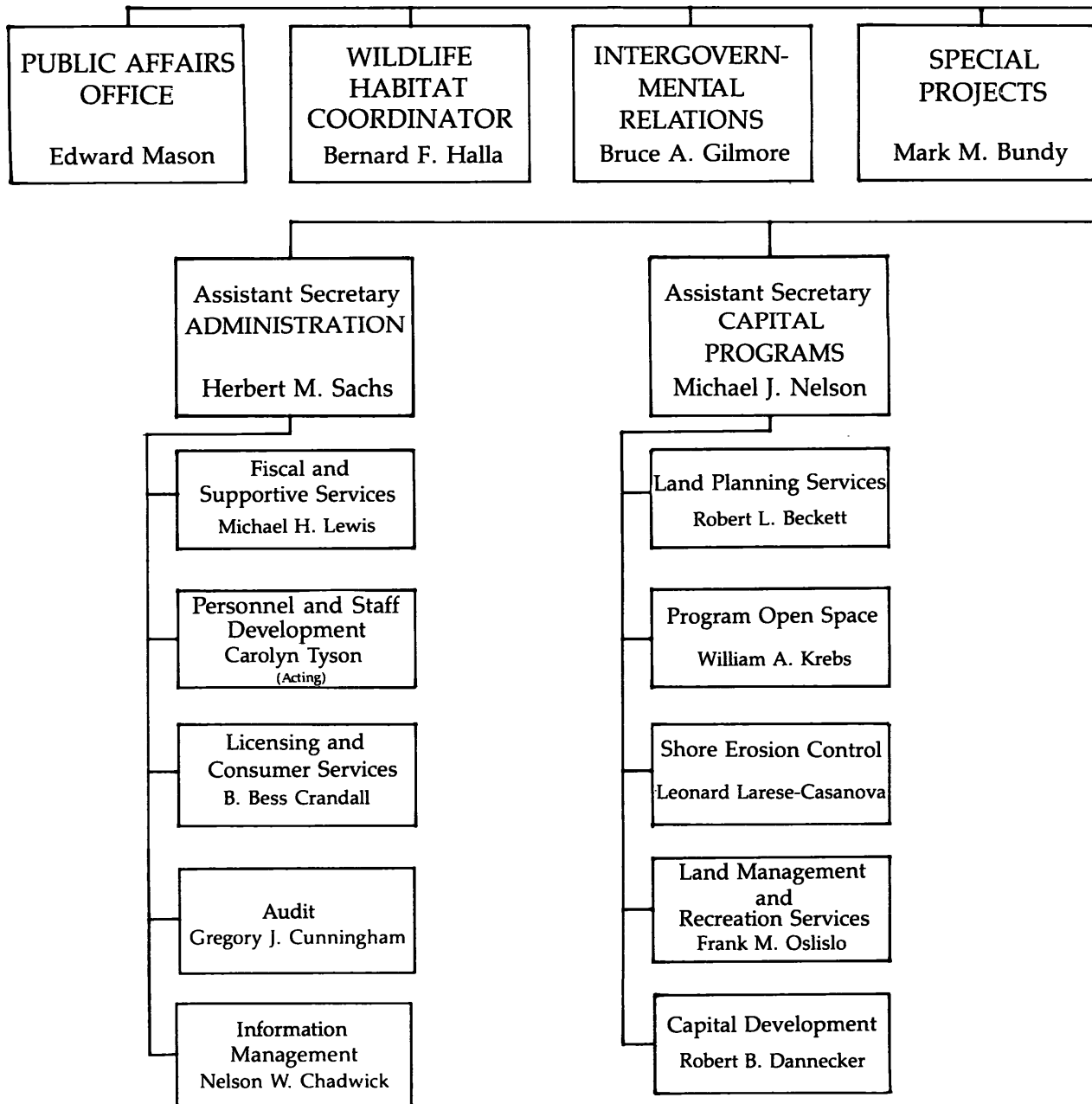
SAVE ENERGY
AND PROTECT YOUR
ENVIRONMENT

WA TE
OIL ONLY

CHART OF ORGANIZATION FISCAL YEAR 1988

SEC
TORRE

DEPUTY
John



SECRETARY
C. BROWN
D.

SECRETARY
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CHESAPEAKE
BAY
CRITICAL AREA
COMMISSION
Judge Solomon Liss

BOARD OF
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John W. Neumann

HEARING
EXAMINER
Judith Singleton

LEGAL
Thomas A. Deming

Assistant Secretary
NATURAL
RESOURCES
James W. Peck

Water Resources
Administration
James Dunmyer

Maryland
Geological Survey
Dr. Kenneth N. Weaver

Hazardous Waste
Facilities Siting Board
William M. Sloan

Power Plant
Research Program
Michael Hirschfield

Maryland
Environmental
Service
George G. Perdikakis

Assistant Secretary
NATURAL
RESOURCES
Verna E. Harrison

Tidewater
Administration
Paul O. Massicot

Forest, Park and
Wildlife Service
Donald E. MacLauchlan

Natural Resources
Police
Jack T. Taylor

Maryland
Environmental Trust
H. Grant Dehart



MARYLAND ENVIRONMENTAL TRUST

... to
conserve,
improve, and
perpetuate the
state's natural
scenic and
cultural qualities

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 sixteen 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 140 properties statewide encompassing approximately 26,000 acres valued at over \$36 million. Easements accepted by the Trust are reviewed and approved by the Board of Public Works prior to recordation.

The Trust received 145 easement inquiries in FY 88. A total of eleven easements covering 889 acres were documented, accepted and recorded in FY 88. Two of the easement properties are adjacent to prior easement sites. Three have frontage on Bay tributaries, one has a historic home, and seven have productive agricultural land. Approximately 80% of the FY 88 easement acreage is attributable to the Trust's Chesapeake Bay Initiative.

Easement highlights for the year included three easements which protect vital limestone aquifers in the Green Spring Valley that provide large quantities of drinking water for the Baltimore Metropolitan area. In addition to being an area of important geological significance, the valley is a Nationally Registered Historic District and all the easement sites are visible from public roads.

Also, in Baltimore County, an easement protects the stream valley of Beaverdam Run, provides wildlife habitat, and restricts any timbering on the property; another ease-

ment, in the Worthington Valley Historic District, adjoins four other MET easement sites and lies at the heart of an MET easement cluster of 1,125 acres.

In Harford County, an easement was donated on the historic site, called "Medical Hall", near Churchville. The original "Medical Hall" was the birthplace and home of John Archer, the first man to receive a medical degree in America (1768).

In Dorchester County, an easement was donated on a waterfront farm which teems with wildlife.

In Cecil County, an easement was donated on another waterfront farm along the Sassafras River. The property contains part of the Grove Neck Natural Heritage Area, a tidal marsh which provides extensive habitat for many nesting waterbirds and rare aquatic plants.

In addition, one 28 acre forested property was donated to the Trust, in fee, adjacent to Green Ridge State Forest in Allegany County.

Governor Schaefer, along with the "Keep Maryland Beautiful" Committee of the Trust, presented the Margaret Rosch Jones Award to the Sassafras River Community Council, Inc. during a ceremony proclaiming May 22-28 as "Keep Maryland Beautiful Week." Also the Governor, and the KMB Committee, awarded two environmental education mini-grants.

This year's mini-grant recipients were the Perry Hall High School and the Rachel Carson Council, Inc.

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

Goals

Accelerate easement outreach and solicitation efforts, particularly in the Chesapeake Bay area.

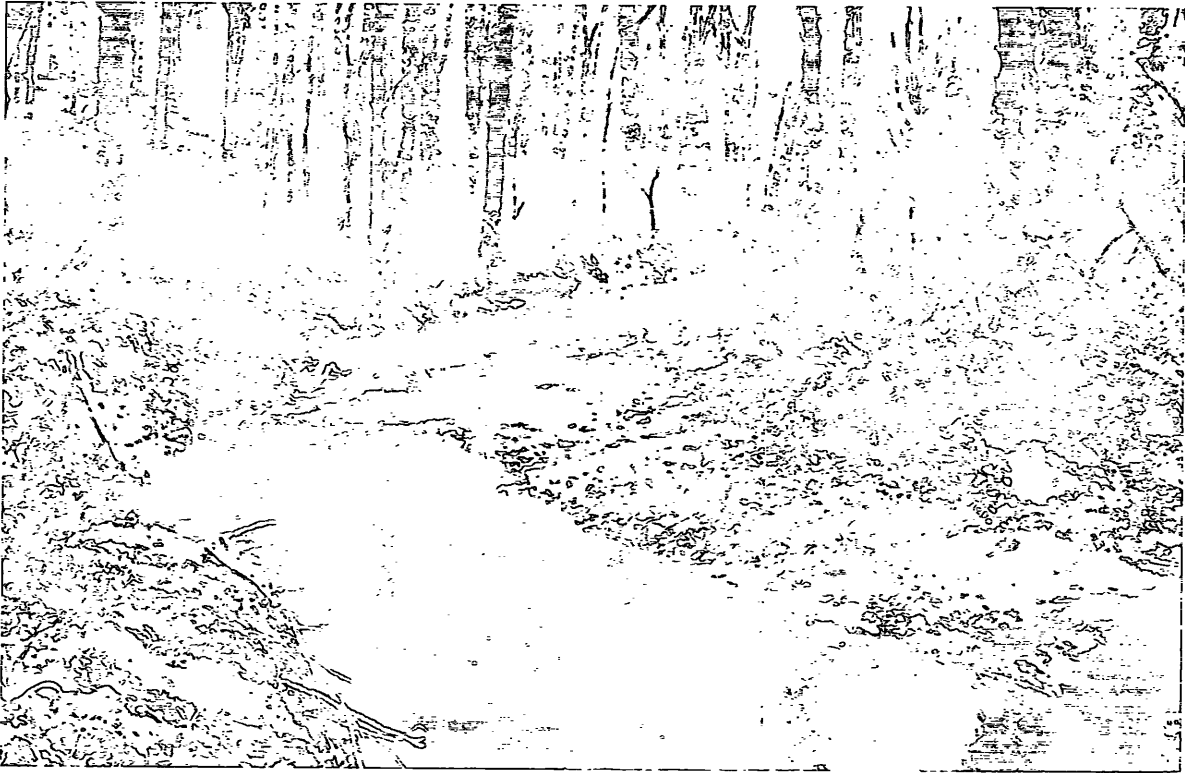
Implement a local Conservation Easement Program for joint local land trust—MET acceptance of easements, in cooperation

with the Chesapeake Bay Foundation and the Coastal Resources Division.

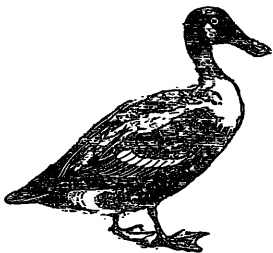
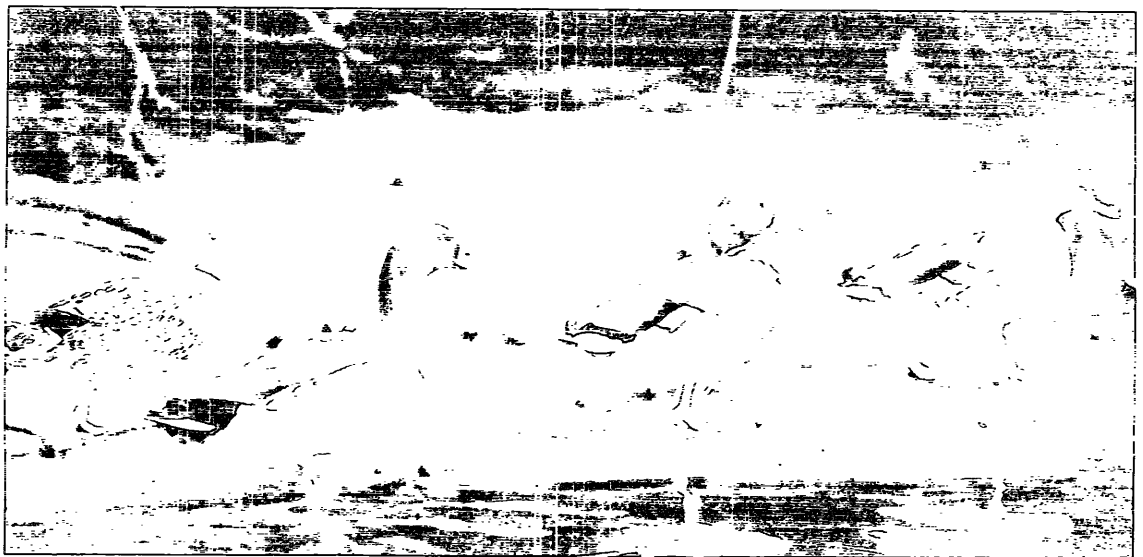
Revise and update brochures and MET land preservation booklets to reflect new state laws and incentives, to address changes in federal tax laws and regulations, and to compare MET's easement program with other state easement programs for the benefit of property owners.

Work with the National Coalition for Scenic Beauty and other groups to conduct a conference on scenic landscapes in Maryland.

Initiate and implement a program for protecting the rural setting for rural historic villages, in cooperation with the Maryland Historical Trust, and the Maryland Agricultural Land Preservation Foundation.

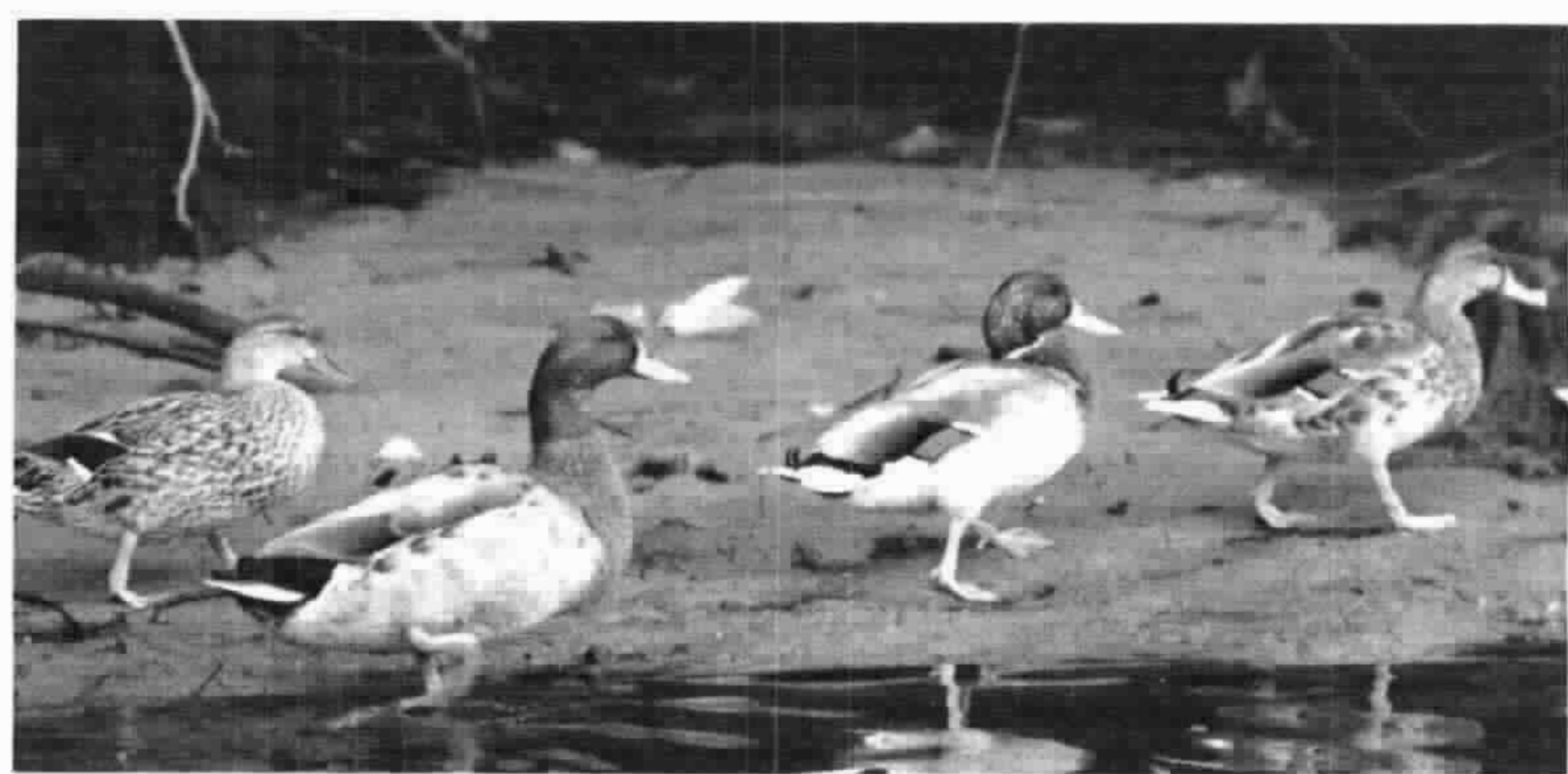


MET easement site in Baltimore County along Beaver Dam Run.



Mallards on Pocomoke River Shore - photo courtesy Maryland Public Television







MARYLAND GEOLOGICAL SURVEY

. . . . studies the geology, archeology, and water and mineral resources of the state applies this research to practical earth science problems

GENERAL DIRECTION

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

Survey publications are the primary means of providing information to the public. Geological and archeological exhibits at schools, state parks, and public events are also used to inform the public of Survey activities.

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

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

During FY 88, the Survey published the following technical reports, maps and pamphlets:

Radiocarbon Dating of Archeological Samples from Maryland, Hettie L. Boyce, Lori A. Frye (Archeological Studies #4).

Ground Water Levels from the Maryland Observation Well Network, Michael J. Smigaj, Raymond G. Davis, Jr. (Basic Data Report #17).

Reprint of *Miocene Fossils of Maryland*, (Bulletin #20).

Head of Chesapeake Bay Map (CBESS Atlas #1), *Approaches to Baltimore Harbor Map* (CBESS Atlas #2), Robert H. Cuthbertson.

The Mineral Industry of Maryland in 1985, William A. Bonin (Information Circular #44).

Directory of Mineral Producers in Maryland (1986), James R. Brooks (Information Circular #45).

Summary of Hydrogeologic Data from a Test Well (1725) Drilled in Tuckahoe State Park, Queen Anne's County, Maryland, David C. Andreasen, Harry J. Hansen (Open File Report #87-2-3).

Loran-C Calibration in Chesapeake Bay, Jeffrey P. Halka (Report of Investigation #47).

Reprint of *Radon and Your Home*, James R. Brooks (pamphlet).

Reprint of *Miocene Plates* (Systematic Report).

Reprint of *Calvert Cliffs and Miocene Sharks Teeth of Calvert County*, Jeanne D. McLennan (pamphlets).

Reprint of *The Building Stones of Maryland*, Karen R. Kuff, James R. Brooks (pamphlet).

Reprint of *Gold in Maryland*, Karen R. Kuff (pamphlet).

Topographic Maps of Garrett and Queen Anne's Counties, David K. Brezinski.

Reprint of *Earthquakes and Maryland*, James P. Reger (pamphlet).

List of Publications.

HYDROGEOLOGY AND HYDROLOGY

Projects of this 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. Staffs of both Surveys participate in project activities.

This program is responsible for the maintenance of a statewide water-data network and the investigation of the hydrologic and geologic characteristics of Maryland's water resources. The water-data network provides information on minimum, maximum, and average streamflows 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 88, investigations were underway in areas of Anne Arundel, Calvert, Carroll, Charles, Garrett, Harford, Howard, Queen Anne's, Somerset, Washington, and Worcester Counties.

Streamflow Gaging Network

During the year, the U.S. Geological Survey maintained 86 continuous-record stream-gaging stations, including 14 quality-of-water sites, and 5 sediment sites. In addition, 21 low-flow stations were operated. Data from these stations for the 1987 water year were compiled and published in "Water Resources Data for Maryland and Delaware," U.S. Geological Survey Water-Data Report MD-DE-87-1.

In FY 88, a special 2 ½ year project was initiated to develop improved estimates of low flow for gaged and un-gaged sites using a newly developed statistical technique.

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. Of the 167 observation wells monitored in the network, 3 are located in the Appalachian Plateau, 8 in the Valley and Ridge, 2—Blue Ridge, 19—Piedmont, 65—Coastal Plain Western Shore, and 70—Coastal Plain Eastern Shore.

During FY 88, Maryland Geological Survey Basic Data Report #17 was printed. It contains hydrographs and water-level tables of the state network wells for the period 1943 to 1986.

In FY 88, 12 observation wells in Southern Maryland were selected to monitor the effects on ambient ground-water quality of non-point sources of pollution, such as road salt-

ing and agricultural chemicals. These wells represent the first segment of a statewide network that will be established over a five-year period in cooperation with the Department of the Environment.

Anne Arundel County (Glen Burnie Area)

During FY 88, a study of the lower Patapsco aquifer in the Glen Burnie area was completed. The purpose of the study was to quantify the effects that additional pumpage will have on ground-water levels, streamflow, and brackish-water encroachment in Sawmill Creek and Marley Creek basins. At year's end the report was in review. Arrangements were made with the Anne Arundel County Department of Utilities to continue the long-term monitoring of 31 observation wells and a gage on Sawmill Creek.

Also during the year, program staff participated in a test well project at the Arnold Water Treatment Plant to obtain data for the deep Patuxent and lower Patapsco aquifers.

Anne Arundel County (Annapolis and Broadneck Areas)

A new four-year cooperative ground-water project was initiated to study the Aquia and Magothy aquifers in the Annapolis Neck, Broadneck, and Mayo Peninsula areas. The objectives of this study are:

- Improve the definition of the hydrogeologic characteristics of the Aquia and Magothy aquifers in the project area.
- Determine the present extent of brackish-water intrusion into the aquifers by canvassing existing wells and test drilling.
- Establish a network of observation wells for monitoring future changes in water levels and chlorides.
- Evaluate, using aquifer modeling methods, the effect that future ground-water development schemes will have on the distribution and rate of movement of brackish-water intrusion.

Charles County (Waldorf Area)

In FY 88, a project was completed to

define the areal distribution and thickness of the Magothy and Patapsco aquifers, determine their hydrologic properties, estimate available quantities of water from them, and define their chemical quality. At year's end the report was in review.

Current Status of County Water Resources Reports

- Frederick County (Bulletin #33), *Water Resources of Frederick County* was "in press" at year's end. Delivery of the printed book is expected in early FY 89.
- Cecil County (Bulletin #34), *Water Resources of Cecil County* was in the final stages of review. Publication is expected in late FY 89.
- Washington County—The field work for this project was completed and the bulletin is currently in preparation. Basic Data Report #18, containing well records, streamflow data, and water-quality analyses compiled during this project, was completed in FY 88 and is nearing publication.
- Somerset County—The field work for this project was completed and the first draft of the report was nearing completion at year's end.
- Howard County—This was the first year of a four-year project to study the characteristics and rates of replenishment of the ground and surface-water resources of the county. During the year emphasis was placed on data collection, such as establishing an observation well network and identifying stream-measuring sites.

Harford County (Coastal Plain Area)

During the second year of the project 16 test wells at 9 Coastal Plain sites were completed. At each site hydrogeologic data were collected, including geophysical logs, core samples, and pumping test data. Water samples were collected for analyses of major ions, trace metals, and selected organic chemicals. Two seepage runs were performed in which discharge was measured at 21 sites, on 7 major streams, to identify gaining and losing reaches. In addition, continuous stream gages were operated at 2 sites on Cranberry Run.

Queen Anne's County (Kent Island Area)

A report discussing the *Hydrogeology, Brackish-Water Occurrence and Simulation of Flow and Brackish-Water Movement in the Aquia Aquifer in the Kent Island Area, Maryland* was completed and is currently being prepared for publication. It discusses the results of a 3 ½ year study undertaken to evaluate the distribution and rates of movement of brackish-water in the Aquia aquifer, a major source of water for Kent Island. A ground-water model of the Aquia aquifer was used to simulate the movement of brackish-water under present and future pumpage conditions.

Arrangements were made to continue data collection from 34 observation wells in order to monitor long-term changes in water levels and chloride concentrations.

Stormwater Infiltration

As part of the effort to "clean up" Chesapeake Bay, stormwater runoff, from parking lots and shopping malls, is being diverted into infiltration basins. Such practices should increase recharge to the water table, but the effects upon 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 complete at infiltration basins located at the Annapolis Plaza Mall, the North Carroll Shopping Plaza near Greenmount, and at a porous pavement park and ride site near Prince Frederick. During FY 88 runoff, soil-water, and ground-water samples from these geologically diverse sites were analyzed to assess the impact of stormwater infiltration on ground-water quality.

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



The traveling exhibit on Maryland archeology has attracted attention in all sections of the state.

City. A report that will include graphical displays of these data will be issued in early FY 89.

Other Active Projects

During the year, the effect of ground-water pumpage on water levels in the vicinity of three Southern Maryland power plants, Calvert Cliffs, Chalk Point, and Morgantown was monitored. In the spring and fall of each year, several hundred wells are measured and synoptic water-level maps prepared for the Aquia and Magothy aquifers. Project activities are carried out in cooperation with the Power Plant Research Program. Open File Report #88-02-4, *Selected Geohydrologic Characteristics of the Patapsco Aquifers at Chalk Point, Prince George's County* was issued during the year.

The effects of deep mining on the hydrology and water quality is being investigated at the Mettiki Coal Mine in southwestern 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. In FY 88, an additional nine observation wells, at two sites, were constructed to monitor ground-water level changes caused by

the expansion of the mine northward into MacMillan Branch basin. Report of Investigations #41-A was "in press" at year's end. This report presents hydrologic and mining data collected during the period 1981 to 1985.

During FY 88 over 100 hydrogeologic inquiries from private individuals, consultants, and other state and federal agencies were handled by Program staff.

ENVIRONMENTAL GEOLOGY AND MINERAL RESOURCES

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

Geologic Mapping

Geologic mapping in FY 88 was focused in central and western Maryland. Maps were completed at 1:24,000 scale for the Flintstone, Manchester, and Lonaconing Quadrangles, while field work continued in the Oldtown, Smithsburg, Keedysville, Littlestown, Barton, Taneytown, Emmitsburg, Cumberland and Westernport Quadrangles. Geologic maps of Caroline and Calvert Counties are ready for press.

Topographic Mapping

Completed maps are ready for publication for Allegany, Kent, and Harford Counties, whereas those for Carroll and Prince George's Counties remain works in progress. The Queen Anne's County topographic map was published during FY 88.

Other Studies

Manuscript maps depicting land use constraints and physiography at 1:62,500 for Charles and St. Mary's Counties are complete and ready for the printer. A similar set for Calvert County is in preparation.

A cooperative effort by Maryland Geological Survey and the park staff at Calvert Cliffs State Park has resulted in a geologic and paleontologic display panel placed at the Bay beach within the park.

RECOI



The program applied for and received a grant from the Minerals Management Service of the U.S. Department of the Interior to help define the mineral resources of the Maryland portion of the inner continental shelf and to develop a data base with which to integrate data into the regional study being conducted by adjacent states. The sand portions of 29 vibracore samples have been processed to remove the heavy-mineral fraction and the heavy minerals are currently being identified.

Sideling Hill Geologic Exhibit

Geologic information and consultation has been provided throughout the year on an as-needed basis to the team of consultants in charge of establishing geologic exhibits at the Sideling Hill Tourist Center and Rest Stop in Washington County, six miles west of Hancock. Construction has been delayed for approximately one year due to contractual problems, and is now scheduled for completion during the summer of 1990.

National Cartographic Information Center (NCIC)

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

Oil and Gas

Production of natural gas continued from 8 wells in two gas fields in Garrett County. Negotiations were still underway between the Board of Public Works and the federal government to lease a few jointly-held tracts in the western portion of the state.

The Maryland General Assembly passed three laws in this session concerning oil and gas: The first prohibited drilling in Chesapeake Bay and its tributaries; the second established restrictions to the leasing of state lands; and the third updated existing oil and gas laws.

No oil wells were drilled on the federal Mid-Atlantic Outer Continental Shelf in FY 88. Plans for Lease Sale #121, covering the mid-Atlantic area, are progressing as part of the five-year leasing program established by the Miner-

als Management Service of the U.S. Department of the Interior and are being monitored by the Survey.

COASTAL AND ESTUARINE GEOLOGY

Laboratory Facilities

Laboratory facilities were completed during FY 88 and have become fully operational. The facilities consist of seven separate laboratories: Sedimentology, Trace Chemistry, Wet Chemistry, X-ray, Petrology, Geophysics and Archeology. These laboratories provide the technical support for research and monitoring activities conducted within Maryland Geological Survey.

Beach Studies Along Ocean City and Assateague Island

The Program continued to profile the beach at Ocean City at seventeen locations, many of which have been surveyed semi-annually since 1972. The most recent profiles were completed in May just prior to the onset of beach nourishment activities. These profiles provide data for comparative studies to assess beach changes related to the Ocean City Beach Replenishment Project.

Geochemistry

The Geochemistry group is pursuing two major research avenues: natural gas generation in Bay sediments and its effects on the environment, and the water quality history of the Bay. In regard to natural gas generation, a gas map of the Bay has been completed from seismic work. Gassy sediments show major differences in bulk chemistry when compared to non-gassy sediments. The water quality history of the Bay is being examined in the sedimentary record. Several research groups (Johns Hopkins University and U.S. Geological Survey) have joined in the effort to understand the paleo-salinity of the Bay and the degree and extent of water column anoxia through time.

Geologic History of Chesapeake Bay

This cooperative study with the U.S. Geological Survey and the Virginia Institute of Marine Science continued for its fourth year. High resolution seismic records were obtained in July along nearly 500 kilometers of track lines using two systems simultaneously. Ana-

lyses indicate that two Chesapeake Bays existed prior to the present system. Each system developed in response to fluctuations in sea level during the Quaternary glaciations and left distinctive channel systems in the sedimentary record. Data collection is completed, and mapping and analyses of results are well underway.

Non-Energy Resources Project

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

Initial interpretation of the vibracores and seismic profiles have identified a major mud unit close to shore, a fluvial systems trending shore-parallel, and numerous tidal channels.

Hart-Miller Islands Monitoring

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

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

Dredged Sediment Monitoring

The sixth year investigative report on all distribution and fate of dredged sediment from the approach channel to the C&D Canal was published in January 1988. High-resolution acoustic surveying, in conjunction with the collection of sediment samples, successfully identified the extent and concentration of suspended sediments in the disposal plume, as well as the volume of the recently deposited dredged sediment on the Bay bottom. Monitoring activities conducted during a seven-month period subsequent to deposition determined that the volume of the deposited sediment was reduced between 33% and 50% as a result of both consolidation and resuspension processes. Data for this continuing effort have been collected for the seventh year.

Field Operations

The research vessel, *Discovery*, logged 1,069 operational hours of scientific investigations in the Chesapeake Bay and Atlantic Ocean in FY 88. The *Discovery* was used by the Maryland Geological Survey, Tidewater Administration, Maryland Department of the Environment, University of Maryland (Horn Point Laboratory) and the Severn River Planning Commission.

Chesapeake Appreciation Days and Tilghman Island Day were very successful in informing the public about the scientific investigations performed on board the *Discovery*. The highlight this year was a display of an underwater camera and a recorded videotape showing a sunken ship and the Bay bottom.

DIVISION OF ARCHEOLOGY

The archeology program is responsible for research in Maryland archeology, for coordinating professional and avocational archeological activities in the State, and for administering the permit system for archeological investigation on State lands. The Division maintains a large reference library on Maryland archeology, detailed records and maps on 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.

The Advisory Committee on Archeology, composed of five Maryland citizens who have skill and knowledge in archeology, counsels the Maryland Geological Survey on archeological matters. The Committee met in July 1987 and in January and April 1988 to review and make recommendations on the work of the Division of Archeology.

General Investigations

Archeological reconnaissance and limited test excavations on 980 acres of eleven DNR properties along the middle Patuxent River in Anne Arundel, Calvert, Charles, and Prince George's counties revealed 89 archeological sites ranging in age from 7000 B.C. to A.D. 1900. The findings and recommendations for management and development of the archeological resources are detailed in Division of Archeology File 219. Two of the newly identified prehistoric sites were subsequently investigated in advance of a proposed shore stabilization project at Milltown Landing in Prince George's County. One of these sites yielded a Middle Woodland (A.D. 200 to 800) trash pit containing shell-tempered pottery and turtle remains.

Field reconnaissance of two Garrett County parcels proposed as surplus

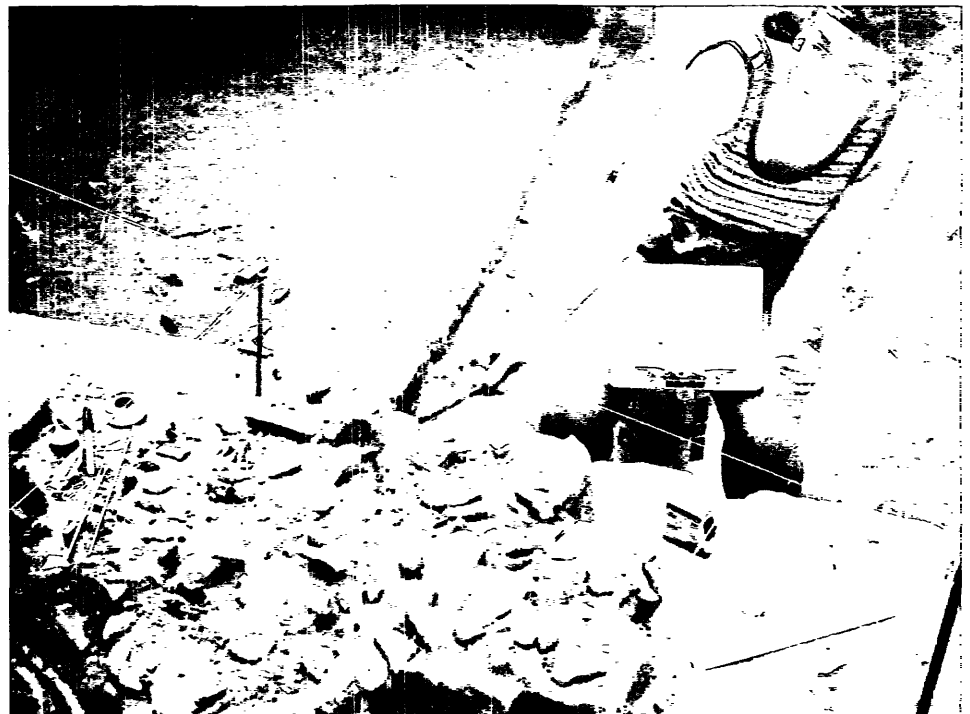
State land encountered an early roadbed (Braddock's?) and historic quarry pits; the investigation is detailed in Division of Archeology File Report 220.

Intensive archeological survey of the Black Marsh Natural Area, Baltimore County, was initiated near the end of FY 88. A comprehensive report will provide DNR with a preliminary inventory, assessment of significance, and management recommendations for archeological resources at Black Marsh.

More than 200 new sites were added to the Maryland Archeological Site Survey during FY 88, bringing the total number to 6,085 archeological sites known in Maryland. Computerization of the archeological site inventory is complete for western Maryland and most of the Eastern Shore.

Permits were issued for archeological field investigations on state lands at Historic St. Mary's City, Jefferson Patterson Park, and Deal Island Wildlife Management Area.

"Radiocarbon Dating of Archeological Samples from Maryland," MGS Archeological Studies 4, was received from the printer, and one issue of the Division of Archeology's newsletter, *"Current Maryland Archeology,"* was distributed.



Recording a prehistoric Indian hearth at the Higgins site in Anne Arundel County.



Highway Studies

Field reconnaissance studies designed to locate archeological sites in proposed highway alignments were completed for 15 projects under terms of the Geological Survey's cooperative agreement with the Maryland State Highway Administration. Intensive testing evaluated the importance of six archeological sites. At the Shoal Creek site near Cambridge, controlled surface collecting and mechanical test strips in areas of artifact concentration revealed prehistoric pottery and a wide range of projectile point and groundstone tool types indicating thousands of years of intermittent camping for the primary purpose of exploiting food resources in the adjacent marsh and estuary.

Testing of the Higgins site, location of the proposed new headquarters building for the Maryland State Railroad Administration near the Baltimore-Washington International Airport, revealed intact early prehistoric archeological deposits, including rock hearths, estimated to date between 7000 and 500 years B.C. More extensive excavations to be initiated early in FY 89 are expected to yield information on site organization, subsistence, food procurement, and lithic technology for the first time at such an early site in Maryland.

A practical application of archeology occurred in connection with the widening of Maryland Route 198 at Burtonsville, Montgomery County. The project had been redesigned to avoid the old Merson family cemetery, but less than three weeks before construction was scheduled to begin the State Highway Administration learned from the Merson heirs that a part of the cemetery with unmarked graves might extend into the project area. The Highway Administration requested assistance from the Division of Archeology, and the Merson heirs welcomed the prospect of an archeological investigation. Hand stripping in search of buried grave markers, followed by power machinery removal of top soil to expose subsurface disturbances was completed within a week. No graves were found in the proposed construction area, so work was able to begin on schedule to the satisfaction of everyone involved.

Public Outreach

Information leaflets on general Maryland archeology, prehistoric artifacts from Maryland, in-print published sources on Maryland archeology, and volunteer opportunities in Maryland archeology were widely distributed through various outlets including the Division's traveling exhibit, "Maryland Archeology: Journey through Time." The traveling exhibit was shown at eleven locations including all major sections of the State during FY 88.

The Division library served 49 researchers, and the laboratory was used by seven investigators during FY 88. Interns from Towson State University and volunteers assisted in the library, laboratory, and field. Division staff gave 19 lectures, served on various professional committees, held offices in professional organizations, published papers and reviews in outside journals, chaired conference programs, and edited an annual journal.

An informal open house for the Maryland archeological committee and interested citizens was hosted by the Division in May. Facility tours, lectures, slide and video shows, a flintknapping demonstration, artifact identification, and refreshments were enjoyed by 64 guests.

The Annual Field Session in Maryland Archeology traditionally held each spring in cooperation with the Archeological Society of Maryland Inc., was postponed from spring to fall 1988.



NATURAL RESOURCES POLICE FORCE

... specifically
charged with the
enforcement of
all Maryland's
natural resources
laws and
regulations

The Maryland Natural Resources Police Force celebrated its 120th anniversary in 1988 with a gala open house held at Sandy Point State Park. Many thousands of Maryland citizens had an opportunity to see exhibits and demonstrations of the many changes the NRP has undergone in its 120 year history. One of the oldest State Law Enforcement Agencies in the U.S., the Natural Resources Police, then known as the Maryland Oyster Police, began in 1868 utilizing sailing ships and decommissioned Civil War gunboats to combat the fleets of oyster pirates from other States who ventured into Maryland to raid the oyster beds. Frequent gun battles ensued over this valuable resource. Additional duties were added in 1874 to include enforcement of Maryland's waterfowl and fishing laws. In order to bring uniformity to the enforcement of the hunting and fishing laws, the Maryland State Game Wardens and Deputy State Game Wardens were formed in 1896. Many name changes and realignments within the State government system were made in the subsequent years culminating in the formation of the Natural Resources Police Force in 1972. As the primary enforcement arm of the Department of Natural Resources, the NRP has seen its duties and responsibilities grow throughout the years. With its commitment to ensure that the citizens of Maryland can safely enjoy the abundant natural resources of the State for generations to come, the NRP has adopted a program of enforcement, education and safety.

With an authorized strength of 225 sworn Officers and 13 Police Cadets, the Natural Resources Police are specifically charged with the enforcement of all the Natural Resource Laws and Regulations of the State. To enable them to fulfill this responsibility, NRP officers have full police authority and can exercise that authority anywhere in the State. A dedicated staff and numerous volunteers provide support in communications, administration, maintenance and education.

The Natural Resources Police Force is divided into two groups. Field Operations is responsible for the majority of the uniformed law enforcement activities around the State. Support Services provides investigative, communications, administrative, logistical, maintenance, and educational services to members of the Force and the public.

FIELD OPERATIONS

Field Operations is divided into four Regional jurisdictions covering the entire state. Each Region is under the command of a Captain who is responsible for all natural resources enforcement within that jurisdiction. Enforcement is divided into marine and inland specialties. All officers are cross trained and support each specialty.

Marine specialists in Field Operations utilize a wide variety of equipment to assist the working public. Both large and small boats are equipped for Search and Rescue, Fire-fighting, Emergency Medical Services and body recovery. Inland specialists, utilizing off road vehicles frequently respond to searches for missing persons or persons stranded or injured in some of Maryland's most remote country.

Information, Assistance and Emergency Responses

A total of 2,907 man-hours were expended on Emergency Responses. The Natural Resources Police handled over 122,000 telephone calls for services or information in FY 88. Of these calls, 15,139 were received in the officer's homes, 49,500 at Regional offices and 57,000 at the Annapolis Headquarters Communications Center. Not all requests were by telephone. The public visited officer's homes on 650 occasions and Regional offices on 4,112 occasions.

Enforcement and Protection

The Natural Resources Police officers assigned to Field Operations worked 298,338 man-hours which includes 22,279 man-hours of overtime in FY 88. These same officers drove 1,918,818 miles in vehicle patrol, operated patrol boats for a total of 60,741 man-hours, and spent 28,309 man-hours on foot patrol. Field operations personnel also spent 320 man-hours patrolling from the air. As a result of these law enforcement patrols, 7,571 citations and 10,834 warnings were issued for violations in FY 88.

SUPPORT SERVICES

Maintenance and Supply

Reports indicate that the contractual

In FY 88, Information Assistance and Emergency Responses totaled 1,468 including:

Disabled boats	168
Disabled vehicles	173
Emergency medical assists	31
Emergency transportation	30
Boats towed to port	607
Boats escorted to port	73
Boats freed from grounding	195
Pumped sinking boats	29
Firefighting	12
Rescue persons in boats	10
Rescue persons in water	32
Rescue persons stranded	11
Search for overdue boats	29
Search for missing persons	20
Search for accident/drowning victims	33

employees hired in FY 88 to relieve patrol boat crews of annual maintenance duties have worked well. All sections have been under a heavy workload due to increased demands for services. Preventive maintenance measures implemented in the last year have reduced down time considerably. Four new Munson aluminum outboard boats have been purchased. These boats are expected to have a service life of 30 years, double that of similar fiberglass boats. The electronics shops continues to update equipment to eliminate communications problems. Confiscated firearms were sold on sealed bid for \$5,886. The annual auction of surplus equipment was held on May 7, 1988 and netted \$54,465. An additional \$15,111 was received on the sealed bid sale of a 32' Lippincott patrol boat.

Investigations Section

This section was formed during FY 88 by combining the offices of General Investigations and Boating Accident Investigations. Operating under strength for the first half of the year, the addition of two Corporals as investigators significantly improved overall efforts. Criminal, applicant, accident, and internal investigations are carried out by Section personnel. Each investigator has primary and secondary responsibilities, but all are cross trained for any type of investigation. The Section also possesses an accredited Polygraph examiner and a certified Fingerprint com-

parison expert. The Investigations Section provide services to the Maryland State Police, the Office of the State's Attorney, Maryland Forest, Park and Wildlife Service, and other State and Local Law enforcement agencies as well as NRP. The Investigation Section has recruited a tremendous increase in requests for assistance in investigation incidents of a serious nature. Requests for assistance have not diminished with traditional "off season." Nineteen fatalities were investigated in the first six months of 1988. The Investigations Section represents 1.8% of the Agency's strength as compared to 13.5% for major law enforcement Agencies within the State.

Communications Section

The Natural Resources Police Communications Section is the only continuous twenty-four hour operation of the NRP. This section is staffed with (3) uniformed officers, (3) classified police communications operators, and (3) contractual communications operators. One of the classified and one of the contractual positions are funded by the Department of the Environment. The communications Section provides a full range of police communications services. Personnel process all vehicle/vessel information requests, maintain the Agency criminal case files, arrest warrant files, answer citizen questions and complaints, and dispatch field units. Communications personnel also dispatch units for the Water

Resources Administration and the Department of the Environment after hours. Records compiled by the Communications Division indicate that 767 cases were recorded for lost or recovered items in FY 88. The value of property stolen in FY 88 was \$829,773.91. The value of property recovered was \$632,431.45. Additional uniformed personnel are needed to man the center for 24 hours.

Training Section

Celebrating its 25th Anniversary in 1988, the Natural Resources Police Training Academy is located at the Matapeake multi-use field station in Stevensville. It is one of 15 Entrance-Level Police Training Academies that are certified by the Maryland Police and Correctional Training Commission. The Academy, designed to house up to 16 police recruits on a live-in basis, has two classrooms that can accommodate up to 40 students. These facilities were needed in FY 88 when, for the first time, since 1978, two classes were run back to back, training a total of 38 Natural Resources Police Officers. Established in 1963 under the command of former NRP Lt. Henry Shultheis, the original 7 week training program has been expanded to 23 weeks of intensive instruction to physically and mentally prepare the recruits to meet the challenges faced by today's conservation officer. In addition to entrance-level training, the Academy staff also coordinates all in-service and instructor training for the Agency. The Natural Resources Cadet program also falls under the direction of the Academy staff. Statistics indicate that the Cadet Program does an excellent job of preparing prospective officers for the rigors of conservation law enforcement, and has significantly improved officer retention.

Outdoor Education

The Outdoor Education Program is primarily responsible for implementing the education programs in Hunter and Boating Safety. These programs are mandated by acts of the Maryland Legislature.

Boating Education Program

The 1987 Maryland General Assembly passed an act, effective July 1, 1988, that all boaters born after July 1, 1972 must receive some form of Boating

education in order to operate a motor-boat on the waters of the State. The job of implementing this legislation has fallen to the Outdoor Education Program of the Maryland Natural Resources Police. The program goal was to make at least one boating program available in each county of the State. Utilizing a combination of in-school instruction, existing boating courses, and equivalency examinations these goals were met. Three civilian Recreation Specialists were hired to coordinate efforts with the school systems and volunteer groups. The following courses have been approved for certification; the USCG Auxiliary Boating Skills and Seamanship Course USCG Auxiliary Sailing and Seamanship Course, U.S. Power Squadron Boating Course, Virginia Boating Basics Course, West Virginia Boating Basics Course, and the Pennsylvania Boating and Water Safety Course.

Hunter Education

This program has been in place and operating smoothly for several years, it is coordinated by NRP officers and carried out in the school setting and through courses taught by NRP and volunteer instructors. Records of course graduates are maintained and persons hunting in Maryland must possess a certificate unless they have experience prior to 1978.

Water Resources Detachment

Specialized enforcement is carried out by two NRP Corporals detached to the Water Resources Administration. The primary responsibility of the NRP officers assigned to WRA is to provide police support to the 15 Environmental Inspectors stationed throughout the State. In addition to providing law enforcement support, officers conduct both periodic and unscheduled surveillance by land, water and air to ensure compliance with laws and regulations concerning Wetlands, Surface mining, Water Appropriations, and Beach Erosion Control. Both short and long term investigations are carried out by detachment personnel. Most violations cited by detachment personnel are issued to corporations. An Assistant Attorney General monitors enforcement activities and works closely with detachment personnel.

Enforcement and Protection violations noted during the last year were:

	Arrests	Warnings
Hunting Violations	1,663	1,142
Fishing Violations	1,257	2,038
Boating Violations	2,901	6,360
Trespass/State Lands	189	712
Oyster Violations	402	214
Clamming Violations	150	59
Crabbing Violations	457	205
Misc. Violations (includes *FTA's)	552	104

These figures represent a 3% decrease in Arrests and a 20% increase in Warnings from the last Fiscal Year.

* Failure to Appear.

Emergency Medical Services

In order to coordinate emergency medical services within the Agency, cooperate with other care providers in the State, and ensure an adequate level of training for all NRP personnel, the part-time position of EMS officer was upgraded to a full-time supervisory position in May 1987. NRP officers are currently certified at either the First Responder, Emergency Medical Technician (EMT), or Cardiac Rescue Technician (CRT) level. All recruits at the NRP Academy receive EMS training and are certified at the EMT level. In addition all NRP officers receive in-service training on a regular basis in order to maintain their skill level.

Advanced Life Support Pilot Program

In May 1988, the Natural Resources Police, in conjunction with the Maryland Institute for Emergency Medical Services Systems, began a one year pilot program to provide Advanced Life Support on the Chesapeake Bay and its tributaries. NRP personnel have been trained as Cardiac Rescue Technicians and, with additional volunteer CRT support, operate the AIS unit on weekends in the Baltimore to Annapolis area. A full range of emergency treatment is possible, including hospital consultation. The goal of the program is to provide the same type of quality care on the waterways of the State as motorists have come to expect on the highways.

Hovercraft Section

After a four year period of test, evaluation, and construction, the Natural Resources Police took delivery, in August 1987, of a 36' air cushion vehicle (Hovercraft). Staffed by a crew of two, the hovercraft operated for over 400 hours in FY 88. A wide variety of missions were carried out by the craft. After a period of acceptance and familiarization trials, the craft was utilized to acquaint other State and Federal Agencies with the mission of NRP and the capabilities of hovercraft technology through a series of demonstration trips. Well received by both governmental agencies and the public, the craft continues to be in demand with over 5,000 people transported during the last year. The primary mission of the craft is, however, search and rescue. During the winter months, several rescues were performed while the Bay was ice covered. In addition, the ice breaking capabilities of the craft was utilized to keep open some of the harbors in the State. Ice of up to 8 inches in thickness was broken with relative ease. Cooperative work with the USCG resulted in several trips of up to 100 miles, all over ice, to make repairs to vital aids-to-navigation damaged by the ice and inaccessible by any other means. During the winter months, an emergency medical transport was made out involving a USCG seaman suffering from hypothermia. The transport was made quickly and easily over ice covered waters. Equipped with Furuno Radar and Loran C, the hovercraft has all weather

capability and will provide a needed resource for the Agency, especially during the winter months and for some of the more remote areas of the Bay. The hovercraft also is the primary vessel used in the Advanced Life Support Program. It was chosen for that mission because of its flexibility and all weather capability.

Retirements and Promotions

FY 88 brought about considerable changes in the upper level management of NRP. In February 1988, Deputy Superintendent Harvey C. Cook, member of the force since 1958, retired. Lt. Col. Cook, a resident of Charles County, began his career as a mate on the agency patrol boat in the Potomac River. Lt. Col. Cook was promoted to the position of Deputy Superintendent in January 1986. Chief of Field Operations, Lt. Col. James M. Hurley, retired on July 1, 1988, after serving since 1957. Lt. Col. Hurley also began his career on board and agency patrol boat in his native Dorchester County. His assignments have included Assistant Training Officer, Training Officer, Commander of Supportive Services, Eastern Shore Area Commander. He was promoted to Chief of Field Operations on March 2, 1987. FY 88 also saw several other dedicated members of the force retire. Sgt. Ed Waddell, Boating Accident Investigator, retired on September 1, 1987 after 19 years of service. Sgt. Fred Murphy, District Supervisor in the Upper Eastern Region, retired on July 1, 1988 after 28 years of service. Cpl. Gene Riggan, a patrol boat Captain in Crisfield, retired on July 1, 1988 after serving since September 1962. These retirements brought about several promotions. Major Willis Dennis, former Commander of the Support Services Division, was promoted to Deputy Superintendent on July 1, 1988. Major Woodland Willing, former Deputy Chief of Field Operations was promoted to Chief of that Division. Captain Thomas Turner, former Upper Eastern Shore Regional Commander, was promoted to Major, Commander of the Support Services Division. Captain Franklin I. Wood, former Commander of the Southern Region, was promoted to Major, Deputy Chief of Field Operations.



NRP Color Guard at the Open House. Left to Right: Cpl. Charlie Rhodes, Cpl. Maurice Davis, Cpl. Bill Bates, Cpl. Bernie Clipper

Cooperative Enforcement

On February 24, 1988 Special Agents of the United States Fish and Wildlife Service, assisted by the Natural Resources Police in Maryland, concluded a four year undercover investigation into the taking of big game by violators in twelve states stretching from Alaska to Florida. As a result of the undercover operation in Maryland, five Special Agents of the U.S. Fish and Wildlife

Service, together with ten Natural Resources Police Officers, served search warrants, arrest warrants, criminal summons, and conducted interviews on six individuals. Seized as evidence in Maryland relative to violations of State and Federal Laws were, brown and grizzly bears, black bear gall bladders (valued for medicinal purposes in some Far East countries), caribou, waterfowl, endangered species and whitetail deer. Additionally, two Federal Agents and three Natural Resources Police Officers served a search warrant on an individual concluding an 18 month joint undercover investigation between the Fish and Wildlife Service and the Natural Resources Police. Seized as evidence were antelope, mule deer, whitetail deer, waterfowl, and protected species taken by numerous individuals with more arrests to follow. Violations from both investigations include out of season hunts, illegal use of aircraft, unlicensed guides, transport of illegally taken wildlife across State lines, unlicensed hunters, illegal night hunting, possession of endangered species, taxidermy violations, and smuggling illegally taken foreign wildlife into the United States.

DNR Hosts SSBLA Conference

The Natural Resources Police and the Licensing and Consumer Services Division of the Department of Natural Resources hosted the Southern States Boating Law Administrators Conference in Annapolis in April 1988.

Update on Operation Delmarva

"Operation Delmarva," which concluded on April 6, 1987, has reached final adjudication.

Various court cases have resulted in the following penalties against defendants:

Total Jail Sentences Assessed — 26 yrs. 7 mo.

Total Jail Sentences to be served — 9 yrs.

Total Assessed Fines — \$23,771

Total Fines Paid — \$22,171

Total Probation — 29 yrs.

Community Service — 60 hrs.

In addition, three rifles, three spotlights, and \$10,000 in cash (drug money) were forfeited.





POWER PLANT RESEARCH PROGRAM

. . . . provides technical information and recommendations based upon research of planned and existing electricity generating facilities to assure minimal environmental impact at a reasonable cost

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

MAJOR FY 1988 ACTIVITIES

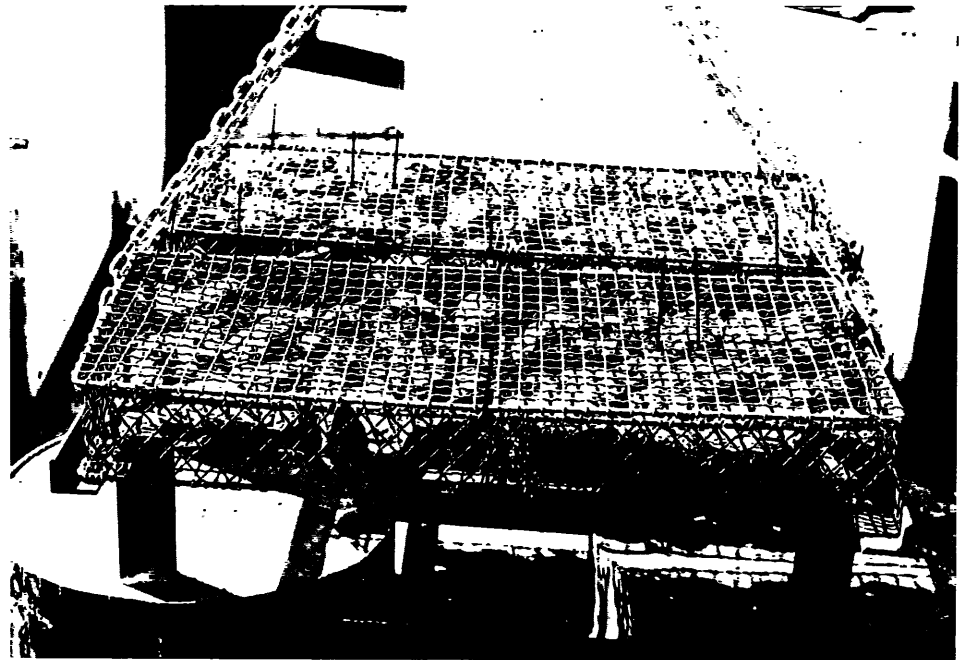
- Completion of the first phase of the PSC licensing of PEPCO's proposed coal gasification/combined cycle plant to be constructed at its Dickerson site.
- Completion and publication of the second annual report on Acid Deposition in Maryland, a comprehensive review of acid rain and its impacts on the State.
- Ongoing assessment of the Chalk Point and Wagner Power Plants to evaluate the need for modifying cooling systems.
- 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.
- Completion of a study to examine the technological feasibility and cost of various sulfur dioxide emissions control methods which might be used at Maryland Power Plants.
- Continued research on the effectiveness of automated liming technology to maintain suitable habitat for early life stages of fishes, potentially impacted by acid deposition.
- Completion of a statewide stream sur-

vey to determine regions of the state potentially vulnerable to acidification.

- Resolved engineering limitations associated with air quality impacts from the proposed expansion of Easton Utility's generating facilities.
- Review of several utility proposals for construction of transmission lines.
- Initiated a study to determine whether herbicides used for controlling growth on transmission line rights-of-way are leaking into shallow groundwater aquifers.
- Completion of a mass balance study of radionuclides discharged by the Peach Bottom Atomic Power Plant present in sediments of the Conowingo Pond, an impoundment of the lower Susquehanna River. Information derived from this study is useful for predicting the transport and fate of particle-reactive pollutants in the Susquehanna River and Chesapeake Bay system.
- Development of a statistical model to predict concentrations of radionuclides in Chesapeake Bay oysters as a function of collection season and timing and quantities of radioactivity discharged by the Calvert Cliffs Nuclear Power Plant.
- Review of environmental impact statements related to issues associated with the cleanup of the Three Mile Island Nuclear Station.
- Ongoing monitoring of radionuclide concentrations in sediments and biota of the Susquehanna River and Chesapeake Bay to assess the impact of Peach Bottom and Calvert Cliffs Nuclear Power facilities.
- Completed a study to determine the chemical composition of the surface microlayer at 12 locations in the Maryland portion of Chesapeake Bay and major tributaries, the results of which were used to develop hypotheses about possible sources for selected identified compounds.
- Initiated studies to: 1) determine major source contributions to dry particle deposition at three locations within the Maryland air shed, 2) determine the feasibility of using rare earth isotopes to directly measure atmospheric

impacts of coal-fired power plants, 3) determine the role of phytoplankton in the fate and effects of arsenic, chromium and copper in estuarine environments, and 4) determine the fate of beryllium, chromium, aluminum and copper contained in coal leachate in Maryland coastal plain soils and surface water.

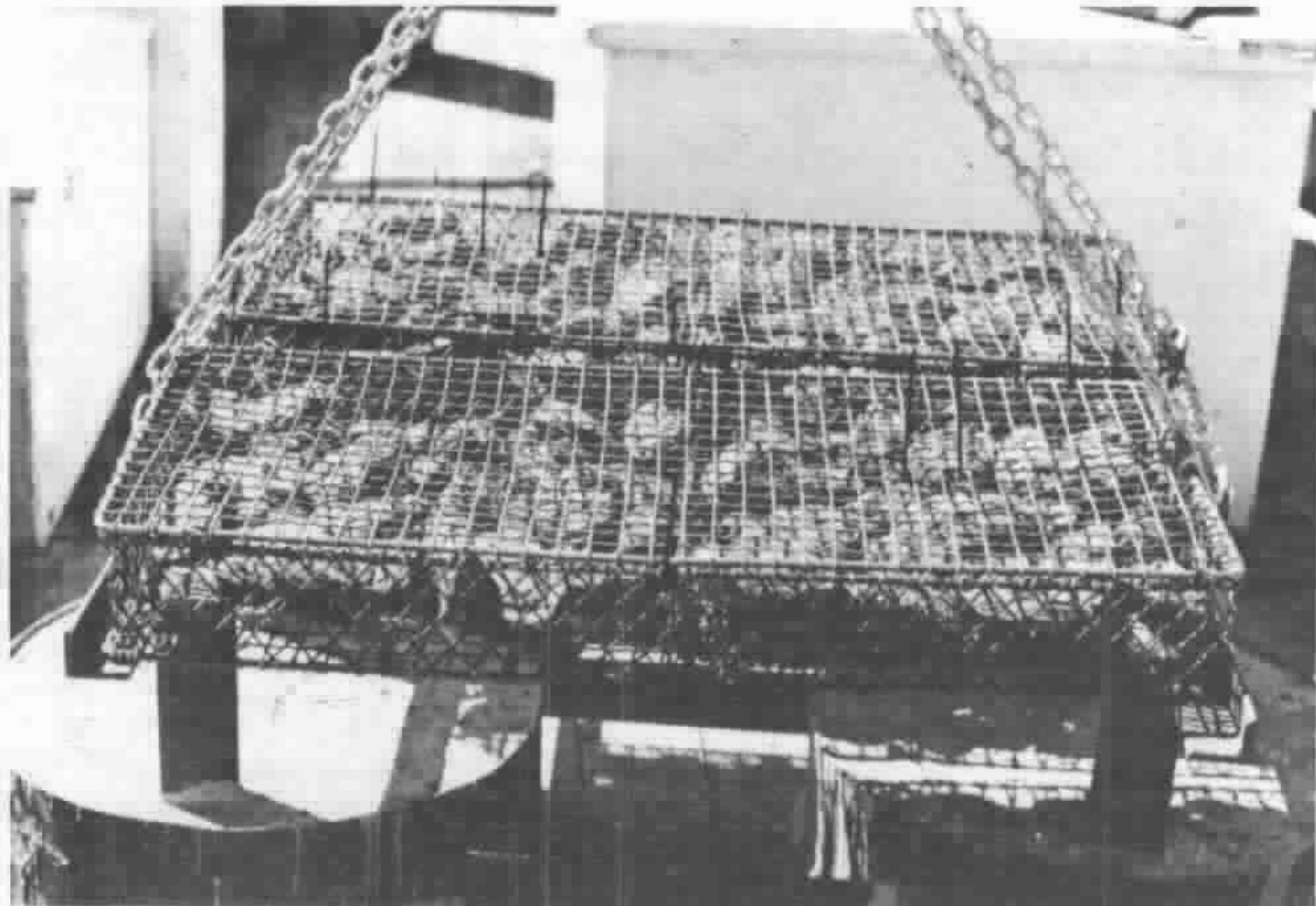
- Completed a study which describes the role of microbiological and chemical factors in determining leachate quality from coal piles at Maryland utilities. The information will be used to determine treatment options and determine potential for environmental impact.
- Initiated a study to determine the trace metal composition of coal slurry pipeline leachate.
- Completion of both an econometric load forecast and a system planning study for the Potomac Electric Power Company, both to be used in demonstrating the need and appropriate scheduling for PEPCO's proposed coal gasification/combined cycle plant at its Dickerson site.
- Completion of an evaluation of the need for a proposed combustion turbine for the Southern Maryland Electric Cooperative to be located at PEPCO's Chalk Point Site.
- Completion of an updated load forecast for the Baltimore Gas and Electric Company.
- Initiation of an econometric load forecast for the Delmarva Power and Light Company.
- Completion of a residential Demand-Side Management (SDM) study which determined potential energy and peak load savings of a set of residential DSM measures for the BG&E system.
- Updating of the Maryland Impact Assessment System (MIMS) model and documentation to determine socioeconomic impacts of citing major facilities using a personal computer.
- Updated the utility data base which includes extensive information on a variety of economic/demographic variables, energy sales data and energy prices for each of Maryland's utilities.



Oyster cage ready for placement in the Calvert Cliffs discharge to provide information on radionuclide uptake

- Participation with the Federal Energy Regulatory Commission (FERC) in the developing plan to address water quality issues in the Susquehanna River.
- Review and oversight of the implementation of pilot turbine venting systems at the Conowingo Dam designed to improve dissolved oxygen conditions below the dam.
- Development and execution of a settlement with Philadelphia Electric Company to resolve all issues presently under litigation regarding the operation of Conowingo Dam.
- Development of specifications for a permanent fish passage facility to be built by Philadelphia Electric Company at Conowingo Dam.
- Final development of a computer program to evaluate and display cumulative regional impacts of industrial air emissions.
- Monitoring the impact of small scale hydro electric operations on the upper Patuxent River.
- Initiation of field activities and review of small scale hydroelectric operation on the Upper Potomac and Youghiogheny Rivers.
- Initiation of field work and review

- of Delmarva Power and Light's proposals for potential expansion on the Delmarva Peninsula.
- Preparation of emissions projections from Maryland Utilities as part of the Cumulative Environmental Impact Report.
- Coordinated the State's review of events associated with the shutdown of the Peach Bottom Atomic Power Station, including the Philadelphia Electric Company's (PECO) Plan for Restart. Provided extensive comments to the Nuclear Regulatory Commission (NRC), and conducted independent inspections of the changes at the plant. PPRP worked closely with the NRC and PECO to ensure that Peach Bottom will operate safely if and when it is permitted to restart.
- Participated in exercises of the radiological emergency plans of both the Calvert Cliffs Nuclear Power Plant and the Peach Bottom Atomic Power Station. PPRP provides the lead technical representative for the State for all nuclear power issues in all exercises and in the event of an accident.
- Coordinated the State's environmental, engineering and needed review of the PSC's licensing of a gas turbine power plant to be con-



structed at the Chalk Point site on the Patuxent River by the Southern Maryland Electric Corporation. This facility is projected to have minimal environmental impact.

- Initiated an evaluation of the Faulkner Fly Ash Landfill in Charles County. The Faulkner site, located just north of Zekiah swamp, is used for disposal of fly ash from coal-fired power plants operated by the Potomac Electric Power Company. The PPRP study is a multi-year effort to collect extensive ground and surface water samples in the vicinity of the site in order to resolve the long-standing controversy over the environmental effects of ash disposal at the site.
- Continued the evaluation of the suitability of the Perryman site in Harford County for the location of a base-load electric generating station proposed for construction in the 1990's by the Baltimore Gas and Electric Company.
- Continued to monitor wells to assess the impact of the Calvert Cliffs, Morgantown and Chalk Point Power Plants on the groundwater resources of Southern Maryland.
- Prepared the sixth edition of the Power Plant Cumulative Environmental Impact Report for Maryland (CEIR). The CEIR evaluates the effect of the operation of all power plants operating in or near Maryland.



Power Plant Research Program and Living Lakes, Inc. are testing stream liming equipment at Stockett's Run



DNR personnel, electrofishing on the Youghiogheny River below Deep Creek Lake Dam in preparation for relicensing activity







TIDEWATER ADMINISTRATION

. . . . deals with the protection, conservation and utilization of the resources of the Bay and its shoreline and tributaries

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 throughout the state.

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

GENERAL DIRECTION PROGRAM

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

Administration and Support

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

Boards and Commissions Coordination

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

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; maintaining and establishing new horizontal control throughout the Bay area, and acting as support service to the

Potomac River Fisheries Commission; ice breaking during the winter for commercial shellfish operations.

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

Dredging

The Dredging Program is responsible for state waterway projects involving dredging and protection of harbors and channels that are not maintained by the U.S. Army Corps of Engineers. Activities include development of hydrographic and topographic surveys at proposed channel areas, determining the need for protective structures at project sites, commenting on the design of all State funded dredging/breakwater projects and conducting surveys of previously completed channel dredging sites. In FY 88, 5 projects were completed at a total cost of \$634,508.

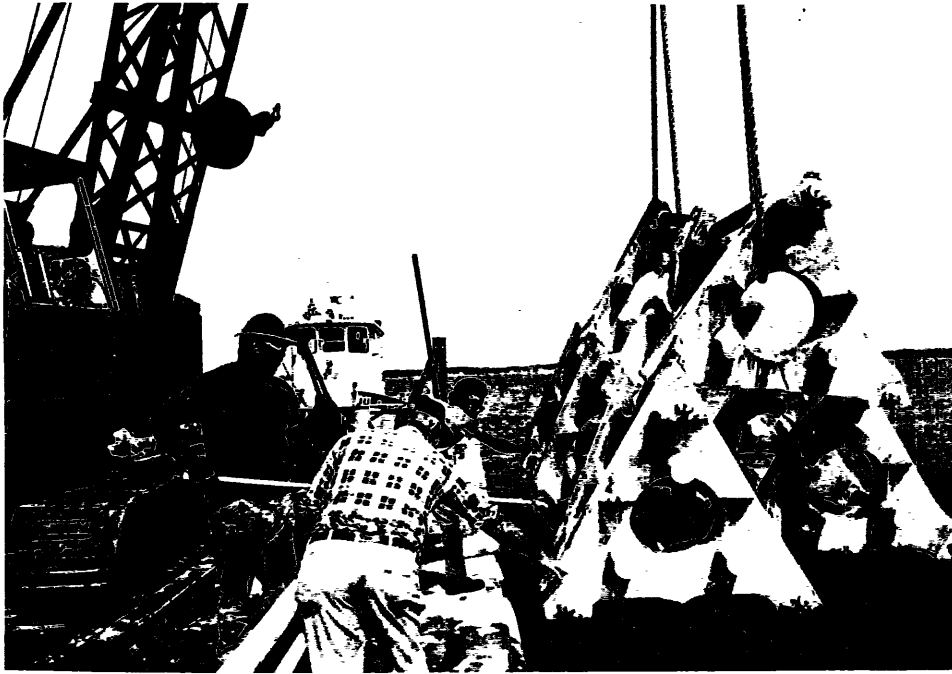
The Dredging Program currently has 93 active funded projects in various stages of development with an estimated construction value of \$18,130,000.

Waterway Grants and Project Planning

During FY 88, the Waterway Improvement Division continued planning efforts for the regional boating facilities at Fort Washington Marina, Dundee Creek Marina, Ocean City Marina, Smallwood-Sweden Pt. Marina, Somers Cove Marina, and Susquehanna State Park.

Construction projects were completed at Hart-Miller Island, Somers Cove Marina, Hal- lowing Point, and Cunningham Falls, Deep Creek Lake, Herrington Manor, and Rocky Gap State Parks.

Engineering for a bulkhead and piers was



Artificial fishing reef deployment.

completed at Fort Washington Marina. Additional engineering was completed at Cambridge Marina Terminal. Engineering was begun for projects at Fort Washington Marina, Somers Cove Marina, Gunpowder-Dundee Creek Marina, and Smallwood-Sweden Pt. Marina. Debris and derelict boat removal projects were completed. Total projects completed in FY 88 were 89 local grants and 15 State projects at a construction value of \$1,931,462 and \$1,149,076, respectively.

As of June 30, 1988, there were a total of 197 local grant projects and 31 State projects in various stages of engineering and construction. Public information was provided through photographic display panels at 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 88, 8 State vessels were

hailed at the Cambridge Terminal railway for annual maintenance and repairs.

Construction was completed on a ramp and boardwalk for the comfort stations at Hart-Miller Island. Also completed was a 60 foot jetty at Hallowing Point and renovation of the Governor's pier in Annapolis. Additional completed projects included assisting Fisheries Division in obtaining core samples of the Patapsco River, removal of debris from the Upper Choptank River, and removal and replacement of 21 pilings at Bivalve Harbor. Five thousand nine hundred and thirty seven cubic yards were dredged at Nanticoke Harbor, and from the Choptank River at Denton.

FISHERIES DIVISION

Recreational/Commercial Fisheries and Special Projects

Statistics

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

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

The 1985 Maryland Saltwater Sportfishing Survey was completed. The survey was conducted in cooperation with National Marine Fisheries Service. Results indicate a reduction in the number of fisherman and fishing trips for 1985 compared to 1980. The estimated catch, however, was substantially increased.

Stream Classification

The concept of water use classification is being re-examined to incorporate the concepts of the Chesapeake Bay Agreement. Specifically, the project is examining ways to enhance the ability of the regulatory system to protect areas which currently support living resources. Computer mapping is being evaluated.

Fish Passage

Projects are developed to mitigate the negative impacts to streams critical for spawning runs of anadromous sportfish.

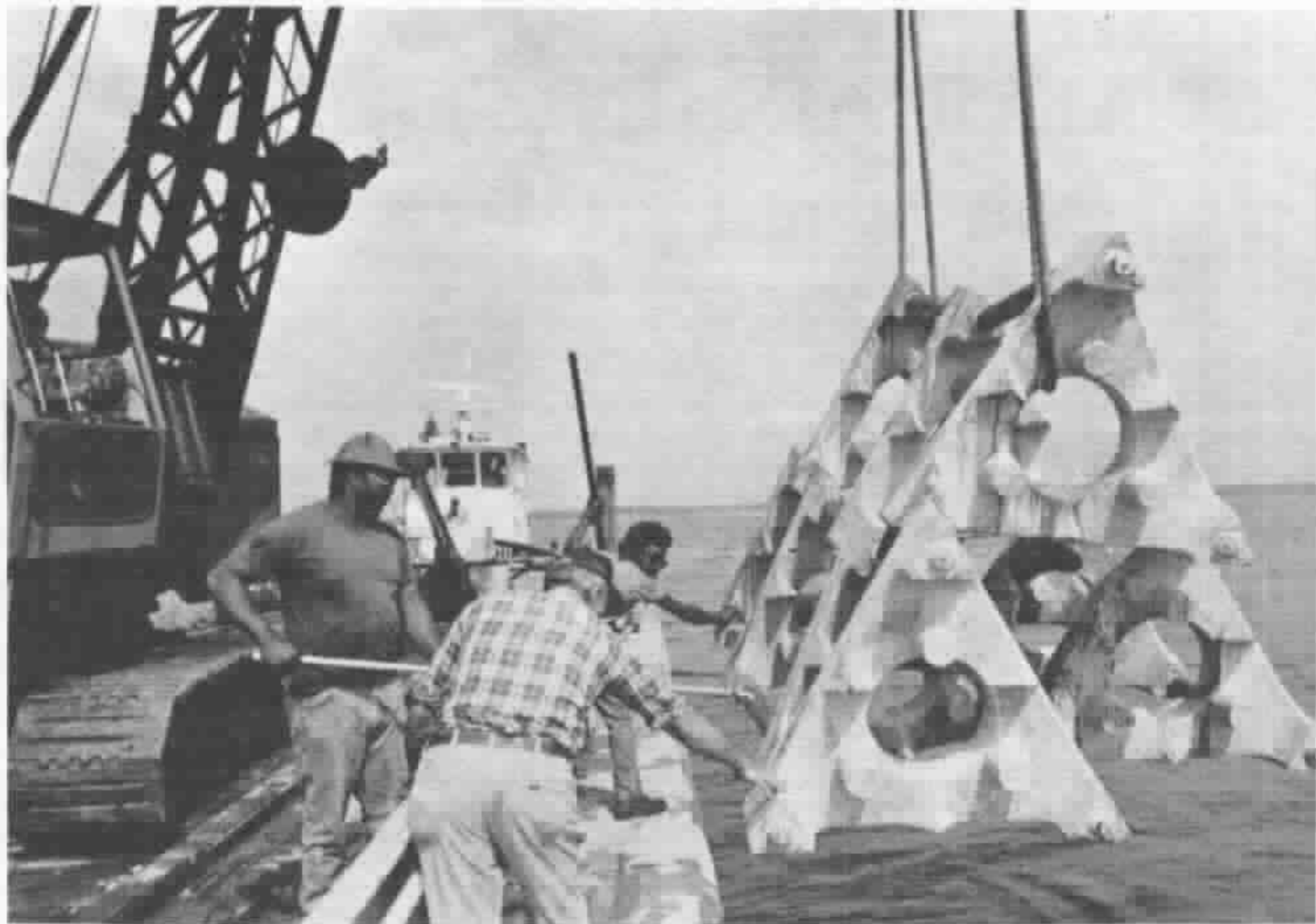
Stream barriers are being inventoried and assessed for effects on anadromous fish passage, and plans are being made for removal or mitigation of blockages. The Patapsco River was judged a high priority. DNR capital funds and dedicated funds of private organizations will be directed to provide fish ladders on two Patapsco River dams blocking spawning runs of river herring and perch. Shad may be reintroduced.

American Shad Restoration Pond

One pond, approximately 1.6 acres, will be constructed on the banks of the Susquehanna River at Havre de Grace to raise American Shad for stocking and to help in restoring the upper Chesapeake Bay spawning populations of this valuable fish species. The pond is in an historical canal site and will also be utilized as a canal boat turnabout basin.

Gwynns Falls Restoration

Baltimore City, Baltimore County, DNR's Tidewater Administration Urban Fishing Project, and Save Our Streams Inc., combined dollar and staff resources to begin to restore the developed Gwynns Falls watershed to a condition suitable for recreational fishing and other uses. The goal is to create a self sufficient neighborhood effort



to restore and maintain these recreational uses. Efforts in FY 88 produced options to prevent residential runoff, disposal of small scale toxins, water conservation, and sediment control. Fishing derbies and environmental workshops were conducted.

Habitat Investigation

Investigations of the long term problems of diminished reproductivity and viability of fisheries due to habitat degradation is the main focus of this project. These investigations deal with striped bass, oyster, clams, and with lesser known fish of equal importance in the Bay's ecosystem, such as menhaden and bullheads. Finfish samples are prepared and examined macroscopically and microscopically. Physiology and biochemistry are utilized to determine fish health, and indicate environmental condition. Fish kills are investigated cooperatively with the Maryland Department of the Environment.

Maryland hatcheries shipped bass larvae to cooperative hatcheries. Each brood striped bass spawned to produce larvae for the restoration effort was examined and declared free of the virus disease, (IPN), prior to shipment of larvae.

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

Publications

The Publications Project produced brochures, pamphlets, information sheets and booklets containing commercial laws and regulations for finfish, oysters, crabs, clams, and fish. Harvest techniques and conservation guidelines were printed and distributed.

The Tidewater Fisheries News was produced on a monthly basis and the project wrote and distributed materials on particular fisheries issues for sportfishing magazines.

Recreational Fisheries Enhancement

DNR's Recreational Fisheries Program was created in FY 85 to implement projects supported by the Chesapeake Bay Sport Fishing License. The primary goal of the program is to improve the

quality of sportfishing on the Chesapeake Bay and its tributaries. This goal is achieved through replenishment and conservation of sportfish stocks, enhancement of recreational fishing, habitat protection and creation, and research on tidal fishery resources. Major areas are: access through fishing piers; artificial reef construction; youth oriented fishing derbies; an annual Maryland Sportfishing Tournament and a Governor's Cup Chesapeake Bay Fishing Tournament.

The Sportfish Tournaments 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 programs were assisted and administrative help given to six major fishing Association Tournaments and other events.

Participation in the 24th Maryland Sportfishing Tournament by residents and tourists was down over previous years. Fresh water and salt water citations, patches and date bars have been issued.

The Urban Fishing Project enhances fishing opportunities for urban residents and youth groups in rural areas. Over 8,000 pounds of catfish were stocked in more than 20 community ponds for the promotion of sportfishing at youth fishing rodeos held cooperatively by community organizations.

Shellfish

The oyster harvest for the 1987-88 season on the public bars was approximately 360,000 bushels, with an estimated dockside value of 7.3 million dollars. These figures represent decreases in bushels of 64% and in value of 56% from the previous season (1986-87). This record low harvest is attributed to the continuing impact of the disease of MSX and Dermo.

Recruitment (spat-fall) was below the previous year (1986) level, with counts on natural bars averaging about 40 spat per bushel. The counts on seed areas ranged from 133 to 1200.

During the spring FY 88, over 880,000 bushels of seed oysters were transplanted from setting areas to growing areas. The seed was planted in areas of the Chesapeake Bay and tributaries where the risks of disease (MSX and Dermo)

are considered low. This seed will be ready for harvest by 1990. Approximately 150 watermen participated in the operation and were paid on a per bushel rate for their services.

The shell dredging program to provide shell for cultch began in 1960. Fossil oyster shells are placed on selected oyster bars to serve as a substrate to which larval oysters attach. These shells remain in place for one year, allowing the attached oysters to grow to 1 inch in length; then they are harvested by watermen and replanted on growing areas as part of the oyster seed transplanting program.

Fresh oyster shells are shells from recently shucked oysters. The shells are purchased from oyster processing plants and placed on selected oyster bars to provide cultch for spat attachment. Because of the recent low harvest levels, very few shells are available. The estimate of the volume to be planted this year is approximately 150,000 bushels.

Bagless dredging is a technique that cleans shells already on the bottom to improve their usefulness as cultch. A standard size oyster dredge with its collecting bag removed is pulled across the oyster bed. This action results in



Setting an oyster scrape during sampling in the Choptank River



loosening the shells from the bottom and turning them over several times, thus allowing the water action to wash them clean. This was done extensively this spring as a way to provide cultch without planting new material.

In 1986, the Fisheries Division began investigating the environmental impacts of the fossil shell dredging operation in the upper Chesapeake Bay. The study, in cooperation with the U.S. Fish and Wildlife Service and the Army Corps of Engineers, addressed impacts on water quality, alteration of bottom contour, benthic organisms, and striped bass. Study results showed no significant impact to the environment.

The Deal Island Oyster Hatchery completed its second season of operation since it was renovated in 1985. Major components of this year's operation was hatching of "disease resistant" seed and cooperative experiments with the University of Maryland designed to test techniques designed to improve spat fall.

Renovations continued at the Piney Pt. Aquaculture Center to prepare the facility for oyster aquaculture studies designed to improve the quality of the product for consumers. A private group, associated with the University of Maryland, is using a small part of the facility as an oyster hatchery.

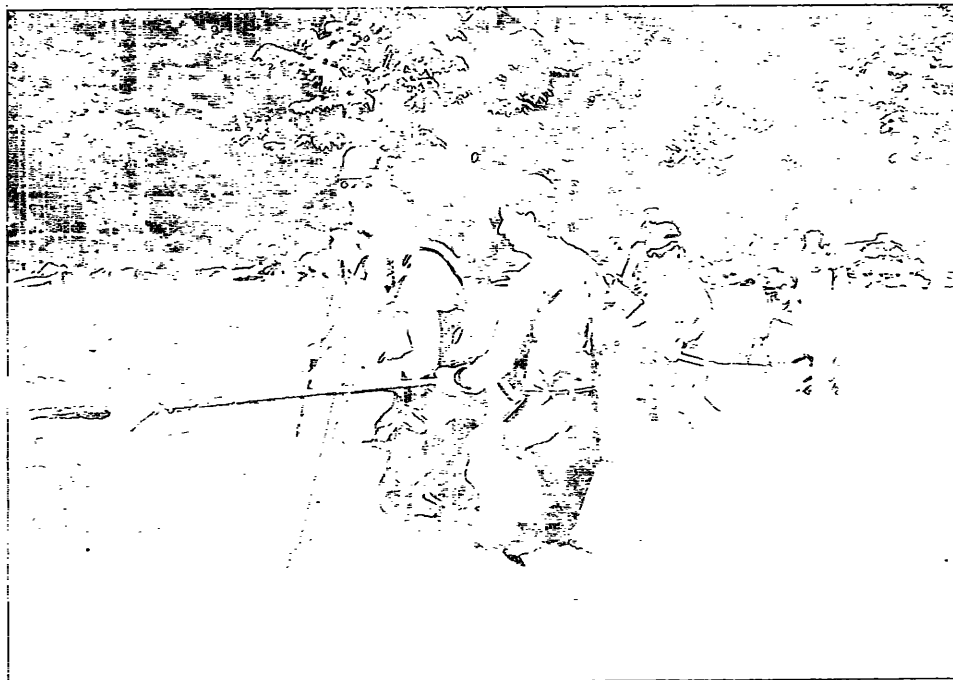
Soft Clams

Soft clam landing continued their strong showing, increasing from 153,211 bushels in '87 to 288,628 bushels this year. The problem of poor quality clams due to high bacteria levels when they arrive at New England markets has continued this summer. Several clam harvesters are cooperating in a "ice packing" study in an effort to alleviate the problem.

Finfish Hatcheries

Coldwater Hatchery Project

During FY 88, Coldwater Hatchery personnel produced and stocked record size trout, exceeding the exceptional production of the previous year. Public trout fishing was enhanced by the release of 221,748 catchable size (9 to 15 plus inches) trout weighing a total of 119,972 pounds into 42 streams and 28 impoundments. The production of



Freshwater fisheries electrofishing crew sample the Youghiogheny River.

the Albert H. Powell Hatchery and Cushwa Rearing Station was 142,019 trout weighing 80,236 pounds. Bear Creek Rearing Station produced 79,729 trout weighing 39,736 pounds.

Warmwater Hatchery Project

The third 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. The hatcheries returned 417,255 advanced striped bass fingerlings for stocking into Maryland tidal waters. A total of 801,341 striped bass were stocked in Bay waters in the fall.

The Patuxent River received, during the summer of 1987 and this year to date, 125,000 marked striped bass fingerlings from the Manning Hatchery and Potomac Electric Power Company. The Patuxent was also stocked with 100,000 largemouth bass fingerlings. During this project the Patuxent River has received 2.7 million striped bass and striped bass hybrids and 500,000 largemouth bass from the hatchery effort.

A pilot project to restore yellow perch saw the production and stocking of

413,000 yellow perch into the Wye River.

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

Freshwater Fisheries

The Freshwater Fisheries Program is responsible for the research and management of the coldwater, coolwater, and warmwater fisheries resources of the State of Maryland. These resources consist of naturally occurring populations and introduced individuals of 13 gamefish, 15 panfish, and 65 rough and forage fish species. Gamefish species include: brook trout, brown trout, rainbow trout, largemouth bass, smallmouth bass, walleye, northern pike, striped bass, striped bass hybrid, yellow perch, tiger muskie, and channel catfish.

The Freshwater Fisheries Program is committed to the revitalization of the warmwater, coolwater, and coldwater fisheries of Maryland. The primary objectives of the program are to protect, conserve, and enhance the quality and diversity of the State's fishery resources and to provide continued and varied



angling opportunities through scientific inventory, classification and management of these resources.

During FY 88, a major effort was directed toward intensive ecological studies of the following streams and reservoirs: Youghiogheny River, Savage River, Gunpowder River, Beetree Run, Hunting Creek, Paint Branch, Little Seneca Creek, Potomac River, Liberty Reservoir, and Deep Creek Lake. These automated studies are in support of a statewide effort to establish an automated data base of the freshwater resources of the state.

A project by the Appalachian Environmental Laboratory at Frostburg State College, funded by federal Wallop/Breaux money, is directed towards obtaining a complete inventory of the physical, chemical, and biological characteristics of the trout streams of Garrett and Allegany Counties. A major effort directed towards the tidal largemouth bass fishery, and another focused on the Upper and Middle Potomac River and major impoundments of the state round out this inventory effort.

Approximately 204,000 catchable size rainbow trout were stocked into 78 streams and impoundments to provide for a high catch rate put-and-take trout fishery in 1987. In addition, 35,000 fingerling rainbow trout and 13,000 fingerling brown trout were stocked in support of the high quality put-and-grow trout fishery. Emphasis for fingerling trout stocking for the past two years has focused on the Youghiogheny River in Garrett County and Gunpowder Falls in Baltimore County.

As a result of achieving a full-time coldwater release from Prettyboy Dam, Freshwater Fisheries personnel continued investigations within the tailwater section of Gunpowder Falls during FY 88 to assess its potential as a coldwater fishery resource. Water temperature regimes were monitored at three locations below the dam to evaluate the quality of the coldwater release as it pertains to needs of salmonid species and to determine the rate and extent of downstream warming. Water quality and macroinvertebrate populations were evaluated and fingerling trout of various species, sizes, and origins were stocked at different locations during the spring and early summer to assess the potential of Gunpowder Falls to support trout on a year-round basis. Trout populations were evaluated using the Zippin, three-pass removal method at seven locations ranging in distance from one half to eight miles downstream of the dam. The investigations document that Gunpowder Falls has a high potential to support a good quality year-round trout fishery from Prettyboy Dam downstream to the mouth of Little Falls. At the moment natural reproduction may not be sufficient to maintain a quality fishery there, and studies are continuing to determine that most cost-effective method of supplementing the natural population in this growing trout fishery.

The excellent growth and survival of stocked fingerling rainbow trout in the upper five miles of the Gunpowder River confirms the potential of this river as a put-and-grow trout fishery. Downstream of Little Falls, the potential for natural reproduction and a put-and-grow fishery diminishes. The

stocking of adult hatchery trout will be continued in the downstream regions of Gunpowder Falls and Little Falls to retain this current popular put-and-take trout fishery in Baltimore County and to make good use of the excellent put-and-take trout habitat within state park property. A complete fisheries management plan for development of a high quality year-round trout fishery in the Gunpowder River State Park and along the Gunpowder Falls State Park Trail will be completed by January 1989.

Freshwater Fisheries biologists studying largemouth bass in Maryland's tidal rivers in 1987 found that this fishery had greatly improved in the Potomac River and upper Chesapeake Bay. Self-sustaining bass populations in the Pocomoke and Wicomico Rivers, and successful spawning in Port Tobacco Creek, a tributary of the Potomac River where heavy silt deposits had previously inhibited reproduction, all point towards an expanding fishery. Recent growths of submerged aquatic vegetation has stabilized silt, improved hatching success, and added thousands of young bass to the fishery. Increased bass reproduction was also documented for the second consecutive year in the upper Chesapeake Bay. Nearly 700,000 fingerling bass have been stocked since 1980 as part of a program to restore this fishery, and the increased number of adult bass from previous stockings and improved environmental conditions are believed to be responsible for this increase in reproduction. The fingerling stocking project will be continued until a self-supporting fishery can be maintained.

The Wicomico River near Salisbury sustains one of Maryland's most productive tidal bass populations. Largemouth bass reproduce successfully in the Wicomico although suitable spawning habitat is limited. Nevertheless, high numbers of adult bass concentrate in Salisbury Harbor. The Pocomoke River also sustains an excellent tidal bass fishery. Growth rates are lower, and the population density is high. The dynamics of these important fisheries are being further investigated under the tidal largemouth bass project and studies will continue in FY 89.

In 1987, a study was initiated on the Youghiogheny River to define the trout fishery potential of the river. Of primary importance was identifying the factors limiting population size, and investigating the ways and means of

The following numbers of warmwater and coolwater fish species were stocked in Maryland waters during FY 88:

SPECIES	SIZE	NUMBERS
largemouth bass	spring fingerlings	193,000
largemouth bass	fall fingerlings	15,800
smallmouth bass	fall fingerlings	2,100
walleye	fry	3,800,000
walleye	fingerlings	2,200
bluegill	fall fingerlings	151,500
bluegill	adult	10,900
golden shiner	fingerlings	2,500
emerald shiner	adult	4,000
fathead minnow	adult	1,001,000
redeer sunfish	fall fingerlings	1,600
pumpkinseed	fall fingerlings	3,000

modifying conditions adverse to trout. The results of sampling efforts in 1987 demonstrated that the Youghiogheny River supported a trout population despite record high water temperatures and low precipitation. The study showed that trout distribution and survival was related to the availability to cool water refugia, and trout reproduction in tributary streams provides a source of trout recruitment to the mainstem of the Youghiogheny River. It appears that virtually all tributaries exhibiting adequate water quality are supporting trout populations.

Because of a decline in the average size of bass caught in Deep Creek Lake, a closed season was imposed on black bass during the spawning season in that lake in 1987. Initial indications are that this measure has reversed the trend towards smaller largemouth bass, and a stabilization of the smallmouth bass fishery. This fishery is being closely watched, as is the excellent walleye fishery in Deep Creek Lake.

During 1987 efforts continued to assess the response of the brook and brown trout populations in the Savage River "tailwater" to the new water release procedures adopted and implemented by the U.S. Army Corps of Engineers in the spring of 1983. In 1987 two "Trophy Trout Fishing Areas" were established in the Savage River tailwater, and fisheries surveys disclose that brook and brown trout are successfully reproducing, the population is increasing, and that the brook trout are showing higher than average growth rates in these waters. Field data collection and monitoring activities during 1987 included: trout population estimates and standing crops, water quality monitoring, macroinvertebrate sampling, water temperature monitoring, and spring swim-up fry assessment.

Other activities of the Freshwater Fisheries Program include:

- Evaluation of walleye introductions in Deep Creek Lake
- Potomac River, and Savage River Reservoir
- Evaluation of black bass populations in the Potomac River
- Evaluation of slot length limit for largemouth bass in St. Mary's Lake and Little Seneca Lake
- Channel catfish studies in tidal waters

- Environmental Review
- Stream reclassification
- Stocking of coldwater, coolwater, and warmwater fish for put-and-take, put-and-grow, and corrective stocking

Estuarine Fisheries Program

The Estuarine Fisheries Program is responsible for monitoring, stock analysis, and management recommendations for finfish populations in Maryland tidewater and marine environments. The Program coordinates with other DNR agencies, University of Maryland and Federal Agencies to provide data and biological samples and to share information.

Fisheries Management Plans (FMP) Project is developing species specific plans for long term management.

This year, coordinated planning was initiated with Virginia Marine Resources Commission to develop Bay wide plans for American shad and blue crab. Plans will be completed by March 1989 with target implementation date of July 1989. The FMP Project has prepared a management atlas titled "Chesapeake Bay Fisheries: Status, Trends, Priorities and Data Needs." Consolidating management information for twenty-one marine, estuarine and freshwater species, this document will be available in August 1988.

The moratorium on striped bass in Maryland remained in effect and was recommended to continue during 1988. Recent analysis of spawning stock data indicates that female striped bass are maturing at levels lower than previously believed and that complete maturation for a year class won't occur until age 8+. This has resulted in a recommendation by the Striped Bass Board of the Atlantic States Marine Fisheries Commission to raise the coastal size limit from 33 to 38 inches total length to protect female spawners. Due to the late age of maturity, female additions to the spawning stock and subsequent if production is only now in the initial rebuilding stages. Despite overall increased numbers of striped bass, winter stock assessment data continue to indicate that by age 6 most striped bass have left the Maryland bay to join the coastal migratory stock and only return for spawning.

The annual estuarine juvenile finfish survey monitors reproductive success of tidewater species. Three times each summer, 22 sites from the Potomac River to the Susquehanna are evaluated. The 1987 striped bass juvenile index was up slightly (4.8) over 1986, but still only about half of the long-term (30 years) average. Relaxation of current coastal management measures by the Atlantic States Marine Fisheries Commission is predicted on achievement of a three year running average of 8 in the Maryland juvenile index. This index is an important component of fisheries models developed by the U.S. Fish & Wildlife Service and Estuarine Fisheries Program for developing future management strategies.

The American shad fishery remained closed with no expectation for opening in the near future. Only three naturally reproduced juvenile shad were collected during the summer/fall 1987 recruitment survey. Over four million fry, reared in Pennsylvania hatcheries were released below Conowingo Dam at Lapidum. There was no evidence of out-migration for five million fry stocked above the dam. An estimated 27,000 American shad were in the 1987 Upper Bay spawning run. This number was not significantly different from the 1986 estimate (21,000). The blueback herring run was up substantially in the Pocomoke and Choptank Rivers but down in other surveyed systems. No shad or herring spawning was found in the Tred Avon or Wye River drainages; a small blueback run was documented in the Miles River.

Publication of the yellow perch management plan was accompanied by public hearings on proposed regulations in spring 1988. In consideration of varying stock levels, river system specific harvest regulations were promulgated. Fishery independent studies of selected yellow perch stocks were initiated as was an experimental stocking program. Over 400,000 hatchery reared yellow perch were released into the Wye River. All fish were marked to allow evaluation of hatchery additions for stock recovery.

During summer 1987 the Marine Project documented normal juvenile summer flounder populations in the seaside bays. Very few juvenile summer flounder were documented during 1988. Norfolk spot abundance has seasonally varied over the past six

years. Silver perch numbers continued above average.

White perch stock assessment in the Choptank River, supported by the Chesapeake Bay Stock Committee, documented good reproduction in 1987 and found an excellent correlation between the juvenile index and subsequent commercial harvest. Growth of white perch in the Choptank River after age 3 is slow. Some fish were moved to isolated ponds to determine if growth is environmentally related and to study aquaculture potential. Fish tagged the previous year showed spawning system fidelity.

In cooperation with the University of Maryland, crab biology, population dynamics and fishery characteristics were studied. Data were collected from commercial vessels fishing pots, scrapes and trotlines between Tilghman Island and the Maryland-Virginia line. Initial stock abundance in 1988 has been down for both juveniles and adults. A modest increase was noted for juveniles in July.

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 State Departments concerned with coastal zone management have agreed to carry out the goals of the Program.

Submerged Aquatic Vegetation

The Submerged Aquatic Vegetation (SAV) Program has three components: research, resource monitoring and management. The major focus of the research component is the SAV transplanting and water quality monitoring projects, which are being implemented by the University of Maryland and Harford Community College. Areas of focus include the Susquehanna Flats,

Elk River, Sassafras River and the Choptank River. Of the eighteen experimental transplanting projects undertaken in the upper Chesapeake Bay, twelve have been successful. Success is measured by the transplant's ability to survive and reproduce. Water quality data collected has led to the generation of a list of water quality parameters include dissolve inorganic nitrogen, dissolved inorganic phosphorous, Chlorophyll a, suspended particulates and light penetration. The Chesapeake Bay Habitat Requirements Document lists these parameters as desirable targets of Bay clean-up efforts. It is hoped these parameters will ultimately be adopted by water quality regulatory agencies. Other research projects addressed the following issues: the development of a predictive model for selecting high success of transplant sites; impacts of pH on SAVs; the impact of Hydrilla on fish communities; and the impacts of Hydrilla on nutrient cycling on the Potomac River.

The resource monitoring component includes aerial reconnaissance of SAV in the Chesapeake Bay and ground-truthing projects. The aerial reconnaissance project is a multi-agency funded overflight. The groundtruthing of the overflight is being accomplished with the help of the Maryland Charter Boat Captains, the Alliance Program for the Chesapeake Bay, the United States Fish and Wildlife Service and the Chesapeake Bay Foundation.

The cooperative management program, within the Potomac River, of a nuisance exotic species of SAV (*Hydrilla verticillata*) continued in FY 88 between the State of Maryland, the Commonwealth of Virginia, the District of Columbia, Washington Metropolitan Council of Governments and the United States Army Corps of Engineers. In FY 88, seven sites were mechanically harvested in Maryland. These sites were all located along the Prince George's County shoreline and comprised approximately 23 acres.

Non-Structural Shore Erosion Control Program

Non-Structural Shore Erosion Control (NSSEC) program activities included selection of a total of 29 projects for design and installation of shoreline stabilization projects on privately owned lands. These projects represent a total of 10,880 linear feet of shoreline.



19" Youghiogheny Brown Trout



The average cost for a private property project is equivalent to \$54.53 linear foot of shoreline, for product design, site preparation and planting of intertidal marsh vegetation to stabilize eroding shorelines.

Chesapeake Bay National Estuarine Research Reserve

On October 28, 1987, the National Oceanic and Atmospheric Administration (NOAA) gave preliminary approval to three sites nominated by the department earlier that year. The sites are Otter Point Creek, in Harford County; Jug Bay, in Anne Arundel and Prince George's Counties; and Adkins Marsh/Kingston Landing, in Talbot County. DNR requested Preacquisition funding and formal approval by NOAA to begin the site designation process. After conducting numerous meetings with NOAA personnel, county representatives, and site owners, NOAA authorized DNR to begin the formal designation process on June 29, 1988. Public meetings and the preparation of a draft EIS/management plan will be completed during the coming fiscal year as part of the process.

Program staff worked with other state agency personnel, local government staff, and environmental groups to increase general awareness of the estuarine reserve program. In particular, utilization of the designated site at Monie Bay and of proposed sites by researchers and educators was stressed. As part of this effort, four proposals for NOAA-sponsored research at Monie Bay were received.

Program staff also worked with NOAA personnel and staff from other states to improve the estuarine reserve program on a national level.

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; providing local technical assistance; and overall coordination activities as indicated in the Coastal Zone Management Program (CZMP) Memoranda of Understanding.

Due to the broad nature of the CZMP, the types of projects reviewed include erosion control, dredge and fill,

municipal and industrial waste disposal, filling within the 100-year floodplain, shoreline residential development, and transportation.

A special aspect of project review activities are those involving a Federal action. The Coastal Zone Management Act (CZMA) requires that Federal activities in the coastal zone be consistent to the maximum 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 950 projects, the majority consisting of U.S. Army Corps of Engineers permits, Clearing-house projects, WRA regulatory actions, and Chesapeake Bay Critical Area project proposals. A major development proposal in which the Program was involved is Port America, a luxury, mixed-use waterfront development and international business center to be located at Smoot Bay on the Potomac River in Prince George's County. Along with other environmental review agencies, the Program was instrumental in minimizing the environmental impacts of the proposal, and played a key role in determining appropriate mitigation for unavoidable impacts. Mitigation will consist of the construction of a fish

ladder at Little Falls dam on the Potomac River.

The Local Technical Assistance Program is that element of the Coastal Zone Management Program (CZMP) aimed at involving local governments in the implementation of Maryland's CZMP and promoting consideration of coastal zone management concerns in their planning and regulatory activities. Through this Program there are two forms of technical assistance provided to local governments: financial assistance through local contractual agreements; and technical assistance in the review of local plans and projects.

Financial assistance is provided to enable the local governments to undertake activities which incorporate the goals and objectives of the CZMP into their planning and regulatory activities. Examples of such activities include: improvement of procedures for day-to-day review of projects from an environmental and general coastal zone management perspective; the development of comprehensive plans, zoning ordinances, and subdivision regulations which take into account coastal zone management objectives; and undertaking special projects.

Examples of the types of special projects that the local governments un-



Fishstocking, Leaking Park, Baltimore



dertake include: habitat assessment studies, stream surveys, remote sensing of habitat and development of non-tidal wetland protection programs, land preservation and recreation plans, and comprehensive land use plans.

Land and Water Activities

Activities of this project included:

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

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

The recreational Boating Program coordinates boating activities for DNR and is responsible, along with other agencies in the Department, for the development of policies for the boating industry. This program also staffs the Boat Act Advisory Committee which provides review and comment to the Secretary of DNR on safety standards for boats and speed limits. During FY 88, a new issue of the Guide for Cruising Maryland Waters was published.

In FY 88, a major project within the Recreational Boating Program was the investigation of the possibility of establishing an inland lake to be used primarily as a competitive training area for waterskiing. Interest about this project has been great, and efforts centered on locating a sand and gravel pit that needs reclamation. Other major efforts included a project aimed at increasing the number of pumpout facilities available for boaters and supplying the list of approved anti-fouling paints to boaters.

Resource Management Improvement Grants are awarded to local jurisdictions for projects in the Coastal Zone. These include projects such as riverfront parks in Princess Anne and Harford Counties. Other projects include a boardwalk and crabbing/fishing pier in Ocean City, easement

acquisition along the Lower Gwynns Falls in Baltimore City, and a canoe launch area along the Patuxent in Prince George's County.

Monitoring & Data Management

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

The Chesapeake Bay program Computer Center is located at the EPA Annapolis Liaison Office. Maryland provides current and historical fisheries and habitat monitoring data to the computer center.

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

The monitoring program conducts long-term field studies. Since 1983, data has been collected on the abundance and survival of early life stages and anadromous fish and the quality of spawning habitats in the Choptank River and the upper Chesapeake Bay. Water during spawning, and rainfall occurring during early larval stages appear to influence the success of striped bass reproduction in the Choptank River. Intensive monitoring of oyster mortality in relation to habitat conditions was initiated in 1986. This study includes intensive monitoring of oyster survival and hydrography in the Choptank River in cooperation with the University of Maryland. In 1987 the project was dovetailed with comprehensive interagency studies of dissolved oxygen dynamics in central Chesapeake Bay. The discovery of high oyster mortalities in the Choptank River in early summer 1987 alerted state biologists and managers to a bay-wide epizootic of the MSX parasite. The continuation of this study in FY 88 has shown only negligible early summer oyster mortality.

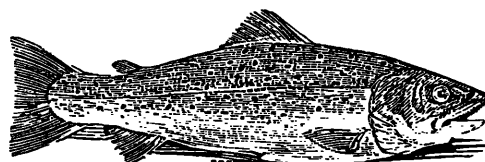
The program provides scientific coordination, data management and report preparation for monitoring of the environmental impacts of the Hart-Miller Islands dredged material containment facility. The program is also conducting computer modeling studies of the effects of Conowingo Dam operation on salinity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

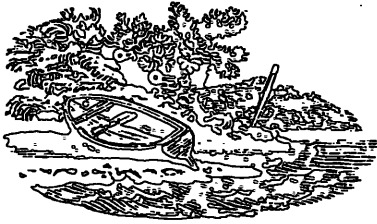
Program staff have assisted with the technical and management aspects of the Chesapeake Bay Restoration through participation on several subcommittees and work groups. Much of the staff work on two Bay Agreement Commitments, and the Living Resources Monitoring Plan, Habitat Requirements for Chesapeake Bay Living Resources, was provided by monitoring and Data Management.

To aid in understanding problems of living aquatic resources, the program has supported research on the physiological responses of striped bass and oysters to water quality, food quality and parasitic disease.

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 the unit. Staff support is provided to the Coastal Resources Advisory Committee (CRAC).





WATER RESOURCES ADMINISTRATION

... responsible
for the
protection,
management and
development of
Maryland's water
resources

The Water Resources Administration is responsible for the protection, management and development of Maryland's water resources and accomplishes its mission through the following organizations for FY 88:

- General Direction
- Watershed Protection including Waterway Permits, Flood Management and Enforcement Divisions.
- Water Management Program including Dam Safety, Water Supply and Technical Services Divisions.
- Resource Protection Program including Surface Mining, Wetlands and Nontidal Wetlands Divisions.
- Bureau of Mines including Abandoned Mine Lands, Coal Mine Permits and Coal Mine Enforcement Divisions.

GENERAL DIRECTION

The overall direction, supervision and coordination of the policies and operations of the Administration are carried out, as well as, the coordination of public notices and hearings, and public information activities.

The Water Resources Advisory Commission met to discuss activities and policies of the Administration.

WATERSHED PROTECTION PROGRAM

Waterway Permits Division

The Waterway Permits Division reviews

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

Major activities during FY 88 included changes to regulations (COMAR 08.05.03—Construction on Non-Tidal Waters and Floodplains), to require permits for activities that change the course, current or cross-section of the channel of a class III trout stream of less than 100 acres drainage area whenever water is flowing in the stream.

The Division received a total of 1109 permit applications for FY 88. This is an increase of approximately 5 over FY 87 and reflects in part the increase in construction activities. A total of 653 permits were issued in FY 88.

Flood Management Division

The Flood Management Division administers the Flood Hazard Management Act which mandates comprehensive planning and design of flood management projects and provides for a grant program to aid local subdivisions in the implementation of projects for mitigating flood hazards. Technical assistance is provided on watershed modeling, flood management planning, methods of mitigating flood hazards and damage, local flood warning systems and local flood management ordinances. The Division coordinates and promotes the National Flood Insurance Program (NFIP) in

The Waterway Permits Division's activities included:

Type of Project	Applications Received	Permits Issued
Maintenance and Repairs	116	32
Temporary Construction	250	139
Waterway Construction	482	359
Small Ponds	28	13
Preliminary Project Plan Review	233	0

Maryland. Under the Federal Emergency Management Agency's Community Assistance Program, evaluation and assistance visits to 31 communities participating in the National Flood Insurance Program were conducted. All 112 flood-prone Maryland communities are required to amend their floodplain management ordinances to remain in the NFIP. The Division initiated this activity in 1988 and has provided assistance to over 50 communities.

Technical assistance to State agencies and local governments is being provided by the Division during the multi-year, federally funded Hurricane Evaluation Study. This study will identify potential hurricane damage areas and develop evacuation scenarios. The Division had an important role in developing and executing the statewide Hurricane Emergency Response Exercise.

Enforcement Division, with a staff of 15 inspectors, is responsible for ensuring compliance with WRA permits including waterway construction permits and small pond permits, wetlands licenses and permits surface mining permits and water appropriation permits.

The Enforcement Division conducted 9117 inspections on job sites in FY 88, investigated 745 citizen complaints and issued 425 notices of violation.

Major activities of the Division for FY 88 included the purchase of a tap top computer in November, 1987 to determine if it could improve the efficiency and quality of work for the inspectors. Large gains were noted in both areas. Sixteen additional units were purchased and will be fully operational in the first quarter of FY 89.

WATER MANAGEMENT PROGRAM

Dam Safety Division

The Dam Safety Division is responsible for managing the safety of the State's 310 inventoried dams as well as the permitting of new dams. Other activities of the Division include: conducting periodic safety inspections of dams, making construction site visits, assisting local civil defense agencies in the preparation of Emergency Warning Plans, enforcing dam safety violations,

Flood Management Division received six capital project grant applications from five jurisdictions. Funding was approved for the following projects:

Town of Federalsburg — acquisition of two-flood-prone homes	\$ 33,250
Allegany County — acquisition of flood-prone homes in Wills Creek	\$ 100,000
Prince George's County — Western Branch Flood Warning System	\$ 75,000
Howard County — Patapsco River Flood Warning System	\$ 60,000
Frederick City — Carroll Creek structural flood control project	\$2,000,000
Prince George's County — Folly Branch detention structure	\$ 309,000

and providing technical assistance to Maryland dam owners.

In FY 88 the Division's major efforts included:

- Initiating fish passage for the dams in the Patapsco River watershed.
- Holding two dam safety seminars to educate owners on the basics of dam operation and maintenance

The Division completed safety inspections of 88 facilities, reviewed 17 permit applications, and provided technical assistance to 100 dam owners.

Although there were no major dams under construction in FY 88, the Division issued several permits. The most notable of these is the new Piney Dam for the City of Frostburg.

Water Supply Division

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

Water Appropriation and Use Permit Section

This Section regulates the withdrawal and use of water in the State to protect the quality and quantity 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 more than 15,000 active water appropriation permits on file. An additional 1,600 surface and ground water appropriation permits are being processed annually by the Section.

In FY 88 the Section passed two significant milestones. First, comprehensive regulations on water appropriation or use became effective on March 7, 1988. Second the 1988 legislature, through the passage of House Bill 206, Water Appropriation or Use Permits, brought the agricultural community into the permit process by removing certain exemptions for farming.

Major FY 88 cases handled by the Water Appropriation and Use Permit Section include:

- Analysis of impacts associated with an application submitted by the Mettiki Coal Company to increase the dewatering rate at a deep mine in southeastern Garrett County.
- Analysis of impacts associated with an application submitted by the Lehigh Portland Cement Company to open a dewater a new stone quarry south of the Town of New Windsor.
- Issuance of surface water appropriation permits to the Town of North East for a combined annual average withdrawal of 870,000 gallons of water per day (gpd) from Northeast Creek and Little Northeast Creek.
- Issuance of three water appropriation permits to the Town of

Thurmont for a combined annual average withdrawal of 500,000 gpd from ground and surface water source.

- Issuance of three ground water appropriation permits to the Easton Utilities Commission for a combines annual average of 2,000,000 gpd for their municipal distribution system.

Water Supply Planning and Engineering Section

This Section analyzes area-wide effects of collective water appropriation in view of a region's future water supply and demand, identifies regional water supply resources problems, and formulates management alternatives. Computer ground water and management models have been developed and utilized in forming plans for development and conservation of regional water supply resources. Implementation of those plans occurs through the water appropriation permit process. An important component of the Section's work has been establishing and maintaining a water use data system. Other responsibilities of the section include water supply reservoir planning and development, mitigation of consumptive water losses through non-structural techniques, initiation of local water conservation programs and coordination of water supply planning activities with the neighboring state, U.S. Army Corps of Engineers, the Interstate Commission on the Potomac River Basin and the Susquehanna River Basin Commission.

Major FY 88 activities of the Water Supply Planning and Engineering Section include:

- Publication of the "Georges Creek Watershed Concept Document" directing the ongoing water supply resources development and management plan for the area.
- Publication of the Quantity and Natural Quality of Ground Water in Maryland (second edition), which brings together, in an easily understandable and graphical form, existing information about Maryland's diverse ground water resources.
- Completion of the water supply resources evaluation for North-eastern Worcester County, Maryland and Southeastern Sussex County, Delaware.

- Development and implementation of a program which certifies well conversion costs in Somerset County incurred as a result of declining water levels due to pumping at the Eastern Correctional Institution.
- Evaluation of water supply resources for the Town of Boonsboro, Washington County and the Town of Charlestown, Cecil County.
- Development and implementation of comprehensive water conservation programs for Anne Arundel County, Charles County and the Town of Aberdeen, Harford County.

Technical Services Division

The Technical Services Division provides various services and support to WRA and other DNR agencies.

The Division's surveying and drafting team conducts surveys for clarification of boundaries for permitting and enforcement of various WRA permits and licenses; development of site plans for construction of parks and buildings; 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 well drilling crew in locating and mapping elevations and distances of monitoring wells.

The geotechnical investigations section of the Division is assigned responsibility for drilling test boring and constructing monitoring, observation and recovery wells. These services are requested by other WRA divisions in connection with monitoring seepage of dams, determining the extent of ground water contamination, collecting data on soil suitability for building construction, obtaining soil samples and conducting percolation testing.

Major FY 88 activities of the Division included:

- Survey of bay bottom and beach profiles at three demonstration sites for Tidewater Administration.
- Assisted Water Supply Division with the monitoring of an aquifer test in Elkton.
- Conducted Surveys of 14 houses to determine flood elevations.

- Established election of 13 monitoring wells used by Maryland Geological Survey.

RESOURCE PROTECTION PROGRAM

Wetlands Division

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

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

The Division received 1130 applications requiring State and Private wetland licenses. Licenses and permits were granted for 773 projects and authorization letters were issued for another 126 minor projects. On 231 projects, applicants were advised that no license was necessary. For those projects that received approval, approximately 120 acres of wetlands were impacted.

Of all permit applications received, approximately 80 were for shore erosion control. Approximately 82 of these projects allowed for less than a 10 foot encroachment channelward of the mean high water. An additional 21 acres of vegetated wetlands were established for shore erosion control and as a mitigation for otherwise environmentally unacceptable works.

Work continued on the Division's computerized geographical data storage system for the tidal wetland boundary maps.

Nontidal Wetlands Division

The Nontidal Wetlands Division provides technical assistance to local governments in developing nontidal wetland protection programs, project review, training and education, and in developing a computer database for statewide wetlands monitoring. The Division provides comment on all issues relating to nontidal wetlands.

Activities of the Division for FY 88 included:

- Principal staff support to the Governor's Nontidal wetland Task Force and the Chesapeake Bay Wetlands Policy Workgroup was provided.
- Four training workshops in wetlands identification and classification for local government, consultant, and state personnel were conducted.
- Environmental review and comments on over 100 development projects impacting nontidal wetlands were processed.

Surface Mining Division

The Surface Mining Division seeks to assure environmental safeguards in the operation and reclamation of non-fuel (e.g. sand, gravel and stone) surface mines and prevent hazards to public safety from such activities. The Division issues licenses and permits. It establishes permit conditions, reviews and evaluates mining and reclamation plans, and makes an annual review of each permit. Funds received from license fees, permit fees and other sources are held in the Surface Mine Land Reclamation Fund to be used for reclamation of abandoned non-fuel surface mines. At the end of FY 88 there were nearly 10,808 acres of land being used for surface mining by approximately 380 license operators.

Reclamation under the abandoned mine reclamation fund was initiated for the following sites in FY 88:

- The Charles County Commissioners and Greater Waldorf Jaycees received a grant in the amount of \$34,620 to reclaim an abandoned sand and gravel mine and develop a sports field complex.
- The Board of Public Works awarded a contract to Laurel Sand and



St. Mary's County Wetlands

Gravel, Inc. in the amount of \$533,315 for the reclamation of a 145 acre site known as the Magruder-Raulin tract. The project is located in Laurel, Prince George's County. The site has been identified as one of the major potential contributors of sediment and sedimentation in the Indian Creek Watershed, a tributary to the Anacostia River.

- Restoration of the A.L.E.R. bond forfeiture site in Lexington Park, St. Mary's County, was completed in June, 1988.
- Restoration of the Robinson tract was completed in June, 1988. The work was completed under a grant to the Maryland National Capital Park and Planning Commission in the amount of \$92,802 for the reclamation of an abandoned sand and gravel mine approximately 60 acres in size.

BUREAU OF MINES

Abandoned Mine Lands Division

This division promotes the reclamation of all abandoned mine areas that have been left in an inadequately reclaimed condition and continue to endanger the health or safety of the public, degrade the quality of the environment, or diminish the beneficial use of land and water resources.

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 88, state funds were utilized for five abandoned mine projects, totaling \$119,325.

In the federally funded program, grants are used for reclamation of the adverse impacts of past coal mining practices. During FY 88, the Bureau requested and received federal funding totaling \$1,708,418 for seven abandoned mine reclamation projects. Construction was conducted on eight projects costing \$526,600 during FY 88.

Coal Mine Permits Division

The Coal Mine Permits Division reviews applications and issues permits for surface and underground coal mining operations. Applications include legal and resource information, detailed engineering design plans, and geologic and hydrologic assessments of the permit and adjacent area. The Permitting division is responsible for assuring that proposed coal mining operations are planned in a manner to prevent or mitigate potential adverse environmen-



tal impacts. Field reviews of the proposed sites are conducted in conjunction with other interested agencies, public comments solicited, and in-depth technical reviews performed. Upon approval of an application, the applicant is required to post a reclamation bond with the State prior to permit issuance. A variety of permitting actions occur each year ranging from adding a fraction of an acre to an existing permit to permitting a new mine in a previously undisturbed area.

FY 88 permitting activities included:

- Approval of 5 original permit applications.
- Approval of 9 major amendments to existing permits.
- Approval of 19 minor amendments to existing permits.
- Approval of 2 permit transfers.
- Denial of 1 application.

Coal Mine Inspection and Enforcement Division

The Inspection and Enforcement Division is responsible for the inspection and enforcement of all surface coal mining and deep mining permits to ensure compliance with the Maryland Regulatory Program.

Major activities for this Division for FY 88 include:

- Inspectable Units 118*
- Inspections 617
- Notices of Violations Issued 34
- Cessation Orders Issued 26
- Civil Penalties Collected \$7,800
- Citizen Complaints 14
- Permits Revoked 2**
- Permits Forfeited 1

*111 Surface Mines; 3 Deep Mines; 14 Preparation Plants

**1 Revocation remains under appeal

Other Reclamation Activity

The Bureau of Mines staffed the State Land Reclamation Committee which reviewed 8 permits, 16 abandoned mine lands and 2 reclaimed forfeited sites when conducting their annual mining progress reviews. Also, the committee evaluated the revegetation on 75 sites and voted to release or

reduce bond on 699 acres from a total of 835 eligible acres.

The Bureau and Committee, through a joint effort, are promoting the tree and a shrub planting on reclaimed mined areas and during the year a total of 206 acres were planted. This is a 25 percent increase from the previous year. A goal of 250 acres planted has been set for the coming year.

In a Natural Resources Emergency or for assistance, telephone (301) 267-7740, (301) 974-3181, or 1-800-492-1138 twenty-four hours a day.

The facilities and services of the Department of Natural Resources are available to all without regard to race, color, sex, age, national origin, physical or mental disability.

STATE OF MARYLAND BUDGET 1989

TOTAL \$9,105,537,253

Public Safety and Correction	\$	534,148,951
General Services		41,619,900
State Reserve Fund		111,605,200
Financial & Revenue Administration		193,774,434
Executive & Administrative Control		236,057,617
Judicial Review & Legal		130,605,609
Legislative		33,526,984
Public Debt		243,711,336
Civil Divisions		116,104,719
NATURAL RESOURCES		160,540,514
Housing & Community Development		115,978,703
Economic and Employment Development		119,736,507
Transportation and Highways		1,862,053,609
Human Resources		697,040,853
State Planning		6,198,391
Agriculture		36,049,956
Licensing and Regulation		31,414,402
Health and Mental Hygiene		1,725,068,702
Budget and Fiscal Planning		6,657,915
Personnel Administration		107,259,039
Education		2,554,931,181
Environment		41,452,671

DEPARTMENT OF NATURAL RESOURCES 1989 BUDGET

TOTAL EXPENDITURES \$160,540,559

Maryland Geological Survey	\$	2,624,364
Tidewater Administration		46,237,023
Office of the Secretary		10,226,198
Hazardous Waste		115,427
Natural Resources Police		11,473,852
Power Plant Research Program		5,971,977
Capital Programs Administration		43,454,808
Maryland Environmental Trust		324,194
Forest, Park and Wildlife Service		31,211,713
Water Resources Administration		7,516,158
Maryland Environmental Service		1,384,845

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Maryland Department of Natural Resources
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