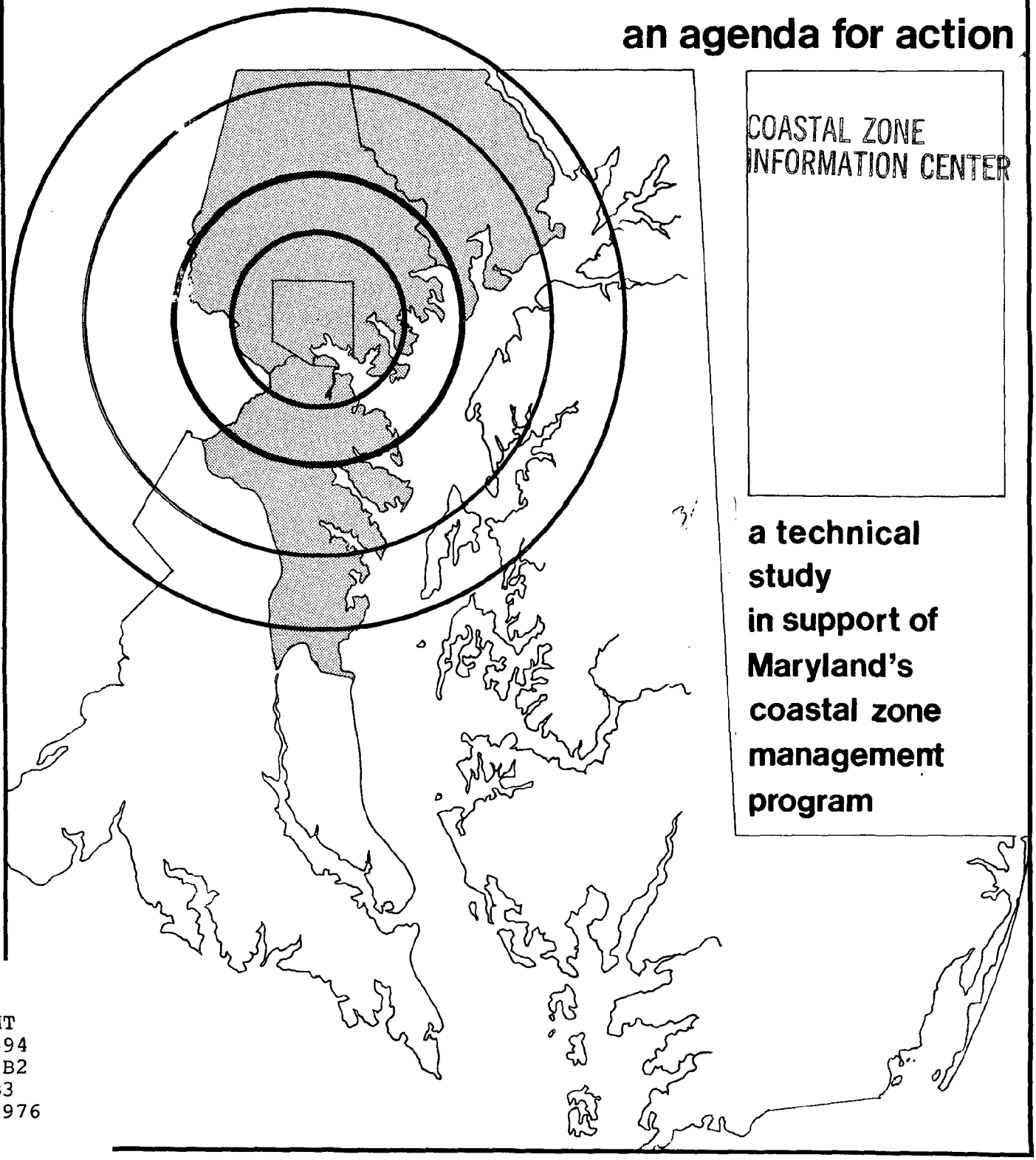
14000

# Baltimore Metropolitan Coastal Area Study

## an agenda for action



COASTAL ZONE
INFORMATION CENTER

a technical study in support of Maryland's coastal zone management program

HT
394
.B2
B3
1976

14000

# BALTIMORE METROPOLITAN COASTAL AREA STUDY
# AN AGENDA FOR ACTION

COASTAL ZONE
INFORMATION CENTER

A Technical Study in support of Maryland's Coastal Zone Management Program produced by an interagency Task Force and Technical Committee to meet the needs of coastal zone management program development and HUD 701 land use planning for the Baltimore coastal region.

Baltimore, Md.
March 1972

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

CZIC COLLECTION

Maryland. Regional Planning Council
HT394.B2 B2 1972
569915
MAR 24 1997

Property of CSC Library

The preparation of this report was made possible in part through demonstration funding from the Department of Housing and Urban Development and the Office of Coastal Zone Management. The purpose of these demonstration grants was to coordinate ongoing HUD 701 comprehensive and land use planning activities with coastal zone management program development.

# INTRODUCTION

This study was produced by the cooperative action of four jurisdictions—Harford County, Baltimore County, Baltimore City, and Anne Arundel County—along with the Regional Planning Council, the Department of Natural Resources, and several other State agencies. Their purpose in working together was to devise better means of responding to coastal-related problems.

This document represents their frank estimation of what should be done within the Baltimore metropolitan coastal area to better preserve resources and control the use of land. It is not a 'plan' but rather a set of recommendations on actions to be taken by the participants in coastal decision-making—citizens, local governments, regional groups, and state government. It should be viewed as the first of three steps. First, coastal problems must be described, recommended solutions put forth, and commitments made to analyze the proposed solutions. This study accomplishes these items. Second, the governments and agencies of the coastal area must endorse, implement, or reject the recommendations. Third, a follow-up report must be prepared on the fate of the recommendations and the new commitments of the study participants to coastal zone management.

This document, then, can be used as a guide to the region's attempt to coordinate action, build consensus, and resolve conflict in the preservation, conservation, and use of its coastal lands and waters.

Authorship of the Study was the responsibility of the . . .

*Task Force*

Bill Carroll—Harford County
Cary Hinton—Baltimore County
Alain Jaramillo—Baltimore City
Tom Ervin—Anne Arundel County
Ginger Klingelhoefer—Anne Arundel County
Beth Reynolds—Anne Arundel County
Dick O'Connor—Anne Arundel County
Rob Hrabak—Regional Planning Council (Interim Project Director)
Barry Garber—Regional Planning Council
Jacob Kaminsky—Regional Planning Council (Initial Project Director)
Joel Hirsch—Maryland Department of Transportation
John Starr—Maryland Port Administration
Matthew Norman—Graphics
Bruce Galloway—Technical Director
Louis Hecht Jr.—Project Manager, Coastal Zone Unit, Department of Natural Resources

Policy direction of the Study was the responsibility of the . . .

*Technical Committee*

Charles Albrecht—Department of Health and Mental Hygiene
Gary Rosenbaum—Department of Transportation
David Carroll—Baltimore City Department of Planning
Don Clifford—Department of Economic and Community Development
Stoney Fraley—Department of State Planning
Al Gwynn—Regional Planning Council
Louis Willett—Maryland Port Administration
Louis Hecht Jr.—Department of Natural Resources
Ken Green—Harford County Planning and Zoning
Paul Solomon—Baltimore County Planning and Zoning
Jeffrey Frank—Anne Arundel County Planning and Zoning
John Wolf—Maryland Environmental Trust

# BALTIMORE METROPOLITAN COASTAL AREA STUDY
# AN AGENDA FOR ACTION

CONTENTS: ..... v


I—WHY? ..... 1

II—THE METROPOLITAN COASTAL ZONE ..... 9
- The Boundary ..... 9
- Assumptions About the Future ..... 15

III—OPPORTUNITIES FOR COASTAL MANAGEMENT ... 19
- The Critical Areas Program ..... 19
- Geographic Areas of Particular Concern ..... 20
- Management Concerns ..... 21
- Goals and Objectives ..... 25

IV—COASTAL PROBLEMS AND RECOMMENDATIONS .. 27
- The Quality of Our Waters ..... 28
  - Land Activities and Water Quality ..... 28
    - Standards and Permits ..... 28
    - Enforcement ..... 29
    - Planning ..... 30
    - Basin Plan Recommendations ..... 32
      - Lower Susquehanna ..... 33
      - Bush River ..... 33
      - Gunpowder River ..... 36
      - Patapsco River ..... 38
      - West Chesapeake ..... 40
    - Flow Reduction ..... 42
    - Septic Systems ..... 43
    - Sewerage Systems ..... 43
    - County Sediment Control Programs ..... 45
  - Water Activities and Water Quality ..... 48
    - Shellfish and Finfish Resources ..... 48
    - Recreational Boating ..... 50
    - Commercial Boating ..... 54
- The Land/Water Edge ..... 55
  - The Port of Baltimore ..... 56
  - Water-Related Employment Centers ..... 58
    - Canton ..... 60
    - Boston St./Fells Point/Falls Harbor ..... 62
    - Locust Point ..... 62
    - Hawkins Point ..... 63
    - Fairfield/Curtis Bay ..... 64
    - Harford County ..... 65
  - Transportation Facilities in the Baltimore Harbor Area .... 65
  - Spoil Disposal ..... 70
  - Wetlands and Aquatic Vegetation ..... 75
  - Shoreline Erosion ..... 82
  - Flooding ..... 83
  - Marinas ..... 84
  - Public Access to the Shoreline ..... 88
  - Parkland ..... 90

Inland Coastal Areas ..... 95
Non-Water Related Employment Centers ..... 95
Harford County ..... 95
Baltimore County ..... 95
Baltimore City ..... 96
Anne Arundel County ..... 97
Land Transportation ..... 98
Air Pollution ..... 106
Solid Waste ..... 108
The Loss of Resources ..... 110
Archeological and Historic Resources ..... 110
Natural Areas ..... 113
Agricultural Resources ..... 116
Mineral Resources ..... 119
Growth Pressures and Their Management ..... 121
Urban Service Areas ..... 122
Rural Service Areas ..... 123

V—SOLVING COASTAL PROBLEMS ..... 127
The Metropolitan Advisory Board ..... 131
Action Commitments ..... 131
Harford County ..... 131
Baltimore County ..... 132
Baltimore City ..... 132
Anne Arundel County ..... 133
Regional Planning Council ..... 133
Department of Natural Resources/Coastal Zone Unit ..... 134
Department of Economic and Community Development ..... 134
Department of State Planning ..... 135
Department of Transportation ..... 137

APPENDICES:
A—State Management Program Goals and Objectives ..... 139
B—Finfish and Shellfish ..... 143
C—Transportation Systems ..... 147
D—National Register Listings ..... 153
E—Technical Work Products ..... 155

Footnotes:

# PART I—WHY?

In his colorful book on the Chesapeake Bay, *Beautiful Swimmers*, William W. Warner notes an observation by the Bay watermen about their place of work . . . "As they go out year after year, the water seems to be changing. It may be, they think, that it is everywhere getting a little tired. Each summer there are more fish kills and in winter you can sometimes see strange little red dots suspended in the water. Old, tired and a little messy, you could even say. Age is coming to the Bay, too, perhaps. Simple as that."

Simple as that? It could be. Make note of the power plants, the erosion and silt, channel dredging, and raw sewage and listen to the public outcry at these threats but also look at the water. It does look tired, old beyond its years. Its not the Bay that even the youngest among us remembers. We expect growth and change in ourselves but we do not expect it in a body of water whose life span is measured in millions of years. In geologic time, the Bay is now in early middle age—about a million years old. Not so long ago it would have been popular and droll to point out that long before the Bay reaches full maturity the hand that has littered its beaches and raided its waters will have utterly vanished from the face of the earth and joined the mastodons that once roamed its shores. There is no longer any philosophical solace to be found in that statement. We might outlast the Bay. Its getting tired.

Among the grains of sand on the beach at Gibson Island are tiny golden flecks of solidified resin left by an ancient evergreen forest. The horizontal black lines in the yellow clay banks of the Magothy River are all that is left of acres of trees and grasses. The remains of an entire forest of cycad trees were once uncovered in Baltimore City. They had shaded the Westport area over a hundred million years ago. Discover time and discover that a million years ago a part of the Susquehanna river valley slid into the sea. The drowning of the valley gave us the Bay. Discover time and discover the ghosts of countless plants and animals crowding into each grain of sand and drop of water. Discover time and discover each interlocked piece of the Bay . . .

Otter Creek marsh in Harford County is one of the few large and undisturbed freshwater marshes remaining in the Chesapeake Bay area. It is a protected 400 acre tidal marshland teeming with life. Its vegetation, decayed organic matter, and microscopic organisms serve as the base of a food chain that supports a large population of finfish and shellfish, reptiles, birds, and mammals. It is a vital link in the ecology of the Bush River and the Chesapeake Bay. But it is also close to Routes 40 and I-95 in an area of high development potential. Both the previous and current Master Plans for Harford County allow for relatively intense development surrounding the entire marsh.

In 1975 a major development proposal was submitted for an area adjacent to the marsh. Harford County lacked floodplain district regulations and an effective sediment control ordinance. The planned filling of some of the marsh, the erosion from construction activity, and the long-term pollutant contribution of stormwater runoff from the developed area were beyond the County's control and the end of Otter Creek marsh was foreseen.

Only citizen action by the Harford County League of Women voters, supported by the Department of State Planning and the Coastal Zone Unit of the Department of National Resources prevented destruction. These two parties joined in a court suit contesting the approval of the development plats and began negotiations with the developer. In 1977 the court suit was dropped and the developer agreed to preserve the threatened wetlands, maintain a natural buffer strip, and install stormwater management systems that would restrict flow into the marsh. In the meantime, Harford County passed a more effective sediment control ordinance (requiring a 75' buffer strip adjacent to wetlands) and added a Flood Hazard Control article to its zoning ordinance.

The Otter Creek marsh incident has two sides. On the one hand, an area vital to the functioning of the upper Bush River was narrowly saved from harm, and on the other, a developer was subjected to long and unexpected delays and experienced cost increases which he will have to pass on to his customers. Why did all this happen? First, there was a lack of understanding by many of the parties about the value of wetlands to Bay ecology and the overall environmental quality of the immediate area. Both private developers and government officials would be less inclined to allow the destruction of a marsh if they understood that the result would be poorer water quality, fewer fish, less wildlife, and more flood damage. Second, there was no one within the County government with the direct responsibility of overseeing the protection of sensitive coastal areas. The project just slipped through. The Otter Creek Marsh experience points out that all coastal

governments should have the authority and administrative structure necessary to monitor the use of sensitive coastal resources.

Verrazano sailed past the mouth of the Bay in 1524 and gave us the first European record of its existence. Brother Carrera came next in 1572 and noted that it possessed the largest and best ports in the world. Captain Vincente Gonzales arrived in 1588 and was probably the first European to sail the upper Bay. By century's end, Queen Elizabeth had chartered the Company of Gentlemen Adventurers of London and with the patriotic words of Hakluyt ringing in their ears and the spirit of competition with the Spanish and Portuguese coursing through their veins, the Gentlemen Adventurers sat back and invested in a new settlement called Jamestown. The unfortunate Adventurers lost their investment but accessibility to oceangoing shipping, rivers and streams providing easy transportation, and fertile tobacco land made the area boom and settlers and settlements spread throughout the region.

Although the plantation system that grew around tobacco discouraged the growth of urban centers, such towns as Annapolis, Oxford, and Chestertown thrived as shipping centers in the 17th century and well into the Eighteenth. As the colonists moved along the rivers inland from the Bay, they soon found their way barred by rapids. At the present sites of Havre de Grace, Baltimore, Washington, Fredericksberg, Richmond, and Petersburg, they reached the head of navigation of the Susquehanna, Patapsco, Potomac, Rappahannock, James, and Appomattox Rivers. These cities are all at the junction of the coastal plain and the Piedmont plateau and the geographic contour connecting them is known as the fall line, after the rapids located there. At these natural points of rest and change in form of transport, towns grew in great number.

Baltimore was founded in 1729 by the colonial legislature and laid out with 60 acres and 60 lots. It was the third Maryland town to have the name and looked as though it was fated to follow its predecessors. Its harbor was a shallow stream, its hinterland was small and tobacco continued to follow the old routes to Elk Ridge Landing and Joppa. Indeed, by 1748 only eight ships offered to haul freight out of the town. But Baltimore had one thing the other communities lacked, waterpower from the Jones Falls, Gwynns Falls and the Patapsco to drive the machinery that turned local grains into flour. Based on trade in flour and wheat, a small amount of tobacco, and a local ore deposit, Baltimore began to grow. From 25 homes in 1752, it became the largest town in the colony by 1772. In 1787 it contained 2000 homes; in 1795, 3000; and by 1802 it had become the fourth largest port in the country.

During the first half of the 19th century, the entire Bay region fell behind the expanding economic and political strength of the north and west. Baltimore struggled to keep pace with the northern ports, the other fall line towns, and with its prime shipping opponent, Norfolk. States vied with one another for canals and railroads to serve their ports. A canal began up the Potomac, another went west from Richmond, a railroad connected Baltimore and Pittsburgh, and in 1829 the Chesapeake and Delaware Canal connected the upper Bay with the Delaware River. Fate favored Baltimore and Maryland over Norfolk and Virginia. Railroads proved more profitable than canals and the Baltimore and Ohio RR captured the products of the midwest and much of the northern and western Virginia trade. The battle was over for a while and Baltimore rapidly expanded not only as a distribution point but as a center of production.

Many colonial fall line communities are now well above the head of navigation. In the 1700's Port Tobacco, Harford-on-the-Bush, Joppa Town, and Upper Marlboro were ports. Now, Upper Marlboro is eight miles above navigable waters . . .

The maintenance of a major port requires maintenance of the shipping access channels to the port. Maintenance of these channels requires dredging and dredging creates spoil. Of the various land use issues in the coastal plain, none has been more controversial than the proposal by the State of Maryland to establish a spoil disposal facility adjacent to Hart and Miller Islands off the shoreline of Baltimore County. This controversy began in the late 60's and continues unabated today.

The Hart Island chain consists of three separate islands totaling 120 acres approximately one mile southeast of Rocky Point. Together with Back River Neck, they form a body of water known as Hawk Cove, an area of heavy pleasure boat use. The islands themselves are uninhabited and are for the most part woodland and wetland.

In the late 1960's it became obvious that the dumping of dredged spoil overboard into the Bay would soon halt because of pressure from watermen and the Environmental Protection Agency. In addition, the deep holes at Kent and Pooles Islands where most of the dumping had taken place historically were filled or nearing capacity. So, on May 2, 1969, the Maryland legislature passed a bill which provided for the funding of diked spoil disposal facilities. The amount funded was $13,000,000. This sum was to be expended both for the design and the construction of one or more diked disposal areas and other facilities to receive dredged spoil from the harbor and approach channels.

Two engineering firms were hired by the State to select suitable sites and provide preliminary design. They selected 70 sites for review. Of these, five were finally recommended with Hart and Miller Islands at the top of the list. The consultants said that the Hart and Miller Island site could contain 54 million cubic yards of spoil or that which would be generated by the actual deepening of the approach channels to Baltimore Harbor. (It had previously been determined necessary to deepen these channels from 42 to 50 feet to provide the necessary draft for the larger vessels being constructed.) In addition, they said that the site could be enlarged to hold an additional 46 million cubic yards of spoil to be generated by maintenance dredging over the next 20–25 years. Based on the proposed design of the diked area, the initial 52 million cubic yards of spoil would create a land area of 1,150 acres.

50272-101

| REPORT DOCUMENTATION PAGE | 1. REPORT NO. BTL/RPC-78/011 | 2. | 3. Recipient's Accession No. |
|---|---|---|---|

**4. Title and Subtitle**
Baltimore metropolitan coastal area study; an agenda for action.

**5. Report Date**
March 1978

**6.**

**7. Author(s)**

**8. Performing Organization Rept. No.**

**9. Performing Organization Name and Address**
Regional Planning Council
2225 N. Charles Street
Baltimore, Maryland 21218

**10. Project/Task/Work Unit No.**

**11. Contract(C) or Grant(G) No.**
(C)
(G)

**12. Sponsoring Organization Name and Address**
U.S. Department of Housing and Urban Development
451 Seventh St., S.W.
Washington, D.C. 20410

**13. Type of Report & Period Covered**

**14.**

**15. Supplementary Notes**
Partial funding also from the Office of Coastal Zone Management (U.S. Department of Commerce.)

**16. Abstract (Limit: 200 words)**

This study was produced by the cooperative action of 4 jurisdictions--Harford County, Baltimore County, Baltimore City, and Anne Arundel County--along with the Regional Planning Council, the Department of Natural Resources and several other State agencies.

This document represents their frank estimation of what should be done within the Baltimore metropolitan coastal area to better preserve resources and control the use of land. It is not a 'plan' but rather a set of recommendations on actions to be taken by the participants in coastal decision-making--citizens, local governments, regional groups, and state government. It should be viewed as the first of three steps. First, coastal problems must be described, recommended solutions put forth, and commitments made to analyze the proposed solutions. This study accomplishes these items. Second, the governments and agencies of the coastal area must endorse, implement, or reject the recommendations. Third, a follow-up report must be prepared on the fate of the recommendations and the new commitments of the study participants to coastal zone management.

This document can be used as a guide to the region's attempt to coordinate action, build consensus, and resolve conflict in the preservation, conservation, and use of its coastal lands and waters.

**17. Document Analysis a. Descriptors**
Land development
Land use
Regional planning
Water quality

**b. Identifiers/Open-Ended Terms**
Coastal zone management
Chesapeake Bay

**c. COSATI Field/Group**

| 18. Availability Statement | 19. Security Class (This Report) | 21. No. of Pages |
|---|---|---|
| Release unlimited. Available from National Technical Information Service, Springfield, VA. 22161 | UNCLASSIFIED | 162 |
| | 20. Security Class (This Page) UNCLASSIFIED | 22. Price |

(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

The State of Maryland was to construct the diked facility and the Corps of Engineers was to perform the actual dredging. But, prior to any construction, a number of permit requirements had to be met by the State. The permits included:

1. A Corps of Engineers dredge and fill permit for dike construction;
2. A State of Maryland wetland permit;
3. Certification from the Water Resources Administration indicating that water quality would not be adversely affected. In addition, an environmental impact statement was to be submitted by the State to the Corps of Engineers.

The State did two things to try and gain acceptance of their proposal. First, The Department of Natural Resources established an advisory committee on the future use of the completed disposal site. This committee consisted of representatives from various local, state and regional agencies as well as representatives from the engineering consultants. The committee concluded that while both recreation and industry were the most logical uses for the site, the need for recreation and open space in the Baltimore metropolitan region was most critical. The committee formally recommended the designation and development of the island complex as a state park.

In 1972, widespread public controversy surfaced rather abruptly and quite strongly at the various hearings required by the permits. The Department of Natural Resources held several additional public information meetings which had the effect of adding more controversy because they were held after the State had made its site selection and because of the manner in which the meetings were held. This is to say the State was not very convincing in its presentation and a number of important environmental questions were left unanswered. The question of alternate land uses for the 1,150 acre site also became an issue. There was considerable fear expressed by the various citizens as well as their elected officials that heavy industrial use might be made of the site.

The State's second action was to establish the Peer Review Steering Committee. This was an attempt to provide an independent review of other possible sites for a diked spoil disposal facility. Another consultant was selected by the committee. The report prepared by this committee created even more controversy. The State argued that the Peer Review Report justified their use of the Hart and Miller Island complex as a spoil disposal site. However, the Report also raised serious questions about certain design features of the diked facility. The Report also indicated that several other sites located within the harbor, although inadequate as far as capacity, possessed advantages over the Hart and Miller Island site.

To date, the construction of a spoil disposal facility at Hart and Miller has not begun and a law suit has been initiated by a private group interested in preserving the area. All required permits have been approved, however, so that construction could begin once the State obtains title to the Islands.

The Hart and Miller Island controversy is a classic example of confusion and lack of coordination among the people and their elected officials, the applicant, in this case the State of Maryland, and the various approving and commenting agencies. The controversy could have been largely avoided if better coordination and cooperation had been sought among these groups at a very early stage. Instead, the groups have been alienated one from another, the channel remains undredged, and future projects, even if very desirable, will begin with black marks against them.

Just as towns had to shift away from port activities when the Bay waters receded and their harbors silted up so did the region's economy have to shift when the plantation system went awry. Tobacco and slaves went and diversified agriculture came but dependence on proximity to the Bayshore and the roads and railroads paralleling it remained.

While Baltimore emerged as the dominant trading center in Maryland many other settlements dotted the shoreline, due as much to the economic advantages of access to trade as the advantage of being close to the Bay's abundant seafood. The effects of Baltimore's port activity were felt throughout the region, especially through the coastal areas of Harford and Baltimore Counties, where the route of the old Post Road northward was developed into a major transport corridor. Within this corridor, US Route 40, I-95, the Chessie (B&O) railroad, and the Conrail (Penn Central) railroad run in a broad band a few miles from each other and parallel to the bayshore. In Anne Arundel County, economic development focused around Annapolis, the center of Maryland government and a major port in its own right since colonial times. Easy rail access along the Baltimore & Annapolis Railroad fostered growth north of Annapolis in such communities as Severna Park and Glen Burnie.

Today, a substantial portion of the economic activity in the Baltimore Region is still located in this coastal zone. The planning area defined for this study averages three to five miles inland from the bayshore, contains 412 square miles (18% of the regional total) with a total length of tidal shoreline of 792 miles. 10.2% of this shoreline is actively committed to commercial and industrial use.

Total employment in the Baltimore Region was 904,200 according to the 1970 census. 371,168 jobs or 41% of the total are located in the study area. The greatest concentration of economic activity in the region is found in the Baltimore Harbor. It contributes in excess of $2.5 billion to the Gross State Product or one dollar in ten. More than 170,000 jobs are created by both primary and secondary port activities, accounting for nearly 20% of the employment in the region. One in every ten jobs in the State is ultimately dependent upon the port.

Among the most important operations within the Harbor are the Dundalk Marine Terminal, the Bethlehem Steel Corporation plant at Sparrows Point, the Maryland Shipbuilding and Drydock Company, and Amstar. Outside the Harbor significant employment centers include: in Harford County, the Aberdeen Proving Ground and the Bata Shoe Company on the Bush River; in Anne Arundel County, the US Naval

Academy, the governmental complex at Annapolis and the Naval Ship Research and Development Center. In Baltimore County facilities include the Harry T. Campbell Sand and Gravel operations at White Marsh, and the Martin Airport industrial park on Middle River.

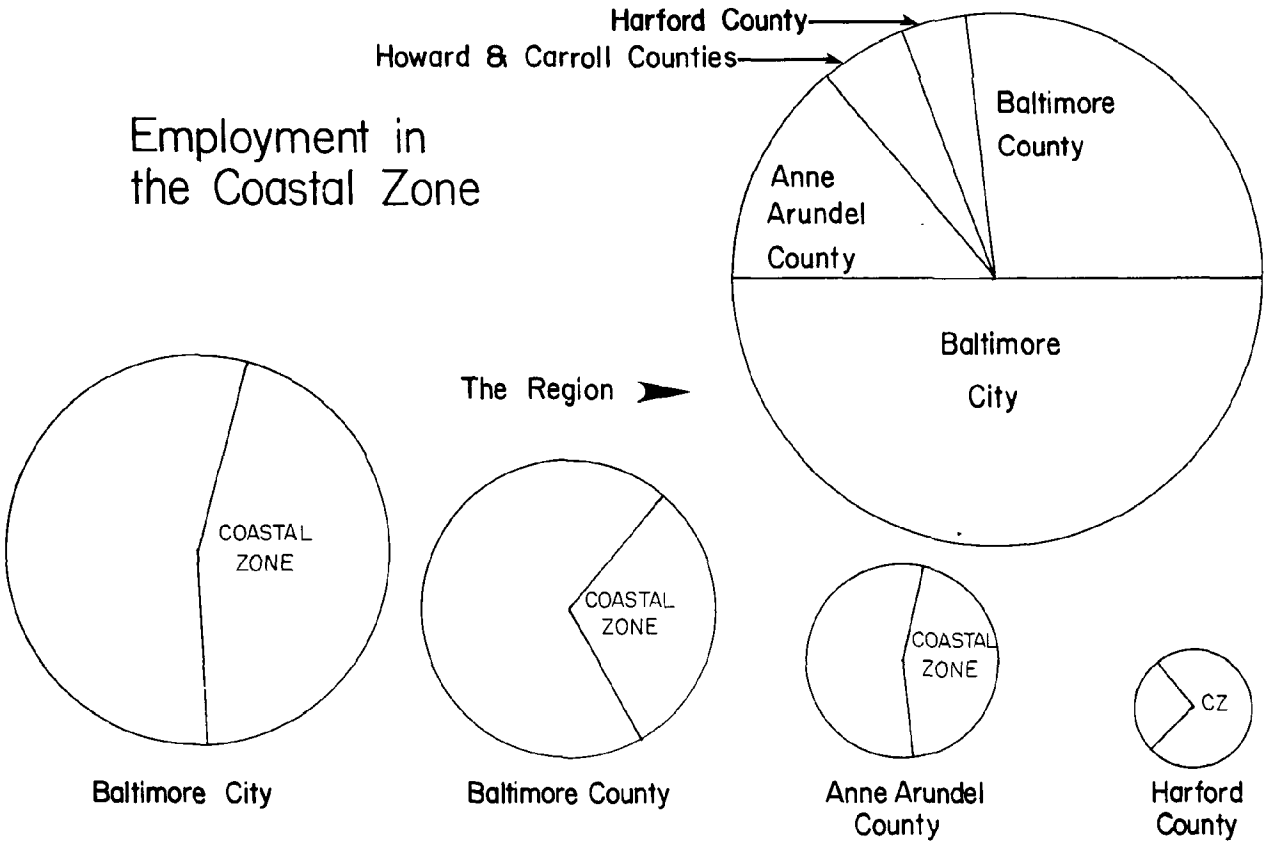
One of our greatest concerns is the future of industrial development in the coastal area. Do the advantages that stimulated past development—an inland deepwater port, well developed rail and highway connections, and a diversified labor market—still make it an attractive and profitable location for industry? If so, how much industrial growth can the sensitive coastal area accomodate?

With the creation of the Maryland Port Authority in the mid-50's, efforts began to convert Baltimore from a railroad-dominated to a shipper-oriented port. A concerted effort is now being made to promote the port as one that meets the needs of the modern industrial market and make the Harbor an area with even greater potential for future development. Accessibility to the Harbor will be greatly aided with completion of the proposed Interstate expressway system and the locational advantages of the Harbor for shipping and manufacturing will be maintained. Prime sites for new industrial development include Sparrows Point, Canton/Ft. Holabird, and Marley Neck.

Outside of the Harbor area, one of the most advantageous, and consequently, one of the most likely areas for industrial development is the transportation corridor which borders the coastal areas of Baltimore and Harford Counties, going north from Baltimore City to the Susquehanna River. This corridor consists of major highway and rail alignments and is a segment of the larger transportation corridor connecting the urban centers of the East Coast megalopolis from Boston to Washington.

The transportation factors and the economies of scale experienced in a heavily industrialized urban area are advantages that are offered by many areas. The degree to which industrial development will take place in the Baltimore Region is directly related to the steps that will be taken by state and local government to recruit industry. In sum, the economic future of the coastal area of the Baltimore Region is this: the *potential* for extensive growth exists due to the locational cost advantages. The *likelihood* depends largely on the efforts of local governments to recruit new industry. The *need* for and environmental *effect* of extensive development is undetermined . . .

"The Marley Neck Peninsula is situated in northern Anne Arundel County, adjacent to the Baltimore city line. The northern tip of the peninsula falls within the city. It is bounded by the Patapsco River on the north and east, Stony Creek on the southeast, and Curtis Creek and Marley Creek on the west. The terrain is



predominantly flat and covered primarily with fields, low-growing shrubs, and trees. Scattered low-density residential development is found in the interior of the peninsula along the roadways, as well as along the Marley Creek shoreline. The predominant aspect of the interior is that of an undeveloped, almost rural area. This is in marked contrast to the periphery of the peninsula, at the water's edge, which is the location of a number of industrial facilities of large size. Two major installations situated here are the Wagner electric generating station of the Baltimore Gas and Electric Company at Cox Creek in the southeast sector, and the US Coast Guard Yard at Arundel Cove in the northwest sector.

"All of the Neck from Tanyard Cove around to Cox Creek is currently zoned by Anne Arundel County for heavy industrial uses; more than 2300 acres are so zoned. Other large areas are zoned for light industrial uses (more than 1000 acres). The center of the peninsula, around the Foreman's Corner area, is zoned residential.

"Marley Neck is served by rail. The Hawkins Point Marine Terminal is located at the northern end. The Neck is merely 0.6 of a nautical mile from the 42-foot-deep Brewerton Angle. With completion of the Outer Harbor Crossing (Francis Scott Key Bridge), this area has access through the interstate highway system to the north, to add to its present access south, east, and west via the Baltimore Beltway and other highway routes, however, a problem exists at the interchange of the Baltimore Beltway and Ft. Smallwood Road. Truck traffic is noticeably heavy. The location has excellent accessibility to the Baltimore region's labor market.

"A recent study of industrial development potential in Maryland notes the following; 'Marley Neck now represents Maryland's only large reserve of ready industrial land presently served by rail, deep water, and interstate highways.'

"Owing to its location, accessibility, and the availability of development infrastructure, Marley Neck is especially suitable to port-oriented industrial development which should not be pre-empted by the establishment of incompatible uses into the area."

—From Anne Arundel County Critical Areas Program

"I've lived on Marley Neck for 10 years and the biggest investment I ever made was my house. I'm not going to sit still and let them build an oil refinery or a chemical plant across the street from my home. Leave our fields and trees alone and put the factories where they won't hurt anyone."

—An Anne Arundel County Resident

The plantation system showed signs of decay as early as 1750. Farmed-out tobacco fields were seeded to corn and wheat or allowed to go to scrub pine. As yields grew poorer, the planters abandoned their cash crop—tobacco—and shifted to subsistence farming. With the change came loss of income, lower living standards, and decreased population. From 1790 to 1815, seven Tidewater counties lost population despite a national increase of 25-fold. In 1794 Port Tobacco was described as a "perfect wilderness . . . for miles altogether." In the 1830's the countryside between Washington and Richmond was characterized by an English visitor as abandoned and eroded. Needless to say, later years brought some change.

The 1970 census shows the population of the Baltimore Region as 2,070,670. The population of the four coastal jurisdictions was 1,939,753 or 94% of the metropolitan region; the population within the coastal zone study area was 728,400 or 38% of the total for the four coastal jurisdictions. While the greatest concentration is in the harbor area, the population is spread throughout the coastal zone. The following charts show the population distribution within the total Region and within each jurisdiction.

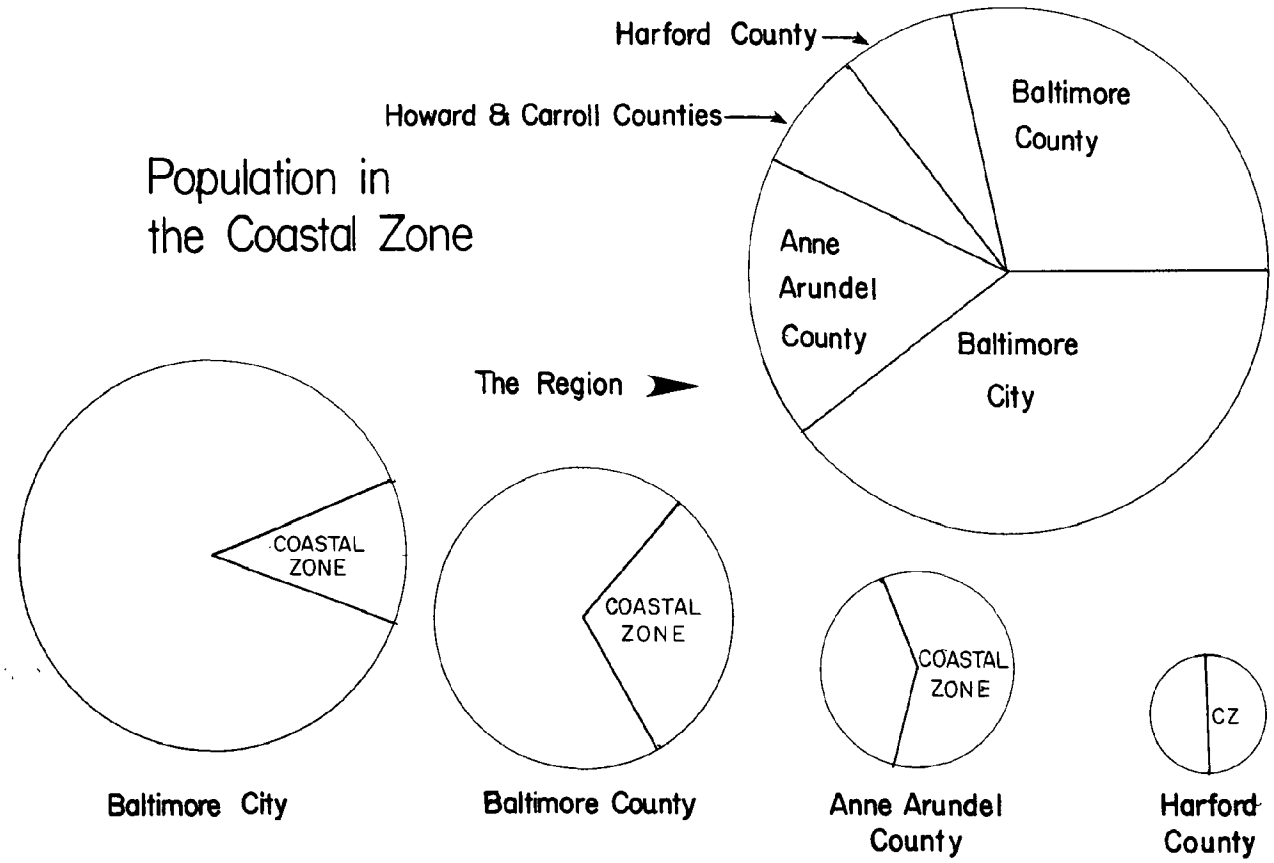
Patterns of settlement and growth follow closely those of economic development: people settle alongside employment opportunities. Transportation improvements throughout the 20th century greatly altered these patterns of settlement, however, and led to the development of dispersed areas that are largely residential and removed from employment centers. The aesthetic values and recreational opportunities present in the coastal zone partially explain extensive shoreline settlement but transportation improvements have also encouraged this locational trend . . .

Bowley's Quarters and Carroll Island Peninsulas were originally developed as recreational, seasonal dwelling areas. The recreational attraction was the Bay and its tributaries, therefore, the majority of this seasonal development occured on waterfront properties. With the development of the Martin Company industrial complex to the west during World War II, Bowley's Quarters and Carroll Island Peninsulas began to transform from seasonal to permanent residential areas. During this period, Carrollwood was completed as a permanent residential development, Following WWII and the subsequent de-emphasis of the Martin Company complex, the growth pattern of the area returned to spasmodic development of areas with access to the waterfront. However, most of this development has been of permanent residential type.

In 1972 a Baltimore County Bureau Of Environmental Services survey of the Bowley's Quarters and Seneca Park areas found that 1,053 of 1,148 properties inspected had failing sewage disposal facilities and that 15 to 30 private water supplies in the Seneca Park area may be subject to contamination. Because a large number of the failing septics were located along the water, the Bay tributaries were receiving large amounts of pollutants.

Many of the problems associated with the 91% failure rate of the Bowley's Quarters area septic systems resulted from their design as systems solely for summer residences. Their low capacity and small drainage fields were inadequate for permanent residences. Furthermore, until recently State and County Department of Health regulations for percolation testing did not provide for the seasonal variance of the groundwater level. Thus, percolation tests that were positive in the summer and fall when the groundwater lever was low resulted in failing septic systems in the spring when the water table was much higher. This causes pollution of the groundwater needed for water supply.

The immediate response by the Baltimore County Department of Health was to promote the extension of




public sewers to those areas with failing septic systems. This proposal has met some resistence from local residents and members of the Baltimore County Office of Planning and Zoning. Construction of the lateral trunk lines and secondary pumping stations necessary to sewer the area has an estimated cost of nearly $12 million, or about $10,000 per residence. This is equal to about one-third of the market value of most of the residences. This cost would not be totally borne by the residents of the area due to federal funding that is available and the system of assessing constructions costs to the entire metropolitan area. However, even the substantially less than cost sewer assessments that would be levied on area residents would undoubtedly cause hardship for many.

Since much of the Bowley's Quarters area is in agricultural use or undeveloped it is suspected that the massive expenditure of public funds for sewering would eventually be justified by additional residential development. Once the sewers were provided for the Bowley's Quarters and Carroll Island Peninsulas historic precedent leads us to believe that development of existing open areas would soon follow. Thus, the question posed is really this: To what extent is large scale residential development with all attendant services including sewers, transportation, schools, recreation, shopping and employment centers, desirable in this area? Preliminary analyses indicate that such increased development would have a significant detrimental impact on the environment, and in particular, on the Chesapeake Bay ecological system. That feature which attracted residents to the area decades ago is now threatened by their very growing presence.

Why tackle this chore of studying the coastal zone? Why this report? The reason is simple—we, as residents and governments, have not done a very good job of managing what happens on our coastal lands and waters.

Fully 50% of the nation's population lives within 50 miles of the seashore. The growth rate in these coastal areas has been three times the national average. The same statistics are even more dramatic for the region's coastal areas. We are placing tremendous demands on a limited and very sensitive piece of land and water and are suffering losses. We must find better way of managing the use of our coastal areas.

We need effective and coordinated management by our governments of activities in the coastal zone. We need an understandable means of relating the concerns and actions of citizens and local, regional, and state agencies to the natural reality of a living coastal system. We need a way to blend our concern over the management of coastal resources with the traditional tools of land use planning and zoning control. We need a means of cutting through numerous layers of govern-

ment and providing a focal point for action in the coastal zone. We need a means of resolving conflicting views on how our coastal areas should be used. This litany of needs could go on and on but we need no further recitation, we need movement toward the solution of our coastal problems because new ones appear almost daily . . .

In 1960 acquisition lines were established for the Gunpowder State Park that included most of the Gunpowder River Delta area. The tidal and non-tidal wetlands backed by upland hardwood forests located at the confluence of the Little Gunpowder River, Slough Creek, Big Gunpowder River and Bird River provide a natural setting unsurpassed on the western shores of the Bay. This is an area that had been given primary emphasis by the Maryland Outdoor Recreation and Open Space Comprehensive Plan for future acquisition. The acquisition of this land would have been a positive step towards fulfilling the Open Space Plan's recommendations for controlling shoreline development, encouraging recreational use of the Bay by acquiring public access points, providing for wildlife habitat and preserving outstanding natural and scenic areas.

Yet, there has never been action taken to acquire any of this area for inclusion into the Gunpowder State Park. During the past sixteen years, mining interests have begun to move ahead with excavation plans for the area. The acquisition lines for the Gunpowder Delta section within Baltimore County encompass approximately 1,236 acres and over fifteen miles of shoreline. Mining interests control 92% of that area. One mining company is currently nearing final approval of excavation plans which would preclude 325 acres from their planned use in the Gunpowder Delta section. Special exception orders which would permit mineral extraction have been granted by Baltimore County for most of the land planned for inclusion in the Gunpowder Delta section of the State Park. Additionally, another 415 acres of wetlands and woodlands that lay along the southwestern edge of the Gunpowder Delta section, and fronting on Bird River, are in the ownership of one of the region's major mining operations.

Much of the 252 acres of land scheduled for acquisition in Hardord County for the Gunpowder State Park is also subject to the pressures of mining interests. There currently is one mining operation along the Harford County side of the Little Gunpowder River which is partially within the take lines of the Gunpowder State Park. It is not known whether the operator of the excavation plans to expand his present activities in the area.

As noted earlier, acquisition plans for the Gunpowder River Delta section of the Gunpowder Park have never been implemented. In addition, the review and approval of excavation plans by Baltimore and Harford Counties and the Water Resources Administration have given inadequate consideration to the suitability of mineral extraction operations in the area. Timing of excavation and reclamation plans has been approved with no consideration of whether they are compatible with future use of the area for parkland. The incremental review of excavation plans will allow the area to be transformed into a series of lowlying grasslands and seventy-five acre deepwater ponds where there had been a mixture of upland hardwood forests and farmland on a varied topography adjacent to wetlands and meandering coastal watercourses. This alteration of the general character of the Gunpowder Delta will be done without any consideration of what the cumulative impact of each of the excavation operations will be on the sensitive nature of the area.

Clearly, the prolonged delay in acquiring this planned parkland will significantly decrease the opportunity for public access to major tributaries of the Bay and lessen chances for preservation of a unique natural area.

# PART II—THE METROPOLITAN COASTAL ZONE

In 1972 Congress passed the Coastal Zone Management Act (CZMA) with the realization that unplanned growth and uncontrolled development in coastal areas had led to "loss of living marine resources, wildlife, nutrient-rich areas, permanent and adverse changes to ecological systems, decreasing open space for public use, and shoreline erosion." Congress recognized that there are "important ecological, cultural, historical, and esthetic values in the coastal zone which are essential to the well-being of all citizens," and which are subject to pressures that may irretrievably alter them.

In the total Baltimore Region, 94% of the population lived in the four coastal jurisdictions according to the 1970 census; and 35% lived within the narrow area of focus within three to five miles of the Bay itself. Between 1970 and 1975, the coastal areas of the Region experienced a growth rate five and one-half times as great as the four jurisdictions.

Growth pressures are felt in all coastal areas. In some, these pressures exceed the ability of the public sector to provide necessary services, resulting in increased capital costs and operating expenditures as facilities are overextended to accommodate levels of demand well beyond their initial design parameters. In others developed in the past, there is an insufficient amount of development and redevelopment activity. Stagnation, deterioration, and abandonment characterize these areas and show an inadequate level of private and public investment and reinvestment. This leads to inefficient utilization of land, roads, sewers, and public services and results in an increase in public expenditures.

New development—particularly residential and vacation-oriented activities—is drawn to metropolitan coastal areas because of their job offerings, natural amenities, recreational opportunities, and access to urban areas. Although this development may be enhanced, at least in the short run, by a coastal location, there are often adverse developmental impacts associated with it that in the long run may far outweigh any intial benefits. This is particularly significant in urban areas, where coastal pressures are most acute, and where the availability of land necessary to accommodate the pressure for development is most limited.

The environmentally sensitive nature of much of the remaining undeveloped coastal land, and the relatively limited inventory of developable areas underscores the need to manage remaining land resources for activities that draw the most benefit from a coastal location.

The last ten years have witnessed dramatic changes in the nature of coastal growth pressures. In most areas of the region, residential development is outstripping the ability of local and state governments to provide adequate levels of service. Leapfrog development has led to sewer moratoriums and a catch-up game of providing existing developments with services that could have been delivered much more efficiently prior to development.

Sprawling, low-density residential development has pre-empted virtually all of the shoreline that could have been used to ensure public access to the Bay. Out of over 792 miles of shoreline, only 15 miles has been set aside for public use. This is far less than what has been achieved in other metroplitan areas.

In light of these conditions, coastal land has begun to be viewed as a scarce, valuable resource that must be managed if it is to be used wisely. This concern is the challenge of coastal zone management.

**The Boundary**

That part of the coast examined in this study, the 'area of focus', is shown on the accompanying maps. This area includes all of the region's significant coastal resources, both natural and manmade, as well as the land area on which management must be focused for the solution of problems. It contains both undeveloped land that should be preserved and developed land around which new development should occur because of the availability of public facilities. In general, the line has been drawn to include the many geographicallly identifiable parts of the coastal zone that are areas of particular concern to the public. Because of that concern, the boundary denotes that area of the region that needs a special management effort. This study provides for that management effort through a set of recommended planning polices and regulatory standards which are to be applied in the next few years by state, regional, and local agencies.

The boundary of the 'area of focus' was developed

jointly by the four coastal jurisdictions (Harford County, Baltimore County, Baltimore City, and Anne Arundel County), the Regional Planning Council, and the Coastal Zone Unit of the Department of Natural Resources. The criteria applied in the boundary development process included the following:

- Geographic Factors—
  - —The established high water shoreline shown on U.S. Geological Survey maps;
  - —The open water boundary as delineated on U.S. Geological Survey maps;
  - —The 100 foot elevation contour line;
  - —The 20 foot elevation contour line and the area below that line;
  - —A 1000 yard setback from the shoreline.
- Natural Factors—
  - —Inland tidal surge points at selected rivers and streams as designated by the Maryland Marine Police;
  - —All tidal wetlands identified by the Maryland Department of Natural Resources;
  - —Coastal soils and bedrock geology;
  - —Areas of periodic flooding;
  - —Drainage basins;
  - —The fall line.
- Administrative and Cultural Factors—
  - —Significant roads and rail lines;
  - —City and County boundaries;
  - —Census tracts, election districts and regional planning districts;
  - —Community and social centers that are oriented to the coastal zone;
  - —Present land use patterns within the zone;
  - —Identified area-wide and site specific issues.

The mapping of these criteria produced a graded 'zone' rather than a single, definitive boundary line. Specific criteria crossed and recrossed and what emerged was numerous partial definitions of the coastal relationship, some more significant, more precise, and more continuous than others. It was necessary to reduce the complexity of the many, often discontinuous and ambiguous, natural factors to an approximate boundary, a line of best fit.

Because of its precise legal status, its visibility and familiarity, and its function as a shaper of development, the system of major urban and rural arterial roads produced the line of best fit. As an inland boundary, it best reflects the various natural systems, administrative, statistical, and land use units. In Baltimore and Harford Counties the boundary follows I-95. This limited access highway provides a significant break in land use and parallels the fall line separating the coastal plain from the piedmont. The head of tide on each river in these counties occurs at the fall line. In Baltimore City, the boundary encloses the land area related to port activity and the waterfront in the harbor. In Anne Arundel County, the boundary chiefly follows major roads, approximating the watershed of the West Chesapeake Basin below the head of tide. It also follows roads and ridgelines outlining the Patuxent, the Little Patuxent, and their contiguous wetlands.

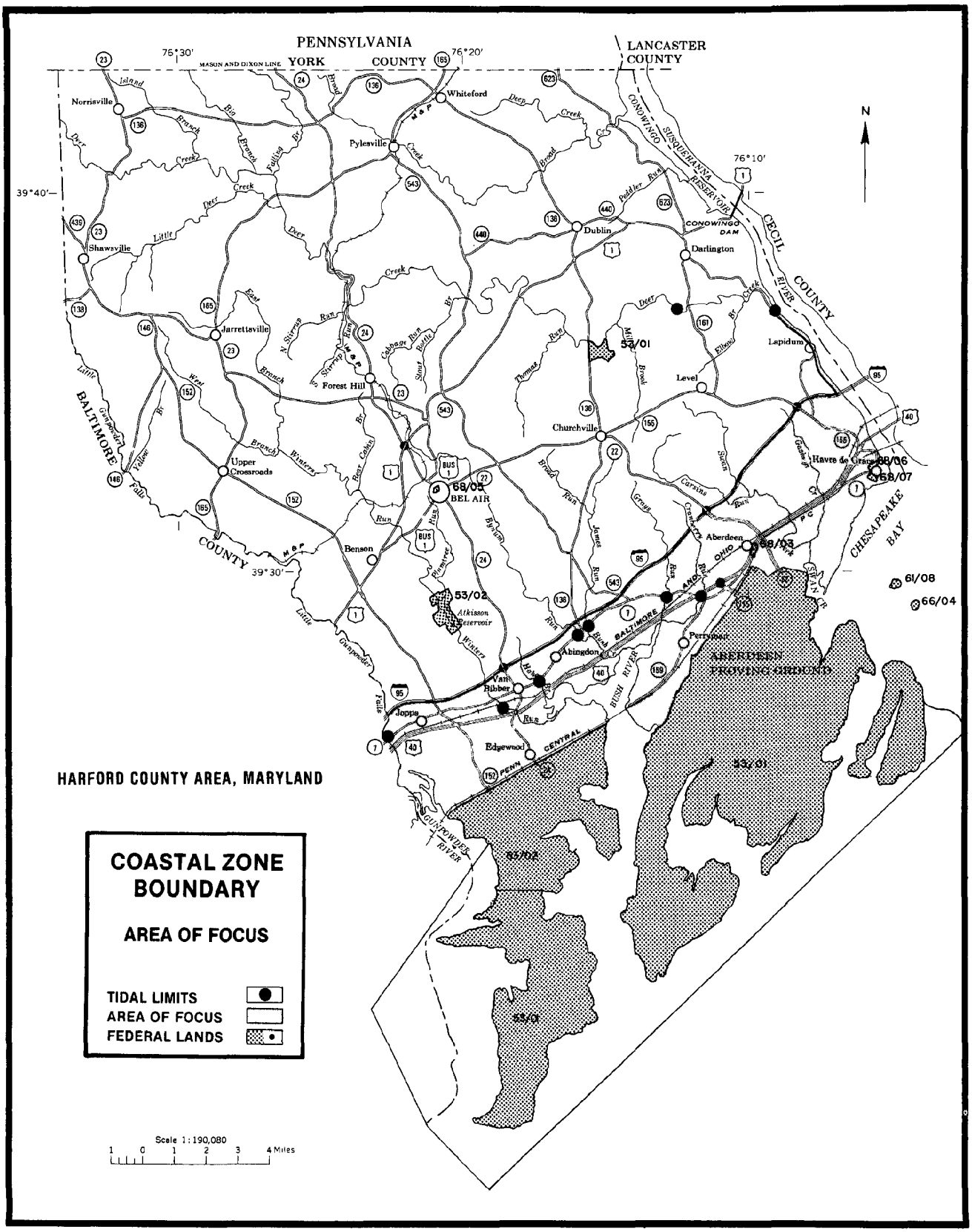
In Anne Arundel County, the study area consists of the tidal rivers in the County and their entire watersheds up to the head of tide. The study area also includes the headwaters of the Severn River. This headwater area was included because it is a fish spawning area and an undeveloped natural area containing rare plants. In Baltimore and Harford Counties, the study area consists of the coastal plain. It includes the tidal rivers and their entire watersheds up to the head of tide. The study area in Baltimore City contains the shoreline, all land involved in port-related industrial activity, all marine terminals, all recreation areas with shoreline access, and the adjacent residential communities of Fells Point, Brooklyn, South Baltimore, and Cherry Hill. The study areas in the four jurisdictions form a continuous area as shown on the maps.

The line describing the inland boundary of the area of focus is important because it outlines a part of the region especially significant to the environmental well-being of the Bay due to its proximity to the shoreline and because of the resources, opportunities, and problems included. The inland boundary line means that the area of focus will be just that—an area of special considerations, whose management will focus on the fact that it is a single, unique, regional coastal resource.

This does not imply that what happens outside the area of focus is unrelated to what is included inside, nor does this line suggest that many of the management activities and recommendations advocated by this study should not be considered for implementation on a broader scale than solely within the area of focus. Rather, the line represents a decision as to what area is most appropriate to manage in light of commitments to special coastal policies and anticipated actions under the auspices of an approved coastal zone management program. The special consideration and actions proposed for the area of focus include project review, public participation, planning activities and coordination, special studies, and data analysis.

### Project Review

Outside the area of focus, only projects which are considered as major facilities, e.g., power plants, refineries, large residential or commercial developments, will be evaluated on a project basis by the management program. Within the area of focus the Coastal Zone Unit of the DNR will be notified of all projects which may have a potential for significantly impacting the coastal waters of the Bay or its tributaries, or which are inconsistent with the goals and objectives of the policy framework established by either the state or local and regional management guidelines. This notification process will apply to any projects requiring state or local approval or A-95 review. Local jurisdictional staff will have primary responsibility for deter-

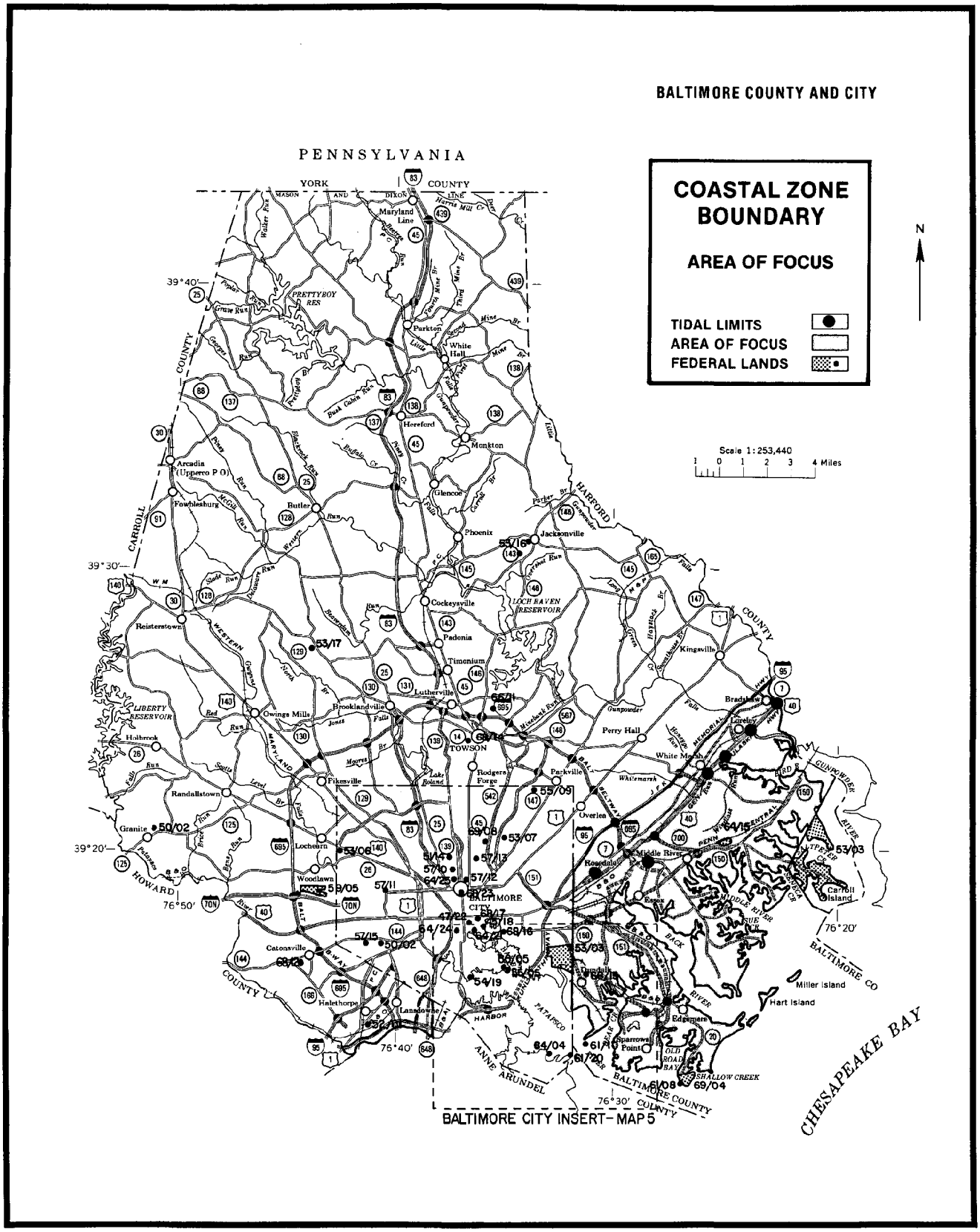



HARFORD COUNTY AREA, MARYLAND

**COASTAL ZONE BOUNDARY**

**AREA OF FOCUS**

TIDAL LIMITS
AREA OF FOCUS
FEDERAL LANDS

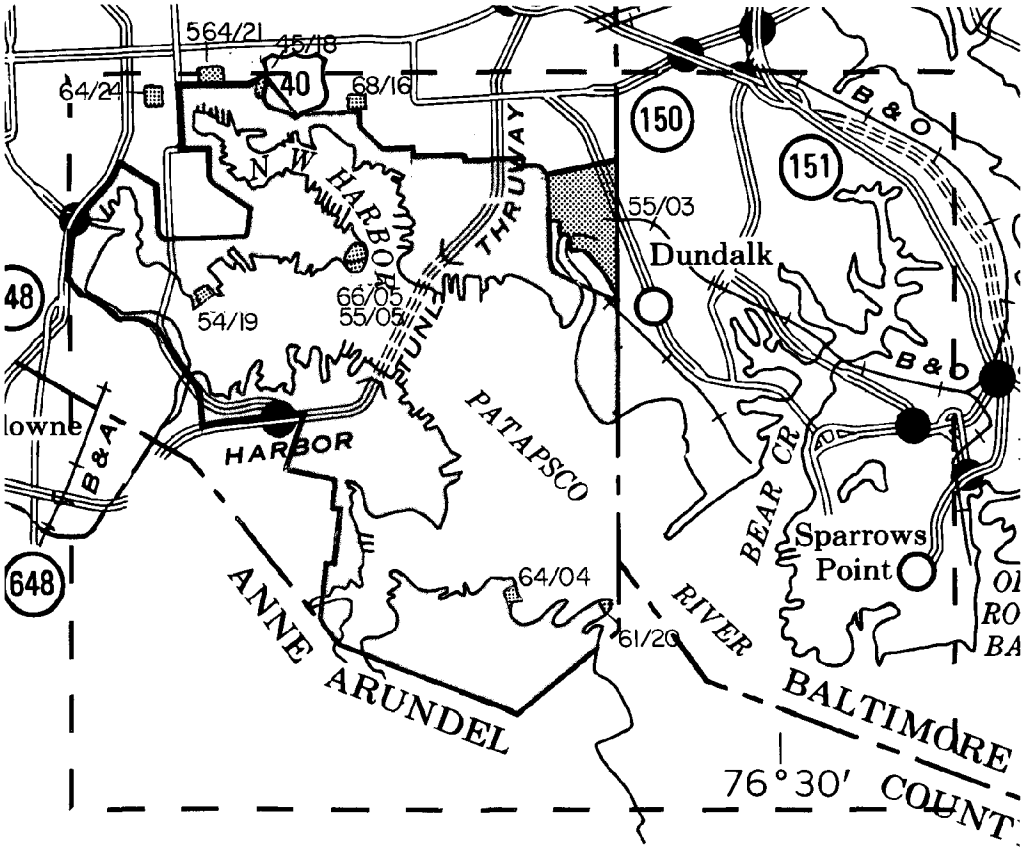

BALTIMORE COUNTY AND CITY
COASTAL ZONE BOUNDARY
AREA OF FOCUS
TIDAL LIMITS
AREA OF FOCUS
FEDERAL LANDS
N
Scale 1:253,440
1 0 1 2 3 4 Miles
PENNSYLVANIA
YORK COUNTY
CARROLL COUNTY
HARFORD COUNTY
HOWARD COUNTY
ANNE ARUNDEL COUNTY
BALTIMORE COUNTY
BALTIMORE CO
BALTIMORE CITY
TOWSON
CHESAPEAKE BAY
BALTIMORE CITY INSERT-MAP 5
39°40'
39°30'
39°20'
76°50'
76°40'
76°30'
76°20'
Maryland Line
Parkton
White Hall
Hereford
Monkton
Glencoe
Phoenix
Jacksonville
Cockeysville
Padonia
Timonium
Lutherville
Brooklandville
Owings Mills
Reisterstown
Fowblesburg
Arcadia (Upperco P O)
Butler
Kingsville
Bradshaw
Perry Hall
White Marsh
Parkville
Overlea
Middle River
Rosedale
Dundalk
Edgemere
Sparrows Point
Fikesville
Randallstown
Granite
Lochearn
Woodlawn
Catonsville
Halethorpe
Lansdowne
Rodgers Forge
Miller Island
Hart Island
Carroll Island
LOCH RAVEN RESERVOIR
LIBERTY RESERVOIR
PRETTYBOY RES
SHALLOW CREEK

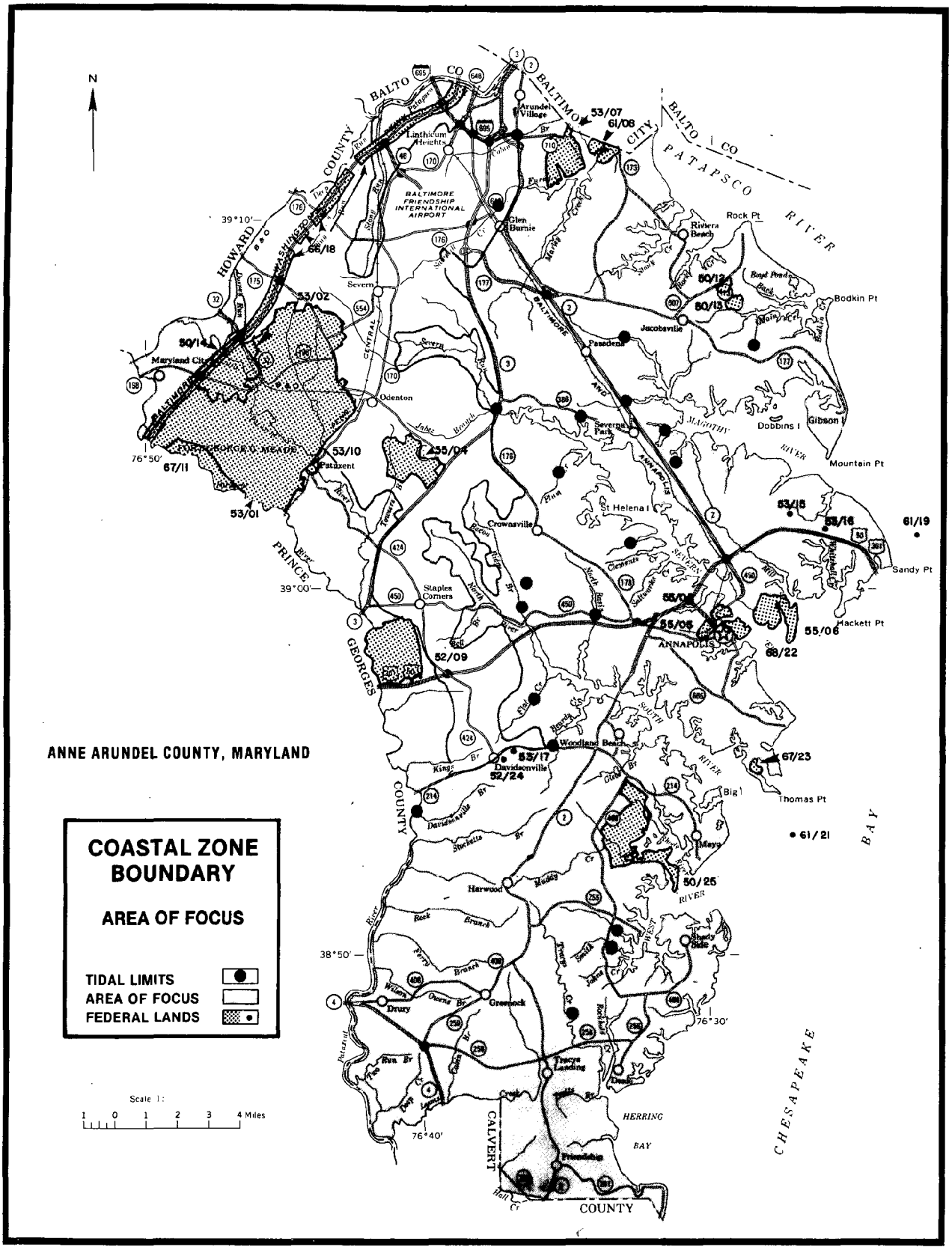
BALTIMORE CITY INSET

**COASTAL ZONE BOUNDARY**

**AREA OF FOCUS**

TIDAL LIMITS
AREA OF FOCUS
FEDERAL LANDS




ANNE ARUNDEL COUNTY, MARYLAND
COASTAL ZONE BOUNDARY
AREA OF FOCUS
TIDAL LIMITS
AREA OF FOCUS
FEDERAL LANDS
Scale 1:
1 0 1 2 3 4 Miles
N
BALTO CO
BALTIMORE CITY
PATAPSCO RIVER
HOWARD COUNTY
PRINCE GEORGES COUNTY
CALVERT COUNTY
CHESAPEAKE BAY
HERRING BAY
BALTIMORE FRIENDSHIP INTERNATIONAL AIRPORT
Arundel Village
Linthicum Heights
Glen Burnie
Severn
Odenton
Maryland City
Patuxent
Crownsville
Staples Corners
Severna Park
Pasadena
Jacobsville
Riviera Beach
Rock Pt
Bodkin Pt
Dobbins I
Gibson I
Mountain Pt
St Helena I
Sandy Pt
Hackett Pt
ANNAPOLIS
Woodland Beach
Davidsonville
Thomas Pt
Big I
Mayo
Harwood
Shady Side
Drury
Greenock
Tracys Landing
Friendship
Deale
53/07
61/08
66/18
53/02
50/14
53/10
55/04
67/11
53/01
53/15
53/16
61/19
55/05
55/06
68/22
52/09
53/17
52/24
67/23
61/21
50/25
50/12
50/13
39°10'
39°00'
38°50'
76°50'
76°40'
76°30'

mining which projects within the area of focus will need an impact evaluation.

Public Participation

Each jurisdiction has developed a form of citizen oversight and review to assist in the preparation of this study. The Coastal Zone Unit has also established a regional ombudsman to represent citizens-at-large on its Coastal Resources Advisory Committee. The Regional Planning Council, through the Coastal Zone Advisory Committee has integrated the local and state citizen participation efforts by including their representative and concerned at-large interests with local governmental designees to assist in policy review and to advise the Council on coastal-related issues.

This type of citizen and public participation has been extended to include concerned non-governmental representation in the implementation of the coastal zone management program. Under the proposed Metropolitan Advisory Board, outlined in Part V of this report, the public will continue to participate in coastal decision-making, becoming in effect stewards of the area of focus.

As participants in full, the public will become a part of the project review, planning activities, and special studies undertaken to manage the area of focus. It will act in both an oversight and resource capacity, and will serve as a coastal advocate to both decision-makers and the general public alike.

Planning Activities

The daily planning activities of the local and regional agencies provide basic ongoing management for the area of focus. These activities center around recognizing the area of focus as a special, sensitive, coastal resource that requires constant attention to coordinate coastal management goals and objectives with land use planning, water quality planning, and local decision-making.

Coastal planners, funded by the Coastal Zone Unit, will help conduct these day-to-day activities by serving as coastal liaison personnel and by performing specific planning functions at the local and regional levels. They will be responsible for bringing the special perspective called for by the coastal zone to the zoning, comprehensive planning, and capital programming decisions made in their jurisdictions. They should also lead in the preparation of coastal guidance plans (see Part IV under 'Growth Pressures and Their Management') and suggest implementation techniques to assist decision-makers and facilitate coastal project review.

These coastal planners, together with their project supervisors, constitute a special resource capable of supporting the involvement of the public and other affected agencies and interests on the Metropolitan Advisory Board. The activities of the coastal planners should include screening of projects requiring local certification, technical support of the Metropolitan Advisory Board in its preparation of preliminary project evaluations and recommendations, and the development of more accurate data bases and coastal land and water utilization plans.

Special Studies and Data Analysis

Most of the data inventory and analysis necessary to implement coastal zone management has been completed for the area of focus as part of the demonstration grant which produced this report. These inventories need to be maintained with current information, and in some cases, expanded to provide technical information for project review and decision-making. This resource information should also be used to prepare coastal guidance plans outlining area-specific policies and priorities for resource utilization within the area of focus.

In certain cases, the data may be augmented by special studies to deal with particular coastal pressures that affect more than one jurisdiction. Studies of marina development impacts and alternatives, boating overcrowding, dredge spoil disposal, and the availability of mineral resource preservation, recovery, and site revitalization are among the issues identified by this study as needing further consideration under coastal zone management.

The boundary line can thus be viewed as an opportunity to coordinate the resolution of coastal issues and the realization of coastal potentials. Local governments, citizens, state and regional agencies, and special interests must establish a dialogue to ascertain what coastal priorities should be, and they must share access to their abilities to attain the priorities.

**Assumptions About the Future**

Single-purpose, environmental, and comprehensive planning skills and techniques must be pooled for use in the area of focus. Essential to this kind of planning or, indeed, any other kind—business, personal, or public policy—are the premises upon which policies are based. These are the key factors expected to influence planning decisions, including assumptions or forecasts of future conditions. Some of the most important premises upon which our planning can be based include: People, Natural Resources, Economic Growth, Transportation, Existing Community Resources, Public Financial Resources, Quality of Development, and the Public/Private Partnership.

People

Large and far-reaching changes in the region's population (see following tables) are shifting demands for public services and amenities, and changing preferences for housing and community location. Changing lifestyles and declining fertility rates are combining to reduce dramatically the average household size. Married couples with fewer children, large increases in the elderly population and in families whose children have left, and large increases in singles mean a continued decline in average household size.

These changes mean that the desire for single-family detached homes, long the mainstay of young families with growing children, will remain, but the proportion of households attracted to it and able to afford it will diminish. Increased emphasis will be placed on alternative residential environments—such as various forms of attached housing townhouses, and apartments offering such amenities as recreation and open space, creative design, integration of site and structure, maintenance-free features, and locations near desired services such as shopping, health care, restaurants and leisure-time opportunities.

**POPULATION & HOUSEHOLD GROWTH IN THE COASTAL STUDY AREA**

**TOTAL POPULATION**

| | 1970 | 1975 | 1980 | 1985 |
|---|---|---|---|---|
| Baltimore City | 261,950 | 242,000 | 242,100 | 244,250 |
| Coastal Study Area | (29)[1] | (29) | (28) | (28) |
| Anne Arundel Co. | 230,700 | 253,800 | 290,050 | 332,100 |
| Coastal Study Area | (77) | (75) | (75) | (75) |
| Baltimore Co. | 222,500 | 228,500 | 241,400 | 257,450 |
| Coastal Study Area | (36) | (35) | (35) | (35) |
| Harford County | 67,250 | 74,200 | 78,200 | 84,350 |
| Coastal Study Area | (58) | (55) | (55) | (56) |
| Regional Coastal Zone Study Area | 728,400 | 798,500 | 851,750 | 918,150 |
| Coastal Study Area as a percent of: | | | | |
| Total Coastal Jurisdictions | 38% | 40% | 41% | 42% |
| Total Region | 35% | 36% | 37% | 38% |

[1]Note: Figures in parentheses indicate the percentage of the total jurisdictional population that is within the coastal study area of that jurisdiction.

**TOTAL HOUSEHOLDS**

| | 1970 | 1975 | 1980 | 1985 |
|---|---|---|---|---|
| Baltimore City | 82,050 | 81,500 | 86,450 | 91,800 |
| Coastal Study Area | (28)[1] | (28) | (30) | (30) |
| Anne Arundel Co. | 66,100 | 80,200 | 97,200 | 116,500 |
| Coastal Study Area | (81) | (78) | (78) | (78) |
| Baltimore Co. | 65,800 | 75,100 | 83,600 | 93,100 |
| Coastal Study Area | (36) | (35) | (35) | (34) |
| Harford County | 18,350 | 22,100 | 24,500 | 27,600 |
| Coastal Study Area | (57) | (54) | (54) | (55) |
| Regional Coastal Zone Study Area | 232,300 | 258,900 | 291,750 | 329,000 |
| Coastal Study Area as a percent of: | | | | |
| Total Coastal Jurisdictions | 40% | 40% | 40% | 41% |
| Total Region | 37% | 37% | 37% | 38% |

[1]Note: Figures in parentheses indicate the percentage of the total jurisdictional number of households that are within the coastal study area of that jurisdiction.

## Natural Resources

The reality of shortages in some resources is becoming clearer and clearer. Scare resources must be used wisely, and their conservation must take on added importance. This is especially true for coastal lands, energy supplies, farmland, and forests.

Coastal land itself is a finite resource and activities affecting it should not take place in a haphazard manner. Priorities for the use of the coastal zone should be established, based on the capabilities of coastal resources to support particular types of activities and on the suitability of such activities relative to others competing for the same resource or area.

The world's supply of readily available gas and oil is running out. Although there is disagreement as to exactly when this might occur, most experts are looking toward the end of this century. The United States already imports more than half of the oil it uses. Developing nations can be expected to increase their energy consumption dramatically as they strive to raise their standard of living. Thus, the real cost of energy in the U.S. will increase in the future and continuing energy shortages beginning in the late 1980's could become a fact of life. The need for energy conservation must be given great weight in coastal planning and community building.

The United States has an agricultural production capability second to no other country in the world. Increasingly, it will be called upon to help feed the world's growing population. Prime agricultural land should be considered an important national asset, whether in California, Florida, the midwest—or in Anne Arundel, Baltimore, and Harford counties. Prime and productive farmland in the region is considered a scarce resource to be used wisely.

The nation's forest resources are also among its great national assets. Managed forests and the wood products generated by them are essential to our way of life. The region's forests already provide for a multitude of uses—ranging from water quality management, to recreation and scenic beauty, to the production of wood products. The forests in the region are considered an important resource to be used widely for multiple purposes.

## Economic Growth

As part of coastal planning, two alternative economic futures for the region were examined—strong and stable. These two scenarios are the upper and lower end of the extent of economic growth expected over the next twenty years. Obviously, we cannot predict with any certainty what the future holds but we can prepare in a planning sense for growth falling within the expected range.

To sustain a high level of economic growth in the region, substantial investments must be made in transportation facilities—including principal highways, rapid transit, and especially, the Port of Baltimore, to maintain the region's competitive advantage in the U.S.

This strong economic growth scenario assumes a reversal of downward trends in manufacturing employment and the posting of major gains by 1995. All other employment sectors would increase more rapidly than in the 1970–1975 period. The growth-inducing influences of the nearby Washington Metropolitan Area would continue to be felt strongly. There would be substantial migration into the region.

**CHANGES IN EMPLOYMENT, BY SECTOR, BALTIMORE REGION, 1975–1995**
**(Thousands)**

| | | 1995 | |
|---|---|---|---|
| **Employment Sector** | **1975** | **Strong Growth (% Change)** | **Stable Growth (% Change)** |
| Retail Employment | 152.8 | 193.2 (26%) | 182.5 (19%) |
| Service Employment | 93.2 | 149.9 (61%) | 132.6 (42%) |
| Office Employment | 49.6 | 77.8 (57%) | 69.2 (40%) |
| Government & Institutions | 297.3 | 434.1 (46%) | 413.4 (39%) |
| Manufacturing | 161.9 | 230.0 (41%) | 164.9 (1%) |
| Extensive Industry* | 162.9 | 237.4 (46%) | 177.9 (9%) |
| TOTAL | 918.4 | 1322.4 (44%) | 1140.5 (24%) |

Source: *1977 General Development Plan Scenarios*, (February, 1977).

*Mining, Agriculture, Construction, Transportation. See also *Technical Memorandum #4: Employment Changes in the Baltimore Region, 1964–1970*, Oct., 1973, Regional Planning Council, for a SIC breakdown.

A stagnant or stable (approximately 1% increase in employment annually) is also possible. If major transportation improvements are cancelled or postponed, if the growth influence from Washington wanes, if the region is unable to reverse the downward trend in manufacturing employment, if more of the nation's growth is attracted elsewhere (such as to the Sun Belt states)—then stabilized economic growth for the region is a real possibility. This condition is already present in numerous other metropolitan areas, particularly in the northeast.

Coastal zone goals and objectives do not stand in the way of a high rate of regional economic growth and they reaffirm that people can live and work in an environmentally responsible manner. Sufficient developable land, furnished with appropriate services and facilities can be supplied to accommodate urban land needs at a strong rate of growth. Should less growth occur regionally than has been anticipated, land consumption requirements and the need for additional public facilities will be less, reducing the pressures for their provision. To a certain degree, less growth will also reduce the impacts that can be anticipated over a given time, allowing a more gradual pace of development in environmentally suitable areas, but not removing the need to carefully plan where growth—at any rate—should and should not occur.

Conversely, to inadequately anticipate growth could increase the probability of the inadequacy of public facilities, increase the likelihood of environmental degradation, and threaten the economic vitality of the region with stagnation. Therefore, coastal management does not imply a halt of growth, but instead seeks to direct growth to appropriate areas, thus strengthening the urban fabric and protecting the more environmentally sensitive areas from growth pressure. The foundation of the urban coastal management approach is to encourage responsible, appropriate development and redevelopment as the most effective means of reducing pressures on areas that should not be developed.

Transportation

The real cost of gasoline will continue to climb as a result of scarcity and national policies designed to conserve energy. The private automobile, which has allowed sprawling, scattered land development, will also increase in cost, becoming more expensive to own and operate, in spite of the average fuel economy improvements mandated by Congress. "Auto-dependent" residential and employment locations remote from services and not served by public transportation will be increasingly vulnerable to rising gasoline and other automotive prices and potential fuel scarcities. Locations which are served by various means of public transportation will increase in attractiveness. More than ever there is a need for mixed use planned developments which offer creatively integrated residential, commercial and employment activities, offering residents and workers options for transportation including the opportunity to ride or even walk to work, to shop, or to play.

Existing Community Resources

The greatest assets in an urban coastal zone are the existing communities. They provide the living and working environment for today's residents and will do so for most of the region's residents twenty years from now. They are resources to be enhanced and maintained. They should be provided with additional facilities and services to meet the needs of their residents and to correct deficiencies. Investment and revitalization within existing communities is encouraged. Vacant, developable land within existing communities is a valuable resource which should be assembled and used for in-fill development. Leapfrog development in the past has left numerous vacant areas which are well located with respect to existing facilities and services. Water and sewer facilities are already available or can be provided quite economically. The wise use of vacant land resources within existing communities is crucial and calls for direct action to make them attractive and viable.

Public Financial Resources

More than ever before, the wise use of public financial resources is essential. Public capital, like other resources, is not unlimited. It should be invested where it can return the greatest benefit for the citizens in the region. Enormous public investments have been made over the years in providing water supply, sewerage systems, transportation systems, fire and police service, school plant systems, and libraries and cultural facilities. Where these facilities have additional capacity, growth can take place with minimum added public capital investment.

Quality of New Development

Quality urban design, including good architecture, well integrated with its surroundings and its site, is essential to the success of coastal development as much of the new growth will occur in vacant, skipped-over parcels in existing communities, often at higher densities than the surrounding environment Public policies should insist that the development process utilize the talents of the design professions, and should offer sufficient design flexibility to allow a creative response to development needs.

Public/Private Partnerships

Community building calls for a partnership between the private and public sectors of the economy. Although public policy, capital investments, and services are necessary to establish a framework to implement coastal zone management such management cannot be implemented without initiative and involvement by the private sector; community building by the private sector will produce the coastal zone of the future. Concerned and knowledgeable landowners, must, therefore, become stewards of their land resources. Land developers and builders should utilize the talents of good design professionals to create desirable living and working environments. The public sector should serve as the facilitator establishing implementation policies and regulatory measures, financing needed capital improvements, simplifying land assembly where necessary and providing incentives to the private sector to make investment decisions consistent with the environmental and resource management mandate of coastal zone legislation and with the goals, objectives, policies and recommendations of this study.

# PART III—OPPORTUNITIES FOR COASTAL MANAGEMENT

Pressures from population and industrial expansion along the Chesapeake Bay and its tributaries, lack of planning, planning without environmental consideration, poor regulation activities, and changes in social values have all led to the rapid and highly visible deterioration of our coastal environment. How should we respond to this situation? It is perhaps easier to see what we should not do—we must not permit the "WE/they" attitude to gain the upper hand. "We-they" is an adversary outlook in which we all tend to see ourselves as victims of a conspiracy of others. "They" may be a remote Department of Natural Resources, a powerful interest group or a large corporation. Or "they" may be a nearby property owner or developer. Or "they" may be different social or racial groups. Increasingly "they" may be almost anyone. This approach erodes the cement that holds a community together. Trust dissolves under constant battering, and a stalemate in decision-making results.

It is no answer to wish things otherwise or to exhort cooperation. When people feel government is not on their side, no amount of information will put things right. Goverment is expected to be efficient, prompt and responsive in deterring sprawl, in providing public transit, in thwarting inappropriate development, and in protecting our coastal waters. At the same time, it had better consult with every affected interest, it must not interfere with the individual's right to drive a car or boat, or to own a single-family home, or perhaps even to build a resort cottage. We are left, then, with an enormous task—that of finding a means of apportioning resources to fulfill important expectations in a way that most people will regard as fair. This study is a first step in that direction.

The coastal zone must be recognized as a unique area. It is a resource with a unique set of natural conditions and with potential for a unique set of uses. Its problems are also unique and vary from the recreational needs of an individual shoreline community to the protection of the Chesapeake Bay ecosystem as a whole. Whatever scale the problem, however, it is nearly always viewed in parochial terms—"We cannot swim at our beach this year" or "That factory will lower my property values." Problems may be viewed this way but their causes and solutions cannot. The Bay functions as a unit and so must we. Interjurisdictional cooperation and the attention of state and federal agencies is essential. Pollution does not recognize the difference between a public and private beach or stop at a political boundary. Neither must we. We should look at the coastal zone as a set of problems needing identification and solution and use all the tools at our command regardless of political or bureaucratic boundaries. This study takes that tack, speaking as an advocate for the coastal areas and directing recommendations at all the authorities involved.

Before recommendations can be made some framework for identifying and analyzing the problems must be set up. How are particularly important issues identified now? Can coastal problems be categorized? Can they be given geographic locations? Is one more important than another? What are our overall management objectives regarding the coast? The rest of this chapter will deal with these kinds of questions.

Several mechanisms now exist for bringing attention to specific coastal problems: land use planning within the local jurisdictions, the Critical Areas Program as coordinated by the Department of State Planning, and the Geographic Areas of Particular Concern element of the State Coastal Zone Management Program.

**The Critical Areas Program**

The program for the designation of areas of critical state concern (the Critical Areas Program) is an opportunity for the local jurisdictions to indicate to the state (via the Department of State Planning) those areas it considers to be of importance and the land uses it considers appropriate for such areas. The general categories of areas being evaluated include:

- Natural Areas
  - —Rivers
  - —Bays and Estuaries
  - —Wetlands
  - —Beaches
  - —Dunelands
  - —Prime wildlife habitat
  - —Rare animal habitat
  - —Rare vegetation

- Areas of Special Public Concern
  —Reservoirs
  —Floodways
  —Seismic zones
  —Steep slopes
  —Aquifer recharge areas
  —Noise hazard areas
  —Areas with high air pollution potential
  —Areas with existing groundwater problems
  —Public water supply watersheds
  —Public water supply wellfields

- Areas of Special Economic Concern
  —Prime industrial sites
  —Prime agricultural land
  —Prime forest land
  —Existing or potential mineral extraction sites

- Areas of Cultural Concern
  —Historic areas or sites

- Areas of Major Public Facilities
  —Major Highways
  —Railroads
  —Airports
  —Marine Terminals
  —Educational Facilities
  —Institutional Facilities
  —Defense Installation
  —Transit Impact Areas

- Areas held in Public Trust
  —Nature or Historic Preserves
  —Parks
  —Wilderness Areas
  —Historic Sites
  —Public Rights-of-Way
  —State or Federal Forests

- Private Development with an Interjurisdictional Impact
  —Recreation
  —New towns or planned large-scale development
  —Port facilities

The factors examined in establishing the degree of critical State concern were suggested by the Department of State Planning in the "Guidelines for the Designation of Areas of Critical State Concern."

An area can be found to have "State Concern" if:

—it is characterized by features that are unique, significant, or scarce;
—development actions can create an interjurisdictional concern;
—the expenditure of fiscal resources introduces a concern for the financial resources of the State;
—it is essential to, is impacted by, or has an impact upon, State policies, plans, or programs.

An area is defined as "critical" if:

—it is susceptible to physical alteration, destruction, or loss;
—it contains valuable natural resources, existing or proposed major public facilities, the use, preservation or conservation of which may be pre-empted or curtailed by the establishment of other land uses.

Local jurisdictions are now evaluating areas and nominating them to the Department of State Planning for designation as State Critical Areas, and formulating management plans. Once the areas are officially designated by the Secretary of the Department, State and local actions effecting the areas will be monitored by the Department for consistency with the proposed management programs. Where actions affecting Critical Areas are found to be inconsistent, the Department may intervene in administrative proceedings and may initiate judicial proceedings to encourage and enforce proper management of these Critical Areas. However, it is important to note that the intervention authority is not limited to designated Critical Areas.

It is beneficial for the local jurisdictions, therefore, to evaluate all areas that may be considered to be of State concern and will involve State actions (acquisition or permitting). By doing so, a step will be taken towards insuring consistency of State actions affecting these areas, and the assistance of the Department of State Planning will be enlisted in monitoring and evaluating uses of such areas.

**Geographic Areas of Particular Concern**

One major element of the State Coastal Zone Management Program is the identification of geographical areas of particular concern. This element is tied very closely to the State Critical Areas Program. A designated State Critical Area that is within the coastal zone "area of focus" is automatically a Geographic Area of Particular Concern (GAPC). Critical Areas outside of the area of focus may be designated GAPC's upon the suggestion to, and approval of, the Coastal Zone Unit. The designation of coastal Critical Areas, or GAPC's, also encourages monitoring and evaluation of the Areas by the Coastal Zone Unit as per the recommended management programs of the local jurisdictions.

The importance of the unification of the Critical Areas Program with the Coastal Zone Management Program is that the Federal Coastal Zone Management Act requires that actions of Federal agencies be consistent with a state's approved Coastal Zone Management Program. Consequently, the coastal management concerns of the local jurisdictions, as they are affected by Federal actions, can be assured of State attention and Federal consistency depending on the language of the final regulations.

The categories of areas that may be suggested as Geographic Areas of Particular Concern, as indicated

in the proposed State Coastal Zone Management Program include:

- Resource Protection Areas
  —Vegetated Tidal Wetlands
  —Upland Natural Areas
  —Prime Recreational Areas
  —Productive Agricultural Land
  —Areas of Historical or Archaeological Importance
  —Aquatic Sensitive Areas
- Hazard Prone Areas
  —High Risk Shore Erosion Area
  —Flood Hazard Areas
- Development Critical Areas
  —Major Facility Sites (including major residential developments)
  —Ports
  —Mineral Extraction Areas

Land use planning within the local jurisdictions is the main channel for use of this study. Recommendations and supporting data should be used by coastal planners within each jurisdiction in the preparation and revision of master plans, zoning ordinances, and other relevant County and City ordinances.

Local land use controls are the strongest mechanism for affecting the pattern and characteristics of coastal development. An approved land use plan—showing a general range of permissible uses in specific areas within the jurisdiction—serves as the major criterion for zoning decisions, capital improvement projects, and private development proposals. Zoning ordinances, subdivision regulations, and other local ordinances are specifically addressed to the characteristics and standards of the various uses and activities.

The local jurisdictions of the Baltimore Region, cooperating through the Regional Planning Council, prepare a regional General Development Plan. This General Development Plan is similar to but more generalized than the local land use plan. It represents a regional consensus of optimal development patterns and is a strong influence on proposals with a greater than local significance. This study is being coordinated with the current updating of the General Development Plan to insure that coastal management concerns are addressed.

The roles of the Department of State Planning in the Critical Areas Program and the Coastal Zone Management Program are limited to *advising* and *assisting* the local jurisdictions in the development of land use plans. The actual authority for preparing and enforcing land use plans lies within the local jurisdictions. It should be emphasized that the designation of Areas of Particular Concern should become part of local land use plans, encouraging State and Federal consistency.

**Management Concerns**

These, then, are some of the ways we have now to identify problems and to manage resources in the coastal zone. They contain a warning in that none are truly comprehensive or totally coordinated. There remains a need for some form of long-range planning and program for the conservation and utilization of our finite coastal resources. The condition of the water and the built and unbuilt environments which line its shores will not yield to a piecemeal approach characterized by the adversary "we-they." What are our overall concerns in the coastal areas? If we view the coast as a set of problems, where do these problems affect sensitive resources? Let's go through the concerns and give names to the problems and sensitive coastal resource areas.

**Management Concern:** The degradation of the ability of coastal waters to perform their natural functions.

Water Quality

The region's coastal waters have been severely affected by poor management of such pollution sources as industrial wastes, failing sewage treatment plants and collection systems, boat toilets, commercial shipping, dredging and spoil disposal, agricultural runoff and sedimentation, urban stormwater runoff, and septic system failures. Coastal waters which have been subjected to the greatest deterioration in quality or are very sensitive to increased levels of pollution and, therefore, are in need of better management include:

—Susquehanna River
—Swan Creek
—Romney Creek
—Bush River
—Bird River
—Galloway Creek
—Norman Creek
—Sue Creek
—Back River
—Patapsco River
—Spa Creek
—Back Creek
—Patuxent River

Wetlands and Aquatic Vegetation

The continued destruction of wetlands and the loss of aquatic vegetation has resulted in the decline of several important benefits. Biologically, they provide an essential link in the food chain and habitat of shellfish, finfish, waterfowl and lowland animals. Physically, they function as erosion and flood control mechanisms and sediment traps. In addition, they decrease water pollution by metabolizing nitrates and phosphates. While all of the region's wetlands and aquatic vegetation are generally sensitive, the following areas have been determined to be of the greatest management concern.

—Susquehanna Flats
—Otter Point Creek
—Aberdeen Proving Grounds and Edgewood Arsenal
—Gunpowder Delta
—Dundee Creek
—Flat Creek
—Mesnick Pond
—Lyons Creek
—Hines Pond
—Lerch Creek
—Smith Creek
—Mill Swamp

—Black Marsh
—Patapsco/Reedbird area
—Severn Run
—Deep Pond
—Deep Cove Creek
—Jug Bay
—Patuxent River
—Little Patuxent River
—South River headwaters
—Round Bay Bog
—Forked Creek (Magothy R.)
—Angel's Bog
—North Basin (South R.)
—Sullivan's Cove (Severn R.)

Shellfish and Finfish Resources

Aquatic areas in the Baltimore region provide suitable habitat for several species of shellfish and finfish during various phases of their lives. Several of these areas contribute significantly to the commercial and sport fishing industries. Primary management concern must be given to spawning and nursery areas, migratory pathways, areas historically providing high commercial or sport catch, areas suitable for the propagation of shellfish, and the range of rare or endangered species. Those coastal waters that contain these sensitive aquatic areas include:

—Lower Susquehanna River and the Susquehanna Flats
—Deer Creek
—Bush River
—Little Gunpowder River below Route 40
—Gunpowder River below Route 40
—Bird River below Route 40
—Dundee Creek
—Upper Middle River including Dark Head Creek, Sterling Creek, Hopkins Creek and Norman Creek
—Back River including Deep Creek and Muddy Creek
—Lower Patapsco River including Curtis Creek, Bear Creek and Bodkin Creek
—Magothy River above Catherine Avenue, Mill Creek, Dividing Creek and the Little Magothy River
—Severn River
—South River headwaters
—Rhode River
—West River

**Management concern:** The physical limitations and overutilization of coastal waters and their resources.

Commercial Boating

Regionally, the main factors in commercial shipping are the maintenance of channels of suitable depth and oil spills. Due to the limited maneuverability of commercial vessels another area of concern is the conflict between recreational boating and commercial ship navigation.

—Chesapeake Bay Channel
—Brewerton Channel Eastern Extension
—Fort McHenry Channel and connecting harbor channels
—Baltimore Harbor
—Upper Chesapeake Bay Bridge area

Recreational Boating

The region's coastal waters are an important recreational resource, providing opportunities for pleasure boating, skiing, sportfishing, sailing and swimming. The increasing demand for recreational boating opportunities has resulted in the high utilization of many of the coastal tributaries. This has led to an increase in the incidence of boating accidents, deteriorating shoreline areas, and dissatisfaction among boaters. Those areas most overutilized by boating enthusiasts are:

—Susquehanna River
—Middle River
—Back River
—Inner Harbor
—Middle Branch
—Upper Chesapeake Bay Bridge area
—Magothy River
—Severn River
—South River
—West River
—Rockhold Creek

**Management Concern:** The presence of residential development in inappropriate coastal areas.

Residential Communities

The need to provide protection from natural hazards and to maintain existing coastal residential communities is of major concern. Tidal flooding due to hurricanes and tropical storms along with shoreline erosion pose significant hazards to most existing shoreline residential communities. Many of these communities also suffer from high concentrations of air pollution from cars and nearby industries and noise from airports. The disposal of solid wastes and sewage provides a major problem for several coastal communities. Furthermore, the structural decline of residences within the older coastal communities creates long-range concerns for the continued vitality for those areas. These problems are most apparent within the following coastal communities.

—Havre de Grace
—Bowley's Quarters
—Essex/Middle River
—Dundalk
—Edgemere
—Millers Island
—Brooklyn, Cherry Hill, Locust Point
—Fells Point
—Landsowne/Pumphrey
—Glen Burnie
—Annapolis
—Mayo Peninsula
—Shadyside Peninsula
—Davidsonville

**Management Concern:** The maintenance of a viable economic community in the face of limited air, water, and land capability.

Port of Baltimore

The Port of Baltimore has become a major world seaport, the hub of a major urban region, and the prin-

cipal node of commercial and industrial activity within the coastal zone. Future port management must address the return to a reasonable level of the harbor's water quality, rail land transportation accessible to port facilities, protection from natural hazards, encouragement of public waterfront access, and the promotion of residential development along the water's edge. Those areas within the Harbor for which management opportunities exist and which would improve the port's capabilities include:

—Inner Harbor East and West
—Fells Point
—Boston Street
—Canton
—Dundalk Marine Terminal
—Sparrows Point
—Locust Point
—Bethlehem Steel Shipyard
—Marley Neck
—Hawkins Point
—Curtis Bay/Fairfield
—Masonville
—Middle Branch
—Port Covington

Spoil Disposal

The disposal of dredge spoil is a process directly related to the maintenance and improvement of navigable waterways. Different kinds of problems arise concerning spoil disposal depending on the spoil disposal method and the quality of spoil to be disposed. Spoil disposal methods include: upland filling, overboard dumping, containment within tidal areas, beach restoration, marsh creation, and lightweight aggregate production. Current spoil disposal problems occur when spoil quality characteristics are not properly matched with spoil disposal options. In some cases there are no adequate spoil disposal means. Those existing and potential spoil disposal areas that offer the greatest management concern include:

—The approaches to the Chesapeake and Delaware Canal
—Pooles Island Deep
—Kent Island
—Hart and Miller Islands
—Patapsco River Mouth
—Baltimore Harbor containment sites

Employment Centers

Historically, the coastal zone has accommodated the majority of industrial and commercial activities within the region. These coastal employment centers are a major contributing factor to the economic base and welfare of the region and the State. What is imperative now is to determine, with the limited amount of land available for employment functions, especially in the vicinity of Baltimore Harbor, what can be accommodated and what will provide the greatest benefit in terms of jobs and taxes with the least negative impact on the region's coastal resources. Those areas where this is of major concern include:

—Havre De Grace
—Essex-Middle River
—Patapsco Neck
—Port of Baltimore
—Lansdowne
—Marley Neck
—Glen Burnie
—Annapolis

**Management Concern:** The provision of adequate opportunity for the enjoyment of coastal recreational and cultural resources.

Parkland

The region's coastal parkland can provide an almost endless variety of recreational opportunities for people to play, to be refreshed, and to be inspired: sandy beaches for cooling off from the heat of the city; wooded creeks and rivers for canoeing or exploring; bluffs for watching the Chesapeake Bay or one of its tributaries; waters for swimming, boating, fishing and shellfishing; and coastal wetlands for nature study. In short, coastal parkland is critical to the quality of life in the Baltimore region and accessible public parkland along the Chesapeake Bay and its tributaries is limited. This is especially true in the following areas:

—Edgewood
—Joppatowne
—White Marsh
—Bowley's Quarters
—Dundalk
—Inner Harbor
—Patapsco Neck
—Patapsco/Reedbird
—Fells Point
—South Baltimore/Ft. McHenry
—Middle Branch
—Cherry Hill
—Hawkins Point
—Northern Anne Arundel Co.
—Mountain Road area
—Annapolis area
—Mayo Peninsula
—South, Magothy, Severn, Rhode, and West River Peninsula areas

Marinas

Marinas, piers, mooring buoys, and boat launching ramps constitute some of the most common uses of the shoreline and adjacent waters. Their presence is significant in terms of miles of shoreline developed, their beneficial contribution to the region's economy and to the potential for recreational boating. However, these benefits are also associated with a number of social and environmental problems. Due to the breadth of these potential problems, the entire shoreline of Baltimore City, Baltimore County, and Anne Arundel County can be presumed to be a sensitive coastal resource with respect to the management of marinas, piers, mooring buoys and launching ramps.

Public Access to the Shoreline

The region's shoreline has great potential for numerous forms of public enjoyment—viewing, walking, bicycling, fishing, shellfishing, photography, nature study, or just sitting beside the water. These extensive coastal resources, however, are available to but a limited number of the region's residents and only a small

portion of the shoreline is accessible to all the public. The severity of the lack of public access to the shoreline requires that critical management concern be given to all waterfront areas that remain undeveloped.

Archeological and Historic Preservation

The many historic, architectural, and archeological sites within the coastal zone provide a significant link with Maryland's past and an important addition to educational and cultural resources. The frequent destruction of these sensitive coastal resources disrupts the environment by substituting monotony for visual variety and cultural richness. In general, critical management concern should be given for all historic structures with a potential for filling a useful as well as an aesthetic function. Areas where this is of greatest concern include:

—Havre De Grace
—Federal Hill
—Fort Howard
—Fort Carroll
—Fort McHenry
—Fort Armistead
—Fort Smallwood
—Fells Point
—Curtis Creek Furnace
—Owensville
—Annapolis

**Management Concern:** The provision of properly located and sized modes of transport in an environmentally constrained coastal area.

Transportation

Transportation is a fundamental service in and around the Baltimore coastal zone. Each transportation mode (highway, rail, public transit, and aviation) affects the coastal environment in its own way, and together interact with waterborne transportation to produce a cohesive regional system. The provision and location of transportation facilities have far-reaching consequences on growth and development patterns, and sensitive coastal resources. This transportation stimulus has frequently been outpaced by development causing overutilization and congestion. Those coastal areas where the condition of the transporation mode is of significant management concern include:

—Glenn L. Martin State Airport
—MD 150 east of Martin Airport
—Back River Neck Road
—Dundalk
—Canton
—Fells Point
—Locust Point B&O Rail Yard
—Baltimore-Washington International Airport
—MD 100
—U.S. 50/301 between MD 424 and Ritchie Highway
—Parole (U.S. 50/301, MD 2, MD 178, MD 450 and Riva Road)
—College Parkway
—Ridgely Avenue Bridge
—South River Bridge (MD 2)
—Lee Airport
—MD 3 from the Beltway (I-695) to MD 32/178
—MD 178 from MD 32 to Parole

**Management Concern:** The loss of those coastal resources that comprise a non-renewable portion of our natural support systems.

Natural Areas

Coastal natural areas are simply those places where at present the natural functions predominate and are not significantly influenced by either deliberate manipulation or accidental interference by man. The region's significant and sensitive coastal natural areas include forests, wooded swamps, non-tidal wetlands, stream corridors, and tidal wetlands. Due to the urban nature of the region's coastal zone, many of its significant natural areas have been lost or impacted by development such that the loss of their natural functions and public benefits seems irreversably committed. Those major sensitive coastal natural areas which are of critical management concern, in addition to the previously mentioned wetlands, are:

—Robert and Spencer Islands
—Bush River headwaters
—Railroad Creek
—Bird River Beach
—Windlass Run
—Honeygo Run and Whitemarsh Run
—Goose Harbor Peninsula
—Miami Beach
—Holly Neck
—Bodkin Point
—Eagle Hill
—Upper Severn River
—Lake Waterford
—Brewer Pond
—Annapolis Water Works
—Flat Creek
—Jug Bay
—Beards Creek
—Seven Ponds
—Poplar Point
—Harness Creek
—Cedar Point
—Mayo Point

Agriculture

The region's coastal agricultural land is of great value as a natural resource. The loss of prime coastal agricultural land results in the loss of products, jobs, open space, wildlife habitat and several other significant social and environmental benefits. Due to the nature of urban expansion within the region we can consider all agriculturally productive coastal lands to be sensitive coastal resources and of critical management concern.

Minerals

Since most of the region's supply of sand and gravel is obtained from within the coastal zone, the future management of this limited resource is of critical concern. The loss of areas with mineral resources to other

pre-emptive urban land uses will continue to add stress to mineral resource management decisions. Many supposed sand and gravel deposits are located within or adjacent to riverine shoreline or tidal natural areas, the extraction of which could be environmentally incompatible. These critical management concerns are most prevalent along the following coastal tributaries:

—Susquehanna River
—Little Gunpowder Falls
—Big Gunpowder Falls
—Bird River
—Patuxent River

**Management Concern:** The negative environmental effects and high public costs associated with inappropriate new growth.

Development Pressures

Growth pressures are selectively felt throughout all coastal areas of the region. In many areas that have been developed in the past, there is an insufficient amount of development and redevelopment activity. Stagnation, deterioration, disinvestment, and abandonment characterize an insufficient utilization of land, roads, sewers, and public services, which results in increased public expenditures. In many other areas, growth pressures exceed the ability of the public sector to provide necessary services, resulting in increased capital costs and operating expenditures as facilities are overextended to accommodate levels of demand well beyond their initial design parameters. Furthermore, these growth pressures often adversely affect the wise management of other sensitive coastal resources. Those coastal areas subject to the greatest future development pressures include:

—Bellcamp
—Edgewood
—White Marsh
—Middle River
—Essex
—Back River Neck
—Metrocenter
—Fells point
—Brooklyn Heights
—Glen Burnie
—Marley Neck
—Severna Park
—Mountain Road area
—Broad Neck
—Annapolis
—Edgewater
—Mayo Peninsula

**Goals and Objectives**

The foregoing, them, is a way of picturing the coastal zone as a set of problems and giving them names and locations. It is meant to make the job of conceiving the task before us a little easier. Where do we go from here? What do we want a management program to do for us? These questions require a statement of goals and objectives. The goals of the management program suggested in this study can be stated as:

To promote recognition of coastal concerns and management priorities by the appropriate local, regional, State, and Federal agencies, private organizations, and the public; and to promote maximum inter-agency coordination where there is complementing or overlapping authority;

To promote maximum public participation in identifying coastal problems, in evaluating alternatives, and in reviewing implementation of the program; and

To ensure that public and private actions and activities affecting the coastal zone are consistent with the standards of development as recommended by this document.

These overall program goals may be strengthened by refining them into management objectives—in other words, in examining a particular problem area, what is it that we want to do and what should we direct our actions toward? Management objectives should be brought to bear on a continual basis in the process of state and local evaluation of coastal projects. Each objective has a criterion that forms a question directed to the proponent of the development—is it a water-dependent use? does the project adversely impact finfish or shellfish? does it block public access to the shoreline? The answers to these questions can be the reasons for approving the development, denying it, attaching conditions, requiring mitigation measures, or any combination of these.

It is expected that local governments will translate the words of the policies and the specific coastal resource management recommendations into their general plans, zoning maps and ordinances, and other implementation tools. This translation may make the standards more detailed and specific and, overall, perhaps more sensitive to local and even regional needs. In the final analysis, coastal development must pass certain tests for conformity with coastal resource management objectives. The management objectives recommended by this study are:

- Protection of the natural conditions and ecological function of coastal waters.
  - —Preservation and improvement of water quality through control of the sources of water pollution.
  - —Protection of wetlands and areas of aquatic vegetation from direct destruction and indirect sources of degradation.
  - —Protection of fish and shellfish through the proper management of harvesting and indirect sources of harm.
- Promotion of proper utilization of coastal waters for recreational and commercial activities.
  - —Promotion of balanced recreational use of coastal waters while recognizing the problems of congestion and environmental degradation.

—Promotion of commercial boating growth in a manner compatible with environmental sensitivities and recreational activity.

- Promotion of redevelopment and restoration of declining residential and commercial areas in the coastal zone.
- Maintenance and growth of a sustainable water-related and non-water related economic sector while recognizing the associated environmental costs.
  - —Maintenance of the vitality of the Port of Baltimore through the provision of adequate shoreline facilities and through the provision of adequate channel depths.
  - —Provision of suitable areas for the disposal of dredge material and control of the location and methods of disposal to minimize environmental impacts.
  - —Encouragement of shoreline industry location in a manner compatible with environmental and recreational goals, and restriction of industrial uses to those that are dependent on a water location.
- Encouragement of the provision and protection of coastal recreational, natural and cultural resources.
  - —Promotion of increased public access to the shoreline for recreational and educational purposes.
  - —Encouragement of further acquisition of coastal parkland and the efficient development and maintenance of existing coastal parks.
  - —Encouragement of the preservation, protection, and restoration of coastal historic sites and districts.
- Provision of adequate transportation facilities with recognition of their direct and indirect impacts on sensitive coastal resources.
- Prevention of the loss and degradation of valuable natural resources in the coastal zone.
  - —Protection of coastal forests, stream valleys, and wetlands with special consideration of those areas identified as prime wildlife habitats and endangered species habitats.
  - —Prevention of the pre-emption of coastal mineral resource areas and encouragement of the timely re-use of those areas.
  - —Prevention of the loss of prime, productive agricultural lands.

# PART IV—COASTAL PROBLEMS AND RECOMMENDATIONS

We now have a way of looking at the coastal zone, a way of categorizing its problems and locating their impact, and a set of objectives against which to measure our recommended actions. What are the specific recommendations? They are presented in this chapter on a problem-by-problem basis under four major headings. 'The Quality Of Our Waters' includes such matters as water quality planning, sewerage systems, sediment control, shellfish and finfish resources, commercial and recreational boating, and marinas. 'The Land/Water Edge' covers such concerns as the Port of Baltimore, spoil disposal, wetlands, parks, and public access to the shore. 'Inland Coastal Areas' includes a discussion of major employment centers, land transportation, and sensitive inland resources, such as natural areas, agriculture, and mineral deposits. The final category, 'Growth Pressures and Their Management,' deals with overall development patterns and their guidance through planning policy.

After each recommendation in this chapter, the following chart appears:

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |

The chart represents the agencies and governments participating in this study. The first four spaces are the local jurisdictions—Harford County, Baltimore County, Baltimore City, and Anne Arundel County. In order, the acronyms stand for the following agencies and groups: RPC—Regional Planning Council; DNR—Department of Natural Resources (with the Coastal Zone Unit of the Energy and Coastal Zone Administation as the most concerned and active agency); DECD—Department of Economic and Community Development; DSP—Department of State Planning*; DOT—Department of Transportation; DHMH—Department of Health and Mental Hygiene; MPA—Maryland Port Administration; and State Obj—this refers to the objectives described in the State's Coastal Zone Management Program (a complete listing may be found in Appendix A).

The purpose of the chart is to let the reader know who has assumed responsibility for further action on each recommendation. The following symbols will be used:

- • —Indicates a commitment on the part of the agency to review the recommendation for implementation. This review could end in either adoption or rejection. The specific review processes of the study participants are explained in Part V.
- o —Indicates that although the participant has no review or implementation authority regarding the specific recommendation, the participant urges the affected government or agency to take action.
- × —Indicates that the participant does not agree with the recommendation.
- No Symbol —Indicates that the recommendation is supported in concept towards achieving overall coastal zone management goals and objectives.
- Number 1-35 —Indicates the State Management Program objective to which the recommendation is directed. The goals and objectives are listed in Appendix A.

Too often, policies and recommendations are spelled out in reports only to die because no one will commit to their examination or implementation. The chart is a device designed to avoid this pitfall and to establish

*The Department of State Planning is an active participant in the Metropolitan Coastal Area Study and has reviewed and commented upon the draft document. The recommendations which appear in the document also have been reviewed by Departmental staff. Comments on the recommendations have been presented to the Coastal Zone Unit. Since the recommendations represent the efforts of technical staff in each participating jurisdiction and have not been approved by a policy making body, the Department, at this time, will withold formal action on the recommendations until the appropriate action has been taken in each jurisdiction. Once action has been taken by each jurisdiction, the Department will then be in a position to review recommendations which have received formal endorsement. Action by the Department on those recommendations approved by each jurisdiction will be handled according to the Department's action agenda (see Part V).

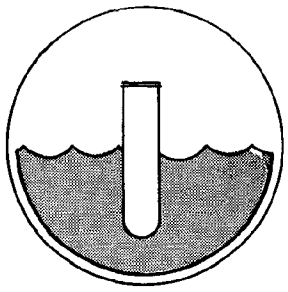
this study as a *working* document, not a *final* statement. The final statement will be the action or inaction of the participants, and this will be reported on as a follow-up to this study.

The recommendations begin with . . .

## THE QUALITY OF OUR WATERS

The overall management objective here is the protection of the natural condition and ecological functioning of our coastal waters. More specifically, this objective includes:

— Preservation and improvement of water quality through control of the sources of water pollution;
— Protection of fish and shellfish through the proper management of harvesting and indirect sources of environmental harm;
— Promotion of balanced recreational use of coastal waters, recognizing the problems of congestion and environmental degradation; and
— Promotion of commercial boating growth in a manner compatible with environmental sensitivities and recreational activity.



### Land Activities and Water Quality

A variety of land and water activities affect or are affected by water quality. Among the land activities are industrial operations, sewage treatment plants, agricultural runoff, sedimentation, urban stormwater runoff, and septic system failures. Related water activities include recreational and commercial boating, dredging, marinas, and shellfish and finfish harvesting. Although land and water activities related to water quality are dealt with separately in this section for the sake of clarity, it must be remembered that in terms of their impact on the Bay and its estuaries they are tightly linked.

**Water Quality Standards and Permits**

The waters of the State are protected and managed through a water quality program that includes standards, permits, enforcement, planning, and contruction of treatment plants. This program is designed to ensure water of suitable quality for water users and uses.

Water quality objectives are quantified in established State water quality standards. The Department of Natural Resources, Water Resources Administration, in collaboration with the Fisheries Administration and the Department of Health and Mental Hygiene (Environmental Health Administration) is responsible for determining water quality standards for all surface waters in the State. Four water use classifications of water bodies have been established according to the most critical uses for which each must be protected. These classes are:

Class I: Water contact recreation and aquatic life
Class II: Shellfish harvesting
Class III: Natural trout waters
Class IV: Recreational trout waters

A new Class V water use designation is being proposed for a set of revised water quality standards. This designation, "Special Resource Waters," identifies critical aquatic uses taking place in surface waters of the State (e.g., spawning grounds for striped bass).

The objective of the State water quality program is to protect or maintain water quality for contact recreation, fish life, other aquatic life and wildlife. Criteria to protect these uses and areas are set such that water supply for public consumption, with treatment and disinfection, and agricultural and industrial water supply are also afforded protection.

The Maryland Water Resources Administration has defined eight common water quality parameters that can give an indication of the chemical condition of a body of water. These parameters can also, in varying degrees, be translated into the health of the biological community in a body of water. These eight parameters are:

1. Dissolved Oxygen (D.O.).
2. Bacteria
3. Algae
4. Sediment
5. pH (alkylinity, acidity)
6. Temperature
7. Oil
8. Trash

These parameters have been translated into water quality standards for each class of waters. For example, five of these eight parameters were translated into water quality standards for Class II waters (shellfish harvesting):

Dissolved Oxygen—The D.O. concentration shall not be less than 4.0 mg/l at any time, with a daily average of not less than 5.0 mg/l, except where lower levels occur naturally.

Bacteria—

a) The Most Probable Number (MPN) of coliform organisms may not exceed 70/100 ml, as a

median value and not more than 10 percent of the samples may exceed an MPN of 230/100 ml for a five tube dilution test (or 330/100 ml where a three tube decimal dilution test is used).

b) Compliance shall also be achieved with the sanitary and bacteriological requirements as set forth in the latest edition of "National Shellfish Sanitation Program Manual of Operations."

Temperature—Temperature elevations above natural levels shall be limited to 4°F in September through May, and to 1.5°F in June through August, outside designated mixing zones.

pH—Normal pH values must not be less than 6.5 nor more than 8.5, except where pH values outside this range occur naturally.

Turbidity (sediment)—a) May not exceed levels detrimental to aquatic life; b) be within the limits of Best Practicable Control Technology c) may not exceed, for extended periods of time, those levels normally prevailing during periods of base flow in surface waters; and d) turbidity of the receiving water resulting from any discharge may not exceed 50 JTU (Jackson Turbidity Units) as a monthly average, nor exceed 150 JTU at any time.

Similar type standards are set for the other three classes of water use and can be found in Receiving Water Quality Standards established by the Water Resources Administration.

Standards are also set for discharges to waters of the State. If a discharge is greater than 10,000 gallons per day (monthly average) or it is a discharge of waste or waste waters of any volume, a Discharge Permit must be obtained from the Water Resources Administration (WRA).

Other WRA permits for water quality include:

*Wetlands Permits and Licenses*: This program provides for the licensing of dredging, dumping, filling and like activities in tidal wetlands including licensing by the State Board of Public Works upon recommendations of the Secretary of Natural Resources to perform works in State wetlands (navigable waters, below mean high water line) and permit issuance by the Secretary of Natural Resources of work in private wetlands (above mean high water line). Issuance or denial of such a permit is made following public notice and hearing in the affected county. A water quality certificate issued with each wetland license stipulates the conditions that must be met to maintain water quality conditions in the disturbed area.

*Groundwater Permits—Dischargers*: WRA also administers a system of permits to discharge water to groundwaters. This includes the processing of new applications to discharge wastes to groundwaters (e.g., industrial sludges, landfills, lagoons), the monitoring of groundwater quality and investigation of actual cases of groundwater pollution and potential pollution sources.

*Oil Permits*: WRA is responsible for the prevention of oil pollution in State waters. Activities which involve the handling of oil products are regulated by Oil Handlers Permits, Oil Vehicle Operator's Certificates, Oil Terminal Facility Licenses and on-site inspection of oil handling and storage facilities.

*Hazardous Substances Permits*: This program provides for the control of disposal of hazardous substances (any matter than conveys toxic, lethal, and sublethal effects to plant, aquatic or plant life, or which may be injurious to human health, or persists in the environment). The Water Resources Administration has established rules and regulations that focus on control of hazardous substances in their transport, storage, and disposal. Some examples of hazardous substances include: DDT, Kepone, Mirex, Clordane, and Mercury.

**Enforcement**

The Enforcement Division of WRA is responsible for inspection and enforcement activities of the Administration. The Division also serves as a general contact and coordinator with the public for the wide range of water resources management programs.

The enforcement activity of the Water Resources Administration addresses three general objectives: (1) prevention of violations, (2) detection of violations, and (3) resolution of violations.

Enforcement personnel conduct both periodic and unscheduled surveillance by ground and air. Enforcement actions, either administrative or legal, are based on the nature, extent, and impact of the violations. Primary emphasis is given to direct, in-the-field corrective action and follow-up. A 24-hour duty roster is maintained through the Department of Natural Resources Police radio watch to handle emergency problems.

Related enforcement activities are carried out by other agencies at local, State and federal levels of government, including major regulatory interaction with the following:

*Federal level*—Corps of Engineers for tidal waters and sediment control; Environmental Protection Agency and Coast Guard for water quality; Housing and Urban Development for sediment control;

*State level*—Department of Natural Resources Police for water quality; State Health Department for water quality related to protection of public health; State Highway Administration and Department of General Services for sediment control; Board of Well Drillers for wells; and Board of Public Works for wetlands; and

*Local level*—Health departments for water quality and wells; planning and zoning and public works for storm water and flood plains; and inspections and permits and soil conversation districts for sediment control.

During Fiscal Years 1975 and 1976 the Enforcement Division of WRA conducted the following kinds of activities:

| Activity | Total for F.Y. 76 | Total for F.Y. 75 |
|---|---|---|
| 1. Enforcement actions | 867 | 707 |
| 2. Inspections | 20,056 | 17,791 |
| 3. Complaints received | 850 | 891 |
| 4. Permits, licenses, and approvals received for enforcement | 2,499 | 1,805 |
| 5. Average number of insp./man/month | 64.8 | 56.1 |

(Note—36 administrative cases were referred to the Attorney General for legal action in FY 76 and 37 in FY 75.)

| Penalties Collected | Total for F.Y. 76 | Total for F.Y. 75 |
|---|---|---|
| a. Fish Kill assessments | $ 255.24 | $ 924.71 |
| b. Administrative civil penalties | 1,500.00 | 3,000.00 |
| c. Court fines | 4,150.00 | 13,725.00 |
| | Total $5,905.24 | $17,649.71 |

These figures show that in the period the Enforcement Division better met the objective of preventing violations before they occur. Note that for FY 76 as compared to FY 75, the number of inspections increased and the number of complaints decreased.

**Water Quality Planning**

Water quality planning programs now in operation include River Basin Planning (303(e)), Area-Wide Facility Planning (208), and Facilities Planning (201). River Basin Planning identifies and suggests methods for treating point source water quality problems in each river basin. Area-Wide Facility Planning supplements River Basin Planning through evaluation of point (sewerage and industrial waste treatment, waste water collection and storm water run-off systems) and non-point (agriculture, construction, residual waste, and land excavations) sources of pollution. Facilities Planning incorporates planning, design and construction of sewage treatment systems in river basins. All of these programs are a result of the Federal Water Pollution Control Act of 1972. As established by the Federal Act, states and designated agencies were to complete 208, 303(e) and 201 sequentially. However, due to funding problems at the Federal level, states were only allowed to proceed with River Basin Planning 303(e) between 1972 and 1976. After 1976 monies were released for 208 planning. Facilities Planning 201 has been on-going since passage of the Act, yet the law requires input from the prior two planning processes, particularly waste load allocations, land use patterns and projections, water quality treatment alternatives, and local water and sewer plans.

The State of Maryland is required to prepare a yearly overall program document describing how water quality management is conducted in the State. *The Continuing Planning Process for Water Quality Management* sets out how all planning requirements set forth under section 303, 208, and 201 are integrated and fulfilled by state, regional, and local agencies.

In this document, the State outlines the phases for water quality management planning. Phase I incorporates all water quality planning completed by the state prior to July 1976. This includes only River Basin Planning. River Basin Plans and 208 Area-Wide Planning is designated as Phase II and is expected to terminate in December 1978. The State's intention is to fully integrate River Basin, Area-Wide, and Facility planning programs during Phase II.

Particularly important is the relationship between 303, 208, local water and sewer plans, and 201 planning. Local water and sewer plans identify the priorities of local governments concerning placement, operation and expansion of water supply, and municipal waste treatment facilities in the locality. They are completed under State law and must be updated every year. River Basin Plans provide the general framework from which new local water and sewer plans are developed. Areawide waste water management planning (201) identifies specific requirements that must be met and accomplished when facilities are being planned, designed, constructed and operated.

Responsible agencies for the conduct of these water quality planning activities are:

303(e)—Water Resources Administration
201 —Environmental Health Administration
208 —Regional Planning Council and Water Resources Administration

There are six river basins lying either wholly or partially within the coastal portion of the Baltimore metropolitan area. These basins are:

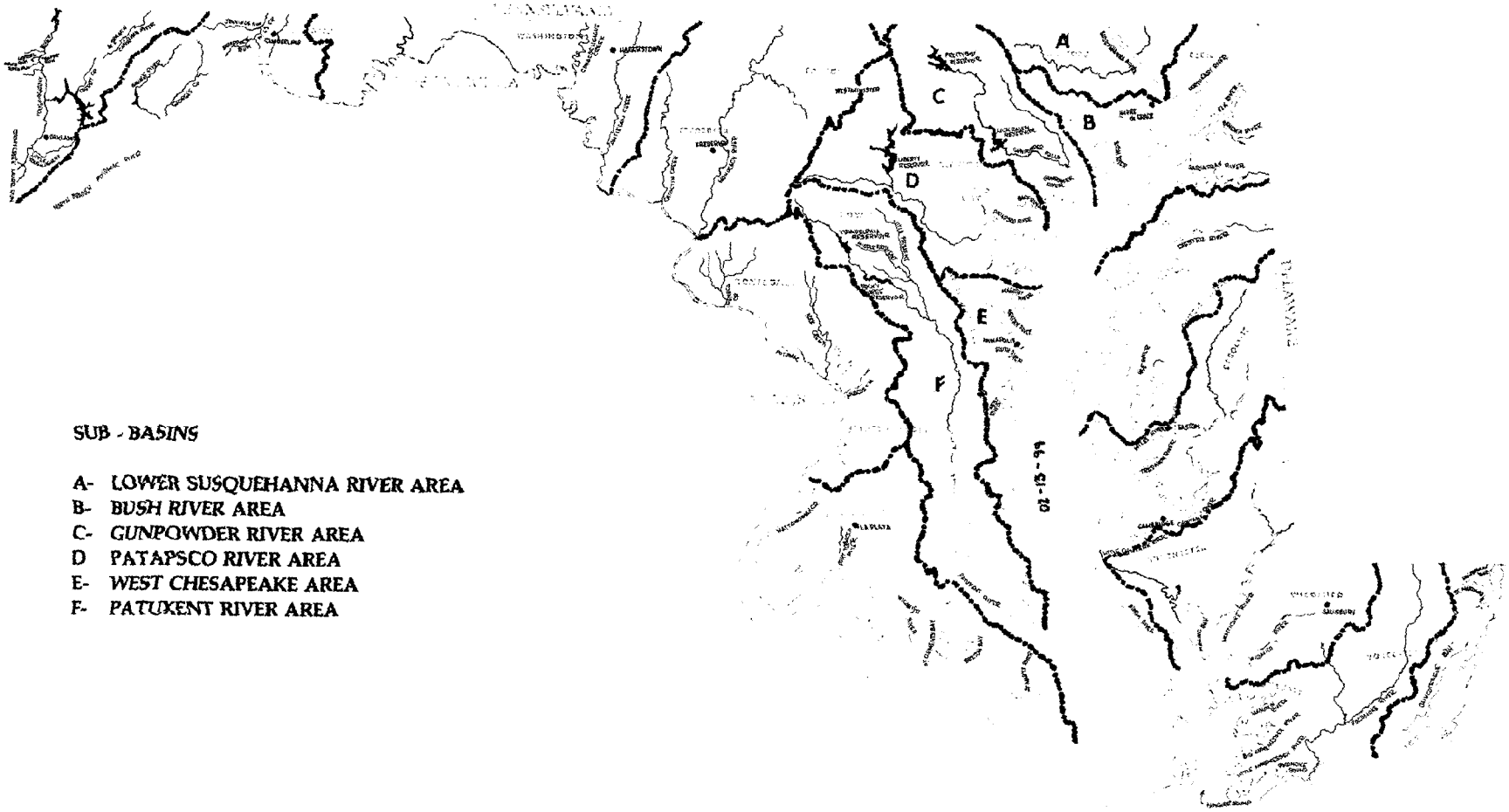
a) Lower Susquehanna River Basin;
b) Bush River Basin;
c) Gunpowder River Basin;
d) Patapsco-Back River Basin;
e) West Chesapeake River Basin; and
f) Patuxent River Basin.

The Water Resources Administration has completed 303(e) Basin Plans for all of the above river basins, except the Patapsco-Back River. A draft of this plan went to public hearing in January, 1975, but final revisions were never completed. The Water Resources Administration has decided to defer to the work of the 208 Program for this river basin, rather than revise and update the Patapsco-Back River Basin Plan.

The 303(e) Plans quantify and list all point source problems in each stream segment. Included in the basin plans is an assignment of wasteloads for each municipal and most industrial facilities. By establishing this preliminary inventory of point source deficiencies, specific short term facility needs were established. Criteria

# Maryland Watershed Designations:

## MARYLAND WATER RESOURCES ADMINISTRATION




SUB - BASINS

A- LOWER SUSQUEHANNA RIVER AREA
B- BUSH RIVER AREA
C- GUNPOWDER RIVER AREA
D PATAPSCO RIVER AREA
E- WEST CHESAPEAKE AREA
F- PATUXENT RIVER AREA

were also established for review of existing sewage facilities plans and facilities plans to be conducted in the near future. A major problem arises, however, with regard to long-range planning since there is very little information generated by the Phase I, 303(e) plans regarding the impacts of non-point source pollution and urban stormwater runoff on overall water quality.

The State hopes to achieve this broader assessment of water quality through the Phase II planning process. It is the goal of the State's Phase II Work Plan to document and report on the results of analyses of all water quality in the State. Thus the Phase II program provides the opportunity for further assessment of the specific point source problems identified in the River Basin Plans in light of further information on non-point source problems. In addition, it will allow for the documentation of future planning needs. It is envisioned that as the 303(e) plans allowed for the establishment of criteria for short-term planning of facilities, the Phase II process will establish criteria for long-range facilities planning.

Current water quality planning activities in the Baltimore area focus on the 208 requirements of the Federal Water Pollution Control act of 1972. As detailed in the "Project Control Program" the 208 process in the region will result in improvement in the quality of the region's waters in accord with the following objectives of the national law:

> "Wherever obtainable water quality by 1983 will be improved enough to allow for the propagation of fish and for recreation in and on the nation's waters."
> "By 1985, elimination of all discharges of pollution into navigable waters."

The process by which the Baltimore area 208 plan will be developed to achieve national water quality objectives features a cooperative, intergovernmental approach; initiates a continuing planning effort to be updated and certified annually; and is comprehensive in that it will consider both point and non-point sources. The plan will also recognize land use implications of water quality decisions and requires that local land use planning and the 208 plan be consistent.

208 Planning is to be an on-going process for more than two years. Based upon an early identification of the most critical water quality problems facing the Region, a realistic planning program has been devised for the initial two-year planning period. Problems needing longer-range study will be addressed in subsequent years. Refined approaches to solving initially identified problems will also be devised and tested in subsequent years. In other words, not everything can be done in two years with the financial and human resources at hand. The thrust of the Region's 208 water quality management program is to take significant beginning steps in solving problems that have either lacked definition or have been unable to be addressed due to inadequate resources.

Since initiation of the 208 Program in the Baltimore Region in July 1976 the following tasks have been accomplished:

1. Non-point sampling program was designed.
2. Treatment facility service areas and wasteload projection were developed.
3. Draft land use and population projections were developed.
4. Water Quality districts were developed.
5. Inventory of industrial discharges was begun.

(These accomplishments are reviewed in detail in the Interim Output Report, April, 1977, Regional Planning Council)

Responsibility for the coordination of Section 201 Facilities Planning review rests with the Department of Health and Mental Hygiene, Environmental Health Administration. Major inputs into this process, however, are also provided by DNR, WRA, RPC, the Maryland Environmental Service and by the Department of State Planning. The importance of the 201 Facilities Planning process cannot be overlooked as a contribution to the development of the State's Phase II Plans. The Phase II water quality management plans will integrate the planning accomplished under Section 303(e), 208 and 201.

A final goal of the Phase II planning process is the shifting of emphasis of the 201 facilities program from individual facilities to overall water quality. To date, because of the lack of specific water quality information, review of 201 facilities plans has been oriented to individual facility problems. By providing more extensive water quality data, in segments with present problems or where preventive action is needed, it is hoped that 201 facilities planning emphasis will be related to water quality goals and be better able to take into account the interrelationships of facilities on water quality. Tradeoffs between controlling point sources and non-point sources will then be able to be evaluated.

**Specific Basin Plan Recommendations**

Each of the Basin Plans, and in some cases additional studies conducted after the basin plans were completed, contain specific recommendations that should be acted upon by the State and local governments.

Found below by river basin and river basin segment are tables which provide a summary of the problems and anticipated means of solution. It should be noted that only coastal segments that currently violate water quality standards are discussed.

The first, or left hand column, of the Tables presents a listing of segments violating fishable and swimmable standards, cites the specific violation, and states applicable water quality severity scores. The water quality scores are measures of the severity of pollution in each segment. The highest score (50) indicates a severe standard violation or that a water use has been precluded. The second highest score possible is 30, which indicates an occasional or not extensive standards violation. A segment can also receive a score of 10 or

0 but these ratings were not used. The segments were scored by the Planning Section of WRA as an on-going part of the Phase I and Phase II Water Quality Management Planning Effort pursuant to 303(e) and 208 planning respectively.

The second column outlines probable reasons for not meeting fishable and swimmable standards. The reasons are separated into point and potential non-point source contributions. The third column, Control and Inventory Program, is also divided into point and non-point categories. A breakdown by percentage of land uses in the segment is included in the non-point category. Phase II Water Quality Management Plans will address in detail non-point controls and inventory procedures. The goal of Phase II Water Quality Management Plans is to assess non-point sources and to define Best Management Practices (BMP) for land uses to control pollution from those sources. Definitions of BMP's will evolve during the Phase II planning period. For this section of the report it will suffice to note that BMP's should be determined and implemented for the land uses listed in each segment.

The most frequently employed point source control measure listed is municipal sewerage upgrading. The vast majority of municipalities and sanitary districts are utilizing Section 201 construction grant project funds to finance this upgrading. Under this arrangement, the Federal government funds 75% of a project, with the State and applicant each funding 12.5% of the costs. There are three distinct steps in the development of sewerage projects. Step One is the facilities planning phase where various sewerage alternatives are considered. Areas experiencing failing septic systems are addressed in this Step. Step Two is the design of the chosen sewerage alternative and Step Three is the actual construction.

All domestic wastewater treatment facilities are required by discharge permit and regulation to maintain: 1) a dissolved oxygen level of not less than 4.0 mg/l (5.0 mg/l in some cases); 2) a coliform not to exceed 200 mpn/100 ml fecal or 70 mpn/100 ml total depending on the location of the discharge; and 3) total residual chlorine not to exceed .01 mg/l to 0.5 mg/l depending upon the location and size of the discharge. In specific cases, the State has specified effluent limits more stringent than EPA's definition of secondary treatment.

The State requires more than Best Practical Technology for industrial discharges when necessary to meet water quality standards. Upon revisions of National Pollution Discharge Elimination System (NPDES) permits, the State will be requiring, by 1983, Best Available Treatment in all cases.

The final column, titled 1983 Forecast, briefly describes expected water quality improvement and related control measures.

Following the table is a summary of water quality sampling undertaken by the Water Resources Administration. A list of facility planning studies necessary is also included.

SUB-BASIN: Lower Susquehanna River Basin

*Water Quality Summary*

With the exception of a few elevated fecal coliform values, the State's water quality standards were met throughout the sub-basin.

*Water Quality Sampling Summary*

*Conowingo Dam Susquehanna River Area Drainage*

During 1976, one station below Conowingo Dam was sampled on eleven occasions. Water quality standards for D.O., temperature, pH, and turbidity were in compliance for Water Contact Recreation waters. Three bacteriological samples were collected, and of the three, only one sample slightly exceeded the standard. Nutrients are increasing and will continue to contribute to enriched conditions in the waters of the Lower Susquehanna and the Upper Bay. This enrichment is the result of land runoff, and the many discharges being brought down into the Maryland portion of the river.

**Recommendation:** Facilities Planning should be undertaken for the Havre de Grace area with emphasis on correction of overflow problems in the sewer system.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | o | | | | ● | | 2 |

**Recommendation:** The State of Maryland should conduct studies of the Lower Susquehanna relating to carbon and organic compound concentrations in river sediments.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | o | | | | ● | | 2 |

SUB-BASIN: Bush River Basin

*Water Quality Summary*

Although development in the basin seldom exceeds medium-density residential/commercial and is lower density in most of the basin, water quality problems related to sewage conveyance or treatment are found in most of the basin's segments. Swan Creek, Romney Creek and Spesutie Narrows are all stressed by existing sewage treatment plant discharges while Bush River is affected by sewage overflows from sewers and by septic system failures. Winters Run, Bynum Run and Bush River are affected by heavy sediment loadings after rainfall. As a result, fisheries in these segments have been harmed and bathing beaches have been closed.

| -Segment<br>-Violation<br>-Scores | Reasons for not meeting standards | | Control and Inventory Program | | 1983 Forecast |
|---|---|---|---|---|---|
| | Point | Potential Non-point | Point | Land Use Non-point | |
| Bush River | | | | | |
| -Water contact (Class I) violations due to bacteria.<br>-Bathing beaches closed.<br>-Bact: 50<br>-Algae: 50<br>-Sed: 50 | Overloaded pumping station at Bush Creek Discharge from U.S. Army's Edgewood Area STP. | Failing septic systems next to river and on some tributaries. Sediment loading from farms and construction sites. Urban runoff from suburban areas. | Sod Run STP discharge will be introduced to river, but treatment requirements are stringent. Current construction will eliminate raw sewage losses from Bush Creek force main. Army will upgrade Edgewood Area STP. | Forest: 36%<br>Agric: 31%<br>Develop: 31%<br>Implementation of RPC/208 recommendations will reduce non-point pollution from all sources to some degree. | Current condition will be greatly improved, but runoff from planned development in tributary areas will have adverse effect unless Best Management Practices are employed and maintained. |
| Lower Winters Run | | | | | |
| -Water contact (Class I) violations due to bacteria.<br>-Bact: 30<br>-Algae: 30<br>-Sed: 50 | None | Failing septic systems. Some agricultural runoff. Sediment loading from farms and construction sites. Urban runoff from Edgewood area. | N/A | Forest: 46%<br>Agric: 27%<br>Develop: 25%<br>Implementation of RPC/208 recommendations will reduce non-point pollution from all sources to some degree. | Proper use of Best Management Practices will reduce sediment loading. Urban runoff from planned residential development will harm water quality unless Best Management Practices are employed and maintained. |
| Aberdeen Proving Grounds Area | | | | | |
| -Water contact (Class I) and shellfish harvesting (II) violations due to bacteria and D.O. sags.<br>-D.O.: 30<br>-Bac: 50<br>-Algae: 50 | County's Sod Run STP is causing eutrophiction of Romney Creek. Smaller discharges are also impacting Romney Creek. U.S. Army's Aberdeen Area STP is impacting Spesutie Narrows. | Runoff from airfield and parking lots at APG has negligible effect. Some failing septic systems on the base. Limited agricultural runoff. | Flows from Sod Run STP will be removed from Romney Creek. U.S. Army will abandon or eliminate many of the small discharges on the base while upgrading the Aberdeen Area STP. | Develop: 99%<br>Agric: 1%<br>(much of APG area is wooded) | Water quality in Romney Creek and Spesutie Narrows should improve as STP discharges are eliminated or upgraded. Non-point runoff should continue to present minimal problems unless activities on the base change drastically. These waters have the potential to be restored to good quality. |

| -Segment<br>-Violation<br>-Scores | Reasons for not meeting standards<br>Point | <br>Potential Non-point | Control and Inventory Program<br>Point | <br>Land Use Non-point | 1983 Forecast |
|---|---|---|---|---|---|
| Swan Creek and Susquehanna Flats | | | | | |
| -Water contact (I) violations due to bacteria.<br>-Bact: 50<br>-Algae: 50<br>-Sed: 30 | STP discharges from Town of Aberdeen, U.S. Army's Pusey STP and private Swan Harbor Dell. | Numerous failing septic systems in Swan Creek drainage area. Agricultural runoff. Urban runoff from Aberdeen, highway corridors and suburban areas. | Town of Aberdeen STP will upgrade to meet NPDES limits. Pusey STP will be abandoned and its service area connected to Army's main Aberdeen Area STP. Swan Harbor Dell STP will be abandoned and connected to Town of Aberdeen STP. | Forest: 42%<br>Agric: 39%<br>Develop: 18%<br>Implementation of RPC/208 recommendations will reduce non-point pollution from many sources to some degree. | Correction of point source problems (elimination or upgrading) and correction of failing septics will bring improvements in Swan Creek water quality. However, this segment is scheduled for future growth by the Town of Aberdeen and Harford County. This will result in increased urban runoff, unless Best Management Practices are implemented and maintained. |

*Water Quality Sampling Summary*

*Bush River Drainage*

One sampling station was maintained in this segment during 1976, as it was during 1975. No changes in parameter values were noted from this year compared to past years.

Problems encountered in this area stem from overloaded interceptors at the head of the estuary and septic system discharges in the tributaries. These lead to bacteriological problems and algal enrichment in the estuary.

Biological sampling was carried out in James Run, a tributary to the Bush. Preliminary evaluation in the field indicates that this portion of the stream was in fair condition.

*Lower Winters Run (below Atkisson Reservoir)*

One sampling station was maintained during most of 1976. A second station sampling was begun in this watershed as part of the Regional Planning Council non-point source study program. Data from both of these stations indicate no discernible changes from the data of past years.

The water quality in this segment is fair to good, as indicated by these data, with only the bacteriological data exceeding state standards.

Biological sampling that was carried out during 1976 indicates that the conditions in the stream are fair to good, substantiating the physical and chemical indications.

*Aberdeen Proving Ground Area*

No chemical or physical water quality data were taken in this segment during 1976. The Army conducted intensive chemical studies of Romney Creek in 1976 which demonstrated that eutrophication of the creek as a result of nutrients from the Sod Run wastewater treatment plant was continuing.

Biological sampling was conducted in Romney Creek during the year and these results indicate poor water quality for aquatic life.

There have been no major changes in the land use in this area; hence, water quality should be the same as in past years.

*Swan Creek Drainage*

No chemical or physical data was taken in this segment during 1976.

Biological sampling near the U.S. Route 40 bridge

indicates a major improvement in water quality in 1976, compared to 1975. A possible explanation for this improvement might be the fact that during 1975, flooding occurred that could have flushed many of the organisms out of the area, and complete recovery of the aquatic community took a full year, leading to apparent improvement in 1976.

**Recommendation:** Harford County and the State should initiate a Harford County Facilities Plan for the areas of Fallston, Swan Creek, Joppatown, and Edgewood.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | | | | o | o | | | | ● | | 21 |

SUB-BASIN: Gunpowder River Basin

*Water Quality Summary*

In comparison with many other areas, the Gunpowder River Basin has generally good water quality. Problems with aquatic loadings, dissolved oxygen, acidity and toxic substances are minimal. There are only a few small-to-medium-sized public sewage treatment plants in the large basin area, and industrial discharges result in most cases from "clean" processes. Loch Raven and Prettyboy Reservoirs generally provide good-quality raw water for the Baltimore City-Baltimore County water supply system—with the notable exception of high algae levels in the reservoirs during the warmer half of the year. The basically good water quality observed in the basin should be kept in mind when considering the particular problems which do exist in the area.

| -Segment<br>-Violation<br>-Scores | Reasons for not meeting standards: Point | Reasons for not meeting standards: Potential Non-point | Control and Inventory Program: Point | Control and Inventory Program: Land Use Non-point | 1983 Forecast |
|---|---|---|---|---|---|
| Lower Gunpowder Falls | | | | | |
| -Water contact (Class I) violations<br>-D.O.: 30<br>-Bact: 30<br>-Sed: 30 | Discharges from the Richlyn Manor STP and the Forge Heights STP. A few small industrial discharges. | Failing septic systems (several hundred). Agricultural runoff. Urban runoff in suburban areas. | The two STP's will either upgrade to meet NPDES limits or connect to the central sewer system (treatment at Back-River WWTP).<br>Industrial discharges will attain NPDES permit limits.<br>WRA Enforcement and Sediment Control activities. | Agric: 47%<br>Forest: 44%<br>Develop: 9%<br>Implementation of RPC/208 recommendations will reduce non-point pollution to some degree. | Improvements resulting from up grading or abandonment of point source discharges and from connection of failing septic systems will be negated by increased urban runoff resulting from the growth of suburban communities, unless Best Management Practices are implemented and maintained. |
| Bird River Drainage | | | | | |
| -Water contact (Class I) violations-turbidity temperature.<br>-Bact: 30<br>-Algae: 30<br>-Sed: 50 | None | Runoff from abandoned mining areas. Stream channel erosion (turbidity). Disruption of vegetative cover (temp). Failing septic systems (bacteria, nutrients). | WRA Enforcement and Sediment Control activities. | Agric: 16%<br>Forest: 39%<br>Develop: 42%<br>Implementation of RPC/208 recommendations will reduce non-point pollution to some degree. | Major development is to be planned for this watershed by Baltimore County. Unless Best Management Practices are implemented and maintained, storm runoff will be intensified, fur- |

| -Segment<br>-Violation<br>-Scores | Reasons for not meeting standards<br>Point | <br>Potential<br>Non-point | Control and Inventory Program<br>Point | <br>Land Use<br>Non-point | 1983<br>Forecast |
|---|---|---|---|---|---|
| | | | | | ther aggrevating existing erosion and sedimentation problems in this drainage basin. |
| Middle River | | | | | |
| -Bacteria violations for water contact (Class I) and Shellfish Harvesting (Class II) waters. About one dozen bathing beaches have been closed because of bacterial counts and septic system failures.<br>-Bact: 50 | Industrial park discharges. Yacht Club STP. | Widespread failing septic systems among shoreline properities (more than 1500 properties experiencing failure). Heavy boating activity on Middle River. Urban runoff from suburban areas. | Industrial park and yacht club will attain NPDES limits.<br>WRA Enforcement and Sediment Control Program activities. | Develop: 64%<br>Forest: 33%<br>Agric: 3%<br>Implementation of RPC/208 recommendations will reduce non-point pollution to some degree. | Elimination or correction of many failing septic systems will bring definite improvement in the water quality of Middle River. Phased implementation of Federal and State requirements for marine sanitation should improve pollution from recreational boating activity. The use of Best Management Practices should improve urban runoff. |

*Water Quality Sampling Summary*

*Gunpowder River Area Drainage*

This segment includes Seneca, Saltpeter and Dundee Creeks and their tributary streams, and the Gunpowder River proper and its tributaries, with the exception of Bird River, Gunpowder Falls and Little Gunpowder Falls.

Tidal portions of Seneca, Saltpeter and Dundee Creeks, and the Gunpowder River below a line drawn between Oliver Point and Maxwell Point are designated as Class II, Shellfish Harvesting, as the primary water use. The remainder of the Gunpowder and non-tidal waters are designated for Water Contact Recreation and Aquatic Life, Class I.

While water quality is generally good in this segment, algae populations tend to build to higher than normal proportions during the summer months. The growth of algae is controlled in part by the availability of nutrients. Nutrient sources in this segment include sediment from eroding lands, sewage treatment plant discharges, septic system failures, wastewater discharges from pleasure craft, and urban agricultural runoff.

Sampling by the Baltimore County Health Department in the vicinity of the one public bathing beach on the Gunpowder River indicated satisfactory water quality. The right and left forks of Seneca Creek had higher than acceptible bacteria concentrations, while near the mouth of the creek, bacterial levels were satisfactory.

*Lower Gunpowder Falls*

This segment includes Gunpowder Falls from its mouth to Loch Raven Reservoir. The mainstem of the Falls and its tributaries are designed as Class I, Water Contact Recreation and Aquatic Life.

While water quality standards were met in this segment throughout the year, Gunpowder Falls suffers from lower than normal stream flow during the summer months. The most critical reduction in the volume of water flowing within the channel of the Falls occurs at Cromwell Bridge Road, located 1.3 miles downstream of Loch Raven Reservoir.

*Bird River*

The entire segment, which includes Bird River, its principle tributary, Whitemarsh Run and other tributaries is designated as Class I. While water quality

standards were met, Whitemarsh Run and Bird River continue to suffer from high sediment loads resulting from eroding construction sites and from high erodability of the soils in the area.

*Middle River-Browns Creek Drainage*

Middle River above Log Point and Turkey Point is designated as Class I. The remainder of Middle River and Browns Creek is Class II, Shellfish Harvesting. Bacteriological sampling conducted by the Baltimore County Health Department in 1976 showed Middle River to have improved significantly, compared to previous years.

Bottom samples from a station near the mouth of Middle River showed poor water quality, as evidenced by the types of organisms found.

**Recommendation:** Back River Neck: Baltimore County should proceed with the construction of the Bauernschmidt Manor-Turkey Pt. sewerage system and the connection of all failing septic areas to this system.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | | | | ○ | | | | ○ | | 21 |

**Recommendation:** Middle River Neck: Baltimore County should reevaluate sewerage service area requirements for Bowleys Quarters north of Galloway and Seneca Creeks.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | | | ○ | ○ | | | | ○ | | 19 |

**Recommendation:** Baltimore County should evaluate facility alternatives for Perry Hall Manor-Bengies Shore area, Middle River Neck and Back River Neck area in a combined and unified fashion and abandon all facility septic systems and private or unacceptable sewage treatment plants. It is Baltimore County's position that only areas not sewered and lying within the Urban Demarcation Line should be sewered. Areas outside the Line should be corrected for failing septic systems through implementation of alternative policies and techniques. This position should become the public policy recognized by all affected local, regional and state agencies.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | ● | ○ | | | | ○ | | 21 |

SUB-BASIN: Patapsco River Basin

*Water Quality Summary*

This river basin contains areas ranging all the way from rural agricultural to the central business district of a major urban city, Baltimore. As a result, water quality and water pollution vary greatly within the basin. Back River remains the most heavily polluted segment in the basin, Baltimore Harbor has made some improvements in recent years, but remains polluted—especially its bottom sediments. Major urban streams continue to be impacted by raw sewage discharges or overflows and by urban runoff. Suburban growth in outlying areas is stressing streams previously marked by good quality.

| -Segment<br>-Violation<br>-Scores | Reasons for not meeting standards: Point | Reasons for not meeting standards: Potential Non-point | Control and Inventory Program: Point | Control and Inventory Program: Land Use Non-point | 1983 Forecast |
|---|---|---|---|---|---|
| Back River | | | | | |
| -Water contact (Class I) violations for bacteria. Fish kills recorded often. Closed beaches.<br>-D.O.: 50<br>-Bact: 50<br>-Algae: 50<br>-Sed: 30 | Back River STP discharge. Industrial discharges Sewer overflows in tributaries. | Urban runoff. Widespread, high benthic oxygen demand and toxic substances in estuary. Septic system failures on lower ends of peninsulas. | Back River STP will upgrade to meet NPDES.<br>Industrial discharges will meet NPDES limits.<br>Relief sewers will end sewer overflows in tributaries.<br>WRA Enforcement and Sediment Control Program activities. | Develop: 95%<br>Forest: 3%<br>Agric: 1%<br>Implementation of RPC/208 recommendations will reduce non-point pollution to some degree. | Benthic load, which results from 60 years of solids loading from Back River STP, will persist, so full recovery of water quality throughout the estuary will take a long time. Some loadings from landfills and urban runoff will continue. |

| -Segment<br>-Violation<br>-Scores | Reasons for not meeting standards<br>Point | Potential<br>Non-point | Control and Inventory Program<br>Point | Land Use<br>Non-point | 1983<br>Forecast |
|---|---|---|---|---|---|
| Baltimore Harbor Area | | | | | |
| -Water contact and Shellfish (II) violations for bacteria (and D.O. violations at depths); Closed beaches.<br>-D.O.: 50<br>-Bact: 30<br>-Algae: 30<br>-Sed: 30<br>-Oil: 30<br>-Trash: 30 | Patapsco and Cox Creek STP discharges.<br>Numerous industrial discharges.<br>Sizeable raw sewage overflows in tributary streams. Oil and chemical spills in Harbor and its tributaries. | Urban runoff (including industrial sites).<br>Benthic oxygen demand and toxic substances in much of Harbor.<br>Some failing septic areas (especially in northern Anne Arundel County).<br>Wastes from ships. | Patapsco and Cox Creek STP's will be upgraded to meet NPDES limits.<br>Industrial discharges will meet NPDES limits.<br>New sewers will eliminate raw sewage overflows.<br>Improved handling of oils and chemicals is expected.<br>WRA Enforcement and Sediment Control Program activities. | Develop: 86%<br>Forest: 12%<br>Agric: 2%<br>Implementation of RPC/208 recommendations will reduce non-point pollution to some degree.<br>Holding tanks will be installed on more ships. | Some loading from urban runoff will continue. Point source discharges will be greatly improved (industries are already making great progress) Raw sewage overflows will be eliminated. Benthic oxygen demand will continue to affect lower layers of the Harbor, and toxics in bottom sediments will persist, but rest of waters should improve. |
| Patapsco River North Branch and Mainstem below Liberty Reservoir | | | | | |
| -Water contact and natural trout (III) violations for bacteria.<br>-Bact: 50<br>-Sed: 30 | Industrial discharges. | Urban runoff. Wastes from farm animal concentrations. Failing septic tanks. Direct discharge of raw sewage in some areas. | Industrial discharges will attain NPDES limits.<br>WRA Enforcement and Sediment Control Program activities. | Forest: 48%<br>Develop: 39%<br>Agric: 16%<br>Implementation of RPC/208 recommendations will reduce non-point pollution to some degree. | The completion of the sewage interceptor line below Ellicot City and the presence of smallmouth bass indicates that portions of the river have regained some of their potential as a recreational fishery. Urban and agricultural runoff will be principal determinants of water quality. |

*Water Quality Sampling Summary*

*Back River Drainage*

This segment includes the entire Back River drainage area and is designated for water copntact recreation and aquatic life, Class I.

While water quality standards for temperature, dissolved oxygen, pH, and turbidity were generally met throughout the tidal and non-tidal portions, the Back River Wastewater Treatment Plant (WWTP) continues to have an adverse impact on Back River water quality. Oxidation of ammonia concentrations in the estuary causes depressed dissolved oxygen concentrations. Current upgrading and renovation of the existing fa-

cility should accomplish increased oxidation of ammonia.

During the warmer months, the Back River system becomes highly eutrophic due, for the most part, to the nutrient concentrations discharged from the Back River WWTP. Plans to upgrade the treatment facility to include phosphorous removal should considerably reduce the degree of eutrophication in the estuary.

Bacteriological sampling by the Baltimore County Health Department showed an improvement in Back River Water Quality. Although bacteriological standards were generally exceeded in the upper portion of the estuary, fecal coliform counts were found to decline in the lower part of the river, with standards being met at two stations near the mouth of Back River.

*Bodkin Area Drainage*

This segment includes the entire Bodkin Creek drainage area and is designated for water contact recreation and aquatic life, Class I.

Water quality sampling was not conducted in this segment during 1976.

*Baltimore Harbor Area Drainage*

This segment includes the Inner and Outer Baltimore Harbor, the North drainage to Inner Baltimore Harbor (except Gwynns Falls and Jones Falls); the South drainage to Inner Baltimore Harbor; and the Shallow Creek area drainage. Segment designation is for water contact recreation and aquatic life, Class I.

Water quality in this segment has generally remained the same as in previous years. Water quality standards for temperature, pH, dissolved oxygen, and turbidity are being met for most portions of the estuary except in the upper reaches, when during the warmer months depressed dissolved oxygen values are encountered. Organic loadings from Jones and Gwynns Falls along with urban runoff are, for the most part, believed to be responsible for this condition.

Bacteriological samples taken showed higher fecal coliform counts in the upper portions than in the rest of the system. The sources mentioned above could be considered the major contributors.

*Patapsco River—Lower North Branch and Mainstem*

This segment includes the Patapsco River mainstem and the North Branch Patapsco River below Liberty Reservoir, and is designated water contact recreation and aquatic life, Class I, except for Granite Branch and Mordella Branch, which are designated natural trout waters, Class III.

Periodic chemical water quality monitoring in this segment indicated no significant changes during 1976. Moderate degradation occurs in the upper portions of the segment due, for the most part, to construction, agricultural runoff and septic system failures. Increased industrial activity, urban runoff, and sewage overflows degrade the lower portion of this segment.

The completion of the sewage interceptor below Ellicott City and increased control of industrial point source dischargers have greatly improved conditions, although moderate degradation still occurs.

**Recommendation:** A 201 facility planning effort is being initiated by the City of Baltimore for the Back River treatment plant. However, the facilities plan cannot address the impact heavy metals and other toxic materials contained in the influent have on the plant's efficiency and on Chesapeake Bay water quality. Studies to determine this impact are necessary.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | o | o | o | | o | | | | ● | | 2 |

**Recommendation:** The Cox Creek Plant may have to go to advanced wastewater treatment by 1980 due to projected nutrient concentrations for that year. These projections should be verified by the 208 Water Quality Plan.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | o | o | ● | | o | | | | o | | 2 |

SUB-BASIN: West Chesapeake Area

*Water Quality Summary*

Bacteria values in excess of the applicable standards (Class II waters) are found in nearly all of the segments in the Basin, particularly at times of heavy rainfall. In the recent past, nutrient concentrations have been increasing. Available data show the average phosphate value to have increased tenfold in a ten year period in the Severn River.

*Water Quality Sampling Summary*

*Magothy River Drainage*

This area is beginning to have algae blooms (so-called "red tides") as have been occuring in the past in the open bay and in the South, Severn and West Rivers. These blooms have attendant low oxygen content in the bottom waters and sometimes fish kills. However, for other than aesthetic purposes, the blooms should not effect the "swimmability" of the waters.

As of September 1976, the area from Forked Creek to Arundel Beach in the main river was open to shellfishing after having been closed for a year.

*Severn River Area Drainage*

The estuarine portions of this segment have been subject to algae blooms with attendant low oxygen content in the bottoms waters and sometimes fish kills. These conditions should not detract from the "swimmability" of the waters.

Bacteriological sampling was carried out by the U.S. Naval Academy. This study indicates high counts in the spring and fall in the vicinity of Annapolis and at

| -Segment<br>-Violation<br>-Scores | Reasons for not meeting standards | | Control and Inventory Program | | 1983 Forecast |
|---|---|---|---|---|---|
| | Point | Potential Non-point | Point | Land Use Non-point | |
| **Magothy River** | | | | | |
| -Shellfish closures. | No point Sources. | Failing septic tanks. Construction activities. Boating activities. | WRA Enforcement and Sediment Control Program Activities. | Forest: 57%<br>Develop: 39%<br>Agric: 4%<br>Some septic system failures may be treated at Broadneck STP. | Bacteria conditions should improve when failing septic systems are corrected and BMP's for forests and farms are implemented. |
| **Severn River** | | | | | |
| -Shellfish closures. Closed Swimming Indian Landing. | Municipal and institutional discharges. | Boating activity. Storm water runoff from Annapolis, Odenton. | Annapolis and Broadneck STP's to upgrade facilities.<br>WRA Enforcement and Sediment Control Program activities. | Forest: 58%<br>Develop: 31%<br>Agric: 10%<br>Sediment pond for Annapolis requested. Best Management Practices for forest, developed areas and farms. | Municipal treatment plant upgradings should result in decreased bacterial level. Implementation of BMP's should also reduce bacteria concentrations. |
| **South River** | | | | | |
| -Shellfish closures. | Municipal discharges. | Failing septic tanks, Storm water runoff. Boating activity. | Woodlawn Beach and Sylvan Shores to upgrade and expand facilities.<br>WRA Enforcement and sediment Control Program activities. | Forest: 70%<br>Develop: 17%<br>Agric: 13%<br>Many failing septic systems will be sewered.<br>Best Management Practices for forest and agric areas. | Municipal treatment plant upgradings should result in a decreased bacteria level. Implementation of BMP's should also reduce bacteria concentrations. |
| **West River** | | | | | |
| -Shellfish closures. | Industrial discharges. | Boating activity. Failing septic tanks. Agricultural runoff. Construction sediment. | Industrial discharges are required to meet NPDES limits.<br>WRA Enforcement and Sediment Control Program activities. | Forest: 55%<br>Agric: 35%<br>Develop: 9%<br>Individual corrective action for failing septic systems.<br>Implementation of BMP's and individual corrective action for septic systems should improve water quality. | |

| -Segment<br>-Violation<br>-Scores | Reasons for not meeting standards<br>Point | <br>Potential Non-point | Control and Inventory Program<br>Point | <br>Land Use Non-point | 1983 Forecast |
|---|---|---|---|---|---|
| Other Drainage of West Chesapeake | | | | | |
| -Shellfish<br>-Bacteria: 50 | Municipal discharges. | Failing septic systems. Agricultural runoff. Construction activity. | Broadwater, Twin Beaches, and Prince Frederick will upgrade existing facilities.<br>WRA Enforcement and Sediment Control Program activities. | Forest: 75%<br>Agric: 15%<br>Develop: 7%<br>Individual corrective action for failing septic systems.<br>Best Management Practices for forests, farms and developed areas. | Municipal treatment plant upgrading should result in decreased bacteria level. Shellfish STP buffer zone will remain. |

the head of the estuary and low counts throughout the estuary in mid-summer and winter.

A small area in the mouth of Mill and Whitehall Creeks that had been closed to shellfishing was opened as of July 1976.

Studies carried out in Severn Run by Water Quality Services shows degradation in the area of Picture Frame Branch as indicated by aquatic biota and temperatures exceeding state standards.

Although advanced wastewater treatment is not presently required for effluents discharged to the Severn River, the analysis of non-point sources and their impacts on the receiving water to be conducted during 208 planning may impose such restrictions. These concerns will be addressed in the final 208 Plan.

*South River Drainage*

Trend sampling shows no differences in water quality from past years, however, observation showed that 1976 had fewer and noticeably less intense plankton blooms than past years.

*West River Drainage*

No differences in water quality during 1976 as opposed to 1975 were reported.

*Other Drainage of West Chesapeake Bay Area*

This segment is made up of small streams draining directly to Chesapeake Bay and no measurements were made in the area in 1976.

**Recommendation:** The Broadneck Treatment Plant and Mountain Road Severn area should be studied to determine if connection of the service area to the treatment plant is cost-effective. Facility Planning for the area should be undertaken.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | o | ● | | o | | | | ● | | 21 |

In addition to recommendations specific to a particular river basin the overall planning process has produced suggestions that apply to water quality problems in general. Water quality recommendations generally common to each river basin are discussed below. The discussion deals with these issues:

—Flow reduction
—Septic System Technology
—Sewerage Systems
—Non-point Source Pollution
—Sediment Control Programs

These recommendations may also serve as a basis for determining Best Management Practices to meet 1983 Water Quality goals.

## FLOW REDUCTION

**Recommendation:** All Facility Plans in the region should investigate the feasibility of reducing sewage flows. This investigation should include:

—detailed estimates of per capita sewage contributions from residential, commercial, and industrial sources;
—an analysis of the potential impacts of reduced sewage flows on treatment plant operation and waste loading
—detailed estimates of flow reduction achieveable through both structural and non-structural means;
—description of a program for implementation including estimates of cost;
—description of changes in legal standards necessary to facilitate implementation of the alternative means; and
—description of suitable procedures to inform the public in the facility planning area of the suggested flow-control program.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | | o | | | | ● | | 19 |

## SEPTIC SYSTEMS

Several communities in Anne Arundel, Baltimore, and Harford Counties contain homes with failing septic systems. Failure of the systems is due to a variety of causes, with impermeable soils and high water tables predominating. Some communities were originally developed with summer cottages which are now used as permanent residences. These homes are often sited on small lots of less than one-quarter acre, inadequate in size to absorb the present sewage effluent from these homes. In other areas, development on steep slopes is the reason for failure of septic systems. In these areas sewage effluent drains down the slope before it can be adequately filtered by the soil.

At present this problem is being addressed through the provision of sewage treatment plants or the extension of interceptors from existing plants. Until sewage treatment can be provided to areas with failing septic systems, new development is restricted to one to two acre lots depending on how soon sewer service will be available.

In addition, new homes without sewers cannot be constructed unless adequate percolation capacity exists in the soil to accept sewage effluent disposed in a septic system. Existing homes with failing systems are required to retain all effluent in their septic tanks and not let it into their leach fields. The tanks must be pumped out when they are full.

The provision of sewers to an area can make new growth possible. The amount of new growth and its location is dependent upon the capacity of the sewage treatment system and the length and location of the interceptors. New growth can be managed through scaling new sewage treatment systems to the planned population of an area and arranging interceptors to meet the planned distribution of density in the area. Alternatives to sewage treatment plants can also be provided where a small scale solution to failing septic systems is desired.

One alternative to sewage treatment facilities and their tendency to accelerate growth is the use of composting toilets. These are completely self-contained units which produce compost suitable for use in fertilizing farms and gardens. These systems are priced competitively with sewage treatment systems and produce a usable and potentially marketable by-product. A major limitation is that they cannot accommodate wash water. This must be disposed of in a septic system or evaporated in a holding pond. In areas of failing septic systems, neither of these may be feasible. Furthermore, composting toilets are still experimental and have not been approved for use by the State Department of Health and Mental Hygiene. Allowing the use of a few composting toilets, with close monitoring by the Department would help to test their feasibility and discover problems of operation which might be solved through modifications of the unit.

The types of septic systems being studied throughout Maryland include:

—Improved septic tanks–tile field system
—Aerated tanks–tile systems
—Evapotranspiration Field Systems
—Mound Systems
—Infiltration Pond System
—Waste Water Separation Systems

Professional public health officials working in many different parts of Maryland have expressed serious misgivings about one or more of these alternative on-site disposal systems. At present, several of these methods are being tested at different locations in the state, but the evaluations are far from complete. The suitability and acceptability of these methods vary greatly in different areas.

The list of individual sewage systems is lengthy and new ones are invented each year to overcome the limitations of conventional septic tank-tile field systems. Few generalities apply to all the systems because of fundamental differences in the methods by which they operate.

**Recommendation:** Facilities Plans, when studying areas which contain failing septic systems, should investigate alternatives for solving these problems in addition to central sewerage systems. This investigation should include:

—a review of suitable alternatives to remedy problems with septic systems, including on-lot and small-scale clustering approaches,
—an assessment of the cost and environmental impact of these means, as applied to entire portions of the facility planning area (they should be compared to the cost of buying out the homes in severe problem areas, as well as to the cost of central sewerage);
—a description of a program for implementation of these means;
—a description of changes in legal standards necessary to facilitate implementation of the chosen means;
—a description of suitable procedures to inform the public in the facility planning area of the suggested program.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ● | ○ | ● | ● | ○ | | | | ● | | 21 |

## SEWERAGE SYSTEMS

Inflow and infiltration of extraneous water into sewer lines is a serious problem in some systems in the region. This problem alone can more than offset any water conservation measures and their benefits in terms of treatment efficiencies. The costs of treating this extraneous water along with actual sewage, and of rehabilitating sewer lines and manholes, are expected to increase continuously in the future. To avoid future problems and prolong the lives of all treatment works, the following recommendations are made:

**Recommendation:**

—The Maryland Environmental Health Administration in cooperation with all municipalities and counties should adopt regulations concerning standards of materials used in sewage transportation lines and a program for testing new construction during the construction process.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | | ○ | | | | ○ | | 21 |

—The Maryland Environmental Health Administration and the Federal EPA plan to expand their program of on-site inspections during construction of all projects funded under the Construction Grants Program. An evaluation should be made of the inspection program applied to all projects funded under the Construction Grants Program. New construction should be backed up with enforcement of performance bonding by contractors.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ● | ● | ● | | ○ | | | | ○ | | 21 |

Sewage treatment systems themselves may cause pollution. One frequent example in Anne Arundel County has been the malfunction of a pumping station resulting in an overflow of raw sewage into an adjacent water body. These malfunctions may not be detected for several hours. Malfunctions could be more efficiently detected and corrected if an operator were present at each pumping station and sewage treatment plant or checked it frequently. Once detected, a quick response would help alleviate resultant degradation of water quality. The response could be repair or replacement of the faulty component, the use of a relief system, or the use of a holding tank. The relief system could either be permanently installed or mobile. Of these alternatives, a relief system would probably afford the quickest response to an overflow. A mobile relief system is normally cheaper than a stationary relief system at each treatment plant and pumping station.

**Recommendation:** The procedure for detecting, reporting, and repairing sewage treatment plant and pumping station malfunctions in a timely manner should be instituted and include provisions for the protection of public health to the greatest possible extent.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | ● | | 21 |

**Recommendation:** As part of sewage treatment or pumping station failure procedure, each local jurisdiction should have at least one mobile pumping station which can be used at the scene of a pumping station failure until the faulty component can be repaired or replaced.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | ○ | | 2 |

## NON-POINT SOURCE POLLUTION

Unmanaged runoff of storm water causes erosion and siltation of creeks and rivers. Storm water also carries fecal matter, other organic material, oil, fertilizer, and pesticides that have been deposited haphazardly on the land. Storm water drained off the land through gutters and underground pipes may cause sewage treatment plants to overflow if these drains are connected to sewers.

Siltation from storm water has caused a reduction in the depth of many of the creeks and rivers in the region, decreasing their ability to handle flows and decreasing recreational and natigational access. This has been a particular problem in Back Creek in Annapolis, Bush River in Harford County, Baltimore Harbor, and tributaries of Middle River in Baltimore County. Confined storm water from heavy rains frequently causes a flow exceeding the capacity of the Back River sewage treatment plant in Baltimore County. This plant serves highly urbanized communities in Baltimore City and County.

Anne Arundel and Baltimore Counties have ordinances which require storm water management for new developments. These regulations, however, do not address storm water runoff in existing communities. Some remedial action is possible to partially alleviate the impact of storm water runoff. Retention basins could be constructed to catch the water and increase its filtration into the soil. These basins could be constructed on the ground to serve several structures or on roofs to serve individual ones. Storm water could also be directed into grass-covered or gravel-lines channels to reduce its velocity, thus reducing erosion and increasing infiltration. Infiltration would also be improved by using porous pavement for parking lots and instead of gutters along streets. At the end of existing storm drains, a fine screen could be fitted to collect debris and large particles of sediment. The end of the pipe could also be relocated back several yards from the waterway and the discharge directed through course gravel after passing through the filter. This would aid infiltration and trap some of the fine sediment. Frequent cleaning of the filters would be required, however, to prevent clogging.

The impact of urbanization on the quality and quantity of storm runoff should be given consideration by

local governments in developing their land use plans. Sensitive or valuable surface waters should be given special consideration in this regard.

Federal regulations require that certain types of non-point sources be addressed during Phase II/208 planning. Pollution from each of the following categories is present in each river basin and are required to be identified and detailed during the RPC/208 program:

—Urban non-point sources, including storm sewer discharges and direct runoff from industrial, commercial, and residential areas (including septic system failures);

—Agriculturally-related non-point sources of pollution, including runoff from manure disposal areas, and from land used for livestock and crop production (also from land used to produce timber);

—Construction-activity-related sources of pollution;

—Sources of pollution from disposal of residual wastes and other pollutants on land, in wells, or in subsurface excavations in a manner that affects ground and surface-water quality;

—Mine-related sources of pollution, including runoff from operating or abandoned surface mines;

—Pollution from recreational boating;

—Saltwater intrusion into estuaries and groundwater resulting from reduction of freshwater flow from any cause, including irrigation, obstruction, and diversion; and

—Sources of pollution related to hydrologic modifications, including those caused by changes in the movement, flow or circulation of navigable waters or groundwaters due to construction and operation of dams, levees, channels or flow-diversion facilities.

Based on field investigation, modeling studies and research, the Baltimore Region 208 Plan will develop specific implementation programs for control of non-point source pollution.

**Recommendation:**

—Adoption of amendments to existing local sediment-control legislation to provide for stricter control of runoff.

—Adoption of amendments to local land use plans, zoning laws, and building codes to reduce the water pollution effects of urbanization.

—Development of land management policies to reduce urban and agricultural runoff; development and dissemination of information to encourage land-owners and farmers to adopt improved land management techniques.

—Provision of additional technical assistance for farmers to correct agricultural sources of pollution.

—Identification of areas of potential failing septic systems and investigation of solutions to these problems.

—Development of additional programs to reduce erosion of land and of stream channels.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | | ● | | | | ○ | 22 | |

## COUNTY SEDIMENT CONTROL PROGRAM

The State is currently working on a storm water management policy which will foster as its key elements working with nature, increasing infiltration by taking advantage of the natural topography and soil conditions and relying on structural elements like rooftop storage, detention structures, etc. as secondary alternatives.

**Recommendation:** The State Water Resources Administration has developed but not promulgated a storm water management policy. Before this policy is made final, local governments and state agencies should be consulted as to the suitability of the policy in meeting their problems. This policy and resultant program should serve as the basis for a State Storm Water Management Program as well as give guidance to county and municipal programs.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ● | ○ | ○ | | | | ○ | ○ | | 22 |

The concepts of erosion control and sediment control are often used interchangeably. However, to the Water Resources Administration, these two aspects are very different in that erosion control is a preventive technique used to reduce or eliminate erosion at its sources, whereas sediment control keeps the eroded material on site. Sediment control is still preventative in that it stops sediment from leaving the construction site or entering the waters of the State, however, the sediment has already been detached from the soil and is being moved by surface waters. In the six years under the sediment control program more and more emphasis has shifted towards the sediment control aspect and less and less emphasis has been placed on erosion control—especially within the urban construction scene. It seems very easy to construct a large sediment basin at the low point of the property and to forget erosion control until it is time to clean out the basin. At that time, one must ask if it would have been less costly to have provided erosion control and storm water handling on site rather than now having the added cost of removing the sediment from the basin and disposing of the material. As an example, as one travels across the State, straw bales are seen in great numbers on many projects. It is felt that many of these straw bales used as sediment control would be of much greater value if the straw bales were broken apart and the straw spread over the disturbed site as a mulch material,

thereby reducing erosion and reducing or eliminating sediment control problems on the site. If nothing else, the straw bale should be used only as an individual measure not as the key item in the sediment control plan.

**Recommendation:** Engineers, consultants and Soil Conservation District personnel across the State should reevaluate erosion control *versus* sediment control. More emphasis should be placed on the review of proposed permanent features such as slopes, storm drain outlets, and the handling of surface water to ensure that these structures as planned or designed will result in a stabilized or non-erosive condition after construction.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | ● | ● | | ○ | | | ● | ○ | | 22 |

**Recommendation:** A facet of sediment control plans that needs increased attention is the timing, scheduling, or phasing aspect of sediment control design. This increased emphasis should be given by both the engineer designing the sediment control plan, and those reviewing the plan.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | | | ○ | | | | ○ | | 35 |

For example, a technique used by Calvert County for the distribution of grading permits has proven especially valuable in the enforcement effort. Once all approvals are in line, but prior to issuance of the grading permit, the permit is held on file until the developer is ready to commence grading. The developer then notifies the sediment control inspector who meets the owner, developer and/or foreman at the construction site to review the sediment control plan and grading permit. All involved parties are made aware of their responsibilities in erosion and sediment control and the grading permit is issued to the developer. This procedure is a good tool for notifying the sediment control inspector that construction is about to commence and it notifies all involved parties of their responsibilities in sediment control. The Water Resources Administration has used this procedure on a number of Water Resources' permits.

**Recommendation:** All local jurisdictions should study Calvert County's grading permit procedures for possible use in their own grading permit activities.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | | ○ | ○ | | | | ○ | | 22 |

Many counties and municipalities use standard sediment control plans for single lot development and maintenance work. To date, there has been abuse of this approach in that whole subdivisions have been built on a lot by lot basis without consideration of their combined impact.

**Recommendation:** Agencies that allow the use of standard sediment control plans when a single lot is developed should analyze past abuses of this system and make recommendations for its proper use and administration by the local jurisdiction.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | | | ○ | | | | ○ | | 36 |

At present, all of the erosion and sediment control plans are being designed, reviewed, and approved and inspected based on a qualitiative judgment of the plan's effectiveness. To assist with this judgment, there are detailed standards for individual structural and vegetative practices. However, currently no attempt is made to *quantitatively* determine the overall effectiveness of the control plans. This is not to imply that the existing sediment control plans currently being implemented are not adequate. However, under this procedure, all persons involved (designers, reviewers, inspectors, and contractors) exercise their own best judgment as to which combination of structures and practices will provide the most effective and efficient control. This allows for extensive variability and a lack of consistency.

To address this situation, the Water Resources Administration has been working to perfect more standardized, quantitatively oriented design and review procedures. The Universal Soil Loss Equation, recently developed by the USDA Agricultural Research Service, provides a realistic guide for effective conservation planning. The equation provides a method for rationally determining the various combinations of erosion control practices required to meet a maximum allowable sediment yield. The equation is universally applicable in that virtually all upland areas subject to overland erosion can be analyzed. As research continues, the additional knowledge gained can be readily incorporated into the procedure.

Using this procedure, the designer will be able to provide a control plan which is not only economical and will fit the proposed site but will also provide the required level of treatment over the entire construction time.

**Recommendation:** The state should provide all local jurisdictions with a guide for using the Universal Soil Loss Equation for review and development of sediment

control plans and monitor its effectiveness as a standardized tool. If other methodologies became available, they should be analyzed for possible use.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | | ○ | | | | ○ | | 36 |

The need for control of agricultural erosion has long been recognized by agricultural leaders and producers in Maryland. This led to the creation of the Soil Conservation Districts in the late 1930's, which have been actively striving for the wise use and conservation of natural resources. This, however, has been a voluntary program. Farm conservation plans are developed on request and contain conservation plan treatment measures to conserve the soil, water and related natural resources. In Maryland, the agricultural contribution to the sediment problem varies greatly across the State because of the difference in topography, soils and crop produced. Soils are naturally protected by live vegetative material or vegetative residue. If soil moisture or fertility is low, the soil is more subject to erosion and the resultant sediment pollution is greater. Tillage, crop harvesting, overgrazing and burning of residue increases erosion. Proper land use and management techniques can greatly reduce sediment pollution.

Farmlands adjacent to growing metropolitan areas could offer very special problems. They might be held for speculative purposes with little concern for erosion and sedimentation problems on the part of the owner.

Since the Regional Planning Council and the Water Resources Administration are presently instituting Phase II of Water Quality Management Planning, the major thrust of which will be the assessment of water quality problems caused by non-point sources including sediment, it is appropriate to question whether mandatory sediment control for agricultural lands should be instituted in the State as part of the 208 activities. It is expected that these activities will result in a management program (mandatory or not) by the end of 1978.

At present, inspection and enforcement is probably the weakest link in the sediment control program. Proper implementation of plans on the ground is directly related to the degree to which the projects are inspected and the inspection procedures are executed. The field inspections and enforcement procedures are very important in (a) having the applicant comply with the sediment control plans or (b) controlling any sediment problems not anticipated on the plans by making minor field changes to eliminate the potential problems.

There are a number of reasons why the inspection and enforcement effort is probably the weakest part of the sediment control program. First, there is generally a lack of manpower across the State within the inspection and enforcement area. Many of the local jurisdictions do not have a full time inspector to implement or carry out the activities of the ordinance, or the inspector presently employed is involved with many other duties and, therefore, is not available full time to adequately perform the duties of the sediment control inspector. Funding of inspectors is a major concern in all jurisdictions, and they should evaluate their permit fees, such that the fee could offset if not totally cover the budgeted sediment control program. This permit fee could be based on a sliding scale keyed to a percentage of the area disturbed or it could be based on a percentage of grading costs for a given project. The second reason contributing to a generally weak inspection and enforcement effort is a lack of proper training of inspectors. The Water Resources Administration's audiovisual training program should be of help in this area. Training should provide the inspector with a good background in the general technology of erosion and sediment control as well as the control methodologies. The third reason suggested for a weak inspection and enforcement effort is lack of administrative support at all levels of the program. For any program to be effective, there must be complete understanding and support of the program from the field supervisor to the local jurisdiction governing body as well as throughout the judicial system.

Final inspection reports are required by State law and local ordinances to be forwarded to the local Soil Conservation District. There are still a number of jurisdictions that do not comply with this requirement. In many cases, the local jurisdictions do not use proper documentation, proper names or numbers when the final inspection report is forwarded; therefore, it is of little use to the local Soil Conservation District. It is recommended that each jurisdiction reevaluate the method and form of final notification to the local Soil Conservation Districts when projects are completed. According to the Sediment Control Law and Regulations, State Enforcement personnel can be called upon for assistance on sediment control violations, and State technical assistance can be requested by the local jurisdictions.

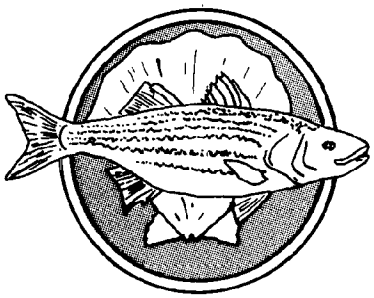
**Recommendation:** All jurisdictions should reassess and take steps to improve their inspection effort regarding sediment control.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | | | | | | | | 36 |

**Recommendation:** All jurisdictions should consider imposing permit fees for sediment control project review and permit issuance. Bonding procedures to ensure that the sediment control program is fully implemented should also be investigated.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | | ○ | | | | ○ | | 36 |

## WATER ACTIVITIES AND WATER QUALITY



### SHELLFISH/FINFISH RESOURCES

Waters in the region provide suitable habitat for finfish and shellfish during various phases of their lives. Many fish migrate into the freshwaters at the upper segments of the rivers to spawn. The larvae of other marine species, having been spawned in the ocean, utilize the Bay as a nursery. While marine fish visit Maryland's waters only seasonally, freshwater and estuarine communities of finfish and shellfish are year-round residents and are dependent upon these waters throughout their lives. Because the migratory and resident fish have such an enormous dependency upon a varied aquatic environment, all such areas could, and perhaps should, be identified for protection. Such an all-inclusive identification, though ecologically valid, is of limited value to decision makers. There are, however, certain areas that make a greater contribution to Maryland's commercial and recreational fishing industries than others. Examples of these are the following: spawning and nursery areas, migratory pathways, areas historically providing high commercial or sport catch, areas suitable for the propagation of shellfish and the range of rare or endangered species. These are the aquatic areas where primary attention must be given to manage coastal resources. The Department of Natural Resources is giving major emphasis to these areas by identifying them as aquatic sensitive areas. A detailed description of these areas is found in Appendix B.

The commercial fisheries harvest of Chesapeake Bay for both finfish and shellfish averaged about 127.5 pounds per acre from 1966 to 1970. For some species this commercial fishing pressure can be increased without exceeding the maximum sustainable yield (MSY) while the MSY for other species (primarily shad) is already being exceeded. The commercial fishery for finfish can be divided into two parts, industrial, (e.g., menhaden and alewives), and non-industrial or edible (e.g., striped bass, shad, catfish, white perch, spot, croaker).

Within the study area, 82 percent of the finfish harvest by weight in 1974 was of industrial species (mainly menhaden) and constituted 55 percent of the total value of catch. Of the major edible fish species, striped bass accounted for 14 percent of the total value, spot and shad, about 4 percent each with other species, including white perch, yellow perch, flounder, catfish, and croakers, accounting for another 14 percent.

The commercial shellfish harvest from the Bay and its tributaries consists of crabs, clams, and oysters. Oysters account for 68 percent of total value; crabs, 20 percent; and clams, 12 percent. Harvesting of shellfish is highly variable from year to year and is influenced by natural population fluctuations as well as by natural and man-induced pollution. Oyster harvest, while significantly decreased from record harvests of 7 to 15 million bushels during the late 1800's, are presently well above record low harvests of the 1940's and 1950's. Crab harvests have risen slightly in the last few years but have been marked by great fluctuations in year to year catch. Since the late 1960's, harvests have been generally lower than those recorded in the 1940's and 1950's (1968 being a record low year). Softshell clam harvests have dropped to very low levels recently, from record harvests between 1955 and 1972. The historical record is characterized by low harvests that gradually climb to high levels and drop down quickly. 1972–73 shows the most dramatic drop in clam harvest since the early 1950's and can be attributed to the effects of Hurricane Agnes.

The number of persons licensed for commercial fishing in Maryland and Virginia in 1970 was approximately 17,000, with more than 11,000 vessels used for this activity on the Bay and its tributaries. In Maryland, the major fishing effort has been toward shellfish, with a lesser effort toward finfish, while the opposite has been true in Virginia.

Along with the increases in population and leisure time there has been a rise in recreational fishing on the Bay. Since the Bay offers quality fishing with a high catch rate, a large percentage of total fishermen-days were spent on the Bay and its tidal tributaries versus rivers, lakes, or the ocean. Recreational fishing accounts for a significant portion of the total landings for several species of fish. Sport fishermen harvest striped-bass, weakfish, perch, spot, shad, croaker, and bluefish in quantities suggested to equal or exceed those harvested commercially. Shellfish are also taken by a considerable number of people on a recreational basis. It has been estimated that blue crabs are sought by as many people as are game fish; however, the recreational catch of this species has not been accurately determined.

Management of the fishery resources of Chesapeake Bay and its tributaries is the responsibility of several organizations including the Federal government, the states of Maryland, Delaware, and Virginia and the Potomac River Fisheries Commission. The variety of laws enforced by these organizations have presented and continue to present conflicts in management prac-

tices and resource utilization. The agencies most directly concerned with the resources of the Bay are the Fisheries Administration of the Maryland Department of Natural Resources, the Virginia Marine Resources Commission, and the Potomac River Fisheries Commission. These three essentially separate organizations regulate resources which are, for the most part, common to all of the Bay.

One of the marine resources common to several areas are certain fish species, e.g., herring, found not only in the Bay area, but in the ocean along the eastern coast. The effects of management practices on these species are felt not only in this region but in other areas far removed. For example, concentrated offshore fishing for herring has greatly reduced the spawning runs which take place in the Bay each spring. A number of management practices have caused controversy between the citizens of Maryland and Virginia. The watermen of these states feel that any practice which gives the residents of a neighboring state a greater opportunity to utilize a resource may, at the same time, be causing a reduction in their own catches. Crabbing regulations have been cited as an example of this type of controversial management practice. Virginia allows the dredging of wintering crabs buried in the Bay bottom while Maryland has no such provision leading some Marylanders to feel that this dredging depletes the supply of crabs which would be available to them the following season. However, scientific proof for this supposition is lacking at present.

Conflicts also arise within a given management area due to the diverse needs and desires of those who utilize its resources. Resource managers are confronted with the problem of trying to develop programs which will conserve or enhance fishery resources and at the same time satisfy the needs or desires of dissimilar special interest groups. Whenever an action is taken which satisfies one need, it is not unlikely that a conflict with the needs of another group will soon manifest itself. For example, with the increases in population, per capita income, and leisure time, there has been an increased demand for recreational developments along the shorelines of the Bay. In some parts of this shoreline, productive wetlands essential to the aquatic community are being altered to provide for housing and recreation facilities. The loss of these wetlands to development reduces the productivity of the area and ultimately the yield to the sport or commercial fisherman. Thus, the demand for waterfront homes and recreational facilities is causing a reduction in the resource which originated the demand.

Water quality is an important ingredient for producing viable, productive fishery resources. For example, over 65% of Chesapeake Bay is naturally able (by bottom conditions, water depth, salinity, and dissolved oxygen) to support shellfish populations. But shellfish communities are subject to many natural and man-induced stresses. Probably the most critical natural factor determining the general health of shellfish communities is salinity. Large scale shifts in salinity are associated with massive influxes of fresh water from Bay tributaries, such as occurred during Hurricane Agnes in 1972. That storm had disastrous effects on shellfish populations in the Upper Bay (above the Bay Bridge) and in the upper portions of many tributaries. Localized shifts of salinity are usually associated with large size freshwater discharges such as cooling water or treatment plant effluents.

Sediment, a pollutant common to the region, affects fishery resources in various ways. However, the end result is the same—a loss in productive habitat causing declines in productivity. Sediment can directly affect shellfish by smothering or by making the bottom unsuitable as habitat. Sediment can block sunlight, thus reducing photosynthetic activity of aquatic plants and contributing to a low dissolved oxygen level. High sediment concentrations can have adverse effects on finfish and shellfish larvae and cause adult shellfish to exhibit abnormal physical responses.

Heavy metals, pesticides, and toxic substances also have detrimental effects on fishery resources. Metals, present in minute concentrations, are toxic to many forms of life that inhabit the Bay. Many metals such as mercury or complex hydrocarbons (DDT) concentrate in the tissues of fish life as they filter water through their gills or feed on decaying matter on the bottom. Most break down very slowly or not at all in nature.

Existing fish and shellfish areas are managed by the State (Fisheries Administration and Environmental Health Administration) to protect the health and well being of fish-life and consumers. When bacteria, toxics, and pesticides are found to exceed prescribed health standards, shellfish beds are closed and finfish sales or harvests are prohibited. Many of the shellfish beds in the Baltimore region are now closed due either to sedimentation, pollution, or disease.

Other economic development related activities also affect fishery populations. These include dredging and spoil disposal, industrial water supply intakes, and hydrographic modification (changing flow or tidal patterns). Within the region, these kinds of modifications have taken place primarily in the Baltimore Harbor area. The fact that the State has, for over 200 years, opted for development activities over other resource attributes in this portion of the coastal zone is important to note. Since the 1940's various state agencies and research institutions have sampled the tidal waters of Patapsco River to obtain data on what species of fish life inhabit the Harbor area. Never noted as a particularly productive fishing area since the early part of the twentieth century, findings of past studies show a steady decline in the diversity of marine life in the river. Since 1967, the State has taken a very active role in maintaining and protecting water quality for marine life in every river of the State. The Patapsco, in spite of its diversity in industry and commerce rather than marine life, is no exception. Experts have noted that in the last five years the number of people seen fishing

and catching sport fish in the Inner Harbor has increased. In 1972 a record striped bass was landed in Baltimore Harbor near Curtis Creek. Although the reasons for this increase are not fully known, it is thought that improvements in water quality discharge from industry might be an important, if not dominant, factor. It is also thought that as water quality management programs for non-point source pollution are implemented, sport fish will continue to repopulate portions of the Harbor. There are other tributaries in the region where improvements in water quality will yield larger areas of habitat suitable for reintroduction of shellfish and finfish. Where such potential exists, it should be investigated and become a factor in determining future uses of nearby lands and related water resources.

**Recommendation:** Construct a comprehensive fishery management program through the Coastal Zone Management Program to be cooperatively sponsored by Maryland and Virginia. In the Baltimore region local units of government should use the technical services of the Coastal Zone Unit to address fishery management concerns from land-use decisions affecting significant fishery resource areas. As part of these services the Coastal Zone Unit should develop standards for the measurement of land use impacts on shellfish/finfish resource areas.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | ● | ● | ○ | ● | ● | | | ○ | | 35 |

**Recommendation:** The 208 water quality planning program for the Baltimore Region is assessing the impact of land use activities on fishery resources. Based on the results of the assessment, the 208 Plan should contain land-use guidelines that consider fishery management and production concerns.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | | ● | ● | ● | ● | | | ○ | | 3 |

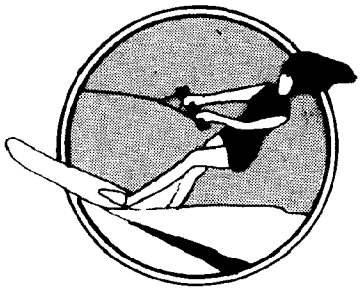
There is no comprehensive fish/shellfish monitoring network related to biological production. Present sampling techniques for bay living resources are conducted on an "as need" basis. Based on what little knowledge a select few biologists and fishing experts have gained (over the last 30 years), the following production trends, by species, seem to be present:

| | |
|---|---|
| Striped Bass | —Slow decline |
| Shad | —Slow decline |
| Herring | —Slow decline |
| Menhaden | —Increasing |
| Catfish | —Increasing |
| Spot | —Increasing |
| Spotail Shiner | —Increasing |
| Blue | —Increasing |
| Croaker | —Increasing |
| Clams | —Declining |
| Crabs | —Declining |
| Oyster | —Declining |

The rate at which these species are either increasing or decreasing is speculative due to a lack of hard data. The reasons for the trends are thought to be a combination of water resource conditions and the changing physical nature of the Bay. More time and data are necessary, however, to verify any hypothesis.

**Recommendation:** Establish a comprehensive fishery resource monitoring network and seek funds in order to predict production trends accurately.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ● | ● | | | ○ | | 30 |



## RECREATIONAL BOATING

Several problems associated with recreational boating can be identified. The direct environmental impacts of motorized boating can be a significant factor in the degradation of the aquatic environment. Disposal of untreated waste material can be a problem in congested areas and may become a greater problem with the anticipated growth in recreational boating in the Bay. Boating congestion is also a growing problem in the region and results in an increase in accidents and a decrease in recreational satisfaction. In addition, such restrictions as Federal waters and low bridges are an obstacle to realization of the full recreational potential of some areas.

Most of the environmental impacts of recreational boating are associated with motorized boating. The direct impacts include:

—Leakage and spills of gasoline and oil both dockside and on the open water;

—Exhaust from engines;

—Propellers on bottom sediment;
—Propellers on aquatic grasses;
—Engine noise on the natural amenities of a water body and on wildlife; and
—Wakes from boats on shoreline erosion.

The degree of impact is difficult to measure and is dependent on a variety of factors including water body characteristics, flushing rate, intensity of activity, existing water quality, boat operation, and engine efficiency. However, it can be concluded that the impacts are greater in shallow enclosed areas, areas of existing poor water quality, and areas of intense use.

**Recommendation:** Future development of marinas and private docks (for use by dock owner only) should be encouraged in areas less sensitive to the impacts of motorized boating and local jurisdictions via planning and zoning authorities should restrict marina and pier development in shallow, enclosed upstream areas where impacts of motorized boating are likely to the great.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ● | | | | o | | 8 |

**Recommendation:** State licensing regulations should be evaluated to determine if they should be made more stringent. Possible changes include:
—License fees which provide incentive for non-motorized boating.
—Required yearly inspection of boats to assure safe and efficient engine operation.
—A tax on boats docked but not licensed in State waters or a requirement that all boats docked in Maryland waters have valid state registration.
—Strict regulations involving licensing of water scooters, hydroplanes, and similar craft.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | ● | o | o | o | ● | | | | | | 8 |

Disposal of waste from boats is one of the contributing factors in estuarine water pollution. Raw sewage and garbage present both health and aesthetic problems. The impact of sewage, as with other factors, is dependent on the water body characteristics, existing water quality, presence of aquatic resources, and the use intensity in a given area. The relative contribution of waste disposal from boats to total estuarine water quality problems is probably minimal, since use is sporadic and limited mostly to weekends during the summer months. In areas where boat use is heavy and tidal flushing is minimal, however, the impacts of waste disposal can be significant.

Authorities for controlling waste disposal from boats are based on the Federal Water Pollution Control Act Amendments of 1972. The Coast Guard is authorized to approve waste disposal systems for boats based on Environmental Protection Agency guidelines. Simplified, the approved systems are either pass-through systems (chlorinator-macerator) or holding tanks. Further authority may be granted to a state, upon application to EPA, to declare certain areas as "no discharge" zones, regardless of the type of disposal system that is used. The regulation of waste disposal presents several problems in Maryland. The effluent from Coast Guard approved marine sanitation devices, Types I and II, does not meet State water quality standards, and boats with holding tanks are often forced to pump overboard because few marinas have pump-out facilities.

The Water Resources Administration and the Environmental Health Administration are jointly considering regulations that would require marinas to have pump-out facilities and would declare certain areas of the bay as "no discharge" zones. The declaration of "no discharge" zones appears to be difficult without public acceptance of the need and will be costly to enforce in terms of additional personnel.

**Recommendation:** Disposal of untreated waste should be eliminated in the tidal waters of the region.
—The regulation of waste disposal systems and no discharge zones must be preceded by requirements for pump-out stations, other sanitary facilities, and adequate sewage disposal at marinas and enforced by local health departments.
—The Water Resources Administration should initiate a specific public information program to educate the public on the waste problem and the need for regulation.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | o | ● | o | ● | | | | o | | 2 |

Recreational boating congestion is an increasingly serious problem in the tidal rivers of the Chesapeake Bay. Both increasing population and increasing popularity of boating are the principal causes of greater use. The problems of congestion take three forms: first, a potential safety problem as a result of increased probability of boating accidents; second, greater environmental problems resulting from increased loadings from waste disposal and other impacts of motorized boating; and, third, a decrease in recreational value for the boater because of the crowding.

Congestion of boats and a high boating accident rate occurs in the region during the summer months. The boating capacity of the rivers and the activity to capacity ratio for them were computed in a report titled "Recreational Boating on the Tidal Waters of Maryland." This study evaluated the capacity of water bodies based on estimated peak use and an average amount of surface area necessary per boat. The use/capacity

ratio is a comparison of the number of boats using a given water body on a peak day (Sunday in the summer), in relation to the surface area of the water body.* A ratio of 1.5 indicates that there are likely to be one and one-half times the optimal number of boats on a water body on a peak day.

The report rated the Patapsco River as the only one of the region's ten rivers with any reserve capacity. The Bush, Gunpowder, Rhode, West, and Susquehana Rivers were rated as slightly overused. The South River was rated as moderately overused. Ten of the eleven rivers in the State rated as over-utilized occur in the region (see Table 1). In addition to congestion, there is a high accident rate compared to the rest of the state. Table 2 shows the number of accidents that have occurred in the region and the State from 1964 to 1976 and the percentage of the total accidents which occurred in the region. Consistently, over the years, between 34 per cent and 57 per cent of the total accidents have occured in the region.

**Recommendation:** Growth of recreational boating should be discouraged in identified congestion areas. State, Federal and local authorities should consider congestion in granting permits and local for marinas, launching ramps, and mooring buoys.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | o | ● | ● | o | | | | o | | 8 |

**Recommendation:** Development of recreational facilities in the Patapsco River should be encouraged because it has the lowest level of recreational boating in the region. The Inner Harbor and Middle Branch areas of the River offer the best opportunities as they are close to populated areas and more removed from areas of intensive commerical shipping activity.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | ● | ● | ● | ● | ● | | | o | o | | 8 |

The recreational boating study provided useful data and analysis of the general problem of congestion and accidents in the state. However, the study was general in nature in that it averaged boating use over the entire surface of the rivers in the region rather than focusing on points where boats tend to be moored, tend to congregate, and points where conflicts between various activities occur. Further study of the pattern and intensity of boating activity in the region is needed. The Baltimore District of the Corps of Engineers is preparing to let a contract for an environmental impact assessment of the proposed Baltimore-Washington International Yachting Center (Magothy River, Anne Arundel County) and a marina proposed for Dark Head Creek (Middle River, Baltimore County). This study could include a detailed investigation of congestion and conflicts in water use on the Magothy and Middle Rivers, and the Bay. It could also be supplemented by concurrent study of these problems on the other rivers in the region.

**Recommendation:** Further study of the boating congestion and water use conflicts in the region should be undertaken in a comprehensive boating study and as part of the environmental impact statement to be prepared for the two marina proposals being considered by the corps of engineers. Locations of congestion should be documented through field work, including aerial photography, during the summer months. This study should be supplemented by work undertaken by state, regional and local agencies to identify locations of congestion and water use conflicts.

*A summary of the report's findings is presented in Table 1.

**TABLE 1**
**Water Body Use Activity Relative To Spatial Boating Capacity**

| River | Estimates of Sunday Peak Hour Activity (30% of Water Stored Craft) | (80% of Launchings) | Activity (Total Number of Peak Hour Boats) | Capacity | Activity to Capacity Ratio |
|---|---|---|---|---|---|
| Patapsco | 1083 | 458 | 1541 | 2608 | .59 |
| Bush | 201 | 194 | 395 | 382 | 1.03 |
| Gunpowder | 265 | 273 | 538 | 497 | 1.08 |
| Rhode and West | 554 | 242 | 796 | 622 | 1.28 |
| Susquehanna | 416 | 382 | 798 | 591 | 1.35 |
| South | 1007 | 522 | 1529 | 874 | 1.75 |
| Back | 589 | 373 | 962 | 483 | 1.99 |
| Severn | 1439 | 1008 | 2447 | 1000 | 2.44 |
| Magothy | 1089 | 591 | 1680 | 595 | 2.82 |
| Middle | 1519 | 215 | 1734 | 510 | 3.40 |

(Adapted from *Recreational Boating on the Tidal Waters of Maryland*, Roy Mann Associates, 1976)

**TABLE 2**
**Reported Boating Accidents 1964–1976**

| | Number of Accidents | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 | 1975 | 1976 |
| Anne Arundel County | 40 | 47 | 43 | 25 | 57 | 74 | 54 | 31 | 35 | 31 | 67 | 59 | 102 |
| Baltimore County and Balt. City | 18 | 18 | 17 | 12 | 17 | 21 | 12 | 3 | 1 | 10 | 24 | 8 | 19 |
| Hartford County | 2 | 7 | 4 | 5 | 5 | 8 | 8 | 2 | 7 | 4 | 5 | 3 | 8 |
| Baltimore Region | 60 | 72 | 64 | 42 | 79 | 103 | 74 | 36 | 43 | 45 | 96 | 70 | 129 |
| State of Maryland | 155 | 154 | 171 | 122 | 169 | 189 | 188 | 71 | 76 | 88 | 211 | 177 | 223 |

| | Percentage of Accidents | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anne Arundel County | 25% | 30% | 25% | 20% | 33% | 39% | 28% | 43% | 46% | 35% | 31% | 33% | 45% |
| Baltimore Co. and Balt. City | 11% | 11% | 9% | 9% | 10% | 11% | 6% | 4% | 1% | 11% | 11% | 4% | 8% |
| Harford County | 1% | 4% | 2% | 4% | 2% | 4% | 4% | 2% | 9% | 4% | 2% | 1% | 3% |
| Baltimore Region | 38% | 46% | 37% | 34% | 46% | 54% | 39% | 50% | 56% | 51% | 45% | 39% | 57% |
| State of Maryland | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

Based on *Recreational Boating on the Tidal Waters of Maryland*, Roy Mann, 1976, and data supplied by the Maryland Department of Natural Resources, Marine Police.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | ○ | ● | ● | ● | | | | ○ | | 30 |

Accidents can be reduced if all boaters are thoroughly familiar with boating safety techniques, navigation, and the boating rules of the road. Currently, the Natural Resources Police, Marine Division, offers a nonmandatory, free, home study basic boating course. This course covers speed limits, boat registration, classes of boats, required equipment; boating accidents, litter, skiing and reckless operation regulations; emergency procedures, first aid, and knots. This course is supplemented by lectures in schools and publicity in the news media. The Natural Resources Police increased their publicity on boating safety in 1975 over that which they had provided in the previous years. The number of boating accidents reported in 1975 was lower than the number reported in 1974 and 1976. The Natural Resources Police attribute this change to their increased emphasis on safety in 1975.

**Recommendation:** The Natural Resources Police should give increased emphasis to boating safety and should consider alternatives such as increasing the number of marine police in the region, stricter enforcement of existing regulations, lower speed limits, activity zones; increased publicity and availability of safety, operation, and navigation courses; licensing of operators, and the impoundment of boats involved in violations.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ | ● | | | | ○ | | 8 |

Throughout the region, various problems exist which prevent the full realization of recreational boating's potential, including lack of access and shoreline facilities, physical obstructions, Federal waters, and conflicts with commercial activities.

The problem of lack of access and facilities is most evident in Baltimore Harbor and in Harford County. In Baltimore Harbor much of the shoreline is preempted by industrial and commercial uses and as such the Harbor offers little inducement for investment in recreational facilities. In Harford County, approximately 80 miles of shoreline (75% of the total) is within the Aberdeen Proving Ground and access is limited to base personnel.

Physical restrictions are primarily a problem in Harford County. Low bridges over the Gundpowder and Bush Rivers discourage marina development and the use of sailboats in upstream areas.

Commercial fishing also presents problems to recreational boating. Extensive gill net fishing in spring creates navigational hazards because of stakes and net lines close to the surface of the water. In some cases, entire river mouths have been reported to be obstructed by gill net lines.

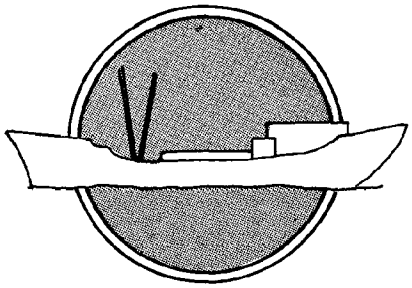
Restricted Federal waters are a severe constraint in Harford County. The Chesapeake Bay adjacent to Aberdeen Proving Ground and Bush River are frequently closed to boating when military testing is taking place. These closings are an imposition on boating on the Upper Bay and discourage facility development on the upper portion of Bush River.

**Recommendation:** Fulfillment of the recreational potential for recreational boating should be encouraged in non-congested areas.

—Increased accessibility to the Bay should be made at the Aberdeen Proving Ground. If lands are declared surplus (uncontaminated areas), priority should be given to recreational facility development. In addition, APG might consider making the existing recreational facilities on the Bay more accessible to the public.

—A study should be conducted to analyze the conflicts between recreational boating and commercial fishing with particular attention given to gill netting at the mouths of rivers.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | o | o | o | ● | ● | ● | | | o | | 8 |



**COMMERCIAL BOATING**

The direct environmental impacts of commercial shipping include waste disposal, ballast cleaning, spills, leakage, accelerated shore erosion from wakes, and resuspension of sediment from propwash in shallow channels.

Modern ships have more sophisticated waste treatment facilities, but many older ships discharge wastes untreated. The contribution of this discharge on the total water quality problem in the Bay is small; in enclosed areas, however, the impact can be significant.

Discharge of ballast water can be a problem when bulk material (coal, oil) is stored in the same compartments used for ballast. Discharge in the Bay is illegal and is closely monitored—however, it still takes place. This is due, in large part, to the fact that there are no facilities for discharging ballast water within the Bay.

The powerful propwash from large ships causes massive resuspension of sediment in the relatively shallow Harbor channels. Ships entering the Harbor with drafts very close to the channel depth cause this problem and it will persist until channel depths are altered.

One of the greatest direct impacts of commercial shipping is channel dredging and disposal of the dredge material. The dredging process can have a significant impact on water bodies that have not been previously dredged by changing the circulation patterns and disturbing bottom life. Maintenance dredging is less of a problem, but can still have a significant impact on aquatic resources by disrupting fish migration patterns and disturbing blue crabs wintering in the channels.

Channel depth requirements vary according to ship design and the load being carried, but fall roughly in the range of 24′ to 60′. Modern tankers and bulk carriers have the largest drafts of any class and are frequently required to travel with less than a full load because many ports do not meet depth requirements. The depth of the Chesapeake Bay Bridge-Tunnel at the mouth of the Bay is 55′ and is consequently the controlling factor in ultimate depth capability of the Bay. Channels into Baltimore are authorized at 50′ depth for the southern approach and at 35′ depth for the northern approach from the Chesapeake and Delaware Canal. The 50′ channel has not yet been constructed and present channel depth for the southern approach is 42′.

Overhead clearance requirements also vary. Larger ships may require well over 100′—the Key Bridge and Bay Bridge have 185′ of clearance to accommodate major traffic into the Harbor. Bridges over the Chesapeake and Delaware Canal are 135′ at the lowest.

In addition to channel access to port facilities, large areas of deep water are necessary near shore for holding and turning vessels. Again, the actual spatial requirements for turning basins depends on the type of ships a particular port facility anticipates; but this can be a major requirement as many of the large ships exceed 1000′ in length.

New technology can significantly change the characteristics of large commercial shipping. For example, offshore oil facilities, from which crude can be transported to shore by pipeline, could serve to ameliorate traffic congestion and reduce demand for dredging to accommodate deeper draft vessels. Another possibility that could offset demand for dredging deeper harbors is the development of large shallow draft vessels that can still achieve economies of scale by carrying large quantities of bulk material. However, the continued production of deeper draft vessels may restrict the large-scale traffic into Baltimore to the older, less dependable ships, considering the depth limitations of the Harbor approaches.

Conflict among commercial shippers appears to be minimal. Collisions are rare, and incidences of delay due to congestion are not evident. The Coast Guard limits the period of time that a ship can stay at mooring in the Harbor to 48 hours, preventing large backlogs of ships.

In some cases, recreational boating conflicts with commercial shipping. Because large commercial ships are less maneuverable and must maintain speed, areas of intensive recreational boating are felt to be hazardous by commercial pilots. For this reason, shipping interests do not welcome the idea of greatly increased recreational boating in the Harbor. The only area

where it is identified as a problem now is adjacent to Annapolis.

In light of the major oil spills in coastal areas throughout the country, the potential of such an occurrence in Chesapeake Bay is a major concern. The physical characteristics and sensitivity of an estuary means that the potential impact could be ecologically disastrous. While there are many chemical pollutants being stored, manufactured, transported, and discharged into the Bay, oil is of particular concern because its toxicity means that the impact on aquatic life is direct and immediate.

The sources of oil pollution from commercial shipping include area spills at land/water transmission points, emptying of ballast tanks that previously contained oil, spills from wrecked vessels, and leakage from antiquated vessels. The vessels with this problem potential include both large tankers and barges. In the Baltimore region, tanker terminals are found only in the Harbor. However, terminals for barges carrying petroleum products are located in Havre de Grace and in Annapolis, extending the spill potential to the lower Susquehanna and lower Severn Rivers.

Oil spill responsibilities are vested in the terminal operators, the Water Resources Administration, the Maryland Port Administration, and the Coast Guard. Terminal operators are required by the State and the Coast Guard to maintain equipment to contain a spill in transmission. The Water Resources Administration has ten trailers with clean-up facilities. Additionally, the Maryland Port Administration has containment equipment for Harbor spills and the Coast Guard is equipped for limited containment of spills in the Harbor and the Bay.

Containment in the tidal rivers and creeks is facilitated by the natural enclosure and the proximity of clean-up facilities; spills in the open bay are more difficult to contain. Both the Water Resources Administration and the Coast Guard maintain equipment for open bay spills. The Coast Guard facilities for such an operation are based in North Carolina and require eight to ten hours to respond. With its newly acquired open water containment equipment and contingency plan, WRA can respond to a spill in Maryland waters within two hours.

While the petroleum industry appears to have a good record on complying with oil spill prevention measures, it must be recognized that the potential for a major spill still exists especially in light of more antiquated vessels and increased traffic.

A great deal of uncertainty exists concerning the number and size of spills that could occur even if no further oil related development is permitted. In view of our inability to predict with certainty future oil spill impacts, it is important to consider the range of possible impacts that could accompany oil and gas development, paying particular attention to 'worst case' conditions. It is equally important, however, in attempting to maintain perspective on the problem, to associate these potential impacts with quantitative estimates of the probability of their occurrence.

**Recommendation:** The Coastal Zone Unit, in concert with interested State and local agencies and the State of Virginia, should request the United States Geological Survey to perform an oil spill risk analysis for the entire Chesapeake Bay. The study should focus on known and potential oil related facilities, channels that oil tankers utilize, and oil spill containment practices used by industry and government.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | ● | ● | o | | o | o | | 30 |

The results of such an analysis would provide better information upon which to evaluate an oil-related project proposal.

## THE LAND/WATER EDGE

The first overall objective in the management of this portion of the coastal zone is the maintenance and growth of a sustainable water-related economic sector while recognizing the associated environmental costs. This objective includes:

—Maintenance of the vitality of the Port of Baltimore through the provision of adequate shoreline facilities and through the provision of adequate channel depths;

—Provision of suitable areas for the disposal of dredge material and control of the location and methods of disposal to minimize environmental impacts;

—Encouragement of shoreline industry location in a manner compatible with environmental and recreational goals and restriction of industrial uses to those that are dependent on a water location.

The second overall objective is to encourage the provision and protection of coastal recreational, natural, and cultural resources. This includes:

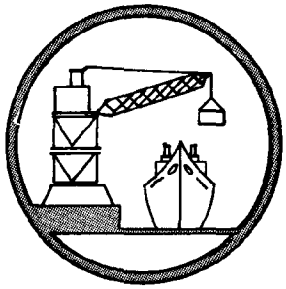
—Protection of wetlands and areas of aquatic vegetation from direct destruction and indirect sources of degradation;

—Protection of existing shoreline residential communities from natural hazards;

—Promotion of increased public access to the shoreline for recreational and educational purposes;

—Encouragement of further acquisition of coastal parkland and the efficient development and maintenance of existing coastal parks.

These objectives call for consideration of such land/water edge activities as the Port of Baltimore, water-related employment centers, marinas, spoil disposal, wetlands, shoreline erosion, flooding, public access, and parkland.



## THE PORT OF BALTIMORE

The Port of Baltimore has emerged as a significant regional asset as a result of the working of numerous forces over a long span of time. Among them were the early efforts of the three trunkline railroads which developed facilities (Figure 5) at Canton (Pennsylvania Railroad), Locust Point (Baltimore and Ohio Railroad), Port Covington (Western Maryland Railway), and Curtis Bay (Baltimore and Ohio). Railroad terminals generally include break-bulk general cargo piers (usually of finger pier configuration), a large grain elevator, a coal dumper, and an ore unloader. This collection of facilities meant that port traffic was composed of substantial volumes of bulk movements, a pattern still evident. Whereas railroad initiative was responsible for the early development of cargo terminals, it was the industrial and commercial sectors which later filled much of the remaining port shoreline. Industrial activity takes place on more than 42 per cent of the Port's perimeter; among the activities are the massive steel and shipbuilding complex at Sparrows Point, the shipbuilding and repair yards in Fairfield, the ship repair yards along Key Highway and adjoining Ft. McHenry, the chemical and fertilizer plants in Curtis Bay, Canton, and along the Northwest Branch of the Patapsco River, the sugar refinery on Locust Point, the petroleum storage facilities (originally refineries) in Fairfield and Canton, the gypsum plants in Canton and Marley Neck, and the numerous power generating stations which dot the harbor shoreline.

Aside from the major terminal development by the railroads and the industrial activity of the region's principal heavy industries, the Port's commercial functions have been stimulated and reinforced by several private developers and by the Maryland Port Administration and its predecessor agency, the Maryland Port Authority. Although a number of independent terminal operators constructed facilities along the shoreline at an early date, particularly in the older Inner Harbor, Fells Point, and Canton areas, the three remaining major sets of facilities of this kind are the Rukert Terminals along Clinton Street, at Lazaretto Point, and at Fells Point, the Terminal Corporation facility at Fells Point, and the Sea-Land terminal in Canton. This last facility is devoted entirely to the transfer of containerized cargo, whereas the others are involved in general cargo movements and in the handling of certain commodities for which specialized services are required.

In 1956, legislation creating the Maryland Port Authority gave it "the power, if private facilities are inadequate or inadequately operated at any time, to construct and, if necessary, to operate supplementary public facilities deemed by it to be required in the public interest." In essence, the Legislature provided the Authority with power to foster an environment conducive to port development in those areas beyond the scope of private activity. Over the past two decades, the Authority and its successor—the Maryland Port Administration—constructed and either leased or directly operated a number of general cargo terminals in the Port. Its activities have focused on maritime trade at Dundalk, Locust Point, Clinton Street, and Hawkins Point.

Traffic flow through the Port has shown an upward trend in recent years and is expected to follow national trends in economic growth in the future. Whereas growth has occurred in both bulk and general cargo tonnages, the most dramatic increases have been registered in the general cargo figures, especially in the volume of containerized goods moved through Baltimore terminals. Among bulk commodities, notable increases were recorded in the grain trades—a group of commodities whose aggregated tonnages nearly quadrupled during the five-year period 1971–1975; sharpest increases were in the export of corn, wheat, and, to a lesser extent, soybeans. Import iron ore tonnages rose steadily as inland demand continued to rise; receipts at the iron and steel complex at Sparrows Point remained fairly even. Coal traffic, which declined slightly in the early 1970's, has reversed its downward trend with increases both in exports and in the renewed use of the fuel in the harbor region itself. Petroleum tonnages attained an all-time high in 1973 and decreased subsequently. The mix of other bulk commodities changed only slightly during the period.

General cargo traffic increased by nearly 30 per cent between 1971 and 1975. Most of the increase resulted from gains registered at the Dundalk Marine Terminal, although significant increases also occurred at the Clinton Street and Locust Point terminals. The persistent overall growth in general cargo traffic may be attributed to the 131 per cent increase in container tonnages handled by terminals throughout the Fort; of this traffic, roughly 72 per cent was handled at Dundalk in 1975. By that date, approximately 52 per cent of all general cargo which crossed public piers was containerized; this compares to but 31 per cent in 1971. Clearly, containerization as a method of transferring general cargo has matured, and it seems probable that the trend will continue.

The Port, then, is an aggregation of industrial and commercial functions constituting a significant economic resource in the Baltimore region. Terminals are served by Federally-maintained 42-foot channels (with

accompanying state and privately-maintained approaches to the facilities themselves) and supported by landward rail and truck transport. Although these industrial, commercial, and transport activities comprise most of the Port's shoreline, certain other land uses are interspersed along the water's edge. Plans call for recreation and open space, housing, and non-port-oriented commercial development in the near future. It should be understood that despite the mix of land uses surrounding the harbor, port functions will continue to dominate both in extent and significance. Also, it should be noted that site requirements for port-dependent commercial and industrial activities are such that there are a limited number of feasible sites for expansion. Marine terminals, for instance, depend upon close proximity to main channels to minimize the need for dredging access channels, back-up space to allow for the rapid turnaround of modern vessels which have become too costly to bear the costs of long delays in port, and accessibility to both rail and truck transport. To help insure that the economic vitality of the Port will be preserved while possible environmental problems are lessened, the following recommendation is made.

**Recommendation:** Baltimore Harbor, defined as that area northwest of a line connecting North Point and Rock Point which contains industrial and commercial port facilities and supporting back-up space, should be designated as the State's Principal Maritime Workshop. This designation is meant to ensure a significant voice for the Maryland Port Administration in the use of land adjacent to deep draft channels. Toward protecting the integrity of this regional resource and toward insuring its optimum utilization, emphasis should be placed on concentrating port activities in this Workshop.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | | | ● | o | o | | ● | o | ● | 16 |

A problem which has beset the Port in recent years and which threatens its future at a time of fierce interport competition is the silting in of channels, both within the harbor itself and at the upper Chesapeake Bay entrance to the C&D Canal. With respect to the Canal, Baltimore has a distinct advantage over many other ports in having two navigational routes (the other route is via the Virginia Capes) connecting it with the open sea. The Canal route provides substantial time savings for vessels calling at Baltimore and more northerly ports on the North Atlantic Range; indeed, a significant fraction of a day may be saved on the voyage, for example, from Baltimore to New York or Philadelphia. But the lack of dredging in the upper bay has reduced channel depths such that Canal traffic is relegated to break-bulk general cargo vessels, and even these are prohibited from passage when fully laden due to the shallow conditions on the western approach.

The problem of channel maintenance experienced in the upper bay is compounded within Baltimore Harbor itself by a prolonged failure to deepen and widen existing channels. The U.S. Army Corps of Engineers recommended in June, 1969, that channels in the harbor be deepended to 50 feet to accommodate the ever-larger bulk carriers which transport such sizable volumes of commodities to and from the Port. Scale economies in the movement of such commodities as iron ore, coal, and petroleum products cannot be realized within the constraints imposed by 42-foot channels—even if properly maintained.

Failure to complete previously authorized channel improvements will result in stagnation or even decline in the movement of bulk cargoes, with probable capture of such traffic by competing ports which are free of such problems. In light of the Port's long-established tradition in the handling of such commodities and its heavy investment in industrial complexes and transshipment facilities, the following recommendation is called for.

**Recommendation:** Authorized projects, both on the Bay side of the Chesapeake and Delaware Canal and in Baltimore Harbor, should be completed with appropriate consideration accorded environmental concerns and a maintenance dredging program should be developed which includes a strict work schedule.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | ● | o | ● | o | o | | o | | ● | 16 |

Directly related to the problem of channel deepening and maintenance is the issue of spoil disposal. Required dredging of main channels, lateral access channels, anchorages, and berths at existing and proposed terminals will yield considerable spoil volumes, posing the need for suitable disposal sites. Such sites must have sufficient capacity to handle this material as well as spoil resulting from maintenance dredging. A recent enactment of the Legislature (Senate Bill 28) prohibits the dumping of any dredged material outside Baltimore Harbor except within a spoil containment facility. Inasmuch as there are no available disposal sites of suitable size, construction of a containment facility has been proposed for Hart and Miller Islands, and the Corps of Engineers has issued a permit to the State for that purpose. To meet channel requirements and, hence, to encourage commerce in the Port of Baltimore with minimal adverse environmental effects:

**Recommendation:** The proposed Hart and Miller Island diked disposal facility should be constructed as soon as possible following resolution of pending court action and used for material dredged from the Federal

channels in Baltimore Harbor and its Approaches with the provision that the finished island be used for recreation purposes.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | * | ● | ● | ● | o | o | | o | o | ● | 24 |

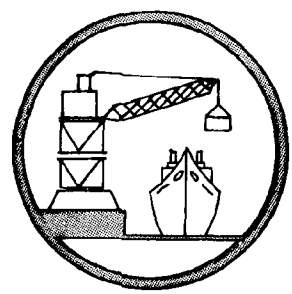
[Baltimore County through its County Executive and County Council and through its various agencies including the Office of Planning and Zoning has withheld support for the use of the Hart and Miller Island and environs as a spoil disposal facility. The basic reasons for this lack of support include environmental and constructual concerns as well as a concern over the ultimate use of the site and the possibility that the construction of the facility with its accompanying dredged channel might cause industrial expansion in this area.]

The volume of world trade is expected to increase considerably between now and the year 2000, and the Port of Baltimore, as one of the world's major seaports, might expect to grow also. Such growth will depend upon both the providing of silt-free channels to handle the larger containerships and bulk carriers and the development of suitable terminals through which these ever-increasing tonnages will move. Thus, it is necessary to project future traffic flows and then to identify areas of potential port expansion. Projected trade estimates have been developed, based on the experience of fifteen years from 1956 to 1970 and on anticipated growth to the year 2000. Historical trends show that an ever-increasing share of general cargo movements (not handled at private piers) is being handled at MPA facilities: 12 per cent in 1962; 50 per cent in 1967; 64 percent in 1972; and 70 per cent in 1975. There is no reason to expect a change in this trend because the private sector is unable to bear the extremely high costs of general cargo terminal development; hence, it might be expected that most future demand for such facilities will fall within the responsibility of the MPA. Incidentally, private piers have been handling approximately 1,400,000 tons of traffic annually for the past two decades, and it is expected that a similar annual volume will be handled in the future.

The problem at hand, therefore, is to determine projected traffic volumes to the year 2000 which might logically be handled by construction of additional MPA or other general cargo (including container) facilities. It is also important to determine the extent to which future general cargo will be containerized, as this will dictate the type of facilities needed. The MPA has projected general cargo tonnages to the year 2000; these projections allocate traffic between break-bulk and containerized. Actual tonnage for 1970 is 10 per cent above the historical trend line and the 1975 actual tonnage is 21 per cent above the trend line, with containerized cargo growing at an even more rapid pace (actual tonnage exceeded projected by 41 per cent in 1975) than total general cargo. To guage projected traffic volumes, and, by extension, facility demands, a new trend line was developed, based on more recent actual data. This new trend line is substantially steeper than either the 1966 or 1971 forecast. These projections indicate that future growth in general cargo tonnage will be confined principally to containerized movements. It may be concluded, then, that future port expansion will occur largely in the providing of new container facilities and in the expansion of existing terminals.

**Recommendation:** New terminals will need to be constructed, and certain existing facilities will require conversion from break-bulk to container uses. To effect construction of new terminal facilities, both Federal and State permits are required, and it is recommended that greater cooperation be promoted among agencies in an effort to expedite completion of projects.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | o | o | | o | o | o | | ● | o | ● | 16 |



## WATER-RELATED EMPLOYMENT CENTERS

Throughout the history of this region, commerce has been altered by many influences. Havre de Grace, Joppatowne, Elkridge, and Annapolis all functioned as trade centers during the past. They shared many of the same advantages as the Port of Baltimore and were able to accommodate the ships of the 18th and early 19th centuries. Each, however, served a rather specialized client and only Baltimore, because of its deeper water, was able to handle the larger vessels of the 19th and 20th centuries. Perhaps the three most critical conditions in determining that the landbased nucleus of the region would be located adjacent to the Port of Baltimore were the Patapsco's depth and a willingness to improve the channels, the development of the railroads and their landward improvements, and the water-powered industry which developed along Gwynns Falls and Jones Falls. The relatively shallow waters of the smaller rivers within the region prohibited the development of other major water-dependent or water-related industry. Annapolis remained an important port

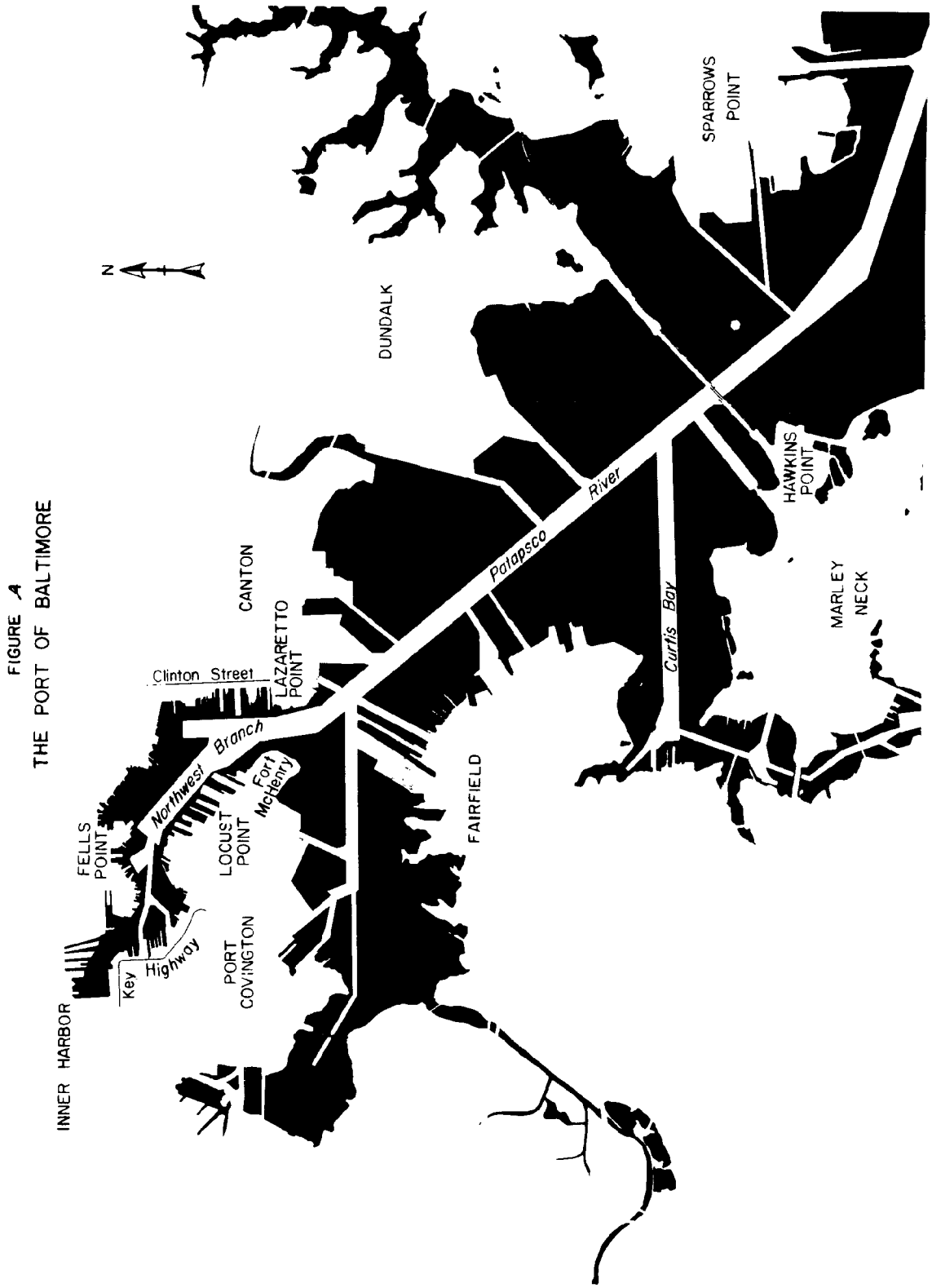



**FIGURE 5**
**The Port of Baltimore (map of the Port.)**

to service the fishing fleets, but the canning and shipping related industries grew in Baltimore

Movement of goods to and from the water's edge and into the expanding service area was assured by the development of a massive rail system. The railroads were responsible for the construction of tracks, yards, coal and ore piers, terminals, grain elevators, and general cargo piers. Inland areas not readily accessible to the water's edge were tied to the shoreline by major rail lines and, in some instances, specially developed rail switching companies. With the advent of trucking and a large scale highway program, rail traffic was challenged and, in a number of services, overtaken by the advantages offered by a more flexible transportation system. Currently, the major marine terminals and many industries depend largely on highway transportation.

Although the Port of Baltimore includes portions of Baltimore and Anne Arundel Counties, most development has occurred within the twenty-eight miles of shoreline of Baltimore City. The most notable exceptions are Sparrow's Point, a large portion of the Maryland Port Administration's Dundalk Marine Terminal in Baltimore County, and the Kennecott copper plant in northern Anne Arundel County.

The following deals with the existing conditions and requirements of employment centers within the Harbor on an area by area basis.

Canton

The Canton area is one of the region's most highly industrialized districts. It contains a large network of rail lines and a collection of both manufacturing firms and port-related storage facilities. Several marine terminals, owned by private concerns as well as by the Maryland Port Administration, are situated along Canton's shoreline. The Dundalk Marine Terminal straddles the City/County line and is the largest general cargo facility in the Port. Although portions of Canton are occupied by intensive employment centers, large tracts of land are vacant or underutilized. Much of this is used as open storage for bulk goods.

Canton contains a range of possible re-use alternatives. There are projects now in planning and construction which will guide these options. Construction of I-95, I-83 and a toll plaza on a 12 acre strip of land parallel to the Harbor Tunnel Thruway is to begin in the autumn of 1977. Several local transportation problems should be alleviated by this construction. Vehicular access to the area will also be greatly increased, removing the necessity of travel over local streets. A sanitary sewer to serve the Northwest quadrant will deal with many of the pollution problems. With the greatest concentration of industrial land in the City, Canton's redevelopment involves several complex issues.

Three manufacturing firms dominate the area: Western Electric, General Motors, and Lever Brothers. Together, they own 390 acres and employ more than half of the 26,192 workers in Canton.

Since 1963, GM, assembler of Chevrolet trucks and cars, has increased employment to more than 5,500. In 1972, it purchased the 47-acre American Standard property, expanding operations to provide an additional 650-1000 new jobs. Recently, the auto firm has invested heavily in converting its body painting process to a water base system that will drastically reduce hydrocarbon emissions.

Although Lever Brothers has not substantially increased employment, it has made considerable capital investments in a plant modernization program and spent considerable sums for pollution control equipment. Acquisition of the American Standard property by GM allowed Lever Brothers to purchase land previously leased to them by GM that can be used for future expansion.

Western Electric, a subsidiary of American Telephone and Telegraph Co., has steadily increased its employment. Today, more than 7,000 workers produce telephone cords, cables, and switching equipment, making this firm the largest private industrial employer in the City.

Other major manufacturing concerns include: National Gypsum, makers of gypsum board used in dwelling construction, Federal Yeast, producers of baker's yeast and self-rising flour, and the Exxon petroleum distribution center.

Canton is also the location of fertilizer industries. Agrico, Kerr-McGee and Lebanon Chemical Companies are the largest of these. This industry has been declining in past years, because many large scale fertilizer plants have moved to the midwest. Located along Clinton Street and at Lazaretto Point, the industry serves a market area consisting of the mid-Atlantic and New England states. Until 1970, the fertilizer industries received large volumes of raw material imports through their own pier facilities. Now, the industries have converted mostly to rail for shipments of their raw materials. Several problems affect the industry in Canton; an inadequate transportation system, both rail and highway, and inadequate sewer service.

Firms are forced to use septic systems for sanitary waste and to treat their industrial wastes. The area has a high water table which causes septic systems to malfunction and ground water to become contaminated. Industry is currently denied the option of pre-treating waste for introduction into the sanitary systems. At this time, the only option is direct discharge into the Harbor. This discharge requires compliance with Federal effluent standards while discharges into the sewer system require meeting pre-treatment standards.

Construction of the Canton trunk sewer, to be completed in autumn, 1980, will eliminate the need to utilize failing septic systems and allow individual industries a choice between pretreating their wastes or treating for direct discharge, whichever proves cost effective.

Opportunities exist for better parcelization of in-

dustrial land that is now either vacant or underutilized. An industrial renewal plan, focusing on West Canton chiefly, could increase developed property by utilizing the under-used rail property and finger piers.

Perhaps the most promising opportunity is Fort Holabird. With its proximity to the rest of the Canton industrial area, Dundalk Marine Terminal, and City and County communities with numbers of industrial workers, this vacant 212-acre site is particularly well suited for industrial development. A 1975 study by the Baltimore Economic and Development Corporation explored industrial development alternatives for Fort Holabird. The preferred option was a mix of labor intensive and capital intensive industries, together with considerable industrial office development. This scheme could generate between 4,500 and 5,000 new jobs and an annual payroll of $80 million. Besides economic benefits, an extensive landscaping and planting program would enhance the visual attractiveness of the entire area.

Dundalk is the Port's largest general cargo facility. With 12 berths in operation, Dundalk employs a labor force between 2,200 and 2,400. Two additional berths are in the development plans. There is a total of 435 acres of paved open storage with about 521,000 square feet of covered storage. In 1976, 2.4 million tons of containerized cargo moved through Dundalk.

Sea Land Service was the first all-container line in Baltimore with its own specially-designed terminal. This 22-acre site is used as marshalling space for nearly 800 containers. The Canton Company of Baltimore, which constructed the Sea Land Terminal, plans to further develop the site into a 155-acre facility by filling the area inside the bulkhead line between National Gypsum and Western Electric.

Rukert's two terminals have expanded; two new warehouses have been constructed at Clinton Street, and additional property has been acquired from Agrico Chemical Co. at Lazaretto Point for a bulk storage warehouse. The two facilities at Clinton Street are equipped to handle an assortment of cargoes. At South Clinton Terminal, up to 20,000 tons of bulk commodities are handled yearly. At the Lazaretto Point facility, special cargo requiring bagging, drumming, and canning are shipped. Rukert's facilities currently employ over 80 people. Rukert has expressed an interest in converting its facility at Pier 5 Clinton Street into a marginal pier. These plans, however, depend upon the City's willingness to sell Rukert 12 acres of vacant land east of Clinton Street as part of relocation due to I-95 construction. The "temporary" relocation site would become a permanent expansion area and serve as additional backup for an expanded Rukert Pier 5 after Lazaretto Point Berth 'A' is reconstructed by 1985.

The Canton Company, original developers of Canton, operate facilities and lease land used for a variety of purposes ranging from salt storage to oyster shell storage to container shipping. A modernization program has been proposed which would add 50 acres of back-up space by landfilling between Piers 3 and 11 Newgate Street. This would alleviate the conflict between areas used for ore handling and those used for the expanding trailer and cargo operations of its primary leases. Ramp structures and other relocated rail facilities will affect 21 acres of Canton Company property although this land will still be available for cargo storage after I-95 is built.

Three carriers provide service into Canton—Chessie (B&O), ConRail, and the Canton Railroad which services the piers and many industries in Canton. Numerous problems exist with Canton's railroad system. Among them are poor track conditions which limit the speed of trains to less than five miles per hour and short yard trackage which requires splitting the typical 100 car coal train into shorter cuts of about 10 cars. Consequently, the rail yards are congested and valuable shipping time is lost between yards. This produces two basic rail operation problems: continuous switching moves and frequent truck-rail conflicts as rail lines cross over several streets.

There appears to be enough existing space for rail car storage. The ConRail coal pier generally serves local customers. If their customers, the largest of which is Bethlehem Steel at Sparrows Point, can receive their coal by more direct rail shipments instead, the pier and its backup facilities would no longer be needed. The land could then be used by new or expanded industries.

Demand for bulk storage space is cyclical. Fluctuations respond to the needs of the fertilizer industry, ore imports, and demand for road salt. Most of the storage is located on scattered sites north of Newgate Avenue. Much of the present storage area could be put to more intensive use. By stockpiling at one location farther inland on unused rail property or distributing raw materials to the user immediately upon arrival.

Another opportunity is for the joint utilization of trackage and other facilities by the three railroads. Eventually, the multi-management approach of administering three lines could be converted into a single management administration.

**Recommendation:** The 3-A Interstate expressway system in the Harbor area (I-95, I-395, I-83) with associated local street improvements should be completed as soon as possible to relieve local congestion and provide improved access to Harbor industries.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | ● | o | ● | o | | | ● | | o | 16 |

**Recommendation:** Realignment and reconstruction of railyards in the Canton area to improve the efficiency of operation.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | o | ● | o | ● | o | | o | | ● | | 16 |

**Recommendation:** Reparcelization of underutilized or vacant land in the Canton area to provide development opportunities for employment resources.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | o | ● | o | ● | o | | | | | o | 14 |

**Recommendation:** Development of Fort Holabird as a major employment center.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | o | ● | | ● | o | | | | | o | 14 |

Boston Street/Fells Point/Falls Harbor

This strip of waterfront along the northern shoreline of the Northwest Branch contains a mixture of port related and non-related industries, residential and commercial areas, vacant land, and warehousing operations. The major employers; Renneburg on Boston Street and Allied Chemical in Fells Point are examples of the heavy industry found in the port. While Renneburg is directly dependent on water shipment of goods, Allied receives its raw materials via trucks and rail cars which must move through the congested streets of Fells Point. Plans have been developed for the rehabilitation of Fells Point to provide for an improved residential/commerical environment and encourage the use of the shoreline for active water traffic, tugs, and marine suppliers.

While in comparison to other port areas this strip of land does not occupy a major amount of land, the shoreline offers a variety of development opportunities. The Boston Street corridor will be significantly affected by the alignment of I-83. The eastern portal at Anchorage 'A' will require the creation of a protective bulkhead just off the shoreline of Boston Street. The thin strip of land between the highway and the shoreline is subject to several interpretations as to the appropriate land use. The Department of Planning and Joint Development of the Interstate Division have begun planning studies for alternative land uses.

The area west of the highway along Boston Street will be open for development in small scale marine-oriented uses, public access, and new housing. The Fells Point Plan, developed by the Department of Housing and Community Development and the community has projected a combination of shoreline access, commercial/warehousing/terminals, and residential rehabilitation to occur in the next 20 years in the area bordering Broadway and adjacent to the waterfront.

Falls Harbor, immediately west of Fells Point, is also impacted by the construction of I-83. The area, which is primarily warehousing, rail yards, and small manufacturing, will receive improvements to streets and rail lines through several Federal grant programs. Because the rail system lies in the streetbeds, congestion has been a prime problem. The conflict of truck and rail traffic with the growing residential community in Fells Point is likely to continue despite the improvements. Although much of the truck movement through the neighborhood will be reduced by the construction of I-83, internal service routes will remain much the same.

Several planning efforts are underway in this waterfront area. The alternatives vary greatly and are dependent on numerous factors which have yet to be fully explored and resolved. The very character of the community is open to continuing discussion by residents, land owners, industrial and shipping concerns, and several City agencies.

**Recommendation:** Implementation of the Fells Point Plan which provides for:

(a) increased water-dependent employment through encouragement of docking for tugs and other vessels;
(b) Continued rehabilitation of residential units and commercial buildings;
(c) development of new residential dwellings; and
(d) increased public open space along the waterfront.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | o | ● | o | | | | | o | 13 |

**Recommendation:** Continued evaluation of the appropriate, long-range land uses for the Falls Harbor area.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | | ● | o | | | | | | 13 |

**Recommendation:** Reduction of the conflict between industry related traffic and the increasing residential quality of Fells Point.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | o | ● | o | | | o | | | 2 |

Locust Point

Locust Point contains a great variety of uses ranging from a strong and stable residential and commercial community to complete terminal and shipping facilities operated by the MPA, private shippers, and the Western Maryland Railway's Port Covington facility. Beth-

lehem's Key Highway and Fort McHenry Ship Repair Yards are a significant employer and, combined with the Amstar and Proctor and Gamble plants, provide several thousand jobs in a relatively compact area. The MPA operates the North Locust Point piers and will soon open the South Locust Point container/breakbulk terminal. Western Maryland Railway's Port Covington is an important facility for the movement of grain, auto parts, and other general cargo. The transportation network uses a considerable portion of the area. The trackage for the Western Md. Railway conbined with the planned Interstate 95 will be the dominant land features.

Five primary issues affect the character of Locust Point:

—Marine terminal operations of the MPA control a significant amount of land on the north and south shores. Access to and from these operations affects the residential communities and other industrial concerns. Construction of an access road within MPA's North Locust Point Terminal and connecting Key Highway and the service roads to I-95 will do much to minimize impact on the communities. This road will also facilitate the rapid movement of goods from the terminal operations to distribution points. This road must be designed to maximize security for MPA's operations.

—I-95 construction will not only improve through movement in the entire City but will also give much needed direct access for terminal operators and manufacturers. Several joint development projects adjacent to the highway and Hanover Street have been identified which could provide for additional employment.

—The operators of the Bethlehem Steel Key Highway Ship Repair Yards have indicated a need for expansion to provide additional drydocks and assembly areas. It is estimated that this project could provide up to 1000 additional jobs. Several alternatives have been explored, including moving Key Highway to the west and expansion along the shoreline to the east. Both proposals are under study.

—Port Covington uses land under Western Maryland Railway's control and has little opportunity for immediate expansion. Proposals for creating additional cargo handling space by fill between existing piers and along the shoreline were submitted to the Corps of Engineers in 1971 and 1972. These projects have not been pursued by the railroad.

—Several neighborhoods located on the peninsula have co-existed with the shipping terminals and manufacturing operation for well over 150 years. There are, however, limitations to the amount of traffic, noise, and air pollution which can be produced if the communities are expacted to remain stable. Many of these problems have been dealt with by the construction of roads designed to remove heavy traffic from local streets, but there is continued pressure to limit expansion of industry where it conflicts with residential areas.

An additional improvement to the industrial base of the area will be the construction of the Port Covington Trunk Sewer, now under design and review, which will provide sanitary sewer service to the south shore. This will improve local water quality and provide service to the expanding south Locust Point Terminal.

**Recommendation:** Expansion of the Bethlehem Steel Key Highway Ship Repair Yards to increase the employment base and capacity.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ○ | ● | | ● | ○ | | | | | ○ | 14 |

**Recommendation:** Dredging of the approach channel to the Bethlehem Steel Highway Ship Repair Yard to an appropriate depth.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ○ | ● | | | ○ | | | | | ● | 16 |

**Recommendation:** Development of expanded marine terminals by placement of fill at the Port Covington facility.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ○ | ● | | ● | ○ | | | | | ○ | 16 |

Hawkins Point

With more than 600 acres of vacant land, Hawkins Point has considerable potential for expansion of port facilities and industrial use. The major industries of Davison Chemicals, U.S. Gypsum, and Glidden-Durkee employ 1,600 of the approximately 1,700 persons working in Hawkins Point. Eastalco is a water dependent operation which handles the transfer of ore to their plant near Frederick. Although the employment at the terminal operations is small, over 700 jobs are provided in the Frederick plant. With the completion of the Francis Scott Key Bridge access has increased to the area although a full interchange is needed to bring it up to maximum. Hawkins Point Road has been upgraded and rebuilt and provides excellent local connections.

Since 1971, Crown Central Petroleum Corporation of Baltimore has been planning a new refinery to serve the mid-Atlantic and northeastern markets. In 1973, they announced a development plan for construction of a petro-chemical complex on a 1300 acre site on Marley Neck in Anne Arundel County, just south of

Hawkins Point. Local citizen opposition, however, persuaded county officials to re-zone the area for uses which excluded petroleum refining, wholesale storage, and a number of other industrial uses. By 1975, Crown Central had decided on a smaller, 500 acre site in Thoms Cove on Hawkins Point, the area of Marley Neck located within the City. This property would be assembled by purchasing vacant land owned by the Chessie System, W. R. Grace, and others. During the 2–3 year construction phase, over 2,000 workers would be employed. Once completed, the plant may employ 300 to 450 persons. The labor force would include skilled technical, mechanical and operational aides as well as semi-skilled workers.

The proposed refinery could process as many as 200,000 barrels of crude oil per day. With the production of substitute natural gas (SNG) and low sulfur fuel which is sold to utility companies, some of the area's energy demends could be met. The daily output of 65,000 barrels of diesel fuel, 30,000 barrels of gasoline, and SNG could reduce the number of layoffs and cutbacks in production which have occurred over the last few years due to the scarcity of fuel.

Also planned for the Thoms Cove area of Marley Neck is the development of an import automobile and general cargo terminal by the Maryland Port Administration. This would involve use of part or all of a 160-acre site owned by MPA. The proposals for the Crown Central refinery and the Thoms Cove terminal use common land. This conflict must be resolved to determine if either or both of the facilities may be constructed. Both proposals also raise the issue of suitable infrastructures. Though major road construction has made Hawkins Point more accessible, other improvements will be needed. Most important is a full interchange between I-695 (Beltway) and Hawkins Point Road. Such access would allow for east-west movement in addition to the current pattern across the Harbor to northbound highways.

**Recommendation:** Resolution of the apparent land use conflicts between the Thoms Cove Terminal and the Crown Central refinery.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ○ | | | | | ○ | | ● | 13 |

Fairfield/Curtis Bay

Chemical, petroleum storage, steel fabrication, coal and ore transfer, and ship repair characterize the industrial sector of this area. Large tanks used for petroleum storage dominate much of the land area along the shoreline and in the interior. Most oil companies utilize the Colonial Pipeline for their product source, although barges are used to supplement volumes. Texaco and American Oil Companies are directly dependent upon barges and small tankers for their supply of oil products. The eight to ten oil companies in the Fairfield/Curtis Bay area employ approximately 425–450 people.

Maryland Shipbuilding and Drydock Company, located on the shoreline to the west of the Harbor Tunnel entrance, is a large ship repair facility, employing 2,500, which deals with ocean-going vessels. The complex also contains the largest floating drydocks on the east coast. Other large employers in Fairfield include Alcolac, FMC Corporation, Chevron Asphalt, and Bethlehem Steel (Buffalo Tank Division). These firms combined with a number of others provide employment for over 1200 people. The Fairfield/Curtis Bay area has a total employment force of approximately 4,200.

Many of the firms located in the Fairfield/Curtis Bay area are subsidiaries of nationwide companies which have made major capital investments in the area. By all indications, these plants appear to be operating efficiently and seem to be experiencing very few critical sales or operating problems which would alter employment. Although part of the Olin Corporation plant may soon close because of market penetration from low-cost Canadian competition, no other firm employing more than five workers is considering relocation from this part of the City.

Highway improvements, however, are needed in several locations. Frankfurst Avenue is in good condition up to its intersection with Vera Street but Childs Street, providing access to Weyerhauser Timber and Maryland Shipbuilding & Drydock, is in poor condition and needs reconstruction. The road system south of Frankfurst Avenue and east of the B&O tracks is in need of major repair. Though the present alignment adequately serves existing land uses, street beds, street drainage, and street lighting are inadequate. Northbridge Road, Patapsco Avenue, Chesapeake Avenue, and Vera Street should be reconstructed. There is also a conflict between industrial vehicular traffic and the residential areas along Curtis and Pennington Avenues. Heavy truck traffic encroaches upon the local street system and creates a nuisance to the neighborhood.

With the exception of the area along the terminus of Curtis Avenue, sewer service has recently been provided to the entire peninsula. Labor intensive firms who until recently were forced to find other methods for waste disposal are now serviced by the City sewerage system. A problem does occur with the storm drainage lines that flow directly into the Harbor.

Probably the most significant development opportunity for the Fairfield/Curtis Bay area is the proposal for a container terminal on the filled Masonville site. The 166 acres is now owned by the Arundel Corporation. By landfilling approximately 200 acres, MPA has proposed to create a major Port facility which would provide four additional berths for container movement. The 360 acre terminal could provide approximately 1200 jobs if employment is at the same density as the Dundalk facility.

However, several points of conflict are raised by the scheme. Rail service, a critical need of any port ter-

minal, may interfere with the opeation of the B&O #2 backup yard supporting the coal and ore pier. To provide such rail service, it may be necessary to elevate Frankfurst Avenue for vehicular movement. An efficient interchange for traffic from the Terminal to Frankfurst Avenue, the Tunnel Thruway, and southbound local streets will have to be built. Finally, the effects of increased truck traffic onto local arterials should be examined to see what measures can be taken to reduce any possible negative impacts on residential areas and road maintenance.

Another proposal in the area is the ConRail Harbor Rail Tunnel. Planners studying rail needs for the future have suggested a rail tunnel as one of many alternatives to relieve mainline bottlenecks in Baltimore. An alignment parallel to the bed of Frankfurst Avenue and the Harbor Tunnel Thruway has been considered for through train traffic. The tunnel would continue underwater at a depth of 55 feet to the Canton industrial area, with its approaches on either side of the Thruway. The approaches would be highly disruptive to existing railyards and the proposal is not high on the list of proposed mainline solutions. In addition to such specialized development, the area has potential for new development on vacant land and redevelopment/modernization of obsolete industrial sites. Six unimproved land parcels that can be developed by present landowners have been identified in the area. Two parcels are owned by the B&O Railroad and used for ore storage. Both can be redeveloped for industry. Other sites are also available. A large parcel held by BP Oil is a logical expansion space for petroleum storage. At present, it is leased to the B&O for ore storage. The former Swift Agricultural Chemical property, owned by Excavation-Construction Inc. appears to be available though it is not being actively marketed. Bethlehem Steel is retaining its property adjacent to the Buffalo Tanks. The steel firm envisions this land to be used eventually for its subsidiaries. The final industrial firm keeping its property for expansion space is Tuscan Properties. It is being developed for warehousing.

The old industrial strip along Curtis Avenue also presents redevelopment/modernization potentials. At some time in the future, the ninety-year old Harris Heller and United Scrap buildings will need to be renovated or demolished. Rehabilitation of these huge complexes would vastly improve the image of industrial Curtis Bay and provide additional employment opportunities.

Land south of Benhill Avenue is another opportunity site. At present, the major landowners are Olin Corp., manufacturers of sulfuric acid, and Gambel Industries which purchased property to lease to other industries. Jointly, the two firms own 35 acres of land that can be aggregated into a single site with both rail and deepwater access.

Harford County

In Harford County, the only water-related employment is found in Havre de Grace. A shipbuilding firm and an oil terminal are dependent on the 15′ channel which provides access to the town. Aside from several marinas there are no other water-related commercial uses, yet there is much underutilized and vacant land.

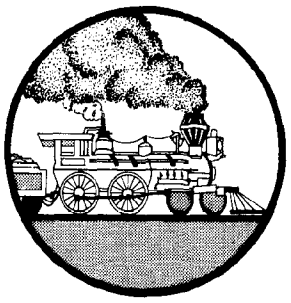
There does not appear to be much potential for further industrial use of the shoreline and the Havre de Grace Comprehensive Plan indicates that the shoreline will be designated a marina and resort commercial district.

The Baltimore Gas and Electric Company, however, owns a 700 acre parcel on the Bush River in the Perryman area which it proposes as a nuclear power plant site. BG&E has conducted a preliminary site investigation and has requested the Nuclear Regulatory Commission for an Early Site Review.

Intensive review and analysis of the site by BG&E, the Department of Natural Resources, and the Nuclear Regulatory Commission should provide sufficient technical data for rendering a decision. There is, however, a need for further study of the impact of the facility on Harford County.

**Recommendation:** A study should be conducted by Harford County on the impact of the proposed Perryman nuclear power plant on County resources and services. Citizen participation should be an important part of the study process.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | | ○ | ○ | | | | | | | 21 |



**TRANSPORTATION FACILITIES IN THE BALTIMORE HARBOR AREA**

The Harbor area has historically been the focus of the regional transportation system, and thus contains major investments by the public sector in roads and utilities and by the private sector in railroads, maritime facilities and industrial plants. The financial requirements and environmental impacts of dispersing Port facilities throughout the Baltimore Region Study area would be prohibitive not only for the actual Port facilities but also for the necessary supportive land transportation facilities.

In this context, it is logical to take advantage, to the maximum extent possible, of the existing and proposed infrastructure in the Harbor area and redevelop or expand where the land/water edge is suitable. These areas would include existing public and private port facilities and those underdeveloped areas which have access to deep water channels and adequate land transportation systems. This would be required to be accomplished in a manner that seeks to balance environmental and economic concerns.

The Canton area contains a large employment center, major rail yards, a mixture of port facilities and certain serious transportation problems in the study area. Vehicular circulation is impeded by a limited number of streets and highways and high peak hour traffic congestion as the major industrial plants change shifts. However, the Interstate projects and associated improvements (primarily Keith Avenue) will greatly increase accessibility to the area and to port facilities. Rail problems in the area tend to discourage development of new rail dependent industries, while at the same time, the Interstate system tends to enhance the transportation terminal character of the area.

**Recommendation:** The Canton area should be studied in an effort to take maximum advantage of the regional highway system and the existing rail facilities. Coal and ore operations, which have traditionally been significant in the area and which promise to be even more important in the future, should be modernized, thus allowing the transfer of poorly utilized space to alternative port uses. Land with channel frontage such as the areas west of Newkirk Street and south of G.M., should remain in port or related uses but areas further inland need not be specifically port oriented.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | o | ● | o | o | | ● | | o | 13 |

Port-related facilities at Locust Point are presently served by adequate rail service. Several rail operating problems appear to place limits on the amount of additional rail capacity that will be available to new and existing facilities in the future. Improved highway accessibility will be provided with the completion of the Interstate System in the area. This should help to reduce truck traffic on local streets, thus improving conditions within the residential community on Locust Point.

**Recommendation:** Re-development of port facilities on South Locust Point should continue with accessibility to both rail and truck transport. Mitigating measures should be taken to minimize the impact of highway construction in this area on existing transportation facilities and the residential community.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | o | ● | o | o | | ● | | ● | 16 |

Masonville/Fairfield has a transportation system quite different from that of Canton and Locust Point. Rail service on the B&O's Curtis Bay Branch has few operating problems, adequate line capacity for increased volume, and sufficient capacity for new customers. The highway system is less adequate. The Harbor Tunnel Thruway offers single direction access (from the north side of the Harbor) and Patapsco, Curtis and Pennington Avenues offer little capacity and have residential communities adjacent to them. The nearest expressway is I-95 in Locust Point, requiring the use of Hanover Street. Fairfield is heavily industrial and is likely to remain so, with only the Masonville area not yet developed. Potential port use of Masonville will require additional land transportation for the handling of cargo.

**Recommendations:** Movement of bulk cargo, such as coal and ore, should be encouraged to remain at Curtis Bay where the rail system can accommodate the demands of these cargoes. Given the limited opportunities within Baltimore Harbor to meet projected port needs, Masonville should be developed for port-oriented use which can utilize both rail and truck transportion with an emphasis on rail if feasible. West bound ramps to the Harbor Tunnel Thruway should be investigated.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | o | ● | o | o | | ● | | o | 16 |

Hawkins Point/Marley Neck contain the remaining major vacant parcels in the Harbor area with access to deep channels. Like Masonville/Fairfield, rail service is available and could serve new industries. Direct access to the regional expressway system is severely limited by uni-directional interchanges (eastbound only) on the Beltway which is a toll facility here. Alternate access to the Beltway (westbound) via Ordinance Road exists but is indirect. The local street system will be able to support increased development. There are a number of proposals for Port and non-port industrial uses for the area.

**Recommendations:** Since both rail and limited highway facilities are available, potential uses should take advantage of accessibility to existing channels. A general or bulk cargo terminal which can use the rail line would be preferable from a transportation perspective. Westbound ramps for the Beltway should be provided to improve highway access. Industries which do not need a Port facility for shipment of raw materials or products

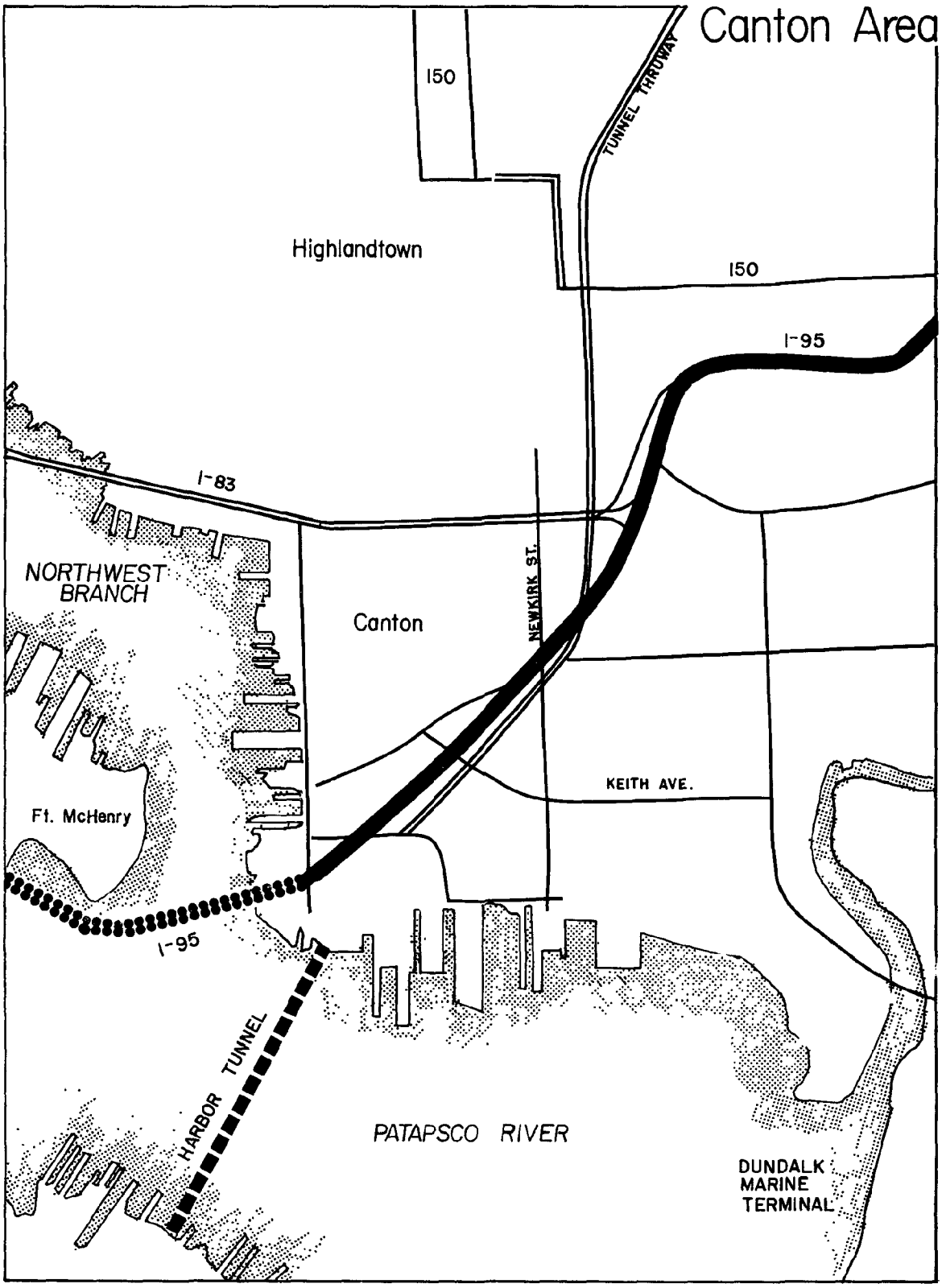



**FIGURE 6**
**Canton Area**

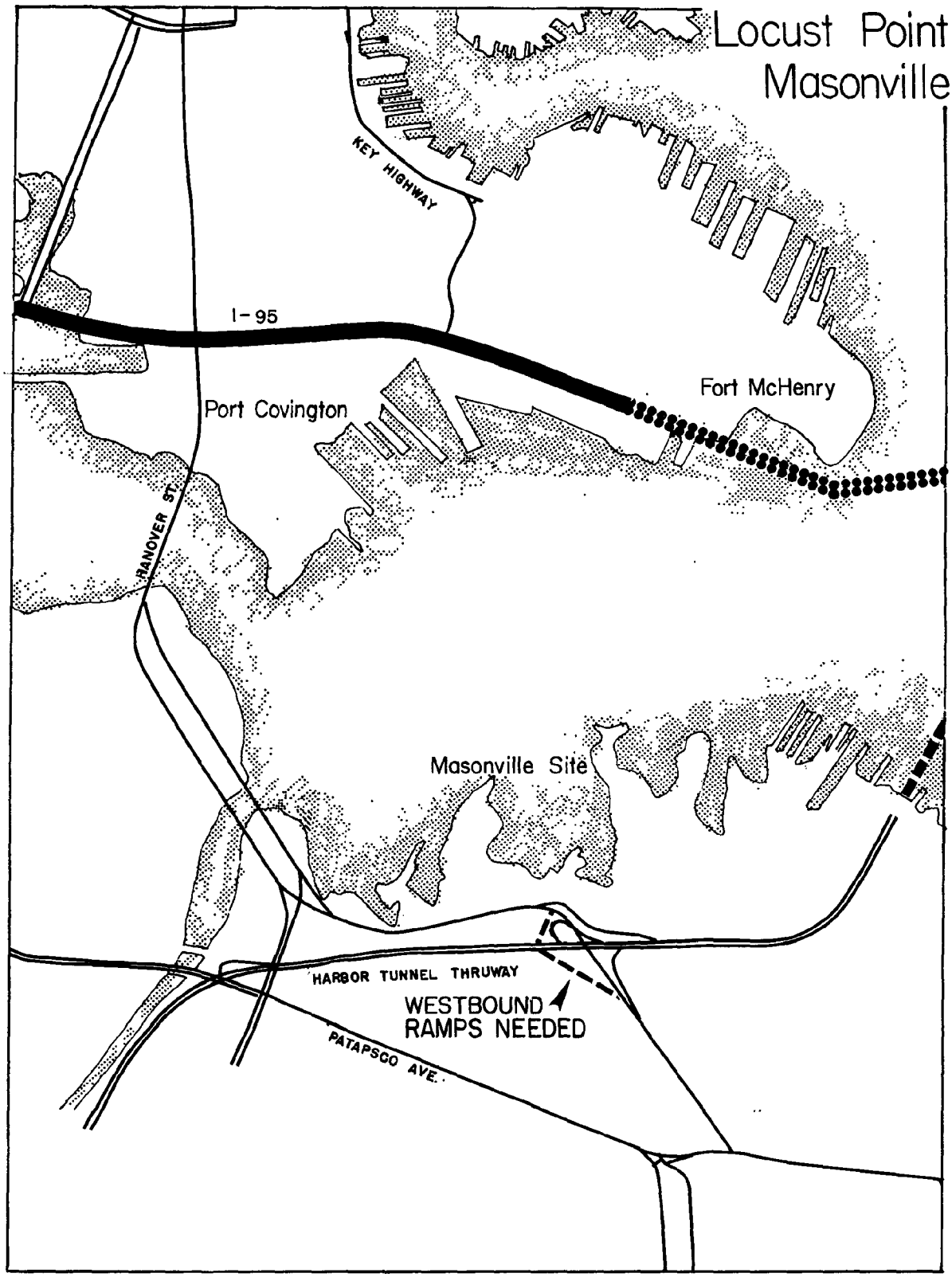



**FIGURE 7**
**LOCUST POINT/MASONVILLE**

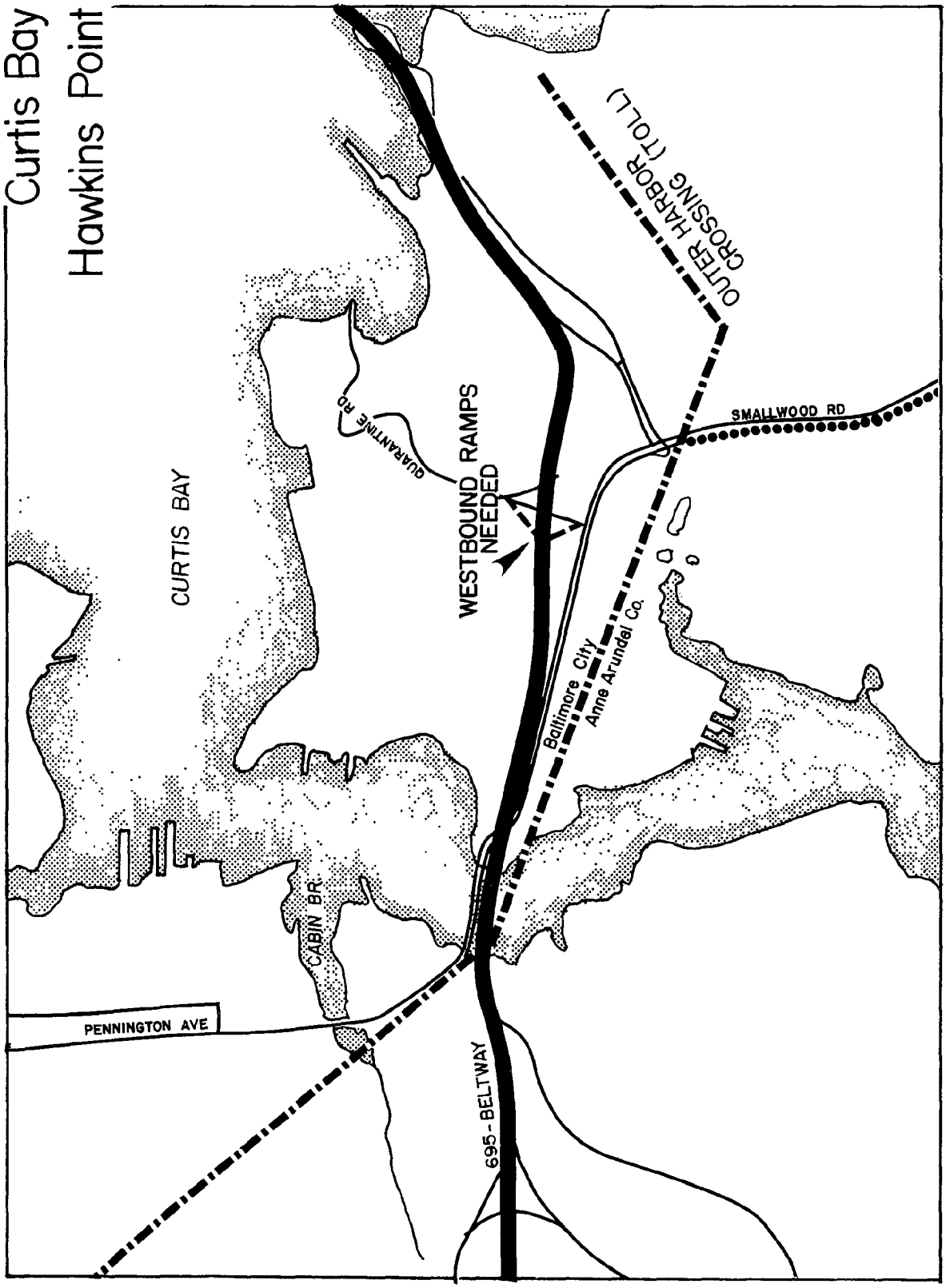
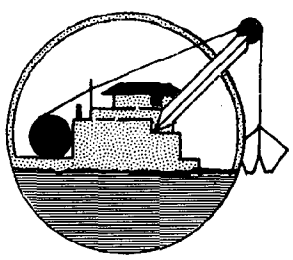



**FIGURE 8**
**CURTIS BAY HAWKINS POINT**

should consider non-channel shoreline or inland sites and utilize rail, truck, pipeline or conveyor transport to the more limited channel frontage pier areas.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ○ | ○ | | ○ | | ○ | 16 |

In summary, all expanding Port development should consider the need for supportive uses such as truck terminals and railyards when deciding the function of a specific development. The goal should be to move cargo onto the inter-regional transportation system (highway or rail) as directly as possible and lessen the impact on local streets outside the Port area. Similarly, rail cargo should be handled in a method which avoids reclassification of freight cars as much as possible thus improving rail service.



**SPOIL DISPOSAL**

Spoil disposal is the final step in maintenance and improvement of navigable waterways. Problems arise when the *method* of spoil disposal and the *quality* of the spoil to be disposed are considered. Spoil disposal methods include: upland filling, open water placement, containment within tidal areas, beach restoration, marsh creation, and production of weight aggregrate materials. The selection of one of these methods is based upon cost and the quality of the spoil. Spoil quality parameters relate to such physical characteristics as grain size, percent of organic material, toxic concentrations, and percent of water content. Problems occur when spoil quality characteristics are not properly matched with spoil disposal methods. For example, if highly toxic concentrations were disposed of in open waters, the suspension of pollutants in the water column could subject living things to small but concentrated dosages of pollutants that could impact higher in the food chain.

Dredging operations may generate 155 million cubic yards (mcy) of spoil material over the next 20 years, 140 mcy of which could result from Federal, State and private dredging activities in Baltimore Harbor and the Chesapeake and Delaware (C & D) Canal and approaches. This total includes a federal program for deepening the Harbor approaches from 42′ to 50′. Table 3, Column A gives a complete breakdown of maximum 20-year dredging requirements.

Four open water disposal areas have been used by the Corps of Engineers in recent years; Pooles Island Deep, Kent Island, Patapsco River Mouth, and areas alongside the C & D approaches north of Pooles Island. Existing containment sites along the C & D approach channel in Maryland have a total of 8.9 million cubic yards of environmentally acceptable capacity remaining. Existing privately owned containment sites in Baltimore Harbor have a potential capacity of 2 to 4 mcy remaining. Eight potential containment sites have been identified in Baltimore Harbor, with potential capacities ranging from 2 to 14 mcy each. The proposed Hart-Miller Islands Diked Containment Area is designed to accomodate 52 mcy, including 42 mcy produced by dredging the congressionally authorized 50′ channel for Baltimore Harbor. A complete breakdown of existing and proposed sites is contained in Table 4.

Existing and proposed containment sites will not accommodate maximum expected dredging quantities from Baltimore Harbor and related channels over the next twenty years.

Federal projects constitute 72% of the estimated maximum dredging in the Chesapeake Bay. The Water Resources Administration investigated three scenarios for reducing the total cubic yards to be handled:

(1) Dredging only the inbound side of Baltimore Harbor and Approaches to 50′. This alternative results in a 40% reduction in material dredged from these channels; the total dredged material is reduced from 155 mcy to 138 mcy. The inbound side may be used only for inbound ships, or it may be used, through special scheduling, by inbound and outbound ships. Corps of Engineer estimates show only one outbound ship per week would require the additional depth. (Column B).

(2) Eliminating the 50′ channel project for Baltimore Harbor and Approaches; the channels would be maintained at the previously authorized depth of 42′. Total dredged material is reduced from 155 mcy to 110 mcy. (Column C).

(3) Eliminating the 35′ channel project for C & D Canal and Approaches. A 9 mcy maintenance dredging backlog accumulated since the first deepening to 35′ would remain in the channel and the channel would be maintained at 27–28′, its approximate controlling depth at present. Total dredged material is reduced from 155 mcy to 138 mcy. (Column D).

Alternative (1) appears most attractive because both a deeper channel and a reduction in material handling costs are achieved. However, the added traffic control cost and the potential navigation hazard associated with this option are not offset by the decreased costs in dredging and disposal. Of particular concern is the

**TABLE 3:**
**Estimated 20-Year Dredging Requirements For Maryland Waters 1976–1995**

| Dredging Project | Column A<br>Maximum Program (mcy) | Column B<br>Alternative Programs to Federal Projects<br>Dredge Inbound 50′ Channel Only (Balto. Harbor) | Column C<br>Eliminate Whole 50′ Channel (BH) Maintain 42′ depth | Column D<br>Eliminate 35′ Channel (C&D) Maintain 27′ |
|---|---|---|---|---|
| FEDERAL SECTOR | | | | |
| Maintenance: | | | | |
| Baltimore Harbor (BH) | 6.00 | 6.00 | 6.00 | 6.00 |
| Harbor Approaches & C & D Connections | 16.00 | 16.00 | 16.00 | 16.00 |
| C & D Approaches | 23.51 | 23.51 | 23.51 | 23.51 |
| C & D Approaches (existing backlog to 35′) | 9.19 | 9.19 | 9.19 | 0.00 |
| C & D Canal (to Md. State line) | 4.00 | 4.00 | 4.00 | 4.00 |
| Authorized Deepening: | | | | |
| Baltimore Harbor (50′) | 14.67 | 8.80 | 0.00 | 14.67 |
| Harbor Approaches (50′) | 26.94 | 16.16 | 0.00 | 26.94 |
| C & D Connections (35′) | 7.40 | 7.40 | 7.40 | 0.00 |
| Other Projects in Md. Waters | 10.00 | 10.00 | 10.00 | 10.00 |
| STATE SECTOR | | | | |
| MPA Maintenance | 4.00 | 4.00 | 4.00 | 4.00 |
| MPA New Projects | 10.00 | 10.00 | 10.00 | 10.00 |
| SHA (3-A System) | 3.80 | 3.80 | 3.80 | 3.80 |
| PRIVATE SECTOR | | | | |
| BH Maintenance | 2.00 | 2.00 | 2.00 | 2.00 |
| BH 50′ Access Channels | 2.63 | 2.63 | 0.00 | 2.63 |
| Other BH New Projects | 10.00 | 10.00 | 10.00 | 10.00 |
| Other Projects in Md. Waters (includes State & Local Projects) | 5.00 | 5.00 | 5.00 | 5.00 |
| TOTALS | | | | |
| All Dredging | 155.14 | 138.49 | 110.90 | 138.55 |
| Baltimore Harbor | 53.10 | 47.23 | 35.80 | 53.10 |
| Harbor Approaches & Brewerton Extension | 50.34 | 39.56 | 23.40 | 42.94 |
| C & D Canal, Approaches | 36.70 | 36.70 | 36.70 | 27.51 |
| Other | 15.00 | 15.00 | 15.00 | 15.00 |

increased probability of collisons which might result from this channel configuration. A discussion of this alternative appears in "Supplemental Information; Baltimore Harbor and Channels", 19 July 1974, Baltimore District Corps of Engineers.

Implementation of alternatives (2) or (3) requires a major change in the State policy regarding the position of Baltimore Harbor in the world shipping market. The 50′ channel is a prerequisite for maintaining a viable bulk cargo trade and the 35′ C & D passage is important to the port's competitive position in the East Coast container cargo market.

The State must clearly establish its priorities regarding completion of major dredging projects, continuance of open water disposal, construction of State disposal facilities, and accommodation of material generated by the private sector in Baltimore Harbor. The following recommended actions are considered to be reasonable approaches to these issues.

**Recommendation:** Open water disposal of environmentally acceptable dredged material is being done on a limited basis for maintenance of the Harbor Approach channels until a containment facility is built. Investigations of these operations should be designed and carried out to evaluate the impacts of and standards for open water disposal. The results should be used to determine whether or in what manner open water disposal will be allowed to continue in the future.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | × | o | o | ● | ● | o | | o | | o | 24 |

**TABLE 4**
**Disposal Site Inventory**

| 1. Existing Sites | Area and/or Max. Allowable Elevation (± mlw) | Remaining or Potential Capacity (mcy) |
|---|---|---|
| A. *Open Water Sites* | | |
| Patapsco River Mouth | −10′ | 4 |
| Kent Island Deep | −40′ | 15 |
| Pooles Island Deep | −18′ | 6.5 |
| C & D Approaches | −18′ | — |
| B. *Containment Sites* | | |
| 1. C & D Approaches (Federal): | | |
| Courthouse Point | 240 acres/+60′ | 6 |
| Grove Point | 105 acres/+60′ | 5 |
| Pearce Creek, diked | 253 acres/+40′ | 6.3 |
| Pearce Creek, undiked | 743 acres/+60′ | 55 |
| 2. C & D Canal (Federal): | 556 acres | 4.9 |
| 3. Baltimore Harbor (Private): | | |
| Hawkins Point (Kennecott)* | 85 acres | 3 |
| Masonville (Arundel)* | 50 acres (variable) | 2 |

| 2. Proposed Sites | Proposed Elevation | Estimated Capacity (mcy) |
|---|---|---|
| A. *Baltimore Harbor* | | |
| W. of Colgate Creek | +10′ | 9.8 |
| N. of Sollers Point | +10′ | 9.5 |
| S. of Sollers Point | +10′ | 8.0 |
| Masonville | +10′ | 11.1 |
| Wagners Point | +10′ | 6.8 |
| Curtis Creek | +10′ | 4.7 |
| Thoms Cove | +10′ | 1.7 |
| Kennecott/B & O | +10′ | 13.5 |
| B. *Hart-Miller Islands* | +18′ | 52 |

*Dike height and therefore capacity is subject to change; maximum potential height is unknown.

**Recommendation:** The State should proceed on constructing inner harbor sites with a total capacity of 20 million cubic yards for containment of spoil from State projects. One site should be constructed as soon as possible and an other selected and banked for use in about 10 years. One of the sites should be adaptable for use as a permanent rehandling facility for dredged material. Private dredging interests should be encouraged to develop harbor containment sites for their needs. The appropriate role of the State in constructing these private sites should be resolved.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | o | × | o | o | ● | o | | o | | ● | 24 |

**Recommendation:** The State should consider providing disposal areas for private dredging interests only when capacity exceeds the State's needs. A short-term exception to this policy may be made in the case of access channels for the 50′ project which are for industrial locations and activities consistent with state and local management authorities.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | × | o | o | ● | o | | o | | o | 24 |

**Recommendation:** The Water Resources Administration should identify spoil disposal priorities immediately and a twenty year program should be drafted which outlines a schedule for selection, construction, and utilization of disposal areas for dredging projects in Harbor channels, Harbor approaches and C & D Approaches. This program would be used as the basis for evaluating and scheduling future dredging and disposal projects in these areas. Recommendations on funding should also be included. New containment capacity, or alternative disposal options such as marsh creation, should be developed for maintenance of those channels as soon as possible, with assistance from the State if necessary.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | ● | o | | o | | o | 24 |

Effective management of dredging and disposal operations requires clarifying the roles of involved State agencies. At present, State government is at different times applicant, regulatory authority, and contractor on dredging projects in Chesapeake Bay. These roles are variously assumed by the Maryland Port Administration (MPA), the Board of Public Works (BPW), the Water Resources Administration (WRA), and the Department of Natural Resources (DNR). Comprehensive management authority within a single agency does not exist at this time and the operating State agencies often do not adhere strictly to their formally designated roles but rather function by informal interagency agreements.

State and Federal agencies need current regulations and guidelines for project and proposal reviews they are required by law to perform. In many cases, the sole agency guidance is found in the law which established the agency and only broad legislative intent is described. The absence of definitive objectives and procedures described by regulation has two effects; applicants may have difficulty in determining what is

required of them, and each agency's review is more difficult since all decisions must be made on a case by case basis.

This situation does not allow easy resolution of the following issues: planning and providing legal assurances for the deepening and maintenance of Federal channels in Baltimore Harbor, responsibility and procedures for allowing use of open water spoil disposal areas, responsibility for long-range disposal facility planning, funding, and construction. Recognition by the Board of Public Works of a lead management agency and a functional division of agency responsibility is needed.

The Department of Natural Resources, by virtue of general legislative mandate (its duties as stated in Maryland's Annotated Code, the Wetlands Act, and the requirement that it monitor dredging and disposal activities in Maryland waters), of interagency cooperation (assisting MPA in providing disposal sites), and of duties assigned to it by the Board of Public Works (responding to all CE information requests) has assumed many activities appropriate to a management agency for dredging and disposal.

**Recommendation:** The Board of Public Works should assign to the Department of Natural Resources the initial management responsibility for reviewing and scheduling disposal alternatives for major projects in Baltimore Harbor and the C & D Canal and Approaches with final authority remaining with the Board. Water Resources Administration should continue its monitoring and enforcement activities, the Board of Public Works should retain authority for granting use of State lands for disposal and for acquiring upland disposal sites, and the Port Administration should research dredging needs and recommend disposal options for major port areas, provide economic analyses, and advise on the future use of disposal areas.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | ● | o | | o | | o | 34 |

Although the State is responsible for providing disposal for major Federal dredging projects within the Baltimore District of the Corps of Engineers, planning for this responsibility is hampered by the operating procedures of the two agencies. For example, due to budgetary constraints and time limits, the Corps must plan and request funding for a dredging and disposal operation prior to requesting or receiving State approval. If the site is environmentally undesirable, and the alternative more costly, the project may be delayed or cancelled for that fiscal year. To lessen the difficulties caused by situations like this, the Department of Natural Resources should improve its relationship with the Baltimore District.

**Recommendation:** Establish a system whereby Department of Natural Resources is advised of the District's projects-maintenance schedule for major Baltimore Harbor improvements over a 4–5 year period with annual notifications of changes. Department of Natural Resources should then provide the District with reasonable disposal options at a convenient time prior to the District's budget request for any particular project. The Department of Natural Resources should also clarify the States' information needs with regard to its responsibility to monitor the execution of major Federal dredging/disposal projects and set up a procedure for prompt notification of the details of these operations. The Department of Natural Resources should also seek a mechanism to insure State involvement with the Philadelphia District in the planning of scheduled maintenance dredging and in the procedures needed to aid the State's monitoring duties.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | ● | o | | o | | o | 37 |

Dredging operations outside the major shipping channels represent a relatively small proportion of the total disposal requirements, but several problems regarding these operations can be identified. A monitoring program is necessary for large dredging projects, particularly those involving disposal of material in open water, to detect undesirable impacts before significant environmental damage can occur. The State is required by law to perform such monitoring, but monitoring operations are not formally budgeted items at this time. They should be covered in Water Resources Administration's general operating budget or otherwise funded to insure the availability of at least a minimum level of funding when the need to monitor arises. At this time, only federal dredging projects receive the level of scrutiny specified in the monitoring legislation. However, non-Federal dredging and disposal operations of large magnitude may also cause significant environmental impact and should be monitored.

Involvement of the State in the actual planning of county projects is neither more desirable nor more productive than allowing local jurisdictions to continue their present efforts. Areas where interaction is desirable lie in the development of guidelines for use by counties and other applicants for choosing spoil disposal areas and in the provision by the State of a technical advisory information service for all aspects of dredging and disposal problems.

Steps can be taken immediately to improve overall management of dredging and disposal activities in Maryland waters as follows:

**Recommendation:** Regulations should be developed by the Wetlands Permit Section of Water Resources Administration governing the review of dredging proj-

ect applications. Concurrently, guidelines which define acceptable methods of dredge spoil disposal including beneficial uses, should be developed to aid applicants in the design of disposal operations.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | ● | o | | o | | o | 24 |

**Recommendation:** The Wetlands Permit Section of Water Resources Administration should become involved in State-funded dredging projects prior to the permit/license application. With their contribution of technical assistance in the design of the project and disposal site selection, delays at the permit stage may be avoided.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | ● | o | | o | | o | 34 |

**Recommendation:** Extensive monitoring of large dredging and disposal projects by Water Resources Administration should be extended to include non-Federal operations. To insure consistent use of this tool, a working document should be prepared defining the type and magnitude of operation which will require monitoring. Permanent funding sources for all monitoring should be procured including the use of permit fees as a partial source.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | ● | o | | o | | o | 24 |

**Recommendation:** A methodology which is acceptable to State and Federal review agencies for choosing spoil disposal sites should be developed by Water Resources Administration through the Coastal Zone Management Program for use by counties, municipalities and other local dredging interests.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | ● | o | | o | | o | 24 |

**Recommendation:** If the Hart-Miller Island Spoil Disposal Complex is constructed and operated, Water Resources Administration must have a well planned and funded monitoring program. The monitoring program should be reviewed by local governments and the public via the public hearing process. Contingency procedures, in case of accidents, should be detailed.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | ● | ● | o | | o | | o | 24 |

Research must continue on dredging and spoil disposal to improve our understanding of the physical, chemical and biological processes they impact and to improve our decision-making capability. The beneficial use of dredged material is one area of such research. 'Beneficial use' is a disposal alternative which results in an environmental or economic improvement of the material or the disposal site. Application of beneficial uses and other non-conventional disposal concepts requires comprehensive information on all spoil disposal activities throughout the Bay area. Actual and potential dredged material supplies must be matched with existing demands and potential uses.

**Recommendation:** The Water Resources Administration should begin a comprehensive evaluation of local and nationwide research on open water disposal, sediment transport, hazards of upland disposal, testing procedures and advances in dredging technology for the purpose of 1) reevaluating procedures and criteria applied to dredging projects in Maryland waters, and 2) identifying gaps in current knowledge which could be addressed by local research programs such as the EPA's Chesapeake Bay Study Program.

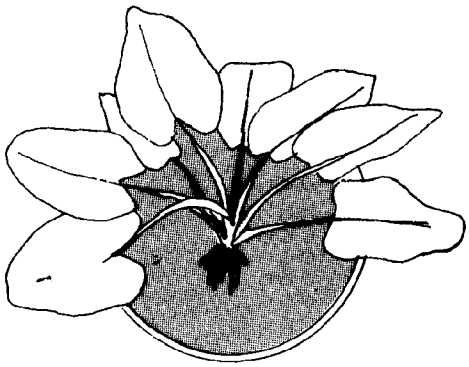
| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | ● | o | | o | | o | 24 |

**Recommendation:** Investigations of beneficial uses of dredged material should be expanded, with particular emphasis given to applications in major channel projects. Specific investigations should be initiated immediately into the concepts of material reclamation in Baltimore Harbor and marsh creation along the C & D Canal Approaches.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | o | o | o | ● | o | | o | | o | 24 |

**Recommendation:** The Coastal Zone Unit, with Water Resources Administration and interested local governments, should investigate regulating new channel dredging as a means of controlling water-oriented land use and its associated impacts. Existing data systems, land use plans, and wetlands inventories should enable the identification of waterways where dredged channels should be restricted, encouraged, or otherwise controlled.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | ● | o | o | ● | ● | o | | | | | 19 |



## WETLANDS AND AQUATIC VEGETATION

Wetlands are areas on the land-water edge that support extensive submerged or emergent aquatic vegetation because of permanent, temporary, or intermittent water submersion. Locally, wetlands are known by a variety of common names: salt marsh, tidal marsh, marshland, marsh, swamp, gut, slough, bog, pothole, mud flat, wet meadow and floodplain. Wetlands may be classified as either tidal or non-tidal. Within these divisions as many as twenty types have been identified using vegetation and waterfowl as criteria. Seven wetland types have been identified in the Baltimore Region. A description of these types and the vegetation associated with them appears in Table 5. One of these, the coastal shallow fresh marsh, is the most important of all coastal marshes as waterfowl habitat.

The value of wetlands has been assessed biologically, hydrologically, physically, economically and in terms of pollution abatement. Biologically, wetlands are a highly productive biomass, a source of nutrients, and an essential factor in the life cycles of economically important blue crabs, shellfish, and finfish. Physically, they function as erosion control mechanisms and sediment traps. Hydrologically, wetlands function as buffer systems to flood water. Their unique water holding capacity, estimated at as much as 300,000 gallons per acre, allows them to store excess water and release it at times of drought to recharge aquifers. Wetlands also provide significant pollution abatement. Acting as nutrient pumps they decrease water pollution by metabolizing nitrates and phosphates. They also decrease air pollution by absorbing and assimilating gaseous pollutants directly into their leaves. Economically, wetlands produce large returns in such activities as commercial fishing, sport fishing, hunting, boating, and trapping. Adding the aesthetic, recreational, educational, and agricultural contributions of wetlands makes them extremely valuable and essential areas for preservation.

Prior to the passage of the State Wetlands Act, wetlands were being destroyed at an alarming rate. Between 1942 and 1967, 23,000 acres of Maryland's approximate 303,600 acres of wetlands were lost. In other words, for twenty-five years approximately two and

**TABLE 5**
**Baltimore Region Wetland Types and Associated Vegetation**

| Wetland Type | Description | Associated Vegetation |
|---|---|---|
| Inland Fresh Meadow | Found in shallow upland basins or bordering deeper marshes. Soil usually without standing water, but is water-logged within a few inches of the surface. | ironweed<br>goldenrod<br>sweetflag<br>common rush<br>spikerush<br>chufa<br>smartweed<br>eelgrass<br>arrowhead |
| Inland Open Fresh Water | Shallow water in artificial ponds, lakes and open areas interspersed in inland fresh marsh types. Water depth variable. Usually fringed by border of emergent vegetation that grades into another type of wetland. | pondweed<br>water lily<br>smartweed<br>elodea<br>coontail<br>water milfoil<br>duckweed<br>arrowhead<br>burreed<br>spikerush |
| Shrub Swamp | Found along sluggish streams and flood plains. Soil normally water-logged and covered with up to 6 inches of water. | alder<br>buttonbush<br>willows<br>maples<br>sweetgum<br>tearthumb<br>swamp rose<br>beggar ticks<br>loosetrife<br>grasses and sedges |
| Wooded Swamp | Occur in association with shrub swamps and along sluggish streams, on flood plains and poorly drained uplands. Soil always waterlogged to within a few inches of the surface, in uplands near streams often covered with a few inches to one foot of water. | red maple<br>river birch<br>sweet gum<br>pinoak<br>cypress<br>nettle<br>greenbrier<br>honeysuckle<br>beggar ticks<br>grasses and sedges |

**TABLE 5—Continued**
**Baltimore Region Wetland Types and Associated Vegetation**

| Wetland Type | Description | Associated Vegetation |
|---|---|---|
| Coastal Shallow Fresh Marsh | Found along tidal rivers. Tidal, and may be covered at average mean high tide by 6 inches of water. Soil always water-logged. | cattail<br>reed<br>big cordgrass<br>arrow-arum<br>pickerel-weed<br>Olney three square<br>rose mallow<br>saltmeadow cordgrass<br>saltmarsh cordgrass |
| Coastal Open Fresh Marsh | Includes shallow variable depth portions of open water along fresh tidal rivers. Tidal cycles and currents keep sediment suspended. | pondweed<br>naiad<br>wild celery<br>coontail<br>widgeon-grass<br>cattail<br>saltmeadow cordgrass<br>saltmarsh cordgrass<br>Olney three square<br>reed |
| Coastal Salt Meadow | Found along landward side of saltmarsh or bordering open water. Always waterlogged, rarely covered by tide waters. | saltmeadow cordgrass<br>saltmarsh cordgrass<br>salt grass<br>black rush |

a half acres of wetlands were being lost per day. The Wetlands Act and the subsequent wetland permitting and licensing process reduced the rate of wetland loss. But the Maryland Wetlands Act seeks to conserve, not preserve, wetlands. Therefore, increasing pressure from a continuing influx of people into the coastal region and the subsequent pressure for shoreline development continues to threaten the existence of wetlands. This pressure raises three major questions: 1) how to avoid further unnecessary and undesirable destruction or degradation of valuable wetlands; 2) how to evaluate and rank wetlands; and 3) how to protect and enhance those deemed most unique. The intent of the following recommendations is to further protect and preserve wetlands in the region's coastal areas.

In 1970, the General Assembly passed the Maryland Wetlands Act creating a regulatory program to preserve wetlands for their basic ecological, economic, developmental, recreation, and aesthetic value. The Act deals with tidal wetlands and divides those wetlands into two types, State and private. State wetlands are defined as "any land under the navigable waters of the state below the mean high tide, affected by the regular rise and fall of the tide." Private wetlands are defined as "any land not considered state wetlands bordering or lying beneath tidal waters, which is subject to regular or periodic tidal action and supports aquatic growth" including those state wetlands which have been transferred to private ownership.

The Act makes it unlawful to dredge or fill on state wetlands unless a license has been issued to do so by the Board of Public Works. To aid the Board in its decision on issuing a license, the Secretary of the Department of Natural Resources is required to submit a report to the Board indicating whether the license should be granted and, if so, any conditions that must be met. Upon reviewing the Secretary's report and after a hearing in the local jurisdiction affected, the Board makes a decision on the issuance of a license. Any person found guilty of violating provisions governing state wetlands is subject to a fine of not less than $500 and not more than $1000. Any person found guilty of a knowing violation is subject to a fine and is also responsible for restoration of the wetlands to the extent possible.

The Secretary of Natural Resources is also responsible for establishing rules and regulations governing dredge and fill operations and similar activities that alter private wetlands. These regulations are subject to adoption or rejection by the Maryland Agricultural Commission. A permitting system has been established to regulate activities that can occur on private wetlands. If a person wishes to conduct an activity on a private wetland, he may file an application for a permit to the Wetlands Permit Section of the Department of Natural Resources. After receipt of the application a public hearing is held by a hearing officer in the affected county. The hearing officer decides to grant or deny the permit by considering the effect of such activity on "the public health and welfare, marine fisheries shellfisheries, wildlife, economic benefits, the protection of life and property from flood, hurricane, and other natural disasters, and the public policy set forth in the Wetlands Act." If the applicant does not comply with the conditions of the permit, the permit may be suspended or revoked. Violation of the provisions governing private wetlands in the Wetlands Act may result in a fine or not more than $100 or imprisonment of not more than one month, or both. A knowing violator is also responsible for restoration of the damaged wetlands.

Although the Wetlands Act serves its purpose in mitigating wetland loss, a major problem exists with the lack of provision for controlling the effects of development near or adjacent to wetlands.

**Recommendation:** When land use changes are planned for land immediately adjacent to wetlands, compre-

hensive measures should be taken by local and state agencies to preserve and protect those wetlands.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ○ | ● | | | | | | 4 |

The Wetlands Permit Section of the Water Resources Administration, in reviewing applications for wetland licenses and permits, treats each proposal largely on a case by case basis without fully taking into account the regional or overall implications of development on wetland areas. An alteration to a wetland, such as a marina, may not have negative impacts on the wetland itself, but may create problems in adjacent areas. These problems could involve increased transportation, degradation of water quality, or increased demand on existing sewage treatment systems.

**Recommendation:** Applications for alterations to wetlands should be considered in terms of their cumulative impact on wetlands, and on local and regional activities.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | ● | ● | ● | ● | | | | | | 4 |

When a license to fill state wetlands is approved by the Board of Public Works, public land is lost to private ownership. At present, no monetary compensation is paid to the state by the property owner for the addition to his property. State law does, however, allow for compensation.

**Recommendation:** The owner of property to which new fast land is added through the process of filling state wetlands should be required to pay to the State the market value of the newly created land based on the value of comparably used land plus the value of the lost water resources.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ● | ○ | ● | ○ | | | | | | 25 |

Enforcement of the Wetlands Act has been adequate. There are however, two areas within the enforcement process that need further emphasis. First, wetland sites on which alterations are being made should be more frequently inspected to insure that all conditions of the wetlands permit are being carried out. Should it be found that conditions are not being met, an immediate cease and desist order should be presented to the violator on the site. The Wetlands Permit Section should then be informed immediately of the violation. This process is currently being carried out by the enforcement section of the Water Resources Administration to an extent, but needs to be more comprehensive.

Secondly, monetary fines for violations of the Wetlands Act are insignificant. The current fine for illegally altering a private wetland is $100, and for altering a state wetland is $500.

**Recommendation:** The current system for inspecting alterations to wetlands should be more frequently and comprehensively carried out; and monetary fines for violations of the Maryland Wetlands Act should be made more significant.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ● | ○ | | | | | | 36 |

The Maryland Wetlands Act, in defining wetlands, deals only with tidal wetlands and therefore does not protect non-tidal wetlands. Although considered less valuable than tidal wetlands because they do not support economically important populations of shellfish and finfish, non-tidal wetlands are important hydrologically and serve an important role in flood control. With their unique water holding capacity, they act as storage basins and reduce the destructiveness of floods, especially in densely populated areas such as the Baltimore Region where development and urbanization has intensified surface run-off. A move toward recognizing the importance of these functions would be to initiate protective legislation for non-tidal wetlands.

Implementation of the following recommendation could be made through an addendum to the Maryland Wetlands Act or through redefining "wetlands" in the Act to include non-tidal wetlands.

**Recommendation:** State legislation should be enacted to identify and protect non-tidal wetlands.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ● | ○ | | | | | | 5 |

Wetlands form highly valuable and essential natural areas for the Baltimore Region. Continued loss of these areas should be prevented. The Maryland Wetlands Act can only minimize, not prevent, the destruction of tidal wetlands. Some of the Region's wetlands are presently receiving protection under such county zoning categories as Open Space and Resource Conservation Districts, however, more comprehensive moves are needed on the local level to protect all wetlands, tidal and non-tidal.

Currently, only a portion of Anne Arundel County's wetlands are zoned Open Space. Within these districts, development is limited and only certain uses are permitted. These districts are preserved as open areas for recreation and to protect people and property against

the hazards of floods and water pollution. A fifty-foot buffer zone is required around all Open Space districts within the county.

Approximately one third of Baltimore County's wetlands are included in Resource Conservation Zones. These zones do not have an associated buffer zone, nor do they necessarily protect wetlands.

In Harford County, wetlands are protected under a regulation which restricts filling and structural activity within the one hundred year flood plain. Under its Sediment Control Ordinance, Harford County also requires that a seventy-five foot buffer zone in which developmental activity is prohibited be established around wetlands.

The Water Resources Administration has prepared mylar photomaps of all tidal wetlands in the state.[1] The rezoning of all wetlands appearing on these maps, as well as non-tidal wetlands identified through other sources, to Open Space districts by Anne Arundel County, Baltimore County, and Harford County would provide additional protection as well as further State policy.

It can be shown that a fifty-foot buffer zone reduces the impact of sedimentation and run-off onto wetlands from construction occurring adjacent to them. Fifty feet should therefore be considered the minimum distance required in establishing an effective buffer. The "Maryland Uplands Natural Areas Study" of 1976 described fifty feet as not adequate to filter out biological and nutrient contaminents, and suggested that a buffer of one hundred feet would be more desirable due to factors of slope and sediment types. Such a buffer zone should be implemented under the sediment control plans of counties that do not currently maintain buffer zones.

**Recommendation:** Tidal wetlands appearing on the state wetlands map and non-tidal wetlands identified from other sources should be evaluated for designation as Open Space zones by local governments, and a buffer zone of one hundred feet should be established around all designated wetlands one acre in size or larger. A wider buffer should be considered in areas of steep slope.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 5 |

Competition for the undeveloped shoreline in the Baltimore Region can be expected to intensify. Between 1942 and 1969, 2,099 acres of wetlands were lost in the Baltimore Region to residential development, industrial development, dredging and spoil disposal, public works projects, marinas, agricultural drainage, pollution, erosion, and natural succession.[2] (See Table 6). One hundred and fifty acres were lost in recent years for port and industrial development. In 1969 only 63 acres of privately-owned shallow fresh marsh were left in Baltimore City, all of which are now considered highly vulnerable (see Table 7). The net impact of these losses is softened by large remaining acreages of wetlands, specifically on the Eastern Shore. Wetland loss continues, however, and these losses lead to reduction in fish and wildlife populations, shifts in natural population composition, and degradation of conditions in the aquatic environment.

Approximately three percent of Maryland's Bay shoreline is publicly owned.[3] Wetland loss might be further curtailed if more wetlands were in public ownership and preserved. Certain environmental groups such as The Nature Conservancy purchase areas for preservation with private funds. The Maryland Environmental Trust has received 5305 acres of donated conservation easements, most of which are along the Chesapeake Bay. Possibilities should be explored for setting up a process whereby The Nature Conservancy and other environmental groups acquire private wetlands when they become available and maintain them in their natural state until the county or state agencies obtain money to purchase them for public preservation.

**Recommendation:** County and state agencies should work in conjunction with such environmental groups as The Nature Conservancy to acquire privately-owned wetlands for preservation when available.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 5 |

Shoreline erosion continues to be a problem in certain areas of the Baltimore Region. Not only is erosion responsible for the loss of valuable waterfront property and therefore of great concern to the property owner, but it also has detrimental impacts upon water quality and marine biota. Sediment runoff from bank erosion and upstream activity increases the turbidity of adjacent waters. Increased turbidity decreases light penetration which in turn decreases the ability of submerged aquatic vegetation to carry on photosynthesis thereby reducing available dissolved oxygen and resulting in the depletion of submerged aquatic communities. Decline in these communities causes a loss of habitats vital to the development of the larvae and fry of economically important fish. Wetland vegetation can inhibit this process by trapping the sediment before it reaches the main water body.

Wetland vegetation also functions as a buffer to dissipate storm tides, tidal currents, and wave energy. Functioning as a buffer and sediment trap, wetland vegetation should be utilized as a means of erosion control and shoreline stabilization.

**Recommendation:** Owners of land containing or adjacent to areas of shoreline erosion should be encouraged to plant wetland vegetation to curtail erosion when

**TABLE 6**
**Regional Wetland Loss**
**1942–1967**

| Destructive Factors | Acres lost by county | | | | Regional Total |
|---|---|---|---|---|---|
| | Anne Arundel Co. | Baltimore City | Baltimore Co. | Harford Co. | |
| Residential Development | 185 | — | 48 | 359 | 592 |
| Industrial Development | 256 | 36 | 220 | 20 | 532 |
| Marinas | 31 | — | 19 | 32 | 82 |
| Dredging Dis. | 24 | — | 66 | 47 | 137 |
| Public Works | 13 | 118 | 4 | 125 | 260 |
| Natural Erosion | — | — | 9 | 154 | 163 |
| Natural Succession | 14 | — | — | — | 14 |
| Others | — | — | 249 | 70 | 319 |
| Total | 523 | 154 | 615 | 807 | 2,099 |

Figures from "Wetlands in Maryland" by Metzgar (1973)

**TABLE 7**
**Vulnerability Status of Regional Wetlands**

| County | Total Acres of Wetlands | % Considered Safe | % Considered Moderately Vulnerable | % Considered Highly Vulnerable |
|---|---|---|---|---|
| Anne Arundel County | 7,700 | 22 % | 41 % | 29 % |
| Baltimore County | 3,700 | 35 % | 33 % | 14 % |
| Baltimore City | 63 | — | — | 100 % |
| Harford County | 9,300 | 66 % | 16 % | 9 % |

Figures taken from "Wetlands in Maryland" by Metzgar (1973)

conditions permit. The Department of Natural Resources should investigate ways of assisting owners in accomplishing this.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ○ | ○ | ● | ● | | | | | | 11 |

When improperly disposed of, sediment from dredging and fill produces the same negative impact upon aquatic vegetation and bottom life as shoreline erosion. Along with degradation of the estuarine environment and disruption and loss of habitat, recreational enjoyment is curtailed and ecological changes are often triggered that can lead to less valuable plant species.

Pressure to fill wetlands is increasing as maintenance of navigable waterways continues and spoil disposal sites decrease. In the thirty years between 1939 and 1969, 16 million cubic yards of spoil were dredged as part of navigational maintenance improvement projects from the tidal water areas of the Bay. Forty-one percent of this spoil was deposited on wetlands.[4] Spoil from dredging projects associated with the Baltimore Harbor, its approach channels, and adjacent bay areas equaled an additional 38 million cubic yards from 1957 to 1968.[5] The total estimated amount to be removed from the Baltimore Harbor and its approach channels from 1976 to 1995 can reach 155 million cubic yards. Land must be acquired for spoil disposal and wetlands are cheap. Non-tidal wetlands have also frequently been volunteered as disposal sites so that the owner can benefit from improvement of the property by filling. The net result is a substantial loss of wetlands.

Consideration and evaluation of dredge spoil impacts on aquatic vegetation in non-tidal wetlands could be carried out by the Water Resources Administration as an extension of their existing evaluation program for

wetland permits. Such evaluation should be conducted in view of the biological, hydrological and physical values of those wetlands.

**Recommendation:** No dredge spoil should be placed in non-tidal wetlands without prior consideration of impact on the biological, hydrological and physical values of those wetlands.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | ● | o | ● | ● | ● | | | | | | 5 |

A statewide study in 1960 by the Maryland Department of Health showed that fourteen wetland areas were being used as public or municipal solid waste disposal sites. These sites include: Anne Arundel County—Furnace Creek and Baltimore County—one hundred acre swamp on Patapsco Flats. Use as disposal sites destroys wetlands outright and increases water pollution in aquifers and Bay waters. Contaminents leached from the surface of the filled areas travel to adjacent waters via surface run-off. Contaminents may also leach downward into the water table, degrading water quality.

On the other hand, if not overloaded with sanitary sewage or toxic industrial wastes, bacteria and zooplankton in wetlands will cleanse polluted water by decomposing organic wastes in a type of tertiary treatment process. Certain plants like sedges take up toxic substances and pollutants and break them down into biologically acceptable components such as amino acids.

The State Wetlands Act dictates that "a person may not dredge or fill on state wetlands without a license." Section 9-302 of the law states that "the Secretary may promulgate rules and regulations governing dredging, filling, removing or otherwise altering or polluting private wetlands." The law discourages filling on non-tidal wetlands, and charges the Secretary of the Department of Natural Resources to regulate such actions. Considering the importance of private and non-tidal wetlands as soil erosion and pollution abatement units, vital wildlife habitats, and flood buffer systems, these wetlands should be preserved against filling with solid and toxic wastes by state regulations that would prohibit such filling.

**Recommendation:** No non-tidal wetlands be used as ground disposal sites for public, municipal or industrial solid wastes or toxic materials.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | ● | o | o | ● | ● | | | | | | 5 |

Demand for shoreline residential development and modern earthmoving techniques which facilitate the filling of wetlands will increase pressures for the destruction of wetlands. Industrial development and its demand for proximity to metropolitan areas, the scarcity of available land in those areas, and the need of local jurisdictions to increase their tax base will add to existing pressures to create new industrial lands by filling wetlands. The greatest pressure on wetlands appears to exist in Baltimore and Anne Arundel Counties due to proximity to the industry of the harbor area and the Port of Baltimore itself. Seventeen percent of the Baltimore County's wetlands have been lost to the expanding industrialization of the Baltimore Port complex. In Anne Arundel County between 1942 and 1969, 523 acres of wetlands were lost. Of this acreage, 49 percent was lost to industrial development and 35.4 percent was lost to residential development.[6] Relative wetland losses and their causal factors for the Baltimore Region appear in Table 6. During a 1969 study of wetlands, a survey was conducted to identify the future potential industrial sites which involve wetlands. Results of this study appear in Table 8.

**TABLE 8**
**Planned, Proposed or Potential Industrial Sites Coinciding With Wetlands**

| County | Total No. of Wetlands | Total Acreage |
|---|---|---|
| A. A. Co. | 5 | 130 |
| Balto. Co. | 17 | 543 |
| Balto. City | 1 | 3 |
| Harford Co. | 3 | 200 |

The study found that more than half of all planned, proposed, or potential industrial sites in the State coinciding with wetlands were located in the Baltimore Region. Should development occur it would be primarily on wetlands which are tidal and of utmost importance to waterfowl.

Prior to 1970, tidal wetlands were highly vulnerable to development. With passage of the Wetlands Act and the subsequent permitting process, tidal wetlands could be developed only with a permit from the Department of Natural Resources. Figures in Table 9 show that between 1973 and 1976 permits were applied for to fill or dredge 29 + acres of vegetated tidal wetlands. Permits were approved for nearly 10 acres. The permitting process has alleviated much of the pressure on tidal wetlands. However, due to the continued expansion and growth of the Baltimore Port complex and the development pressures from an increasing population, pressure still exists to develop the remaining wetlands in the region. Attention needs to be given to wetlands under greatest pressure through determination of the impact of potential change on wetlands.

**TABLE 9**
**Wetland Permit Applications to Dredge and Fill Vegetated Tidal Wetlands (Regional Total in Acres)**

**State Wetlands**

| Fiscal Year | Applied For | | Approved | |
|---|---|---|---|---|
| | Fill | Dredge | Fill | Dredge |
| 1973 | 4.905 | 1.211 | .052 | .493 |
| 1974 | 2.107 | 2.977 | .186 | 1.08 |
| 1975 | 1.665 | 3.32 | .103 | 2.61 |
| 1976 | .887 | .089 | .096 | .089 |

| Fiscal Year | Applied For | | Approved | |
|---|---|---|---|---|
| | Fill | Dredge | Fill | Dredge |
| 1973–1976 | 9.564 | 7.597 | .437 | 4.272 |

**Private Wetlands**

| Fiscal Year | Applied For | | Approved | |
|---|---|---|---|---|
| | Fill | Dredge | Fill | Dredge |
| 1973 | 3.834 | 2.327 | 1.276 | 1.377 |
| 1974 | 2.939 | .905 | .125 | .905 |
| 1975 | 1.736 | .01 | 1.122 | .004 |
| 1976 | .608 | .045 | .089 | .045 |

| Fiscal Year | Applied For | | Approved | |
|---|---|---|---|---|
| | Fill | Dredge | Fill | Dredge |
| 1973–1976 | 9.117 | 3.287 | 2.612 | 2.331 |

Statistics from Wetlands Permitting Section, Water Resources Adm.

**Recommendation:** Wetlands under greatest development pressure should be identified and considered for recommendation as State Critical Areas suitable for preservation; and determination of the impact of all potential change on those wetlands should be made.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ○ | ○ | | | | | | | 5 |

The marshes of the Chesapeake Bay and their associated aquatic vegetation are of the utmost importance to wintering waterfowl populations. Twenty-three percent of the entire Atlantic Coast waterfowl population winters in the Chesapeake Bay.[7] Of the 20,763 acres of marsh in the Baltimore Region, 13,087 acres are coastal shallow fresh marshes. This type of marsh has been rated the highest of the coastal marsh types in its importance to waterfowl. Widgeongrass, clasping-leaf pondweed, Olney threesquare and eelgrass are major constituents of these marshes and probably most important to the diets of majority of waterfowl in Maryland.[8] Not only are the marshes important feeding grounds, they are also important resting and breeding grounds. Equally as important, they are vital habitats for the survival of threatened species such as the Osprey, Bald Eagle and Canvasback Duck.

S. P. Shaw and C. G. Fredine in their study "Wetlands of the United States" surveyed the value of wetlands in Maryland to its waterfowl. Of the 290,000 acres of wetlands in Maryland, 112,600 were determined to be of high value to waterfowl; 87,800 were of moderate value; 51,000 were of low value; and 38,500 were of negligible value. A recommendation should be made with respect to these values. Wetlands of high value to waterfowl could be included in either federal or State waterfowl management programs and should be looked at as top priority for conservation in the form of refuges and wildlife sanctuaries. Those wetlands of moderate value could be controlled or managed by State, local or private environmental organizations. Low value areas should be viewed as potential habitat improvement sites which could be upgraded to offset losses elsewhere.

**Recommendation:** Wetlands found to be vital habitats for wildlife species, specifically wintering waterfowl populations, should be considered for designation as wildlife sanctuaries, natural resource management areas, State Critical Areas or all.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ○ | ● | ○ | | | | | | 5 |

A program of marsh creation or re-establishment has not been implemented on a large scale in Maryland. Nineteen projects of marsh creation have been attempted in the Chesapeake Bay area by the Environmental Concern Company of St. Michaels, Md. Of these projects sixteen were successful.

A few studies have been made to determine whether marsh can be artifically created, remain viable, and achieve maturity. One such study conducted by Edward J. Larimer determined that "there does not appear to be any insurmountable physical, chemical, hydraulic or ecological obstacles to the creation of marsh." Due to a lack of available sites, applicability of marsh creation in the Baltimore Region is limited. However, sand and gravel operations and surface mining sites such as those located on the Patuxent, Gunpowder, and Patapsco rivers offer potential sites for filling and subsequent marsh creation. Industrial disposal sites such as Kennecott in Anne Arundel County

offer potential sites depending on the nature of the fill. As previously mentioned, areas of shoreline erosion may also provide feasible sites for marsh creation.

**Recommendation:** A study should be conducted by the Water Resources Administration to determine the feasibility of new marsh creation.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ● | ○ | | | | | | 4 |

Many areas of wetlands have already been lost or despoiled by such activities as unregulated dredging, dumping, and filling and many remaining wetlands are in jeopardy of being lost, particularly in the Baltimore Region. These detrimental activities result in a net loss of wetlands with no replacement program for re-creation of these vital areas. Intensifying pressures result in destruction of wetlands at a rate that may exceed the restoration ability of natural ecosystems. Furthermore, cumulative impacts result in the loss of the aesthetic, recreational, and educational values of wetlands to humans.

A program for maintenance and re-establishment of wetlands is essential to the preservation of the region's wetlands. By increasing the number of wetlands, such a program could erase the pressure of the remaining wetlands in the region, and offset the 2100 acre loss of wetlands that occurred between 1942 and 1967. To be effective, such a program would have to be implemented on the State level.

**Recommendation:** A program for marsh creation should be established to offset losses incurred through development and a strict set of guidelines should be developed to maximize the effectiveness and productivity of the marsh.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ● | ○ | ○ | | | | | | 4 |

## SHORELINE EROSION

Shoreline erosion is a natural process occurring along 186 miles of the Region's 792 mile shoreline.* The severity of this erosion varies as shown in Table 10.

The primary measure used in the past to prevent loss of land and damage to structures from erosion is bulkheading the shoreline. Bulkheading usually consists of constructing a steel, concrete, or timber wall at or near the mean high water line along the eroding shoreline. Since the passage of the State Wetlands Act in 1970, riprap has been the primary protection method approved by the Department of Natural Resources. Riprap consists of a sloping mass of loose stone placed on the shoreline at or near the mean high water line. Riprap avoids the filling of wetlands often associated with bulkheading and does not obstruct shoreline access. It also absorbs wave energy instead of reflecting it to other areas.

Other structures used to prevent erosion are revetments, sloping concrete walls similar to bulkheads; groins, stone or timber structures built perpendicular to the shore; breakwaters, offshore structures parallel or at an angle to the shore; and gabions, wire boxes filled with gravel. Eroding shore areas may also be stabilized with vegetation.

Shore erosion protection in residential areas is aided through the provision of loans from the Shore Erosion Control Loan Fund administered by the Capital Programs Administration of the Department of Natural Resources. The Administration also provides technical

**TABLE 10**
**Summary of Shore Erosion Rates In The Baltimore Region**

| | | Shoreline Natural Processes Categories (Feet of Shoreline/% of Total Shoreline) Shore Erosion | | | | Total Feet of Shoreline |
|---|---|---|---|---|---|---|
| | Accretion | Slight | Low | Moderate | High | |
| Chesapeake Bay | 31,650 ( 7%) | 175,250 (42%) | 112,500 (27%) | 62,200 (16%) | 33,250 ( 8%) | 414,850 |
| Patapsco River | 8,900 ( 8%) | 47,400 (44%) | 44,800 (41%) | 8,000 ( 7%) | | 109,100 |
| Other Tributaries* | 183,000 (24%) | 527,900 (69%) | 45,900 ( 6%) | 7,500 ( 1%) | 1,500 ( 1%) | 765,800 |
| Baltimore Region* | 223,550 (17%) | 750,550 (58%) | 203,200 (15%) | 77,700 ( 6%) | 34,750 ( 2%) | 1,289,750 |

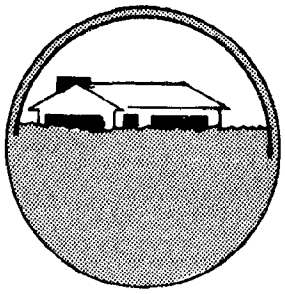
Adapted from Historic Shoreline and Erosion Rates, Table One, Maryland Geologic Survey, 1975.
*The Patuxent River shoreline, the upper portions of the other rivers, and most creeks are not included in this total.

assistance to the property owner regarding appropriate control measures to curtail erosion in a particular location and the design of recommended structures.

Along with shore erosion control structures and vegetative planting, shore erosion damage to new structures can be avoided if they are set back from the shore more than the distance over which the shoreline is expected to recede during the useful life of the structure. For example, a home with a useful life of 50 years should be set back at least 50 feet from a shoreline that is receding at the rate of one foot per year. Maintaining natural vegetation, especially deep rooted trees in the undeveloped area also helps to limit erosion by blunting any increase in the natural rate of erosion.

**Recommendation:** All new construction in the coastal zone should be set back from the shoreline at least the number of feet which the shoreline is expected to recede (according to the Maryland Geologic Survey) over the useful life of the structure, and that no cutting or clearing of vegetation be permitted by the local jurisdictions within the area between the structure and the shore.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ○ | ● | ● | × | | | | | | 10 |



## FLOODING

Damage to residential communities from flooding is of particular concern in the Patapsco River basin and in shoreline areas adjacent to the region's rivers and the Bay. Maps of areas subject to flooding at least once in every 100 years are being prepared by the Water Resources Administration. After these flood hazard areas are mapped, management plans are to be prepared by local governments in cooperation with the Departments of Natural Resources, State Planning, and Agriculture.

Tentative maps of the 100 year flood plain have been prepared by the Army Corps of Engineers for the Federal Flood Insurance Program administered by the U. S. Department of Housing and Urban Development (HUD). Owners of property within a 100 year flood plain are required to purchase flood insurance before they can obtain financing from a federally insured loan institution for home improvements or the construction of new dwellings and they must comply with certain structural and locational requirements. The present maps, however, are general in nature, so that a survey of a particular piece of property by an engineer may be required to determine if it is in the 100 year flood plain. The maps prepared by the Water Resources Administration will be more detailed than existing maps and they should also be more accurate, because they will be field checked and based on more extensive information.

Currently, local regulations control land use in certain flood plain areas. All structures in Harford County within the 100 year flood plain require a conditional use permit. Applications for structures are evaluated for the increase that they will cause in flooding and permits are issued by a Board of Appeals.

In Baltimore County, under the Interim Development Control Act, no structures are allowed in a flood plain. In addition, the Baltimore County building code specifies that basements for new homes subject to flooding must be flood-proofed and that the first floor must be at least one foot above the level of the 100 year flood plain.

In Baltimore City, no residential development is permitted in floodways.

In Anne Arundel County, flood plains are in 'protected areas' under the Interim Growth Control Ordinance. Under this designation, no new subdivisions submitted after March, 1977, in these areas will be accepted. In addition, some of the land within flood plains in the County is zoned Open Space. No new residential structures are allowed in the 100 year flood plain within these districts. Anne Arundel County also has a building moratorium in effect in the Patapsco 100 year flood plain. The moratorium specifies that no additions to existing buildings and no new buildings shall be constructed.

In addition to the prohibitions discussed above, flood damage in residential communities has been addressed by draining off storm water through gutters and pipes and by public purchase of homes within the 100 year flood plain. In fiscal 1977, Anne Arundel County approved the expenditure of $26,502,317 for storm drainage systems involving gutters and pipes. Baltimore City approved an $18,000,000 project to enlarge storm drain pipes in the communities of Lakewood and Steeper. Baltimore County approved the expenditure of $7,643,000 for storm drains in fiscal 1977. In Harford County, storm drains are constructed in conjunction with roads and a separate budgetary figure is not available. Baltimore City considered purchasing the homes affected by flooding in the Lakewood-Steeper area as an alternative to enlarging the drainage system. This alternative was cheaper, but it was rejected to preserve the stable, existing neighborhoods. Baltimore County has a $2.7 million program to purchase lots within the 100 year flood plain of its urban streams.

Storm drains, while relieving flooding in one area by moving the water quickly off the land, may aggrevate flooding downstream or at least enlarge the width of the downstream flood plain. This has not been a problem with the storm drains that go into Baltimore Harbor, however. Due to the large size of the Harbor, the water level has not been significantly affected by the present storm drain system.

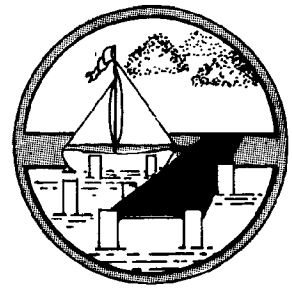
**Recommendation:** The feasibility, benefits, and costs associated with the flood plain management techniques now used or contemplated for use in the Baltimore region should be evaluated by each local jurisdiction on a river basin by river basin basis through the regional 208 Program after a map of the flood hazard area has been prepared.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 9 |

The best answer to flood damage to new structures is to prohibit their construction within any 100 year flood plain. As discussed above, this has been implemented on a partial and temporary basis in parts of the coastal area.

**Recommendation:** Local jurisdictions should prohibit the construction of new buildings within any 100 year flood plain.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | × | ● | ○ | ○ | | | | | | 9 |



**MARINAS**

Marinas, piers, mooring buoys, and launching ramps constitute some of the most common uses of the shoreline and adjacent waters in the Baltimore region, particularly in Anne Arundel County and Baltimore County. Their presence is significant in terms of miles of shoreline occupied, their contribution to the regional economy, and their impact on the recreational use and biota of the coastal zone.

There are 297 marinas in the Baltimore Region.[1] This total includes 200 commercial marinas, 59 community marinas and 38 yacht clubs. The number of marinas, average slips per marina, and launching ramps, for each jurisdiction, is shown in Table 11. In addition to marinas, there are also approximately 9,500 private piers, 1,025 mooring buoys, and 87 launching ramps in the region.[2,3] Seventy four of these launching ramps are located at marinas. The remaining 13 launching ramps are located at city, county and state parks. No marinas or launching ramps are located along the Patuxent River in the region.

The number of commercial marinas has increased 28 per cent since 1962.[4] The rate of increase for launch-

**TABLE 11**
**Marinas, Slips, and Launching Ramps In The Baltimore Region**

| | Commercial Marinas | | | Yacht Clubs | | | Community Marinas | | | Marina Totals | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jurisdiction | Number | Total Slips | Average Slips | Number | Total Slips | Average Slips | Number | Total Slips | Average Slips | Number | Total Slips | Average Slips | Launching Ramps |
| Anne Arundel County | 130 | 6,150[a] | 47 | 23 | 1,031[d] | — | 59 | 2,128 | 36 | 212 | 9,309[d] | — | 43 |
| Baltimore City | 1 | 220 | 220 | 0 | — | — | 0 | — | — | 1 | 220 | 220 | 0 |
| Baltimore County | 58 | 4,707 | 81 | 12 | 563[d] | — | 0 | — | — | 70 | 5,270 | — | 34 |
| Harford County | 11 | 1,369[b] | 72 | 3 | [c] | [c] | 0 | — | — | 14 | 1,369[d] | — | 10 |
| Baltimore Region | 200 | 12,486 | 65 | 38 | 1,594[d] | — | 59 | 2,128 | 36 | 297 | 16,168[d] | — | 87 |

[a]includes 200 mooring buoys
[b]includes 25 mooring buoys
[c]not available
[d]incomplete

Source: Geis, Peter: *Boating Almanac*, volume 4, 1976

ing ramps, private piers, and mooring buoys since 1962 is not known. Applications for mooring buoys are expected to increase at an accelerating rate in the future as areas for land-based moorings become scarce.

The large number of marinas, piers, and mooring buoys in the Baltimore Region exceeded the demand for their use by 1,293 moorings in 1970.[5] By 1990, however, the demand for moorings is expected to exceed available slips by 10,995 slips.[6] In 1970, the demand for launching ramps exceeded the number of available ramps by 200%.[7] The demand for launching ramps is expected to exceed the available supply by almost 600% in 1990.[8]

A number of social and environmental problems are associated with marinas, launching ramps, piers, and mooring buoys. These problems, and the existing and proposed regulations to manage them, will be discussed in the following findings and recommendations.

Fuel leakage and spills from marina fuel docks and discharge of sewage and fuel from boats concentrated around marinas may degrade water quality. This can contaminate shellfish so they are unfit for human consumption, may destroy fish larvae, and may make the water surrounding a marina unfit for swimming. Oyster beds in Eastern Bay in the vicinity of marinas concentrated around Kent Narrows are now closed from the beginning of oyster season on September 15th to the end of November due to pollution from the marinas and boats present during this period. Data has not been collected by the State of Maryland or local institutions on the detailed impact upon water quality of marinas currently in operation or on the potential impacts of new marinas. A study published by the University of Rhode Island,[9] however, recommended that new marinas be located in areas that are well flushed by tidal currents to mitigate any degradation of water quality.

The Chesapeake Bay, near shore, and most of its tributaries, near shore, are shallow. To provide access for marinas to the rivers and the Bay, the Corps of Engineers, the State, and the Counties must maintain channels, through periodic dredging. Private dredging to create slips for new marinas is also often necessary. For example, a new marina proposed for the Mayo area in Anne Arundel County, in conjunction with the proposed Chesapeake Bay Village, has been proposed for a pond which is only two feet deep. Another marina, the Baltimore-Washington International Yachting Center, is proposed for the Mago Vista area on the Magothy River, Anne Arundel County. Construction of this marina would require the dredging of 15,000 cubic yards of material.

Dredge spoil disposal sites acceptable to all concerned parties are scarce. The large amount of developed land, environmental considerations, and the current volume of spoil from maintenance dredging in existing channels all contribute to this scarcity.

To help insure that fish and shellfish resources and body contact recreation opportunities are preserved, the following recommendations should be implemented.

**Recommendation:** The Department of Natural Resources in conjunction with the Department of Health, the Regional Planning Council, and local governments should undertake a study of the impacts of existing marinas in the region and the potential impacts of new marinas, and that the findings of this study, as well as additional information gathered in studying the site of any new marina proposal be used in evaluating the application for that marina, and that this study be funded through the Boat Title Tax. As another part of this study, the Department of Natural Resources should determine what information is required to evaluate the potential impact of a marina, and require that applicants for department permits and licenses for marinas submit the necessary information before a decision is made on their application.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | ○ | ● | ● | ● | | | | ● | | 30 |

The development of new marinas is regulated by several federal laws, three state laws, and five county ordinances. On the federal level, marina and pier construction and the placement of mooring buoys are regulated by the Corps of Engineers under the Rivers and Harbors Act of 1899 regarding their impact on navigation. Bridge heights are regulated by the Coast Guard regarding their impact on navigation. Dredging for new channels and maintainance of existing channels is regulated by the Corps under the Rivers and Harbors Act. Discharge of dredge spoil and the filling of wetlands, streams, lakes, and coastal water is regulated by the Corps under the Water Pollution Control Act Amendments of 1972.

On the state level, marinas are regulated under the Wetlands Act and under the State Water Pollution Control and Abatement Regulations. All of these regulations are administered by the Department of Natural Resources.

On the county level, the location of marinas is regulated through county zoning regulations in Anne Arundel and Harford Counties. In Baltimore County, marinas are regulated under the zoning and health regulations.

Federal Regulations:

Section 10 of the Rivers and Harbors Act of 1899 prohibits the unauthorized obstruction or alternation of any navigable water of the United States. Before any pier, dock, wharf or marina can be constructed in the region or any mooring buoy placed in the region's waters, a permit must be obtained from the Baltimore District of the Corps of Engineers.

Section 404 of the Water Pollution Control Act Amendments of 1972 prohibits the unauthorized discharge of dredged or fill material into the waters of the United States. Discharges of dredged or fill material

in any stream or body of water (with a flow of five cubic feet per second or greater) or contiguous wetlands require a permit from the Corps. The Corps published general regulations on July 25, 1975 to guide review of applications and to provide criteria for decisions. These regulations do not, however, specify particular performance standards or limits for the maximum amount of material that can be dredged or disposed in a particular area.

The Corps of Engineers is currently considering issuing a general permit for the placement of mooring buoys in the Chesapeake Bay and its tributaries. This action would allow anyone to place mooring buoys in the water without obtaining a permit, so long as certain specifications contained in the general permit are met. These specifications concern compliance with local and state regulations (although there are no such state or local regulations currently in effect in the region in regard to the placement of buoys), the color of the buoy, navigation, infringement on shellfish beds, maintenance of the buoy, lighting, and water quality. Issuance of the general permit may increase boating congestion in the region's waters and will decrease the regulatory ability of the Corps in alleviating or preventing congestion.

**Recommendation:** The general permit for mooring buoys should not be issued until the study of boating congestion recommended in this study is completed or unless regulations governing the placement of mooring buoys are developed.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | o | | o | ● | ● | | | | | | 8 |

State Regulations:

Any dredging for a marina must be approved by the State Board of Public Works under the Wetlands Act of 1970. The act specifies that a person must obtain a license from the State Board of Public Works before he may dredge or fill on state wetlands. Decisions made by the Board of Public Works, (consisting of the Governor, the Treasurer, and the Comptroller) are based on recommendations made by the Secretary of Natural Resources after a hearing. A hearing is not required if the fill area is less than 300 feet in length parallel to the fast land and not more than 10 feet channelward of the mean high water line. Wetlands permits are preliminarily reviewed by the Wetlands Permit Unit of the Water Resources Administration of the Department of Natural Resources. Their recommendations are then transmitted to the Board of Public Works through the Secretary of Natural Resources.

New marinas must also receive a water quality certification pursuant to the State Water Pollution Control and Abatement Regulations. Water quality certification is granted unless any discharge from the marina and associated boats would violate State water quality standards for the section of river or Bay surrounding the marina.

County Regulations:

The location of new marinas and the expansion of existing marinas in Anne Arundel County is regulated under the county zoning regulations. Five types of districts are provided for the location of various sizes and types of marinas.

All marinas constructed prior to December 30, 1971, and not located in one of the maritime districts constitute a nonconforming use. In addition, a marina may be a nonconforming use if it does not meet the requirements of the maritime district in which it is located.

The five types of maritime zones are divided into three groups. Maritime Group A includes Community Marina Districts, Commercial Marina Districts, and Yacht Club Districts. Maritime Group B and C each contain one type of distinct (MB and MC, respectively). These two districts provide for the development of large commercial marinas. Maritime Group A districts are located along the Bay and its tributaries, not including the Patuxent River watershed. Maritime Group B and C Districts are located along the Bay and the lower one-half of the county's rivers, not including the Patuxent.

Marinas in all three Group A districts, and Group B marinas providing social or recreational facilities, must have a land to water area ratio of not less than one and one-quarter to one. This requirement prohibits the area occupied over the water by piers or other structures to exceed four-fifths of the land area within the zoning district. The water area occupied by marinas in Group B districts not providing social or recreational facilities and in all Group C districts must not exceed the land area of the marina district.

The following general requirements apply to all marinas in Anne Arundel County.

1. Facilities shall be located on water suitable for boating activities, and shall not violate such water quality control standards as may be established by the State of Maryland.
2. The channel within the facilities shall have a sufficient width to allow side by side passage for two boats of the maximum size expected to utilize said facilities, plus a minimum clearance of ten feet between boats. Water depths shall be maintained at not less than two feet below the draft of the largest boat expected to use any slip or mooring, at mean low tide.
3. The location of marina facilities shall not interfere with existing roads and fixed bridges, water recreational areas, or commercial fishing areas.
4. Road network to and within the site shall provide unobstructed access for emergency equipment.

5. All facilities shall be served by a major state or federal highway, a major county arterial, or a collector street.

The lot area for any Maritime facility shall be not less than one acre above mean high tide. In addition, the Anne Arundel County Zoning Ordinance specifies minimum yard requirements, setbacks, a minimum waterfront width of 150 feet, a building height restriction, a maximum pier limit, and pier setbacks from adjacent property lines. The ordinance also specifies how many toilets shall be provided at a marina, where they shall be located, and the minimum number of parking spaces that must be provided.

Baltimore County requires that a permit be obtained from the County Engineer before any construction or repair work can be done on a marina. The only requirements which a marina must meet, however, are setbacks, a maximum pier length, a minimum land requirement (five acres) before storage facilities are allowed, screening from adjacent property, and health regulations. The health regulations specify the number and location of toilets and garbage cans that must be provided and prohibit the use of toilets on-board when those boats are docked at a marina. There are no zoning districts for marinas in Baltimore County, but marinas are allowed in all industrial districts and in residential and commercial districts by special exception.

Harford County allows the siting of marinas in General Business districts. Marinas are a conditional use in agricultural districts and floodplain districts. Under the Harford County Zoning Regulations Floodplain districts overlap any other district which extends into the floodplain. Thus, a conditional use permit must be obtained before any marina is developed since all marinas are necessarily in a floodplain.

Baltimore City has not enacted any regulations pertaining to the siting of marinas.

To help insure that marinas are located where they will have minimum adverse environmental and social impacts and insure that those marinas that are constructed will have adequate parking and trash facilities, as well as adequate setbacks, the following recommendation should be considered.

**Recommendation:** Baltimore County and Baltimore City should enact maritime zoning regulations. Baltimore County, Harford County, and Anne Arundel County should locate maritime districts only in those areas that are well flushed by tidal action, do not contain valuable aquatic vegetation, require little or no dredging, and the permitted number of slips should be limited to the capacity of the water body to accomodate boating.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 19 |

Interagency Coordination

Mechanisms have been implemented to coordinate the regulation of marinas and boats between the three levels of government having jurisdiction in this area. Both the Corps and the Water Resources Administration will usually not issue permits until an applicant is in compliance with all county regulations. Coordination is also aided through the circulation of applications and environmental statements by the Corps and Water Resources Administration for comments by all parties and by the Corps and Water Resources Administration holding a joint hearing on all applications which require a hearing. Coordination should also be improved with the implementation of project evaluation procedures by the Coastal Zone Unit of the Department of Natural Resources. A project evaluation will be initiated by the Coastal Zone Unit if it determines that a proposed development in the coastal zone is likely to have a major or significant impact on coastal resources. A project evaluation will be carried out in the following manner. All of the agencies having permit authority over the project, plus interested citizens, will be requested to sit down together to discuss the project. The data requirements of the agencies will be determined and a team will be designated by those agencies, with the advice of citizen participants, to gather and analyze this data and prepare recommendations. The data, analysis, and recommendations of the team will be distributed to the various agencies and citizens. The agencies will then individually decide whether or not to issue the permits under their control. A running record of the cumulative impacts of these decisions will be kept by the Coastal Zone Unit.

This procedure will not reduce the authority of any participant. It should, however, coordinate data gathering, allow those regulating different aspects of a project to discuss common and interrelated problems, reduce the time it takes for all of the decisions to be made in regard to a project, and provide for a better record of the impact of decisions made over a period of time.

**Recommendation:** All new marina proposals in the Baltimore region should receive an interagency project evaluation before issuance of a permit.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | ● | ● | ● | ● | | | | ○ | | 34 |

Implementation and enforcement of existing marina regulations is hampered due to the absence of a detailed shoreline survey of all piers and marinas in the Baltimore region. Many of the existing marinas have been compiled in the *Boating Almanac*, Volume 4, 1976 Edition. The *Almanac* does not list, however, private piers being used as illegal commercial marinas. Marinas that have been constructed since 1970 which are not in accordance with zoning regulations may also exist.

**Recommendation:** A complete shoreline survey of existing piers and marinas in the Baltimore region should be made from time to time as resources allow. This survey should be made jointly by county zoning and natural resources police personnel. Air photos should be used to locate marinas and piers where more than one boat is docked. These facilities should then be field checked from the water. If potential illegal marinas are detected, their operators should be sought and a detailed field investigation should be initiated. Prosecution should be sought for violations uncovered by these investigations.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ○ | ● | ● | | | | | | | 30 |

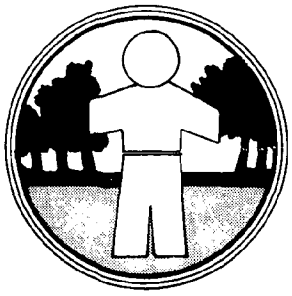
In addition to the regulations already in force, the Maryland Department of Health and Mental Hygiene has circulated for review and comment proposed regulations governing sewage and sanitary facilities at marinas. These proposed regulations would require every marina operator, every developer of a proposed marina, and every marina operator proposing to expand an existing marina to apply to the appropriate county health department for a permit. Before a permit would be granted, the applicant would have to have certain facilities at his marina or, in the case of a development proposal, planned for inclusion. These facilities include a minimum number of dockside toilets, sewage disposal facilities for sewage from vessels docked at the marina and toilets at the marina, pump-out facilities so that sewage can be removed from the holding tanks of docked vessels, a water supply system, and a minimum number of litter containers. The proposed regulations also specify where these facilities are to be located, how many toilets and litter baskets must be provided (based on the number of slips), and penalties for operating a marina without a permit and for violations of an issued permit.

The proposed regulations would partially duplicate the marina zoning regulations in Anne Arundel County and the Health Department regulations in Baltimore County. The regulations would, however, require a greater number of toilets at marinas than presently required by both counties. The requirement for pump-out facilities is a new provision. Currently both counties prohibit discharge from docked vessels but do not require that marina operators have any facilities for emptying the holding tanks of vessels using the marina.

A study is needed to clarify whether the stronger regulations proposed by the Department of Health and Mental Hygiene are necessary. As part of this study, alternatives to holding tanks for disposal of sewage from boats should be investigated. Necessary facilities and regulations for these alternatives should be considered as part of this study. In addition, the need for regulations for the control of sewage and trash from boats moored at buoys should be considered. The study should be carried out by personnel from the Department of Health, and the County Planning and Zoning Offices.

**Recommendation:** A study of the effectiveness of existing regulations in preventing water pollution and solid waste pollution from boats should be undertaken by the Regional Planning Council 208 Program and, as part of this study, alternative disposal methods and facilities should be evaluated, as well as alternative and additional regulations, improved enforcement, and improved coordination.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | ○ | ● | ● | ○ | | | | ○ | | 2 |



## PUBLIC ACCESS TO THE SHORELINE

The Baltimore region's shoreline has great potential for numerous forms of public enjoyment—viewing, walking, bicycling, fishing, shellfishing, photography, nature study, or just sitting beside the water. These extensive waterfront resources, however, are available to only a limited number of the region's residents and but a small portion of the shoreline is accessible to all the public.

The basic right of public access to all coastal tidelands has been reinforced by various Maryland court decisions over the past five years. The courts have concluded that ownership of the land lying between mean high water and mean low water is vested in the State of Maryland and held in trust for public use. However, old restrictions on the public's right to cross private waterfront property from public thoroughfares limits the impact of these rulings. Furthermore, areas of historic public use have nearly been eliminated by the erection of fences, buildings, and other structures.

This lack of access is one of the major problems characterizing the use of the Chesapeake Bay shoreline. This deficiency takes several forms: a lack of vista points and roadside overlooks that afford views of the Chesapeake Bay, its tributaries and the Port of Baltimore; a lack of public waterfront park and recreation

sites; a lack of shoreline paths, trails and bikeways; and even a lack of public boat launches and marinas.

Presently, less than four percent (28.5 miles) of the Baltimore region's 792-mile coastal shoreline is within public parkland. Forty-one parks and school-recreation centers located on the waterfront provide most of the direct and unrestricted public access to the Chesapeake Bay and its tributaries—nine parks in Anne Arundel County account for 8.4 miles of shoreline; Baltimore City's six harbor parks amount to 3.1 miles of accessible shoreline; the greatest amount of public shoreline parkland is in Baltimore County with 18 parks and recreation centers comprising 12.7 miles of shoreline; and Harford County's seven parks account for 4.3 miles of shoreline. There are five local and state parks currently planned that include portions of the region's shoreline. Should the State complete its acquisition plans for the Gunpowder State park, an additional 15 miles of the Gunpowder Delta shoreline would be made accessible. However, most of the public waterfront parks planned by local and state authorities will not be acquired and developed for many years and, even if they were immediately completed, there would still be only six percent of the shoreline open to the public. While it is encouraging that local and state authorities have recently taken new looks at the region's shoreline and have planned new points of public access to the Chesapeake Bay and its tributaries, the full potential for access to the Bay has by no means yet been reached.

A major long-term goal of coastal zone management should be the provision of maximum amounts of waterfront area for public use and enjoyment. Access to the shoreline for all residents should be the goal, consistent with the need to protect coastal areas from destructive overuse and to protect both public rights and the rights of property owners.

Wherever possible, state and local authorities should acquire public access points and vantage points to the Chesapeake Bay and its tributaries. State authorities and local jurisdictions should give acquisition priority to coastal open space with waterfront acreage. Local and state roadways should be designed to provide roadside scenic viewpoints to the Chesapeake Bay and its tributaries. Local jurisdictions should give consideration to the acquisition of areas if development of them would impede public access by using up land needed for shoreline accessways and vantage points at appropriate locations or would unavoidably despoil waterfront views.

**Recommendation:** Public use of the shoreline should be provided through public purchase, dedications from developers as reasonable conditions of subdivision development, purchase and leaseback, scenic and open space easements, scenic restrictions, resource management contracts, and incentive zoning. All means chosen to obtain public use or visual access to the shoreline should be equitable and recognize the rights of private property owners. Acquisition programs should proceed as rapidly as possible and should include leaseback and life estate provisions as incentives for placing privately held lands in public ownership and to prevent hardships to present owners.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 8 |

Homes, businesses, and industries have often cut off existing or potential public access to the shoreline, eliminated waterfront vantage points, used up available road capacity and off-street parking, and precluded use of the shoreline for recreation. Development that is back from the shoreline can also affect the ability of residents and visitors to get to and use the shoreline. In addition to its impact on transportation systems serving the coast, development of upland areas can reduce recreational opportunities that would otherwise relieve demand on the shoreline recreational facilities. Furthermore, the location of expansive private recreational facilities along the waterfront has reduced equal access. Some areas of the shoreline have been used for expensive recreational activities involving second homes, marinas, and country clubs that are limited to a relatively small portion of the general public.

Public access to the shoreline can be provided by more fully utilizing the public's existing legal rights. Local subdivision regulations enable jurisdictions to require public access to and along the shoreline as a condition in the approval of developments. These regulations should be more fully utilized. Experience indicates that access can be required without undue hardship to private property owners.

It is felt that a good design for public access is too subjective and cannot be achieved through the simple application of dimensional standards. Therefore, local jurisdictions should use public access criteria based on the following generalized principles:

—Continuity of public access must be maintained, whether within a project or between projects;

—Access to the public shoreline area should always be readily available.

The flexibility of these public access criteria gives imaginative designers the freedom to arrive at innovative solutions for the provision of public shoreline access via open space areas, landscaped park areas, fishing piers, shoreline boardwalks, wetland catwalks, and access corridors from the shoreline to public streets. Public access areas should be clearly recognizable from nearby roadways. Signs, identifiable access corridors, and the absence of structures blocking the view of the access site may be required when necessary.

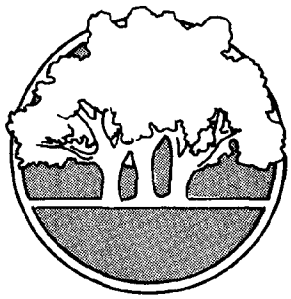
New developments should provide public accessways to the shoreline except in those individual cases where it is determined that public access is inappro-

priate, such as where (1) adequate access exists nearby, (2) the topography makes access dangerous, (3) the proposed development is too small to include an accessway, (4) the coastal resources are ecologically too fragile to accommodate general public use, (5) public safety or military security precludes public use (6) the public accessway would adversely affect agricultural uses or, (7) where access would promote illegal trespassing and vandalism. In developments where the provision of a public accessway is determined to be inappropriate, the project sponsor should pay in-lieu fees (to be established by local regulations) to a fund for the acquisition, maintenance, and operation of public access at a suitable location elsewhere. To the maximum extent feasible, in-lieu fees should be spent in the estuarine or peninsular area in which they are collected and in areas where access is called for in regional and local plans.

In public, semi-public, commercial recreation, and other developments serving visitors (such as colleges, museums, restaurants, country clubs, and hotels) allowing public access to their grounds as part of their normal operations, public access to the shoreline should be guaranteed by the recording of a restriction covering the reserved accessway. In private developments, public access should be insured by either dedication of fee title or an easement for the reserved accessway to a public agency or the recording of a deed restriction, both at the owner's option. Dedicated accessways should not be required to be opened to public use until a public agency or private association agrees to accept responsibility for maintenance and liability for the accessway.

**Recommendation:** Multiple uses should be included in major coastal facilities. The Maryland Energy and Coastal Zone Administration and the Maryland Public Service Commission should require that each application for a major shoreline energy or public service facility evaluate the potential for multiple, public-oriented uses of the site proposed, and should incorporate such uses to the extent feasible and consistent with security, public safety, and resource protection.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ● | ● | | | | | | 21 |



## PARKLAND

The region's coastal area can provide an almost endless variety of recreational opportunities for people to play, to be refreshed, and to be inspired: sandy beaches for cooling off from the heat of the city; wooded creeks and rivers for canoeing or exploring; bluffs for watching the Chesapeake Bay; waters for swimming, boating, fishing and shellfishing; and coastal wetlands for nature study. In short, the shoreline is critical to the quality of life in the region.

The region's shoreline is heavily used for recreation because more than half of Maryland's population lives within a 45-minute drive of the waterfront and because it provides many recreational opportunities not found at inland areas of the state. Many public and commercial recreational facilities may be found along the shoreline, but a shortage of facilities persists for almost every popular recreational activity.

Accessible public parkland along the Chesapeake Bay and its tributaries is limited in the Baltimore region. Only 28 miles or less than four percent of the region's 792-mile shoreline is in public parkland. Anne Arundel County currently has 2,111 acres of shoreline parkland. This should increase to about 3,550 acres in the next five years as a result of planned state and local acquisition programs. This would include ten miles of shoreline or about two percent of the county's total shoreline. Baltimore City currently has 114 acres of local and federal shoreline parkland amounting to some three miles. There are 1,305 acres of county and state shoreline parkland in Baltimore County providing access to about 12.7 miles of shoreline or seven percent of the county's 181-mile shoreline length. The county has plans for the creation of one new 65-acre shoreline park. The State has much-delayed plans which, if implemented, would add another 2,325 acres to the coastal portion of the Gunpowder State Park, two-thirds in Baltimore County and the rest in Harford County. Of the existing 1,960 acres of shoreline parkland in Harford County, 98 percent of that is State parkland. Existing state parkland plans in Harford County would expand that amount to 3,650 acres with about 4.5 miles of shoreline.

Present coastal recreational facilities are inadequate and regional demand for most coastal recreation activities exceeds the supply. Recent increases in State

and local parkland acreage and the expansion of recreation facilities within the region have nearly kept pace with new demands but the past supply deficit remains unfilled. Thus, even though the supply of parkland and recreation facilities has increased, it has not done so at a rate sufficient to meet existing demand. Furthermore, people from outside the Baltimore coastal jurisdictions, particularly from the Washington, D.C. area, use the region's coastal recreational facilities and heighten the total demand.

A greatly increased supply of picnic facilities is needed throughout the coastal zone. Many more swimming facilities are needed in the metropolitan area. While there is an adequate regional supply of trails in relation to the demand for serious hiking, few are in coastal parks. There is a scarcity of trails for nature walks and the more popular general walking for pleasure. There are almost no bike trails in the coastal zone. And, there are no linear coastal hiking or biking trails.

For recreational activities such as swimming, picnicking and pleasure walking where there is a large, imbalance of demand over supply, almost all facilities are crowded. Most evident is the overcrowding of parking lots and access roads. This results in less enjoyable experiences for the public, increased deterioration of facilities, security problems, a longer than desired trip to reach a facility, and an increase in public decisions not to participate in recreational activities.

**Recommendation:** A long-range program to protect coastal recreational resources from overuse should be established. This program should coordinate the planning of coastal access with the desired recreational use intensity along the coast and should ensure that public recreation areas are adequately managed and maintained to achieve this end. This program should include effective controls of recreational use at peak weekend or seasonal times and incentives for use at off-peak times.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ● | ● | ● | ● | | | | | | 7 |

The Maryland Outdoor Recreation and Open Space Plan prescribes a minimum of five acres of local parkland per one thousand residents. While few areas within the coastal zone actually meet this standard, the lack of coastal parkland is particularly acute in those areas which have less than two acres per one thousand residents. This includes the Edgewood—Joppatowne area in Harford County; the Fells Point, Middle Branch, and Cherry Hill areas around the Baltimore Harbor; and Glen Burnie, Annapolis and the Shadyside Peninsula in Anne Arundel County. While planned local and state parkland acquisition will alleviate some existing deficiencies, there will continue to be several major coastal areas with insufficient amounts of parkland as a result of population growth. These areas include: the Edgewood—Joppatowne area in Harford County; the White Marsh—Perry Hall uplands and the Essex—Middle River—Seneca Creek area in Baltimore County; and Marley Neck, Broad Neck, and the Mayo Peninsula in Anne Arundel County.

**Recommendation:** Local jurisdictions should balance future coastal development with adequate open space and recreation facilities. To avoid undue local pressure on coastal recreational facilities because of insufficient alternative recreational facilities for nearby residents, the amount of new development in the nearcoast area should be correlated with expanded open space acquisition and recreational use plans prepared and adopted by local agencies, and with provision of onsite recreational facilities determined to be sufficient to serve the new development. Specifically:

—Coastal open space and recreational requirements should be based on standards included in the Maryland Outdoor Recreation and Open Space Plan unless other standards are determined to be more appropriate for specific coastal areas by the local jurisdictions.

—As part of local government comprehensive, general development, recreation, and coastal plans, acquisition techniques and a timetable should be established for the purchase and improvement of coastal public recreational areas adequate to (1) fully meet the coastal open space and recreational standards for developing areas and (2) substantially reduce any deficiencies in existing developed areas.

—New coastal development proposed in already developed areas with existing recreational and open space deficiencies should be permitted only if consistent with a locally approved program that includes implementation procedures and timetables to substantially reduce these deficiencies.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 8 |

Local and state authorities have given minimal attention to the acquisition of coastal parkland. Until very recently, the three Baltimore coastal counties placed primary emphasis on the expenditure of parkland acquisition funds for small school-recreation centers and neighborhood parks. As a result, there are only three local coastal parks which have more than a mile of shoreline and only an additional nine which have at least a half-mile of accessible shoreline. There are a total of 14 local waterfront parks that are greater than 20 acres, but only three are 100 acres or greater.

Anne Arundel County has begun a major program to acquire and develop three countywide parks within the coastal zone. Each park would be from 150 to 300 acres in size. The first park will be located near Pinehurst and include 240 acres of woodlands and about

a half mile of shoreline frontage. While Baltimore County has established the region's largest local waterfront park, Rocky Point (375 acres), there is only one other planned county-wide park in the coastal zone, Miami Beach (64 acres). Baltimore County's emphasis is still on neighborhood and community parkland acquisition and development. Harford County relies primarily on the State for the provision of major recreational facilities and acquires parkland mainly for neighborhood uses. The provision of recreational facilities along the Baltimore Harbor waterfront has been a relatively new undertaking by the City of Baltimore. Since most of the Harbor waterfront is industrialized, the opportunities for parkland acquisition and development have been limited. Plans are being completed for the public open space usage of the Inner Harbor waterfront area and the City is currently seeking to convert underutilized industrial land along the Middle Branch of the Patapsco River. However, the City's largest waterfront park, Fort Smallwood (located in Anne Arundel County), remains closed due to a lack of maintenance and proper security measures.

**Recommendation:** Local jurisdictions within the Baltimore region should give parkland acquisition priority to coastal open space with maximum shoreline frontage. Primary emphasis should be placed on the acquisition and subsequent development of waterfront areas capable of meeting existing and future local and countywide coastal recreational and open space needs. To capitalize on their shoreline location, waterfront parks should emphasize hiking and bicycling trails, picnic facilities, nature walks, view points, beaches, fishing facilities, and boat launches. Any facility development should be designed to minimize intrusions into natural areas. Due to the limited opportunities for acquisition of optimal shoreline frontage, expenditure of local funds for acquisition should not be predicated on immediate facility development.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 8 |

**Recommendation:** Anne Arundel County, Baltimore City, and the State should explore a cooperative agreement for the use, maintenance, and security of Fort Smallwood Park.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ● | ● | ○ | | | | | | 7 |

Total planned State parkland for the region's coastal counties will be less than ten percent of the statewide total, even though more than half of the State's population lives within this area. Current indications are that future State parklands, other than those planned, will be located outside the Baltimore region, thus requiring longer trips in a time of energy conservation. Upon completion of planned acquisition, 23 percent of the Baltimore coastal counties' State parkland will be located within the coastal zone. However, the acquisition of the coastal parkland has occurred disproportionately slower than in other areas. Of the remaining 9,836 acres of State parkland to be acquired within the Baltimore coastal counties, 40 percent of it lies within the coastal zone. This is illustrated by the fact that less than six percent of the acreage acquired for the Gunpowder State Park is within the coastal zone. Yet, of the 4,115 acres that remain to be acquired for the park, over 40 percent is within the coastal zone at the Gunpowder Delta, most of it having been designated for acquisition over 17 years ago.

**Recommendation:** Priority for public acquisition of land and water areas within the Baltimore regional coastal zone should be directed as follows:

First Priority: (A) Lands best suited to serve the recreational needs of the Baltimore region's population should be acquired before land in rural western Maryland; (B) lands of regionally significant environmental importance, such as habitat protection, should have priority over other less important land; (C) as the highest priority, lands in either of the above categories proposed for development or use incompatible with their basic resource or recreational value should be acquired or protected before land experiencing little or no development pressure

Second Priority: (A) Open space along waterfront areas where visual and pedestrian access to the coastline is limited; (B) areas of high recreational value; (C) highly scenic areas; and (D) areas to serve as a coastal reserve.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ● | ○ | ○ | ○ | | | | | | 8 |

Potential recreational areas for active use by the general public and scenic open spaces that enhance the recreational quality of the waterfront have been irretrievably lost to more intense types of land development. The opportunities for acquisition of large open areas along the region's shoreline are rapidly diminishing. Increasing demands for shoreline property for single and multiple family dwellings, marinas, and industrial activities such as sand and gravel excavations will undoubtedly preclude the acquisition of many of the few remaining open waterfront areas suitable for public parks.

There are but a few waterfront open space areas within the region that are relatively unimpacted and thus serve as potential sites for local and state parkland. Only six percent of the region's 792-mile coast remains in large undeveloped tracts. In Anne Arundel County, this includes sites at Beards Creek; Eagle Hill; Fairhaven Cliffs; Forked Creek; Hancock Pond; Harness Creek; Jack Creek; Little Round Bay Creek; Mayo Point; and Poplar Point. In addition, there are significant coastal open space areas located at the headwaters of coastal tributaries at Cabin Branch; Furnace Branch; Marley Creek and South Haven. In Baltimore County, the sites include Bird River Beach; Black Marsh; Frog Mortar Creek; Goose Harbor Peninsula; Herring Run; Holly Neck; Honeygo Run; Middle River; Northeast Creek; Railroad Creek; Saltpeter and Dundee Creeks; Seneca Park; Stansbury Creek; Sue Creek; and Windlass Run. There is a 415 acre site with 1.3 shoreline miles that is located on Bird River and adjacent to the take-lines for the Gunpowder Delta Section of the Gunpowder State Park. Major coastal open space in Harford County suitable for parkland exists in the Otter Point Creek marsh area and in the coastal area occupied by the Aberdeen Proving Ground (which includes some of the State's best conserved wetland areas). In Baltimore City, undeveloped land exists which could be used for the creation of a continuous park system from the Harbor's Middle Branch to the Patapsco River State Park.

**Recommendation:** Existing large shoreline open space areas should be acquired for regional shoreline parks. The State of Maryland should establish a system of Baltimore Regional Shoreline Parks. A Regional Shoreline park should be an area of land and related water area located on the Chesapeake Bay, estuary or river, which has significant recreational, natural, or scenic value. For an area to be considered suitable for designation as a Regional Shoreline Park, it must possess one of the following characteristics:

—A shoreline area (or grouping of smaller areas connected by trail or water access) possessing a variety of natural shoreline environments and manageable units of littoral, tidal, near-shore area and uplands which have value for scientific or educational purposes with the area suitable for accommodating a variety of regional shoreline recreational activities.

—A shoreline area of land and related water suitable for providing opportunities for a veriety of regional shoreline recreational activities such as swimming, fishing, boating, viewing, or other public shoreline uses.

When appropriate, Regional Shoreline Parks should be entrusted to local jurisdictions for management purposes. State open space funding to the Baltimore coastal jurisdictions should reflect these additional management responsibilities because of the greater than local service which would be provided.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | ● | o | | o | | | | | | 8 |

**Recommendation:** Coastal open space areas should be acquired for a Coastal Reserve System. To soften escalating parkland acquisition costs, the State of Maryland and the Baltimore coastal jurisdictions should establish within the Baltimore region a Coastal Reserve System for the advance acquisition of open space and recreational land. A Coastal Reserve would be an interim classification for future natural environment areas, natural resource management areas, regional shoreline or state parkland, or an opportunity acquisition, easement, or gift of land which has not been specifically identified as a potential park in State plans and would not require immediate facility development. For an area to be considered suitable for acquisition as a Coastal Reserve, it must possess one of the following characteristics:

—Be part of a larger area which has the potential for meeting the minimum standards of either a natural environment area, natural resource management area, regional shoreline or state parkland classification, with acquisition of the necessary surrounding land to form a parkland of operational size under State consideration.

—Possess park, recreation or open space values which make its control by a public agency desirable and no other public agency or suitable nonprofit organization is in a position to assume control of the land.

—Constitute a gift of real property or improvements of potential financial benefit to the State.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | ● | ● | ● | | o | | | | | | 8 |

**Recommendation:** Coastal open space areas should be assured protection prior to acquisition. Until lands designated for public acquisition can be secured, they should be protected from incompatible use through public regulation by local authorities. To provide for coastal recreation and open space utilization, as well as the preservation and protection of coastal natural areas, the coastal counties within the Baltimore region should institute open space zoning districts. In addition to natural features criteria, the open space districts should also be based on (A.) the location of commercial recreation facilities and institutions including large amounts of open space; and (B.) areas delineated for either local or state parkland acquisition.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | o | | | | | | 8 |

**Recommendation:** Publically owned surplus lands should be retained in public ownership. Federally-owned coastal land and water areas that are declared surplus should be turned over to either State or local public agencies to provide for existing and future coastal recreational and open space needs.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 8 |

Due to the loss of tidal swimming beaches, the future of the region's seven operational public tidal beaches is of particular importance in meeting the demands for swimming facilities. There are ten commercial beaches in Baltimore County and two in Harford County which have been closed due to water quality problems. In most cases the water quality problems affecting these beaches are believed to be of a short-term nature. The regional shortage of sandy beaches with good water quality would be heightened if commercial beaches are lost to private residential development.

**Recommendation:** The region's coastal counties or the State should purchase private shoreline recreation areas if they are put up for sale because they are a valuable asset to a local recreation and open space program.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ○ | ○ | | | | | | 8 |

Recent funding of open space acquisition and development, although substantial, has been insufficient to meet coastal open space needs, and may be cut back even further in the near future. The expected appropriations of Maryland's Program Open Space Fund and the Federal Land and Water Conservation Fund to Maryland through the next ten years will not be enough to complete the acquisition of lands already included in the acquisition-lines of existing parkland areas. In recent years, the bulk (90–100%) of Program Open Space and Federal Land and Water Conservation Funds available to the State have been used for land acquisition and development in existing park areas.

Furthermore, the recent recession resulted in a decline in real estate sales which provide money through the land transfer tax for the Program Open Space Fund. And, the general fiscal belt-tightening by the State has meant a reluctance in obligating authorized Program Open Space Bonds to increase the Fund's capacity. Both actions have hurt Program Open Space funding for the region. For fiscal year 1977, Program Open Space Funding is only 58 percent of the average annual funding level since 1970. State funds for development have dropped to only 26 percent of the average annual funding level since 1970.

If State cutbacks continue, a heavier burden in financing open space acquisition and development will be borne by local governments if programmed levels of services are maintained. However, their sources of revenues are limited and are unlikely to increase enough to accommodate existing coastal open space acquisition and development needs.

**Recommendation:** Additional funds to remedy existing deficiencies in public recreation and open space along the coast should be provided. To this end:

—The State's use of Program Open Space and Federal Land and Water Conservation Fund monies within the Baltimore region's coastal zone should be increased. Expanded Program Open Space Funding for the region's coastal zone could result from either an increase in the obligation of authorized Program Open Space Bonds, an increase in the real estate transfer tax or both.

—The method used to allocate Program Open Space funds to the local jurisdictions within the Baltimore region should be restructured to allow for increased coastal land acquisition and development regardless of a decrease in the percentage of the total transfer tax revenues that are collected in each of those subdivisions.

—Special funding programs should be provided, such as bond acts with purchase and leaseback provisions or special capital gains taxes on the sale of coastal properties.

—Local jurisdictions should increase the funding commitments to waterfront and coastal county parks.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ○ | ○ | | | | | | 8 |

Recreational pressures will increase with further coastal development. Large-scale urban development in the coastal zone that does not include adequate internal open space or is not balanced with provision of public recreational areas away from the shoreline increases congestion and limits access to coastal recreational resources for all, as the local residents use the remaining shoreline for all their recreational needs. At the same time, the rapid residential development of large remaining open spaces inland from the immediate shoreline destroys the scenic open space qualities of these areas and precludes their use for recreation (picnic grounds, golf courses), transportation (parking lots, roads, bus stations), and multi-use commercial services (restaurants, hotels, motels, amusements) that could be linked to the shoreline by trails or shuttle buses.

**Recommendation:** Wherever possible, recreational activities and support facilities that do not have to be along the shoreline should be located upland, connected to the shoreline by trails, bicycle paths or shuttle

buses. Upland support areas should be reserved for intensive recreational development that otherwise would require substantial shoreline alterations.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ○ | ○ | | | | | | 8 |

**Recommendation:** To alleviate pressures on public beaches and parks, and to ensure that those areas have room to serve people from inland as well as coastal areas, the coastal counties of the Baltimore region should require new residential developments near the coast to have adequate open space and on-site recreational provisions.

Local residential development requirements should also include standards for (A.) size of open space parcels; (B.) shape of open space parcels; (C.) proximity of dwelling units to open space or public parkland; (D.) provision of waterfront open space; (E.) usableness due to hazard-prone open space areas; (F.) accessibility to open space parcel from public thoroughfare; (G.) accessibility between open space parcels via pathway; (H.) protection of significant natural features; and (I.) payment of a fee in lieu of land where the park site is not useable.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 20 |

## INLAND COASTAL AREAS

Our basic concerns in the inland portion of the coastal zone are expressed by the following objectives:

—Maintenance and growth of a sustainable non-water related economic sector while recognizing the associated environmental costs;

—Provision of adequate transportation facilities with recognition of direct and indirect impacts on sensitive coastal resources;

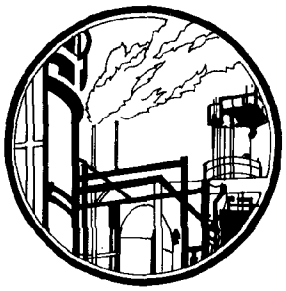
—Encouragement of the preservation, protection, and restoration of coastal historic sites and districts;

—Protection of coastal forests, stream valleys, and wetlands with special consideration of those areas identified as prime wildlife or endangered species habitats;

—Prevention of the loss of prime agricultural lands;

—Prevention of the pre-emption of coastal mineral resource areas and encouragement of the timely re-use of those areas.

These objectives require examination of such inland coastal activities as employment centers, transportation, archeological and historic preservation, natural area preservation, agriculture, and mineral extraction.



### NON-WATER RELATED EMPLOYMENT CENTERS

Harford County

The vast majority of shoreline and coastal land area is occupied by Aberdeen Proving Ground. It stretches from Swan Creek on the north and includes two large peninsulas ending at the Gunpowder River on the south. The Pulaski Highway-Interstate 95 corridor is the major service link to many commercial areas and several large manufacturing complexes. The Bata Shoe Company owns a considerable tract of land, much of which is now under consideration for development as a planned community.

The proposed General Land Use Plan for Harford County indicates the location of employment resource areas along the I 95-Route 40 corridor. Another area extends from this corridor along the northwest border of the Aberdeen Proving Ground. This generally flat area seems well-suited for development and expansion. Both rail and highway access are provided by existing networks, although modifications will be required to serve the local system. Several employment resource areas are located adjacent to Natural Features Protection Areas and will require development guidelines to minimize any adverse impact. Two areas west and south of Havre de Grace are not within the 20 year service area for sanitary sewers.

**Recommendation:** Employment resource centers should be developed within areas designated in the Harford County Master Plan and the Regional General Development Plan.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | | ○ | | ● | ○ | | | ○ | | | 13 |

**Recommendation:** Employment resources areas of Havre de Grace should be utilized to the fullest extent to maintain a strong financial base for that community.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | | ○ | ○ | ○ | ○ | | | | | | 14 |

Baltimore County

The coastal area is marked by major thoroughfares and rail lines paralleling the northern boundary of Pulaski Highway. Adjacent to these access lines are many manufacturing firms and warehousing establishments. The southern portion of the area is separated into three principal peninsulas: Patapsco Neck, Back River Neck, and Middle River Neck.

Patapsco Neck Peninsula, surrounded by the Patapsco River, Chesapeake Bay and Back River, is typified by concentrations of heavy manufacturing, high-density residential, and intensive commercial uses. Approximately 6,000 acres of land are zoned industrial and many of the County's largest employers are located here. Since the existing land area has almost reached holding capacity and there is little vacant developable land, population growth will be slight, with some residential development occurring in the Edgemere area. Although individual shopping centers are stripped along Meritt Boulevard, the old Dundalk and the Eastpoint Center emerge as the major nodes of commercial activity.

Back River Neck Peninsula contrasts sharply with Patapsco Neck. Bordering the shoreline of this peninsula are many small-lot waterfront cottages and major recreational facilities such as marinas, large beaches, and a golf course. The land use pattern of the peninsula ranges from waterfront cottages in the southern portion to high-density apartment and group housing in the northern portion.

The Middle River Neck area lies to the Northeast of Back River Neck and is bounded by Middle River, Bird River and the Gunpowder River. Middle River Neck is today used and appears to be most suited for recreational purposes. Most of the commercial beaches and marinas within the County are located on Middle River and its tributaries. The dominant industry in the area is Martin-Marrietta Corporation's Middle River Plant. Land use in the area has been influenced by the flat topography, closeness to the city and tidal waterfront. "Shore homes" occupy much of the shoreline, many of which are being upgraded in both value and appearance. While there has been substantial development inland in the Essex and Middle River sections, development on the lower necks (Back River and Middle River) have been predominantly along the waterfront, and inland areas are sparsely developed.

As indicated, Patapsco Neck contains a large concentration of industrially zoned and developed land outside the Port. Much of this is located along the major transportation corridors of Pulaski Highway, North Point Blvd. and the Patapsco Freeway. The area is dominated by the Bethlehem Steel Corporation's Sparrows Point facility. Occupying a large portion of its 2,500 acre tract the Sparrows Point plant employs between 22,000 and 26,000 people and a 1975 payroll of $26,923,840. The Sparrows Point steel plant accounts for about 9 percent of all manufacturing employment in the State of Maryland. While Bethlehem Steel's Sparrows Point plant is water dependent, many of the industries in the area do not require direct access to shipping channels.

The Comprehensive Plan of Baltimore County recognizes the potential of employment resource expansion by maintaining the concentration along the Patapsco Freeway, Pulaski Highway and Eastern Boulevard adjacent to the Glenn L. Martin Airport. Commercial employment opportunities are provided at Dundalk, Eastpoint, Golden Ring Mall and a revitalized Essex Center.

Most industrial expansion is expected to be warehousing operations and light to medium industry. All of this development is within the planned 20-year service area for sanitary treatment. Little of this growth is expected to be port dependent, although there is potential for back-up storage and port services expansion. Bethlehem Steel owns approximately 1,000 acres in the Black Marsh area, a portion of which has been set aside as a site for disposal of production by-products. The County has designated 212 acres along the shoreline as a conservation zone allowing industrial use by Bethlehem Steel on the remaining land. Bethlehem Steel has received several permits to create additional land with slag disposal along its southern shoreline. This area will be used for the placement of new coal and ore handling facilities, storage, and the protection of an unstable waterfront. These permits are for considerably less area than the original requests of several years ago. Production of slag is an inescapable factor in the steel industry. Bethlehem Steel has generated an ultimate fill development list which should carry them into the 1990's. This plan will require the filling of 180 acres. Land created will be used for plant expansion, unloading facilities, and a waste treatment plant. Bethlehem Steel is aware of the limitations and impacts of placing slag in the harbor and has begun an effort to find alternative methods of handling disposal.

**Recommendations:** Disposal of production by-products has become an increasingly critical problem for manufacturing operations. However, the use of wetlands for disposal is not warranted and must be strictly prohibited. Alternative methods for disposal should be evaluated.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ○ | ○ | ● | ○ | | | | | | 4 |

Baltimore City-Middle Branch

Although this body of water once supported water dependent trade, it has diminished to barges serving the Westport power station. The area is dominated by a variety of industrial firms, back-up storage for Western Maryland Railroad, two energy related facilities, City owned parkland, and a vast network of roads and highways. Hanover and Russell Streets and Waterview Avenue are the major local roads with Interstate 95

and 395 (under construction), passing over the northern end.

With only a few scattered sites vacant in the Middle Branch, the greatest potential for employment expansion lies in the re-use or expansion of existing facilities. Carr-Lowery glass manufacturers have obtained a permit to create a small fill site enabling construction of new furnaces and production facilities. This will increase employment and add to the stability of this well-established firm. The only user of water transport in the Middle Branch, the Westport Generating Station, expects to maintain its current production and employment. Carroll Industrial Park is undergoing improvements to streets, parking and street lighting. This effort involves the re-use of buildings and expansion of several firms on vacant parcels. The Spring Garden Station for the Baltimore Gas and Electric Co. expects to construct a seven acre fill area to improve efficiency of their operation. The City's Central Garage facility at Dickman Street is expanding operations with the construction of a 10 acre fill. The perimeter of the site will be landscaped and designed for public access. Land adjacent to the garage is used for open storage by Western Maryland Railway. This site is under consideration for a land exchange with the existing Swann Park. With Swann Park relocated because of I-95 and adjacent to City property, the City would have a larger recreational resource along the waterfront and improved facilities. The railroad could develop the existing park site as an improved storage facility with direct access to the Port Covington Terminal and consolidate land parcels in the area. The shoreline along Waterview Avenue and the South Baltimore General Hospital has been identified as a site for a new water oriented recreational facility and expanded parkland. This will provide marinas, boat launches, instructional resources and restaurants.

Transportation improvements, while highly visible in the Middle Branch area, will not directly affect local movements with the exception of the ramps joining I-95 to Hanover Street. This will markedly improve the movement of goods from the Port Covington and Hanover Street industrial and port areas.

Construction of a sewage pumping station will allow businesses in the Waterview Avenue-Cherry Hill Road area to tie into the South West Diversion Interceptor. The diversion, with the alleviation of the overflow at Baltimore Street and the Gwynns Falls, should improve the water quality of the Middle Branch over the next several years.

**Recommendation:** Completion of three approved fill sites: Baltimore City, Central Garage; Baltimore Gas and Electric, Spring Garden Station; and Carr-Lowery Company.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | | ● | ○ | | | | | | 14 |

**Recommendation:** Completion of the Southwest Diversion, Westport Pumping Station and required sanitary sewer connections.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ○ | ● | ○ | | | | ○ | | 20 |

**Recommendation:** Implementation of the Middle Branch Park Plan:

—provide public access along the shoreline;
—develop and expand marina facilities;
—re-use of the Reedbird/Potee landfills for public open space;
—provide for a water resources instructional facility;
—provide bikeways and trails to the Gwynns Falls Park, Patapsco River State Park, and the Inner Harbor.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ○ | ● | ○ | | | | | | 8 |

Anne Arundel County

The upper portion of Marley Neck in Anne Arundel County contains the largest concentration of vacant, industrially zoned land in the port area. Over 3300 acres has been designated as industrial land. Zoning designations, however, prohibit such development as petroleum refining and wholesale storage. Most of the vacant land is located in the interior of Marley Neck with the Kennecott Cooper refining plant, Cox Creek Treatment Plant, and a Baltimore Gas and Electric Company generating station occupying most of the shoreline. Kennecott, which employs about 700 people occupies 107 acres of a 232 acre site. Elsewhere in the County, Westinghouse operates a research and development facility on a site south of the western approach of the Bay Bridge.

State and local government, in the Annapolis area, employ over 4,300. No exact figure has been established for office and commercial employment. Over 2,206 are employed by the Naval Ship Research and Development Center located on the south shore of the Broadneck Peninsula. Approximately 8,200 persons are either students or employees of the Naval Academy in Annapolis.

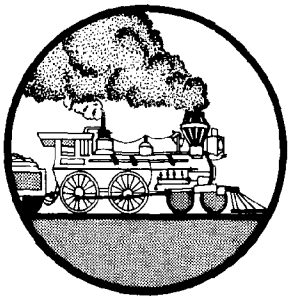
With over 3300 acres of land zoned for industrial use Anne Arundel County faces several issues regarding the type of industry, the infrastructure requirements, and the impact on existing facilities. With the majority of the shoreline currently utilized and no nearby deep-water channel, much of this land is not available for water dependent activities. Portions however, could function as back-up space for shoreline activities or associated land transportation terminals. Development of this area will require considerable expenditure for

roads, water supply, sanitary sewer lines, and treatment facilities.

The continued revitalization of Annapolis is expected to generate additional employment associated with commercial activities and tourism. Commercial expansion can also be anticipated in scattered areas to service residential development.

**Recommendation:** Development of industrially zoned land in the Marley Neck as service facilities to port operations and similar uses. Adequate infrastructure must be available at the time of development.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ○ | ● | ● | ○ | | | ○ | | ○ | 13 |



## LAND TRANSPORTATION

The movement of goods is an essential service. The provision and location of transportation facilities for this movement has far-reaching consequences on growth, development patterns, and the natural environment. In particular, the planning and design of highways and other transportation facilities has direct impact on land uses and direct influences on sensitive natural areas in the coastal area. Each transportation mode (highway, rail, public transit and aviation) affects the environment in its own way, and together they interact with water-borne transportation to produce a unique regional system.

The historical development of Baltimore as a center of maritime commerce can be traced to the presence of a naturally formed harbor. This made the City a natural hub for early roads and, later, the first railroads. As the region expanded, the rail and highway systems grew to keep pace. The establishment of the Interstate highway system accelerated this growth by making it easier to develop farther from the core areas while retaining access to the basic transportation system. This original transportation stimulus has now been outpaced by development in many coastal areas causing overutilization and congestion.

Each coastal area transportation mode has different operating characteristics and is administered by separate, and often independent, private and governmental agencies. The following descriptions of each mode and the regional transportation planning process will identify who is responsible for transportation facilities and how these facilities can be characterized.

Highways: The highway system is administered by a number of state and local agencies using funds from a variety of sources. The State Highway Administration (SHA) maintains and constructs most of the major regional highways outside of Baltimore City. These vary from high service level interstate and state limited access freeways to two lane rural routes. These roads comprise the State's Primary and Secondary Highway Systems. Some major links in the State system are funded by the Toll Facilities Administration (TFA) and include the Harbor Tunnel, Key Bridge and the JFK Expressway (I-95 in Harford County). These are also limited access. Local jurisdictions, both County and City maintain a network of streets and highways which predominantly serve local circulation. Within Baltimore City, the Interstate Highway construction program is under the joint jurisdiction of the City and the State Highway Administration. The numerous agencies responsible for highway construction and maintenance in the region can cause conflicts to develop when facility needs cross jurisdictional lines. Although administrative arrangements have been developed to deal with these problems, conflicts and delays still occur.

Bikeways: The bicycle, as a transportation mode, has been experiencing dramatic growth, and it is estimated that in the Baltimore region, there is nearly one bicycle for every two people. All coastal jurisdictions are involved with a Metropolitan Bikeways Plan to produce a coordinated system for neighborhood and through routes, with adequate facilities to increase non-recreational use of bicycles. Bikeway plans differ between recreational routes, which tend to emphasize aesthetics, and through routes, which emphasize grades and directness of alignment. Many planned through routes follow highway rights-of-way (I-395 and City Blvd.) and abandoned rail lines such as the B&A line in Anne Arundel County. Standards for various classes of bikeways have been established with the concern being to minimize conflicts between bicycles, motor vehicles, and pedestrians.

Rail: The coastal area is served by three major trunk railroads and two switching railroads. The largest is the Chessie System (a private company) which operates the Baltimore & Ohio Railroad (B&O) and Western Maryland Railway (WM). They provide freight service to the Port area and along the coastal zone through Baltimore and Harford Counties. The B&O also provides commuter rail service between Baltimore (Camden Station) and Washington, D.C.

The other large railroad is Amtrak/Conrail. This Federally supported company operates what was the Penn Central railroad. Amtrak provides intercity pas-

senger service while Conrail operates the freight service. Conrail also operates a limited, partially State-subsidized, commuter service between Penn Station and Washington. There is an interchange of freight traffic between the Chessie System and Conrail but operations are separate with duplicate mainlines and yard facilities. This situation developed due to the competitive manner in which railroads evolved. The system that has survived often has marginally profitable competing operations together with heavily used single railroad service areas. The Conrail consolidation has eliminated this problem in some areas, but Baltimore is fortunate in having one of the few solvent east coast railroads—the Chessie System—thus there remains a competitive situation with its attendant advantages and conflicts.

Baltimore is also the primary mainline bottleneck for both the Chessie System and Conrail. In both cases, the problem revolves around tunnels through the City which are too small. Conrail's tunnels will not permit freight trains with oversize cars to pass in the tunnel, and Chessie's main tunnel will only accommodate a single track with sufficient clearance for modern rolling stock. These mainline problems also affect intra-yard movements from both sides of the Harbor and interchange of rail cars between carriers.

Other rail freight service is provided by the Canton RR and the Patapsco and Back River RR (P&BR). The P&BR is a subsidiary of Bethlehem Steel and primarily switches cars from the trunk railroads onto the steel plant property at Sparrows Point. The Canton RR is also a switching company but serves a large number of customers in the Canton industrial district. Canton's operations add to the complexity of Harbor rail operations and proposals have been made in the past to eliminate the Canton RR in favor of alternative operating procedures.

The ability of rail service to support additional development is a function of both trackage—mainline and yard capacity for storage and movement—and efficiency of freightcar movements. Some industries require only a few rail cars, whereas others in bulk importing or exporting require large numbers. The need for specialized rail cars for certain shippers further complicates operations. Operations required to handle these different port and non-port related industries vary and cannot be quantified as easily as highway capacity. Thus each industrial area must be considered separately based on its rail requirements and the ability of the railroads to meet those requirements. These individual area needs must then be combined to determine the region's rail system's operating needs.

Transit: Public bus service for the coastal area is provided primarily by MDOT's Mass Transit Administration. The MTA, founded in 1970, purchased the operations of private carriers within the Mass Transit District (Baltimore City, Anne Arundel and Baltimore Counties) which served the higher density areas known as the Local Service Area. MTA operations, with the exception of one route to Annapolis, are confined to the urban area of the coastal zone. Bus service in Annapolis is provided by the privately operated Arundel Bus Company (ABC).

The public and private bus companies do not duplicate routes and do not have much interraction. Both MTA and ABC try to operate on a break-even basis but increasing operating costs have not been offset by increased revenues. Changes in population and development trends have resulted in declining transit ridership on some routes and the elimination of other routes.

Aviation: Aviation facilities link the coastal zone with other states and other nations and provide fast, efficient service for both the business and pleasure traveler. They also provide an economic link, attracting commerce to Maryland's communities and the coastal area in particular. Combined with rail, highway and port facilities, air cargo provides a balanced goods movement system serving a market which is not met by strictly land or water transportation modes. And, finally, airports are a source of such popular recreation activities as flying, gliding and skydiving.

Aviation facilities are operated by the State Aviation Administration (SAA),—private operators, the military (Aberdeen Proving Grounds), Baltimore City (public use heliport), and hospitals (emergency heliports). SAA owns the two major airports, Baltimore-Washington International, providing scheduled air carrier service and general aviation facilities and Glenn L. Martin providing only general aviation facilities. There are three small privately owned general aviation facilities primarily used by pleasure and small business aircraft. The operations of airports are coordinated by Federal regulations, and the levels of service are governed primarily by economics. Compatability with adjoining land uses is a potential operating problem at all facilities.

Planning for all these modes of transport is undertaken at the local, regional, and state levels of government. Now under development, the State Transportation Plan (prepared by the Maryland Department of Transportation) will form the framework for statewide transportation planning. It will provide a comprehensive and integrated plan for highway, rail, mass transit, port, and aviation facilities that is within the financial capabilities of the Maryland Department of Transportation. Although the State plan will form the framework for transportation planning in the state, a unique planning process has been established to deal with the special interjurisdictional needs of the region. Local governmental planning serves as input to the above planning activities as well as serving city and county transportation needs.

The basic framework for regional transportation planning within the coastal area is the Unified Transportation Planning Process (UTPP), which includes an annual program prepared and approved by the Maryland Department of Transportation and the Re-

gional Planning Council. The purpose of this process is to coordinate studies and prepare a multimodal comprehensive planning program. The regional program also parallels MDOT's statewide process and allows the member jurisdictions of RPC to coordinate their plans with those of the region and the State.

Under UTPP, the Regional Planning Council—composed of the chief executive officers of member jurisdictions plus major state agencies—and MDOT provide overall policy direction. These transportation policies are used by other UTPP committees to shape the Transportation Element of the Region's General Development plan; to decide which projects should be included in the Transportation Improvement Program; to examine long and short-range financial needs and sources of funding; and to decide which transportation problems require additional study. They also provide direction to the UTPP Director and the project managers of the various study elements in carrying out the approved work program.

The Transportation Steering Committee, comprised of RPC members from each jurisdiction, MDOT, and Department of State Planning, oversees all aspects of the unified program, assisted by working committees composed of technical personnel from the various MDOT administrations and divisions, other State agencies, the jurisdictions, and selected private and nonprofit organizations involved in regional transportation issues. Primary attention, however, is given to highway and mass transit programs with less applied to rail, port, and aviation programs.

One product of the Unified Work Program which should become more significant in the future is the Transportation System Management Element. This element is a plan which attempts to make the best use of existing facilities including such things as ride-sharing, transit operating improvements, signal improvements, bikeways, and staggered work hours.

The coastal area is served by all of the previously mentioned transportation modes, but the extent of facilities and their condition and capacity varies throughout the Study area. Due to this variation of conditions, transportation facilities in the coastal zone are best described by geographic area rather than by mode. For analysis purposes, the Coastal Study Area has been divided into three principal areas each of which has distinct transportation and land use characteristics. Each of these areas is discussed in detail in Appendix C.

*Northern Section*—the area north of MD 43 (White Marsh Boulevard) in Baltimore County and all of Harford County.

*Southern Section*—the area south of MD 100 in Anne Arundel County.

*Urban Area*—the heavily urbanized area located between MD 100 in Anne Arundel County and MD 43 in Baltimore County.

Each major section of the Study Area can be described as a series of transportation corridors, primarily oriented along one or more major highways. Rail and transit service basically follow similar corridors, so each corridor is described in terms of all three modes. These corridors basically run parallel to the Bay with secondary roads or branch rail lines providing access to the peninsulas.

In the Urban Area, major arterials and expressways form a classic radial pattern from the downtown area to the Baltimore Beltway. Completion of the Interstate expressway system will continue the radial orientations but will spread the concentration of expressways from the Inner Harbor area to the east into the Canton area.

From a regional perspective there are basically four radial corridors. A northeast corridor proceeds from the City through Baltimore and Harford Counties and contains I-95, U.S. 40 and MD 150. The mainlines of both the B&O and Conrail/Amtrak parallel I-95 and U.S. 40. This corridor connects Baltimore with the Northeastern states.

The southwest corridor begins at the Inner Harbor area, and soon leaves the coastal area heading toward Washington. This corridor contains the highest concentration of expressways including I-95, the Harbor Tunnel Thruway (I-895) and the Baltimore-Washington Expressway (MD 295). Both major railroad mainlines lie in this corridor as well. These expressways serve as a major regional and inter-regional link between Baltimore and the Southern Atlantic States.

A western corridor, which has regional significance but does not lie in the Coastal Study Area, contains I-70 and two major rail lines. The B&O's Old Main Line and the Western Maryland's mainline link the Baltimore area to the western half of Maryland and the Midwest.

The southern corridor has the lowest concentration of expressways of the major corridors but contains most of the land area in the coastal zone. The corridor highways—Md. routes 2, 3 and 10 do not penetrate inside the Beltway as high capacity expressways, but join other radials via the Beltway. No major rail facilities exist in the corridor away from the immediate Harbor area. This corridor is basically internal to the study area and serves an inter-regional function to a lesser degree than the other radials. US 50/301 is a major cross-corridor connector linking the study area to the Eastern Shore and the Washington, D.C. area.

In general, transportation in the Baltimore coastal area is balanced in terms of available modes but is suffering from areas of congestion, inefficiency, and conflict. These problems raise major issues concerning the achievement of a more efficient and effective transportation system.

Continued Residential Growth Pressure in Key Coastal Areas

Many coastal areas are experiencing congestion on local and regional highways. In many suburban areas the problem is caused by residential development expanding at a faster pace than the provision of adequate public facilities—especially transportation facilities. In other cases, when new highway facilities may appear

to offer better access to growing areas, the regional network is not capable of absorbing the cumulative growth of traffic throughout the system. Other growth is encouraged by long term plans showing extensive transportation systems (primarily freeways) which are not capable of being implemented for many years. Unfortunately local growth controls have been unable to pace this growth with the provision of transportation facilities. Another contributor to this problem is the desirability of living along the coast. It is viewed as offering amenities which offset transportation problems. While congestion or lack of transportation facilities tends to regulate development in other areas, these same constraints do not seem to have similar effects in coastal areas.

This problem is accentuated in the region due to the irregular configuration of the shoreline. The natural forces that shaped the region's coastal environment produced numerous peninsulas. With their naturally limited accessibility, the provision of adequate transportation capacity becomes a problem.

The peninsula configuration usually restricts the number of highways to one major facility along with a few minor ones. This single corridor situation can act as a limiting factor for development by controlling traffic volume on the entire peninsula. Along with the provision of other public infrastructure investments, improvements to existing and proposed transportation facilities on these peninsulas must be evaluated in terms of environmental as well as economic factors. The peninsula configuration also reduces the viability of providing mass transit which must make a dead-end trip, thus limiting transportation opportunities for peninsula residents. The question of providing adequate highway capacity on the region's coastal peninsulas without the provision of adequate land use controls at the local level to prevent these new facilities from being overused is a major coastal issue.

The Essex/Back River Neck peninsula has become congested with both radial routes (Md. 150. and US 40) handling near capacity volumes. Access to I-95 (which has radial capacity) is limited to the Beltway which is also near capacity at this point. Back River Neck Road is carrying high volumes which has led to proposals in the past for alternate routes including the Southeast Boulevard. Baltimore County is presently advocating a 4-lane arterial in the southeast corridor as far as Middleborough Drive to provide relief to Back River Neck Road. There are developmental pressures in the area, but Baltimore County plans show the presently undeveloped lower part of the Neck not becoming intensely developed. At issue then, is whether or not relieving existing congestion will open up the lower portion of the Neck and encourage more development than is planned by the County. This is a classic growth vs. adequate facilities issue. Creating growth pressures by improving capacities on existing facilities in areas where county policy, environmental conditions, or lack of other facilities would discourage such development is an ever present problem.

**Recommendation:** Due to the problems posed by the region's coastal peninsulas, consideration should be given to other factors in addition to traffic volumes when highway improvements are proposed. Transportation policies and improvements must recognize the interrelationships between adequate facilities and development pressures on coastal peninsulas where transportation alternatives are often limited. Consideration of land use and subsequent secondary impacts associated with projects should be evaluated. This recommendation is necessary to protect the capacity of new facilities that may be built and to protect the coastal resources of these peninsulas from further unplanned and undesirable development.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | | ● | ● | o | o | | ● | | | 19 |

The south corridor of the coastal zone (Md. 2/3/10) has become congested in many places due to utilization of a facility for both local and regional traffic with a resulting loss of capacity and use by both users, and a lack of alternate routes or connectors between the radials to distribute traffic. Md. 10 and 100 are examples of the use of regional facilities to serve local needs. The lack of a connection between Md. 100 and Md. 10 is limiting the capacity of Md. 100 to support growth (see Figure 9). Thus, residential growth oriented toward Downtown Baltimore in the Marley Neck/Magothy River area appears to lack sufficient highway capacity to continue at the rate it has previously seen. Transit to this area is not at a high level due to distance and low population density. Rail transit, either light or heavy rail, will not be available in the 1985 time frame although alternatives are being studied in the MD 3 and MD 2 corridor. Both rail alignments would require an extensive feeder bus system.

**Recommendation:** Residential growth oriented toward downtown Baltimore employment (i.e. residential growth without accompanying growth in nearby employment opportunities) should be discouraged in the Marley Neck/Magothy River area until alternate transportation links are provided. The connection of Md. 100 and Md. 10 sometime after 1985 is a partial solution but not a complete one since Md. 10 does not penetrate inside the Beltway. Further development should reflect the final rail transit alignments and incorporate higher land use densities than existing development which can adequately support a rail system. A feeder bus system would probably still be necessary but could not function well if existing low density patterns continue. If industrial development proceeds in the Marley Neck area, residential development to support the employment could occur here more easily since this development would not rely on radial routes inside the Beltway. Westbound access to the Beltway would be

needed to provide an alternative east-west connection to MD 100.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ● | × | ○ | ○ | | ● | | | 20 |

Aside from congestion problems in downtown Annapolis, the Parole area is the next regional bottleneck. With five major and secondary highways converging in this area, conflicts are inevitable (see Figure 10). Since Parole is a major commercial center, heavy traffic is not confined to the peak hours. However, during Annapolis' peak rush hours, traffic from the south (Md. 2 and Riva Road), west (US 50/301 and Md. 450), and northwest (Md. 178) is channelled through Parole to reach West Street, Forest Drive, and Rowe Boulevard causing major back-ups. The continued growth of Annapolis as an employment center for State government and of Parole as a regional commercial center will require that this issue be addressed. Although bus service is provided in the City of Annapolis, it does not extend west or south and could not reasonably be expected to be extended by the private bus company into areas of low density and long trips.

**Recommendation:** The character of Annapolis should not be changed to accommodate increased traffic flows. Instead, efforts should be concentrated in the areas of traffic management (including parking restrictions and signalization), staggering work hours, and increased bus service. Since a large proportion of the work force are State and local government employees, these agencies should take the lead in a program of greater staggering of work hours. Expanded bus service should be investigated either by Arundel Bus Company, MTA or a joint operation. Further study of the Parole area to separate local and through traffic is needed.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ● | ● | ○ | ○ | | ● | | | 7 |

South of Annapolis, the Mayo peninsula served by Md. 214 still has some highway capacity but, in a situation similar to the northern part of the County, feeds traffic to a congested Md. 2 (Solomons Island Road). Residential growth on the Mayo peninsula is oriented toward Annapolis, even if the work trip is towards Prince George's County, so the bulk of the off peak trips will be made into Annapolis/Parole regardless of work place. There is no significant public transit and densities are not high enough to justify it at present. The continued growth of the Mayo peninsula will place increasing pressure on Md. 2 and the South River Bridge in particular, considered by Anne Arundel County to be of the highest priority for improvement.

**Recommendation:** Programs should be undertaken to relieve existing congestion and provide for some future growth. Md. 2 should be widened from the South River Bridge to Md. 214. Improvements to the bridge should consider the pleasure boat traffic on the South River.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ● | ● | ○ | ○ | | ● | | | 20 |

Regional and Local Circulation Conflicts

Most non-controlled access highways in the coastal area serve two functions—local circulation and access to adjacent land uses, and through intra-regional traffic. The conflict occurs when a road designed originally as a through route attracts commercial development which increases local access use and reduces traffic speed and highway capacity. In some cases this condition is relieved by constructing a new parallel limited access facility such as I-95 or Md. 3 (the Glen Burnie Bypass). Two major conflict areas remain—Ritchie Highway between Md. 100 and Annapolis, and Md. 3/32/178 also between Md. 100 and Annapolis. Both corridors have been considered for new limited access expressways. Of the two, the Broad Neck Peninsula (Arundel Expressway) is more limited in alignment choices and has been more heavily developed. In contrast, the other corridor (Patuxent Freeway) is non-coastal and involves traversing upland and watershed areas creating the potential for future development to take place in these sensitive areas.

**Recommendation:** This corridor problem is the subject of an ongoing MDOT study. This study should address: 1) which of these two corridors should be designated the principal Baltimore/Annapolis regional travel corridor; 2) how the intercity traffic can be best separated from local traffic; 3) how to relieve local traffic problems after the through traffic is removed; and 4) what further influences will any new facility(s) have on development patterns.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ● | ● | ○ | ○ | | ● | | | 21 |

Coordination Between Transportation Planning and Land Use Planning in the Coastal Zone

General development and growth in the region is closely related to the provision of public facilities (sewer, water, transportation). In many instances, uncontrolled growth has exceeded the capacity of many of these facilities. To provide a safe and efficient transportation network in the region, agencies which provide transportation facilities (SHA, MTA) must be

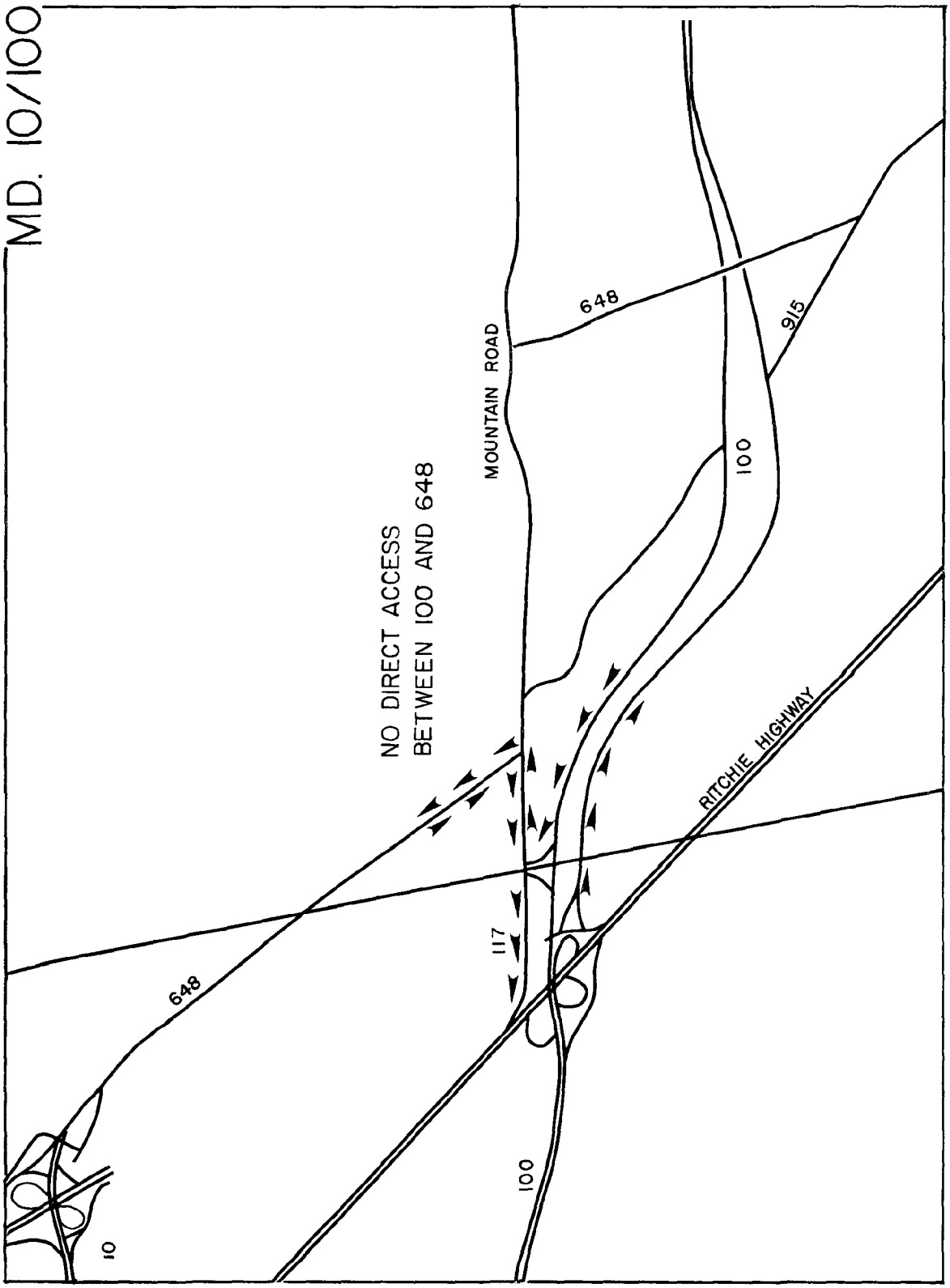



**FIGURE 9**
**Md. 10/100**

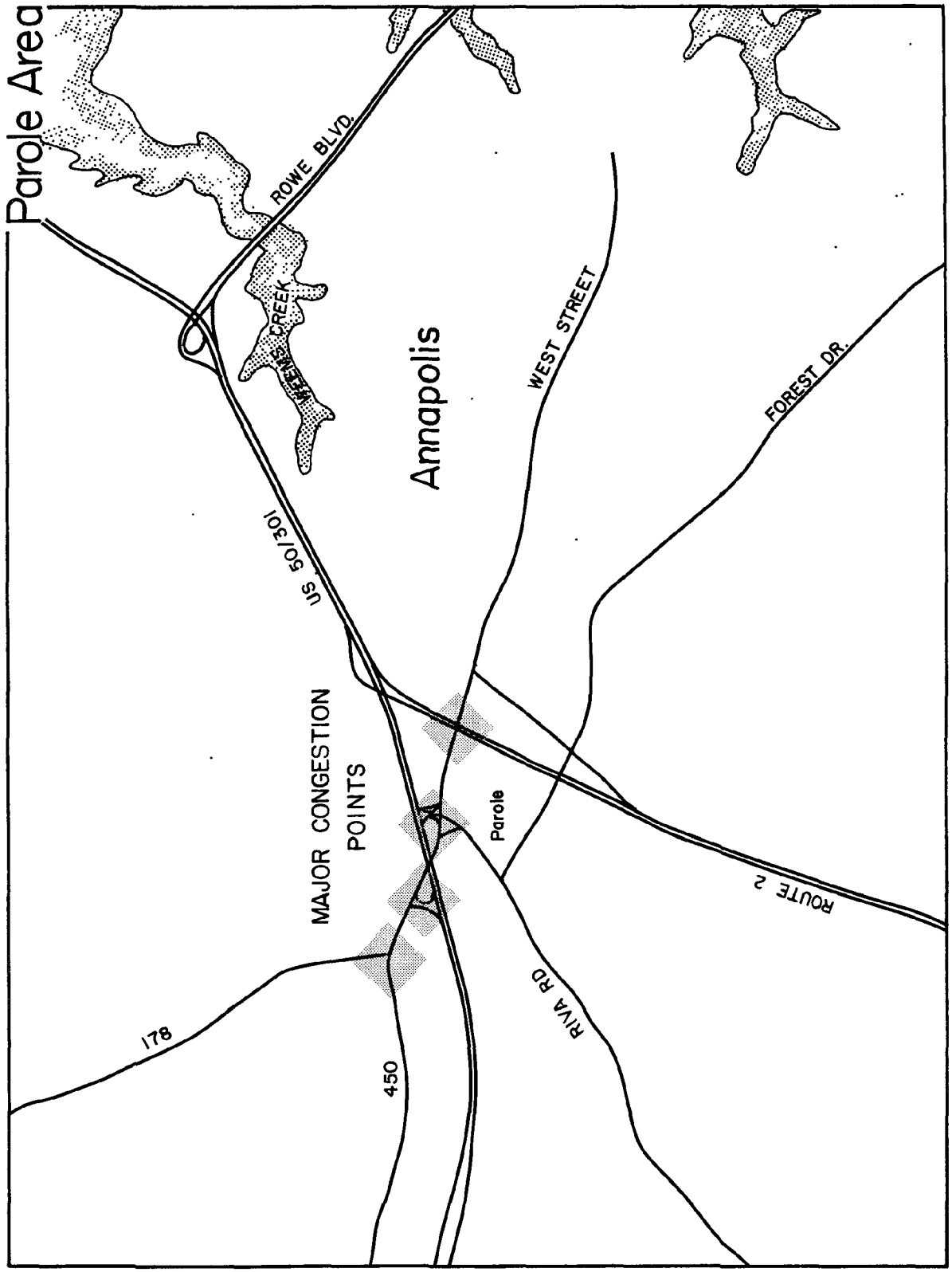



**FIGURE 10**
**Parole Area**

aware of local growth policies and how these might affect the demand for transportation facilities. Thus, a major issue is the ability to develop coordination whereby county growth policies and plans are based upon realistic future transportation facilities. This also ties into concerns over the environmental impacts that transportation facilities may have. While transportation planners can look at such environmental factors as air, noise, and water quality in the design of transportation facilities, they cannot actively control growth and the land use problems that may result from transportation projects without local initiative.

**Recommendation:** The development of the Transportation Element, as part of the Regional General Development Plan, should be compatible and enhance local and regional land use policies. This is one way in which to coordinate regional and local needs and thus provide transportation facilities that will meet the current and future needs in the region. The GDP should reflect and concern itself with environmental and developmental concerns. The GTP should reflect the land use policy of the GDP and provide adequate facilities to those areas where growth is desirable from an environmental and socio-economic standpoint. The local jurisdictions should more closely coordinate their policies with those of the region in regard to transportation system improvements.

Another way to provide a more functional transportation network and make the best use of existing transportation facilities would be to develop a process of closer coordination between the County Master Planning Process with the State Transportation Project Planning Process. This would help insure that realistic transportation plans necessary for the success of a master plan would be developed and implemented.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | | ● | ● | ○ | ○ | | ● | | | 21 |

Environmental Impacts of Transportation Facilities

Transportation systems have impacts on the natural as well as the man-made environment. Due to the character of the coastal environment, the location, design, and construction of transportation facilities in the coastal area have the potential for encountering more problems than facilities outside the coastal environment.

Some of the specific problems encountered can be traced to the nature of the land/water edge. When disturbed, highly erodible coastal soils generate sediment that impacts water quality and aquatic life. Numerous tidal rivers must be crossed with each posing a sensitive design problem. Consideration must be given to recreational and aesthetic needs as well as the more often mentioned safety and financial concerns. The concentration of valuable coastal and inland wetlands, significant upland areas, and the headwaters of streams and rivers in the coastal zone pose limited opportunities for alternative highway alignments. Numerous state scenic rivers, parks and recreational areas within the region's coastal zone further limit alignment opportunities. Growth pressures in such key coastal areas as peninsulas must also be considered. Established residential communities in close proximity to transportation facilities along with the generation of air and noise pollutants tend to make the environmental impact of proposed facilities that much more apparent.

In the past, environmental concern over the impact of proposed facilities received little attention. Over the years, the Maryland Department of Transportation has become more conscious of the consequences of its actions and has identified the need to incorporate environmental concerns into its transportation planning process. As such, the Department and its Modal Administrations consider the probable social, economic, and environmental impacts of proposed projects at all levels of planning. This has taken place in response to environmental legislation, permit review procedures, and greater awareness of the relationship between transportation and the environment. The problems outlined in this study, however, point to the need for increased awareness and greater consideration of environmental factors in the planning of transportation facilities within the coastal environment.

**Recommendation:** Special consideration should be given to the environmental impacts of major projects and the cumulative effects of smaller projects. Future environmental assessments of projects within the coastal zone should consider the major areas of concerns as detailed in this document in addition to those factors which are a part of traditional environmental analyses. Through these environmental assessments, consistency with coastal zone goals and objectives can be identified and appropriate steps taken to incorporate features that minimize the environmental impacts of proposed facilities.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ● | | ● | ● | ○ | ○ | | ● | | | 21 |

The Regional Transportation Planning Process

Although a rather elaborate regional transportation planning process exists via the Unified Transportation Planning Process, this joint effort between MDOT and RPC does not always produce a consistent and achievable transportation element of the Regional Development Plan. One problem lies in the fact that the process was developed basically as a highway planning process in response to federal requirements while regional transportation needs seem to dictate a multimodal planning process. More specifically:

—The membership of the various UTPP committees in the past has assumed that most transportation planning carried out by MDOT in the Baltimore Region involved only SHA and MTA. This resulted in limited involvement by MDOT's other Modal Administrations in the regional planning process. Although they are not required to be actively involved in this planning process, benefits would seem to be derived from their participation.

**Recommendation:** There should be greater representation of MDOT Modal Administrations in the Baltimore Regional Planning Process (rather than just MTA, MVA and SHA). This is especially important in the coastal zone where MPA and Toll Administration projects are located and where the greatest amount of coordinated action is needed.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ○ | ○ | | ● | | | 34 |

—Project funding in the region is coordinated by MDOT for most projects which come under state jurisdiction and the timing of project funding is still the responsibility of MDOT except for projects which lie in Baltimore City.

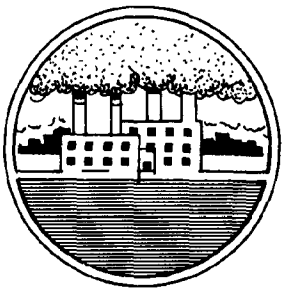
**Recommendation:** Due to the special authority of Baltimore City for most transportation projects within the City, a closer working relationship between the City and State Modal Administrations needs to be established. This is especially true for projects which do not cross City lines (such as Port facilities) and thus may not be addressed by the regional process as completely as an inter-jurisdictional project.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ● | ○ | ● | ○ | | | ● | | | 34 |

—The limited amount of available transportation development funds has caused many projects to be postponed and caused a shift in emphasis at MDOT from new construction to maintenance and maximum use of existing facilities. Regional plans based on a 20-year development framework have taken an optimistic attitude on the timing of proposed new facilities and have encouraged development to precede facilities (transportation and others).

**Recommendation:** Funding and the efficient use of existing facilities should be made prime priorities of the Transportation Steering Committee with emphasis on applying the Transportation System Management Element of the UTPP to all modes of transportation within the region's coastal zone.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ○ | | ● | ● | ○ | ○ | | ● | | | 21 |



## AIR POLLUTION

Air pollution is a man-made hazard affecting the health of all residents in the region. Pursuant to the Federal Clean Air Act of 1970, Maryland has adopted standards for the maximum concentrations of pollutants which may be present in the air. To achieve these standards, limitations are placed on emissions from individual sources of pollution, such as power plants, factories, and automobiles. Emission standards for individual stationary sources (factories, power plants) have been adopted by the Maryland Department of Health and Mental Hygiene to prevent ambient concentrations from being exceeded. Emission standards for cars, buses, and trucks, were set by Congress in the Clean Air Act. The Department of Health and Mental Hygiene can tighten the standards for individual stationary sources if this is necessary to reduce the ambient concentration of a particular pollutant. Standards for cars, buses, and trucks, however, can only be tightened by Congress, which has postponed scheduled implementation of tighter regulations.

To determine if the atmospheric concentration of each of the pollutants is in excess of the ambient standard, a network of monitoring stations has been established. Thirty-two stations are located in the coastal area. The results of the air sample analyses at each station in 1976 have been published in the *Maryland Air Quality Data Report, 1976*, by the Maryland Department of Health and Mental Hygiene, Bureau of Air Quality and Noise Control. The findings of this report are summarized in Table 12. The table shows that the standards for suspended particulates, carbon monoxide, and photochemical oxidants were exceeded several times. Suspended particulates and dustfall are produced primarily by stationary sources. Carbon monoxide is produced primarily by mobile sources. Photochemical oxidants (smog) are produced by a reaction of nitrogen oxides with gaseous hydrocarbons in the presence of sunlight. Hydrocarbons are pro-

duced primarily by mobile sources, and petroleum storage and transfer facilities, including gas stations. Nitrogen oxides are produced by both stationary and mobile sources.

Greater reduction of the concentration of suspended particulates and dustfall can be achieved through stricter State emission limitations on stationary sources and by better application of dust control techniques on such dust sources as ore, sand, and gravel stockpiles. Greater reduction of the concentration of carbon monoxide and photochemical oxidants, however, can only be achieved through the gradual phase-in of Federal regulations on new cars, buses, and trucks. Catalytic converters installed on most 1976 model year cars are designed to eliminate most of the hydrocarbons and carbon monoxide produced by these vehicles. However, many older cars are still on the road and until they are replaced by cars manufactured after 1976, or their use is substantially reduced, photochemical oxidant and carbon monoxide concentration standards will be violated with the resultant impairment to the health and welfare of the citizens in the Region.

**Recommendation:** That the relationship between air pollution and the use of motor vehicles in the region be given greater publicity by the Department of Health and Mental Hygiene, and that the Department of Transportation and local governments place greater emphasis on encouraging and making possible ride sharing, mass transit, and other alternatives to reduce

**TABLE 12**
**Violations of Ambient Standards**
**For Air Pollutants**

| Pollutant | Number of Monitoring Stations | | Number of Stations Registering a Violation | Number of Times Permitted Annual Average Exceeded | Number of Times Permitted Maximum Concentration Exceeded |
|---|---|---|---|---|---|
| Sulfur Oxides | Anne Arundel Co. | 5 | 0 | 0 | 0 |
| | Baltimore City | 8 | 0 | 0 | 0 |
| | Baltimore Co. | 8 | 0 | 0 | 0 |
| | Harford Co. | 1 | 0 | 0 | 0 |
| Suspended Particulates | Anne Arundel Co. | 6 | 1 | 1 | 2 |
| | Baltimore City | 8 | 8 | 8 | 118 |
| | Baltimore Co. | 10 | 7 | 5 | 14 |
| | Harford Co. | 1 | 0 | 0 | 0 |
| Dustfall | Anne Arundel Co. | 9 | 0 | 0 | 0 |
| | Baltimore City | 1 | 1 | 0 | 1 |
| | Baltimore Co. | 7 | 0 | 0 | 0 |
| | Harford Co. | 0 | — | — | — |
| Carbon Monoxide | Anne Arundel Co. | 3 | 0 | 0 | 0 |
| | Baltimore City | 2 | 2 | — | 6 |
| | Baltimore Co. | 1 | 1 | — | 1 |
| | Harford Co. | 0 | — | — | — |
| Hydrocarbons* | Anne Arundel Co. | 0 | — | — | — |
| | Baltimore City | 0 | — | — | — |
| | Baltimore Co. | 1 | 1* | — | 128* |
| | Harford Co. | 0 | — | — | — |
| Nitrogen Dioxide | Anne Arundel Co. | 4 | 0 | 0 | 0 |
| | Baltimore City | 8 | 0 | 0 | 0 |
| | Baltimore Co. | 8 | 0 | 0 | 0 |
| | Harford Co. | 1 | 0 | 0 | 0 |
| Photochemical Oxidants | Anne Arundel Co. | 3 | 3 | — | 244 |
| | Baltimore City | 2 | 2 | — | 125 |
| | Baltimore Co. | 1 | 1 | — | 244 |
| | Harford Co. | 0 | — | — | — |
| Fluorides | Anne Arundel Co. | 1 | 0 | — | 0 |
| | Baltimore City | 0 | — | — | — |
| | Baltimore Co. | 0 | — | — | — |
| | Harford Co. | 0 | — | — | — |

*A maximum concentration standard for hydrocarbons has not been adopted. Violations noted are the number of times the guideline has been exceeded.

the number of motor vehicles miles traveled in the region.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | ● | ● | ● | o | | | ● | ● | | 1 |

**SOLID WASTE**

Residential communities in the coastal area generate over 761,000 tons of solid waste annually. This waste consists of paper, plastic, wood, metal, vegetable matter, and animal matter. Most of it is placed in sanitary landfills but fifty percent of Baltimore City's waste is incinerated. Some solid waste is disposed in illegal dumps. This is a particular problem in the Davidsonville area of Anne Arundel County and other areas with large undeveloped parcels of land. Illegal dumping is of special concern in the coastal zone due to the presence of wetlands and high water tables. Wetlands have been used as refuse dumps in the past. One example is the Reedbird site in Baltimore City.

The regulations of the Department of Health and Mental Hygiene have eliminated most of the adverse impacts of solid waste disposal. Before these regulations were passed, many dumps were operated in the coastal area without regard to the impact of waste disposal on water quality, wetlands, air pollution, disease, or aesthetics. Most of these dumps have been officially closed. However, illegal dumping in some locations still occurs. Most of these sites are on private property, and it is the owner's responsibility to remove waste deposited on the site even if disposal was not authorized by the owner.

To curtail the use of unauthorized disposal sites, several things must be accomplished. Those who deposit refuse at the site must be stopped, informed that they are illegally depositing material, and told where the material may be deposited. Anyone who persists in dumping material at an unauthorized site should be prosecuted by the local jurisdiction under its littering statute.

The problem of illegal dumping cannot be fully solved until disposal alternatives are available. As shown in Table 13, only ten solid waste disposal facilities are operating in the coastal areas of the region. These are widely scattered with only one landfill serving Harford County, two serving Baltimore County, and three in Anne Arundel. Baltimore City has one operating landfill, two incinerators, and a pyrolysis plant. Due to a lack of available land within the City, this situation will become critical in the near future. To add to the problem, all but two landfills in the region are expected to be full within five years. Thus, to provide an alternative for illegal dumping and deal with the generation of solid waste, more landfills will have to be provided or recycling of solid waste will have to be greatly increased.

The length of time that existing and new landfills can be operated can be increased if more material is recycled. A report prepared in 1975 by the Institute for Local Self-Reliance found that 70 to 85 percent of the material presently disposed in landfills can be recycled.[1] In addition, the material can be resold at a profit and disposal costs can be substantially reduced. Currently, the City of Annapolis, Baltimore County, and Baltimore City operate facilities to recycle a portion of their solid waste.

The Annapolis Center accepts aluminum cans, glass, and newspapers brought to the center by residents and placed in separate bins. The cans are sold to Reynolds Aluminum at a profit. The newspapers is sold to scrap paper dealers in Baltimore City also at a profit. Glass is taken to a glass factory in New Jersey. Despite the high hauling cost involved in recycling the glass, it can still be sold at a profit. Community groups in Anne Arundel County also collect and sell newspaper and aluminum cans.

In Baltimore County, a plant is in operation which mechanically and magnetically separates metal, glass, and mixed paper from solid waste brought by garbage trucks to the Texas landfill in Cockeysville. The metal and glass is sold to scrap dealers and the paper is sold to industry and power plants for use as fuel.

The pyrolysis plant in Baltimore City is currently processing 800 tons per day of solid waste. The plant produces a glass aggregate which is sold for road construction and steam which is sold to Baltimore Gas and Electric for power generation. Some non-ferrous metal is also recovered for recycling. The residue from the plant is disposed in the Pennington Avenue landfill. The Pulaski Incinerator in the City recycles ferrous metal. The incinerator is now undergoing renovation and is operating at one-half capacity. If the incinerator can be operated at full capacity and the capacity of the pyrolysis plant can be increased to 1000 tons per day, the life of the Pennington Avenue landfill can be increased three to four years.

There is a possibility that additional recycling centers could be operated by local governments and private groups for a profit. A 1976 report entitled "Planning Solid Residuals Management in the Baltimore Area", prepared for the Maryland Environmental Service,[2] recommended that three steps be taken to increase recycling in the Region . . .

**TABLE 13**
**Solid Waste Acceptance Facilities**
**Baltimore Region Coastal Zone**

| County | Facility | Type | Acres | Operator | Status | Waste Accepted |
|---|---|---|---|---|---|---|
| Harford | (01) Aberdeen | D | 13.5 | M | Closed | R,C |
| | (02) Mullins | SLF | 102 | C | Closed | R,C,RD |
| | (03) Abingdon | SLF | 24 | C | Closed | R,C |
| | (04) Bush Valley | SLF | 30 | P | 5 yr. life | R,C,RD |
| | (05) Havre DeGrace | D | 53.6 | M | Closed | R,C |
| | (06) Perryman | D | 10 | C | Closed | R,C |
| Baltimore County | (07) Norris Farm | SLF | 136 | C | 2–3 yr. life | R,C,I,RD |
| | (08) Patapsco Flats | SLF | 260 | C | 0.5 yr. life | R,C,RD |
| | (09) Bayview Yard | SLF | | M | Proposed | R,C |
| Baltimore City | (10) Pennington Ave. | SLF | 68 | M | 2–3 yr. life | R,C |
| | (11) Pulaski | I | N.A. | M | Operating | R,C |
| | (12) Monument St. | SLF | 29 | M | Closed | RD,IR |
| | (13) Quarantine Rd. | SLF | 55 | P | Operating | R,C,I,RD |
| | (14) Bowleys Lane | SLF | 35 | M | Closed | RD,IR |
| | (15) Reedbird | SLF | 75 | M | Closed | R,C,IR,RD |
| | (16) Reedbird | I | N.A. | M | Closed | R,C |
| | (17) Potee St. | SLF | 18 | M | Closed | RD |
| | (18) Pyrolysis | Plant | N.A. | M | Operating | R,C |
| Anne Arundel | (19) Glen Burnie | SLF | 186 | C | 8 yr. life | R,C,RD |
| | (20) Solley Road | SLF | 30 | P | 2–3 yr. life | R,C,I |
| | (21) Marley Neck | SLF | 107 | P | Closed | I |
| | (22) Annapolis | SLF | 133 | M | 15 yr. life | R,C |
| | (23) Parks | D | 44.5 | P | Closed | R,C |
| | (24) Iglehart | SLF | 25 | P | Closed | R,C,I |
| | (25) C. Hall | D | 35 | P | Closed | R,C,RD |
| | (26) M. Hall | SLF | 20 | C | Closed | R,C,RD |
| | (27) South Co. | SLF | | C | Proposed | Unknown |

KEY

1. Type: SLF = Sanitary Landfill, I = Incinerator, D = Dump
2. Operator: C = County, M = Municipality, P = Private
3. Waste Accepted: R = Residential, C = Commercial, I = Industrial, IR = Incinerator residue, RD = Rubble, Demolition debris

**Recommendation:** That the following steps recommended in the report "Planning Solid Residuals Management in the Baltimore Area" be implemented by each local jurisdiction and the Maryland Environmental Service.

—The search for and evaluation of markets for recycled solid waste should be intensified and include both traditional markets (i.e. secondary material dealers in the Baltimore Area) and expanded markets that become available as large scale processing facilities and recycle centers become operational. The large processing operations will depend on fairly stable markets to which small community recycle centers could gain access.

—Citizen groups to inform citizens and decision makers about feasible solid residuals management alternatives should be developed; such groups could provide the basis for increased community participation. Established environmental organizations could provide support for these efforts.

—Communities with the potential for a high level of participation in waste management projects should be actively encouraged, including communities that have active community groups established for other purposes.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ○ | ○ | | | | ○ | | 39 |

**Recommendation:** A study is needed to investigate whether the markets for recycled wastes now being used by Annapolis, Baltimore City, and Baltimore County will purchase additional material and whether other markets are available. If markets are available, additional recycling facilities should be provided by the jurisdictions or materials should be separated in waste collection trucks or through separate collections and subsequently recycled.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | ○ | | 30 |

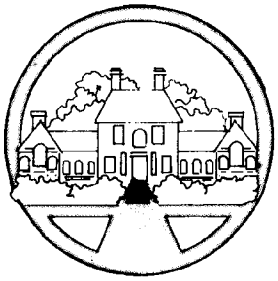
Recycling of solid waste can also be facilitated by requiring that deposits be placed on containers and requiring that retailers and manufacturers redeem them. Statutes of this type have been enacted in Oregon and Vermont.

The Oregon law requires a two-cent deposit on all soft drink and beer bottles and cans, bans flip-top cans, provides a mechanism for standardizing bottle capacities and shapes, and requires dealers to redeem containers of the type and brand that they sell. According to a study by Oregon State University, there has been an 88 percent reduction in the number of beverage containers in solid waste since the passage of this law.[3] This study also found that since the passage of the Act, there has been a $2.8 million increase in net annual income from operations of the beverage industry. Although a law of this type was introduced into the Maryland legislature in 1977 and did not pass, a commission has been organized to study the matter. Their report should be available at the beginning of the 1978 session.

**Recommendation:** Legislation should be enacted by the State of Maryland to reduce solid waste by placing a mandatory deposit on bottles and cans and requiring retailers and manufacturers to redeem them. The feasibility of similar legislation for all non-biodegradable materials should be investigated.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| o | o | | o | | o | | | | o | | 18 |

## THE LOSS OF RESOURCES



### ARCHEOLOGICAL AND HISTORIC PRESERVATION

In recent years there has been growing interest in the protection of architectural and both prehistoric and historic archeological remains. Experience has shown that wholesale destruction of historic buildings or disruption of archeological sites for new construction is rarely progressive. The obliteration of these structures and sites is not only careless "improvement" under the guise of progress but very often disrupts the environment by substituting monotony for visual variety. Rehabilitation and reuse is becoming more economical than demolition and new construction. We are becoming more aware of our past, its traditions, and values and while planning implies the future and preservation the past, a cooperative effort between planners and preservationists can result in a realization that such measures as recognition of historic sites, structures, or districts should be integrated into comprehensive planning. This is one aim of the coastal zone program.

Not only should architecturally significant sites be included in comprehensive planning, but so should prehistoric and historic archeological remains. Prehistoric refers to the material remains of Native American cultures that occupied Maryland for at least 8,500 years prior to European contact. During this period, these cultures left remains relating to their various ways of life and they are important for what we learn from them as well as representing unique sources of education and enjoyment for modern residents.

Unlike archeological preservation which is just now being recognized for inclusion in land use planning processes, historic preservation efforts have been conducted at three governmental levels.

At the national level, the National Park Service (NPS) of the Department of the Interior, is concerned primarily with the identification of national, state, or local properties nominated by the States and the various federal agencies for inclusion on the National Register. The NPS provides funds for each state to carry out surveys of local areas and is empowered to match grants for restoration or renovation of structures on the National Register.

The National Historic Preservation Act of 1966 provides a program for the preservation of cultural property implemented in cooperation with State Historic Preservation offices. Listing on the National Register provides public recognition, protection from projects of the federal government which may have a detrimental effect, and eligibility for federal matching grants. National Register listings within the coastal area are shown in Appendix D.

The major programs providing federal protection of National Register properties are:

- Section 106 of the National Historic Preservation act of 1966 requires federal departments to consider a project's impact on the National Register property and to afford the Advisory Committee on Historic Preservation an opportunity to comment on the project prior to approval of funding or granting a license. When conflicts concerning National Register properties cannot be avoided, the advisory committee provides a forum for assessing the public interest and recommending actions for mitigation. A project is considered to have an adverse impact if it results in changing

the quality or cultural character of the property that made it eligible.

- Federal Executive Order 11593 requires all federal agencies to inventory and nominate to the National Register all properties under their jurisdiction that qualify for listing on the register. The Order directs all federal agencies, where a N.R. property is to be altered or demolished, as a result of Federal action or assistance, to document the original structure by drawings, photographs, maps. Agencies are responsible for the "maintenance, through preservation, rehabilitation, or restoration of N.R. properties under their jurisdiction." The Order also requires agencies to work with purchasers or transferees of federally owned N.R. properties to develop viable plans to preserve these properties. Federal agencies also must give consideration in project planning to properties which may be eligible for the N.R. although not yet formally listed.
- The National Environmental Policy Act includes, as a national policy, the preservation of important historic, cultural, and natural aspects of the national heritage. This is to be included in the environmental impact statement prepared on major federal actions affecting the environment.
- Section 4(f) of the Department of Transportation Act of 1966 denies federal assistance to transportation projects that require land from a N.R. property unless it is proven there are no other "feasible or prudent alternatives."

Other related programs of the National Park Service include:

- *Historic Preservation Grants-in-Aid*; authorizing up to 50% matching grants to state and private National Register property owners.
- *Historic American Building Survey*; photographic, written, or drawn documentation of significant examples of American architecture.
- *Historic American Engineering Record*; documentation of engineering, industrial and technological significance.
- *Interagency Archeological Program*; data collection for the recovery of archeological sites.
- *National Historical Landmarks Program*; survey of historic sites and buildings of national significance.
- *Natural Landmarks Program*; identification of natural areas of national significance.
- *National Environmental Education Landmarks Program*; teaching of environmental awareness.

The Maryland Historical Trust is responsible for administering the State's National Register program. An agency of the Department of Economic and Community Development, the State Trust maintains a survey of historic sites and buildings containing an estimated 12,000 entries. The MHT also has the power to acquire properties and easements and accept gifts of property and donations.

A number of local controls and programs can be used to protect historic sites and districts. The most important is the local historic district or landmarks commission. Creation of a commission and the designation of local districts and landmarks can provide protection of properties against private and local government actions. Several jurisdictions in the region have instituted such legislation while others are considering it. Authority for local historic district legislation exists under Article 66B, Section 37–50 of the Maryland Annotated Code of Public General Laws. Local legislation protects properties designated by a local historic district or landmark commission against demolition or alteration of exteriors by private owners or local government actions.

Each of the four participating coastal zone jurisdictions has a Historic Preservation Commission coordinating efforts with the Maryland Historic Trust. The incorporated towns of Harve de Grace and Annapolis also have preservation agencies.

Anne Arundel County recently passed legislation that established a Historic Preservation Commission as a division of their Office of Planning and Zoning. This body will present the Planning and Zoning Office "recommendations for rules, regulations, definitions, procedures and criteria for the implementation of a program to protect and preserve the heritage of Anne Arundel County . . ."

Perhaps the oldest preservation organization in the State is Historic Annapolis, Inc., a non-profit membership corporation chartered in 1952. For 25 years, this private, non-profit group has been a guiding light in the renaissance of Annapolis. Some economic evidence for this is that although the historic district is only 7% of the city's land area, it accounts for 19% of the assessable base. High homeownership rates and increasing affluence may point to a still brighter future.

Until recently, historic preservation in Baltimore County has been undertaken through private initiative. The most recent of these actions is the restoration of Ballestone Mansion. Private donations were matched by County funds in developing this site as a focal point for the County's Bicentennial celebration. The County's newly created Landmarks Preservation Commission is making an inventory of both public and private structures considered "of significant historical, architectural, archeological or cultural value". A preliminary list will be submitted for public hearings leading to a final list to be adopted by the County Council as a "Final Landmarks and Districts List". Once included on the list, alterations to the original structure will become subject to regulation and negligent owners can be cited for "demolition through neglect".

Because of its large inventory of structures and long history of development, Baltimore City has a very active historic preservation program. The City created

a Commission for Historical and Architectural Preservation (CHAP) made up of eleven citizens and a full-time staff of two. CHAP is concerned with designating and administering historic districts as well as compiling a Landmark List of public structures to be protected from alterations, excavations, or demolition. The City has tied its historic preservation programs with urban renewal, neighborhood rehabilitation, and renovation programs. The City CHAP offices are currently conducting neighborhood surveys which include the City's coastal area. The work is designated as a preliminary survey to be augmented with detailed research.

In Harford County two programs are proving to be the main focus of preservation. One is being coordinated by the Harford County Historic Districts Commission while the other is being handled by the City of Havre de Grace Historic Districts Commission. Both of these commissions have a full-time surveyor preparing inventories leading to formal designations of historic places, sites, and districts. The county also has legislation permitting designation of local historic districts and landmarks that would be protected from private and county action. Harford County is in the process of designating its first group of local historic landmarks.

One problem in historic preservation is that structures of marginal importance are threatened when their land is proposed for a 'higher' economic use. These sites are reminders of the past but contribute very little in current land taxes. Preservation agencies, in tandem with local governments, have to selectively identify these structures and seek solutions for their best use.

**Recommendation:** The preservation agencies of participating Coastal Zone Management jurisdictions should use consistent criteria for evaluating significance. These criteria should include:

- importance as a symbol connected with a turning point in history, a famous person, or a famous institution;
- architecture of a particular style, or quality as a work of art in its own right;
- importance as an element in the character of each local jurisdiction e.g. whole districts, groups of buildings and unique street facades;
- small sites and single buildings that are symbols of the many social and ethnic groups who settled in the region;
- industrial archeology sites and elements reflecting engineering and technical accomplishments;
- prehistoric and historic archeological sites of importance within the coastal zone.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ● | ○ | | | | | 33 |

Archeological sites are rapidly being destroyed by both natural and modern cultural processes including erosion, inundation, construction, and cultivation. At the current rate of destruction entire categories of these resources may be eliminated.

**Recommendation:** Local governments in the Baltimore region, in cooperation with the Maryland Historic Trust and Maryland Geological Survey should undertake a survey of prehistoric archeological resources. These local governments along with the State should also develop a management plan based on the results of the survey for protecting these resources.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | ● | | ○ | | | 7 |

A major problem is the lack of knowledge by local government and citizens concerning the location and relative importance of historic properties in the coastal area.

**Recommendations:** Local governments should cooperate with the Maryland Historic Trust's effort to prepare a historic and cultural resources inventory. This list will catalog artifacts along the Region's coast. The most important sites on the inventory should be included in a list of areas of critical State concern to assure against possible destruction.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | ● | | ○ | | | 7 |

A fourth problem is that individual preservation efforts often end up at cross purposes. Currently, there appears to be a lack of understanding, coordination, and support of the objectives of preservation among agencies and local private groups.

**Recommendation:** An administrative procedure and review process should be developed that will result in review by the Maryland Historical Trust and the Maryland Geological Survey of all locally initiated programs that may be proposed within the coastal zone. The A-95 review process should also be expanded to include a review and assessment of an action's potential effects on historic sites and districts. A jurisdiction's plans for altering or demolishing any publicly owned building included in the local inventory of historic sites should be reviewed by the local historic district commission and the MHT.

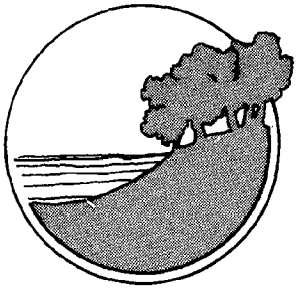
| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ● | ○ | ● | ● | ○ | ● | | | | | 7 |

A final problem is that many citizens of the Region seem to be unaware of the practical benefits and the

implications of preservation. Too many perceive it as a mechanism only for public recognition or as a device to take property rather than as a safeguard for the environment.

**Recommendation:** Each jurisdiction should take steps to provide for meaningful citizen forums in historic preservation as it relates to the Coastal Zone Management Program. The basic conduct of preservation, however, should remain in the hands of local groups. These groups are in the best position to consider the needs of their community.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ○ | ● | | | | | 39 |



## NATURAL AREAS

The region's coastal natural areas are those places where natural functions predominate and no significant influence by either deliberate manipulation or accidental interference by man occurs. They include mature forests, wooded swamps, nontidal wetlands, stream corridors and tidal wetlands.

Mixed hardwood forests originally covered most of the region's coastal uplands. These forests were characterized by oaks, hickories, maples, beech, and gum. Dogwood, sassafras and holly characterized the understory species. Because of intensive farming, logging, the introduction of manufacturing, and urban growth, few remnants of the region's original forests remain. Typical forest stands today are second and third growth. Extensive clearing accounts for the increase of pine forests throughout the region. Pines represent an early successional stage which is often maintained because of continued disturbance from land development and logging. Typical species include Scrub Pine and Pitch Pine.

Two vegetation associations can be found in the lowland coastal areas, the Gum-Pine association and river swamps. The Gum-Pine association is characterized by Sweet Gum and Loblolly Pines along with red maples and several oaks. The river swamps occur along the floodplains of the rivers. The dominant trees of this association are Sweet Gum, River Birch, and Swamp Oaks.

Extensive marshes are found bordering the Chesapeake Bay and its tributaries. These range from coastal salt marshes in the lower estuarine reaches to fresh water marshes further upstream. Typical vegetative species range from cordgrass, Olney's three-square, salt grass, and black needle-rush for salt marshes to cattail, pickerelweed, waterlily, saw grass, and wild rice in the fresh marshes.

The value of the region's coastal natural areas are many and varied. The woodlands and wetlands play an important role in the prevention of sedimentation through the control of storm water runoff and shoreline erosion; they act to minimize tidal and riverine flooding, and they help to control the influx of toxic chemicals into the waters of the Chesapeake Bay. Many of the coastal natural areas aid the health of the aquatic system by maintaining a balanced nutrient regime, moderating water temperatures by shade, providing aquatic organisms with food sources, and reducing the scouring of stream bottoms. When existing areas are retained in a natural condition, they often serve as maintenance-free public works projects. Once destroyed, these amenities and their services are lost and are difficult, if not impossible, to replace at a reasonable cost. Functionally equivalent benefits can only be attained by costly public expenditures for water filtration, dredging, recurrent stocking of streams with fish, structural flood control projects, acquisition of flood-prone dwellings and the creation of artificial wildlife habitats. Natural amenities are irreplaceable.

Coastal natural areas also provide a significant habitat for the region's resident and migratory wildlife population. Educational use of natural areas is becoming increasingly important as we become more urbanized and feel the need for reintroduction to the natural world. Natural areas serve as a veritable storehouse of basic ecological information necessary for scientific research. Recreational uses such as hiking, hunting, fishing, and birdwatching are all dependent on the maintenance of suitable natural areas.

The coastal natural areas, especially woodlands, act to control noise, wind, and temperature. These controls are especially important in our more urban coastal areas and become more so as the cost of energy increases.

Natural areas, particularly woodlands, also offer an important aesthetic backdrop to urbanization occurring in the coastal zone. Woodlands provide important buffers and screens within urban areas. Property values are greatly enhanced by an attractive natural setting. Shoreline natural areas provide important visual benefits to the many users of coastal waters.

There has been substantial destruction of natural areas in the coastal zone. The loss of these areas can be attributed primarily to the expansion of residential development and the resulting public and private support services. Significant natural areas have also been lost due to industrial expansion, including sand and

gravel mining operations. In short, urbanization of the coastal zone has resulted in the preemption of natural areas for other land uses. It has also meant an increase in incompatible land uses adjacent to natural areas, thus reducing their value. The cumulative impact of encroaching urban land uses upon natural areas seriously threatens the performance of their ecological processes. Public benefits from coastal natural areas can only be assured if they are sufficiently protected from incompatible land uses.

Currently, Anne Arundel County is the only coastal jurisdiction in the region which zones natural areas to prevent their development. However, the Anne Arundel County Open Space District applies only to those natural areas within the "Natural Drainage System," including wetlands, marshlands, swamplands, and all lands within the 100-year floodplain. However, little of the 100 year floodplain has actually been designated as open space. One of the Baltimore County Resource Conservation Zones (R.C. 2) provides for the inclusion of wetlands, but the application of this Zone to a wetland area would still allow agricultural and large-lot residential uses. Both types of zoning have been applied to coastal natural areas in an extremely limited fashion.

**Recommendation:** Coastal counties should limit development in areas where development would adversely affect water quality, productive wildlife habitat, biotic systems or scenic and natural values. Including:

—Tidal and non-tidal wetlands;
—100-year riverine and tidal floodplains;
—Upland natural areas having moderate to high-value wildlife habitat;
—Areas that provide habitat for rare or endangered plant or animal species;
—Slopes of 20% or greater;
—Unstable soil subject to slipping, mass movement, or severe erosion, when these areas are two acres or more in size; and
—Natural areas of significant scenic or esthetic value.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 19 |

**Recommendation:** Coastal jurisdictions should control development adjacent to significant and fragile natural areas. Development in areas adjacent to significant or fragile natural areas should be controlled carefully by the coastal jurisdictions to prevent adverse impacts which may significantly degrade the qualities of those areas. Specifically:

—Priority should be given to proposed development or activities that are complimentary to wildlife uses, such as wildlife or fishing preserves or agricultural or grazing lands that serve as auxiliary feeding areas for wildlife.
—New development should be of a type and intensity and set back to prevent significant adverse impact to these natural areas. No unnecessary disturbance or destruction of existing shoreline and intertidal natural areas or wetland vegetation should be permitted.
—New development, including new divisions of land and construction on existing lots, should be regulated to maintain a natural vegetation buffer strip along all ponds, bogs, lagoons, wetlands, and intermittent and perennial coastal rivers, creeks, and streams. The buffer strip should be as wide as necessary for protection of natural areas, but in no case less than 100 feet wide except for minor intrusions upon natural vegetation (e.g., small boat docks and utility pipelines). The buffer strip should normally consist of indigenous vegetation, but in partially developed areas appropriate landscaping may be acceptable where the natural area will not be adversely affected.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | | ● | ● | ○ | | | | | | 19 |

Because of their small size and the proximity to housing, commercial, and industrial development, the region's coastal woodlands are generally unsuited for commercial logging; yet, they have values which cannot be measured in board feet. Woodlands exert strong influences upon the coastal environment and coastal ecological systems. They reduce the force of winds, increase humidity, moderate temperatures, produce oxygen, filter air pollutants and dirt, and serve as noise barriers. Woodlands influence the soil by generating humus, stabilizing the soil (reducing water and wind erosion), increasing the porosity of the soil (increasing water storage capabilities), and they function as a filter system to insure water quality. Coastal woodlands also protect the aquifer recharge areas, reduce flood peaks and damages, and eliminate excess erosion and sedimentation. The existence of several Maryland Big Tree Champions in the coastal zone provide an irreplaceable natural heritage for existing and future generations. Quite simply, woodlands are an essential component of the general welfare of coastal communities.

Rapid growth, the spread of development, and increasing demands upon natural resources have encroached upon, despoiled, or eliminated many coastal trees and other forms of vegetation and have disturbed the natural processes associated with them. While local and state regulations have been developed to protect other critical environmental areas, woodlands have been relatively ignored even though they are vital to the public good. Although local erosion and sedimentation regulations play a part in protecting woodland resources, there are no provisions specifically directed

toward maintaining the health of coastal woodlands. The Maryland Roadside Tree Law requires a permit for the trimming or removal of trees along streets and highways. Trees within parks are protected from indescriminate removal. However, without further local regulation of development in wooded areas, coastal communities risk the loss of their woodland and tree resources.

**Recommendation:** The coastal counties should institute a tree preservation ordinance which would require new subdivision and other site development plans to include: (1) identification and location of all trees that are at least five inches in diameter at six inches above ground level; (2) description of all trees to be removed and locations of those to remain; (3) specifications for the actual removal of trees and description of what measures will be taken to preserve those which will remain; and (4) analysis of any grade changes that might affect trees. In addition, the ordinances should require landowners to secure a permit to apply forestry management techniques to trees and woodlands once development has taken place. Review and approval of the tree preservation component of a subdivision or site development plan should be based upon the following ecological criteria:

—The condition of the trees with respect to disease, danger of falling, proximity to existing or proposed structures, interference with utility services, and interference with neighboring property owner's views.

—Topography of the land and the effect of tree removal on erosion, soil retention, wind reduction, wildlife habitat, noise reduction, and the diversion or increased flow of surface waters.

—The number of trees existing in the community and the effect of tree removal upon property values in the area.

—Good forestry practices: i.e., the number of healthy trees that a given parcel will support.

—The identification of a tree as a Maryland Big Tree Champion, as noted by the Maryland Department of Natural Resources, if its retention will not unreasonably interfere with the use of the property upon which it is located.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | | ● | ● | ○ | | | | | | 5 |

Public land ownership, including Natural Environment Areas, Natural Resource Management Areas, Wildlife Management Areas, and State and County Parks, preserve many of the state's wildlife habitat areas, but much of the inique natural area of the region's coast is still unprotected. There are many significant species of animals and plants making their homes in or visiting the unprotected natural environment areas of the coastal zone. To assure the continued protection of the region's significant coastal wildlife habitat areas, they must be acquired.

Efforts by the local coastal jurisdictions to acquire natural areas have been minimal. Baltimore County is currently negotiating the acquisition of Miami Beach, a 64 acre commercial beach which includes some wetlands and woodlands to be left in a natural condition. To date, the most important protective action has been taken by Anne Arundel County which has been working with the Chesapeake Bay Foundation to acquire 715 acres of wetlands and woodlands at Jug Bay along the Patuxent River. However, plans to protect this ecologically significant area as a public wildlife preserve (the only one in the Baltimore region) and environmental education area have been delayed by the lack of necessary acquisition funding.

The primary responsibility for the acquisition of significant natural areas belongs to the Maryland Department of Natural Resources. However, of the planned 100 acres for Wildlife Management Area within Maryland, none are within the Baltimore region's coastal zone. Upon completion of acquisition plans, only five percent of the state's 12,358 acres of Natural Resource Management Area will be in the Baltimore coastal zone. Five percent of the state's planned 31,629 acres for Natural Environment Area is to be located at Severn Run in Anne Arundel County—this would be the region's only coastal Natural Environment Area.

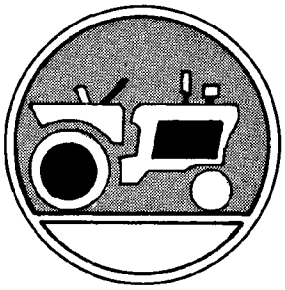
The Department of Natural Resources has delayed for seventeen years its planned acquisition of the 1,236-acre Gunpowder Delta, in Baltimore and Harford Counties, as an addition to Gunpowder State Park. The tidal and non-tidal wetlands backed by upland hardwood forests located at the confluence of the Little Gunpowder River, Slough Creeek, Big Gunpowder River, and Bird River provides a natural setting unsurpassed on the western shores of the Chesapeake Bay. Currently, mining interests control 92 percent of the area. One mining company is nearing final approval from the Department of Natural Resources on its excavation plans. Water Resources Administration permits would exlude 325 acres from the planned Gunpowder Delta section of the Park. It is unknown how much land the Department of Natural Resources will approve for excavation prior to parkland acquisition. Special exception orders permitting mineral extraction have been granted by Baltimore County for most of the land planned for inclusion in the Gunpowder Delta section. Another 415 acres of wetlands and woodlands adjacent to the southwestern edge of the Gunpowder Delta section and along the Bird River shoreline are in the ownership of one of the region's major mining operations.

Many other important coastal wildlife habitat areas are threatened by urban expansion. The headwaters of the South River in Anne Arundel County would be divided by the proposed Patuxent Freeway and could possibly be opened for intensive residential and commercial development. An evaluation of the South River

headwater's non-tidal wetlands by the Department of Natural Resources' "Upland Natural Areas Study" found them to be among the most valuable habitat for waterfowl in the coastal plain. The region's longest stretch of undeveloped shoreline not under Federal control is along Saltpeter and Dundee Creeks in Baltimore County. This 1,500+ acre area includes shoreline frontage in excess of nine miles, most of which is in wetlands backed by hardwoods. However, intense residential development pressures may soon foreclose any opportunity for acquiring this prime shoreline natural area. One of the largest continuous coastal marshlands in the region is the 212 acre Black Marsh with more than five miles of Baltimore County shoreline. However, due to the ownership of this area by Bethlehem Steel Corporation and their industrial use of adjacent properties, the future integrity of the Black Marsh area is doubtful. Finally, the highly important Otter Point Creek marsh area in Harford County remains under pressure due to the recent approval of contiguous areas for residential development.

**Recommendation:** Ecologically significant natural areas within the region's coastal zone should be given immediate emphasis for acquisition by the Department of Natural Resources and the local jurisdictions. Priority for acquisition of new Natural Environment Areas and Natural Resource Management Areas within the state should be given to those areas within the Baltimore region's coastal zone under the greatest development pressure, such as the South River headwaters (Anne Arundel County), Saltpeter and Dundee Creeks (Baltimore County); Black Marsh (Baltimore County); and Otter Point Creek marsh (Harford County). Immediate acquisition of land within the acquisition lines of the Gunpowder State Park's Gunpowder Delta section must begin to insure the integrity of those acquisition plans. The acquisition lines for the Gunpowder Delta section should be expanded along Bird River (Baltimore County) and the Little Gunpowder River (Harford County) to more accurately reflect the opportunity for acquisition of significant natural areas. To implement the previously mentioned acquisition priorities in an expeditious manner, the Department of Natural Resources and the local governments should more fully avail themselves of the opportunities of providing incentives to private land owners through the use of conservation easements. This should be done in concert with the Maryland Environmental Trust, the Nature Conservancy and the American Land Trust. Future natural area and wildlife habitat area acquisition priorities should be made in accordance with the policies set forth in the Parkland section of this study.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ○ | ● | ● | ● | | | | | | 5 |



## AGRICULTURAL RESOURCES

Coastal agricultural lands are of great value as natural resource areas. Much of this land is considered prime by U.S. Soil Conservation Service standards. It produces high quality vegetable and fruit crops that can be shipped economically and quickly to the markets of Baltimore City and adjacent communities. Projections of future food needs—and the greater cost of growing many crops outside the coastal zone—make existing coastal agricultural lands a natural resource of regional and statewide concern. Fuel and fertilizer costs, and the probability that future yield increases will be achieved only through energy-demanding techniques, add to the value of naturally fertile coastal lands.

Coastal agricultural land contributes to a stable economy by providing both direct and indirect job opportunities, income, and markets. Privately owned and operated coastal farms provide taxpaying agricultural open space with many important environmental benefits. Well-maintained farms protect the hydrologic integrity of watersheds through the control of storm water runoff, the reduction of sedimentation, the protection of coastal aquifer recharge areas, and the provision of buffers for water supply. They also provide significant wildlife habitats. And they maintain the quality and beauty of the environment through the air cleansing effect of growing plants.

The retention of coastal agricultural land can help guide the region's future urban growth, reduce costs for public service extensions, provide beneficial use of land that could be hazardous or inappropriate for other types of development, and maintain such future land use options as the extraction of mineral resources. Furthermore, the continued operation of coastal farms preserves a unique and valuable way of life.

Vast areas of agriculturally productive coastal land have been lost to urban expansion. The number of coastal farms in the region has steadily declined for two decades. The urbanization of the region's coastal zone has resulted in the location of subdivisions and homes fragmenting agricultural land and ownership patterns, making many coastal farm operations less economical. Coastal development and land speculation have rapidly increased the cost of agricultural land and its tax assessment, increasing their operating costs and decreasing their economic viability.

Public capital investments currently encourage the development of coastal agricultural land. The extension of such public services as highways, roads, and utilities to agricultural areas has historically resulted in the development of these areas. The presence of public services has been the single most important factor in the conversion of coastal agricultural land to other uses. The fiscal consquences of this development have an impact on all taxpaying citizens of the region. When disorganized and disorderly growth and development occur in the coastal zone, demands are made by developers and speculators for public facilities and services that cannot be justified by cost or location. The financial demands on the county, the state, and therefore on the taxpayers, for sewage treatment facilities, roads, open space, and health and education facilities increase disproportionately with excessive conversion of agricultural land. Continued scattered coastal development will cause more requests for public facilities and services.

**Recommendation:** Local jurisdictions should establish Stable Urban-Rural Coastal Boundaries. Because the sprawl of coastal urban development into nearby agricultural areas has systematically diminished the available amount of agricultural land and generated serious land use conflicts between existing agricultural and encroaching urban uses, further urban encroachment into prime agricultural lands should be curtailed. A well-defined, stable demarcation line between urban and agricultural uses should be established for Anne Arundel. A similar urban-rural demarcation line has been established by Baltimore and Harford Counties. The three coastal counties should discourage public capital investments in roads, utilities, and other community facilities which would lead to urbanization beyond these urban-rural boundaries. The Coastal Zone Unit should recognize this line as an important factor in project evaluation.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | | ● | ● | ● | | | | | | 6 |

Existing State preservation measures for coastal agricultural land are inadequate. Some agricultural preservation measures are now in effect in Maryland and new measures are soon to be enacted. However, existing State laws simply do not adequately provide for the preservation of valuable coastal agricultural land. This problem is not unique to the coast, although it is more critical there due to immediate urbanization pressures.

Since 1956, Maryland has had a preferential farm land assessment law designed to tax agricultural land based on its actual use rather than on its developmental potential. Modifications to the law in 1972 provided for a deferred tax if the agricultural land is converted to a non-agricultural use. Although this revision tends to lower a farm's operating costs, the economic benefit has not been sufficient to dissuade farm owners from selling their land for non-agricultural purposes. The profit made by a farm owner selling his land to a developer is always greater than the deferred taxation penalty. Thus, it has had little effect on preserving agricultural land, although in a limited number of cases it has served to delay the need for a full or partial sale of a farm owner's land.

The 1977 session of the Maryland legislature enacted new legislation providing a program for the purchase of agricultural land preservation easements by the Maryland Agricultural Land Preservation Foundation. However, the enabling legislation in effect eliminates the potential purchase of preservation easements for agricultural land located within a ten-year water and sewer plan unless the easement price is comparable to a similar easement on land not to be serviced within ten years. Since the provision of public services increases the value of coastal agricultural land, it is unlikely that the cost of the easements would be equal, thus precluding the preservation of the agricultural land most in danger of development. In addition, the approved legislation fails to provide an adequate funding mechanism for purchasing preservation easements. The act gives local jurisdictions the option of using a portion of their Program Open Space Funds to purchase agricultural preservation easements but it neglects to provide any other source of funding. The reliance upon Program Open Space Funds will probably be inadequate due to expenditures of local funds for parkland acquisition and development.

**Recommendation:** The Maryland Legislature should investigate an unearned increment tax to provide monies for the Maryland Agricultural Land Preservation Fund. The idea is that agricultural land increases in value due to public and private activity. As a result, there is an unearned increment which might be recaptured on such taxable events as sale or transfer for a non-agricultural land use. The enactment and implementation of an unearned increment tax at the time that agricultural land is sold or transferred to non-agricultural uses would provide two important benefits toward preserving coastal farm land. Initially, it would provide an equitable means of taxation for funding agricultural preservation easements by taxing the source of much of the existing problem—those that convert farm land to non-agricultural uses. Secondly, the unearned increment tax could dissuade speculators from purchasing agricultural land on the hunch that it can be developed at an inflated profit.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | | ● | ● | ○ | | | | | | 6 |

Within the last year and a half, both Baltimore and Harford Counties have undertaken efforts to modify their zoning of agricultural land. The difficulty with both efforts as well as the zoning in Anne Arundel County, is that they do not zone prime and productive agricultural lands for exclusive agricultural use. Essentially, the zoning efforts to protect agricultural land have failed to produce agricultural zoning; rather, they have produced a large-lot system for sprawling rural residential development. While it is certain that the present systems are improvements over the past zoning classifications, they do not promote continuing agricultural use.

**Recommendation:** Coastal county zoning should permit only agriculturally related development on productive coastal agricultural lands. New development on agricultural lands should be limited to construction necessary for farming such as farm residences and buildings, residences for family members, farm-worker accommodations, farm service facilities, rural roads, or other uses related to an agricultural economy. Any development permitted on agricultural lands should be sited and designed to minimize adverse impacts on agricultural operations.

Agriculturally zoned lands should only be allowed to convert to non-agricultural use where: (1) conversion is required for public service, energy, and transportation facilities or for mineral extraction; (2) the proposed facility or activity is necessary for the public good and is consistent with other coastal policies; (3) there is no alternative location that would meet the same need with less environmental damage; and (4) such facilities are sited and designed to minimize adverse impact on the agricultural resource.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | | × | ● | ○ | | | | | | 6 |

**Recommendation:** Criteria for the designation of Agricultural Zones should be established by the Coastal counties. The designation of an agricultural parcel for either agricultural or urban use should consider: (1) the long-term agricultural production yield potential of the parcel in question; (2) the size of the parcel and whether the parcel can be combined with adjacent or nearby agricultural parcels for agricultural purposes; (3) whether the parcel is contiguous to developed areas; (4) whether the parcel is in close proximity to urban services such as roads, sewers, and water; (5) whether the parcel could be maintained in productive use by use of greenhouses; (6) energy and transportation costs relative to other areas where the same crops are grown; (7) the potential for causing development pressure on nearby agricultural parcels; (8) the absence or presence (for five years or more) of agricultural-urban conflicts; (9) whether the parcel could provide recreational uses; and (10) whether the conversion of the parcel to urban development would further other coastal policies, or (11) contribute to the completion of partially filled neighborhoods.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | | ● | ● | ○ | | | | | | 6 |

**Recommendation:** Counties should limit the division of land within coastal agricultural zones. Subdivisions and lot splits should not be permitted to reduce agricultural parcels to a size that is uneconomical or impractical for continued agricultural production on the parcels in question or on adjoining parcels. Where divisions of agricultural lands are allowed for agricultural purposes (such as long-term leasing of specific parcels), the approval of such divisions should be conditioned on the recording of appropriate restrictions precluding the future division of the parcels and limiting the use of the parcels to agricultural activities.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | | × | ● | | | | | | | 6 |

Coastal agricultural operations may have such adverse effects as the introduction of toxic pesticides, increased sediment loads, and runoff of nutrients causing excessive algae growth in watercourses, removal of large areas of native vegetative cover, and heavy drafts on surface and groundwater supplies. In addition, agricultural operations are exempted from having to obtain any county grading permits and obtaining and carrying out a Soil Conservation District Sediment Control Plan.

**Recommendation:** Agricultural operations should be required by local jurisdictions to provide aquatic buffers according to a formula based on degree of slope and the normal high water mark and all coastal farm tillage should be carried out in conformance with the provisions of an approved Soil Conservation District Sediment Control Plan.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | | ● | ● | ○ | | | | | | 23 |

## MINERAL RESOURCES

The region's coastal zone is an area of relatively flat plains and low hills underlain by unconsolidated sedimentary strata from which most of the region's sand and gravel production originates. Sand and gravel are present in several coastal geologic formations including the Wicomico and Sunderland formations which are mined in some areas of Anne Arundel County; and the Patapsco and Patuxent formations which are the most important sources of sand and gravel being mined in Anne Arundel, Baltimore, and Harford counties. Although these sources of natural aggregate material occur over relatively large areas, deposits suitable for mining occur on a widely scattered basis throughout the coastal zone. There are no mineral or fossil fuels located in the Baltimore coastal zone.

The location of mineral aggregate deposits is critical to the industry. Because these low-value materials are extracted in large quantities, mining operations must be located near urban centers, the primary consuming areas. To minimize the transportation costs, which amount to at least fifty percent of the delivered price, sand and gravel producers have historically placed a premium value on deposits closer to market centers.

Most of the Baltimore region's supply of sand and gravel is obtained from within the coastal zone. A limited amount is imported from the Eastern Shore and Cecil County. Over three million tons of sand and gravel is consumed annually within the region. Imports from outside the region have historically been less than ten percent of annual consumption. However, since both of the largest Baltimore-based mineral aggregate producers control either options or negotiated leasing agreements on deposits in Cecil County, this has had some effect on limiting shipments to Baltimore from that area. The Aberdeen Providing Grounds and the Chesapeake Bay have potential supplies of sand and gravel that are not now exploited. In both areas, substantial geologic exploration and careful study of environmental impact would be required before mining operations could be considered.

Crushed blast furnace slag, a by-product of the steelmaking process, is produced at Bethlehem Steel Corporation's Sparrows Point plant. The relationship between slag production and iron and steel production means that slag output depends upon blast furnace activity and not on the demand for the slag as an individual product. Current demand for slag is such that all produced is consumed within a year. As such, slag cannot be considered an untapped or growing potential source of mineral aggregate. In fact, the tendency to utilize higher grades of iron ore or concentrates has cut the production of blast furnace slag on a regional and national level.

The regional demand for aggregates is predominately for three types of construction: highway, 52 percent; nonresidential, 31 percent; and residential, 17 percent.

Concrete production uses the greatest amount of aggregate material: sand as a fine aggregate, and crushed stone, gravel, or crushed blast furnace slag as coarse aggregate. As base material and fill, large amounts of coarse aggregates are used for road base and foundation construction.

Data on the availability of coastal mineral resources is presently incomplete. Local planning and zoning decisions, by necessity and legality, depend on complete and accurate information. To ensure that a future supply of aggregate is adequate, there must be accurate information on location, amount, and type of coastal mineral resources.

Recent trends show that the amount of land necessary to justify investment has increased because economies of scale favor larger operations and they, in turn, require greater reserve tonnages under the land. The proximity to market for mineral aggregate operations has a demonstrated impact on the price of aggregates because of transportation costs. These factors can only be addressed effectively when there is an adequate data base on the availability of coastal mineral deposits for local planners and officials.

**Recommendation:** To reduce the pressures of haphazardly mining coastal sand and gravel resources, the Maryland geological Survey should step up inventories of the location, quantity, and quality of the Baltimore region's mineral resource deposits.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ● | ○ | | | | | | 30 |

Urban expansion limits the availability of coastal mineral resources. The availability of these resources is affected by urban development in three ways. The Baltimore region's trend towards decentralized urban development has fostered increased, and sometimes excessive, construction activity demanding coastal sand and gravel resources. Forced by economic constraints to be located as near to the region's urban center as geologic constraints will permit, the expansion of the urban area often forces the premature closing of the producer's operation. In addition to loss of existing production, continuing decentralized urbanization makes sand and gravel unavailable by preempt-

ing the land surface and subsurface mineral deposits. This kind of preemption reduces the potential supply by one million tons yearly.

Urban expansion often results in land use conflicts requiring the restriction of the aggregate producer's operation. These restrictions include when operations may be conducted, methods of operation, and methods of transporting products. Such restrictions are sometimes enforced by issuing short-term operating permits when the restrictions are agreed to by the producer. Although it seldom occurs, permit renewals may be denied, thus prematurely terminating production. As a result, the producing firm abandons that site and searches for another minable deposit, usually located further from the urban market area.

New sand and gravel excavations are more often being located in areas considered to be environmentally sensitive. Since less sensitive areas are often preempted for other land uses, the selection of natural or agricultural areas is inevitable in many places. This is compounded by the special exception system that all coastal jurisdictions employ as part of their zoning regulations. The special exception system allows land to be zoned for a particular land use but also allows for special exceptions to be granted for mineral extraction. Usually, the special exception places certain restrictions on operations and requires annual inspections or re-evaluations. However, in Baltimore County once a special exception for mineral extraction is granted and a test pit is made the special exception is effective for an indefinite period of time. This practice ignores the responsibility of the local government to insure the public safety and welfare by monitoring the operation. In cases where there is no excavation for years after the issuance of the special exception, there is no follow-up evaluation that proves at the time of excavation that it is in fact the best current use of the land.

Increased sand and gravel prices due to increased transportation and operating costs will affect the residents of the Baltimore region both as consumers of private construction and as taxpayers supporting public construction. The most significant impact will be the increased cost of road construction and maintenance programs. Such large public projects as dams, bridges, mass transit systems, and non-residential building construction will also cost more.

Centralized urban development, imports, and improved resource recovery technologies may extend the life of existing sand and gravel supplies. Depletion, however, is already in sight as are the problems and higher costs associated with material shortages. The ultimate depletion of supplies may be inevitable but it is in the public interest that planners, local officials, and the aggregate industry conserve resources of sand and gravel so that maximum reasonable use may be attained from the available supply in an environmentally compatible manner.

**Recommendation:** The counties should establish potential mineral resource zones in conjuction with sequential land uses. The purpose of the mineral resource zone would be to ensure extraction of existing sand and gravel deposits prior to the development of the land for other purposes. This method establishes certain zones for the primary purpose of mineral extraction.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | | ● | ● | ○ | | | | | | 17 |

The major condition necessary for the establishment of such zones is that substantial commercial deposits of sand and gravel be available. It must also be determined if mineral extraction is the most beneficial use of the land. Its implementation must include consideration of alternative land uses to prevent reduction of land values by forcing a less valuable use. Mineral extraction operations must be required to be compatible with existing land uses in the area. All existing and future sand and gravel mining operations should be restricted to operation only in mineral resource zones. No structural improvements should be permitted in mineral resource zones unless they are to support excavation operations.

Specification of the subsequent use of the land after the mineral extraction should be incorporated into a mineral resource zone ordinance. The use of the depleted aggregate site should be planned before mining operations commence. Since extractive operations are temporary, plans for the sequential use of the mined-out lands should be required as part of the zoning to promote rehabilitation in coordination with other land uses in the area.

The mining of coastal sand and gravel deposits involves many environmental hazards. Open-pit mining removes all vegetation, creates overburden and waste disposal problems, may pollute both air and surface water, increases sedimentation, and deprives wildlife of habitat. Abandoned coastal open-pit mines serve as major sources of erosion, storm water runoff, sedimentation and scenic destruction. Dragline mining, which scrapes off surface materials with a bucket suspended from an arm, either on land or under water, can cause disruption to aquatic areas, pollute the water with silt and residual material, create dredge spoil disposal problems or it can cause any of the problems associated with open-pit mining. Runoff and increased sedimentation caused by upland mining of sand and gravel has reduced spawning grounds and resulted in increased estuarine siltation.

The environmental impacts resulting from mineral extraction are primarily regulated by local jurisdictions through special exception requirements, grading permits, and sediment control plans. However, Baltimore County exempts mining operations from grading permit and sediment control requirements if they obtain a State Surface Mining Permit. The issuance of a State Surface Mining Permit requires only perfunctory con-

sideration of environmental impacts and does not require either public hearings or review by local agencies of permit applications or sediment control and reclamation plans. However, if excavation is to occur in flood plains or tidal wetlands, the water Resources Administration requires public hearings for issuance of the necessary permits.

**Recommendation:** There should be strict enforcement of local and state mining, grading and sediment control regulations. Mining should not be allowed by local or state government authorities in sensitive areas such as marshes, wetlands, lagoons, streams, and other coastal water areas and landforms that are fragile, valuable, or highly scenic natural environments. Local and state government authorities including the Coastal Zone Unit should coordinate, to the extent possible, the review of all mining, grading and sediment control plans to avoid variance in restrictions and unnecessary delay for the applicant. Local government authorities should assist the Maryland Water Resources Administration in the implementation of the Maryland Surface Mining Act by providing an inventory of all land zoned, granted conditional use or special exception, or considered to be a nonconforming use which allows mineral extraction to ensure the enforcement of surface mining permit requirements. All surface mining permit applications, accompanied by sediment control and reclamation plans for excavations within the coastal zone should be submitted for review by appropriate local agencies. Public notification should be made of all submitted surface mining permit applications. And, local and state government authorities should coordinate the monitoring of excavation operations and enforcement of special exception and permit requirements. Permit applications for excavation within the acquisition lines for state and local parkland should be subject to public hearings.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | | ● | ○ | ● | | | | | | 17 |

**Recommendation:** Coastal mineral extraction sites should be required to provide watercourse buffer areas. Buffer areas should be mandatory to provide maximum feasible screening of new mineral extraction operations from coastal watercourses, beaches, tidal and non-tidal wetlands, and flood prone areas. Further, coastal mineral extraction operations should be required to provide aquatic buffer areas. In addition, screening should be required between mineral extraction operations and coastal roads, trails, residences and recreation areas.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | | ● | ● | ● | | | | | | 23 |

## GROWTH PRESSURES AND THEIR MANAGEMENT

Policies for urban coastal zone management should be directed toward achievement of a centralized development pattern for the Baltimore Region. This direction reflects consideration of a number of alternative future regional development patterns and a comparison of their consequences with the goals established for urban coastal management and the premises cited previously. The benefits of a centralized development pattern can be found in: air, water, and energy resource utilization; land resource preservation; public facility and infrastructure commitments; and economic and fiscal constraints. Specifically, when compared with more decentralized development, a centralized development pattern can:*

—Reduce potential septic system failures in new residential subdivisions by 98%.

—Reduce the aggregate stormwater pollutant burden from new residential development by about one-half.

—Reduce the space heating requirements of new residential units by 25%.

—Reduce motor vehicle fuel consumption by traffic due to new growth by 17%.

—Save a cumulative total of about 30 trillion BTU's of energy over the next ten years for residential space heating of newly constructed units and motor vehicle fuel requirements.

—Reduce the aggregate air pollutant emission burden from residential space heating of newly constructed units by 24%.

—Reduce motor vehicle air pollutant emissions attributable to new growth by 10–18%.

—Reduce total residential land requirements of newly constructed units by 62%; reduce land requirements outside the planned 10-year sewer service area by 75%; and by 42% inside the service area.

—Reduce farmland losses by 75%; a saving of over 80 thousand acres in the coastal jurisdictions alone.

**First-Cut Land Use/Environmental Assessment of Alternative Regional Development Patterns*, Draft, January, 1977, Regional Planning Council, Baltimore, Md. Revised, June, 1977.

—Reduce forest losses by 65% (over 37 thousand acres).
—Reduce transportation costs for solid waste collection and hauling.
—Result in less ground water withdrawals by individual wells in newly constructed residential subdivisions, and less discharges of effluent into ground water from septic systems and seepage pits.
—Reduce traffic as measured in vehicle miles of travel.

The best course for future development in the coastal zone—after considering past trends in development and their consequences, the premises concerning the future, and the evidence of an evaluation of alternative future development patterns—is toward a more centralized development pattern.

**Recommendation:** Coastal resources should be managed to achieve a more centralized development pattern. Public actions should be designed to enhance, maintain and revitalize existing communities and public policies should encourage the growth of existing town and community centers with appropriate supporting facilities. Scattered development in the rural coastal areas should be virtually halted, and new well-planned development should utilize land resources within existing communities and in carefully staged new growth areas in sequence with the orderly provision of public services and facilities.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | × | ● | ○ | | | | | | 14 |

The purpose of this policy is not to contain, to control, or to limit the rate of economic growth—but to attain and manage a strong and sustainable economic level. Less growth would, of course, mean less development, lower public service requirements, and fewer impacts; but it would make the need to plan for orderly development no less important. The intent of this policy is to better manage development in the context of scarce resources and rising demands for environmental quality and public service adequacy, and to improve the quality of life of all the region's residents, present and future.

The trend toward scattered residential subdivisions in rural areas is wasteful of energy and other resources. It saps the growth potential from existing communities and increases demands for urban services within rural areas while reducing revenues for services within urban areas. It threatens the continued viability of farmland. Over 60% of all land subdivided between 1970 and 1975 was located outside planned 10-year sewer service areas. This trend, together with other economic pressures, has resulted in a 27% decline in farmland acreage between 1964 and 1974. To redirect future growth into existing communities and staged growth areas, the following policies should be adopted.

**Recommendations:** An urban/rural boundary should be established which separates the future urban service area and the rural service area. Urban development and urban services should be planned and encouraged inside the urban service area and discouraged in the rural service area. Within the area of focus, the Coastal Zone Unit should recognize this boundary as a first broad test of applicability in program review and project evaluation.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ○ | ● | ○ | ● | | | | | | | | 14 |

**The Urban Service Area**

The Urban Service Area should be planned to accommodate the urban land needs of a more centralized pattern of urban development, staged over the next twenty years to coincide with the timely provision of public services and facilities and harmonized with environmental systems and natural features. Regional priorities and policies within the Urban Service Area are associated with the following areas: Existing Communities, Staged Growth Areas, and Conservation Areas.

Existing Communities:

Existing coastal communities are resources of national importance. Major investments and commitments, both public and private, have been made to establish, maintain, and to foster continued vitality within such coastal communities as Baltimore, Annapolis, Aberdeen, and Havre de Grace, as well as in the surrounding suburbs. These centers provide some of the best opportunities for employment and the highest levels of services and delivery of goods in the State. They contain major health-care facilities, social institutions, universities, cultural opportunities, and an historical legacy that is unique and irreplaceable.

Major potential still exists for seizing the opportunities these communities offer. This has already begun to happen in the waterfront district in Annapolis and in the Fells Point area in Baltimore. Major redevelopment has also transformed Baltimore's Inner Harbor, returning a portion of the harbor to the metropolitan community at large and focusing development on the potential offered by a modern, community-oriented waterfront. However, in recent years, many communities have faced mounting difficulties in providing increased employment opportunities, opportunities for social contact, and urban residential communities.

Leapfrog development has bypassed many areas suitable for development and infill and has strained the

ability of local resources to extend urban services to the hinterlands. This has sapped the vitality from many established areas and dampened the pace of development and redevelopment. Stagnation, deterioration, disinvestment, and abandonment characterize many communities as growth spills outward and bypasses them. Such inefficient utilization of urban land, human resources, roads, sewers, schools, and public services ultimately results in increased public expenditures to be borne by every resident in the region. These problems, characterized as "urban" in the past, are inseparable from growth management concerns and central to managing an urban coastal zone.

**Recommendation:** Urban coastal zone management carries a commitment to rediscover the values of existing communities, to enhance their strengths, to solve their problems, and where necessary, provide them with new investment, new growth, and renewed vitality. The Coastal Zone Unit, local governments, and the Regional Planning Council should actively encourage the development and revitalization of established coastal communities within the urban service policy area.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ● | | | | | | 14 |

Staged Growth Areas:

Although coastal growth policies stress carefully planned development utilizing vacant, skipped-over parcels within existing communities, the development requirements of the region over the next twenty years will require selective extensions of public facilities and services into staged growth areas to insure an adequate supply of developable land within existing communities. These staged growth areas should be sufficient enough to allow for market flexibility and choice but not so expansive as to allow costly, sprawling, decentralized patterns of development.

**Recommendation:** Development should be guided into existing communities where there is vacant land already served by public facilities and services, housing which can be renewed, converted or rehabilitated, and older commercial and industrial areas which can be revitalized; and into appropriate staged growth areas in sequence with the orderly provision of public services and facilities.

Each jurisdiction should extend facilities in such a way as to maintain a supply of developable land within its existing communities and its staged growth areas sufficient to accommodate five years of anticipated development requirements.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ○ | | | | | | 20 |

Preferred (Stage I) Growth Areas should be those areas which, in combination with the vacant land in existing communities, will provide the land resources for development needs up to 1985. Public services and facilities should be staged to include service to those areas.

Deferred (Stage II) Growth Areas should be those areas which, in combination with vacant lands in existing communities and Stage I Growth Areas, will provide the land resources for development needs from 1985–1995. Public services and facilities should be staged to include service to these areas at the appropriate future time.

Conservation Areas:

The adequate provision of open space within the urban service area is crucial to the success of growth management. Open space offers people opportunities to participate in recreation and leisure time experiences and to relate to the natural world within their own communities. It offers change and relief from the man-made environment, and serves a variety of environmentally important functions—from moderating storm water runoff and climatic changes, to protection of sensitive natural features.

**Recommendations:** Key natural features, conservation areas, and parkland should be set aside in a permanent open space system within the urban service area. A network of river and stream valley parks, wetlands and shorelands, area and regional parks should offer people recreational experiences close to where they live. This network should provide form and definition to the development pattern within the urban service area and protect the integrity of important natural systems.

The Coastal Zone Unit, local jurisdictions, and the Regional Planning Council, working cooperatively, should identify, evaluate, and rank suitable areas for inclusion into local and state open space and recreational planning activities.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ● | ● | ● | ● | ● | | | | | | 8 |

**Rural Service Areas:**

Agriculture and forestry, open space, and conservation should be the dominant function of the Rural Service Area. In the past, public policies have allowed urban residential subdivisions to encroach randomly within the rural areas of the region. Between 1970 and 1975, one out of every eight residential units created in the subdivision process was located outside the sub-

urban counties' planned 10-year sewer service area. For every four acres subdivided inside the service area, six acres were subdivided in rural areas outside the service area. From this record, it is clear that large-lot subdivisions have not been an effective means of growth control. Two acre lots by themselves, are ineffective growth management mechanisms, and in lieu of additional techniques, lead to excessive land consumption.

Urban development in the rural areas has also preempted prime farmland. It has bid up farmland prices making it increasingly difficult for young farmers to purchase farmland and gain a reasonable return from the farm income it produces.

Even under the most favorable soil conditions, septic tanks have a limited life expectancy. In unsewered coastal areas, the vast majority of soil conditions are much less than ideal and may not be adequate for even a one-year life due to impervious layers, fluctuating water tables, and other natural constraints. In the past, provision of public water and sewer has been seen as the only technological solution to health problems associated with failing septic tanks. Other treatment technologies exist and should be given consideration. As the cost of providing public services increases, particularly in regard to the consequences of the growth that is promoted by such actions, the long-range desirability of other technologies may far outweigh any short-range considerations to the contrary. In cases where no alternative technologies would prove feasible and where the cost of providing sewer and water service would be comparable to the existing value of development, public condemnation on the grounds of health and safety should be seriously considered. Urban services simply cannot be extended to sprawling, scattered areas without great cost.

**Recommendations:** The priority uses in the rural service area should be farming and forestry, public watershed protection, conservation of valuable natural areas and wildlife habitat, and major public parkland where appropriate. Urban development within the rural service area should be virtually halted.

Urban services and facilities, particularly new highway access, water and sewerage facilities, should not be extended to serve the rural service area. Urban development should not be permitted without reclassification.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ○ | ● | ● | ○ | | | ● | | | 15 |

Urban coastal zone management must be a cooperative effort involving local, regional, and state agencies in actions that affect both land and water uses and resources. The single factor separating urban coastal management from rural areas is the need to manage explosive growth pressures effectively. Between 1970 and 1975, the coastal areas of the region experienced a rate of population growth two and a half times that of the region as a whole. Growth in the suburban coastal areas more than doubled the overall rate of suburban growth, and outstripped the Region-wide rate of growth by almost 500%.

In the next 10 years, up to 43% of the total regional population growth and up to 41% of all new household growth may take place in the region's coastal areas which comprise only about 20% of the region's land. Even if policies designed to centralize and guide growth are effectively implemented, future coastal growth will continue at a rate significantly higher than the rest of the region. Future development pressures are estimated to be 50% higher in the coastal areas of the suburban jurisdictions than the region as a whole, or about 10% greater than the suburban growth pressure. Conservation of coastal lands can be accomplished only if urban coastal management and growth management objectives and policies are carefully integrated to guide growth into existing communities and developments and into areas adequately serviced by utilities and roads.

**Recommendation:** The Coastal Zone Unit, local jurisdictions and the Regional Planning Council should adopt an urban coastal management growth strategy integrating coastal zone project evaluation and program review with local and regional growth management objectives and land use controls.

For purposes of project review and to serve as a preliminary geographic basis for establishing consistency between growth management and urban coastal zone policies, the five types of growth management areas should be consolidated into three coastal management review categories: Development-Preferred Areas; Conditional Areas; and Preservation-Preferred Areas.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | ● | | | | | | 34 |

Under Coastal Zone Management project review, development proposals within the Development-Preferred (DP) Category should be encouraged under the assumption that appropriateness exists, pending specific project detail and any required environmental impact statements. Existing Community Areas and Preferred Growth areas are included in this management category.

In the Preservation-Preferred (PP) Category, projects and developments should be discouraged. Potential development should face a presumption of inappropriateness unless there are compelling reasons along with impact mitigation measures which are presented in behalf of the proposal. In this case, the burden

of proof rests on the developer himself to demonstrate the necessity of the proposal and the adherance to rigid environmental restrictions. This category includes Conservation and Rural Service Areas.

The third coastal management category is Conditional Areas (CA). Included in this category are lands in the Deferred Growth Areas that are considered developable upon provision of urban services and infrastructure, but are outside existing and five-year plans for such services. Projects proposed for these areas should be restricted. This means that, depending on the specific details, a project may or may not be found appropriate to the area or consistent with urban coastal management goals and objectives. Here developers will have to provide full environmental assessments and explicit site plans. In project evaluation, emphasis should be placed on the costs of sprawl, possible effects of induced development pressure, the feasibility of alternative locations, and whether or not the proposal will spawn accelerated decentralization or sprawl in the near project area.

The effective implementation of this kind of urban coastal management growth strategy requires that local jurisdictions prepare "coastal guidance plans." These plans would address: (1) the relationships between the suggested growth categories and each jurisdictions prescribed zoning and land use classifications; (2) the effect continuing state and federal environmental management and economic development programs will have on the jurisdiction's resource base from a programmatic viewpoint; (3) local jurisdiction methods for meeting CZMP goals, objectives, and policies plus project evaluation and program review requirements; and (4) mechanisms with which the local jurisdictions choose to implement the recommendations contained in this study.

More specifically, the plans would contain local management policies, permit processes, decision making criteria, standards of performance, and if a local government chooses, land and water use plans for determining acceptability of proposed developments within the coastal area of focus.

**Recommendation:** The local jurisdictions with assistance from Coastal Zone Unit and the Regional Planning Council should prepare coastal guidance plans for the area of focus to guide continuing use and enjoyment of the coastline. These packages should be completed in time to be reviewed by the Coastal Zone Unit for consistency with the State management program and, if found consistent, be included in the first annual program recertification. When found consistent they should be used as a basis for project consistency.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | ● | ● | o | | | | | | 36 |

These plans should be prepared by the local jurisdiction's coastal planners and staff with technical assistance and participation from Regional Planning Council staff and the Coastal Zone Unit. Continuing coastal inventories, resource capability analyses developed as part of this study (see Appendix E), as well as studies and data developed by the Coastal Zone Unit, should provide a basis for initially determining the appropriateness of existing land and water use classifications in each coastal area category in the area of focus.

This determination should be most specific as to the mixture and intensity of uses for the Development-Preferred (DP) category, with emphasis on criteria for impact assessment and mitigation. Conditional Area (CA) analysis should focus on how certain uses might be phased into this Area with minimal fiscal and environmental effect. In the Preservation-Preferred (PP) category, major emphasis should be placed on resource management, natural features protection, and growth management through existing authorities at the State and local levels.

Second, the plans should focus on integrating ongoing adequacy-of-facilities studies, 208 Water Quality Planning, facilities planning, and comprehensive land use planning with the coastal zone management program. Particular emphasis might be placed on identifying work tasks not covered by these programs and devising a schedule of priorities for their accomplishment with CZMP funding.

Third, the plans should discuss the means by which local jurisdictions will continue to meet CZMP goals, objectives, and policies including project evaluation and program review requirements. Of particular importance are the mechanisms local jurisdictions might use to implement recommendations contained in the study.

Fourth, the plans should include a review and analysis of regional plans, such as the Baltimore Harbor Plan, and regional concerns such as marinas, boating congestion, and mineral resource supply and development. In these cases, the coastal guidance plans should suggest specific revisions to prior plans based on new data, or altered conditions and policies, or propose regulations, ordinances or codes for implementation by the appropriate participant.

The preparation of the Coastal Guidance Plans should be overseen by the Metropolitan Advisory Board (see following section, Solving Coastal Problems) and by the local jurisdictions acting through their coastal planning personnel.

Much of the work necessary to prepare a Coastal Guidance Plan for the Baltimore City area of focus has been accomplished through preparation of the Harbor Opportunities Plan. This plan will identify opportunities to expand water-oriented recreational activities, to introduce residential development along the shoreline and to identify areas for economic growth and development. As part of this planning process the Bal-

timore City Department of Planning in cooperation with the City's Commission On Historic and Architectural Preservation has identified and documented historic structures along the harbor shoreline. To assess industrial needs, the Department of Planning, in cooperation with the Baltimore Economic Development Corporation, interviewed industries located within the area of focus. Information compiled from these interviews will be used to evaluate the impact of federal, state and local resource development programs, as well as to identify opportunities for economic development within the City. Through these study programs, the Department of Planning will propose guidelines for the use of the City's waterfront which are consistent with economic growth and environmental quality objectives expressed in local, state and federal laws.

**Recommendation:** The Coastal Zone unit should implement federal and state consistency of actions with the Coastal Guidance Plans by including the Coastal Guidance Plans in the first annual recertification of the approved coastal zone management program.

| Harford Co. | Balto. Co. | Balto. City | A.A. Co. | RPC | DNR | DECD | DSP | DOT | DHMH | MPA | State Obj. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ● | ● | ● | o | ● | o | | | | | | 34 |

The Coastal Zone Unit should provide technical, staff, and public participation assistance to the Metropolitan Board and to local and regional technical staffs in the preparation of the Guidance Plans. The Unit should also review the end products, recommendations, and Coastal Guidance Plans to ensure that they meet the goals and objectives of the approved state Coastal Zone Management Program. When the Plans have been found consistent with the State's policy framework, they should be transmitted to the Office of Coastal Zone Management (OCZM) and included in the annual recertification of the approved program. The guidance plans will then be subject to the same provisions of federal consistency as other portions of the program.

# PART V: SOLVING COASTAL PROBLEMS

At heart, coastal zone management is a process for getting things done. Over the years, the coastal environment has deteriorated and has not been adequately managed because of a complicated and difficult to understand decision-making process, the sheer number of affected interests and responsible authorities, and an inability to reconcile differing values and roles into an effective resolution.

Symptoms of this situation include entrenched misunderstandings regarding the motives of the various participants (e.g. the environmentalists vs the industrialists), jealous guarding of institutional roles (e.g. state prerogatives vs local prerogatives), erecting barriers to comprehensiveness (e.g. the reluctance of permitting agencies to broadly interpret their legislative mandates and consider secondary impacts of coastal activities), and so on. The point is that there are both real and imagined barriers to getting things done in the coastal zone and that many of these obstacles have been inadvertantly created by the present structure for making decisions. A concrete illustration is the actual number of authorities making decisions about the coastal zone. The following list was adapted from one prepared by the Citizens League of Baltimore for its recent report *The Chesapeake Bay and the Port of Baltimore:*

WHO IS DOING WHAT ON THE BAY

| Who | What |
|---|---|
| FEDERAL | |
| Dept. of Agriculture | |
| Soil Conservation Service (SCS) | Sedimentation, soil erosion, flood control activities |
| Dept. of Commerce | |
| The National Oceanic & Atmospheric Admin. (NOAA) | Funds and administers Coastal Zone Management Program |
| National Marine Fisheries Service | Strengthens fishing industry and promotes conservation of fishing stock, comments on Corps of Engineer permits |
| Maritime Administration | Regulates shipping and operation scheduling |
| Dept. of Defense | |
| Corps of Engineers | Administers dredge and fill permit programs for channel improvements, flood control projects, beach erosion, all structures in navigable waters, conducts the Chesapeake Bay Study (Chesapeake Bay Future Conditions Report and Chesapeake Bay Existing Conditions Report), operates hydraulic model, evaluates environmental impacts |
| Dept. of Interior | |
| Bureau of Outdoor Recreation | Administers land and water conservation, funds for planning and acquisition of areas for recreation (statewide) |
| U. S. Fish & Wildlife Service | Administers fish and wildlife programs for propagation, protection, reviews environmental impact statements, comments on Corps of Engineer permits |
| Dept. of Transportation | |
| U. S. Coast Guard | Navigation safety, clean up of oil spills, ice breaking, regulates bridge construction and operation |

| | |
|---|---|
| **INDEPENDENT AGENCIES** | |
| Nuclear Regulator Comm. | Regulates nuclear power plants |
| Environmental Protection Agency | Administers Federal Water Pollution Control Act and Clean Air Act, oversees State permit process for discharges to water and air, provides grants for wastewater treatment facilities, reviews EIS, studies water quality problems on basin level, solid waste management, control of toxic substances, Chesapeake Bay Water Quality Study |
| Smithsonian Institution | Operates field biology research station, scientific programs |
| **INTERSTATE** | |
| Susquehanna River Basin Compact | Prepares comprehensive basin plan for Susquehanna which must consider effects on Chesapeake Bay |
| **STATE** | |
| Dept. of Transportation | |
| Maryland Port Administration, Modal Administrations, and office of the Secretary | Administers dredge and fill permit process in harbor, development of Port facilities, transportation planning, and construction, and operation of airports and mass transit |
| Dept. of Natural Resources | |
| Water Resources Administration | Oversees local implementation of soil erosion and sediment control permit program, constructs water works, administers flood control, water pollution abatement control program, advises the Board of Public Works on licenses for projects in State wetlands, administers private wetlands program |
| Md. Environmental Service | Responsible for disposal of liquid and solid wastes, river basin planning, operation of treatment plants |
| Md. Geologic Survey | Conducts topographic, geographic, hydrographic geophysical surveys |
| Wildlife Administration | All wildlife regulatory programs, sanctuaries |
| Energy & Coastal Zone Adm. | State Coastal Zone Management Program, power plant siting program, administers Coastal Facilities, Review Act |
| Md. Environmental Trust | Conservation easements |
| Dept. of Health & Mental Hygiene | |
| Environmental Health Adm. | Joint administration of health aspects of water pollution control program with Dept. of Natural Resources, water quality monitoring, comprehensive water and power planning, sets and enforces air quality standards |
| Dept. of State Planning | Statewide general development and outdoor recreation plans, state clearinghouse, reviews all plans and programs, administers critical areas and intervention program, prepares State Capital Budget, monitors local and State land use decisions |
| Dept. of Economic & Community Development | Economic development planning, promotion of industrial projects, Port facilities |
| Board of Public Works | Grants licenses for projects on state owned wetlands |
| **INTRA-STATE** | |
| Regional Planning Council | Coordination of plans, special studies, project reviews, regional planning for the Baltimore Region |
| Tri-County Council for Southern Maryland | Coordination of plans, special studies, project reviews, regional planning |

| | |
|---|---|
| Delmarva Advisory Council | Promotes economic development on eastern shore |
| LOCAL | |
| City of Baltimore and County Municipal Governments | Capital improvement programs, planning, licensing, zoning, subdivision control, soil erosion, sediment control, water/sewer planning |
| NON-GOVERNMENTAL | |
| Wye Institute | Strengthens educational, cultural, economic opportunities on Eastern shore |
| Chesapeake Bay Institute | Division of Johns Hopkins for study in oceanography, marine biology, estuaries |
| Chesapeake Research Consortium | Council for coordinating scientific research on Bay, U. of Md., Johns Hopkins, Va. Institute of Marine Science, Smithsonian Institution |
| Citizens Program for the Chesapeake Bay | Citizens' organization representing over 60 private groups, promotes better Bay management and coordination, educational programs, seminars |
| Chesapeake Bay Foundation | Fosters interest in Bay, operates, nature center for education, conducts studies |
| Center for Estuarine Studies | Division of University of Maryland for studies of estuarine processes and resources |
| Center for Estuarine Studies | Division of University of Maryland for studies of estuarine processes and resources |

The pieces for making decisions about the management of Maryland's coastal resources are in place. What is needed is clarification of the relation of the key pieces to one another and an operational framework that promotes the working together of the various elements. The key pieces of direct concern to this study are:

| | |
|---|---|
| The Core Group: | Harford County<br>Baltimore County<br>Baltimore City<br>Anne Arundel County<br>Regional Planning Council<br>Local citizens |
| The State's Lead Agency | The Coastal Zone Unit of the Energy and Coastal Zone Administration of the Department of Natural Resources |
| Other Concerned Agencies | Department of Economic and Community Development<br>Department of State Planning<br>Department of Transportation<br>Maryland Port Administration<br>Department of Health and Mental Hygiene |

At present, responsibility for coordination among the above participants rests with the Coastal Zone Unit. Its aim is to assure that all actions taken in the coastal zone are in accord with the State's management program, i.e. the approved objectives and policies for the use of coastal resources. Basic consistency with the management program is to be achieved through three mechanisms: (1) legislative assurances from the federal government that any federal actions within the State will recognize and meet the State objectives and policies; (2) interdepartmental memoranda of understanding between the Department of Natural Resources and other State agencies, cabinet level negotiation, the resolution of inter-departmental conflicts by action of the Governor, or legal intervention by the Department of State Planning; and (3) the resolution of conflicts between the Coastal Zone Unit and another agency of the Department of Natural Resources by the Secretary of the Department. Local governments will also be asked to review all planning, zoning, and other regulatory actions for consistency with the Coastal Zone Management Program. To aid in this activity, the Coastal Zone Unit is supplying financial aid to be used for staff assistance to each coastal jurisdiction. These, then, are the key devices created by the Coastal Zone Unit to deal with coordination, comprehensiveness, and consistency.

Four mechanisms will be used to ensure all governmental units use the coastal management authorities granted to them to carry out the State's Coastal Zone Management Program. First, a consolidated set of

goals and objectives for coastal zone management in Maryland has been drawn up. These goals and objectives will be formalized through memoranda of understanding between the Department of Natural Resources and other governmental units. Second, an advisory group, the Coastal Resources Advisory Committee (CRAC), has been established to represent local government participants, citizens and special interest groups. Third, a procedure has been established by which individual project proposals located in the coastal zone can be comprehensively evaluated for consistency with the state program. Fourth, a method for reviewing the impact of programmatic decisions on coastal resources has been established. "Programmatic" decisions include such actions as the issuance of new regulations, the development of local comprehensive plans and zoning ordinances, the development of plans by State agencies (e.g. River Basin or 208 plans, transportation plans), and the patterns of decision making on small, individually insignificant projects which cumulatively have severe, adverse impacts on coastal resources.

The local government role in coastal management is vital. The State's Management Program sees it occurring in this manner . . . "[Local] participation must occur in development as well as in implementation of the Coastal Zone Management Program. During the development phase the local governments review and improve the goals and objectives, as they are proposed by the Coastal Zone Unit, in order that the goals and objectives reflect the outlook of local preferences. The local governments identify and recommend to the Department of State Planning those Areas of Critical State Concern that are located within their jurisdictional boundaries. Along with each nomination, the local governments provide to the Department of State Planning a management plan for the preservation, conservation, or utilization of the critical area. Those Areas of Critical Concern located within the coastal zone will be made part of the Coastal Zone Management Program.

"When the Coastal Zone Management Program is accepted by federal authorities, the local government planning and regulatory activities become an element of coastal zone management. The local governments participate in its implementation by structuring future comprehensive plans, zoning plans/ordinances, and other actions in a manner consistent with the Program's goals and objectives. Those Areas of Critical State Concern designated by the Department of State Planning and included in the Coastal Zone Management Program will be managed according to the plan provided for each area.

"Participation by local governments in implementing the Coastal Zone Management Program can be augmented by providing a technical assistant to each of the coastal counties and Baltimore City if the [local government] finds it desirable. A contract can be written with each local government to provide funding to obtain the technical assistant. Identification by local governments of coastal resource management problems, requiring extra resources toward resolution, will mandate the Coastal Zone Unit to seek funds from the federal agency on behalf of the local government. Generally, if funds are to satisfy all requirements, the highest priority for funding should be given to remedy those problems identified as common to several local governments and critical to the effective management of coastal resources."

In short, the State's Management Program proposes three basic tools for local implementation of the coastal program—first, the nomination and preparation of plans for Areas of Critical Concern; second, the structuring of local plans, ordinances, and actions in a manner consistent with the Program's goals and objectives; and, third, the provision of technical and financial assistance directly to the local governments for work on coastal problems.

From the perspective of this study, what needs have not been met in the State's attempt to clarify coastal management roles and design an operational framework for local governments? In no particular order, they are:

—There is no forum for identifying issues of broader than local concern and resolving them on a regional basis.

—There is no means of resolving conflicting demands on regional or State resources prior to bringing them before State bodies.

—Assurance that the Coastal Zone Unit will have the opportunity to review all appropriate projects within the coastal zone is lacking.

—There is no organized mechanism to catalyze awareness, attract resources, and advocate metropolitan solutions to regional coastal problems.

—The opportunity for an annual formal assessment of the performance of the management program outside the Coastal Zone Unit is lacking.

—There is insufficient coordination and role definition for the "Core Group" (Harford, Baltimore County, Baltimore City, Anne Arundel, the Regional Planning Council, and local citizens groups) in the State's program.

How can this study help in meeting these needs? First, we can make specific management recommendations and have done so throughout the document. Second, we can formalize a commitment from each of the study participants to actually evaluate and act upon the recommendations. Third, we can spell out the evaluation process set up by each of the participants. And fourth, we can follow up on the evaluations and report on what actions, if any, were taken. The remainder of this chapter will be devoted to fleshing out the first three items—the fourth item must await action by the study participants.

The need to continue the dialogue about regional coastal zone management begun by the Technical Committee of The Baltimore Metropolitan Coastal Area Study is of great concern to those who participated in the Study process. One one level, the complex coastal issues of the region require a forum for debate

and coordination and, on another level, the Metropolitan Study needs a regional body to shepherd its recommendations through the endorsement process toward implementation. To this end, the Technical Committee suggests that an *independent Metropolitan Advisory Board be formed with the broad charge of acting as a regional forum for the discussion of coastal zone issues and the specific charge of acting as an advisory body to the Regional Planning Council and the local jurisdictions.*

Organization:

| | |
|---|---|
| Permanent Members | —the CRAC representatives from Anne Arundel Co., Harford Co., Baltimore Co., and Baltimore City and one member from each of their professional staffs. |
| Permanent Advisory Members | —Representatives from RPC, CZU, DSP, DOT, MPA, DECD, DHMH, and the Citizen Regional Representative to CRAC. |
| As Needed Participants | —Other State agencies, Federal agencies, and appropriate special interests (particularly those represented on CRAC). |

This group would have a wide variety of resources available to it. First, it has the technical expertise of the funded personnel supplied by the Coastal Zone Unit to the four jurisdictions. Second, it has the experience of local and State personnel in developing and coordinating the Metropolitan Area Study. Third, RPC's and CZU coordinating experience and physical facilities are available. Fourth, it has the existing coastal zone public participation mechanisms available for use. And, fifth, it may take advantage of the experience and contributions of special interest groups and their representatives.

Suggested Functions:

—Identify and analyze issues of broader than local concern and attempt to resolve them on a regional basis before bringing them before State bodies;
—Perform as a regional advocate before the Coastal Zone Unit;
—Focus public input on particular issues and simplify and clarify the channels of communication among coastal management interests;
—Involve affected State and federal agencies in a metropolitan approach to solving coastal problems;
—Contribute to the determination of 'scopes of works' for coastal studies and manpower assistance upon request of the managing agency;
—Contribute to the technical and policy direction for urban coastal management activities and special studies upon request of the management agency; and
—Aid in the process of examining and adapting the State Management Program's objectives and policies for use in regional guidelines and actions.

These functions are suggestions only but it would be necessary for a group of this nature to clearly spell out and adopt a set of functional concerns to guide its operation.

Suggested Initial Activities:

—Follow the recommendations of the Baltimore Study through the endorsement processes of the various participants and lend support wherever possible;
—Keep the purposes and processes of the Baltimore Study before the interested parties. This can take the form of progress reports, summaries of action taken, etc. The point here is to maintain the visibility of the Study and avoid its being shelved;
—Identify coastal management concerns that need a regional rather than local or statewide approach; and
—Identify coastal management concerns where further technical work is needed and investigate means of accomplishing it.

The most important long-range activity of this group would be to aid in seeing that the objectives and policies presented in the State Coastal Zone Management Program are considered and used in making resource management and land use decisions at the local and regional level.

The Metropolitan Advisory Board is the only new organization proposed by this study. All other organizations with roles to play in carrying out this study are in existence and actively involved in coastal zone management. Their commitment to act upon specific recommendations has already been spelled out (see the chart following each recommendation). The review process they will subject these recommendations to is covered in the remainder of this chapter.

Harford County

The recommendations pertaining to Harford County encourage action on the part of many different County offices. The center of continued planning and implementation will be in the Department of Planning and Zoning. Other centers of activity will be other County departments, other jurisdictions within the County, and County citizens.

The study will first be subject to review by the Resource Management Advisory Committee for endorse-

ment and then forwarded to the County Executive. Concurrently, technical review and revision will be made by the key County departments:

Department of Planning and Zoning
Department of Public Works
Department of Parks and Recreation
Department of Health
Historic Districts Commission
Soil Conservation District

Technical review will also be made by other jurisdictions within the County having authority over land use (where appropriate):

Incorporated Towns: Aberdeen
Havre de Grace
Belair
State Agencies: Park Service
Land Planning Services
Federal Agencies: Aberdeen Proving Ground

After this period of review and comment, the study will be presented to the County Executive and County Council for informational purposes and for approval of the program concept.

Baltimore County

The first two actions by Baltimore County will be to endorse the study concept in principle and endorse the study goals and management objectives in detail. These actions will be taken by the Office of Planning and Zoning, the Planning Board, and the County Executive.

The review, adoption, and implementation of the study's recommendations will be carried out (depending on the recommendation) by the following agencies: Office of Planning and Zoning, Planning Board, Landmarks Preservation Commission, Industrial Development Commission, Department of Traffic Engineering, Department of Public Works, Department of Permits and Licenses, Department of Recreation and Parks, Department of Health, Office of Finance, County Solicitor, County Executive, County Council, and the County Legislative Delegation. Cooperative action is foreseen with the following groups: Regional Planning Council, Maryland Department of Health and Mental Hygiene, Department of Transportation, Maryland Port Administration, Department of State Planning, Department of Natural Resources—Water Resources Administration, Energy and Coastal Zone Administration, and the Marine Police—and the Corps of Engineers.

The City of Baltimore

The City of Baltimore, through the Department of Planning, intends to participate and act on the State's Coastal Zone Program and the Baltimore Region Coastal Zone Management study at two levels. The first will be through program development and the ongoing project review process of City agencies and the Planning Commission. The second will be the implementation of private and public capital projects, as incorporated in the Baltimore City Development Program, which are consistent with the goals and objectives of the State and Regional programs.

To assure continued participation in the coastal planning process the City of Baltimore serves on the Regional Coastal Zone Technical Committee, has appointed a Mayor's representative and citizen to the State's Coastal Resources Advisory Committee and is represented by the Department of Planning and a citizen on the Regional Planning Council's Coastal Advisory Committee.

The Department of Planning receives funding from the Coastal Zone Unit to provide staff participation in program development and implementation. The Economic Analysis Section of the department has developed inventory information and summaries of industrial areas of the harbor. The Mayor's Office and the Baltimore Economic Development Corporation have participated in the evaluation and application of this information for specific projects.

Several City agencies will be responsible for implementing the findings and recommendations of the Regional Coastal Study and the State's Coastal Program. The following programs will be coordinated with the regional and State efforts:

*Action Process*

1. Economic Plans and Development:

*Ongoing Activities*

Baltimore's Development Program
Baltimore Overall Economic Development Program
Mayor's Advisory Committee on Small Business
Baltimore City Industrial Revenue Bond Program

**Recommendations:**

—Land with access to primary channels should be utilized for water dependent or water related uses.

—Land extensive uses which are dependent on water transportation, but provide minimal return to the jurisdiction in terms of taxes, employment and indirect benefits should occupy waterfront land only when the economics of its functions necessitate that relationship. Evaluation of alternative inland sites, methods of commodity handling or production which could minimize the need for waterfront land should take place prior to final site selection.

—Development of employment centers should occur in areas where there is adequate infrastructure to accommodate waste water flow, storm water runoff, traffic, emissions, power requirements, etc.

—Harbor sites to accommodate harbor dredging beyond the capacity of the Hart-Miller disposal site have been identified. Development of these sites should occur as soon as possible. Land created by these sites should be held in reserve for water dependent uses which can adopt to the construction contraints of fill.

—Revenue Bonds should continue to be utilized to

help finance the construction and expansion of industrial and commercial enterprises and for the installation of pollution control devices.

—Special urban renewal areas should be designated to create new opportunities for economic development and to strengthen existing industrial, office and commercial areas.

—Adequate highway and rail transportation systems must be provided for the port, industries and commercial enterprises. This requires the completion of Interstate 95,-Spur-395 and Interstate-83 and the local access improvements, a full interchange on Hawkins Point for 695, the loop road for Locust Point, improved access for the development of the Masonville site and other local projects.

—Realignment and reconstruction of rail yards to improve the efficiency of operation and free underutilized land for development as employment resource areas.

—The continued redevelopment of marine terminals and piers which are in poor condition.

—Reparcelization of underutilized and/or vacant land to provide development opportunities for employment intensive resources.

—Development of Fort Holabird as a major employment resource.

2. Recreation Plans

*Ongoing Activities*
Baltimore Development Program
Regional Open Space Committee

**Recommendations:**

—Utilize local, State and private funds for the development of marinas and launching facilities in the harbor. The Inner Harbor and Middle Branch/Patapsco areas offer the best opportunities as they are close to populated areas and more removed from intensive commercial shipping activity.

—Implementation of the Middle Branch/Patapsco Park Plan as a major shoreline facility.

—Development of the Five Forts concept as a regional, water-oriented tourist attraction. This will require the restoration of Fort Carroll, improvements to Fort Armistead and Fort Smallwood and the continued rehabilitation of Fort McHenry by cooperative agreements with private owners, local, State and Federal agencies.

—Coordination with the State of Maryland to establish a Baltimore Regional Shoreleine Park System.

—Identification and development of small scale sites for public access.

—Completion of the Inner Harbor East Shoreline to maximize public access.

—Completion of the Fells Point Plan with the recommended public access areas and parks.

—Development of water-oriented recreational and safety programs for school children and adults of the area.

Anne Arundel County

The County's review process will consist of the following steps:

1 Review by the Planning and Zoning Officer with advice from the Planning Advisory Board, the Planning and Zoning staff, and the Coastal Commission;
2 A recommendation forwarded to the County Executive by the Planning and Zoning Officer for action;
3 A resolution by the County Council (optional).

The Office of Planning and Zoning will serve as the lead agency in Anne Arundel County for implementation of the study recommendations endorsed by the County. Other agencies involved in implementation will be the Departments of: Health, Public Works, Inspection and Permits, and Recreation and Parks. Project evaluations may involve one or more of these agencies in addition to the Office of Planning and Zoning. Management of designated critical areas and nomination of additional areas will also be handled by the Office of Planning and Zoning.

Anne Arundel County is currently drafting a revised general development plan. This plan will be the primary vehicle for implementing coastal zone management recommendations. Development alternatives drafted for the general development plan will be reviewed for their consistency with the coastal zone recommendations. Existing County regulations will also be reviewed for their consistency with coastal zone recommendations, and necessary modifications will be proposed by the County Coastal Zone Planner. These modifications will be taken through the review process noted above for the coastal zone study.

### Regional Planning Council

The Regional Planning Council exists as the sole metropolitan agency, within the coastal area of Maryland, having a major on-going interest in resource management, land use, and port planning on the upper Chesapeake Bay.

Recommendations dealing with overall regional development patterns and use of regional resources or issues involving, or needing to be coordinated among two or more jurisdictions will be submitted to the Council for review, consideration, and formal adoption, support, or endorsement as statements of regional coastal management policy. This review process will consist of the following steps:

This Study Report will be submitted to the Coastal Zone Advisory Committee, a policy sub-committee appointed to advise the Council on important issues and policies affecting the Bay, the Baltimore Harbor, and the region's coastal lands and waters. This committee includes local jurisdictions, citizen, state and federal agency representation, and includes special interest, academic, and at-large participation.

Action recommendations by this committee will be transmitted directly to the Council for deliberation and final action. Functional divisions and sections within the agency staff will become directly involved in carrying proposals for actions relating to their on-going planning responsibilities to the appropriate oversight and review committees and channeling outside review and comments to the Council.

Upon action by the Council, recommendations for actions and specific policies will be incorporated into agency work programs and reflected in policy documentation and on-going planning activities. The Council will actively seek and encourage formal mechanisms of policy oversight through the coordination and involvement of the local jurisdictions in the on-going functional activities carried out at the regional level. Special emphasis will be placed on all activities conducted with joint local participation including 208 Water Quality Planning Management, Open Space, Housing, Air Quality and Land Use planning activities. As appropriate, key coastal management policies will be incorporated into the regional General Development Plan and its future revisions.

**Coastal Zone Unit of the Department of Natural Resources**

The Draft Coastal Zone Management Program will be undergoing revisions between July and September 1977. A Final Draft of "A Management Program for Maryland's Coastal Zone" will be submitted to NOAA for Federal review and approval in December 1977 with the goal of obtaining federal approval by July 1978.

The Baltimore Metropolitan Coastal Area Study will be distributed regionally in a final version in early 1978. A description of the Study and its relationship to the State coastal zone management program will be included in the main text of the final draft of the Program document.

The Coastal Zone Unit will consult with the Study participants during the incorporation of items from the regional study to the State Program. The Coastal Zone Unit will be most interested in those recommendations evaluated by the study participants during the Spring 1978 review period. The Coastal Zone Unit sees the incorporation of these approved recommendations into the State Program as a means of reaching a level of detail useful to the urban jurisdictions when implementing the Coastal Zone Management Program.

The Coastal Zone Unit will assist local jurisdictions and other state agencies in implementing the Study's recommendations via the following techniques:

1. Provision of pass-through funds for uses specified under section 305, 306, 308, and 310 of the Federal Act;
2. Provision of technical assistance to participants in the Program via completed or ongoing Coastal Zone Unit Studies, e.g., the Major Facilities Study;
3. Use of procedures for project evaluation and program review to uphold the goals and objectives of the State Program including those specific to the urban coastal region of Maryland.

As a representative of the Department of Natural Resources, the Coastal Zone Unit will, with the assistance of the other agencies in the Department, review and evaluate all recommendations contained in the Study as they relate to the mandated responsibilities of each agency within the Department. The Study will be submitted to the Secretary for his review and approval. As recommendations of the report are implemented by the study participants they will be incorporated into the state's program.

**Department of Economic and Community Development**

The Department is an active participant in the Maryland Coastal Zone Management Program developed and administered by the Department of Natural Resources Coastal Zone Unit.

The endorsement by the Department of any portion of the Coastal Zone Program will be accomplished in accordance with the memorandum of understanding between the Department of Economic and Community Development and Department of Natural Resources.

The Management objectives of particular concern are:

—Protection of fish and shellfish through proper management of harvesting and indirect sources of impacts.

—Maintenance of the vitality of the Port of Baltimore through the provision of adequate shoreline facilities and through the provision of adequate channel depths.

—Promotion of commercial shipping growth in a manner compatible with environmental sensitivities and recreational activity.

—Provision of adequate areas for the disposal of dredge material, and control of the location and methods of disposal to minimize environmental impacts.

—Encourage the location of shoreline industry in a manner compatible with environmental and recreational goals, and encourage the restriction of industrial uses to those that are water-dependent.

—Encourage the preservation, protection and restoration of coastal historic sites and districts.

—Provision of adequate transportation facilities, etc.

Further, recommendations of prime interest are:

—Establishment of a fish monitoring network. While

this could be worthwhile the Seafood Marketing Authority would give a much higher priority to study and activity to increase the production and harvesting of marketable seafood products.

—The designation of Baltimore Harbor as the State's principal maritime workshop. While Baltimore may be the principal workshop it is noted that there are other ports that are of vital importance to the economy of the State, i.e. Crisfield, Cambridge, Annapolis and Ocean City.

—The completion of the authorized dredging of the Bayside of the C and O Canal and Baltimore Harbor and the development of a strictly scheduled maintenance dredging program.

—Start and completion of the Hart and Miller Islands containment facility.

—Each of the dredging items including the streamlining of the permit process and the establishment of a long range dredging and spoil disposal program are essential to the economic vitality of the Port of Baltimore and the State.

—Further consideration be given to the impact of wetland and tidal areas at both local and regional levels including the cumulative impacts of development. The DECD concern is that there will be sufficient sites available to accommodate growth and that the methodology, processes, and procedures within the CZM program will not preclude economic and community development activities essential to the State.

### Department of State Planning

The Department of State Planning is active in the State Coastal Zone Management Program being administered by the Coastal Zone Unit of the Department of Natural Resources. An approved memorandum of understanding is in force between the Department of State Planning and Natural Resources. The memorandum details the extent to which the two Departments will endeavor to work together to carry out a coastal management program to protect, conserve, and properly utilize the coastal resources of the State.

Within the memorandum are six points of understanding: goals and objectives, critical areas, intervention in land use proceedings, plan and permit review, data management, and relations of employees. Described in detail within each point of understanding are the methods by which each Department will implement approved plans and policy recommendations. A copy of the Memorandum of Understanding follows.

The Department will utilize those goals and objectives of the regional study consistent with the approved State management program in the execution of the Department's mandated duties, powers, and authorities.

## DEPARTMENT OF STATE PLANNING AND DEPARTMENT OF NATURAL RESOURCES MEMORANDUM OF UNDERSTANDING ON COASTAL ZONE MANAGEMENT

This Memorandum constitutes an understanding between the Department of State Planning and the Department of Natural Resources concerning development and implementation of a program to protect, to conserve, and to properly utilize the coastal resources of the State. This understanding is based upon each agency's statutory authorities and commitment to appropriate, planned development and conservation of the land surrounding and covered by Chesapeake Bay, and Maryland's Atlantic Coast, bays, and submerged lands to the extent of State jurisdiction. The Department of State Planning derives its primary authority from Article 88C and 41 of the Annotated Code of Maryland. The Department of Natural Resources' primary authorities derive from the Natural Resources Article of the Annotated Code of Maryland.

The following points of agreement have been reached to clarify the activities of the Department of State Planning and the Department of Natural Resources to conduct an efficient and effective Maryland Coastal Zone Management Program to fulfill the State's responsibilities under the federal Coastal Zone Management Act.

**Points of Understanding**

Under Article 88C (2) (b) of the Annotated State Code, the Department of State Planning is responsible for preparation of plans for development of the State embodying policy recommendations in regard to the economic and physical development of the State. The series of plans for development of the State include recommendations for the most desirable general pattern of land uses within the state; recommendations concerning the need for and proposed general location of major public and private works and facilities; recommendations of the Department of State Planning concerning current and impending problems as may affect the State as a whole. The Coastal Zone Management Program will operate within the framework of the plans prepared for the development of the State, pursuant to Article 88C, Section (2) (b), once those plans are filed by the Governor.

**Goals and Objectives**

The Department of State Planning agrees to utilize the goals and objectives of the Coastal Zone Management Program, once approved, in the execution of the Department's mandated duties, powers and authorities including generation of plans for development of the State. The Department of Natural Resources agrees

to incorporate into the Coastal Zone Management Program the goals and objectives of the Department of State Planning Plans for the development of the State, prepared pursuant to Article 88C, Section (2) (b). Both Departments agree to cooperative and supportive efforts in the implementation and enforcement of their respective programs.

Critical Areas

1. The Department of Natural Resources agrees to provide the coastal jurisdictions with suggestions of potential areas of critical State concern and recommended management techniques to assure compatible uses in these areas. In accord with the Critical Areas Guidelines, local jurisdictions forward these suggestions to the Department of State Planning as either official recommendations of the local jurisdiction or as unaccepted suggestions.
2. The Department of State Planning agrees to consult with the Department of Natural Resources in the evaluation of the critical area recommendations and suggestions which it receives from the local jurisdictions. This evaluation will consider both the official recommendations and those sites suggested to, but not accepted by, the local jurisdictions.
3. Once the Secretary of State Planning has designated areas of critical State concern, those designated for the purposes of preserving, conserving or utilizing coastal resources will become Geographic Areas of Particular Concern in the State Coastal Zone Management Program.

Intervention in Land Use Proceedings

1. The Department of State Planning agrees to utilize the goals, objectives, and policies of the State's approved Coastal Zone Management Program in intervention in land use proceedings.
2. The Department of Natural Resources agrees to provide technical advice and expertise to the Department of State Planning for any intervention action concerning the State's coastal resources.
3. The Departments will make every reasonable effort to establish a mutually acceptable and jointly supported position on intervention cases concerning activities within the coastal zone.
4. Intervention by the Department of State Planning in any land use proceeding will be carried out under the provisions of Article 88C (2) (q), Annotated Code of Maryland (1969 Repl. Vol., 1974 Cum. Supp.) and published "Standards for Intervention."
5. The Department of State Planning will honor any request for intervention by the Department of Natural Resources. The Department of State Planning will use the goals and objectives of the Coastal Zone Management Program in determining when intervention is advisable. The final decision to intervene resides with the Secretary of State Planning.
6. The Department of State Planning will provide the Department of Natural Resources with periodic lists of actions being considered for intervention so that the department of Natural Resources may alert the Department of State Planning to coastal management issues that may be involved.

Plan and Permit Review

1. The Department of State Planning agrees to utilize the policies of the State's adopted Coastal Zone Management Program in its review of permit applications and local plans. Every effort will be made to assure that local plans are compatible with the State's policies for management of coastal resources.
2. Upon the request of the Department of State Planning, the Energy and Coastal Zone Administration agrees to provide the Department of State Planning information and technical analysis necessary to determine if a plan or permit application is consistent with State Policy regarding coastal zone management.

Data Management

1. The Department of State Planning will provide the Department of Natural Resources access to the Maryland Automated Geographic Information System. Use of the MAGI system will be under terms detailed in individual agreements.
2. The Energy and Coastal Zone Administration will advise the Department of State Planning of any data it has generated, or new or updated data it has received, in support of the Coastal Zone Management Program. The Energy and Coastal Zone Administration will make every effort to assure that such data will be consistent with data referencing standards established for use of the MAGI system. The Department of State Planning will incorporate all relevant data in the MAGI central file.

Relations of Employees

1. Once Administrative grants are available to the Maryland Coastal Zone Management Program, funds will be provided by contract to each coastal county for the purpose of hiring one technical assistant where that need is determined to exist. The responsibilities of the local coastal management technicians, under the supervision of the counties, are limited to implementation of the State Coastal Zone Management Program.

   The Department of State Planning maintains regional offices throughout the State to provide planning assistance to local jurisdictions and to provide a local perspective on planning activities of the Department.

Both Departments intend to foster a cooperative, mutually supportive working relationship between the Department of State Planning's regional planners and the coastal technical assistants. The technical assistants will pursue their coastal zone management duties in the manner compatible with the planning and local assistance duties of the Department of State Planning's regional planners. The Department of State Planning's regional planners will seek the advice of the coastal technical assistants regarding the impact of planning decisions on natural systems and resources.

2. Whenever feasible technical assistants hired by the counties with funds from the Department of Natural Resources will share office facilities with Department of State Planning Regional Planners.

**Department of Transportation**

Due to the significance of transportation in the Baltimore Region Coastal Zone, the Maryland Department of Transportation has been an active participant in this Study. The Department has worked closely with the involved coastal jurisdictions and RPC in identifying major transportation issues of regional coastal concern. As an outgrowth of the identification of issues and subsequent analysis several preliminary recommendations have been made which are intended to provide an initial first cut approach in attempting to rationally manage the region's unique metropolitan coastal zone. The issues and recommendations contained within this study represent the joint effort of local and state government agencies. As such, a commitment is required by all of those involved with local, regional and state transportation planning towards solving the problems identified and implementing the general recommendations contained within this report.

At the state level the Maryland Department of Transportation is an active participant in the development of the State's Coastal Zone Management Program. As the development of the State's program is almost complete and implementation about to begin, the Department of Transportation is working towards developing a memorandum of understanding with DNR which will serve as a mechanism for formalizing cooperation and coordination concerning the State's Coastal Zone Management Program. The memorandum of understanding will apply to all of the Department's administrations and address several major areas concerning the State's program. These include the recognition of the program's goals and objectives, the incorporation of coastal zone management concerns into the transportation planning process through the Action Plan, and the establishment of working arrangements between MDOT and DNR. This participation and cooperation at the State level will help to further define MDOT's commitment at the regional level.

Specifically, since at the regional level transportation planning is carried out by a joint effort between RPC and MDOT, further consideration of the transportation recommendations contained within this document must take place under the auspices of the Baltimore Region Unified Transportation Planning Program (UTPP). Participants in this program include members from the local jurisdictions within the Baltimore Region. The main body within the regional program is the Transportation Steering Committee (TSC) which provides overall policy direction and acts as overseer of transportation planning within the region. As such, the transportation recommendations contained within this document will be submitted to the TSC for its review. This review will also be based upon the Regional Planning Council review process as outlined previously. Based upon that review, action can take place by incorporating the recommendations, as appropriate, into transportation policy and the plans and programs that are an outgrowth of the UTPP. Some of the recommendations may also be incorporated as modifications in various committees and processes.

# APPENDIX A

# THE MARYLAND COASTAL ZONE MANAGEMENT PROGRAM'S GOALS AND OBJECTIVES

**GOAL 1: Preserve and Protect Coastal Resources**

Objectives:

1. To protect, maintain, and where feasible improve air quality in the State's coastal zone in order to protect public health, safety, and welfare, and the quality of the State's environmental resources.
2. To protect, maintain, and improve the quality of the State's tidal waters for propagation of wildlife, fish and aquatic life, and for human use and enjoyment.
3. To protect coastal aquatic areas of significant resource value and where possible, restore presently degraded areas of potentially significant resource value, such as viable oyster bars and clam beds, important fish migratory pathways, spawning, nursery and feeding areas, and wintering and resting areas for migratory birds.
4. To protect, maintain, and where feasible restore the integrity of the tidal wetlands of the State.
5. To protect coastal terrestrial areas of significant resource value-areas having scenic, scientific, geologic, hydrologic, biological or ecosystem maintenance importance—such as nontidal wetlands, endangered species habitat, significant wildlife habitat, and wintering and resting areas of migratory birds.
6. To promote the protection and wise management of productive coastal agricultural and forested areas through cooperation with programs of the local Soil Conservation Districts, the Agricultural Lands Preservation Foundation, the Maryland Department of Agriculture, the Maryland Forest Service, and the Department of State Planning.
7. To protect coastal cultural, historical, and archeological resources.
8. To promote increased recreational opportunities in shoreland areas, to promote increased public access to tidal waters, and to assure that these occur in a manner which protects the quality of coastal resources and which maintains public health and safety.

**GOAL 2: To Protect the Public Interest, Safety and Welfare in Natural Hazard Areas**

Objectives:

9. To give priority to non-structural management techniques for controlling tidal and riverine flood hazards, including the use of flood plains for open space uses such as agriculture, forestry and recreation, in order to lessen the danger to life and property, and to minimize adverse effects on biological resources and water quality.
10. To promote the use of shoreline setbacks and to restrict development in high risk erosion areas in order to reduce erosion-caused danger to life and property and to minimize the cost to the public and private sectors.
11. To promote the use of shore erosion control techniques, where necessary, in a manner which provides long-term protection, minimizes adverse effects on natural systems (both biological and physical), and avoids damage to adjacent property owners.
12. To restrict development in other natural hazard areas such as steep slope and high water table areas to reduce the danger to life and property and to prevent adverse environmental impacts.

**GOAL 3: To Locate Necessary Major Facilities only in Appropriate Coastal Areas so that Environmental Quality is Maintained**

Objectives:

13. To encourage the inland siting of facilities which are not shoreline dependent, and to encourage the location of necessary shoreline-dependent activities in shoreline areas where adverse so-

cial, economic, and environmental impacts can be minimized.

14. To encourage the location of necessary new coastal facilities whether industrial, commercial or residential, in already developed areas capable of accommodating additional development, in areas suitable and planned for redevelopment, or in areas determined by scientific study to be environmentally and economically suitable for development.
15. To discourage the location of major new or expanded facilities on or immediately adjacent to Resources Protection Areas or Hazard Prone Areas.
16. To ensure the viability of Maryland's port areas, and to ensure that their development is carried out in an environmentally sound manner.
17. To encourage the wise use of coastal mineral resources, with due regard for protection of the environment, and to encourage sequential multiple use of mineral lands where mineral extraction is deemed appropriate.

**GOAL 4: To Promote Appropriate Methods of Use of Coastal Areas in Order to Prevent Deterioration of Coastal Resources**

Objectives:

18. To promote use of the State's coastal resources to meet social and economic needs in an environmentally compatible manner.
19. To ensure consideration of the carrying capacity of air, land and water resources (both surface and groundwater), and the conservation of coastal natural areas in state and local regulatory decisions concerning coastal developments.
20. To ensure that adequate water, sewer, and transportation services are provided before new coastal developments are approved by state and local governmental agencies.
21. To ensure that adequate consideration is given to social, economic, and environmental impacts in government decisions concerning the siting of public facilities in coastal areas, particularly those involving transportation and waste treatment facilities.
22. To ensure the incorporation of storm water management measures in state and local regulatory programs that would require runoff from a development site, to maintain, to the maximum extent possible water quality and quantity conditions that prevailed naturally.
23. To promote the maintenance of natural buffers along, and natural drainage ways feeding to, coastal tributaries and estuarine waters, to minimize adverse environmental effects of coastal developments and activities.
24. To identify environmentally suitable methods of dredging and disposal of dredged material (including beneficial use of dredged material) to meet long-term needs resulting from navigational projects, state and local governmental projects, and major private projects, and to oppose the use of methods found to be environmentally unsuitable.
25. To prevent the filling of the State's tidal waters unless there is no feasible alternative and the proposed project is in accordance with the goals, objectives and policies of the Coastal Zone Management Program.
26. To oppose the dumping into ocean waters off the State of Maryland of any material which would adversely affect human health, welfare or amenities, the marine environment, ecological systems, or resources of economic value.
27. To ensure the use of thorough assessments of probable energy costs and benefits, positive and negative economic effects, probable social and environmental impacts, and the value of the public resources involved, as the basis for decisions on the development and production of Outer Continental Shelf resources.
28. To ensure that the coastal counties, if affected by development related to energy facilities, obtain sufficient financial and technical assistance to adequately plan for and cope with the social, economic or environmental impacts of such development.
29. To ensure that hazardous substances are utilized and disposed of in a manner which prevents any toxic, lethal or sublethal effects to plant, aquatic or animal life, which prevents any adverse effect upon human health, and which prevents disposal of the substances into terrestrial or aquatic ecosystems.

**GOAL 5: To Promote Intergovernmental Coordination and Public Participation in Coastal Zone Management Program Development and Implementation.**

Objectives:

30. To undertake studies and inventories, where needed, to provide the most complete and accurate information base possible for all levels of government and the public to use in management decisions and activities affecting coastal resources.
31. To encourage the analysis of possible impacts on energy production and consumption, both natural and man-induced as part of management decisions concerning coastal resources and activities.
32. To ensure the establishment of repositories of coastal zone-related documents, reports, and materials which are easily accessible to the general public in each of the coastal counties.
33. To promote standardization of techniques and compatibility of federal, state and academic research efforts in the State's coastal areas.

34. To ensure coordination and use of existing state and local government programs to achieve the CZMP's objectives.
35. To ensure interstate coordination of plans for the management of resources which are shared with neighboring states such as migratory aquatic species.
36. To ensure the review of state and local governmental programs, and those of the local Soil Conservation Districts, in order to identify possible modifications needed to facilitate achievement of coastal zone management goals, objectives, and policies.
37. To promote coordination of state and local governmental programs with those of federal agencies and neighboring states to further the goals of the Coastal Zone Management Program, and to minimize duplication of efforts, conflicting actions, and regulatory permit processing delays.
38. To provide adequate representation of the interests of the State of Maryland in federal decisions regarding the exploration, development and production of Outer Continental Shelf Resources.
39. To provide full opportunity for participation by relevant federal, state, and local government agencies, concerned organizations and the general public, in development and implementation of the Coastal Zone Management Program.

# APPENDIX B

# FINFISH AND SHELLFISH RESOURCES

### 1. Patuxent River

Unique among Maryland's rivers, the Patuxent River lies wholly within the borders of the State. It hosts a variety of habitats suitable for the various needs of its resident and migrant populations of finfish and shellfish.

Spawning of anadromous species is intensive in the upper portion of the river, while resident species occur throughout. Striped bass spawn from Deep Landing to two miles above Lyons Creek Wharf. Shad ascend as far as Queen Anne's Bridge (Old Route 214) for spawning. At one time they ascended as far as Laurel. The river herring ascend the main stream about 12 to 14 miles beyond the area used by shad. They also ascend into the fluvial tributaries as do yellow perch and white perch. Spawning of winter flounder occurs just inside the mouth of the river around Solomons Island. The lower river furnishes a nursery for the young of most seaspawners and provides foraging areas for many of the adult marine migrants.

The commercial fisheries are all below Route 4 (Bristol) and usually are most intense in the spring for migrating anadromous and semi-anadromous fish, stake gill nets are used in the lower river, drift gill nets and fykes further upstream. Haul seines are most frequently used for summer and fall catches of striped bass, croakers, spot, weakfish, and bluefish. Other noteworthy commercial species include alewives, catfish, gizzard shad, white perch, gray seatrout, and some sea herring.

Recreational fishing is usually good for the sea spawners, striped bass and white perch in the lower 25 miles of this stream. Angling for shad occurs largely in the vicinity of Queen Anne's Bridge.

The Patuxent has both natural oyster bars and leased areas for private oyster growing. The area for both oysters and soft clams is in the lower 21½ miles of the river.

The Patuxent River provides favorable habitat for blue crabs that migrate into the system as juveniles. Commercial and recreational crabbing uses trout lines and hand nets.

### 2. West Chesapeake Bay Drainage

Anne Arundel County waters merge midway across the Bay with waters primarily from Talbot and Queen Anne's Counties.

During the spring season gill and pound net fishing for striped bass, shad, herring, white perch and to a lesser extent yellow perch, dominates commercial fishing in most of this watershed. A few fishermen engage in drift gill net fishing from Thanksgiving to mid-March in the Bay proper. Other commercial finfish fishing occurs from March through the fall, using stake gill nets, fyke nets, and pound nets in water up to about 30 feet deep. Commercial fishing is prohibited in the Magothy and Severn Rivers.

One industry seemingly on the increase in this area is the crab pot fishery. Potting begins in early spring, taking crabs emerging from deepwater wintering retreats, and moves shoreward as the waters run.

Oyster beds occur on hard and shelled bottom in waters 5 to 30 feet deep, in the Bay and lower reaches of tributaries. Soft clams are found within the same salinity range in all kinds of bottoms, except soft mud.

Private oyster culture occurs on bottoms leased from the State in Anne Arundel County waters. Shelled to provide firm substrate if necessary, these areas are planted with seed oysters that grow to market size. The West River, Rhode River, South River, and White Hall Creek support most of this industry. Bottom dwelling organisms, lacking locomotive capability, are vulnerable to severe or sudden environmental changes. For example, oyster and clams have a low salinity tolerance of about 5 parts per thousand. Prolonged exposure to salinity concentrations less than this generally leads to death. Tropical storm Agnes and other events producing large amounts of freshwater runoff have severely affected oysters and clams.

Sport fishing is intense in the Bay and lower tributary waters from June to December, weather permitting, with the greatest fishing effort on weekends and in the evenings. Target areas and target species vary with locality, season, and the individual fisherman. Many sport fishermen start the fishing season with the run

of yellow perch into tributary streams in late January and February. Some of the best sport fishing area in the State occurs in this area. This area includes the waters beneath the Chesapeake Bay Bridge where more than 3,000 boats have been counted at one time.

To enhance sport fishing, the Department of Natural Resources has established fishing reefs of discarded tires and concrete pipes in strategic areas through Maryland's coastal waters to attract fish and fishermen. Two such reefs are in the Bay waters of the West Chesapeake Drainage—one southeast of Holland Point, the other off the mouth of the West-Rhode River complex of Curtis Point.

**a. Rhode and West Rivers**

These are small river systems greatly influenced by continguous Bay waters. The tributaries of the West River and Rhode River complex support spawning for both species of river herring (alewife and blueback), white perch, and yellow perch. The highly visible eggs of the latter species have been noted in two feeder streams to the West River, Lerch Creek below Galesville, and in Smith Creek below Maryland Route 468. In the Rhode River, yellow perch eggs have been observed in Sellman Creek and in Muddy Creek.

Sportfishing in the upper ends of both rivers is good for yellow perch, pickerel, and white perch. Down river, fishing for striped bass and spot begins. Bluefish, croaker, striped bass, and gray trout are seasonally present around buoy No. 73.

Commercial catches recorded for this area are high for bluefish, menhaden, striped bass and white perch. Much of these come from adjacent Bay waters.

**b. South River**

South River has a somewhat limited freshwater input but affords spawning for limited runs of river herring and white perch. Yellow perch probably spawn in many areas of this system and have been definitely documented in the headwaters above and below Rt. 450 (Defense Highway). This area is a popular sportfishing area when yellow perch make their spawning run. White perch are the predominate sport fish in the river with pickerel often caught in the grassy areas of the upper portion from October through January. Annual commercial catches exceeding 1,000 pounds have been recently recorded for gizzard shad, striped bass, and white perch. Some of this catch was taken by stake gill nets. However, commercial catches have declined over the past several years, with rapid shoreline development a possible cause. Selby Bay and the lower portion of the river have privately leased oyster bars.

**c. Severn River**

Poor water quality in the Severn River has generally restricted commercial shellfish harvests. White perch, yellow perch, striped bass, and pickerel, however, are recreationally fished throughout the river. Commercial netting in the Severn is prohibited by State law. White perch, yellow perch, and herring spawning occurs in the upper tributary areas. Resident species such as pickerel and carp occupy many of the tributaries. Ease of access to the water is responsible for the recreational desirability of the Severn River, as evidenced by the number of people who regularly fish from the seawall around the U.S. Naval Academy.

**d. Magothy River**

White perch and yellow perch are the predominate species which spawn here. Also present are many of the same species found in the other rivers in the Baltimore Metropolitan Area. The region above Catherine Avenue, Mill Creek, Dividing Creek, and the Little Magothy River are areas of greatest occurrence of spawning. Large schools of menhaden can be seen feeding here during the warm months. Some research data suggest a greater usage of the southern side of the river for spawning and feeding. As with the other rivers in Anne Arundel County, both alewives and blueback herring are found in the upper tributary areas in varying numbers from year to year. An area between Dobbins and Gibson Islands is one of the few recorded winter flounder spawning areas in Maryland's coastal zone. Commercial fishing for finfish is prohibited. Even though the portion of the river below North Ferry Point is classified as state shellfish waters, the viability of the shellfish population is uncertain.

### 3. Patapsco, Gunpowder and Bush Drainages

Drainages of the Patapsco, Gunpowder and Bush River watersheds are similar in the diversity of their aquatic resources. A major difference, however, is higher crab populations in the Patapsco.

All these areas lack the commercial harvestable shellfish populations of more saline areas such as the West Chesapeake and Nanticoke watersheds. Resident, anadromous, estuarine, and salt water fish population are hosted by all three drainages. Spawning grounds are provided for alewife, blueback herring, white perch, yellow perch, and gizzard shad. Juveniles of such sea spawners as weakfish, spot, bluefish, croaker, and particularly menhaden, use these areas as a nursery. Being less saline, these waters have larger populations of freshwater species.

Good sport fishing exists throughout this area. The various rivers and the Susquehanna Flats are known for the availability of striped bass, shad, herring, largemouth bass, crappie, perch, and catfish. Eel fishing is widespread.

Suitable habitat is provided for the brackish water clam (Rangia) by the low salinity. This species is prevalent throughout many of these drainage areas and, although of negligible importance at present, is a potential seafood source.

Two important aquatic sensitive areas are noteworthy in this Upper Bay area. The first includes the probable range of the endangered Maryland Darter between Deer Creek and Gashey's Run. The other area is Otter

Creek Marsh, one of the last freshwater marsh lands in the State. Because of the extreme sensitivity of both areas, any alteration of the environment in either area may result in considerable reduction in the associated aquatic resource.

The blue crab's principal range in the Upper Bay and within the tributaries varies from year to year, presumably influenced by both population size and prevailing salinity gradient. Although crab populations in the Upper Bay and its tributaries are generally low, some potting and recreational crabbing occurs throughout much of this area. The Department of Natural Resources has constructed a fishing reef in the Chesapeake Bay east of Hart Island to enhance sportfishing in this area.

**a. Patapsco River**

The Patapsco River has received considerable biological study over the years because of its urban location near Baltimore Harbor. Acknowledged pollution from point and non-point industrial and domestic sources has put severe stress on the biological productivity of this system. This has resulted in a considerable reduction in the abundance of resident and migrating species, especially in the harbor region. Major areas of abundance occur in Curtis Creek, Bear Creek and Bodkin Creek where resident anadromous and estuarine species spawn or nurse. Menhaden is generally the most numerous species, but white perch, herring, yellow perch, and silversides are present in significant quantities. The freshwater areas above Baltimore City are viable areas of such resident fish as catfish and sunfish. Although not spawned in the Patapsco, limited numbers of juvenile striped bass can be found in this area, and some adult striped bass are taken in limited numbers by anglers even from the shores of Baltimore City.

**b. Back River**

This stream system has a substantial freshwater population of catfish, sunfish, and other associated species. Tributaries such as Deep Creek and Muddy Creek are used for spawning by white perch. Menhaden are prevalent, finding nursery areas throughout the river.

It can be misinterpreted from the relatively large commercial catches of menhaden, catfish, carp, striped bass, and white perch that Back River is a very healthy viable system. In actuality, the aquatic resources of the river have been considerably reduced in recent years due primarily to the sewage treatment plant. Eutrophic conditions, principally low dissolved oxygen, resulting in occasional fish kills, keep large populations of resident and migratory species from inhabiting Back River.

**c. Middle River**

Species diversity in the Middle River is greater than that of the Back River. The most notable difference appears to be that largemouth bass and pickerel are abundant in the Middle River. Although neither area abounds with harvestable fisheries resources, Dark Head Creek and adjacent tributaries seem to have the greatest biological productivity. Sportfishing is good throughout the river for pickerel, catfish, largemouth bass, and white perch. Folding crabpots are used for recreational crabbing. Commercial fishing records indicate striped bass, white perch, shad (when available), and menhaden are the predominant species landed.

Seneca Creek is similar to Middle River in species composition.

**d. Gunpowder River**

This river system with its many tributaries and feeder streams (including Bird River) affords pathways and spawning areas for blueback and alewife river herring, white perch, and yellow perch throughout its relatively large drainage. Within the system, resident species such as black bass, carp, various catfish, crappie, pickerel, and various sunfish reproduce and mature. The locally spawned anadromous and resident as well as juvenile marine fish such as menhaden, spot, weakfish, and croakers seasonally utilize lower reaches of the Gunpowder and its lower tributaries as feeding areas. Juvenile striped bass, produced elsewhere, find nursery areas here and feeding striped bass range in these areas and are available to fishermen.

The fisheries in this river complex are diverse and support seasonally commercial activities of seining, gill netting, fyke netting, and potting. Because of the relatively large expanse of sheltered water and the favorable mix of legally protected black bass and pickerel with the diversity of other species, the opportunities for sport fishing are very high. Crabs extend their range into the lower Gunpowder and are taken commercially and recreationally from late summer through early fall.

The upper portions of the freshwater feeder streams are unique in having their fauna influenced by Piedmont fauna. Generally Route 40 can be considered the dividing line between the upstream waters influenced by Piedmont fauna and the downstream waters influenced by the Coastal Plain.

**e. Bush River**

The Bush River has populations similar to the Gunpowder, with its tributaries, Bush Creek, Grays Run, James Run and Winters Run having documented spawning areas for river herring and yellow perch. White perch also spawn in these areas and elsewhere in the system.

Commercial gill nets, fykes, and pots as well as sportfishing gear take several of the anadromous and semi-anadromous species during the early spring. The carp and catfish taken in the Bush River system are often sold alive for public and private stocking. Pike and black bass excluded from commercial exploration remain through most of the river system for the enjoyment of the angler.

### 4. Susquehanna Drainage

The Susquehanna River provides seasonal habitat and spawning areas for anadromous, estuarine, and resident freshwater fish species. The four mile portion of this river below the dam is closed to commercial fishing but supports an active seasonal sport fishery. Many recreational fishermen fish specifically for shad, hickory shad, striped bass, largemouth and smallmouth bass, walleye, chain pickerel, and black and white crappies. However, channel, catfish, pumpkinseed, white perch, yellow perch, bluegill, eel, and carp are more frequently caught.

Upstream migration of fish in search of spawning areas or foraging for food is obstructed by the Conowingo Dam. Migrating populations, therefore, are dependent on the lower river to provide suitable areas. Several tributaries also afford spawning areas to some of the anadromous and estuarine species.

Deer Creek in Harford County and Octoraro Creek in Cecil County, both obstructed by dams, afford limited spawning areas for some anadromous and estuarine species. Small populations of hickory shad, river herring, white perch, and yellow perch spawn in these streams, but striped bass and shad do not. Smaller tributaries in both Harford and Cecil Counties such as Herring Run, the two Rock Runs, and Happy Valley Run, are even more limited in areas suitable for spawning. Nonetheless, they are important in supporting the general biological base for Chesapeake Bay fisheries.

The lower Susquehanna River and the Susquehanna Flats provide fishing areas for both recreational and commercial fishermen. Fish pots, fykes, and gill nets are dominant during the spring and fall in the area for commercial fishing. Herring, shad, striped bass, catfish, and white perch dominate the commercial catch recorded in this areas.

The Susquehanna Flats is an important feeding and resting area for waterfowl because extensive areas of shoal water support the submersed aquatic vegetation on which they feed. This habitat also provides spawning and nursery areas for large populations of resident freshwater fish species such as largemouth bass, sunfish, catfish, pickerel, and carp. The channel areas in the flats provide the principal pathways for the migration of anadromous and semi-anadromous fish species into the mainstreams and tributaries of the Susquehanna and Northeast Rivers.

Tropical storm Agnes in 1972 brought great changes in the flats. The deluge scoured the Susquehanna River and flats, dislodging or smothering vast areas of vegetation on which waterfowl fed and which provided breeding areas, feeding areas, and shelter for fish. Plant regrowth occurred slowly but was again set back in September 1975 by similar scouring and inundation by the tropical storm Eloise. These two massive storms within a four-year time span have greatly altered the ecology of the area.

# APPENDIX C

# SUMMARY OF LAND TRANSPORTATION SYSTEMS WITHIN THE BALTIMORE REGION COASTAL ZONE

To help clarify the confusion concerning the existing classification system, highway facilities have been grouped into three functional classes: 1) expressways are limited access divided highways, both freeways and toll roads; 2) major arterials are divided highways without access control such as US 40 or Ritchie Highway; and 3) secondary roads are all others including State secondary system roads and nondivided City and County roads.

The capacity of each functional class of highways to carry traffic varies according to the number of lanes, spacing of intersections or interchanges, the number of hills and curves, and adjoining land uses. In the Coastal Zone, the broad regional perspective makes the use of a 24-hour capacity preferable to describe highway capabilities. The 24-hour capacity is based on the ability of a road to handle a given volume of traffic recognizing that traffic volumes vary between peak hours and non-peak hours and the relationship between peak and 24-hour volumes is related to the function of the road (commuter route, regional traffic, local service road, etc.)

Thus, when a highway is described as being 'congested', this generally refers to peak hour traffic with lower volumes during the remainder of the day. In a few cases, such as some downtown areas, industrial areas, and certain retail/commercial strips, non-peak volumes may approach peak hour volumes and congestion results more often.

The normal operating capacity of a highway is generally estimated as the highest volume of traffic that can be moved without experiencing delays on freeways (although not at high speeds) or long back-ups at traffic signals (service level 'D'). A highway can accommodate more traffic than its capacity, but traffic will move more slowly and experience delays which reduce fuel economy and generates more air pollutants (service level 'E'). When congestion reaches the point of forced flow at low speeds with continual delays, the volume actually decreases (service level 'F'). Service levels A through C describe conditions of free flow and minimal interruptions.

In describing the potential of a highway to support growth, that is, handle more traffic, some definitions are required as formulated within the context of this Study. Significant capacity means that 24 hour traffic volumes can increase at least 50% over 1975 volumes without peak traffic becoming congested. Marginal capacity would allow volume increases of between 10 and 50% before significant congestion. A highway that is presently congested during peak hours or is predicted to become congested by 1985 due to regional trends is not considered to have growth potential. This does not necessarily mean that all development dependent on the highway must cease, but that conditions are not favorable for any new planned growth unless capacity is increased by some method (either structural or operational), and that a more detailed study of the situation is in order.

Transit service levels and service areas are flexible with bus transit since service can be implemented on most highways and local streets. Service levels are related to the demand for transit and headways are generally shorter in higher density areas due to greater ridership. High level service includes routes with peak hour headways of less than 6 minutes and off peak headways of less than 11 minutes. Moderate service has peak headways of 30 minutes or less and off peak service at least once an hour. Low level service has peak headways of greater than 30 minutes or off-peak service less than every hour.

**Northern Section**

This section of the study area has the least transportation congestion, and the greatest potential for highway and, to a lesser extent, rail-oriented development.

I-95 is a six-lane toll road throughout the Northern Section and average volumes are well below capacity indicating significant growth potential for residential development with a Baltimore area orientation and highway-oriented industrial development. Projections indicate such Baltimore-related growth if present trends continue.

U.S. Route 40 is a recently improved four-lane divided arterial parallel to I-95 serving a more local circulation role. U.S. 40 also has growth capacity north of Md. 24 (Edgewood). Capacity is marginal from Edgewood into Baltimore County as far south as Md. 43 which offers an alternate route to I-95. Some local congestion on U.S. 40 in Edgewood is also probable by 1985.

Public transit in the Northern Section is limited. The McMahon Transportation Company provides limited schedule commuter service between Bel Air (out of the Study Area) and Baltimore. Greyhound local bus service is available along the U.S. 40 corridor, Downtown Baltimore, Joppatown, Edgewood and Aberdeen. MTA routes do not extend into the Northern Section and it is doubtful whether ridership would be sufficient to justify extensions of service.

The Northern Section contains mainlines of both B&O and Amtrak-Conrail. The B&O runs between I-95 and U.S. 40 with Amtrak/Conrail running closer to the Bay and forms the northern boundary of Edgewood Arsenal. Both lines converge in Havre de Grace to cross the Susquehanna on separate structures. The B&O does not have any major spurs or yards in this area. The line is single tracked, in good condition and used for freight only. The Amtrak/Conrail "Northeast Corridor" line is a main passenger and freight line with high speed Metroliner service. The line is four-tracked, except for major water crossings, and fully electrified. Spurs run into Edgewood Arsenal, Aberdeen Proving Grounds and Havre de Grace. Although no major yards exist along the mainlines, regularly scheduled local freight trains service industry at private sidings. Capacity for expanding these operations is available and new rail-oriented development could occur in this corridor. Local rail passenger service does not exist and no commuter rail operations are planned within the 1985 time frame.

No general aviation airports are located in the Northern Section. The Army has a large military airport (Phillips Army Airfield) at the Aberdeen Proving Grounds which is capable of handling large jet transports but this facility is not open to the public.

**The Urban Area**

*North of the Inner Harbor.* This section contains the urbanized Coastal Zone of Baltimore County and major Port facilities and industrial areas of Baltimore City. The I-95/US 40 corridor of the Northern Section continues into the City thru this area. I-95 is a six-lane expressway from the Northern Section to the Beltway (I-695/MD-695) and expands to eight lanes inside the Beltway. US 40 is a four-lane major arterial until it enters the City, where it widens to six lanes. MD 150 (Eastern Blvd.) is another parallel route (four-lane major arterial) from the City to just beyond Martin Airport. All three radial routes are highly travelled with a number of existing congestion points. Cross-connection links to help distribute traffic are minimal with only I-695 connecting all three. (MD-700 only links US 40 and MD 150 at their congestion points and does not improve regional circulation.) The Beltway between US 40 and the recently opened Francis Scott Key has capacity for growth but capacity diminishes rapidly west of US 40.

Three Harbor Crossings should be available by 1985 if I-95 is completed on schedule. At the present time, the Tunnel Thruway is the most active harbor crossing. The four-lane divided toll road is operating at near capacity and averages 64,000 vehicles per day (VPD) through the tunnel. The facility is designed strictly as a crossing, with partial interchanges only allowing exit after passing through the tunnel. The Francis Scott Key Bridge (Outer Harbor Crossing) is also a toll facility with two lane approach roads between MD 10 (Section of the Harbor) and North Point Blvd. (MD 151), and partial interchanges. I-95 will be an eight-lane tunnel with full access and will be operated as a toll facility (tunnel only) by the City. I-95 should relieve congestion on the Tunnel Thruway since volumes are projected to be only ½ to ⅓ of its 120,000 VPD capacity in 1985. I-83 will connect with I-95 north of the tunnel and complete the expressway system. I-83 provides access to the northern points of the City and Baltimore County from the harbor area.

Local circulation has a number of problem spots. The Back River Neck/Essex area is considered 'critical' by Baltimore County due to a combination of a single main road down the peninsula (Back River Neck Road) and local business congestion on MD 150. MD 150 east of Martin Airport is also nearing capacity with some interim widening planned. Transit service presently exists at low and moderate levels in this area which may help relieve some congestion if transit usage can be increased.

The Dundalk/Sparrows Point area has more alternate routes, but is heavily developed and is experiencing conflicts between truck traffic and residential areas. Bethlehem Steel has also been using off-road equipment near residential areas to move ore to and from their main plant and the Black Marsh area, causing some problems. Truck traffic from the Dundalk Marine Terminal (DMT) is a minor problem but should be partially reduced by the completion of an access road to directly link DMT to the Key Bridge ramps. Dundalk/Sparrows Point also has good transit service with high and moderate service level rates serving most employment and population centers.

The Canton area is the most heavily industrialized area in the city. The three large employers (General Motors, Western Electric, and Lever Brothers) generate large traffic volumes during shift changes as well as truck traffic. Heavy port oriented operations from Dundalk Marine Terminal, Sea-Land and others generate large truck volumes. All of these impact Broening Highway, Holabird Avenue and Dundalk Avenue, all secondary roads. The lack of good east-west links due to the large numbers of rail yards plus inadequate north-south links make the Broening/Holabird intersection one of the worst in the city. Proposals to make this

grade separated cannot be implemented until an alternate route is provided for the construction period and this will not be accomplished in the 1985 time frame. As part of the I-95 project, a new east-west arterial, Keith Avenue Extended, will be built to connect Clinton Street with Broening Highway and interchange with I-95. This should relieve the Broening/Holabird problem to some extent.

The Fells Point area is congested simply due to old, narrow streets with some railroad street tracks which can block vehicular traffic at various times. The final alignment of I-83 may relieve some of this congestion. The Inner Harbor Redevelopment has a number of street widenings and re-routings associated with it which should help to relieve some bottlenecks. However, traffic in the Metrocenter area can never realistically be expected to flow congestion-free all the time.

In an effort to improve access to the Metrocenter, the City applied for Federal demonstration funds to build a 'people mover' in the Pratt Street Corridor. A 'people mover' is a form of mass transit using small (6–12 passenger) automatically controlled vehicles operating on an exclusive guideway and designed for high density short trips. Although Baltimore was not among the five cities chosen for this project, the possibility of implementing a similar project in the post-1985 time frame should still be considered.

Transit service in the City portions of the Coastal Zone is good with high or moderate levels of service throughout most of the employment areas, but since most major industrial plants provide free parking, utilization of transit is not as high as could be expected.

Rail service is provided by all railroads serving the Region. The B&O does not have a single yard large enough to accommodate all road trains and permit a single classification of cars for final delivery to customers. Thus, most road trains arrive at the mainline Bayview Yard, are broken down into smaller groups for other areas of the Coastal Zone, and then sent to smaller yards for reclassification for final delivery. The B&O operates yards in Canton (Penn Mary) and Sparrows Point (Grays). The Penn Mary yard has a lack of holding capacity forcing use of Grays Yard (over 5 miles away) for some GM traffic. The Canton Railroad uses Penn Mary to interchange with the B&O and operating problems of the Canton RR account for most of the backup in B&O yards.

Conrail also lacks a single terminal yard large enough to classify all trains and uses a system of satellite yards. Conrail's Bayview Yard is larger than the adjacent (but separate) B&O facility. Bayview also contains Conrail's TOFC (Trailer on Flat Car) terminal and appears congested at the present time. The Canton yard complex has lost 47% of its capacity between 1964 and the present due to a combination of deferred maintenance and land sales. Grain traffic is a major commodity at Canton and a major problem due to old yard design and frequent switches across Newgate Street. Conrail also handles all traffic to Dundalk Marine Terminal (DMT) through Canton to a new TOFC yard in DMT. The branch line to DMT experiences interchange problems with the B&O. The President Street Branch serves the Falls Harbor area industries via track in City streets west of Clinton Street. Most service is done at night to minimize vehicular/railroad conflicts but conflicts and derailments still occur regularly. Excess capacity is minimal and repairs would be very expensive. Traffic for Conrail's largest shipper, Bethlehem Steel, and other Sparrows Point industry leaves the north end of Bayview on the spur to the Wise Avenue Yard and then to interchange at Grays Yard with the P&BR. This branch has few operating problems and could support additional traffic.

The Canton RR is a marginally profitable terminal switching operating which handles all traffic to the GM plant and a number of other industries. The yards are not suited to modern classification methods and overall operations are considered inefficient. A large segment of Canton's business is ore and large land areas are used for open storage. The ore traffic also causes rail capacity problems during shipments which in turn affects B&O and Conrail interchange traffic. I-95 construction will severely impact Canton's yards and will require reconstruction of some yards.

The interaction between water and land transportation systems varies depending on the commodity being shipped. Bulk goods such as grain, ore and coal rely almost exclusively on rail. At present levels of operation the land modes are adequately handling their share, but an increased level of service for rail modes is problematical. Containerized cargo from DMT utilize both rail and truck modes with 62%/38% split in favor of trucks. Existing rail operations do not seem to be efficient enough to take a larger share even through DMT's facilities can utilize a larger rail component. Other container facilities such as Sea-Land use trucks almost exclusively. Break-bulk (non-containerized) cargo and non-port industry use both modes in varying degrees which makes generalizing difficult. Rail service has been declining north of the Harbor while regional highway improvements have been continuing. This shift in modal capacity may influence new industry and port development toward highway dependence over rail.

North of the Harbor are two general aviation facilities, Essex Sky Park and Glenn L. Martin State Airport. Essex is a private airport which also accommodates seaplanes. Martin is the home base for two Air National Guard units and is expected to relieve much of BWI's general aviation traffic. Martin can handle medium sized jets and has a noise impact zone which covers some existing development and a large area of undeveloped land. Baltimore City also operates a public heliport on pier 4 in the Inner Harbor.

*South of the Inner Harbor.* This section of the Coastal Zone contains the urbanized areas of northern Anne Arundel County, portions of Baltimore County and the Middle Branch and Curtis Bay areas of the City. Radial routes are not as continuous inside the

Beltway as those on the north side of the harbor. The Baltimore-Washington Parkway (MD 295)/Russell Street is the only existing radial expressway which penetrates into the downtown area. This is 6 lanes in the City and 4 lanes elsewhere. I-95 is under construction and should be completed across the harbor by 1985. This will complete the 8 lane facility from Washington through Baltimore. The B/W Parkway will have no excess capacity outside the Beltway but may receive some relief from I-95 which will provide significant capacity. However, neither of these radial routes are oriented directly toward the coastal portions of Anne Arundel County.

Md. 173 inside the City north of Curtis Creek appears to have marginal additional capacity to the Patapsco River although the heavy truck mix and street conditions tend to eliminate this capacity. Capacity is still marginal but more usable across Middle Branch (at Md. 2) to Locust Point and the I-95/395 connection. However, Md. 173 does not function as a radial route once it leaves the City and there is no westbound connection to the Beltway (which is a toll facility at this point).

Md. 2 (Ritchie Highway) is a 5-lane arterial (one reversable lane) beginning as Hanover Street in the City and continuing to the Tunnel Thruway at the City line where it becomes a divided facility to Annapolis. Md. 3 (Crain Highway) does not lie completely in the coastal zone study area but is an active expressway in the corridor which connects with other study area roads and is part of the regional circulation pattern. Md. 3 travels south from the Beltway as a 4 lane expressway, bypassing Glen Burnie, connecting with Md. 100, and continuing into Prince George's County where it connects with US 50:301. Md. 10, the Arundel Expressway, is planned to parallel Md. 2 from the Beltway to Annapolis, but the only completed section is a 3.4 mile, 6 lane segment from the Beltway to Old Annapolis Road (Md. 648), and this is all that is anticipated by 1985. Md. 100 is part of what was originally planned to be an east-west connector into Howard County but has only been constructed as far west as Md. 3 and is a 4 lane expressway. Md. 177 continues this corridor to Gibson Island.

The Md. 100/177 corridor has capacity for significant growth. The Md. 100/177 corridor, however, feeds the Md. 2/3/10 corridor for City bound destinations. Md. 2 is presently over capacity south of Md. 100 but gains some relief from 100 where traffic can switch to Md. 3 until Furnace Branch where it again becomes congested to the Beltway.

Md. 3 will probably be over capacity from Md. 32/178 to the Beltway by 1985 although it is not seriously congested at present. Md. 10 will have adequate capacity to provide some relief to Md. 2 but will only exist from Md. 648 (Old Annapolis Road) to the Beltway. The gap to Md. 100/177 is filled by Md. 648 which is a 2 lane road with no additional peak hour capacity. Due to future construction of Md. 10, Md. 648 does not have an interchange with Md. 100 (only with Md. 177) so any traffic from the Md. 100/177 corridor which wishes to use Md. 10 must use Md. 177 and adds to congestion on that route.

The segment of Md. 173 from Riviera Beach to the City line is scheduled to be widened to a 4 lane major arterial and together with Anne Arundel County plans to improve Marley Neck Road, will provide significant capacity in this area.

Local highway trouble spots coincide with regional problems in most cases. Ritchie Highway is both a regional highway and the principal commercial corridor of Glen Burnie/Harundale/Pasadena. Mountain Road (Md. 177) should serve local circulation due to the location of Md. 100, but as discussed above, local and intraregional traffic conflict due to design of Md. 100. Closer to the harbor, Md. 173 and Patapsco Avenue have conflicts between truck traffic and adjacent residential uses. Similar problems exist on Locust Point but should be relieved by City projects to construct a short truck by-pass from Key Highway to Nicholson Street.

Transit service ranges from a high level with heavy ridership in the Cherry Hill/Baltimore Highlands to very low levels on long dead-head surburban routes to Gibson Island. Most commercial and employment centers have moderate levels of service including express rush hour service on an Old Annapolis Road/Hanover Street route.

Rail service south of the Harbor is provided by the three mainline railroads. The B&O has a large yard at Curtis Bay which primarily handles coal and ore traffic. This yard is being expanded to meet expected growth in export coal volume. The B&O Curtis Bay Branch line also serves other industries as far south as the BG&E generating plant near Stoney Creek. The Curtis Bay Branch line has few operating problems and interference with mainline traffic is not significant. The Locust Point Yard complex is an older complex of industrial service yards designed for pier traffic which accounts for only a small percentage of existing traffic. Yard tracks are short, switching is difficult, and many tracks are in need of repair. The yard is considered to be operating near capacity.

Conrail service to this side of the harbor is mostly by interchange with the B&O, although the Gwynns Run yard on the mainline a mile south of Funton Street services non-port industrial customers. Track conditions in the yard are poor and vandalism is high.

The Western Maryland RR (WM) operated primarily to the Port Covington Terminal on Locust Point. Other traffic is handled by the B&O for WM and taken to Canton or Curtis Bay. With the exception of grain, most other cargo has adequate capacity. Grain, which arrives by unit trains of 65–100 cars, can be handled by the elevators faster than the railroad can supply freight cars due to a lack of storage space for the oversized grain cars. Operations of Port Covington are not efficient due to yard configurations. Construction of I-95 will require relocating some B&O and WM tracks including a reduction in interchange track capacity.

Land/water interaction in Locust Point has problems similar to those of Canton. The major commodity exported from Locust Point is grain and it creates most rail operating problems. Containers are not yet a significant factor, but MPA is building a new South terminal for containers and general cargo. Although WM has a Trailer on Flat Car terminal in Port Covington, it has little room for expansion. Completion of I-95 will give this port area greatly expanded regional highway access, but vacant land for expanded industry is not readily available. Curtis Bay is also a major bulk cargo area with coal (rail-dependent) and petroleum (local distribution by truck) facilities. The rail lines and yards are in good condition, operate efficiently, and have room for expansion.

The Urban Core Study boundary does not include Baltimore-Washington International Airport, but as the State's major commercial passenger and air freight facility, it influences the Coastal Zone. BWI provides balance to the Coastal Zone's transportation system, and employment opportunities. Since turbine (jet) aircraft constitute the majority of flight operations at BWI, a noise influence zone has been established. The noise zone covers mostly developed areas in Glen Burnie and some less developed areas along Marley Creek.

**Southern Section**

This section of the study area contains Annapolis, developing suburban areas and rural areas of Southern Anne Arundel County. Maryland routes 2 and 3 continue from the Urban Core through the Southern Section. Ritchie Highway (Md. 2) is a 4-lane major arterial and the principal access route to the Broad Neck peninsula. Md. 3 is also a 4-lane major arterial which connects with Md. 32/178 to provide a second route between Baltimore and Annapolis. Md. 2 is congested at present with projections indicating more traffic by 1985. There are no plans for improvements to Ritchie Highway. Md. 3 is projected to be over capacity by 1985 so it would offer little relief to Md. 2 for intercity traffic. Since both roads serve areas separated by the Severn River, re-distribution of local traffic can only be accomplished north of Benfield Road. Md. 178 is considered over capacity now from the Md. 32/178 junction to Parole, with no alternate routes available either for local traffic. US 50/301 is the major approach from the west to Annapolis and the Bay Bridge. The 4-lane expressway provides the major inter-regional link between the Washington Area and the Eastern Shore. Traffic is moderate all year, but reaches congestion levels during the summer weekends and during the short rush hours near Annapolis at the Severn River Bridge. The limited number of river crossings funnel most traffic through a few highways.

South of Annapolis, Md. 2 (Solomons Island Road) is a major arterial up to the South River Bridge, where it continues as a two-lane road through the County. Md. 2 is congested from Parole to Md. 214, but Riva Road has some capacity for growth until it reaches Parole. The Parole area is a major bottleneck with routes 50/301, 2, 178, 450 and Riva Road all converging at a major commercial center. Further south, most routes are moderately to lightly traveled, but many have isolated safety problems (sight distance, etc.) which limit capacity.

Local congestion problems in many cases are also of regional significance due to the limited number of roads on each peninsula. Ritchie Highway is both a regional link between Baltimore and Annapolis and a major collector/commercial strip for the Broad Neck Peninsula. Also, on Broad Neck, College Parkway has had rapid growth along it which will require widening to its full 4 lanes by 1985. Its intersection with Ritchie Highway is a major problem as well. Lack of Severn River crossings and the frequent closing of the Ridgely Avenue bridge add to the rush hour which is short, but intense on Rowe Boulevard. The Mayo peninsula is also developing at a rate which is causing safety problems on Md. 214, and could exceed capacity depending on how much growth occurs by 1985.

Transit service is provided by MTA between Annapolis and Baltimore at a moderate level along Ritchie Highway. Bus service in Annapolis is provided by the Arundel Bus Company over two routes which are mostly confined to the City limits. Service is hampered by narrow and congested streets in Annapolis but is maintained at a moderate level.

Rail service, either passenger or freight, does not exist in the Southern Section. The right-of-way between Glen Burnie and Annapolis of the Baltimore and Annapolis Railroad has been abandoned and there are no plans to reactivate service on this line.

The Southern Section has two privately operated general aviation airports, Deep Creek near Shady Side, and Lee near the South River Bridge west of Annapolis. Both provide facilities for light piston powered aircraft. Limited noise impacts are associated with both. Lee Airport is experiencing increased operations, but is also facing residential pressure which could affect its operation.

# APPENDIX D

## NATIONAL REGISTER LISTINGS WITHIN THE COASTAL ZONE

| Baltimore City | *Date Built* |
|---|---|
| 1. Federal Hill Historic District | 1880's |
| 2. Fells Point Historic District | 1763 |
| 3. Fort McHenry National Monument & Historic Shrine | 1794 |
| 4. USS Constellation | 1797 |

| Anne Arundel County | |
|---|---|
| 1. Annapolis Historic District | |
| 2. Artisan's | 1777 |
| 3. Brice House | 1766–1777 |
| 4. John Callahan House | 1780's |
| 5. Chase-Lloyd House | 1769–1774 |
| 6. Patrick Creagh House | 1750 C. |
| 7. Hammond-Harwood House | 1774 C. |
| 8. House by the "Town Gates" | 1880's |
| 9. Maryland State House | 1772–1779 |
| 10. Mt. Moriah African Methodist Episcopal Church | 1874 |
| Old City Hall & Engine House | 1821 |
| 11. Paca House & Garden | 1763 |
| 12. Pinkey-Callahan House (St. John's College Infirmary) | 1750 C. |
| 13. Upton Scott | 1762 |
| 14. Peggy Stewart House | 1761 |
| 15. U.S. Navy Academy | 1899 |
| 16. Whitehall | 1765 |
| 17. Martin's Pond Site | |
| 18. Thomas Point Shoals Light Station | 1838 |
| 19. St. James Church (St. James Lothian) | 1763 |
| 20. St. Paul Chapel, Md. | 1865 |
| 21. Belvoir | 1650 |
| 22. Mount Airy | 1850's |
| 23. All Hallow's Church | 1710 |
| 24. Summer Hill | 1840 |
| 25. Sudley (Cumberstone) | 1683 |
| 26. Holly Hill | 1667 |
| 27. Cedar Park | 1600 |
| 28. Tulip Hill | 1755 |
| 29. U.S. Naval Academy Dairy Farm | 1713 |
| 30. Larkin's Hill Farm | 1650 |
| 31. Larkin's Hundred | 1704 |
| 32. Mary's Mount | 1742 |
| 33. Obligation | 1700's |
| 34. Iglehart (The Vineyard, Md.) | 1800 |
| 35. Burrages | 1700 |
| 36. Christ Church | 1869 |
| 37. Evergreen | 1690's |
| 38. Hancock's Resolution | 1700's |
| 39. Sandy Point Farmhouse | 1700's |
| 40. South River Club | 1742 |
| 41. London Town Publik House | 1745 |

| Baltimore County | |
|---|---|
| 1. Ballestone Mansion | |
| 2. Todd Farmhouse | |

| Harford County | |
|---|---|
| 1. Gunpowder Meetinghouse | 1800's |
| 2. Presbury Meetinghouse | 1720 |

| | |
|---|---|
| 3. Sophia's Dairy | 1768 |
| 4. Poplar Hill | 1700's |
| 5. Havre de Grace Lighthouse | 1827 |
| 6. Southern Terminal Susquehanna & Tidewater Canal | 1835 |
| 7. St. George's Parish Vestry House | 1766 |

# APPENDIX E

The technical work of the task force includes a series of maps, reports, and memoranda as follows:

### Reports

- *Inland Boundary Delineation*, Draft, December 1975
- *Issues*, Draft, December 1975
- *Dredge and Fill Permit Process*, Second Draft, December 1975
- *Existing Conditions Review*, First Draft, February 1976; Second Draft, March 1976
- *The Economy and Population: A Summary*, Draft, April 1976
- *Land Capability Analysis*, Draft, August 1976
- *Planning for the Coastal Zone: Issues, Goals, Inventory Analysis*, August 1976

### Memoranda

- Memorandum of Understanding/Joint Work Program, October 1975
- Quarterly Progress Report, October-December 1975
- Communication and Participation, Draft, February 1976
- Quarterly Progress Report, January-March 1976
- Technical Work Schedule and Review Process, April 1976
- Project Completion Report (to HUD), October 1975—June 1976
- Participants' Roles and Responsibilities, September 1976

### Maps

- Inland Planning Boundary (1″ = 1 mile)

**Coastal Zone Inventory (1″ = 2000′)**
- Urbanized Land Activity
- Marine Resources and Activities
- Non-Urbanized Physiography
- Public Facilities and Service Review
- Soils
- Elevation, Streams, and Drainage Basins
- Issues

**Coastal Zone Analysis (1″ = 2000′)**
- Sensitive Areas
- Resource Protection Areas
- Activity Centers and Linkages

**Coastal Zone Plan Preparation (1″ = 2000′)**
- Land Capability Units
- Water Capability Units
- Exerting Development Pattern
- Proposed Development Pattern (First Draft)

## WETLANDS: FOOTNOTES

[1]Mylar photomaps are on a scale of 1:2,400. An update is underway by the Wetlands Permitting Section of the Water Resources Administration to quantify current acreages and assess productivity value.
[2]Metzgar, R. G., *Wetlands in Maryland*. Maryland Dept. of State Planning. Publication No. 157. 1973. p. II-1.
[3]Ghigiarelli, E. A., *An Analysis of Problems Which Influence Coastal Zone Management in Maryland*. Thesis, Univ. of Md. 1972. p. 75.
[4]Op. cit. note 2.
[5]Op. cit. note 2.
[6]Op. cit. note 2.
[7]Stewart, R. E., *Waterfowl Populations in the Upper Chesapeake Region*. U.S.D.I. BSF+W. Spec. Sci. Report. Wildlife No. 65. U.S.G.P.O. Washington, D.C. July, 1962.
[8]Shaw, S. P., and C. G. Fredine. *Wetlands of the United States*. U.S. Fish and Wildlife Service. Circular 39. 1959.

## MARINAS: FOOTNOTES

[1]Greis, Peter: *Boating Almanac*. Volume 4, Severna Park, Maryland, 1976
[2]Ibid
[3]Boat registration records of the Maryland Department of Natural Resources (unpublished)
[4]Lyon, Tuthill, and Matthews: *Economic Analysis of Marinas in Maryland*. Maryland Agricultural Experiment Station, publication MP679, College Park, Maryland, 1969

[5]Ris, et al: *Recreational Boating on the Tidal Waters of Maryland*. Roy Mann Associates for the Maryland Department of Natural Resources, 1976
[6]See Note 5
[7]Ibid
[8]Ibid
[9]Nixon, Oviatt, and Northby: *Ecology of Small Boat Marinas*. Marine Technical Report Number 5, University of Rhode Island, Kingstown, 1973

## SOLID WASTE: FOOTNOTES

[1]Seldman, Neil: *Garbage in America: Approaches to Recycling*. Institute for Local Self-Reliance, Washington, D. C., 1975
[2]Forste, and Siegler: *Planning Solid Residuals Management in the Baltimore Area*. Maryland Department of Natural Resources, 1976
[3]Gudger, and Bailes: *The Economic Impact of Oregon's "Bottle Bill."* Oregon State University, 1974

SHIPPED FROM NMFS
MAR 18 1980

NOAA COASTAL SERVICES CENTER LIBRARY
3 6668 00002 7666