

PATUXENT RIVER POLICY PLAN
A LAND MANAGEMENT STRATEGY

APPROVED APRIL 1984

MARYLAND DEPARTMENT OF STATE PLANNING

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June, 1984

Dear Fellow Marylander:

Water quality in the Patuxent River is the result of how we use land in the watershed. If we would improve the water, and the vitality of life depending on it, we must better manage our land.

The Patuxent River and its watershed are vital assets for Maryland - for its people, its fish and wildlife, and its economy. Over recent years, development and more intensive use of land for housing, industry, and agriculture have created adverse impacts on the river and life depending on it.

Most pollution in the river comes from two sources: sediment and excess nutrients, principally phosphorus and nitrogen. Increased population has increased the effluent going into the river from sewage treatment plants. But virtually all sediment and half of the nitrogen going into the river are coming not from sewage treatment plants or "point sources" but from "non-point sources". Non-point run-off pollution increases when forests are cut, development covers fields, construction changes topography, and excess fertilizer runs unchecked from farms.

Any improvement to the river requires addressing both sewage effluent and non-point pollution simultaneously. This plan, the Patuxent River Policy Plan, addresses non-point pollution through a watershed land management strategy. The 208 Water Quality Management Plan for the basin provides the strategy for controlling discharges to the river from sewage treatment plants. The Policy Plan and the 208 Plan, combined with other on-going programs provide the necessary steps to improve water quality in the Patuxent Watershed. The Policy Plan has been approved by the seven county governments in the watershed and by the Maryland General Assembly.

The Patuxent River Policy Plan is a land management plan. It is a plan for both the State and seven counties in the watershed. Without the discipline of land management, the Patuxent River, or any other river, cannot accommodate people and changing land use and still be viable for fish, wildlife, vegetation, and recreational use. We urge you to support implementation of the Policy Plan.

Very sincerely yours,

Constance Lieder

INTRODUCTION

A committee composed of State and local executive and legislative representatives examined the Patuxent River beginning in 1977. The committee's final report recommended enactment of legislation requiring preparation of a Watershed Policy Plan. In 1980, the General Assembly enacted the Patuxent River Watershed Act. A Patuxent River Commission was created in the Department of State Planning. The Department was charged to prepare a Watershed Policy Plan to give policy direction to local and State agencies in carrying out their programs and making regulatory decisions in the Patuxent River Watershed. The Commission and Department have ongoing responsibility for implementation of the plan.

The Patuxent River Watershed contains parts of seven Maryland counties: Montgomery, Howard, Anne Arundel, Prince George's, Calvert, Charles, and St. Mary's. Each county has a representative on the Commission. In addition, the Departments of State Planning, Natural Resources, and Health and Mental Hygiene serve on the Commission. The Commission began work in early 1981.

The Patuxent River Policy Plan presented here is the result of much effort and many meetings with State and local representatives and citizen groups. Comments and recommendations received at the three public hearings held November 28, 29, and 30, 1983 were considered in preparation of this plan.

The Patuxent River Policy Plan has been approved by all seven county governments in the Patuxent Watershed and the General Assembly.

Unless otherwise noted, the data and information contained in or on which this Plan is based were developed before January 1983.

Chapter One of this document describes the Patuxent River Watershed's assets and problems. The cause of the river's declining water quality is traced to point and non-point source pollution. This chapter also explains that the basic purpose of the plan is to attack non-point source pollution, which is attributed to population growth and land use change. The final part of the first chapter incorporates a statement of goals for the watershed.

Chapter Two reviews the existing State and local laws and programs applicable to the river's condition. Ten recommendations are presented composing a land management strategy for the watershed.

The Patuxent River Commission has been instrumental in helping to prepare this Policy Plan. The Department also expresses its appreciation to the scores of State, local, and private individuals who have given information, and reviewed earlier drafts of the plan, providing constructive criticism. This assistance was most helpful in completion of the proposed plan.

SUMMARY

Rich in history and natural beauty, the Patuxent is a river in distress. Serving many purposes from the headwaters to its confluence with the Chesapeake Bay, the river, its tributaries and watershed reveal great diversity. The Patuxent Watershed contains forest, farmland, and suburban development. There is rolling topography and flat terrain. Productive wetlands and valuable wildlife areas are plentiful. Sand and gravel resources are abundant. The river system contains narrow streams and a wide estuary. Fishing, crabbing, boating, and outdoor recreation provide enjoyment and the livelihood for many persons.

The river is also used as a disposal for sewage treatment plant effluent and runoff from streets, parking lots, and farms. There are two types of pollution in the river: sediment and nutrients. Excess nutrients have caused increased algae in the water which consume dissolved oxygen and cause reduced fish populations. Excess algae and sediment have clouded the water blocking sunlight and causing dramatic loss of submerged aquatic vegetation. This vegetation is prime habitat for juvenile fish and food for waterfowl. Water quality of the two water supply reservoirs is projected to decline with greater production of algae. The following table describes the river's pollution:

PATUXENT WATERSHED¹ POLLUTION

<u>Type</u>	<u>Source</u>
Sediment	99% Non-point
Nutrient	
Phosphorus	83% Point
Nitrogen	51% Non-point

Virtually 100 percent of the sediment and 50 percent of the nitrogen are delivered to the river by non-point sources. Piped or point sources contribute 85 percent of the phosphorus and 50 percent of the nitrogen reaching the river.

Population growth and related land use change are the fundamental causes of point and non-point pollution. As people move into the riverbasin, forest and farmland are converted to homes, shopping centers, industrial parks, highways. The disruption to land during construction and increased impervious surfaces result in sediment and nutrients reaching the water from non-point sources. Sewage treatment plants generate additional effluent and point source pollution as population grows.

¹Source: Environmental Protection Agency,
Chesapeake Bay: A Framework For Action, 1983.

During the 1970's, slightly more than 100,000 people moved into the basin. During the period 1973-81, approximately 17,000 acres of forest and farmland were developed. Prior to 1990, it is expected that 125,000 more people will move into the watershed causing 22,000 more acres of forest and farmland to be developed. Figure 1 shows population growth for each county in the watershed.

The plan contains a series of twenty Goals some of which were initially drafted at the Patuxent Charrette held in late 1981. The Nutrient Control Strategy contained in the 208 Water Quality Management Plan was the major result of the charrette conducted by the Office of Environmental Programs. The Goals were reviewed by the elected leaders of the seven counties and revised based on their suggestions.

Any improvement to water quality must address both point and non-point sources of pollution. Two solutions are proposed. One is the 208 Water Quality Management Plan for the Patuxent Basin. This plan approved by Governor Hughes in June 1983, contains the strategy for controlling point sources of pollution. The 208 plan was approved by the federal Environmental Protection Agency in October, 1983. The State is committed to the nutrient control strategy in the 208 plan. The second solution is this Patuxent River Policy Plan. This plan is a land management plan to control non-point pollution.

The following recommendations are the strategies of the Patuxent River Policy Plan.

RECOMMENDATIONS

1. ESTABLISHING A PRIMARY MANAGEMENT AREA (PMA)

A PRIMARY MANAGEMENT AREA, DELINEATING THE AREA ALONG THE RIVER AND ITS TRIBUTARIES, WILL BE ESTABLISHED TO IDENTIFY AND MANAGE LAND FROM WHICH POLLUTION IS MOST LIKELY TO BE TRANSPORTED INTO THE RIVER.

The PMA shall be considered to be an area critical to the Chesapeake Bay and its tributaries;

Local governments will include the PMA in their plans and zoning ordinances;

Preferred land uses in the PMA will be agriculture, forest, and recreation;

Local governments will prepare plans for the PMA to minimize dense and intensive development and large impervious areas in the PMA;

State agencies, in regulatory activities, technical assistance, and grant programs, will target the PMA as a priority area; and

State and local governments will ensure that land use practices within the PMA shall be of such a nature so as to have no (or at least minimal) adverse impact on water quality of the Patuxent River.

2. PROVIDING BEST MANAGEMENT PRACTICES (BMP's) AND VEGETATIVE BUFFERS

PROGRAMS FOR PROVIDING BMP's AND VEGETATIVE BUFFERS IMMEDIATELY ADJACENT TO THE RIVER AND ITS TRIBUTARIES WILL BE DEVELOPED.

State and local governments will provide BMP'S on their publicly owned lands, including buffers where appropriate;

The State will require BMP's on State assisted projects, including buffers where appropriate;

Local governments will adopt subdivision and zoning provisions that require BMP's, including buffers where appropriate, in all new development;

BMP's, including filter strips and field borders, will be encouraged on agricultural land through education, voluntary action, incentive, compensation, and through implementation of the Maryland Agricultural Water Quality Management Plan;

Implementation of soil conservation plans, including filter strips and field borders where appropriate, will be required on lands acquired in easements;

The federal government will be requested to provide BMP's including buffers where appropriate, on its lands; and

The State Department of Transportation will protect roadside buffers by eliminating its practice of broadcast spraying of herbicides along roadsides.

3. IDENTIFYING MAJOR NON-POINT POLLUTION SITES

THE STATE, IN CONJUNCTION WITH LOCAL GOVERNMENTS, WILL SURVEY THE WATERSHED AND IDENTIFY MAJOR NON-POINT POLLUTION SITES.

Existing State regulatory and corrective programs will consider these sites as priority areas.

4. RETROFITTING EXISTING DEVELOPMENT

THE STATE WILL DEVELOP A COST-SHARING PROGRAM TO AID LOCAL GOVERNMENTS IN CORRECTING AND MANAGING STORM WATER POLLUTION FROM EXISTING DEVELOPED AREAS.

Local governments will pursue a program of abating pollution in existing developed areas;

State and local governments will curtail non-point pollution coming from their facilities; and

The State will establish priorities among developed areas causing non-point pollution and address problems in order of priority.

5. ACCOMMODATING FUTURE DEVELOPMENT

FUTURE DEVELOPMENT WILL BE ACCOMMODATED IN WAYS TO MINIMIZE IMPACT ON WATER QUALITY AND MAXIMIZE EXISTING OPPORTUNITIES.

Development will be concentrated where possible, outside the PMA;

Development will optimize the use of existing facilities and utilities;

Development will be sited to maximize use of soil infiltration capacity;

Development will be sited away from sensitive areas, such as reservoirs, wetlands, steep slopes, and aquifer recharge areas;

Sites within the watershed that offer unique opportunities for development and redevelopment will be identified and planned; and

New public facilities (schools, parks, highways) will incorporate best management practices.

6. INCREASING RECREATION AND OPEN SPACE

ADDITIONAL RECREATION AND OPEN SPACE LANDS WILL BE ACQUIRED IN THE PATUXENT WATERSHED BY THE STATE AND LOCAL GOVERNMENTS.

State and local governments will review their recreation and open space plans for the Patuxent Watershed;

Acquisition will be concentrated along the river and tributaries and in the lower portion of the watershed;

Federal holdings in the watershed must be retained for open space and research; and

An acquisition program for the lower portion of the watershed will be prepared.

7. PROTECTING FOREST COVER

EXISTING FOREST COVER WILL BE RETAINED AND IMPORTANT SENSITIVE AREAS WILL BE REFORESTED TO PROTECT WATER QUALITY.

Existing State programs, like Program Open Space and Agricultural Preservation will be examined and amended for their application to forest protection;

Buffering with forested strips will be encouraged; and

The State will institute a reforestation program for developed areas.

8. PRESERVING AGRICULTURAL LAND

PRIME AND PRODUCTIVE AGRICULTURAL LAND WILL BE PRESERVED IN THE PATUXENT WATERSHED.

Easement purchases will include requirements for implementing soil conservation plans including buffer strips where appropriate; and

The Agricultural Cost-Sharing program will target the Patuxent watershed.

9. EXTRACTING SAND AND GRAVEL

SAND AND GRAVEL ACTIVITIES WILL BE MANAGED TO ALLOW EXTRACTION OF THE RESOURCE WITHOUT DAMAGE TO THE RIVER.

Abandoned sand and gravel sites will be reclaimed;

Sensitive control of active and future sites, particularly those in the PMA, will be required;

Penalties for allowing sediment to enter the Patuxent River resulting from washing operations are to be increased to a minimum of \$1,000 per day for every day a violation is found to exist by the appropriate State agency; and

The location of the resources will be identified, and county resource management strategies developed.

10. ADOPTING AN ANNUAL ACTION PROGRAM

THE PATUXENT RIVER COMMISSION WILL ANNUALLY DEVELOP AND ADOPT AN ACTION PROGRAM TO IMPLEMENT THE STRATEGIES.

The action program will contain a schedule and indicate responsibilities in carrying out specific actions to implement the plan;

A community education program will be an integral part of the action program; and

The Commission will prepare an annual report on progress in implementing the plan.

The recommendations and proposed actions in this plan are a starting point. The Policy Plan has been approved by county governments and the General Assembly. Approval of the plan indicates concurrence and commitment to improving the Patuxent River. The combined work of local and State governments, citizens, land owners, and private industry is required to transform the proposals into an improved river.

While prepared for the Patuxent, the land management recommendations contained in this plan can serve as a model for managing any watershed and the Chesapeake Bay.

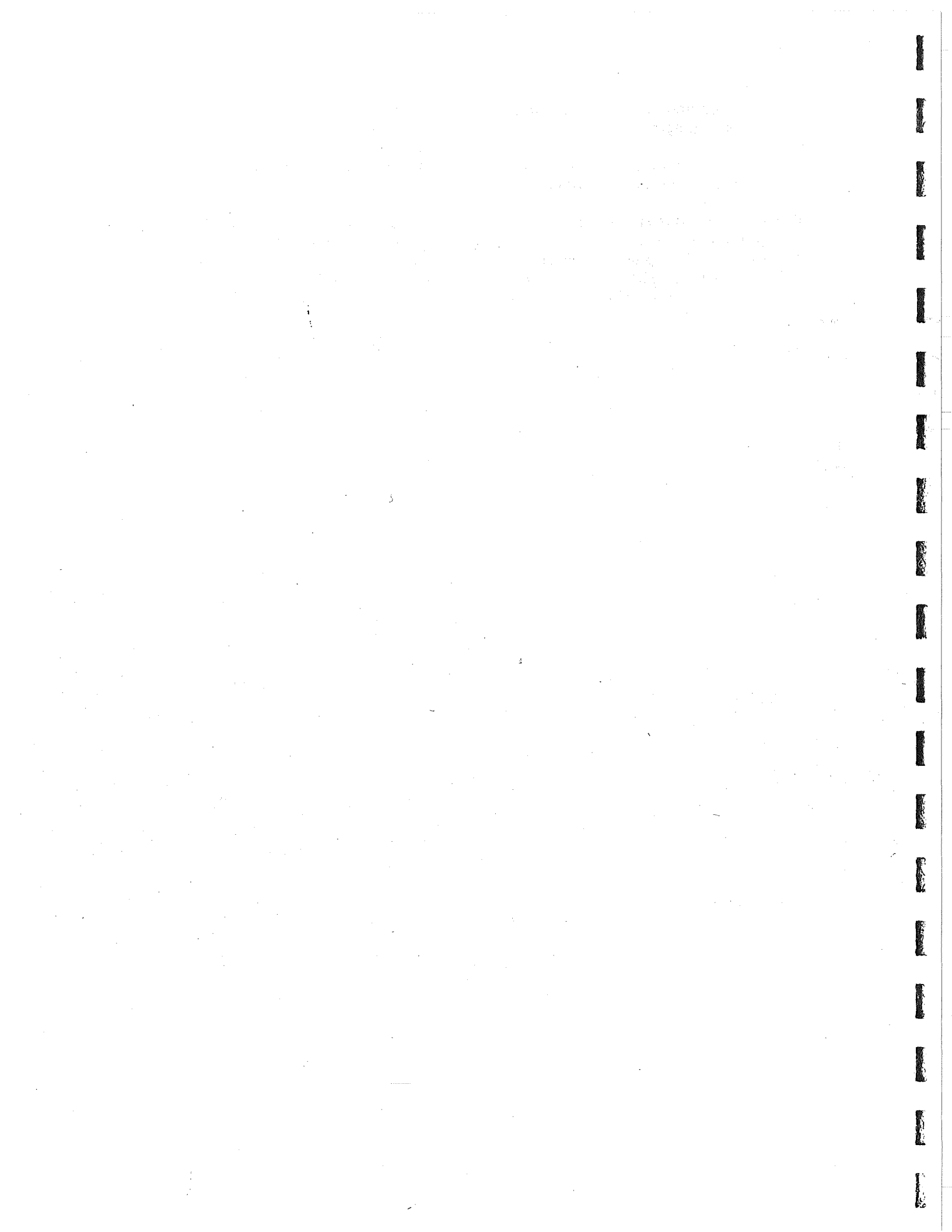


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CHAPTER ONE: A BEAUTIFUL RIVER IN NEED OF PROTECTION

I. HISTORICAL PERSPECTIVE

The long slender watershed of the Patuxent River, occupying approximately one-tenth of Maryland's total land area, lies entirely within the State's boundaries. The watershed contains portions of seven Maryland counties. Early settlers entered the region by water and found friendly natives in small villages, a clean river, lush forest lands, and an abundance of wildlife. Many of the early colonists settled along the river's shoreline to farm the land and harvest oysters, fish, and crabs. The Patuxent River was not only the main street and source of food for the early residents, it was also the thoroughfare to the rest of the world.

The post roads and water powered mills of the late 1700's and 1800's continued to attract people to the river's fall line area in and around the town of Savage. Roads carried horses and carts across the middle section of the watershed as later they would carry cars, trucks, and commuters to the nearby growing cities to the north and south. As the residents of the basin increasingly relied on roads for transportation, the river's transport role lessened in importance. Farmlands replaced forests. Urban development succeeded agricultural lands. Development of the land and water resources served many needs of a growing population.

II. THE RIVER AND ITS RESOURCES

The Patuxent Watershed today remains predominantly rural with 85 percent of its total land cover in agriculture and forest. These lands provide the rural beauty that characterize most of the watershed.

The upper third of the river's mainstem and two of its three major tributaries, the Middle and Little Patuxent, are entirely in the Piedmont Province. Two reser-

voirs, Triadelphia and Rocky Gorge, are located on the mainstem of the river. These reservoirs, owned and operated by the Washington Suburban Sanitary Commission (WSSC), provide approximately 50 million gallons of potable water per day to Suburban Washington. The 4,220 acres of largely forested, publicly-owned land adjoining the reservoirs provide permanent vegetative buffers from nearby agricultural and encroaching urban land uses. The parks and reservoirs also allow for public access to the river for fishing, boating, picnicking, and leisure enjoyment.

The middle third of the river includes the fall line which is the physical division between Piedmont and Coastal Plain lands that runs through the Laurel-Savage area. The Little and Middle Patuxent and Western Branch are important tributaries that join the river in this general vicinity. Taken together, the upper and middle portions of the watershed lie within the Baltimore-Washington urban growth corridor. As a result of this growth, the Little Patuxent and Western Branch carry approximately 75 percent of the 38 million gallons of sewage treatment plant effluent that is discharged into the river and its tributaries each day.

The river begins to show tidal influence in the vicinity of Queen Anne's Bridge and broadens into a flooded valley estuary. The lower third of the river is two-miles wide supporting oysters, crabs, and finfish. The Patuxent River then passes Solomon's Island in Calvert County where it flows into the Chesapeake Bay. Tidal mixing occurs as the Chesapeake Bay floods into the Patuxent with most high tides.

Public access to the Patuxent River for recreational purposes varies greatly between the upper and middle portions of the river and the lower part. In addition to the 4,220 acres of WSSC lands surrounding the reservoirs, the Maryland-National Capital Park and Planning Commission (MNCPPC) owns over 4,500 acres along the Patuxent in Prince George's County with approximately 1,200 additional acres in the Montgomery County portion of the watershed. Another 10,000 acres is managed by the Maryland Department of Natural Resources, most of which is part of the Patuxent River State Park located in Montgomery and Howard Counties. Howard County and the Columbia Association own extensive park acreage along many of the river's tributaries, and Anne Arundel County has purchased several hundred acres near Jug Bay. These extensive acreages of publicly owned land in the upper

and middle watershed provide a vegetative and scenic buffer in addition to public recreational opportunities. In sharp contrast to the upper river, very limited publicly-owned acreage exists along the estuary where water recreation activities are restricted because of poor access. The State has one park with 590 acres of waterfront acreage on the river south of Benedict. The three southern counties own 13 acres of public recreation land along the river.

Federally-owned acreage within the watershed is substantial, presenting potential problems and opportunities for protecting the water quality of the river. The largest concentration of federal land is in the middle of the basin. There are five major facilities in this section of the watershed: Ft. George G. Meade (13,484 acres), the U.S. Department of the Interior's Patuxent Wildlife Research Center (2,800 acres), the U.S. Department of Agriculture (350 acres), the Naval Academy Dairy Farm (856 acres), and the U.S. Air Force (1,023 acres). In addition, the U.S. Navy has a 6,800 acre facility located at the mouth of the Patuxent River. The Wildlife Research Center is largely an undisturbed natural area that offers protection to the river.

The lower two-thirds of the watershed has substantial deposits of sand and gravel that are of considerable importance for construction. A great deal of sand and gravel has been mined in Prince George's and Anne Arundel Counties. Nevertheless, large deposits remain in the basin.

Wetlands within the Patuxent Watershed are critical to the support and propagation of fish and wildlife populations. The watershed contains 6,773 acres of tidal and 4,990 acres of non-tidal wetlands. These figures represent 2.6 percent of Maryland's total tidal wetland acreage and 13 percent of the State's total non-tidal wetland acreage. Eighty-nine percent of the non-tidal wetlands in the Patuxent Basin are located within the 100-year floodplain. These wetlands are predominant in the middle third of the watershed, where urban development pressure is greatest.

Groundwater and groundwater recharge areas are also important resources in the watershed. Groundwater recharge areas absorb surface water which eventually

reaches sub-surface water levels. Charles, St. Mary's, and Calvert Counties, as well as portions of Anne Arundel and Prince George's Counties, rely on aquifers as their primary source of drinking water supply. The recharge areas for these aquifers are located in the upper and middle sections of the basin. Portions of these recharge areas are located where urban development is occurring within the watershed. A large belt of lightly developed federal land serves to protect some of the recharge areas and non-tidal wetlands, and to provide vegetated buffers for parts of the river.

The Patuxent Watershed is a varied environment that supports a diversity of wildlife and fish resources. The Patuxent's location between the northern continental and more subtropical southern climates is reflected in the presence of many wildlife species at the limits of their range. The river supports approximately 160 different species of finfish of which 15 are significant to the commercial fishing industry.

III. RECENT PROBLEMS

Human population growth and associated development have profoundly changed the river. The recently completed 208 Water Quality Management Plan for the Patuxent Basin confirms a decline in water quality. Levels of algae in the water, as measured by chlorophyll a, have increased since the 1960's. Excess algae consumes the dissolved oxygen in water upon which aquatic life depends. The 208 Plan indicates a decline in dissolved oxygen in the bottom waters of the estuary.

A decline in the clarity of the river's water has also been documented. This results from excess algae and particles of sediment suspended in the water. The cloudy water blocks sunlight from reaching submerged aquatic vegetation (SAV) which provides habitat for juvenile fish and feed for waterfowl. The Environmental Protection Agency's Chesapeake Bay Program has documented that less than 2.5 percent of prime SAV habitat in the Patuxent estuary is actually occupied by plants.

The decline in commercial fish catches throughout the Chesapeake Bay and its tributaries corroborates the decline in water quality in the Patuxent estuary.

Production of oysters in the Patuxent River during the 1960's was in the range of 40,000 to 80,000 bushels per year and clam harvests approximately 16,000 bushels per year. However, by 1980, shellfish production had dropped sharply to about a third of that in 1965. Striped bass catches have also declined sharply. While the causes of the decline are varied and complex, improved water quality is an important factor in the restoration of higher yields in the future.

A 1981 report prepared for WSSC entitled "Patuxent River Reservoirs Watershed Protection Program" reported that the reservoirs are aging at a faster rate than acceptable due to high nutrient inputs. Although algal growth in the reservoirs has not been excessive to date, twenty year projections indicate increasing nutrient concentrations with the potential for greater production of algae. Excess algae will shorten the useful life of the reservoirs.

Increased human populations both in and near the watershed have increased the demand for recreational use of the river. In 1977, the Water Resources Administration projected 5-7 percent annual growth rate in recreational fishing. Despite this increasing demand, public access to the Patuxent estuary remains very restricted.

The clearing and settlement of the virgin forests following the arrival of Europeans affected both the diversity and size of wildlife population within the watershed. Species that depended upon large acreages of wilderness disappeared from the Patuxent Basin. The population of other species declined, but they survived wherever suitable habitat remained. Meanwhile, wildlife species that prefer "edge" habitats such as field borders have flourished. However, the majority of human activities in the basin has negatively impacted both the size and diversity of wildlife populations through habitat destruction, overhunting, pesticide and herbicide contamination, and the introduction of pest species.

IV. SOURCES OF THE PROBLEMS

Two types of pollutants have been identified as the principal problems in the Patuxent River: sediment and nutrients (primarily phosphorus and nitrogen).

The clearing of forest lands for agriculture, highways, sand and gravel operations, and development exposes the soil to rain. The rain washes the soil particles off the land into tributary streams and the river. Without vegetative cover to "uptake" some of the rainfall and slow its flow, both the quantity and velocity of stormwater run-off increases. These increased volumes of stormwater not only transport more soil off the land but also increase the volume and velocity of water in the receiving streams. The result is accelerated erosion of the stream channels and even greater deposition of sediment in the river. Some areas of the river have been irreparably harmed by siltation.

The rapid conversion of forest land in recent decades has increased the sediment loads delivered to the river five-fold. Under forested conditions, the sediment delivered to the river from all the lands in the basin approximated 160,000 tons during an average year; however, under current land uses, that figure has increased to 710,000 tons. The sediment clogs streams, decreases water clarity, and covers fish eggs and shellfish bars. Sand and gravel mines, cropland, and construction sites have been major sources of sediment to the Patuxent River. Sand and gravel washing operations, when not properly maintained, discharge sediment to the river.

Nutrients are detrimental to water quality because they stimulate the growth of excess algae that depletes the dissolved oxygen in the water and increases water turbidity which kills submerged aquatic vegetation. Nutrient sources fall into two categories: point and non-point. The point sources are piped discharges of pollutants from sewage treatment plants and industry. In the Patuxent Basin the point source contribution to the nutrient load by industrial discharges is negligible compared to the 38 million gallons of treated sewage piped into the river each day from the thirty sewage treatment plants. By the year 2005, discharges into the river from sewage treatment plants are projected to increase to 74 million gallons per day. Assuming that increased discharge volumes will be treated at 1980 levels, nitrogen discharges will increase from 3,945 lbs/day in 1980 to 7,644 lbs/day in the year 2000. Phosphorus discharges during the same period will increase from 1,123 to 2,219 lbs/day.¹ Additional controls at sewerage treatment plants will decrease the projected nutrient discharge levels.

¹Source: Environmental Protection Agency, Chesapeake Bay: A Framework For Action, 1983.

The non-point sources include everything else: stormwater run-off that carries urban pollutants and chemical fertilizers and animal wastes off the land and deposits them in the river, atmospheric, groundwater, and other nutrient sources. Fifty percent of the nitrogen and fifteen percent of the phosphorus deposited in the Patuxent are from non-point sources. Nearly one hundred percent of the sediment deposited in the river comes from non-point sources.

The driving force behind the increasing sediment and nutrient pollution problems in the river is population growth. As population increases, more forest and agricultural land is converted to highways, homes, and shops and covered with impervious surfaces to service the new residents. This increases the amount of both point and non-point source pollution that is delivered to the river. Between 1970 and 1980, the population within the watershed increased by 42 percent (104,650 persons). Continued population growth is projected for the future as indicated in the following table. During the 1980's, the population of the watershed is expected to increase by nearly 125,000 people.

TABLE 1

PATUXENT RIVER BASIN
1970-90 POPULATION GROWTH

<u>County</u>	<u>Estimated</u> <u>1970</u>	<u>Estimated</u> <u>1980</u>	<u>Projected</u> <u>1990</u>	<u>% Change</u>	
				<u>Actual</u> <u>1970-80</u>	<u>Projected</u> <u>1980-90</u>
Anne Arundel	40,450	50,860	61,470	+25.7	+20.8
Howard	43,170	97,330	134,120	+125.5	+37.8
Prince George's	129,450	150,290	208,830	+16.1	+38.9
Montgomery	10,770	18,020	25,580	+67.3	+42.0
Calvert	9,930	16,790	23,250	+69.1	+38.5
Charles	2,130	2,410	2,290	+13.1	-5.0
St. Mary's	<u>12,310</u>	<u>17,160</u>	<u>22,030</u>	<u>+39.4</u>	<u>+29.9</u>
TOTAL	248,210	352,860	477,570	42.0	35.4

SOURCE: Department of State Planning and the counties.

Table 1 indicates that the portion of the watershed which lies in the Baltimore-Washington corridor will undergo the most dramatic population increase. Prince George's County is expected to experience the largest population growth. The population within the Patuxent Basin portion of Prince George's County is expected to increase by 58,540 persons to 208,830 during the decade of the 1980's. Howard County's population is expected to increase by 36,790 to 134,120. Over 10,000 additional people will move into Anne Arundel County and 7,500 persons will be added in the Montgomery County parts of the watershed. St. Mary's and Calvert Counties in combination will experience a population increase slightly more than 10,000 persons, whereas the population in the Charles County segment of the watershed is expected to decline minimally. Population growth is graphically illustrated in Figure 1.

Population growth is a primary force driving land use changes in the basin. As the population of the basin increases, more houses, apartments, and shopping and employment centers are built to meet the needs of the new residents. Highways are constructed and enlarged to carry the increased traffic. In the Patuxent Watershed most of this urban growth is occurring in the upper basin that lies in the Baltimore-Washington corridor.

Table 2 indicates a rapid conversion of agricultural and forest land into urban land uses. The most dramatic decline in land use is the 7 percent, 13,000 acres, decrease in cropland during the eight-year period (1973-81). Also, over 4,200 acres of forests changed to other land uses. All categories of urban land use with the exception of open urban land increased during the period. Low density residential land increased by a remarkable 70 percent to over 25,000 acres during the period. Medium density residential increased by more than 3,000 acres.

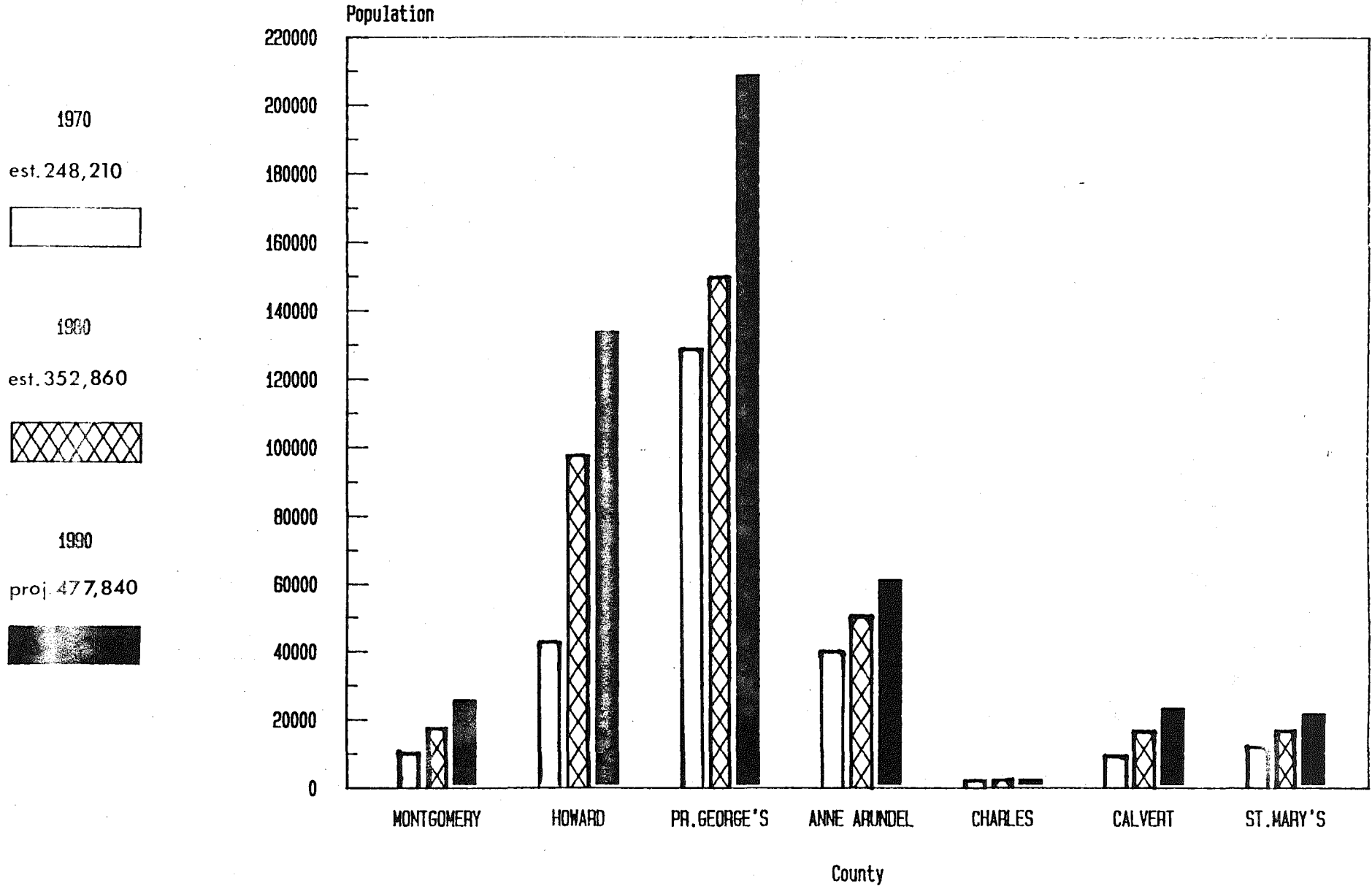
By correlating the increase in developed land to population growth in the basin, an estimate of total developed acreage can be projected for 1990. This analysis projects an increase of approximately 22,000 acres in developed land between 1980 and 1990. If current trends continue, this new development will primarily displace cropland and forest land.

PATUXENT RIVER BASIN

POPULATION GROWTH BY COUNTY

FIGURE 1

-6-



SOURCE: MARYLAND DEPARTMENT OF STATE PLANNING

TABLE 2

PATUXENT RIVER BASIN
1973-81 LAND USE/COVER CHANGE

Type of Land Use	1973 Acres	1981 Acres	Percent Land-Use Change
<u>DEVELOPED</u>	<u>58,900</u>	<u>75,400</u>	<u>+28.0</u>
Low Density Residential	15,000	25,600	+70.0
Medium Density Residential	19,400	22,600	+16.0
High Density Residential	3,500	4,500	+28.0
Commercial	4,500	5,900	+30.0
Industrial	1,200	1,200	0.0
Institutional	7,800	8,400	+7.0
Extractive	1,500	2,100	+43.0
Open Urban Land	6,000	5,100	-13.0
<u>AGRICULTURAL</u>	<u>207,900</u>	<u>195,300</u>	<u>-6.0</u>
Cropland	181,500	168,300	-7.0
Pasture	24,700	25,200	+2.0
Orchards/Vineyards/Horticulture	900	800	-10.0
Feeding Operations	0	100	0.0
Row and Garden Crops	800	900	+11.0
<u>FOREST</u>	<u>307,500</u>	<u>303,300</u>	<u>-1.4</u>
Deciduous Forest	182,300	179,400	-1.0
Evergreen Forest	6,600	6,300	-4.0
Mixed Forest	114,300	112,000	-2.0
Brush	4,300	5,600	+29.0
<u>WETLANDS</u>	<u>8,100</u>	<u>7,800</u>	<u>-3.0</u>
<u>BARREN LAND</u>	<u>100</u>	<u>700</u>	<u>+700.0</u>
TOTAL BASIN ACREAGE	<u>582,500</u>	<u>582,500</u>	

SOURCE: Maryland Department of State Planning - MAGI, 1973, 1981

The water quality impacts of these land use changes can be partially predicted by estimates of pollutants (both sediment and nutrient) that are washed off different land uses by rainfall. The degree to which these loads are transported off the land and into the river depends upon the land management practices, pollution abatement methods employed, and tributary stream and groundwater conditions.

Table 3 presents nutrient loading rates for the major land uses in the Patuxent Basin. These rates estimate the number of pounds of nitrogen and phosphorus washed from an acre during an average year of rainfall. The rates are based on field measurements. The more porous coastal plain soils show lower rates because more rainfall and nutrients infiltrate into the soils rather than running off the land into a stream. The more densely developed land and cropland yield the greatest per acre amount of nutrients.

Figure 2 shows the estimated share of nutrients yielded by Patuxent land uses. The fifty percent of the watershed that is forested yields less than ten percent of the basin's nutrient loads. Generally, forest land is the least polluting land use in terms of both nutrients and sediment. Any conversion of forest land to urban development or agriculture will increase the pollution from the land. Between 1973 and 1981, over 4,200 acres of forest land were converted to other land uses, principally urban development. Higher density developed land uses and croplands occupy less than forty percent of the watershed but yield more than eighty-five percent of the basin's nutrient pollution. Those lands have been cleared of perennial vegetation and have been either cultivated or covered with impervious surfaces. In both situations the volume and rate of run-off increases. Major sources of nutrients accompany these land uses.

The Patuxent 208 Plan estimates that about 710,000 tons of sediment erode into Patuxent streams each year. Sand and gravel mining sites, cultivated lands, and stream channel erosion were estimated to account for 85 percent of that sediment yield.

TABLE 3

PATUXENT RIVER BASIN
ESTIMATED NON-POINT POLLUTION LOADING RATES FOR
MAJOR LAND USES

Land Use ¹	Loading Rates (Lbs./Acre/Year) ²			
	Piedmont		Coastal Plain	
	Phosphorus	Nitrogen	Phosphorus	Nitrogen
Low Density Residential (.2 du/acre)	0.4	4.2	0.3	3.9
Medium Density Residential (4-5 du/acre)	1.1	8.7	0.9	7.9
Multi-Family Residential (10-20 du/acre)	1.8	13.4	1.7	12.5
Commercial/Industrial	2.7	24.6	2.7	24.6
Idle	0.2	3.0	0.1	2.6
Crop: Conventional Tillage	4.2	18.8	2.3	12.5
Minimum Tillage	1.6	9.8	1.1	8.7
No-Till	0.8	3.0	0.4	1.6
Pasture	0.4	1.8	0.2	0.9
Forest	0.1	0.4	0.1	0.4

¹Wetlands, quarries, transportation, institutional uses are not included as they represent less than 5 percent of the basin's total area.

²Rates are generated loads not those actually transported to the river.

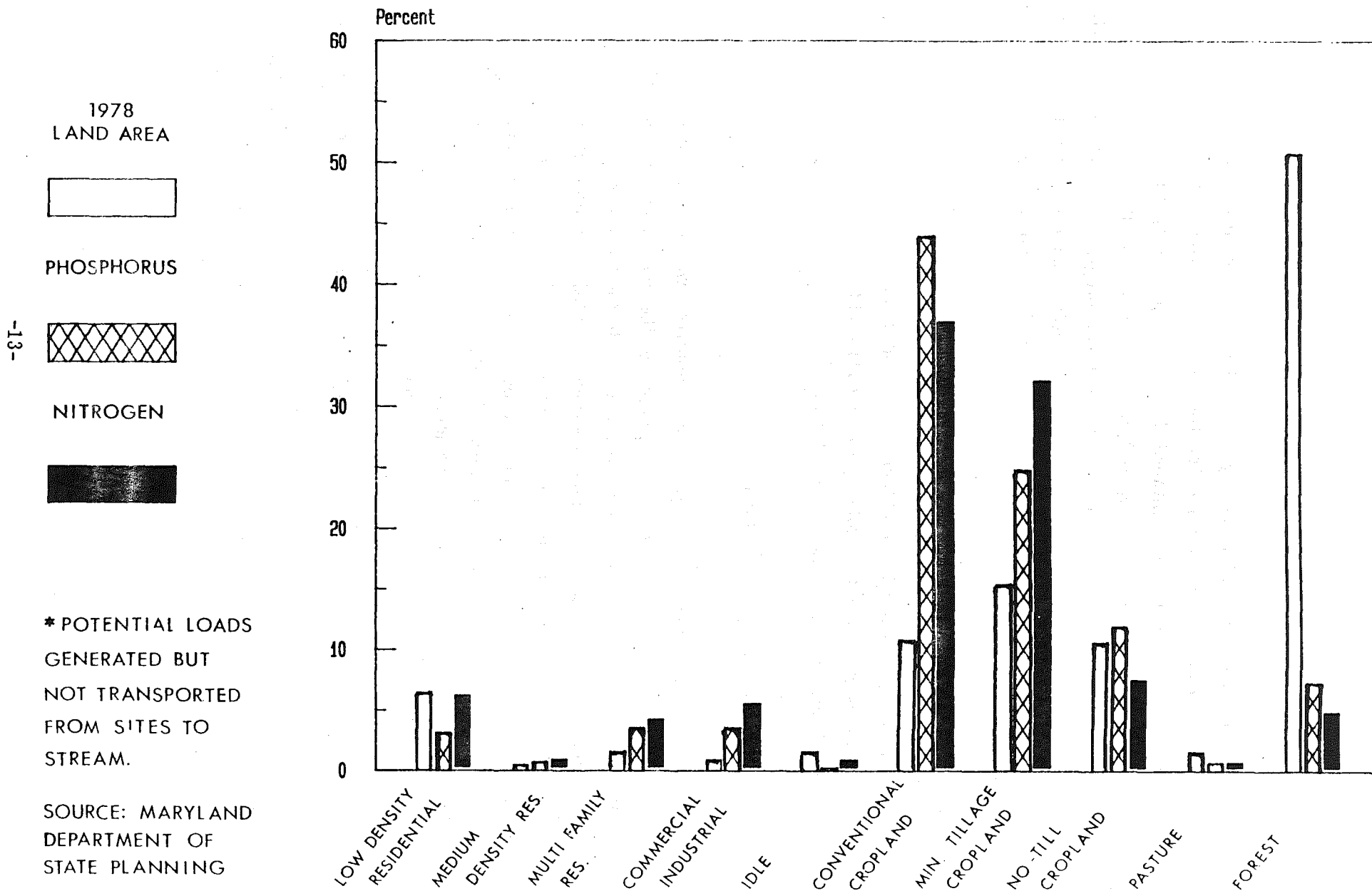
SOURCES: Northern Virginia Planning District Commission, Guidebook for Screening Urban Non-Point Pollution Management Strategies. Prepared for the Metropolitan Washington Council of Governments, November 1979.

Environmental Protection Agency Chesapeake Bay Program based on field data collected in the Patuxent, Chester (Maryland); Ware, and Occoquan (Virginia); and Pequea Creek (Pennsylvania) Basins.

PATUXENT RIVER BASIN

NON-POINT NUTRIENT LOADS BY LAND USE TYPES*

FIGURE 2



V. SOLUTIONS TO THE PROBLEMS

Deterioration of the water quality of the Patuxent has been the subject of much concern. Citizen groups formed for the expressed purpose of putting pressure on government to stem the downward trend. Legislatively formed special groups identified the problems and proposed corrective actions. These efforts resulted in the passage of legislation and development of programs to address the river's problems. The Patuxent River Policy Plan, which addresses non-point pollution problems and other river resource issues through a land management strategy, is one component of the State's efforts to protect the river. The 208 Water Quality Management Plan for the Patuxent, prepared by the Department of Health and Mental Hygiene, contains the program to address point source problems and certain aspects of the non-point problem. The 208 Plan and the Policy Plan are two principal efforts aimed at solving the river's problems. The following is a more detailed description of these two efforts.

The Patuxent River Policy Plan

In 1977, a joint Executive-Legislative Committee was formed to determine what actions the State should pursue to improve the environmental integrity of the Patuxent Watershed. The Committee's report to the Governor referenced numerous federal, State, and local laws and programs established to protect and improve the Patuxent Watershed. In many cases, the quality of the river was a primary focus of these programs and laws while in other cases it was a coincident benefit. Although many of the programs were effective in dealing with particular problems, the programs were often developed and implemented in isolation and unrelated to other efforts aimed at improving the watershed. The committee concluded that a more integrated approach was needed to organize these diverse efforts. The Patuxent River Watershed Act was enacted by the State Legislature in 1980.

The Patuxent River Watershed Act directed the Department of State Planning to prepare a Policy Plan for the Patuxent Watershed. It required an initial review of existing Maryland laws, regulations, policies, programs, and plans relating to the

river and an environmental assessment of local comprehensive planning programs. The Policy Plan has been approved by all seven counties in the watershed and the General Assembly. Appendix I includes a copy of each local and State resolution approving the plan. The plan serves as a policy guide for State agencies and local governments in carrying out their programs in the watershed.

The Act also established the Patuxent River Commission composed of a member from each of the seven counties and representatives of three State Departments, Health and Mental Hygiene, Natural Resources, and State Planning. The Commission was deeply involved in preparation of the plan and will participate in updating and implementation of the Policy Plan. The Commission reports annually to the General Assembly.

The 208 Water Quality Management Plans

Actions taken to implement the Patuxent and State-Wide Agricultural 208 Water Quality Management Plans will contribute to improving Patuxent water quality. The Patuxent 208 Plan contains a technical water quality assessment of the basin. It outlines a point source control program that includes a Nutrient Control Strategy for the major sewage treatment plants. Additionally, non-point sources of pollution and means for controlling them are discussed in the plan. In June 1983, Governor Hughes certified the 208 Plan for the Patuxent Basin. The U.S. Environmental Protection Agency approved the plan in October 1983.¹ The Executive Summary of the 208 Plan may be found in Appendix II.

The 208 State-Wide Agricultural Water Quality Management Program for Control of Sediment and Animal Wastes provides a state-wide process for identifying and addressing agricultural sources of water pollution. As part of the Patuxent Watershed 208 Plan, Soil Conservation Districts in six counties have selected and

¹In approving the 208 plan, EPA stated "It is our opinion that the information and studies performed to date do not provide an adequate technical basis to support nitrogen control in addition to phosphorus control. As a result, if a funding decision were to be made today, federal construction grant funds could only be provided to fund the cost-effective solution to achieving the technically justified nutrient effluent requirements."

mapped 100,000 acres of critical areas within the basin where the potential for pollution from agriculture is greatest. The program includes a strategy for solving pollution from these critical areas.

The 208 Plans and Policy Plan are complementary. Taken together, they provide a program for addressing both point and non-point pollution problems. In addition to non-point water quality issues, the Policy Plan addresses the wise use of the basin's land, mineral, and biotic resources.

Other State Programs

In addition to the 208 Plans and the Policy Plan, the State manages several other programs to address particular problems in the basin:

- o The Maryland Agricultural Cost-Share Program, administered by the Department of Agriculture and Department of Health and Mental Hygiene funds up to 87 1/2 percent of the cost of approved non-point pollution practices on agricultural lands in the basin.
- o The Department of Natural Resources has promulgated state-wide Stormwater Management Regulations to require control of stormwater runoff for new development.
- o The Surface Mining Program issues permits for sand and gravel mines in the basin, inspects pollution control practices on mining sites and requires reclamation of mined land.
- o Program Open Space funds the acquisition of park and forest lands through a 1/2 of one percent tax on real estate transfers.
- o The Sediment Control Program administered by the Department of Natural Resources requires sediment control for new development.

More details including the legal authority, on these and other State and local programs affecting the Patuxent Watershed may be found in Appendices III and IV.

VI. GOALS FOR THE WATERSHED

The Patuxent River Watershed is recognized through law as an important multi-jurisdictional region within the State in need of policy direction. Provision of that guidance is the shared responsibility of the Department of State Planning through its preparation of the Patuxent River Policy Plan, and the Patuxent River Commission, which oversees implementation of the plan.

The Patuxent River Watershed will serve as a regional laboratory for State agencies in implementing Governor Hughes' 1982 Executive Order, "Policies to Guide State Actions for the Physical and Economic Development of Maryland." The principles and policies contained in the Executive Order are the result of an intensive effort by the State Development Council and Task Force to recommend the most appropriate strategy for Maryland's future development. The State Development Council was created by Executive Order in 1980. Chaired by the Secretary of State Planning, its other members include the Lieutenant Governor and the Secretaries of Agriculture, Economic and Community Development, Health and Mental Hygiene, Natural Resources, and Transportation. The Council makes recommendations to the Governor on policies regarding State actions affecting physical and economic development, with the advice and assistance of a Task Force composed of elected officials and other citizens appointed by the Governor. The principles and policies are now being used by program managers throughout State government in making decisions affecting development. Six basic principles of development are set forth in the Order:

1. The viability of Maryland's existing communities and urban areas will be enhanced;
2. Productive agricultural land will be protected, the conservation and wise, balanced use of Maryland's natural resources will be assured, and recreation and open space resources for the use of and enjoyment of this and future generations will be secured;
3. Economic development and employment opportunities throughout the State will be increased for the well-being of Maryland's residents;

4. The quality of the environment will be protected and improved to ensure the health and well-being of residents;
5. The efficient use of non-renewable energy resources will be promoted and the exploration and development of new and alternative energy sources will be encouraged; and
6. The efficient provision of transportation, utilities, water and sewer facilities, and other public investments will be pursued.

In December 1981, the Office of Environmental Programs of the Department of Health and Mental Hygiene, sponsored an intensive three-day charrette focusing on the water quality problems facing the Patuxent River Watershed. Participants included elected officials and agency staff from the seven basin counties, State and regional representatives, scientists, public works officials, consulting engineers, interested citizens, and spokesmen for the federal Environmental Protection Agency. The charrette produced a watershed nutrient control strategy and a statement of watershed goals. The nutrient control strategy seeks to reduce nitrogen discharges to the river from point sources by 2000 pounds per day and from non-point sources by 2000 pounds per day from the 1981 levels. Other components of the strategy may be found in Appendix II.

The requirements contained in the Nutrient Control Strategy are currently used as the basis for the Department of Health and Mental Hygiene's policy decisions on sewage treatment plants in the watershed. Plants with daily discharges exceeding 500,000 gallons must meet the phosphorus requirements and prepare to comply with the nitrogen requirements.

The charrette goals, contained in Appendix V, were reviewed by the Patuxent River Commission and modified slightly. The resulting goals were then submitted to the elected and planning officials of the seven counties. Representatives from the Department of State Planning met with officials from each jurisdiction. After receiving suggestions and approval from local governments, the goals were modified in consideration of the local comments. The following twenty goals form the basis of the Policy Plan:

GOALS OF THE PATUXENT RIVER POLICY PLAN

1. To restore water quality in the Patuxent River to acceptable predevelopment levels as defined by dissolved oxygen content and turbidity;
2. To view the river as an integrated system from the headwaters to the Chesapeake Bay for management purposes;
3. To promote a continuous buffer along the river to protect water quality, prevent flood damage to human life and property, preserve wildlife habitats, and provide an open space and recreation resource;
4. To restore and improve the potential for recreational uses of the river including boating, sports fishing, crabbing, swimming, and aesthetic pleasure;
5. To restore the catch of desired species of fin and shellfish in the river;
6. To protect and enhance the use of the river for fish spawning;
7. To establish and maintain river flow volumes that support the multiple uses of the river;
8. To maintain research capability to identify the key environmental needs of important aquatic species;
9. To preserve and enhance important wildlife habitats throughout the watershed;
10. To protect and enhance the scenic quality of the river;
11. To protect and manage valuable natural resources within the watershed including prime agricultural and forest lands, aquifer recharge areas, and potential sand and gravel extraction sites;
12. To protect the economic and social needs of both upper and estuarine jurisdictions within the watershed;
13. To promote land use patterns and practices that will accommodate growth while protecting water quality goals;
14. To prohibit or regulate the use of hazardous and toxic materials and wastes to ensure that they will not harm the river;
15. To protect valuable cultural resources within the watershed including historic sites and areas that are architecturally unique or picturesque;

16. To determine State funding targets for research, Program Open Space, sewage facility construction, and rural and urban non-point source programs;
17. To assure that each county shall be responsible for the cost of mitigating or preventing environmental problems within its jurisdiction;
18. To promote coordinated planning for basin-wide issues requiring interjurisdictional action; and
19. To promote the protection of the environmental integrity of the areas surrounding the reservoirs to protect and enhance the water quality of the Rocky Gorge and Triadelphia Reservoirs.
20. To protect the environmental quality of aquifer recharge areas.

The Patuxent River is a beautiful resource to the people living within the basin and in the nearby metropolitan areas. Protection of the river is the responsibility of local and State governments and all landowners within the basin. Currently, the river and the amenities it provides are being degraded by pollution. Given the population increases and land use changes projected for the basin, these pollution impacts will increase unless action is taken to protect the river and enhance the benefits it provides to a growing population. Chapter Two presents a land management strategy to accomplish this.

CHAPTER TWO: A WATERSHED LAND MANAGEMENT STRATEGY

The initial step in preparing this plan was to review the river's assets. The problems were then studied and their causes established. Goals were then prepared for the watershed. The next task was to examine current State and local plans, policies, and programs. Then recommendations were presented to solve the problems, enhance the river's assets and achieve the goals. Following is a brief review of existing planning and regulatory efforts:

I. EXISTING PATUXENT WATERSHED PLANS AND PROGRAMS

The fundamental problem to be solved by the plan is non-point pollution (sediment and nutrient) caused by activities on the land. Therefore, the review focuses on the land management powers and activities of State and local government.

A. Local

The State has delegated primary responsibility for land use management to local governments. Each of the seven counties has an active and encompassing planning and regulatory process. With local participation, the Department of State Planning studied the activities of each jurisdiction. Appendix III summarizes the results of this study. The findings of this review follow:

1. Comprehensive Planning - The general planning accomplished by the counties is in response to three basic enabling acts. Each of the seven counties has an adopted Comprehensive Plan. They were initially prepared in the 1960's and 1970's and are periodically reviewed and updated. These plans are countywide; and while recognizing the Patuxent River as a major natural resource, the river does not receive adequate attention.

Each plan addresses the river differently. This can be attributed to the role each county perceives for the river. The upper portion is used primarily as a water supply source. The middle part is the area of highest intensity development. For this reason, the river is the recipient of sewage treatment plant effluent and stormwater run-off. The lower estuary is viewed as a source of seafood and recreational activities. The varying environmental/growth oriented perceptions and differing goals set the direction for local policies and land management.

In addition to the general countywide planning, several more specific planning projects have been completed and others are in preparation. These relate to a particular subject such as agricultural preservation, open space and recreation or a specific area such as Solomons Island. This is useful and important work; however, there is no consistent basinwide approach for any subject nor cohesive guidance for the small area efforts.

2. Zoning and Subdivision Regulations - All of the counties have enacted and administer zoning ordinances and subdivision regulations. The earliest zoning ordinance was adopted in 1949. Amended zoning ordinances have been approved as recently as 1984. The first subdivision regulation was enacted in 1954 with amended versions having been approved through 1981. In the case of each jurisdiction these regulations are continuously updated. Zoning is designed to follow the direction established in the Comprehensive Plan for the location and intensity of land use.

3. Water, Sewer, Solid Waste Plans - This is one of several planning and regulatory programs where local governments respond to State oversight. Each county prepares a water and sewer and solid waste plan prerequisite to obtaining State financial assistance and permit decisions. Each county has a water and sewer plan. These plans are in general accord with the Comprehensive Plan and aid in achieving the jurisdiction's basic perception of the river's purpose or role. All of the jurisdictions have prepared a solid waste plan. The sewer, water, and solid waste plans are updated on a regular basis.

4. Sediment Control and Stormwater Management - Each county has had a sediment control program since it was required by a 1971 State law. The extent of success has been mixed. Some programs have not been updated; others have made only minor improvements. The programs have not been tailored over time to meet each county's needs. The Water Resources Administration has conducted reviews of each county's sediment control program in 1976 and 1980. Some programs were rated acceptable and others unacceptable by each review.

Responsibility for program development and the permit and enforcement efforts varies among the counties. A Department of Permits and Inspection is most often responsible; whereas a Department of Environmental Protection, Public Works, Licenses and Permits or Engineer's Office may be responsible in a county. On-site inspection is the responsibility of a different Department in some counties. In others all county inspectors are instructed to monitor sites. Better inspection and enforcement are universally needed. Recent amendment of the State law to allow enforcement through imposition of civil penalties provides an opportunity for improvement.

Most counties do not have countywide or regional stormwater management plans. Stormwater management is handled in various ways. Most counties address stormwater through subdivision review and approval on a site-by-site basis. Action by the 1982 General Assembly and recent approval of Stormwater Management Regulations by the Water Resources Administration are intended to improve the management of stormwater. These regulations specify the minimum contents of local government ordinances for the management of stormwater from new development. The regulations require that infiltration measures be given first consideration in planning stormwater controls. These measures will reduce the volume and rate of runoff. If infiltration measures are not appropriate, other measures, including vegetative filters, are to be used. The regulations require management of the rate of stormwater release from development sites so that both downstream flooding and stream channel erosion do not occur in excess of natural conditions. Each county is to institute a program in compliance with these State regulations by July 1984.

B. State

There are many State laws and programs that directly and indirectly affect the Patuxent Watershed. For the most part, the Patuxent Watershed is addressed as a part of the application or administration of state-wide laws. Several plans and programs that are important and directly relate to this Policy Plan have been highlighted at the end of Chapter One. These include the Patuxent and State-Wide Agricultural 208 Water Quality Management Plans, Agriculture Cost Share Program, Program Open Space, and the Surface Mining Program.

Often responsibility for program administration is shared by both State and local agencies. Several of these programs have been explained in the previous section. Included in this group are the sediment control; stormwater management; and water, sewer, and solid waste planning programs. All of the State laws and programs are summarized in Appendix IV. Following is a brief description of pertinent State programs not previously discussed:

1. Patuxent River Watershed Act - Enacted in 1961, the law identifies five problems of the basin: water supply, wastewater disposal, soil erosion, park and open space acquisition and preservation, and enhancement of the estuary. The law authorized each county to prepare a plan for its portion of the watershed. Provisions of the law have been ignored or become irrelevant through subsequent enactment of specific state-wide laws addressing these problems.

2. Scenic and Wild Rivers Act - The Patuxent is one of the rivers initially designated as part of the State scenic and wild rivers program. The legislated declaration of policy is that "the State is to protect the water quality of these rivers and to fulfill vital conservation purposes by the wise use of resources..." A plan is to be developed for the use of water and land related resources of the scenic river.

3. Watershed Sediment and Waste Control - Enacted prior to 1957, this law applies to sewerage disposal in the Severn and Patuxent Rivers. Subsequent laws and programs have reduced the importance of these provisions.

4. Flood Control - Several laws address State and local planning, control and management of flooding. Included are control of flooding from State construction projects, regulation of construction in floodplains, and financial assistance for projects to control and reduce flooding.

5. Shore Erosion Control - The Department of Natural Resources has powers and duties regarding public education, erosion control districts, technical assistance, prevention of erosion from State construction projects and administration of an interest free loan program to reduce shore erosion.

6. Water Pollution Control and Abatement - This law establishes the State authority to improve, conserve, and manage the quality of the waters of the State and protect, maintain, and improve the quality of water for public supplies and propagation of wildlife and fish. The basis for requiring permits and treatment of wastes before entering the river is found in this law. The Department of Health and Mental Hygiene is responsible for administering the provisions of this act.

7. Wetlands - Protection of tidal wetlands is the intent of this law and regulatory program. Issuance of licenses to alter State wetlands and permits for projects in private wetlands is controlled by the act. There is no similar protection for non-tidal wetlands.

8. Areas of Critical State Concern - The Land Use Act of 1974 authorized the Department of State Planning to designate areas of critical State concern. The program requires consultation with local governments. The purpose of the program is to focus special attention on designated areas to assure their preservation, conservation, or proper use. Three sites have been designated within the Patuxent Watershed: Battle Creek Cypress Swamp, Jug Bay, and Killpeck/Trent Hall Creek.

9. Intervention - The Department of State Planning has the authority to become a party to any administrative, judicial, or other proceeding concerning land use, development or construction. The Department is notified of pending decisions regarding land use change and provides comments where appropriate. In recent years, the Department with the support of the Patuxent River Commission has made its views known in several major development decisions impacting the Patuxent River.

C. Findings

Based on this review of State and local activities conducted in consideration of the watershed's assets, problems and goals, there are several important findings:

1. The Patuxent has many uses including waste disposal, water supply, recreation, and economic development. Plans are prepared and decisions made without consideration of the impacts on other sections and users of the river. Water conservation and alternative wastewater treatment techniques are inadequately considered.
2. Zoning and subdivision regulations have become more complex and flexible. Decision-making criteria are not sufficiently clear and detailed to assure protection of the river.
3. Sufficiency of authority is not the major concern regarding State and local laws, plans, and programs. Sufficiency in the inspection, enforcement, administration of these authorities is of concern. This is obvious as there is, with limited exception, enough authority to assure a healthy river, yet the river is not healthy.
4. Cumulative impacts of various State and local decisions are not always considered. Each permitting agency only looks at the rather limited focus of the permit request before it and does not consider the cumulative impact of all permits, or the relationship with other permits or programs. Consequently, there is a myriad of decisions which taken individually may only have a marginal effect on the river but in concert have a tremendous effect on the river. There is need to relate the

various permit functions in the basin, and to consider the entire river system in permit processes. In certain circumstances, cumulative analysis is already underway as evidenced by the establishment of basinwide effluent limits through the Patuxent River Charrette.

5. Regular, comprehensive evaluation of the effectiveness of State and local programs as they impact the Patuxent is absent. In the past, there has been little or no provision for internal or external comprehensive evaluations of the effectiveness of laws and programs as they relate to the Patuxent River singularly and in concert. When sufficient data become available, the Patuxent monitoring program, conducted by the Office of Environmental Programs, will assist in evaluation.

6. Communication among State and local agencies and other groups regarding efforts to protect the Patuxent River is inadequate.

7. No program exists to assist the construction of stormwater management measures in previously developed areas.

8. A systematic mechanism to identify and correct high priority non-point pollution problem sites is lacking.

Review of State and local laws, plans, policies, and programs pointed out weaknesses that need to be corrected if the Patuxent is to be rejuvenated. The recommendations that follow are based on the findings of this analysis.

II. RECOMMENDATIONS

This is a strategy for land use management. Water quality control must begin on the land. This Patuxent River Policy Plan focuses on non-point source pollution, both sediment and nutrient caused. This strategy, combined with the 208 Plan and other on-going programs, can be a major factor in improving the water quality of the Patuxent River.

The following major recommendations are the strategies of the Patuxent River Policy Plan:

1. ESTABLISHING A PRIMARY MANAGEMENT AREA (PMA)

A PRIMARY MANAGEMENT AREA, DELINEATING THE AREA ALONG THE RIVER AND ITS TRIBUTARIES, WILL BE ESTABLISHED TO IDENTIFY AND MANAGE LAND FROM WHICH POLLUTION IS MOST LIKELY TO BE TRANSPORTED INTO THE RIVER.

- The PMA shall be considered to be an area critical to the Chesapeake Bay and its tributaries;
- Local governments will include the PMA in their plans and zoning ordinances;
- Preferred land uses in the PMA will be agriculture, forest, and recreation;
- Local governments will prepare plans for the PMA to minimize dense and intensive development and large impervious areas in the PMA;
- State agencies, in regulatory activities, technical assistance, and grant programs, will target the PMA as a priority area ; and
- State and local governments will ensure that land use practices within the PMA shall be of such a nature so as to have no (or at least minimal) adverse impact on water quality of the Patuxent River.

Streamside lands are critical in protecting and restoring water quality. Land located near the river requires greater attention than areas more distant from the river. Sediment from construction sites near the river is more likely to enter the river than from sites located distant from the river. Nutrients from farmland and highly developed areas will reach the river in greater quantities the closer these activities are to the river. Finer, more saturated soils near streams generate more runoff. When developed, more of the available pollutants are washed off these sites than would be washed from more distant sites.

Sensitive areas, for example, steep slopes, and highly erodible soils, near the river and its tributaries require greater protection and more rigorous treatment than similar features distant from the river.

The lands closest to the river and its tributaries are used for a variety of beneficial purposes. Agriculture, forestry, residential and commercial development are all land uses that exist and should continue on land near the river and tributaries. However, the great potential for these lands to negatively impact the Patuxent necessitate especially careful planning and management of them. Whereas intense development with large impervious areas is not a preferred land use within the Primary Management Area, agricultural and forest operations with effective conservation practices are.

Criteria for establishing the PMA must be delineated. Tentatively, the boundaries may include:

- o The river and all perennial tributary streams with drainage areas greater than 640 acres as shown on the most recently published topographic maps of the U.S. Geological Survey at the scale of 1:24,000; or county base maps of greater detail;
- o All 100-year floodplain lands shown on the National Flood Insurance Rate Maps and Flood Hazard Boundary Maps, where the rate maps do not exist; and the maps in those counties where equivalent floodplain studies have been completed;

- o All tidal wetlands and those non-tidal wetlands adjoining the river and streams as identified in the 1978 and 1980 studies of nontidal wetlands by the Maryland Department of Natural Resources;
- o Highly erodible soils (k soil erodibility factor in excess of 0.37 for the natural soil groups of Maryland) and slopes equal to or greater than 15 percent;
- o Publicly-owned conservation areas that adjoin the river or its tributaries; and
- o A management area strip one-quarter mile deep (1,315 feet) beyond the river, floodplains, and wetlands along both sides of the mainstem and one-eighth mile deep (660 feet) on each side of the tributary stream.

Figures 3 and 4 graphically illustrate the Primary Management Area. Management and specific delineation of the PMA will be by State and local authorities in accordance with State and local laws and regulations.

The majority of the land in the PMA will continue to remain in private ownership. The Primary Management Area boundary is not intended for use as a public acquisition limit or "take line".

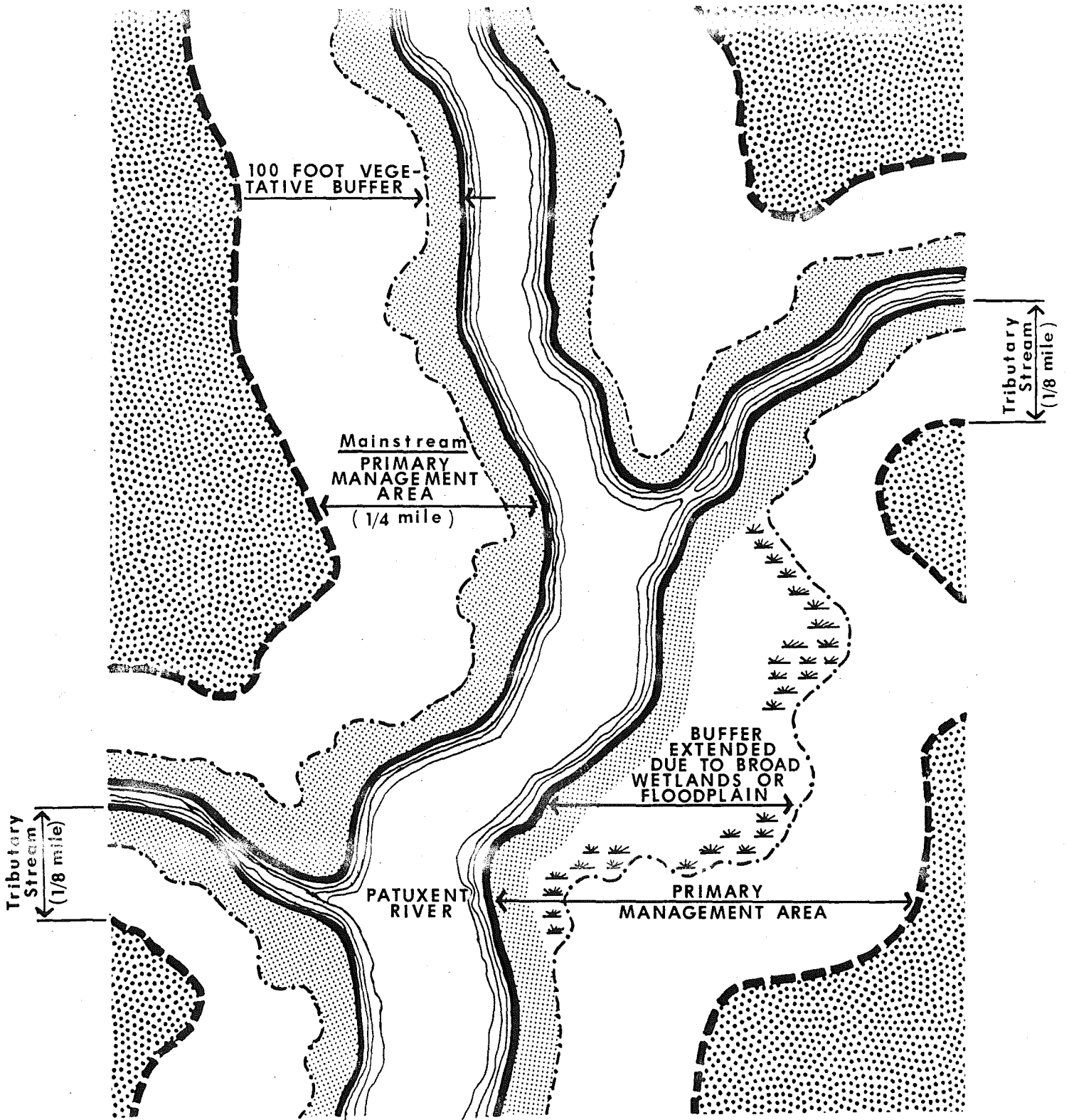
2. PROVIDING BEST MANAGEMENT PRACTICES (BMP's) AND VEGETATIVE BUFFERS

PROGRAMS FOR PROVIDING BMP's AND VEGETATIVE BUFFERS IMMEDIATELY ADJACENT TO THE RIVER AND ITS TRIBUTARIES WILL BE DEVELOPED.

- State and local governments will provide BMP's on their publicly owned lands, including buffers where appropriate;
- The State will require BMP's on State assisted projects, including buffers where appropriate;
- Local governments will adopt subdivision and zoning provisions that require BMP's, including buffers where appropriate, in all new development;
- BMP's, including filter strips and field borders, will be encouraged on agricultural land through education, voluntary action, incentive, compensation, and through implementation of the Maryland Agricultural Water Quality Management Plan;

FIGURE 3

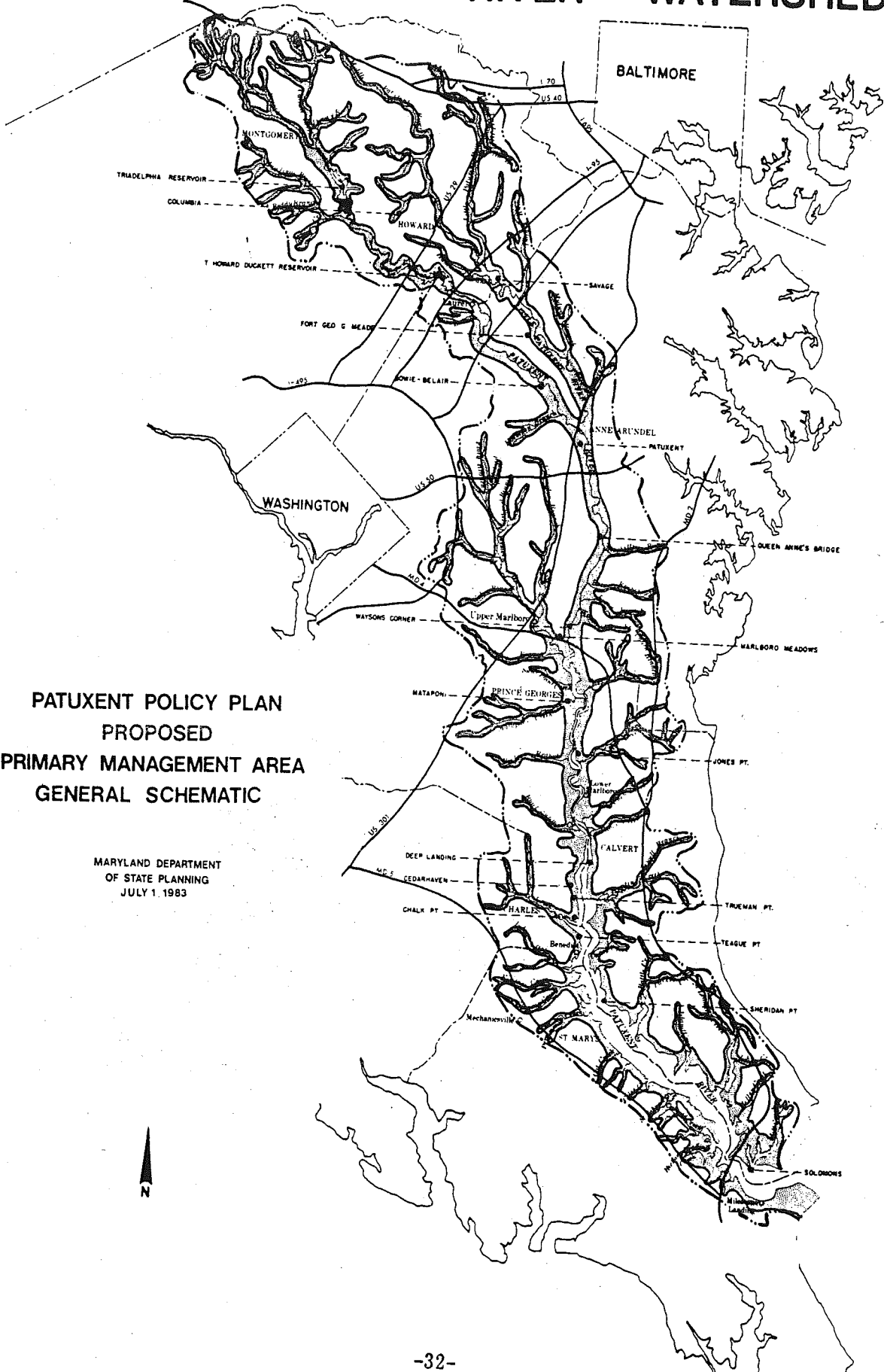
SKETCH OF THE PRIMARY MANAGEMENT AREA



PREPARED BY THE DEPARTMENT OF STATE PLANNING NOT TO SCALE

FIGURE 4

PATUXENT RIVER WATERSHED



PATUXENT POLICY PLAN
PROPOSED
PRIMARY MANAGEMENT AREA
GENERAL SCHEMATIC

MARYLAND DEPARTMENT
OF STATE PLANNING
JULY 1, 1983

- **Implementation of soil conservation plans, including filter strips and field borders where appropriate, will be required on lands acquired in easements;**
- **The federal government will be requested to provide BMP's, including buffers where appropriate, on its lands; and**
- **The State Department of Transportation will protect roadside buffers by eliminating its practice of broadcast spraying of herbicides along roadsides.**

Widespread use of vegetative buffers is receiving attention in Maryland, Virginia, and other areas of the country. Buffers of natural vegetation along streams serve a variety of beneficial purposes. They assimilate nutrients in stormwater run-off and trap sediment particles in sheet flow before they reach water bodies. A number of studies have demonstrated that 100-foot buffers trap 75 percent and more of the sediment in sheet flow on moderate slopes. Trees adjacent to streams provide shade which maintains cool stream temperatures favorable for desirable aquatic life. Buffers provide continuous corridors for wildlife, stabilize streambanks, and protect the scenic beauty of the watershed. Many miles of streams in the watershed now have streamside forest cover that should be maintained in the face of considerable development and agricultural activity. Some stream sections lack buffers where they could be reestablished.

A 100-foot buffer of natural vegetation on each side of the river and its tributaries is the recommended minimum buffer width based upon literature reviews conducted by both the Department of Natural Resources and Department of State Planning. Buffer widths for particular sites should reflect factors such as erodible soils, topographic conditions, and other natural and manmade features. Wherever 100-year floodplains or wetlands extend more than 100 feet beyond the shoreline edge, the buffer should be extended to include those features.

To be effective, buffer lands should be disturbed as little as possible. Although grass buffers may be a reasonable alternative at some sites, woodland buffers are self-maintaining, do not require use of soil disturbing machinery, and generally provide a broader range of benefits. Wetland plants, such as saltmarsh cordgrass, should be considered for use as buffer vegetation for stabilizing shorelines along the Patuxent estuary.

As the watershed's population continues to grow, the value of buffers for protecting water quality, preventing flood damage, preserving wildlife habitats, and providing open space and recreation resources will increase.

One hundred foot deep, natural, streamside buffers are needed for new development and should be maintained or reestablished, where possible, for existing development. Ideally, buffers for new developments will be part of a planned stormwater management system. Woodland soils slow run-off, increase contact time with soil particles where nutrients and other constituents will bond, filter sediment, and slowly release run-off to the adjoining stream. On some sites, conditions may dictate the need for wider buffers whereas buffers narrower than the proposed 100 foot width may be justifiable in other cases.

Streamside buffers should be maintained or reestablished on private agricultural lands through a system of voluntary actions, incentives, and compensation. "Filter strips" and "field borders" are conservation practices recommended by the Soil Conservation Service¹ for use on agricultural lands. Buffer widths for agricultural areas will vary depending on slope, soils, and adjacent land management practices. Buffers are important along roadsides. If properly managed, vegetated roadside areas provide a first line of defense for waterways against pollutants from highways.

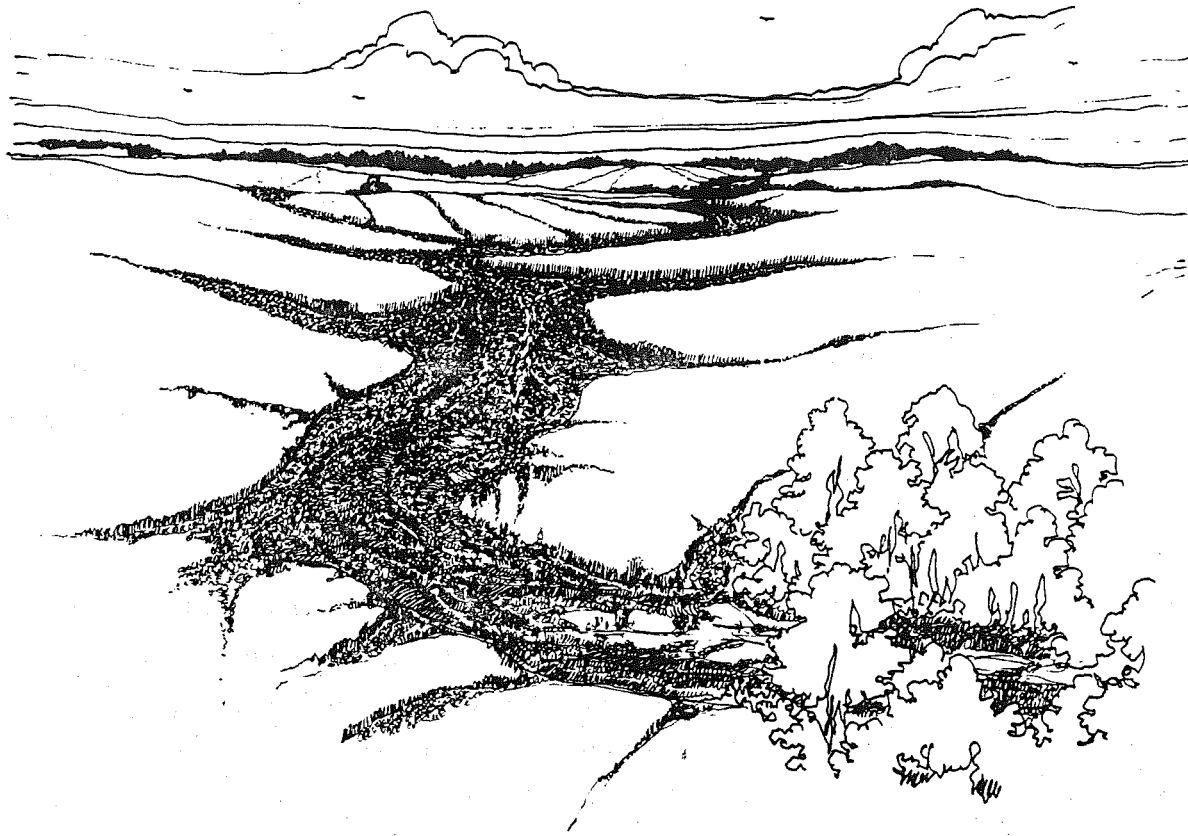
Buffers and other agricultural best management practices for controlling erosion and sediment are illustrated in Sketch 1.

There is considerable public land, many public facilities, and many publicly assisted private projects. Local and State governments need to set an exemplary standard by providing buffers on land they own, and require the incorporation of buffers in private projects they assist.

¹These practices are described in USDA-SCS "Standards and Specifications for Filter Strips (AC) Code 393" - The full code is contained as a portion of the Technical Guide, Section IV, January 1983 - #393-1 to 393-6.

SKETCH 1

AGRICULTURAL RUNOFF CONTROL



Drainage ways in agricultural areas should be maintained as grass swales to prevent their erosion and to trap sediments. Diversion channels may be used to intercept runoff and carry it to a safe discharge point. Hedgerows and stream buffers are integral parts of a healthy agricultural landscape serving as windbreaks, sediment traps and habitat for wildlife.

3. IDENTIFYING MAJOR NON-POINT POLLUTION SITES

THE STATE, IN CONJUNCTION WITH LOCAL GOVERNMENTS, WILL SURVEY THE WATERSHED AND IDENTIFY MAJOR NON-POINT POLLUTION SITES.

- Existing State regulatory and corrective programs will consider these sites as priority areas.

Patuxent Watershed streams and adjoining lands need to be comprehensively checked to identify the major non-point pollution problems resulting from developed sites, agricultural practices, and sand and gravel extraction.

This examination will provide site-specific information on the extent and nature of pollution problems to be controlled. Low altitude, aerial observation will provide an immediate source of information on the location of major erosion sites. Slower flowing segments of streams readily show signs of excess sediment blanketing stream bottoms. Storms flush excess sediment downstream to build alluvial deposits that result in premature shallow waters.

Nutrient pollution can be inferred by the type of land use and stormwater drainage systems. Field studies have shown that areas of dense commercial and residential development and areas of conventionally tilled cropland typically release high nutrient loads to streams.

The pollution site information will be provided to State and local enforcement, technical, and financial assistance agencies. Once program administrators are made aware of the problem sites, correction will be through existing programs and regulations. The survey will be repeated every two years. An annual report will be prepared to demonstrate progress in correcting and preventing new problems.

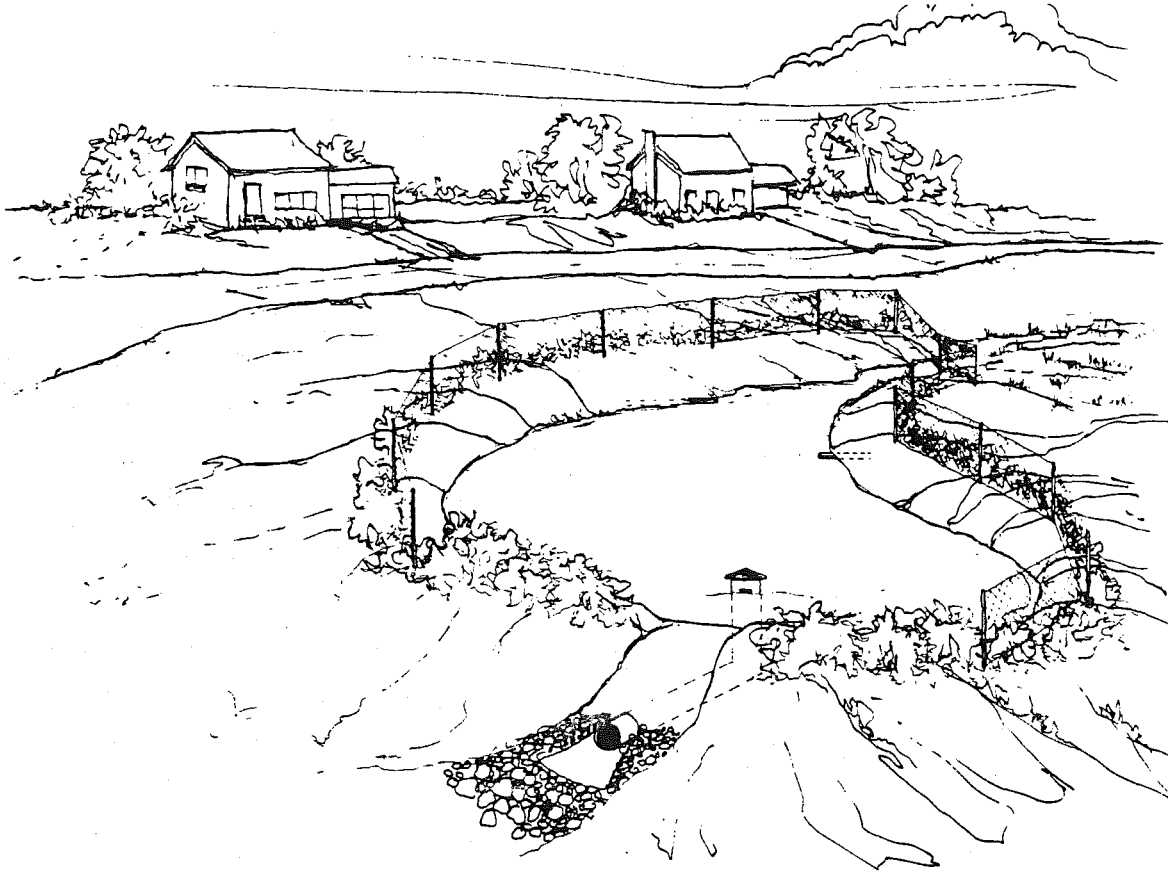
4. RETROFITTING EXISTING DEVELOPMENT

THE STATE WILL DEVELOP A COST-SHARING PROGRAM TO AID LOCAL GOVERNMENTS IN CORRECTING AND MANAGING STORM WATER POLLUTION FROM EXISTING DEVELOPED AREAS.

- **Local governments will pursue a program of abating pollution in existing developed areas;**
- **State and local governments will curtail non-point pollution coming from their facilities; and**
- **The State will establish priorities among developed areas causing non-point pollution and address problems in order of priority.**

SKETCH 2

STORM WATER MANAGEMENT PONDS



These ponds detain runoff from developed areas for slow release to streams. They collect sediments and much of the nutrients in runoff. Placement of these ponds in existing developed areas provide opportunities to retrofit existing communities for storm water management.

Moderate to dense residential and commercial developments built before stormwater management practices were required cause sediment and nutrient pollution. Run-off rates, volumes, and pollutants are not controlled. Storm sewers rapidly deliver run-off to streams. Stormwater management practices need to be installed beginning with locations where water quality impacts are most severe. These locations will be identified through the survey described in the previous recommendation. Sketch 2 depicts a typical storm water management pond installation.

Provision of stormwater management devices to correct previously created sources of non-point pollution will be difficult. Retrofitting will depend on whether space is available for practices (such as retention ponds), drainage patterns, accessibility to potential control sites, and other factors. Often, a single device, such as a retention pond, will serve many uses and owners. There is no one to be held responsible to construct or pay for these corrective actions. This is the only form of water pollution for which there is no federal, State, or local corrective or financial assistance program.

A State non-point assistance program must be established to address the problems originating from existing development. This cost sharing program will make grants or loans to local governments to construct facilities. Eligibility for grants or loans should depend on completion of an adequate water quality plan documenting needs, evaluating alternatives, and specifying costs. Funds will be provided to assist in the planning phase. There are existing State programs, for example the flood management and agricultural cost-share programs, that can serve as a starting point.

There are federal, State, and local highways and facilities located near the river and its tributaries. If any of these are sources of non-point pollution, site specific remedies must be designed and implemented. The public sector can serve to demonstrate retrofitted management practices.

5. ACCOMMODATING FUTURE DEVELOPMENT

FUTURE DEVELOPMENT WILL BE ACCOMMODATED IN WAYS TO MINIMIZE IMPACT ON WATER QUALITY AND MAXIMIZE EXISTING OPPORTUNITIES.

- **Development will be concentrated where possible, outside the PMA;**
- **Development will optimize the use of existing facilities and utilities;**
- **Development will be sited to maximize use of soil infiltration capacity;**
- **Development will be sited away from sensitive areas, such as reservoirs, wetlands, steep slopes, and aquifer recharge areas;**
- **Sites within the watershed that offer unique opportunities for development and redevelopment will be identified and planned; and**

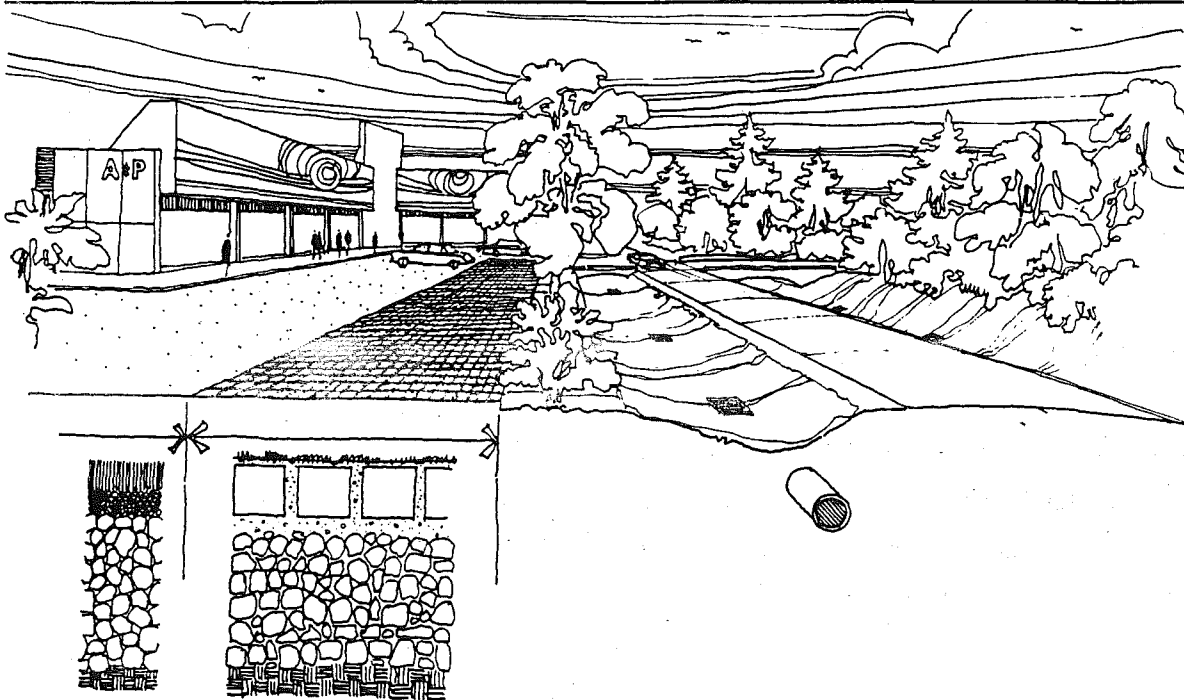
- New public facilities (schools, parks, highways) will incorporate best management practices.

The Policy Plan's goals state that growth is to be accommodated while protecting water quality. Given the location of the river between two major metropolitan areas, additional development is inevitable and necessary. Each county must direct development to areas where negative impacts can be minimized.

Most of the land use change should occur in those portions of the watershed having little influence on the river. Minimal development should occur in the PMA. Low density and cluster development result in delivery of less nutrients to the river and its tributaries. This is largely because more land is undisturbed and remains in its natural condition. Furthermore, stormwater can be efficiently controlled. Infiltration mechanisms can reduce the impact of storm water run-off (Sketch 3).

SKETCH 3

RECHARGE AND DETENTION OF RUNOFF



Porous and modular paving can be used for road and parking surfaces and to promote groundwater recharge. Grass swales with storm sewer outlets filter runoff, provide infiltration, and serve to delay discharge of rainwater to storm sewers.

Use of clustering and intensive land management is necessary for those limited instances when it is desirable to permit development in the PMA.

Governor Hughes' 1982 Executive Order containing policies to guide development in Maryland encourages the maximum use of existing infrastructure. Compact development is also promoted in the Executive Order where the infrastructure and environmental capacity can sustain it. Within the Patuxent, areas having sewer and transportation service should be targeted for development if the other criteria within this plan are met. Sewer service areas are shown in Figure 5. Compact development makes efficient use of sites and can incorporate stormwater management controls to yield the least nutrient and sediment pollution.

Wetlands should be given a high degree of protection for their value as wildlife habitat and as notable landscape features. Aquifer recharge areas exist in portions of the watershed that should be protected from contamination and overuse (see Figure 6). Slopes greater than 15 percent, particularly where highly erodible soils are present, should be protected from development.

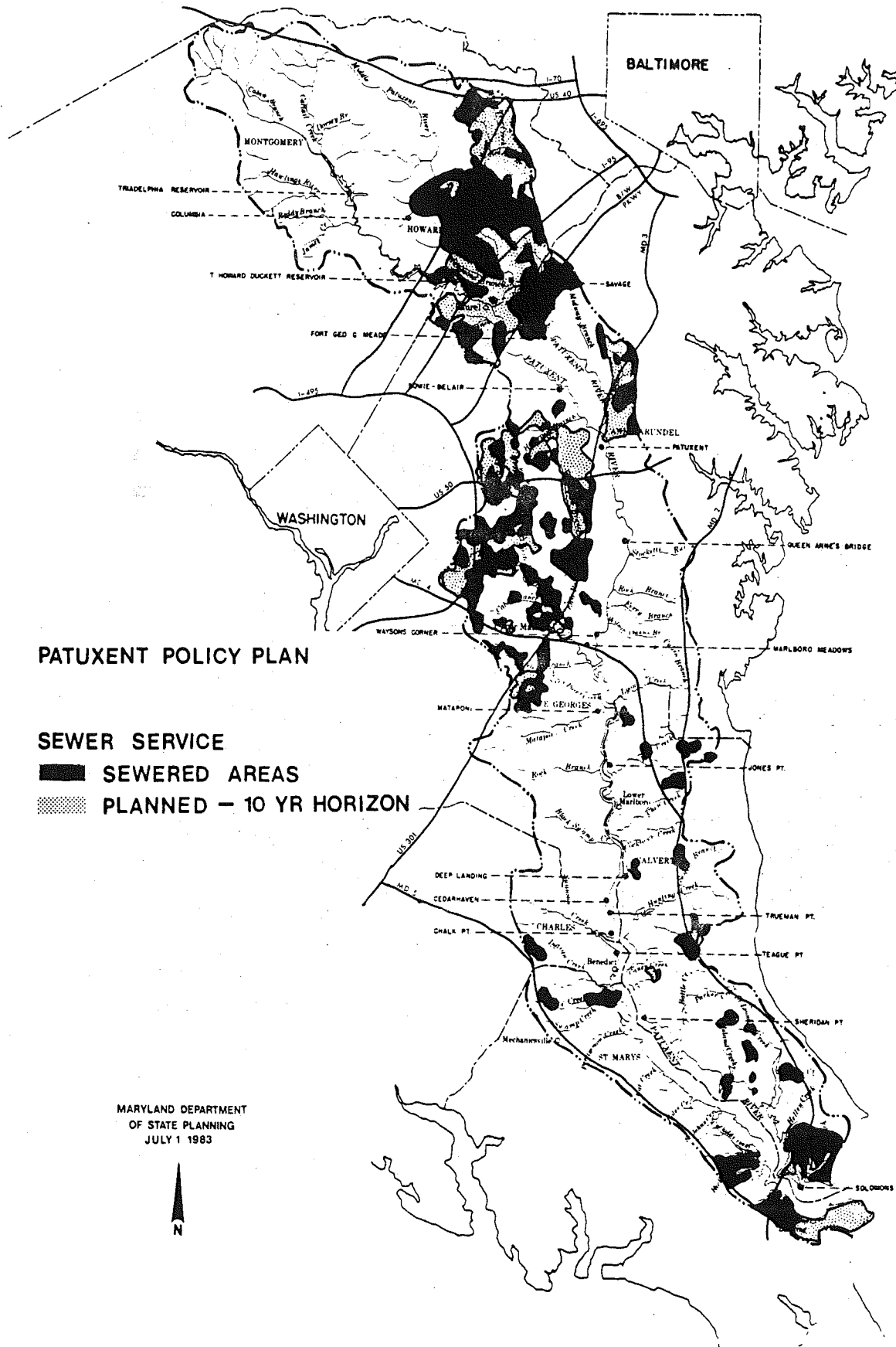
It is essential to encourage economic development in order to meet the needs of the 350,000 persons living in the watershed. Proper planning is also needed to locate the 125,000 people expected to move into the watershed during the 1980's. As there are sites uniquely suited for development purposes, there are also sites not suited for development. Some are associated with current urban and rural development. There are opportunities for "infill" and redevelopment. These need to be identified and plans prepared to assure that this potential is realized.

The 1980 Patuxent Watershed Act authorizes the Department of State Planning to assess the impacts on the river of major development proposals and regulatory actions within the basin. Several major development proposals have been reviewed and commented on by the Department and the Patuxent River Commission since 1980.

The Department is developing an assessment methodology including threshold criteria to determine the type, location, and size of proposal to be examined. The Patuxent River Commission will participate in this assessment process. The purpose of this

FIGURE 5

PATUXENT RIVER WATERSHED



PATUXENT POLICY PLAN

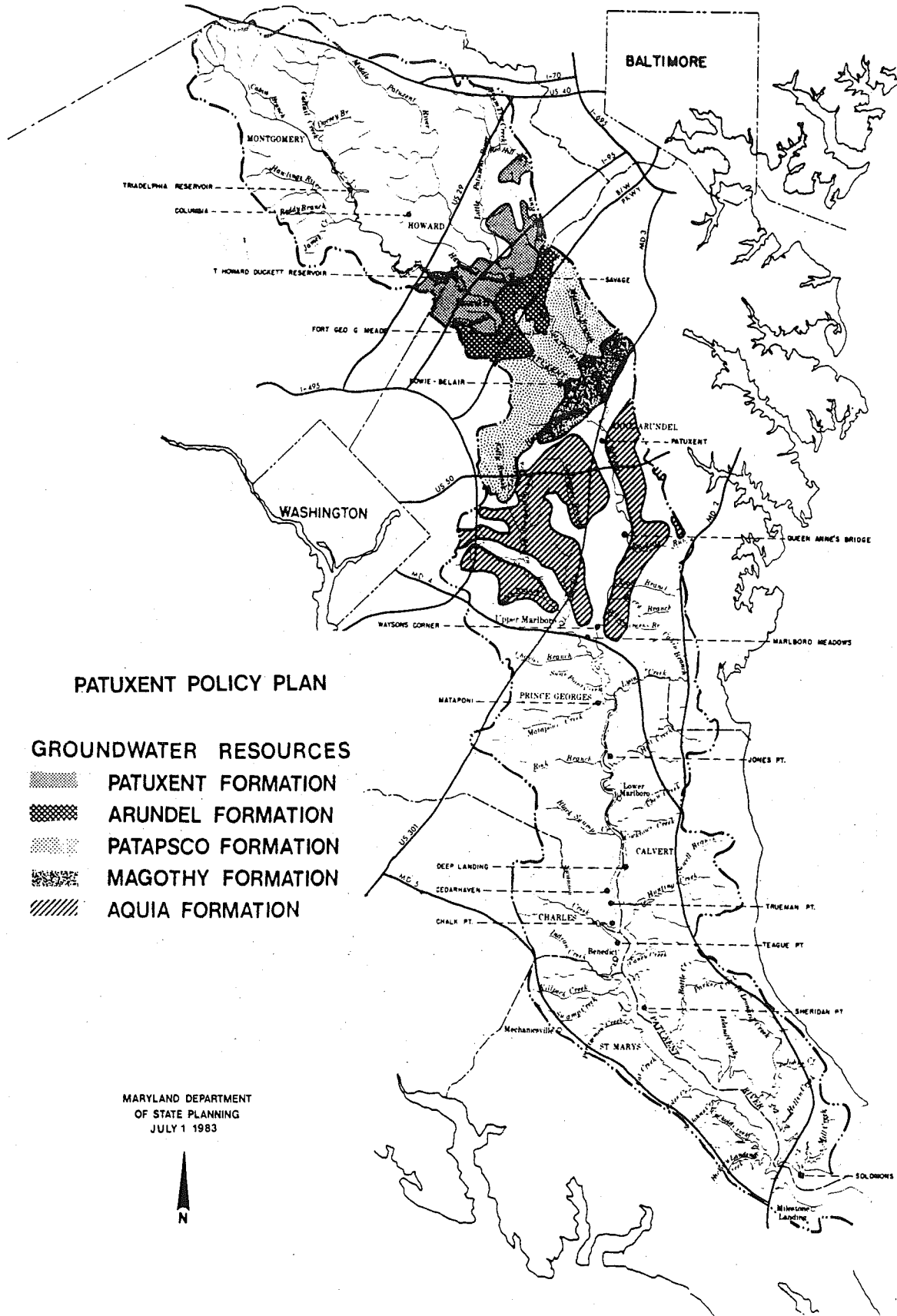
SEWER SERVICE

- SEWERED AREAS
- ▨ PLANNED - 10 YR HORIZON

MARYLAND DEPARTMENT
OF STATE PLANNING
JULY 1 1983

FIGURE 6

PATUXENT RIVER WATERSHED



system will be to aid local and State agencies in achieving the above policies and carrying out the other recommendations of this plan.

6. INCREASING RECREATION AND OPEN SPACE

ADDITIONAL RECREATION AND OPEN SPACE LANDS WILL BE ACQUIRED IN THE PATUXENT WATERSHED BY THE STATE AND LOCAL GOVERNMENTS.

- **State and local governments will review their recreation and open space plans for the Patuxent Watershed;**
- **Acquisition will be concentrated along the river and tributaries and in the lower portion of the watershed;**
- **Federal holdings in the watershed must be retained for open space and research; and**
- **An acquisition program for the lower portion of the watershed will be prepared.**

The river represents an asset. There is significant demand for recreational opportunities along the length of the river.

The Patuxent offers opportunities for open water fishing and boating, canoeing, and other small boat trips, abundant forests and wetlands for natural history studies, hunting and trapping, and horse trails. Its location near two major metropolitan areas makes it even more attractive. However, the recreation resources are only partially developed and used. Access to the river is limited. Its appreciation is limited because so few people share its beauty and value.

The location of publicly owned recreation and open space land is unevenly distributed within the watershed. Very little public land exists in the lower portion of the watershed where the potential benefits of public access to the estuary are very high. Additional acreage should be purchased to meet park and open space needs, especially in the lower portion of the watershed.

Many Federal, State, bi-county, and county agencies own land in the watershed. Several different functions are served by these sites; active recreation, wildlife management, resource conservation, research, and military. Additional acreage remains to be purchased to complete the acquisition program for several of these facilities. Existing publicly owned lands should be retained in public ownership to maintain large areas of open space and associated water quality benefits.

7. PROTECTING FOREST COVER

EXISTING FOREST COVER WILL BE RETAINED AND IMPORTANT SENSITIVE AREAS WILL BE REFORESTED TO PROTECT WATER QUALITY.

- Existing State programs, like Program Open Space and Agricultural Preservation will be examined and amended for their application to forest protection;
- Buffering with forested strips will be encouraged; and
- The State will institute a reforestation program for developed areas.

The primary reason forest cover continues to be lost is development. Approximately 4,200 acres of Patuxent Watershed forest land changed to other land uses between 1973 and 1981. In 1981, 51 percent of the watershed was forested. This compares favorably with the 42 percent average for the State. The loss of forest results in lower water quality. The benefits of widespread maintenance of forest cover include increased infiltration, filtration of run-off, visual and acoustical screening, moderation of air and ground temperatures, reduced wind speeds, and provision of open space.

In addition to siting new development to preserve forests, forest cover should be maintained and reestablished in other ways. Many such opportunities exist on both public and private lands. Low to moderate density residential development can be carried out with minimal disturbance to existing forest cover. Forest cover preservation requirements and incentives should be provided. Reforestation of publicly owned lands should be done, particularly within the PMA and on disturbed areas such as abandoned mining sites. The State can influence publicly assisted

projects to retain and restore forest cover to the maximum extent practical. Current State programs can be adapted to permit acquisition of forest easements and encourage planting of trees in previously developed areas.

8. PRESERVING AGRICULTURAL LAND

PRIME AND PRODUCTIVE AGRICULTURAL LAND WILL BE PRESERVED IN THE PATUXENT WATERSHED.

- Easement purchases will include requirements for implementing soil conservation plans including buffer strips where appropriate; and
- The Agricultural Cost-Sharing program will target the Patuxent Watershed.

Concentrating urban development, preserving agricultural land, and ensuring water quality are compatible goals. All need to be part of any strategy in the Patuxent.

Agriculture is an important way of life and economic activity in the basin. Almost 13,000 acres of agricultural land were converted for development purposes between 1973 and 1981. With continued population and land use change forecast, it is necessary that farmland not be treated merely as land awaiting other uses.

Agriculture must be considered an economic and natural resource. Local and State governments often contribute to the destruction of farmland through the location of utilities and facilities. Scattered low density residential land use is the greatest threat to continuation of farming. Proper location of sewers and highways, elimination of excessive land consumption by development, and targeting of agricultural preservation and assistance programs is required.

9. EXTRACTING SAND AND GRAVEL

SAND AND GRAVEL ACTIVITIES WILL BE MANAGED TO ALLOW EXTRACTION OF THE RESOURCE WITHOUT DAMAGE TO THE RIVER.

- Abandoned sand and gravel sites will be reclaimed;

- Sensitive control of active and future sites, particularly those in the PMA, will be required;
- Penalties for allowing sediment to enter the Patuxent River resulting from washing operations are to be increased to a minimum of \$1,000 per day for every day a violation is found to exist by the appropriate State agency; and
- The location of the resources will be identified, and county resource management strategies developed.

Sand and gravel sites mined prior to implementation of the 1976 Surface Mining Law were not required to have exposed subsoil areas graded, covered with topsoil, and revegetated. Some of those abandoned pits are sources of sediment contamination, visual and safety problems. A fund has been established in the Department of Natural Resources to assist reclamation of such sites. The Maryland National Capital Park and Planning Commission is reclaiming the first site under this program. Other sites, including those on private land, should be reclaimed. The principal criterion should be that a positive public benefit be achieved in reclaiming abandoned sites.

Sand and gravel mining continues to be a major industry in the Patuxent Watershed with active mining sites in Anne Arundel, Prince George's, Calvert, and Charles Counties (see Figure 7). Under the 1976 Surface Mining Law, both a sediment control and a reclamation plan must be approved by the Department of Natural Resources.

Sand and gravel washing operations require a discharge permit from the Department of Health and Mental Hygiene. Failure to maintain the dikes around washing operation settling ponds is a major threat to streams.

The Department of Natural Resources has surface mining and sediment control inspectors. The Department of Health and Mental Hygiene enforces discharge permits. Both Departments need to emphasize inspection and enforcement of Patuxent mining and washing operations to assure adequate control measures are maintained. Proper controls such as those depicted in Sketch 4 will prevent sedimentation of the river.

SKETCH 4

SAND AND GRAVEL OPERATIONS

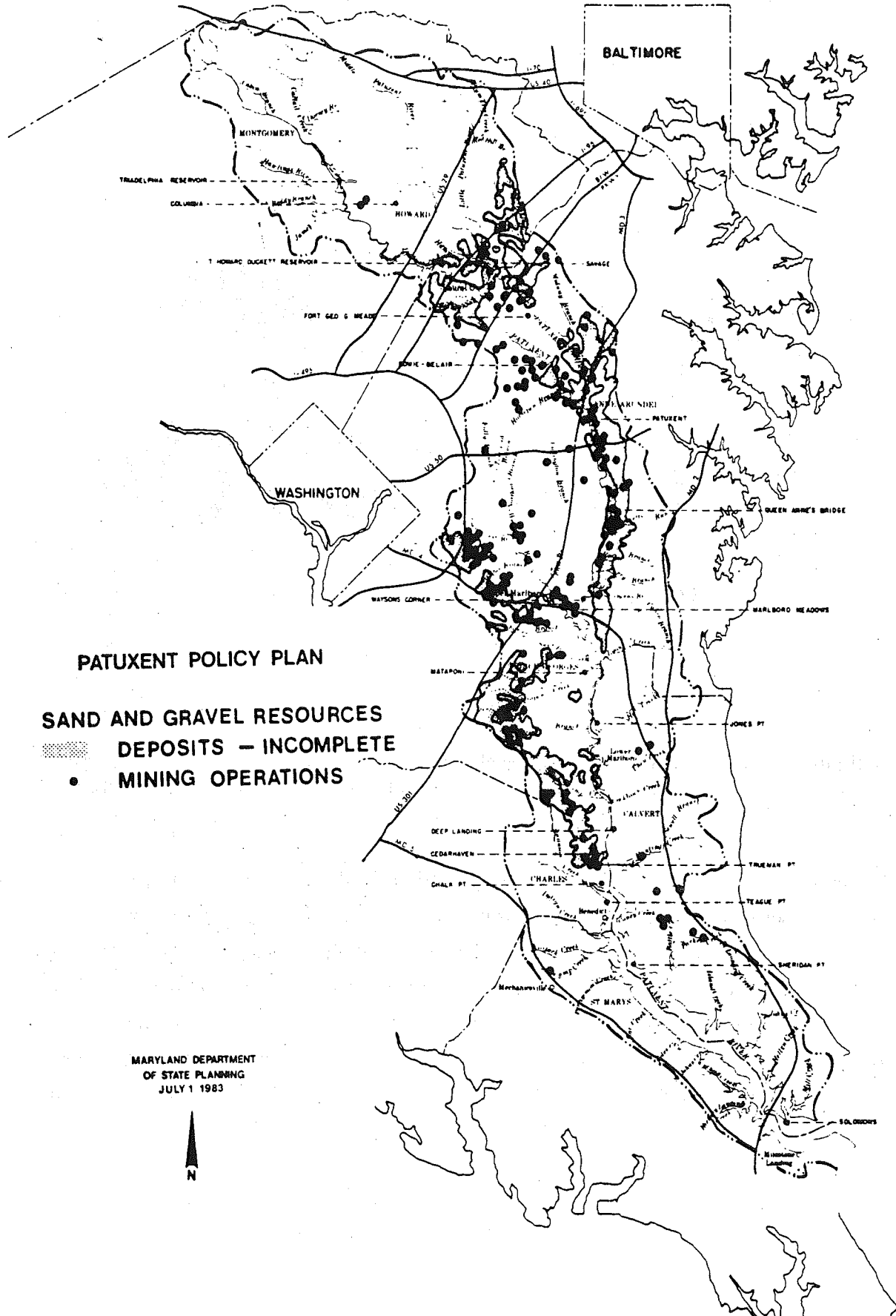


Sediment control from aggregate washing is accomplished by a closed system of sediment ponds. Mining operations should be buffered from the river and processing areas removed from the buffer area.

Though the source of much sediment pollution in the past, sand and gravel mining is an important industry in the watershed. Rather than pre-empt the resource, residential, commercial, and industrial development should be part of the reclamation effort. Existing development must be better protected from the impacts of existing mining operations. County governments must enforce setbacks and other provisions required by local zoning actions. State surface mining regulations must provide adequate environmental control measures and be responsive to local conditions of approval. Future mining operations must be permitted only where conflicts with existing development are minimal.

FIGURE 7

PATUXENT RIVER WATERSHED



Mineral resource surveys need to be completed for Charles, St. Mary's, and Calvert Counties. Mineable sand and gravel deposits must be protected through various forms of local development staging. Each county must ensure that it has an adopted sand and gravel resource management strategy.

10. ADOPTING AN ANNUAL ACTION PROGRAM

THE PATUXENT RIVER COMMISSION WILL ANNUALLY DEVELOP AND ADOPT AN ACTION PROGRAM TO IMPLEMENT THE STRATEGIES.

- **The action program will contain a schedule and indicate responsibilities in carrying out specific actions to implement the plan;**
- **A community education program will be an integral part of the action program; and**
- **The Commission will prepare an annual report on progress in implementing the plan.**

Many agencies within the watershed's local and State governments must act cohesively to accomplish the recommendations of this plan. The Patuxent River Commission has important mandated duties to perform related to Policy Plan implementation. The Commission is to review and comment on plans and reports impacting the watershed, report annually to the General Assembly on the status of the river, and review the implementation and updating of the Policy Plan. The Commission will sponsor "Patuxent Discovery" events to remain familiar with the conditions and problems of the River. These events will also encourage the public to assist in improving the river. The Department of State Planning is required by the Act to report annually to the Commission on the progress of the Policy Plan as well as evaluate the effectiveness and adequacy of the implementation of the plan. Data from the Office of Environmental Programs' water quality monitoring program will be used in this evaluation.

In order to direct and keep track of progress in implementing the plan, the Department of State Planning will prepare a detailed action program for consideration and approval by the Patuxent River Commission. The action program will include a community education segment to encourage public participation in imple-

menting the plan. To assist in updating, local jurisdictions and State agencies will prepare annual status reports on their progress toward accomplishment of the Policy Plan. The Department will also prepare legislative proposals, model ordinances, and other materials to aid in carrying out the plan's recommendations.

III. APPROVAL OF THE POLICY PLAN

The Watershed Land Management Strategy will be effective in protecting and restoring the Patuxent River only through actions and programs that turn the plan's proposals into reality. The plan has been approved by the seven county governments and the General Assembly. Approval by county and State governments is extremely important as an indication of commitment to the plan's recommendations. The Patuxent River Commission members will serve as spokespersons to encourage implementation of the Policy Plan within their respective local governments.

The foregoing recommendations are applicable to other areas where water quality problems are caused by population growth and land use change. While prepared for the Patuxent, the recommendations can be transferred to other watersheds. The actions may need adjustment and tailoring to meet local circumstances; however, they should be pursued immediately. Some of the program recommendations will be carried out on a state-wide basis; for example, retrofitting non-point source control measures in developed areas. This Policy Plan can serve as a model for managing the Chesapeake Bay as it is relevant to the non-point source pollution problems of the Bay.

APPENDIX I

COUNTY AND GENERAL ASSEMBLY
RESOLUTIONS APPROVING THE
PATUXENT RIVER POLICY PLAN

After acceptance of the plan by the Patuxent River Commission, the plan was submitted to each of the seven watershed counties. Each county unanimously approved the plan by resolution. The Senate and House of the Maryland Legislature then approved the plan by Joint Resolution. This Appendix contains a copy of each resolution.

RESOLUTION: MARYLAND SENATE

SENATE JOINT RESOLUTION No. 53

4lr3691

30

 By: Senators Dorman, Simpson, Clark, Fowler, and Winegrad
 Constitutional Requirements Complied with for Introduction in the
 last 35 Days of Session
 Introduced and read first time: March 15, 1984
 Assigned to: Rules
 Re-referred to: Economic Affairs, March 21, 1984

Committee Report: Favorable
 Senate action: Adopted
 Read second time: March 26, 1984

SIGNED

RESOLUTION NO. 16

MAY 15 '84

SENATE JOINT RESOLUTION

BY THE PRESIDENT
AND THE SPEAKER

- 1 A Senate Joint Resolution concerning
 2 Patuxent River Watershed - Policy Plan
 3 FOR the purpose of approving the Patuxent River Watershed policy
 4 plan as presented to, and approved by, the appropriate local
 5 jurisdictions by the Patuxent River Commission and the
 6 Department of State Planning.
 7 WHEREAS, Chapter 746 of the Acts of the General Assembly of
 8 1980 (Article 88C, § 2(c) of the Annotated Code of Maryland)
 9 mandates that the Department of State Planning develop a policy
 10 plan for the Patuxent River Watershed; and
 11 WHEREAS, Article 88C, § 2(c) of the Code mandates that there
 12 be a Patuxent River Commission within the Department of State
 13 Planning and that the Commission review annually the policy plan
 14 for the Patuxent River Watershed as developed by the Department;
 15 and
 16 WHEREAS, Article 88C, § 2(c) requires that the policy plan
 17 for the Patuxent River Watershed be completed by July 1, 1983 and
 18 serve as a basis for continuing coordination and implementation
 19 by the Department of State Planning; and
 20 WHEREAS, Article 88C, § 2(c) mandates that the Department of
 21 State Planning present the Patuxent River Watershed policy plan
 22 to the Governor, the appropriate local jurisdictions, and the
 23 members of the General Assembly; and

EXPLANATION:

Underlining indicates amendments to bill.
~~Strike-out~~ indicates matter stricken by amendment.

1 WHEREAS, Article 88C, § 2(c) provides that, on approval by
 2 resolution of the policy plan by at least 5 of the 7 appropriate
 3 local jurisdictions, the Patuxent River Watershed policy plan
 4 shall be presented to the General Assembly for approval; and

5 WHEREAS, The Patuxent River Watershed policy plan has been
 6 approved by the local jurisdictions and the General Assembly also
 7 finds itself in agreement with the policy plan; now, therefore,
 8 be it

9 RESOLVED BY THE GENERAL ASSEMBLY OF MARYLAND, That this Body
 10 approve the Patuxent River Watershed policy plan as presented to
 11 and approved by the local jurisdictions; and be it further

12 RESOLVED, That copies of this Resolution be sent to the
 13 Honorable Harry Hughes, Governor of Maryland, and the Honorable
 14 Constance Lieder, Secretary, Department of State Planning, 301
 15 West Preston Street, Baltimore, Maryland 21201.

Approved:

Walter B. Steiner _____ Governor.
Benjamin L. Cardin _____ President of the Senate.
 _____ Speaker of the House of Delegates.

RESOLUTION: MARYLAND HOUSE OF DELEGATES

HOUSE JOINT RESOLUTION No. 67

41r3690

30

By: Delegates Parlett, Rymer, Linton, Slade, Bell, and--Sprague
Sprague, Kramer, Thomas, and Toth

Rules suspended

Introduced and read first time: March 19, 1984

Assigned to: Rules

Re-referred to: Environmental Matters, March 22, 1984

Committee Report: Favorable with amendments

House action: Adopted

Read second time: March 29, 1984

SIGNED

RESOLUTION NO. 31

MAY 15 '84

HOUSE JOINT RESOLUTION

BY THE PRESIDENT
AND THE SPEAKER

- 1 A House Joint Resolution concerning
- 2 Patuxent River Watershed - Policy Plan
- 3 FOR the purpose of approving the Patuxent River Watershed policy
4 plan as presented to, and approved by, the appropriate local
5 jurisdictions by the Patuxent River Commission and the
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- 7 WHEREAS, Chapter 746 of the Acts of the General Assembly of
8 1980 (Article 88C, § 2(c) of the Annotated Code of Maryland)
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10 plan for the Patuxent River Watershed; and
- 11 WHEREAS, Article 88C, § 2(c) of the Code mandates that there
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13 Planning and that the Commission review annually the policy plan
14 for the Patuxent River Watershed as developed by the Department;
15 and
- 16 WHEREAS, Article 88C, § 2(c) requires that the policy plan
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18 serve as a basis for continuing coordination and implementation
19 by the Department of State Planning; and
- 20 WHEREAS, Article 88C, § 2(c) mandates that the Department of
21 State Planning present the Patuxent River Watershed policy plan
22 to the Governor, the appropriate local jurisdictions, and the
23 members of the General Assembly; and

EXPLANATION:

Underlining indicates amendments to bill.

~~Strike--out~~ indicates matter stricken by amendment.

HOUSE JOINT RESOLUTION No. 67

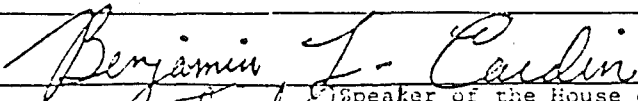
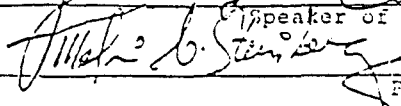
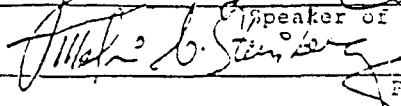
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3 local jurisdictions, the Patuxent River Watershed policy plan
4 shall be presented to the General Assembly for approval; and

5 WHEREAS, The Patuxent River Watershed policy plan has been
6 approved by the local jurisdictions and the General Assembly also
7 finds itself in agreement with the policy plan; now, therefore,
8 be it

9 RESOLVED BY THE GENERAL ASSEMBLY OF MARYLAND, That this Body
10 approve the Patuxent River Watershed policy plan as presented to
11 and approved by the local jurisdictions; and be it further

12 RESOLVED, That copies of this Resolution be sent to the
13 Honorable Harry Hughes, Governor of Maryland, and the Honorable
14 Constance Lieder, Secretary, Department of State Planning, 301
15 West Preston Street, Baltimore, Maryland 21201.

Approved:

	Governor.
	Speaker of the House of Delegates.
	President of the Senate.

RESOLUTION: ANNE ARUNDEL COUNTY

COUNTY COUNCIL OF ANNE ARUNDEL COUNTY, MARYLAND

RESOLUTION APPROVING THE PATUXENT RIVER POLICY PLAN

- 1
2
3 WHEREAS, the population within the Patuxent Watershed has doubled in the
4 last 30 years, resulting in rapid loss of forest cover, agricul-
5 tural land and open space, with a corresponding increase in
6 impervious surfaces causing nutrient and sediment pollution of
7 the river; and
8
9 WHEREAS, as a result of the declining environment and water quality, the
10 economic and recreational resources are less productive; and
11
12 WHEREAS, the 1980 Patuxent River Watershed Act required the Department of
13 State Planning to prepare a Patuxent River Policy Plan to be
14 submitted for approval by the seven counties of the Watershed;
15 and
16
17 WHEREAS, the Department of State Planning worked closely with county
18 officials in preparation of the Plan and the Patuxent River
19 Commission has held public hearings on the Plan throughout the
20 Watershed; and
21
22 WHEREAS, The County Council desires to express support for the overall
23 plan as a policy framework for guiding our continuing efforts to
24 protect and enhance the Patuxent River and its Watershed; and
25
26 WHEREAS, the principles and policies proposed in the plan are generally
27 consistent with approved plans and regulations for the Anne
28 Arundel County portion of the Watershed; and
29
30 WHEREAS, it is understood that achievement of the plan's goals will
31 require refinement and flexible implementation of its stated
32 policies in order to recognize the particular local conditions
33 and needs of existing and planned development throughout the
34 Watershed; and
35
36 WHEREAS, implementation of the plan's recommendations for local programs
37 will require additional consideration, public review and local
38 approval; and
39
40 WHEREAS, Upon approval of the Patuxent River Policy Plan by five counties
41 and approval by the General Assembly, the Plan shall serve as a
42 policy guide for State agencies and local governments in carrying
43 out their programs in the Watershed; now, therefore, be it

RESOLVED BY THE COUNTY COUNCIL OF ANNE ARUNDEL COUNTY, MARYLAND, That it
hereby approves the Patuxent River Policy Plan; and be it further

RESOLVED, That a copy of this Resolution be sent to Ms. Constance Lieder,
Secretary, Department of State Planning.

READ AND PASSED this 14th day of March, 1984.

By Order:

Judy C. Holmes
Judy C. Holmes
Administrative Officer

I HEREBY CERTIFY THAT RESOLUTION NO. 17-84 IS TRUE AND CORRECT AND DULY
ADOPTED BY THE COUNTY COUNCIL OF ANNE ARUNDEL COUNTY.

Wallace R. Childs
Wallace R. Childs
Chairman

RESOLUTION: CALVERT COUNTY

1-867

RESOLUTION NO. 19-84

(Pertaining to the Approval of the Patuxent River Policy Plan.)

WHEREAS, the population within the Patuxent Watershed has doubled in the last thirty years, resulting in a rapid loss of forest cover, agricultural land and open space, with a corresponding increase in impervious surfaces causing nutrient and sediment pollution of the River; and

WHEREAS, as a result of the declining environment and water quality, the economic and recreational resources are less productive; and

WHEREAS, the 1980 Patuxent River Watershed Act required the Department of State Planning to prepare a Patuxent River Policy Plan to be submitted for approval by the seven counties of the Watershed; and

WHEREAS, the Department of State Planning worked closely with county officials in preparation of the Plan and the Patuxent River Commission has held public hearings on the Plan throughout the Watershed; and

WHEREAS, upon approval of the Patuxent River Policy Plan by five counties and after approval by the General Assembly, the Plan shall serve as a policy guide for State agencies and local governments in carrying out their programs in the Watershed.

NOW, THEREFORE, BE IT RESOLVED, that the Board of County Commissioners of Calvert County hereby approves the Patuxent River Policy Plan.

GIVEN under our hands and seal this 13th day of March, 1984.

BOARD OF COUNTY COMMISSIONERS

William T. Bowen
William T. Bowen, President

John M. Gott, Sr.
John M. Gott, Sr., Vice-President

Garner T. Grover
Garner T. Grover

Mary D. Harrison
Mary D. Harrison

George J. Weems, M.D.
George J. Weems, M.D.

ATTEST:

Ann F. O'Neill
Ann F. O'Neill, Clerk

RESOLUTION: CHARLES COUNTY

COUNTY COMMISSIONERS OF CHARLES COUNTY, MARYLAND

RESOLUTION NO. 84-18

WHEREAS, the population within the Patuxent Watershed has increased significantly, resulting in the loss of forest cover, agricultural land and open space, with a corresponding increase in impervious surfaces causing nutrient and sediment pollution of the Patuxent River; and

WHEREAS, as a result of the declining condition of the river economic and recreational resources are less productive; and


WHEREAS, the County Commissioners of Charles County, Maryland have worked to improve the quality of water in the Patuxent River; and

WHEREAS, the 1980 Patuxent River Watershed Act required the Department of State Planning to prepare a Patuxent River Policy Plan; and


WHEREAS, the Patuxent River Policy Plan, upon adoption, is to serve as a policy guide for State agencies and local governments in carrying out programs in the Watershed.

NOW, THEREFORE, THE COUNTY COMMISSIONERS OF CHARLES COUNTY, MARYLAND on this 14th day of March, 1984, do hereby RESOLVE to approve the Patuxent River Policy Plan.

COUNTY COMMISSIONERS OF
CHARLES COUNTY, MARYLAND


Marland Deen, President


Eleanor F. Carrico


Loretta Nimmerichter

Attest:


Nancy P. Hopkins, Clerk

RESOLUTION: HOWARD COUNTY

COUNTY COUNCIL

OF

HOWARD COUNTY, MARYLAND

RESOLUTION approving the Patuxent River Policy Plan.

1 WHEREAS, the population within the Patuxent Watershed has doubled in the last
2 thirty years, resulting in a rapid loss of forest cover, agricultural
3 land and open space, with a corresponding increase in impervious
4 surfaces causing nutrient and sediment pollution of the River; and
5 WHEREAS, as a result of the declining environment and water quality, the
6 economic and recreational resources are less productive; and
7 WHEREAS, the 1980 Patuxent River Watershed Act required the Department of
8 State Planning to prepare a Patuxent River Policy Plan to be
9 submitted for approval by the seven counties of the watershed; and
10 WHEREAS, the Department of State Planning worked closely with county officials
11 in preparation of the plan and the Patuxent River Commission has held
12 public hearings on the plan throughout the watershed; and
13 WHEREAS, the County Council expresses support for the overall plan as a policy
14 framework for guiding our continuing efforts to protect and enhance
15 the Patuxent River and its watershed; and
16 WHEREAS, it is understood that achievement of the plan's goals will require
17 refinement and flexible implementation of its stated policies in
18 order to recognize the particular local conditions and needs of
19 existing and planned development throughout the watershed; and
20 WHEREAS, implementation of the plan's recommendations for local programs will
21 require additional consideration, public review and local approval;
22 and
23 WHEREAS, upon approval of the Patuxent River Policy Plan by five counties and
24 after approval by the General Assembly, the plan shall serve as a
25 policy guide for State agencies and local governments in carrying out
26 their programs in the watershed.
27 NOW, THEREFORE BE IT RESOLVED that the County Council of Howard County,
28 Maryland, this ~~is~~ day of *April*, 1984 that the Council hereby
29 approves the Patuxent River Policy Plan.
30
31
32

RESOLUTION: MONTGOMERY COUNTY

Resolution No. 10-613

Introduction: March 6, 1984
Adoption: March 6, 1984

COUNTY COUNCIL
FOR MONTGOMERY COUNTY, MARYLAND

By: County Council

SUBJECT: Approval of the Patuxent River Policy Plan

WHEREAS, the population within the Patuxent Watershed has doubled in the last thirty years, resulting in a rapid loss of forest cover, agricultural land and open space, with a corresponding increase in impervious surfaces causing nutrient and sediment pollution of the River; and

WHEREAS, as a result of the declining environment and water quality, the economic and recreational resources are less productive; and

WHEREAS, the 1980 Patuxent River Watershed Act required the Department of State Planning to prepare a Patuxent River Policy Plan to be submitted for approval by the seven counties of the Watershed; and

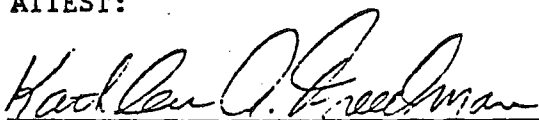
WHEREAS, the Department of State Planning worked closely with county officials in preparation of the Plan and the Patuxent River Commission has held public hearings on the Plan throughout the Watershed; and

WHEREAS, upon approval of the Patuxent River Policy Plan by five counties and after approval by the General Assembly, the Plan shall serve as a policy guide for State agencies and local governments in carrying out their programs in the Watershed;

NOW, THEREFORE, BE IT RESOLVED that the County Council of Montgomery County, Maryland hereby approves the Patuxent River Policy Plan as attached hereto.

A True Copy.

ATTEST:



Kathleen A. Freedman, Acting Secretary
of the County Council for
Montgomery County, Maryland

RESOLUTION: PRINCE GEORGE'S COUNTY

1 COUNTY COUNCIL OF PRINCE GEORGE'S COUNTY, MARYLAND
2 Legislative Session _____ 1984
3 Proposed by _____ Council Members Amonett, Bell, Castaldi,
4 _____ Casula, Cicoria, Herl, Mills, Pemberton, and Wilson
5 Introduced _____ Council Members Amonett, Bell, Castaldi,
6 _____ Casula, Cicoria, Herl, Mills, Pemberton, and Wilson
7 Resolution No. _____ CR-43-1984
8 Introduced by Council on _____ April 3, 1984

9 RESOLUTION

10 A RESOLUTION concerning

11 The Patuxent River Policy Plan

12 FOR the purpose of adopting, with conditions, the Plan as
13 submitted by the Patuxent River Commission and the Maryland
14 Department of State Planning.

15 WHEREAS, the population within the Patuxent Watershed has
16 doubled in the last thirty years, resulting in a rapid loss of
17 forest cover, agricultural land and open space, with a
18 corresponding increase in impervious surfaces causing nutrient
19 and sediment pollution of the River; and

20 WHEREAS, as a result of the declining environment and water
21 quality, the economic and recreational resources are less
22 productive; and

23 WHEREAS, the 1980 Patuxent River Watershed Act required the
24 Department of State Planning to prepare a Patuxent River Policy
25 Plan to be submitted for approval by the seven counties of the
26 watershed; and

27 WHEREAS, the Department of State Planning worked closely
28 with County officials in preparation of the plan and the Patuxent
29 River Commission has held public hearings on the plan throughout
30 the watershed; and

31 WHEREAS, upon approval of the Patuxent River Policy Plan by
32 five counties and after approval by the General Assembly, the

1 plan shall serve as a policy guide for State agencies and local
2 governments in carrying out their programs in the watershed.

3 NOW, THEREFORE BE IT RESOLVED that the County Council of
4 Prince George's County, Maryland, hereby approves the Patuxent
5 River Policy Plan provided that:

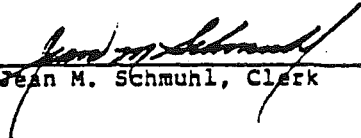
- 6 1) the establishment of the primary management area and
7 the controls imposed therein be entirely a County
8 responsibility;
- 9 2) the County has full responsibility in the decision-
10 making process as to what actions are taken in
11 implementing the Policy Plan recommendations;
- 12 3) the State guarantees that it will not use this Policy
13 Plan implementation as a precondition for other State
14 actions in the County such as grant funding and other
15 services; and
- 16 4) the portions of Action Program to implement the plan
17 which involve the acquisition of land within Prince
18 George's County or a change in zoning or land
19 development policies shall be submitted to the District
20 Council for its review and approval.

21 Adopted this 3rd day of April, 1984.

22 COUNTY COUNCIL OF PRINCE
23 GEORGE'S COUNTY, MARYLAND

24 BY: 
25 Lloyd E. Wilson, Jr.
26 Chairman

27 ATTEST:

28 
29 Jean M. Schmuhl, Clerk
30
31
32

RESOLUTION: ST. MARY'S COUNTY

NO: 84-07

SUBJ: PATUXENT RIVER POLICY PLAN

RESOLUTION

WHEREAS, the population within the Patuxent Watershed has doubled in the last thirty (30) years, resulting in a rapid loss of forest cover, agriculture land and open space, with a corresponding increase in impervious surfaces causing nutrient and sediment pollution of the river; and

WHEREAS, as a result of the declining environment and water quality, the economic and recreational resources are less productive; and

WHEREAS, the 1980 Patuxent River Watershed Act required the Department of State Planning to prepare a Patuxent River Policy Plan to be submitted for approval by seven (7) counties of the Watershed; and

WHEREAS, the Department of State Planning has worked closely with county officials in preparation of the Plan for the Patuxent River and has conducted public hearings on the Plan throughout the Watershed; and

WHEREAS, after approval of the Patuxent River Policy Plan by at least five (5) counties of the Watershed and after approval by the Maryland General Assembly, the Plan shall serve as a policy guide for state agencies and local governments in carrying out their programs in the Watershed;

NOW, THEREFORE, BE IT RESOLVED, that the Board of County Commissioners of St. Mary's County hereby approves the Patuxent River Policy Plan.

This Date:
March 13, 1984

BOARD OF COUNTY COMMISSIONERS
ST. MARY'S COUNTY, MARYLAND

George R. Auld
George R. Auld, President

Larry Hillisno
Larry Hillisno, Vice-President

Richard O. Arnold
Richard O. Arnold, Commissioner

Ford L. Dean
Ford L. Dean, Commissioner

David F. Sayre
David F. Sayre, Commissioner

ATTEST:
Edward N. Cox
Edward N. Cox, County Administrator

APPROVED AS TO LEGAL SUFFICIENCY:

APPENDIX II

PATUXENT 208 WATER QUALITY MANAGEMENT PLAN

Executive Summary

The 208 Water Quality Management Plan for the Patuxent River Basin was prepared under the authority of Section 208 of the Clean Water Act (P.L. 95-217), which requires the development and implementation of areawide waste treatment management plans.

The purposes of the plan are to assess water quality conditions in the Patuxent Basin, identify the nature and degree of existing water quality problems, and provide recommendations for alleviating those problems. The plan is arranged in chapters, which include a statement of goals and objectives, a water quality assessment, and descriptions of the impacts of point and non-point sources of pollution on water quality. Also included are discussions of groundwater and residuals management activities.

The following sections summarize the major elements of the plan:

Water Quality Assessment

Available data for the Patuxent River indicates that certain trends in water quality may be developing. These include increases in the levels of chlorophyll *a* and turbidity since the 1960's, and a decrease in dissolved oxygen (D.O.) levels in the bottom waters of the estuary, although low D.O. concentrations are also observed even under "natural" conditions in the lower estuary. Trend analyses of a variety of finfish indicate that harvest trends in the Patuxent closely parallel trends in the Chesapeake Bay, although there has been a decline in species diversity in the Patuxent.

Data regarding the oyster fishery in the Patuxent suggests that these trends are also similar to those discernable baywide, and indicate general declines in spat sets over recent decades. It is difficult, however, to draw specific conclusions regarding the causes of such declines, since fluctuations in spat set may be caused by a variety of factors. These include changes in water quality as well as other environmental conditions, such as salinity, temperature, disease, and predators.

The plan concludes that water quality problems observed in the Patuxent can be mitigated, to some extent, by reducing nutrient loads to the river from point and non-point sources. A continuing water quality monitoring program is recommended, and several areas where further research is needed are identified. These include, among others, projects which would estimate the rates of exchange of nutrients between the bay and the lower estuary, estimate rates of sedimentation and resuspension of certain nutrients and total sediment, and determine phytoplankton biomass and growth rates in the estuary and their relationship to levels of nitrogen and phosphorus.

Point Sources

In the Patuxent River Basin, 96 percent of the effluent from sewage treatment plants comes from publicly owned treatment works with discharges of over 500,000 gallons per day. Smaller sewage treatment plants and industrial discharges have relatively minor effects on basinwide water quality. This chapter outlines the State's strategy for controlling point source discharges to the Patuxent River. The recommendations were largely derived from the results of a conflict resolution process (called a charrette) which took place in December 1981, and included representatives from various conflicting groups.

The major points of the State's point source control strategy are as follows:

1. All facilities which have discharges that exceed 500,000 gallons per day must meet phosphorus effluent limits of 1.0 mg/l and plan for possible phosphorus limits of 0.3 mg/l.
2. An established goal of the charrette was to reduce nitrogen loadings to the river by point sources by 2,000 pounds from 1981 levels. To accomplish this, certain facilities will meet nitrogen limits of 3.0 mg/l either through conventional nitrogen removal or land treatment. All facilities will plan for possible 3.0 mg/l nitrogen limits and their 201 facilities plans will analyze the various alternatives for achieving this nitrogen limitation.
3. The 201 facilities plans will be the process through which specific decisions for each treatment plant affected by this strategy will be made.
4. Land treatment is the preferred alternative (where it is shown to be cost-effective).

Non-point Sources

In addition to point sources of pollution, water quality can also be affected to a significant degree by non-point sources of pollution. These originate on urban, suburban, and agricultural lands throughout the Patuxent Basin. The State's strategy for controlling non-point sources of pollution consists of the following elements:

1. A Non-point Source Technical Committee will be established to detail and coordinate the implementation of this strategy. The committee will consist of representatives of key State agencies, the seven counties within the Patuxent Basin, the Soil Conservation Districts (SCDs), the scientific community, and EPA.
2. OEP will commit funds to the development and maintenance of a computerized model for the basin, which will serve to test alternative policies and development scenarios for their water quality impacts.

3. A Patuxent Agricultural Task Force will be established, comprised of representatives of the Soil Conservation Service and the SCDs within the basin, and members of key State agencies. The Task Force will detail and coordinate the implementation of the agricultural aspects of the State's strategy.
4. Local SCDs should be strengthened where necessary in order for them to provide adequate technical assistance to farmers for planning and implementing pollution controls.
5. OEP worked with other agencies to develop a State cost-sharing program which was approved by the Maryland Legislature in 1982. Funds will be used to help farmers install best management practices in "critical areas" defined under the State's 208 program for agriculture.
6. OEP will work with local governments to strengthen their stormwater management programs and is calling on these jurisdictions to adequately staff and implement programs for effective stormwater management.

The remainder of the chapter includes brief sections on non-point source pollution from construction sites, surface mines, septic systems, and boating in the Patuxent Basin.

Groundwater

Although Maryland's groundwaters have not suffered widespread or serious contamination, the potential for contamination is present. Maryland is an industrial state and produces significant quantities of toxic or hazardous materials. If these are improperly managed, they may pose a serious threat to the quality of groundwater supplies. Federal and State programs have been implemented to protect groundwater resources throughout the State, and water appropriations control and water supply planning help ensure the conservation of this limited resource.

The plan concludes that no new management programs are necessary to ensure the protection of groundwater quality and quantity in the Patuxent Basin, although careful management is required in a few localized areas to ensure adequate supply. There is also a need to further educate the general public regarding certain actions they may take which might affect groundwater quality, such as improper disposal of toxic household substances.

The plan also concluded that land treatment can be an effective means of treating wastewater, but proper site selection and design must be carefully considered to avoid any adverse impact on groundwater resources.

Residuals

The generation of residuals has increased dramatically in the past few decades as a result of increased population, more stringent requirements for wastewater treatment, and increases in commercial and industrial activities. Landfill space is limited, and improper management or disposal of these wastes may result in surface or groundwater contamination. Federal programs, especially the Resource Conservation and Recovery

Act provide for the development of programs to regulate land disposal of waste materials, and for the development of resource recovery programs. Maryland has developed regulations for the proper management, utilization, and disposal of residuals, including solid waste, sewage sludge, hazardous waste, and resource recovery.

The plan concluded that no new laws or regulations are needed in Maryland to manage residuals waste disposal. There is a continuing need, however, to closely monitor solid waste management facilities and ensure the proper handling of toxic and hazardous wastes. Such monitoring programs should be coupled with strong enforcement programs.

Additional chapters of the plan include Institutional Arrangements, which describe existing local programs related to various aspects of water quality management and provide the reader with contact persons and their phone numbers for various State and local programs.

A chapter on public participation is included, which describes the make-up and functions of various groups which have provided input to OEP during the development of this plan. The chapter also describes the process by which the plan will be reviewed by the public, revised, and submitted to the Governor and EPA for approval.

Several appendices appear at the end of the plan, and serve to provide more detailed information on various subjects dealt with in the body of the plan. These appendices include a discussion of estimated sediment yields in the Patuxent, the State's water quality standards, a glossary, a table summarizing population and land use, a discussion of silviculture, and descriptions of Best Management Practices.

APPENDIX III

PATUXENT RIVER WATERSHED

SUMMARY OF LOCAL PLANNING PROGRAMS AND ORDINANCES

	Montgomery	Howard	Anne Arundel	Prince George's	Charles	Calvert	St. Mary's
Comprehensive Plan	Adopted 1970	Adopted 1982	Adopted 1978 Updated from 1968	Adopted 1964 Wedges & Corridors Updated by Plan- ning Areas New Plan 1982	Adopted 1974	Adopted 1983	Adopted 1974 Amended 1979
Zoning Ordinance	Adopted 1958 Recodified 1977	October 1977 To be updated 1984	Adopted 1971 Updated 1976	Adopted 1949 Amended 1981	Adopted 1974	Adopted 1967 Amended 1984	Adopted 1974 Amended in 1978
Subdivision Regula- tions	Adopted 1961 Revised 1979	Adopted 1961 Updated 1976	Adopted 1971 With Amend- ments	Adopted 1961 Amended thru 1981	Adopted 1974 Revised 1976	Adopted 1972 Revised 1979	Adopted 1954 Revised 1979
Sediment Control Program	Approved 1980	Approved 1980	Approved 1980	Approved 1980	Approved 1980	Approved 1980	Approved 1980
Stormwater Plan and Management Program	Yes. 1975 Also in Sub- division Regulations	Covered in Subdivision Regulations and Official Design Manuals	Yes. Ordi- nance Adop- ted 1977	Yes. Adopted 1980 Updated 1983	None. Interim Ordinance 1983. Covered in Subdivision Regulations	None. Covered in Subdivision	None. Covered in Zoning Ordinance
Water/Sewer Plan	Yes. 1980	Yes. 1983	Yes. Patu- xent River is Referenced Adopted 1982	Yes. 1983	Updated 1980	Yes and Amended 1983	Yes. 1984
Solid Waste Plan	Yes. 1971. No Sites in Basin	Yes. 1983	Yes. 1973 Updated 1983 No Sites in Basin	Yes. Two Sites Located in Basin	Yes. Updated 1980. No Site in Basin	Yes. 1984	Yes. 1976 Updated Bi- Annually. No Sites in Basin
Agricultural Pre- servation Plan	Local Program Adopted 1980. Also partici- pates in State Program	Local Program Adopted 1979/ 80. Also partici- pates in State Program	Local Program Adopted 1981. Also partici- pates in State Program in- cluded in Zoning Ordi- nance	No Local Pro- gram. Partici- pates in State Program	No Local Pro- gram. Partici- pates in State Program	Local TDR Program and Participates in State Program	No Program at County Level. Participates in State Program
Capital Improve- ment Program	Yes. 1980 Updated Annually	Yes. Updated Annually	Yes. FY 1980 Updated Annually 6 Year Pro- gram	Yes. Five-Year Plan and Up- dated Annually	Yes. Five Year Annual Update	Yes. 1980 Annual Up- date	Yes. Annual Update
Special Purpose Plans - Patuxent Focus	None	Middle Patuxent Environmental Area	Analysis of Anne Arundel Watershed - Not Adopted, General Development Plan, Policy to Protect River	Patuxent River Park Plan Adopted 1964, Amended 1980	None	Calvert County Park and Re- creation Plan, 1973. Solomons Harbor Study, 1977. Estuary Study, 1979, 1980	None
District or Area Plans	Damascus Olney East Mont- gomery	Savage North Laurel Guilford		Northwestern Area, Adopted 11-15-77; South Laurel, Adopted 8-5-75; Glenn Dale, Adopted 4-29-80; Bowie- Collington, Adopted 10-28-75; Largo, Adopted 6-27-78; Model Neighborhood, Adopted 11-8-77; Subregion V, Adopted 9-5-78; Subregion VI, Adopted 7-12-77 Suitland, 1969 College Park, 1970	North Charles County, 1982	North Beach Economic Development 1983	Lexington Park Plan, 1983

APPENDIX IV

PRINCIPAL STATE LAWS AND PROGRAMS AFFECTING THE PATUXENT RIVER

	Date of Original Enactment of Authority	Source of Legal Authority	Applies to Patuxent Specifically or Applies State-Wide	Intent of Legislation: Water Quality or Other Purpose(s)	Type of Authority	Responsibility For Implementation
"Patuxent River Watershed"	1961	Nat. Res. Article, Title 8, Subtitle 13	Specifically	Water Quality	Planning & Acquisition	State - DNR and Basin Counties
"Scenic & Wild Rivers Review Board and Related Program"	1969	Nat. Res. Article, Title 8, Subtitle 4	Specifically	Water Quality	Acquisition and Management	State - DNR
"Appropriation of Federal Funds for Sewage Systems"	1977	Article 43, Section 394.5	Specifically	Water Quality	Prioritize	State - DHMH
"Watershed Sediment and Waste Control"	Pre-1957	Nat. Res. Article, Title 8, Subtitle 12	Specifically	Water Quality	Regulatory	State - DNR and DHMH
"Appropriation or Use of Waters, Reservoirs or Dams"	Pre-1957	Nat. Res. Article, Title 8, Subtitle 8	State-wide	Water Supply	Regulatory	State - DNR
"Flood Control and Water Supply Powers and Functions"	Pre-1957	Nat. Res. Article, Title 8, Subtitle 9	State-wide	Flood Damage	Planning and Coordination	State - DNR
"Shore Erosion Control"	Pre-1957	Nat. Res. Article, Title 8, Subtitle 10	State-wide	Water Quality	Technical Assistance and Funding Assistance	State - DNR
"Water Pollution Control and Abatement"	Pre-1957	Nat. Res. Article, Title 8, Subtitle 14	State-wide	Water Quality	Regulatory and Research	State - DNR and DHMH
"Wetlands and Riparian Rights"	Pre-1957	Nat. Res. Article, Title 9	State-wide	Water Quality and Other	Regulatory	State - DNR
"Program Open Space"	1969	Nat. Res. Article, Title 5, Subtitle 9	State-wide	Parks and Open Space	Land Acquisition	State - DNR, Other State Agencies and Counties
"Sediment Control"	1970	Nat. Res. Article, Title 8, Subtitle 11	State-wide	Water Quality	Regulatory	State - DNR and Counties
"Critical Areas Program"	1974	Article 88C, Section 2(b)(3)	State-wide	Designation and Management	Planning and Management	State - DSP and Local Government
"Intervention Program"	1974	Article 88C, Section 2(4)	State-wide	Advisory Function	State Participation in Local Proceedings	State - DSP
"Surface Mining"	1975	Nat. Res. Article, Title 7, Subtitle 6A	State-wide	Water Quality	Regulatory	State - DNR
"Flood Control and Watershed Management"	1976	Nat. Res. Article, Title 8, Subtitle 9A	State-wide	Water Quality and Other	Regulatory	State - DNR and Local Government
Maryland Coastal Zone Management Program	1978	Executive Order	Coastal Area of the State	Water Quality	Planning and Coordination and Research	State - DNR
"Stormwater Management"	1982	Nat. Res. Article, Title 8 Subtitle 11A	State-wide	Water Quality and Quantity	Regulatory	State - DNR and Local Government

APPENDIX V

PATUXENT RIVER CHARRETTE

The Patuxent River Charrette was held on December 2-4, 1981 to reach a consensus among State and local leaders on a nutrient control strategy for the watershed. The following statement of goals for the watershed, as taken from the Patuxent 208 Plan, was agreed upon.

Water Quality Goals and Measures

Goal: To restore water quality to the 1950's levels as defined by dissolved oxygen (DO) and turbidity.

Reduce pollutant loadings
Ensure levels to sustain biological life
Maintain sources of potable water in upper river

Measures:

DO Minimum

5 mg/l above Sheridan Pt. (river mile 20)
2 mg/l at Sheridan Pt. in deep water

Turbidity:

1.5 to 2 meters secchi disc visibility at Sheridan Pt.

Recreational and Esthetic Goals and Measures

Restore and improve the potential for recreational uses of the Patuxent River, including boating, sports fishing, swimming, and esthetic pleasure.

1. Enhance the scenic quality of the river

Measures: refuse cleanup
rehabilitation and reclamation of sand and gravel sites*
turbidity reduction
maintenance of traditional water uses and way of life
agricultural land preservation
park development*

2. Preserve and enhance wildlife habitats

Measures: zoning control of water frontage
return of indigenous species

*Added from Charrette Action Plan