

# Land Use in the Swimming and Manasquan River Reservoir Watersheds

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A Growth Management Guide White Paper



Adopted by the Monmouth County Planning Board

April, 1985

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April, 1985

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## 1.0 INTRODUCTION

As part of the New York Metropolitan Region, Monmouth County is directly affected by the economic and population trends of the Region as a whole. One of these trends is the deconcentration of the larger economic and population centers, which has led to the increased development of the Region's suburban areas, including Monmouth County. In 1966, Monmouth County was 68% undeveloped. By 1980, the amount of undeveloped land had dropped to 48%<sup>1</sup>. As used here, "undeveloped land" is vacant, wooded, or developed for agricultural use.

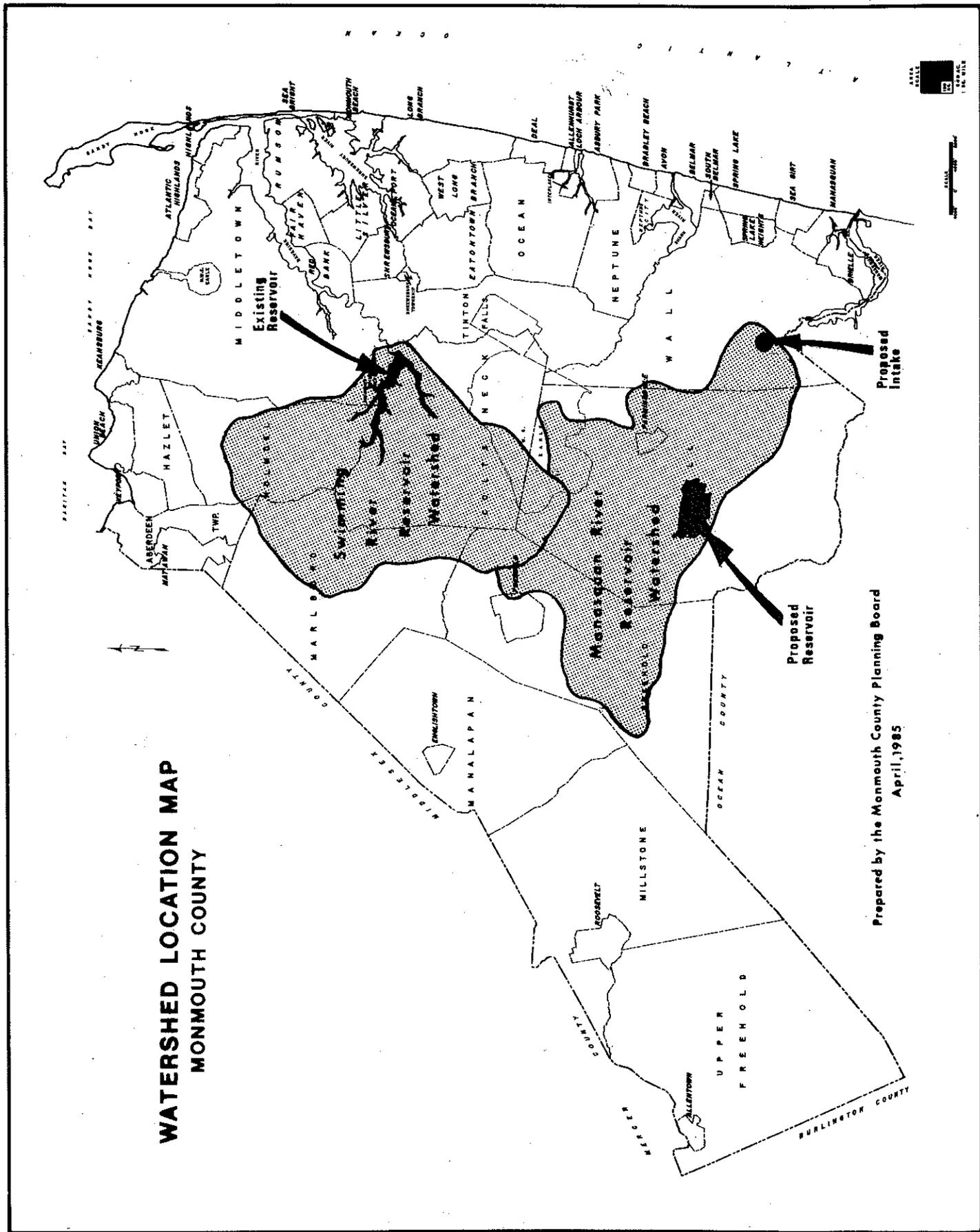
Among the features which attract people and businesses to Monmouth County are its proximity to major highways and airports, its strategic location between New York and Philadelphia, its highly skilled labor force, and the diversity and quality of its natural and cultural resources. The County's bay and ocean shorelines and rolling rural landscapes are particularly important in making the County a desirable place to live. Because of these assets, it is anticipated that growth pressures in the County will continue for some time until market forces balance and/or the County becomes less desirable relative to other areas in the State.

Among the areas of particular concern to the Monmouth County Planning Board are the watersheds of the Swimming River and proposed Manasquan River Reservoirs (Fig. 1). The watersheds provide the County with a source of potable surface water, abundant productive farmland, woodland and open space, habitat for wildlife, and a variety of historic features. The importance of the watersheds as a source of potable surface water is enhanced by the fact that the County's groundwater supplies are being severely depleted from overpumpage and that the rate of this pumpage will be sharply reduced by the State.

The Monmouth County Growth Management Guide (GMG) provides a framework for accomodating development while protecting important resources like the two watersheds. The provision of a safe and adequate water supply and the maintenance and expansion of the County's agricultural potential are two of the GMG's major goals. Most of the land in the watersheds has been included in the GMG's Central Limited Growth Area, which lies between the more intensely developed coastal area and Route 9 transportation corridor (Fig. 2). The headwaters of the Manasquan River lie within the GMG's Western Limited Growth Area.

This paper will discuss some of the problems associated with continued growth in the Swimming and Manasquan River Watersheds and will offer strategies for channelling growth and reducing its impact on the water supply. The chief focus will be on the portions of the watersheds within the Central Limited Growth Area which drain into or above the reservoir sites themselves.

Fig. 1





## 2.0 WATERSHED DESCRIPTION and HISTORY

### 2.1 Existing Conditions

The Swimming River Reservoir watershed is comprised of most of Colts Neck Township, portions of Holmdel and Marlboro Townships, and smaller portions of Aberdeen, Freehold, Howell, and Middletown Townships. The Manasquan River Reservoir watershed is comprised of most of Howell Township and portions of Freehold and Wall Townships and Freehold and Farmingdale Boroughs. The two watersheds are the largest in the County.

The current land uses are fairly evenly distributed throughout the bi-watershed region and include agricultural and residential uses with some commercial and industrial activity.

Agriculture, including crops, livestock, nurseries and orchards, is one of the most prevalent uses of land in the region.

Much of the region lies in the path of the largest belt of prime agricultural soils in New Jersey which runs southwest - northeast from the Camden area to the Highlands of Monmouth County. Outside this belt, the soils are generally too sandy and/or wet to support economically productive agriculture. Many of these soils support the pine-oak associations typical of the New Jersey Pinelands.

Monmouth County is ranked among the Nation's 100 counties in the dollar value of agricultural products sold per acre and leads the State in horse breeding and nursery stock<sup>2</sup>. It also leads the State in the direct marketing of fruits and vegetables as a percentage of total sales. Monmouth currently ranks second among the New Jersey counties in the production of sweet corn and cabbage and is ranked among the top five counties in the production of field corn, wheat, barley, soybeans, potatoes, peppers, apples, and strawberries<sup>3</sup>.

Most of the region's residential development is evenly dispersed and consists of single-family homes on large lots. The exceptions to this pattern occur in Freehold and Farmingdale Boroughs, where development densities are greater. Multi-family housing is found in Freehold Township, Freehold Borough, and Farmingdale. Public water and sewer systems are generally absent.

Commercial activity can be found in Freehold and Farmingdale Boroughs, Holmdel Village, and along Routes 9 and 79 and includes community-level retail centers as well as local and neighborhood centers. Major office-research centers are located in Holmdel. These include Bell Labs and Prudential, two of the largest employers in the County.

Major industry is located in several areas of the region: 3M, Nestles, and Brockway Glass in the Freehold area; Penwalt Corp. in Holmdel; Laird & Co. in Colts Neck; Marlboro Industrial Park in Marlboro; and the Fairfield Industrial Park and numerous industries in the Howell-Farmingdale area.

U.S. Naval Weapons Station Earle, which occupies large areas of Colts Neck and Howell, is maintained as a mostly wooded area.

Much of the land in the region is wooded or vacant. In addition to preserving water quality, the County's woodlands contribute to improved air quality and an aesthetically pleasing environment.

## 2.2 Historic Resources and Settlement

Monmouth County's farms and rural countryside are an important part of our heritage. The Monmouth County Historic Sites Inventory, which is based on extensive surveys conducted between 1980 and 1985, devotes considerable attention to historic farmsteads, field patterns, and structures of the agricultural landscape, such as barns and field cribs.

The County has a significant number of historically important farmsteads. Many of these are concentrated in the Swimming River Watershed municipalities of Holmdel, Colts Neck, and Marlboro. Country schools and rural churches have also been documented in significant numbers.

There is a direct connection between the rural landscapes of today and the County's early settlement. While there are a few examples of the New England settlement pattern (such as Middletown Village) in the County, the predominant pattern in the two Watersheds and the County as a whole was one of dispersed family homesteads.

Although the northern part of the combined watershed area was settled in the late 17th century, much of the settlement in the southern, Howell Township portion occurred in the early 20th century as the area was populated by egg farmers. The early settlement of Howell Township was influenced by the Howell Iron Works, an example of early industry located on the site of the present-day Allaire State Park.

The area was host to several experiments in communal living, including the North American Phalanx in Colts Neck Township, which was established in the mid-19th century. Some of the egg farm settlements in Howell Township, such as those in the West Farms section, were related to the Jewish agricultural settlement movement.

The Historic Sites Inventory also describes intact rural villages, which existed largely as rural service and retail centers. Examples of these include the present-day Ardena, Colts Neck, and Marlboro Villages.

## 3.0 WATERSHED DEVELOPMENT

Whether it occurs on a large scale over a short period of time or continues on a small scale over a longer period, development begets development. Increased residential development provides the labor and

market for increased office, industrial, and commercial development, and the employment opportunities created by non-residential development stimulate additional demands for housing. A residential subdivision of 500 units and an average household size of 2.9 persons per unit, for example, would easily provide the threshold population for additional professional services (doctor, dentist, lawyer, etc.) and local retail establishments (grocery store, liquor store, pharmacy, and gas station).

One of the greatest catalysts for development is the installation or improvement of local infrastructure, particularly sewer and water service. Most of the sewer service in the Swimming River Watershed lies at the fringes of the watershed (Fig. 3). In the Manasquan River Watershed, the recent installation of the Manasquan River Regional Sewerage Authority collector lines will increase development pressures in large areas of Howell Township.

While the central portions of both watersheds are largely free of water service, much of southern Holmdel Township is traversed by water mains (Fig. 4). In the Manasquan River watershed, Farmingdale and the Adelphia area of Howell Township are served by public water systems.

Development in the two watersheds is proceeding rapidly. In order to gauge the rate and magnitude of development in the upper portion of the region, the Monmouth County Planning Board (MCPB) staff reviewed the records of all major subdivisions approved by the Board for the Swimming River Reservoir watershed between 1976 and 1984. During this time, some 2304 acres (3.6 sq. mi.) of land were developed for residential purposes, with the potential for another 1318 acres (2.1 sq. mi.) of residential development. (Potential projects are major subdivisions granted final MCPB approval from 1980 to the present or preliminary approval from 1982 to the present.) These figures yield a total of 3707 acres (5.7 sq. mi.), an area the size of Eatontown (Fig. 1).

An inspection of all major subdivisions and site plan applications submitted to the Board in 1984 for residential and non-residential projects in the Swimming River Reservoir watershed revealed a total of 327 acres (0.51 sq. mi.) of land with development potential, an area larger than Farmingdale. The corresponding area for the Manasquan River Reservoir watershed is 405 acres (0.63 sq. mi.), an area greater than Sea Bright. The combined area is 732 acres (1.14 sq. mi.), an area the size of Monmouth Beach. The total impervious surface area which would be created in the two watersheds would be about 87 acres.

Monmouth County is undergoing a significant boom in office construction. Of the 1,422,298 square feet of office space proposed in applications submitted to the Planning Board in 1984, 186,856 square feet (13.1%) was proposed for the Swimming River Watershed portion of the Central Limited Growth Area delineated in the Monmouth County Growth Management Guide. All these applications were for projects in Holmdel Township. The floor area figures are based on projects with 5000 square feet or more of space.



## 4.0 THE WATERSHED in RELATIONSHIP TO COUNTY and STATE PLANS

### 4.1 County Plan

It is the goal of the Monmouth County Planning Board to provide a pattern of land use that includes a variety of uses, development densities, and open space based on the physical characteristics of the land and the availability of public facilities and services. Strategies for phasing and channelling growth must account for the urban, suburban and rural nature of the County and must seek to maintain the area's traditional quality of life.

The bulk of the County's development should be directed to utilize the available buildings, land and services within the two Growth Areas designated in the Monmouth County Growth Management Guide (GMG). This would economize on space, time, energy, and public services.

As noted above, most of the Swimming and Manasquan River Watersheds are located in the GMG's Central Limited Growth Area. The GMG's two Limited Growth Areas were delineated according to the following criteria: absence of infrastructure, such as public water or sewer lines; presence of significant areas of environmentally sensitive or special use lands; and lack of public transportation. Most of this Central Limited Growth Area has been designated as an Agriculture/Conservation Area.

Growth in the Limited Growth Areas should be channelled away from the Agriculture/Conservation Areas toward the designated growth nodes such as the Town Centers and Town Development Areas. Essentially, the Agriculture/Conservation Area is the sending area of the Limited Growth Area, while the growth nodes are receiving areas for rural development needs. Hence, agriculture and conservation are seen as the basic land uses of the two watersheds.

The size, density, and phasing of the growth nodes as well as the recommended land uses for these centers is discussed in the GMG and Planning Board White Paper entitled Land Use Designations and Site Criteria (June, 1983). The White Paper defines commercial, office research, and industrial facilities according to their size and function and discusses the locational acceptability of these facilities.

Agriculture/Conservation Areas can be protected by innovative land conservation techniques such as agricultural clustering and/or districting, density transfers, and purchase of development easements. While traditional large-lot zoning can be used to support these techniques by controlling overall densities, it has been largely ineffective as a deterrent to rural development when used alone.

Acquisition of land in Limited Growth Areas will help prevent sprawl development, protect watershed areas, provide for groundwater recharge, conserve wildlife and maintain the quality of life in Monmouth County. Se-

curing land along stream valleys protects the natural drainage system, provides linear parks adjacent to stream corridors and ensures detention areas for storm water control.

## 4.2 State Plan

The watersheds also lie in a Limited Growth Area as defined by the State Development Guide Plan, which offers the following recommendations for land use in Limited Growth Areas:

- o "Scale additional public investments in growth-including facilities to meet existing needs and moderate in-filling in established centers, but do not provide for extensions into the surrounding countryside."
- o "Correct existing on-site facility problems with septage management techniques or with the construction of off-site sewerage of capacities no greater than needed to remedy the problem."
- o "Do not construct new highways or additional accesses to existing highways. The establishment or reestablishment of rail corridors, linking urban areas but transversing Limited Growth Areas, should not be prohibited if it can be assured that no new growth or development will result within the Limited Growth Area."

## 4.3 Municipal Role

Municipal governments exercise the greatest control over local land use and will therefore play a major role in the destiny of the watersheds. The New Jersey Municipal Land Use Law lists (among others) the following objectives:

- o "To encourage coordination of the various public and private procedures and activities shaping land development with a view of lessening the cost of such development and to the more efficient use of land."
- o "To promote the conservation of open space and valuable natural resources and to prevent urban sprawl and degradation of the environment through improper use of land."

The municipal master plan, which includes a number of elements of importance to watersheds, forms the basis for local land use decisions and is used by the local planning board as a reference when reviewing and commenting on the capital investment projects of the State, county, and municipality as well as those of an authority, special district or other

public agency. Municipal and County governments can help to guide the growth of the region by ensuring that their own capital projects, grants, and economic development activities are consistent with watershed management goals.

## 5.0 IMPACT of DEVELOPMENT on WATER QUALITY

The region is host to two major reservoir sites. The existing Swimming River Reservoir, which is owned and operated by the Monmouth Consolidated Water Company, is currently the largest surface water source in the County, serving nearly 250,000 people (close to half the County population) in the northern coastal portion of the County. The Reservoir has storage capacity of some 2.6 billion gallons (bg) and a safe yield of 22.8 million gallons per day (mgd).

The proposed Manasquan River Reservoir will serve as a supplementary water source for purveyors in much of eastern and central Monmouth County, including Monmouth Consolidated. This reservoir will have a capacity of some 4.0 bg and a safe yield of 30.0 mgd.

A reservoir's ability to cleanse itself is limited due to its restricted outflow. Moreover, a reservoir is a still body of water and collects sediments which are transported to the reservoir by its feeder streams. These sediments reduce the capacity of the reservoir and frequently carry pollutants which remain as a persistent source of contamination. Therefore, a reservoir is extremely vulnerable to changes in land use. For example, erosion in the Swimming River Watershed contributes some 4400 tons of sediment to the Reservoir annually. As the result of nutrient loading from agricultural and non-agricultural sources, the Reservoir is becoming eutrophic at an accelerating rate. Water treatment costs have increased due to taste and odor problems stemming from algal growth<sup>4</sup>.

A reservoir is only a small part of a larger system—its watershed. We must think of the reservoir and the watershed as a single system. The relationship between watershed land use and the local water supply is discussed in the Monmouth County Water Quality Management Plan (208 Plan):

"...the protection of a watershed involves two basic approaches, either remedial or preventive. The remedial approach is expensive and requires treatment of already polluted water. The preventive approach is the regulatory control of land uses, with the need to protect the watershed for water supply."

"Already there are a number of discharge points located upstream from the (Swimming River) reservoir. During dry periods the decreased streamflow without a corresponding decrease in wastewater discharge could result in a significant lowering of water quality in the watershed."  
(Figs. 5, 6.)

Fig. 5

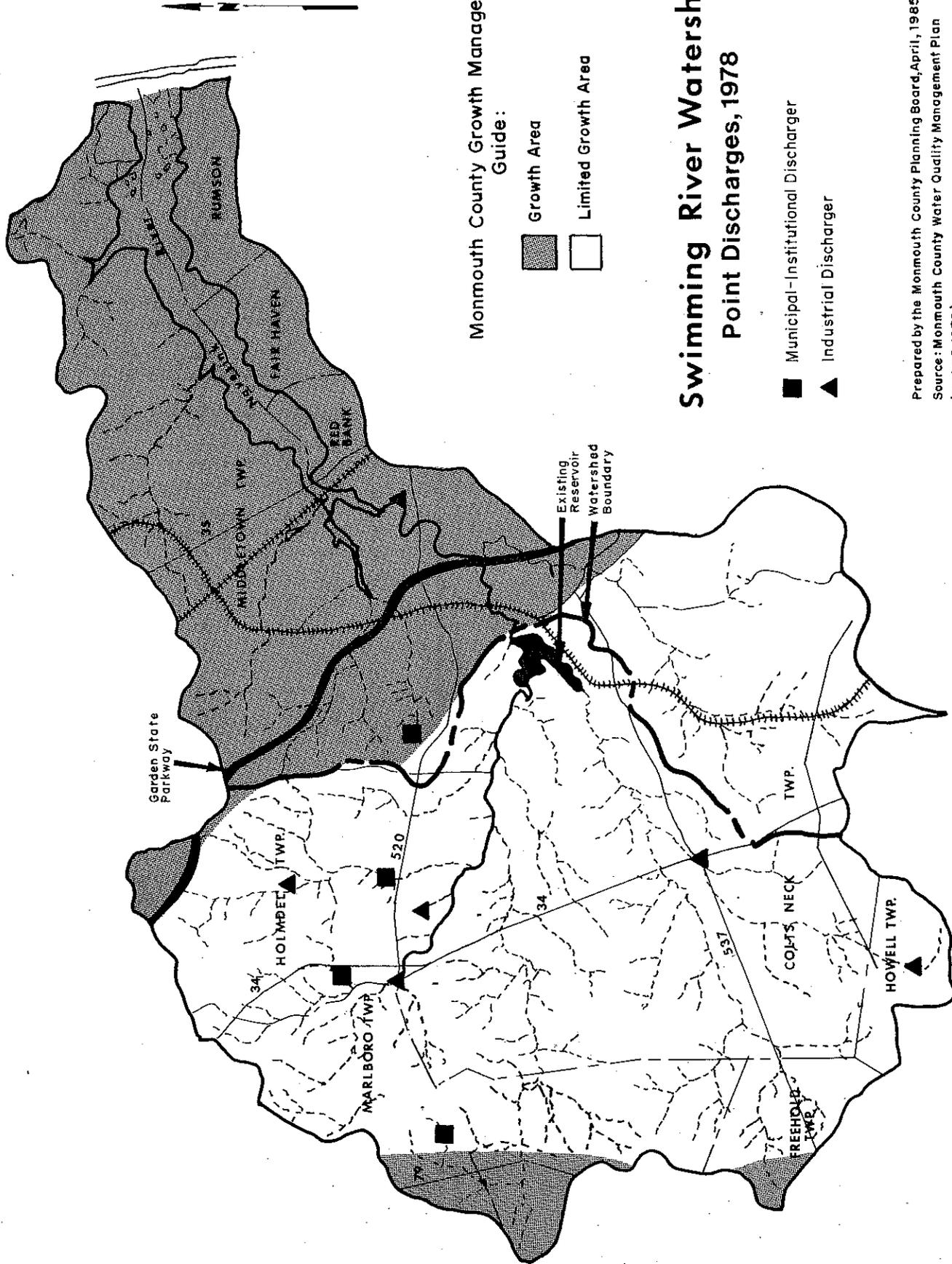
Monmouth County Growth Management

Guide:

-  Growth Area
-  Limited Growth Area

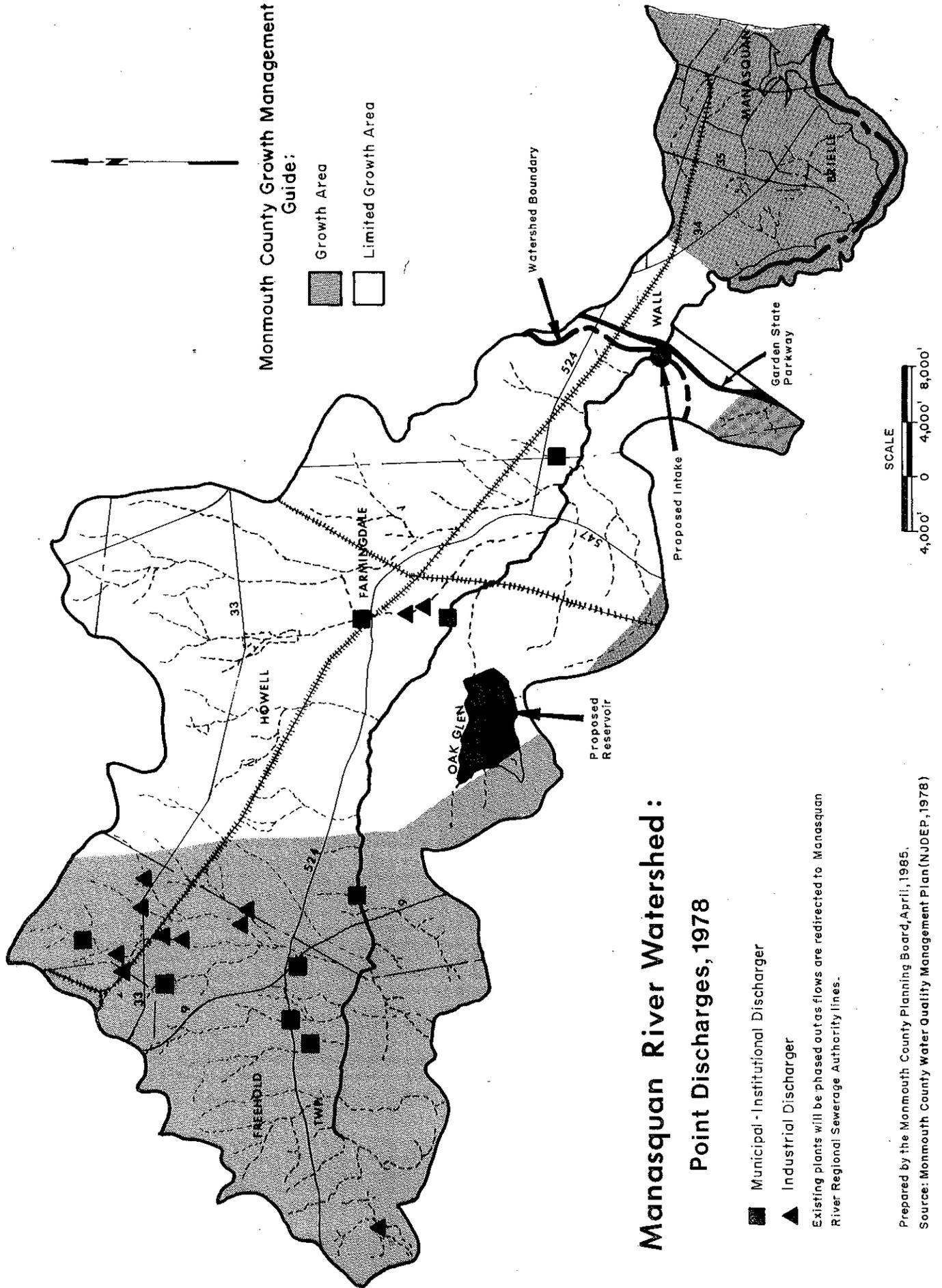
# Swimming River Watershed: Point Discharges, 1978

-  Municipal-Institutional Discharger
-  Industrial Discharger



Prepared by the Monmouth County Planning Board, April, 1985.  
 Source: Monmouth County Water Quality Management Plan  
 (NJDEP, 1978)

Fig. 6



Prepared by the Monmouth County Planning Board, April, 1985.  
Source: Monmouth County Water Quality Management Plan (NJDEP, 1978)

"In addition to point sources of pollution, non-point sources can have a substantial negative impact on drinking water. Urban/suburban runoff, agricultural runoff, and construction-related runoff are some examples of non-point pollution sources which could contaminate a water supply with pollutants ranging from sediment and oxygen-demanding materials to hazardous substances."

This relationship is also described in the New Jersey Water Supply Master Plan (1982), which points out that the contamination of a public water supply increases treatment costs, at the best, and at its worst renders a water supply unusable. The Plan goes on to state that upstream discharges, uncoordinated land use and the encroachment of incompatible activities into a potable water supply source area could create a serious drinking water problem.

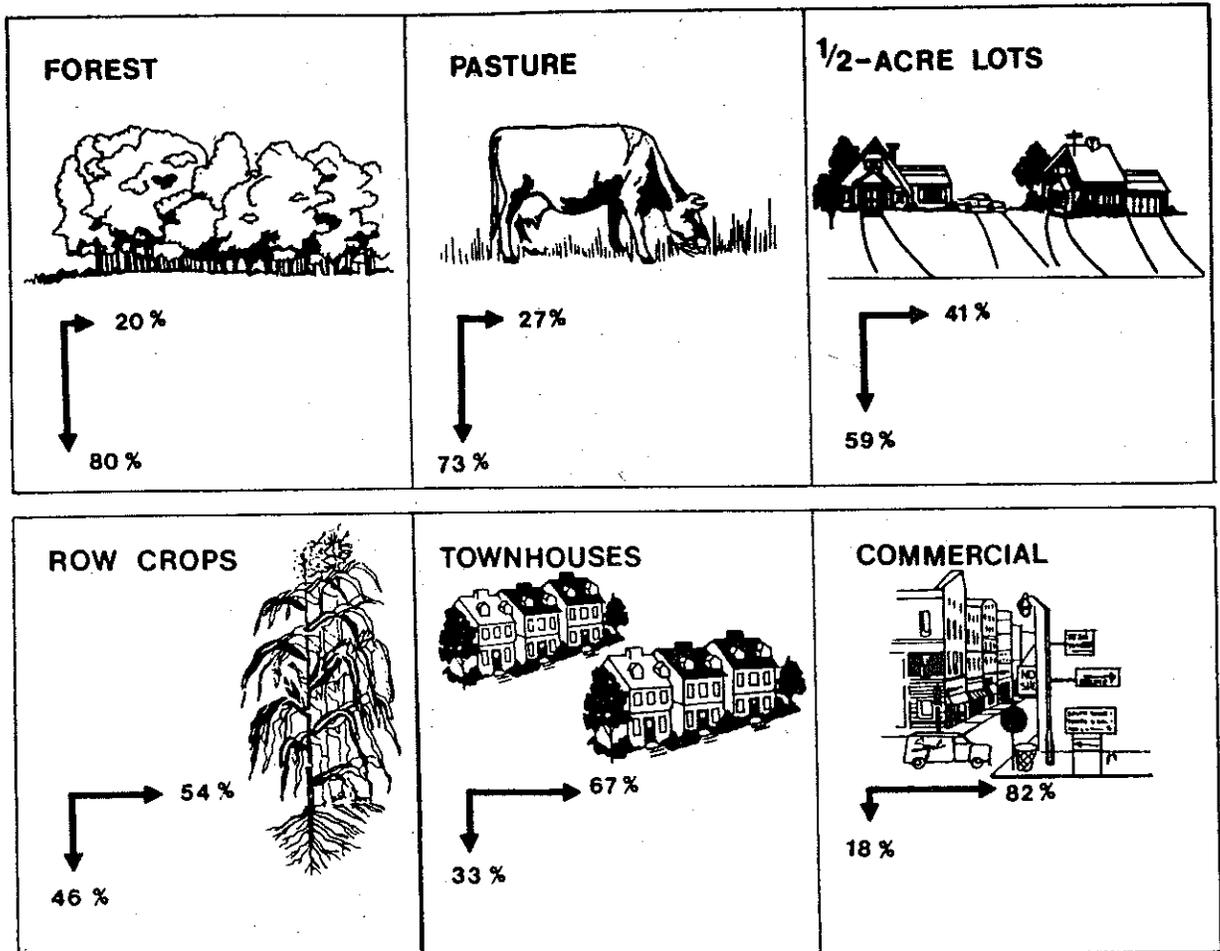
From a water resources standpoint, the best land use is mature woodlands. (Fig. 7, Table 1). As land is developed, the volume of stormwater runoff increases, while groundwater recharge is reduced. Increased peak flows erode streambanks and increase sedimentation downstream. Water quality also suffers as expanding suburban land covers contribute automobile-related materials, road salt, litter and uncollected refuse, fertilizers and pesticides, septic flows, and cleaning agents to the surface and ground waters of the watershed.

In Monmouth County, most non-agricultural activities involving 5000 square feet or more of soil disturbance are regulated by the Freehold Soil Conservation District, which is charged with controlling soil erosion during construction under New Jersey's 1975 Soil Erosion and Sediment Control Act, as amended.

Two recent programs should augment existing efforts to control non-point source pollution on the farm. As part of the New Jersey Agriculture Retention Program, the State Agricultural Development Committee will be defining acceptable agricultural management practices in accordance with the State's 1983 Right to Farm Act. In addition, cost-sharing grants for soil and water conservation projects will be available to farmers enrolled in eight-year farmland preservation programs. A comprehensive conservation plan will be developed by the U.S. Soil Conservation Service for each farmer who applies for a grant.

Conservation plans will also be prepared for Swimming River Watershed farmers who participate in a \$1.1 million Federal pilot program which will be administered by the Freehold Soil Conservation District. The goal of this program is to improve water quality in the Reservoir itself and in the shellfish beds below the Reservoir. Under this program, grants will be available for the control of animal waste, soil erosion, and nutrient runoff. Funding for the program has been authorized by Congress through the 1954 Watershed Protection and Flood Prevention Act.

Fig. 7



(Drawn by Dotores Walter)

Proportion of Runoff and Infiltration for Various Land Uses. (Assumed conditions 10-yr. storm in northern New Jersey producing 5 inches of rain in 24 hrs.; hydrologic soil group B; all other conditions average.)

Source: Fraser, Elizabeth A. and Morris, Anne F. 1980. Getting it All Together. Association of N.J. Environmental Commissions. Mendham, New Jersey.



## 6.0 OTHER IMPACTS

Suburban sprawl has many consequences. Just as there is a limit to the amount of development the natural environment can accommodate before it is severely degraded, there is a critical point in the socioeconomic environment at which land use and economic changes will affect an area's economic base, fiscal order, community services, recreation and open spaces, and historic and aesthetic character.

Perhaps the most obvious change is the alteration in the visual environment. With increasing development, the wooded stream corridors and architecturally distinctive farmsteads which provide scenic variety and a visual link with the past are replaced by gabion-lined drainage canals and monotonous suburban subdivisions.

The Swimming and Manasquan River watersheds have a long history as a rural/agricultural area. As development spreads, the historic structures and sites of a community (such as mill complexes and battlefields) are frequently lost. Those that remain lose their sense of place as the surrounding landscape is destroyed.

Native flora and fauna are also lost as large natural areas are cleared for new houselots and replaced by residential landscape plantings. Development which affects water quality will also affect waterfowl and fish.

The result of unchannelled growth will be fewer opportunities for improving mass transit in the County's two Growth Areas and unrelieved traffic congestion throughout the County. Since there is no passenger rail service in the Central Limited Corridor and little bus service, commuters will rely on their automobile for all or a good portion of their journey to work. The experience of driving quiet country lanes free of auto exhausts or of "getting out on the open road" (which is still possible in parts of Monmouth County) will be a thing of the past. Many of these country lanes lack the capacity to handle significantly increased volumes of traffic, and increases in the local population would bring pressures to widen them.

Haphazard residential development in traditionally rural areas fragments and isolates large contiguous tracts of farmland and increases the cost of acquiring land for expanded farm operations. It also leads to land use conflicts which have frequently led to restrictions on the farmer's right to farm and decreasing investments in his operation. Conversely, the protection of large agricultural areas will help maintain a core of land and growers necessary to support a healthy agricultural economy.

Urban/suburban population growth results in increasing demands on municipal governments for such services and facilities as additional police and fire protection and recreational and community facilities. When development spreads, public services may become overextended and costly.

## 7.0 CONCLUSIONS

As noted in the introduction, the County saw 20% of its total land area developed for non-agricultural purposes in the fourteen years between 1966 and 1980. Much of this development occurred in the Swimming and Manasquan River Reservoir Basins.

Since a reservoir is a regional resource, the management of its watershed is a shared responsibility. The State, County, and municipal government should be willing partners in the protection of this resource.

As citizens and planners of Monmouth County, we face a choice: We can continue the status quo and await the complete conversion of our rural landscapes to wall-to-wall suburbs dotted with traffic lights and an occasional park, or we can accept the challenge of directing growth to tighter, more cohesive communities and preserve some of the wide open spaces which replenish our reservoirs and improve our quality of life.

The latter course will require early action, increased cooperation, and new approaches to managing land use. Some of these approaches are suggested below.

## 8.0 RECOMMENDATIONS

The Monmouth County Planning Board strongly recommends that the following actions be considered and put into practice by the State, County, and municipal governments. Such actions are needed to preserve and maintain the many assets of water quality in the Swimming River and Manasquan River Watersheds. These are policy recommendations and are based on previously adopted positions by the Board.

1. The Planning Board encourages regional cooperation on watershed protection and management. While the State, County and municipal governments have taken some steps to manage growth and conserve land, these efforts have clearly been inadequate. Legislation should be developed to expand the power of county planning boards to review and control developments which have a regional impact on watersheds, natural resources, and other areas or features of regional concern.
2. The Planning Board encourages the channelling of non-agricultural development away from the heart of the watersheds and into the Growth Areas designated in the Monmouth County Growth Management Guide. This would provide for the more efficient use of existing urban/suburban services and infrastructure, increase the potential for the use of mass transit, and help revitalize depressed urban centers.

3. Development within the watersheds must be directed into growth nodes designated in the Monmouth County Growth Management Guide. These development nodes should serve as focal points for residential, commercial and municipal developments within the Limited Growth Areas and prevent encroachment on agricultural and watershed bank lands.
4. The extension of sanitary sewer service into unserved portions of the Swimming River and Manasquan River watersheds should be prohibited. The extension of sewer lines is a major catalyst for development in a region.
5. The introduction or expansion of potable water service into unserved portions of the two watersheds should likewise be prohibited. Exceptions, if any, should be restricted to the installation of limited-capacity piping to replace a contaminated supply for an existing population where other alternatives are infeasible.
6. The County and municipalities should work together to develop and implement new approaches to managing land use. The use of intermunicipal transfer of development rights could locate major developments in suitable growth nodes, while a form of regional tax-sharing would make such transfers equitable to all participating municipalities.
7. The Planning Board strongly recommends that critical and unique tracts within the Swimming River and Manasquan River watersheds be preserved through fee-simple acquisition or deed restrictions. These tracts must include greenbelts along streams supplying the two reservoirs. The greenbelts will act as a watershed bank and serve to preserve water quality and reduce stream and reservoir siltation. Other critical sites would include freshwater wetlands, tracts of native flora, areas of aquifer recharge, and buffer land to the reservoir.
8. The enforcement mechanism of the Soil Erosion and Sediment Control Act should be strengthened to provide for a more aggressive enforcement of the certified soil erosion control plans for non-agricultural activities which are required under the Act.
9. The Planning Board strongly encourages agricultural preservation within the Swimming River and Manasquan River watersheds. Such preservation not only maintains an important natural resource and productive land use but also maintains valuable open space.

The adoption of best soil erosion and waste management practices by all farmers should be vigorously promoted by the

County and municipalities in close cooperation with the Freehold Soil Conservation District in order to minimize non-point source pollution. Periodic conservation audits by the Freehold Soil Conservation District (FSCD) and the U.S. Soil Conservation Service (SCS), which provides technical support to the District, would identify key problem areas and help the responsible agencies and farmers to develop plans and priorities.

The County and municipalities should work closely with the FSCD, SCS, and U.S. Agricultural Stabilization and Conservation Service and should propose modifications in the programs of these agencies or new programs, as needed, through an ongoing dialogue with the agencies.

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