PLANNING AND MANAGEMENT OF THE NEW JERSEY PINELANDS

GOVERNOR'S PINELANDS REVIEW COMMITTEE

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of the

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prepared by

Governor's Pinelands Review Committee

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PREFACE

This report is intended to provide the Governor of New Jersey with background, analysis, and recommendations necessary to realize the general goal of preservation and protection of the New Jersey Pinelands.

The Governor's Pinelands Review Committee was assembled to reflect, to the degree possible, a wide spectrum of interests and geographic locations in order to provide the ingredients for healthy, constructive debate that can result through bringing together varying points of view. The work relies primarily on the voluminous amounts of information prepared and collected by others. The Committee believes that it has produced a creative packaging of both known materials and fresh viewpoints so as to respond to the Governor's charge in a manner that is responsible and reasonably sensitive to the region's varied interests.

The Committee is not so naive as to think it has developed all of the answers. In fact, we are concerned that all of the questions may not have been articulated. However, we do believe that a great deal of progress has been accomplished to initiate a credible and workable response to the issue of the future of the New Jersey Pinelands.

It is in this spirit that the Governor's Pinelands Review Committee presents the results of more than a year of deliberations to Governor Brendan T. Byrne and the citizens of New Jersey, thereby beginning the task of constructing the necessary framework to make preservation and protection of the Pinelands a reality.

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INTRODUCTION

December 17, 1976, marked Governor Brendan T. Byrne's explicit commitment to the preservation of the New Jersey Pinelands. On this day, a conference was held in Princeton, New Jersey, to provide an opportunity for a frank and informal exchange of views, to review options, and to arrive at some conclusions to begin to assist those who will make decisions which will shape the future of the Pinelands.

The Governor set in motion a number of interim efforts which would serve to refocus the State government toward the primary goal of preserving the unique natural resources of this region. On May 28, 1977, Executive Order No. 56 was signed which initiated implementation of the interim steps referred to at the Princeton conference prior to more effective land use planning and legislation. The Order created a Pinelands Review Committee composed primarily of citizens representing varied interests and geographic places as well as three cabinet officers from the Departments of Agriculture, Community Affairs, and Environmental Protection. Among the charges given to the Committee in the Executive Order were the delineation of a Pinelands region and the development of a plan to guide State actions affecting that region.

Shortly thereafter, as a significant gesture of his commitment, Governor Byrne directed that $10 million be set aside from the 1974 Green Acres bond issue authorization and used expressly for the purchase of land in the Pinelands.

At approximately the same time that the Governor focused his Administration's position on the Pinelands, a series of efforts by members of the New Jersey Congressional delegation surfaced in the form of legislative proposals. The earliest proposal, H.R. 15826, sponsored by Representative Edwin B. Forsythe, District 6, authorized the purchase of certain critical Pinelands tracts by the Federal government. The bill was never acted on and became history along with the 94th Congress.

The next proposal, H.R. 6625, was introduced to the 95th Congress by Representative James J. Florio, District 1, in April 1977. The bill called for a novel Federal-State partnership that would oversee the management via a regional plan of a 970,000-acre Pinelands district within which a 50,000 acre ecological reserve would be acquired, bolstered by a $50 million authorization.

Following in October 1977, Representatives William J. Hughes, District 2, and Edwin B. Forsythe, District 6, introduced H.R. 9535 and H.R. 9539 which authorized a 50,000-acre wildlife refuge supported with a $35 million authorization. This proposal emphasized a Federal-local relationship for the same 970,000-acre area and did not require a regional plan.

In November 1977, Senators Case and Williams introduced S. 2306, designed to establish a national reserve system, citing the New Jersey Pinelands as a qualifying natural area for participation. Financing of the planning and acquisition would come from a 15 percent fund taken from the Federal Land and Water Conservation Fund. There is no predisposition regarding a State- or local-Federal partnership. The criteria are the powers to plan and enforce.

In July 1978, the House of Representatives passed the National Parks and Recreation Act of 1978 (H.R. 12536). Section 502 of this bill concerns the Pinelands. It authorizes the appropriation of $26 million to purchase lands of critical ecological importance; up to three million dollars of that authorization for the preparation of a comprehensive planning and management program for an area of approximately 1,000,000 acres. Differences centering around local representation were resolved by incorporating a formula of seven appointments made by the Governor, one each made by the governing body of the seven affected counties and one representative of the U.S. Secretary of the Interior just before passage. The President signed the bill on November 10, 1978.

While there were technical and philosophical differences among the many bills, they all agreed with the overall purpose of preserving and protecting the special ecological, scenic, and recreational resources of the Pinelands.

Public concern for the future of the Pinelands has been expressed in many ways over the years. Individuals (residents and nonresidents) and interested groups have expressed their points of view at public hearings, conferences, meetings, etc. Among the more notable expressions which have raised the public's consciousness is John McPhee's The Pine Barrens. In simple language, Mr. McPhee has captured the beauty and significance of this area. The last two or three years have witnessed a resurrection of widespread interest in the Pinelands. Countless newspaper articles, radio and television shows have appeared. Dozens of primarily environmental groups and clubs have formed the Pine Barrens Coalition which will attempt to focus a concentrated lobbying effort to achieve the preservation of the region.

Finally, in November 1977, the voters of Burlington County, New Jersey overwhelmingly passed a nonbinding referendum which authorizes the County Freeholders to incur $1 million of indebtedness for the purpose of acquiring conservation easements for unique and critical Pinelands areas. This is significant because the general public in a substantial portion of the area to be affected by any Pinelands preservation activities was willing to put up its tax money as confirmation of its concern for the region's future.

These examples are indicative of what appears to be widespread public support to save the Pinelands.

Review of Some Prior Efforts

To review all the prior studies of the Pinelands, many of which date back to before the turn of the century, is a Herculean task. Therefore, highlighting some of the more recent efforts will serve to illustrate the point that, aside from the fact that time has largely seemed

to pass by this region, there has been a history of much scientific and governmental awareness and interest.

The Pinelands Regional Planning Board was created under State law in 1960. It met regularly to discuss regional issues and problems and, in June 1962, received funds from the State to begin the planning program. In November 1963, a report, "The New Jersey Pinelands Region," was published and distributed. The work provided a framework for planning to be carried out over the next year or two. Almost two years, 18 technical reports, and countless meetings later, a final report, "The New Jersey Pinelands Region: Future Development Plan Alternatives," was submitted to the Regional Planning Board by its consultant. The report presented four growth futures for the region ranging from very low to very high intensity development. It was during this planning program that the much talked about "Jetport in the Pines" proposal was developed. The significance of this effort was not in its conclusions but in the fact that the area was being discussed and evaluated as a region.

Almost at the same time, the Academy of Natural Sciences of Philadelphia was in the midst of a major effort for the National Park Service. This work, headed by Jack McCormick, PhD, was published by the Academy in December 1967 in a report entitled, "A Study of Significance of the Pine Barrens of New Jersey." This effort detailed the constituent floral and faunal inhabitants of the area and presented the very important principle that these plants and animals are not here on their own but are part of a complex system of interdependencies that exists in a delicate and easily disturbed balance.

In December 1970, the New Jersey State Museum published the study under its own copyright in a report titled, "The Pine Barrens: A Preliminary Ecological Inventory." In doing this, an important work was no longer left to languish in the drawers of a few scientists, bureaucrats, and enthusiasts.

As a result of the 1967 work, an Advisory Committee of the Secretary of the Interior recommended that the National Park Service continue its work,resulting in a study of alternatives being initiated in September 1968. The National Park Service published and distributed a report, "Pine Barrens of New Jersey: Study Report," which summarized their 20-month effort and resulted in four alternative plans.

In December of that year, a Citizens Advisory Committee was appointed by the Freeholders of Ocean and Burlington Counties to provide liaison between the many interests of the region and the National Park Service and to act as a sounding board for the work. This Committee published a report in July 1970, recommending that a land use review commission be established by State law and outlining the provisions of that law, the identification of a district, and the endorsement of acquisition proposals suggested in the Park Service study.

In January 1972, then Governor William T. Cahill signed into law the Pinelands Environmental Council (N.J.S.A. 13:18 et seq.) which was substantially consistent with the recommendations of the Citizens Advisory Committee's July 1970 report. The Council produced a "Plan for the Pinelands" which was not well received by environmental groups nor the current Administration in Trenton. While its recommendations for conservation were compatible with preservation objectives, the criticism was largely directed toward its development recommendations which appeared to be inconsistent with the long term protection of the region's Pinelands environment.

It is significant to note that all of the above cited efforts concentrated their activities in a portion of the Pine Barrens known as the central Pinelands or the "Heart of the Pines." Little attention was being given to the southern Pine Barrens, principally south of the Mullica River. However, in January 1973, the New Jersey State Museum again published a report by Jack McCormick and Leslie Jones. The report, "The Pine Barrens: Vegetation Geography," focused on the total Pine Barrens -- approximately 1.2 million acres. The work, which involved photointerpretation of aerial photographs, was a great aid to planners and conservationists alike and helped to expand the public's understanding of the extent of the Pinelands.

In the winter of 1975, the U.S. Bureau of Outdoor Recreation released another report which was intended to define and examine an appropriate Federal role in preserving the Pinelands. This study, "New Jersey Pine Barrens: Concepts for Preservation," explored various options for State-Federal management and suggested what provisions might be appropriate for legislative proposals. Significantly, this effort included the consideration of the southern Pinelands as an inseparable part of the total and fostered the principle that the entire area, or a reasonable approximation, is needed to plan for the preservation and protection of the region.

The foregoing selectively traces current thinking and efforts toward the Pinelands. The unmistakable conclusion is that the objective of long term preservation continues to endure on a widely accepted basis and that the disagreements are focused on how that would be accomplished.

Private Property Rights vs. The Public Interest

The above history is culminating at a time when courts all over the nation are in the process of re-evaluating the sanctity of the individual vis-a-vis the public. The environmental movement of the 1970's has been the immediate cause of this rekindled debate between private rights and public rights. This is especially so since environmental protection has invariably meant using the use of the police power to increase the restrictions on a property owner's ability to use his land as he sees fit. These new restrictions have been challenged continuously as a deprivation of property without compensation (a taking), however, it appears that the judiciary is in the process of redefining the interests of the public in a parcel of property which has significant environmental features.

The parameters regarding the interpretation of the taking clause of the Fifth Amendment also discussed as the interface between private property rights and the public interest are best expressed by the opposing views of the precedent setting case of Pennsylvania Coal Company vs. Mahon (1922). Writing for the majority, Justice Holmes wrote:

> "If the regulation of privately owned land goes too far, it really amounts to a taking of property. We are in danger of forgetting that the public desire to improve conditions is not enough to warrant by-passing the constitutional way of paying for the change."

A very important minority statement written by Justice Brandeis said that:

> "Even relatively severe government restrictions on land use are not an unconstitutional taking of land, since the property would still remain in the hands of its owner. The government would merely be preventing the owner from conducting a land use which would interfere with the paramount rights of the public."

Consistent with Justice Brandeis' view is a rejection of the traditional notion of land ownership and the rights that go with it. A premium is placed on the social value of the land rather than viewing it as a commodity in the economic laissez-faire sense. This wider attitude presumes that land can no longer be considered simply as another factor of production to be bought cheaply and sold dearly. It is held to be a social resource which private individuals may own, use, and trade but is subject to restraints designed to protect localities and regions.

This notion is consistent with widening the base of participation in land use decisions so that all who are affected by the spill-over efforts would have a right to be heard.

Traditional attitudes on private property are most vigorously espoused under the premise that growth and community well-being are essentially synonymous. Growth means jobs which means a healthy community. Growth attracts more and new people which increases tax revenues, thereby easing the burden on the rest of the community.

Each of these points of view taken exclusively fails, since a community's health is a composite of its economic and environmental well-being. The issue then becomes in what proportions and under what conditions of authority are these seemingly opposing positions mixed to achieve an equitable balance.

The report that follows describes the predominant issues that must be harmonized in a manner that equitably melds these views. Such

an effort will work best when local prerogatives and private property interests are preserved while protecting the rights and interests of all those who would benefit or be harmed by decisions for which there is no accountability and which are too parochial.

SECTION I: THE RESOURCE BASE

I. A: THE VEGETATION OF THE PINELANDS

The Pinelands encompasses an area of approximately 2,000 square miles within the outer coastal plain of southern New Jersey. The region can be characterized by its relatively low relief and sandy soils. Most of the region receives an annual rainfall of between 46 and 48 inches that is well distributed throughout the year. Precise boundaries for the region are difficult to establish but have been related to the distribution of the soils and characteristic types of vegetation that are present (Buell and Cantlon, 1950). The relationship of vegetation to other components of the ecosystems present will be addressed throughout this section, as well as the relationship of the vegetation to both natural and humanly influenced disturbances.

The sandy soils of the Pinelands hold a large amount of water that is protected from evaporation by the overlying soil slowly draining towards the ocean through the flow of both surface and ground water. The future quality and quantity of water that is held in the underlying aquifers are related to the vegetation present and the degree that the region may be affected by changing land use patterns. Vegetation plays an important role in the hydrologic cycle, and its alteration may effect both the amount and quality of the surface and ground water of the region.

The Pinelands represents an area where 21 species of northern plants reach their southernmost limit and over 110 species of southern plants reach their northernmost limit. As such, it represents the last relatively undeveloped area in eastern North America where a combination of range overlaps occurs in such magnitude. Two plants, the sand myrtle and Pickering morning glory, are endemic to the Pines. The destruction of suitable habitats resulting from urbanization throughout the range of many of these plant species strongly underlines the need to establish the value of the Pinelands as a natural resource that should be protected (McCormick, 1970).

Many factors are involved in controlling the distribution of plant communities, such as soils, rainfall, topography, microclimate, and human impact. The distribution of plant communities within the Pinelands can be most directly related to topography, moisture, the influence of fire, and repeated cuttings. Of these factors, soil moisture plays the single most important role in controlling the distribution of plant communities. The individual moisture requirements of plant species directly influence the plant communities present.

Soil moisture relationships are clearly related to a large number of physical and biological factors that influence the distribution of plant communities. Soil moisture is a function of such factors as topography, soils, slope exposure, underlying geologic structure,climate, the

seasonal distribution of rainfall, and the water requirements of the vegetation present. The plant communities of the Pinelands may be examined in relationship to their response to a moisture gradient ranging from lowland, moist sites to upland, dry sites. While utilizing this approach as a general model, a number of other factors are also at work and influence the degree of control that this gradient exerts.

In lowland areas along streams, within swampy areas, bogs, and other places where soil moisture is not a limiting factor to plant growth, the vegetation can be classified into a number of lowland types, including:

(1) southern white cedar forests;
(2) maple-gum-magnolia forests or southern hardwood swamp forests;
(3) pitch pine lowland forests.

Although these plant communities play an important role in the Pinelands ecosystem, their distribution is limited. In contrast, where soil moisture is more limiting and the elevations higher, upland vegetation is widely distributed and occurs throughout the region. The upland vegetation can be further broken down into three major types: pine-oak forests; oak-pine forests, varying greatly in species composition and dominance; and a more localized dwarf pine-oak association that characterizes the Plains region (McCormick, 1970). The vegetative associations of lowland and upland areas are depicted on the map on page 3.

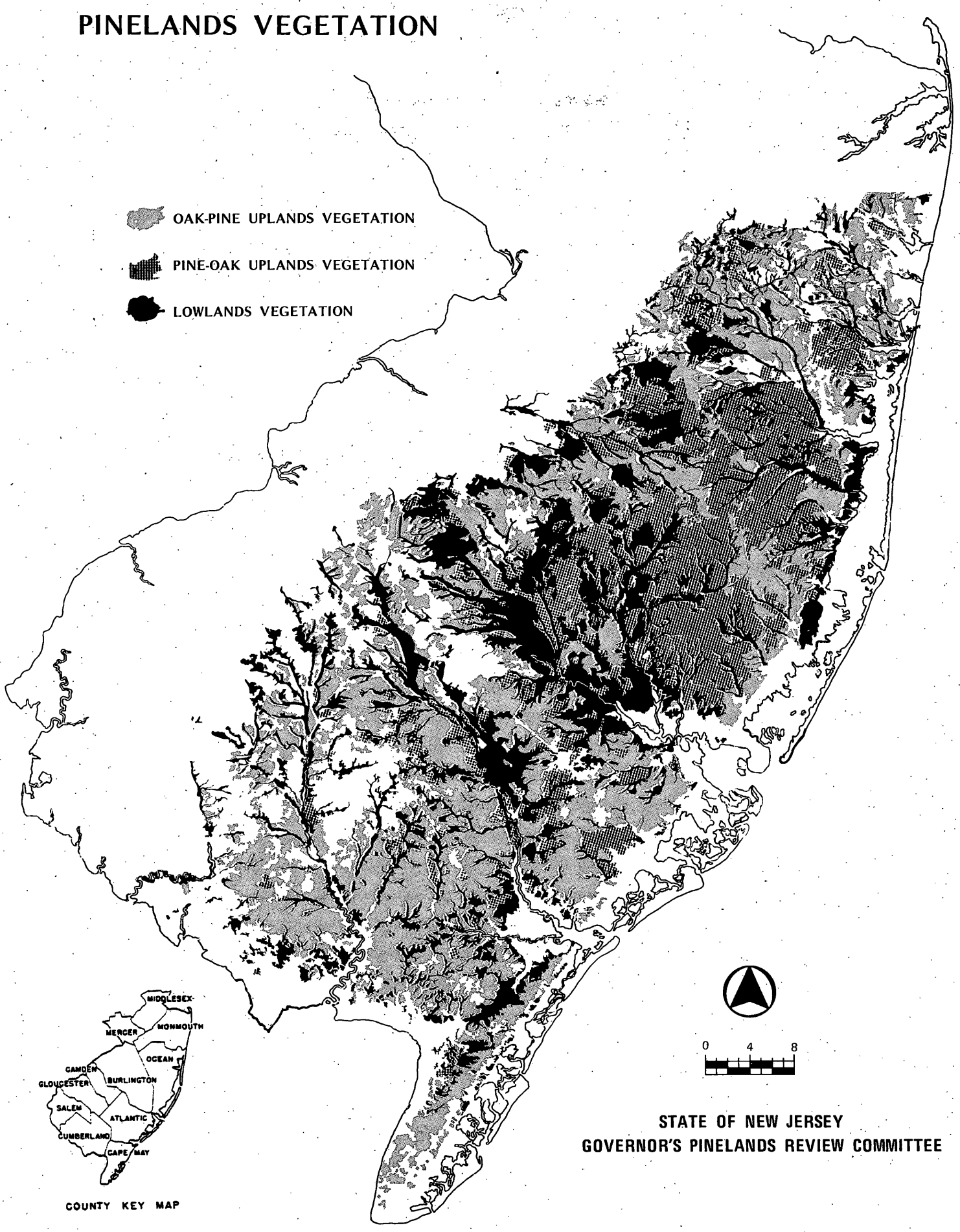
1. Lowland Plant Communities

Lowland areas within the Pinelands provide a number of distinct habitats that share many of the same physical and biological characteristics as well as similar plant communities. A distinction can be made between lowland areas in terms of moisture availability and drainage characteristics. Bogs represent one end of a moisture gradient where drainage is extremely poor, organic material is accumulating and is preserved due to the acidity of the water present, and fertility is low.

Bogs by their very nature are eventually destined to disappear unless influenced by natural or human alterations that force them back to an earlier successional state. As a consequence of the accumulation of organic materials, the length of time that a bog will remain an open water body is limited as it becomes progressively filled with organic matter and sediments. Although this process is slow in terms of a human life span, it must be recognized that this is a dynamic natural process. As a bog fills in, the plant communities present are subject to change as the moisture and other requirements of plant species are altered. Thus, a pattern of succession in the plant communities present in a bog can be recognized as the habitat becomes progressively drier (Robichaud and Buell, 1973).

The characteristic forest vegetation initially present in fresh water bogs within the Pinelands is dominated by southern white cedar. The cedars often occur in almost pure stands and form a forest canopy that is

PINELANDS VEGETATION



SOURCE: SEE BIBLIOGRAPHY

extremely dense. With the passage of time and if undisturbed by human activity or fire, deciduous tree species begin to invade the bog and ultimately result in a conversion of the plant community to a southern swamp hardwood forest, or what can also be described as a maple-gum-magnolia forest (McCormick, 1970; Robichaud and Buell, 1973).

The cedar bogs of the Pinelands have been greatly influenced both directly and indirectly by man. White cedar has been repeatedly cut for its use as a building material because of its resistance to moisture damage. Additionally, natural bogs have been reclaimed by man in order to convert them for use in the cultivation of cranberries, a major agricultural product of the region. Natural successional patterns and human activities have greatly reduced the presence of natural cedar bogs within the region from the colonial period until the present (Robichaud and Buell, 1973). In spite of this reduction, New Jersey has the largest stands of Atlantic white cedar in the East today.

White cedar forests are also found along stream and river flood plains and in swampy areas throughout the outer coastal plain of the Pinelands. These habitats provide the soil moisture conditions required by a number of plant communities that, if undisturbed, occupy these sites through a general successional pattern: fern communities; shrub communities; white cedar forests; and, ultimately, southern hardwood swamp forests dominated by three tree species -- red maple, black gum, and sweet bay magnolia. The transition of the white cedar forest to a deciduous swamp forest occurs through the gradual invasion of deciduous tree species favored by the inability of the white cedars to reproduce in the dense shade that they produce. White cedar forests are found along many streams throughout their length but are less common than the swamp hardwood forests. Although distinct examples of these plant associations can be found throughout the region, they often occur together, and the transition between one type and another may be difficult to accurately define (McCormick, 1970).

The understory layer of lowlands is composed of a variety of shrubs and woody vines, including black huckleberry, sheep laurel, dangleberry, and greenbriar. The herbaceous plants present include wintergreen, bracken fern, turkey beard, and several species of orchids as well as the rare curly grass fern. Among other mosses, sphagnum moss at one time grew in such large quantities it was harvested and sold to florists by local residents as a seasonal means of support.

The composition of plant communities in swamps and along flood plains has been greatly altered by human activity. Much of this vegetation has been cleared, swamps drained and filled, and the species composition altered through forest management practices. Destruction of the vegetation through competing land use activities results in permanent alterations of many sites. Conversion of swamps and flood plains to more intensive land use activities may result in significant changes in the hydrologic characteristics of a watershed. Changes in water quality may occur through a variety of pollutants introduced or associated with specific land uses.

Additionally, the quantity of water entering the ground or surface water may be altered as impervious surfaces are created and surface runoff increased. The effect of these changes may have significant impacts on the plant communities that are present as well as having impacts on other components of the ecosystems present in the region (Robichaud and Buell, 1973).

On drier sites at low elevation or in low depressions, a pitch pine lowland forest type occurs. Pitch pine is the predominant tree species present and forms a canopy 15 to 20 feet above the ground. A large variety of the understory shrubs are present, with sheep laurel the most characteristic of this plant association. Pitch pine lowland forests are transitional between the lowland and upland plant communities and contain many species that are found in both associations (McCormick, 1970).

2. Upland Plant Communities

The Pinelands has been characterized by the vegetation that is most apparent to the casual observer. Most of the region, excluding the lowland areas, is covered by a mixture of pines and oaks that varies greatly in its species composition from place to place. The uplands have a greater diversity of tree species in comparison to the lowlands but contain fewer species of shrubs, herbaceous plants, mosses, and lichens. The vegetation of the region has been greatly affected by two primary factors, fire and the cutting of timber. The role of fire in the environment is both a natural one, brought about through lightning strikes and other natural phenomena, and one that has become increasingly more important throughout the history of man's presence in the region. The periodic occurrence of fire over a long period of time has resulted in plant associations that are adapted to, and in turn dependent upon, it for their maintenance. Forestry has historically focused on the clearing of timber for charcoal production and, as a consequence, these techniques resulted in the occurrence of severe fires. The danger of fire remains a constant threat during periods of drought and in early spring prior to foliage and is further compounded by the increased development of the region (Robichaud and Buell, 1973).

As previously indicated, the upland vegetation can be classified into three major types: pine-oak dominated forests, oak-pine dominated forests, and the Pine Plains or dwarf pine community. The distribution of these plant communities and their composition are related to a number of factors,including soil variation, the availability of soil moisture, and the role of fire in their maintenance. Of these factors, fire clearly plays the dominant role and greatly influences the pattern of succession that would occur if it were not present.

Plant succession would result in the development of forests dominated by oaks if fire were excluded from upland sites in the Pinelands (Little, 1973; Robichaud and Buell, 1973). While pines are unable to reproduce when a dense accumulation of litter builds up on the forest floor, oaks, in contrast, are favored by this and are able to reproduce from seed.

Thus, if fire were excluded, succession would proceed with the transition from pine-dominated communities into oak-dominated communities. However, pines and oaks as well as the understory vegetation of shrubs and herbs that is normally present produce litter in the form of leaves, needles, twigs, and other forms of organic material that is highly flammable under the right set of conditions. The accumulation of this material provides the fuel that can be ignited by natural causes or by man.

Fire is a normal component of the Pinelands ecosystem, and the severity of the fires that will occur is a function of the length of time that it has been excluded from a particular site. This frequency can be directly related to the types of vegetation that are found throughout the region. Pines are well adapted to this environment because once they become established they are more resistant to fire damage than oaks of similar age. Pines and certain species of oaks are also capable of root sprouting after a particularly intense fire where the crowns of the trees have been destroyed. This ability gives them an advantage in re-establishing their dominance after a severe fire (Robichaud and Buell, 1973).

Approximately 50 percent of the upland sites in the Pinelands are occupied by pine-oak forests. Pines predominate and may comprise 80 percent of the canopy. Pitch pine is by far the most common pine species, with shortleaf pine frequently present (Robichaud and Buell, 1973). Oaks may make up from 10 to 20 percent of the trees present,with black oak the most common; a variety of other oak species may also be found, including scarlet, white, chestnut, or blackjack oak (McCormick, 1970). Pine-dominated forests are relatively open with a well developed shrub layer, with black huckleberry and lowbush blueberry being the most common. The maintenance of these forests in their present state is related directly to the frequency at which they are disturbed by fire. A cycle of approximately 20 years tends to halt the succession of these forests toward more oak-dominated types (Robichaud and Buell, 1973).

Where fire has been excluded or occurs infrequently, oak-pine forests are present on upland sites. These forests are dominated by oak species, including black, scarlet, white, chestnut, and post oak, although both pitch pine and shortleaf pine are also present to a lesser extent. In contrast to the more open canopy of the pine-oak forests, the oak-pine forest canopy is almost closed. The shrub and herb layers are,in general,composed of the same species as found under the pine-oak forests.

The role of fire in maintaining a large proportion of the forest cover of the region in an earlier successional state has been recognized as a potentially important forest management technique. From an economic point of view, pine-dominated forests are more valuable than oak-dominated forests because their yield of forest products is from three to four times as great (Little, 1973). Prescribed burning, the setting of controlled fires as a forest management practice during the winter months, has been utilized to maximize the productivity of pine stands by reducing seedling competition from oak species, creating a favorable environment for pine

reproduction, and reducing the occurrence of intense wild fires by eliminating the long term accumulation of forest litter. Prescribed burning as well as recurring wild fire may have a number of other impacts; changes in the population of animals in the region linked to an alteration in the abundance of favored plant species browsed or utilized as habitat; long term changes in the fertility and structure of the forest soils; and potential impacts on the agricultural activities of the region brought about through changes in insect pest populations and plant diseases associated with species whose relative abundance might be significantly altered (Buell and Cantlon, 1953).

The most dramatic impact of recurrent fire is evident in the Pinelands within the Wading River ecosystem, where it has led to the development of the biologically unique dwarf pine or pigmy pine forest of the Pine Plains. Periodic fire occurring within a 10 year period or less within this region has resulted in the creation of a forest composed of dwarf pitch pines, comprising approximately 78 percent of the canopy, and oaks that seldom reach a height above six feet. The extent and distribution of this plant community are dependent upon fire for maintenance, and the community's boundaries can only be specified by the description of the vegetation that is used and, in the long run, by the frequency and intensity of fire incidents that occur (McCormick and Buell, 1968). The upland and lowland plant communities account for over 100,000 acres of undeveloped forest in the nation's most densely populated state. This is truly a unique and remarkable phenomenon.

In conclusion, the vegetation of the Pinelands represents one component of the ecosystems that are present. Alteration of the vegetation will occur through both natural and man-induced mechanisms. The very nature of ecological systems dictates that these changes may have both short and long term impacts upon the structure and function of the ecosystems of the region. Although the scientific knowledge to control the natural trends in succession or maintenance of the Pinelands vegetation exists, the future of this system and the benefits that we obtain from it will still be directly affected by the alterations in land use that are permitted to occur. More intensive uses of the land will directly affect the distribution and composition of the forest vegetationtion and, in turn, may have significant impacts on water quality and supply, agricultural production, animal populations, and other linked effects that are more difficult to identify and evaluate.

I. B: GEOLOGY AND HYDROLOGY OF THE PINELANDS

The Pinelands is located on one of the country's major physiographic features -- the Atlantic Coastal Plain. This coastal plain extends along the Atlantic coast from Cape Cod to Florida and then stretches westward along the Gulf of Mexico to the southern tip of Texas. It is characterized by land forms of low relief; that is, the terrain is gently rolling, and there are no substantial rock outcrops, steep slopes, or

high mountain peaks. Geologically, the coastal plain is comprised of a wedge-shaped layer of unconsolidated sands, clays, and marls.

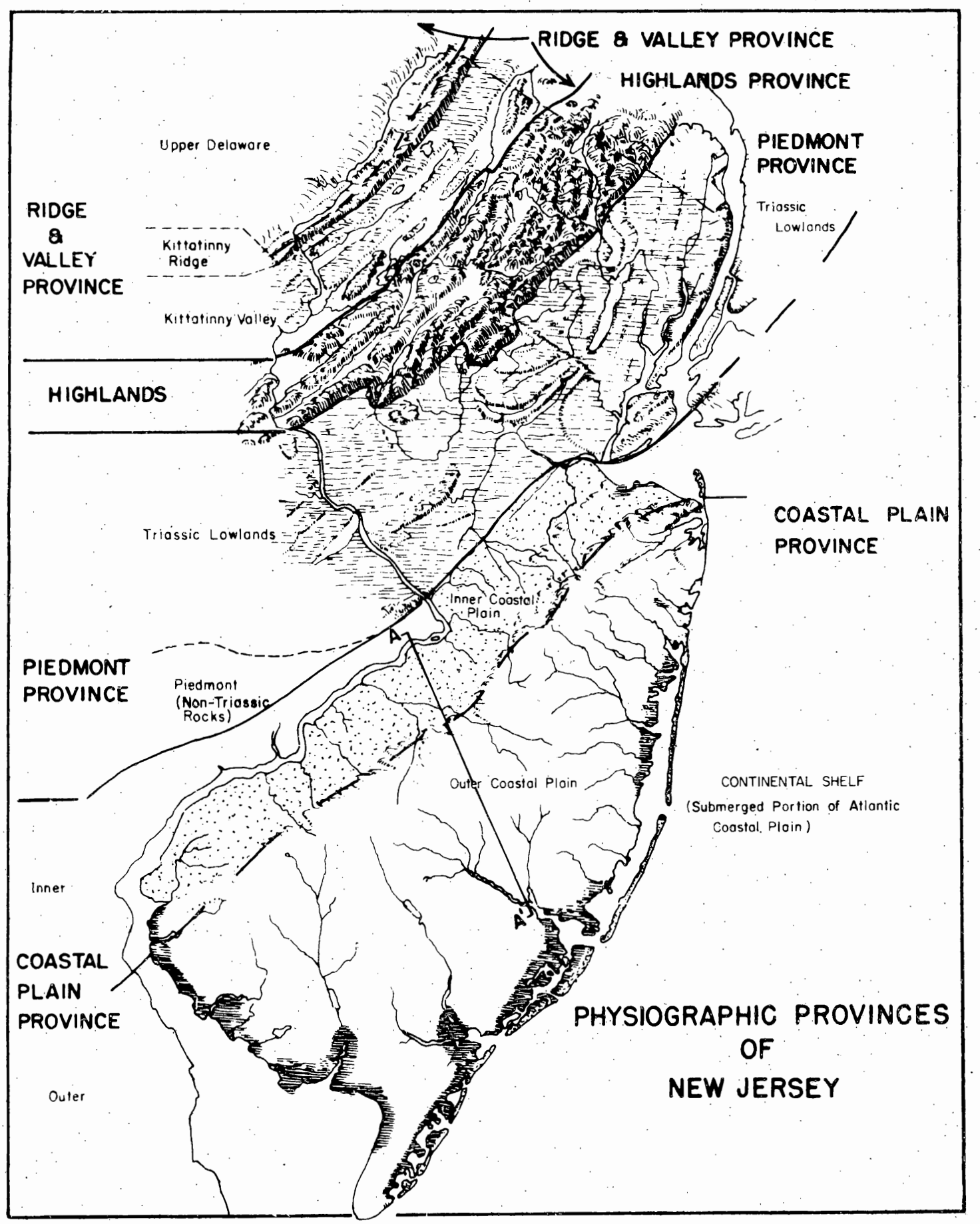
In New Jersey, the coastal plain is divided into two rather similar sections. The geologically older and narrower strip known as the inner coastal plain is separated from the outer coastal plain by a cuesta (a ridge of somewhat erosion-resistant sand and marl) which runs from the Atlantic Highlands in the northeast through Salem City in the southwest. (See map on page 9.) This cuesta roughly delineates the drainage divide between the Atlantic Ocean and the Delaware River. With the exception of the Rancocas Creek Drainage Basin, most streams which originate to the east of the cuesta flow to either the Atlantic Ocean or to Delaware Bay, while streams originating on the cuesta or west of it flow to the Delaware River or to Raritan Bay. The cuesta demarcates the self-contained and isolated hydrologic unit known as the outer coastal plain.

The sedimentary layers which comprise both the inner and outer coastal plains were created layer by layer over the last few million years, on a bedrock now several thousand feet below sea level, by alternating deposition and erosion by the sea and by streams and glacial outwash which is depicted in the diagram on page 10. The most recent and extensive of these formations are the Kirkwood and the Cohansey aquifers. The Cohansey formation, in particular, is closely associated with the vegetative patterns of the Pinelands and is well known for its tremendous potential as a potable water supply.

The Kirkwood formation is composed primarily of sand with some lignite and clay. In places, the clay forms thick lenses which serve to reduce the formation's permeability and create local artesian conditions. The Kirkwood is hydraulically connected to the Cohansey, and the formation may be as much as 180 feet thick near its outcrop area. Near the coast line, the Kirkwood is much thicker and is largely capped by clay which isolates it from the Cohansey, as shown in the accompanying diagram. This deep, confined formation is the most important water-bearing source for cities along the Monmouth County coast and for many barrier island communities and coastal towns in Atlantic and Cape May Counties. However, development of the Kirkwood as a potable water source is nearly at its maximum in many coastal areas,and severely lowered water depths and salt water intrusion are already problems for some communities.

The Cohansey formation overlays the Kirkwood throughout most of the "true" Pinelands area. It is somewhat lighter in color than the Kirkwood, is more predominantly a coarse sand, and dips seaward at about 9 to 10 feet per mile. It is the most recent of the major coastal formations and is overlain in places by a veneer of sand and gravel from four formations laid down during the four Pleistocene glacial periods.

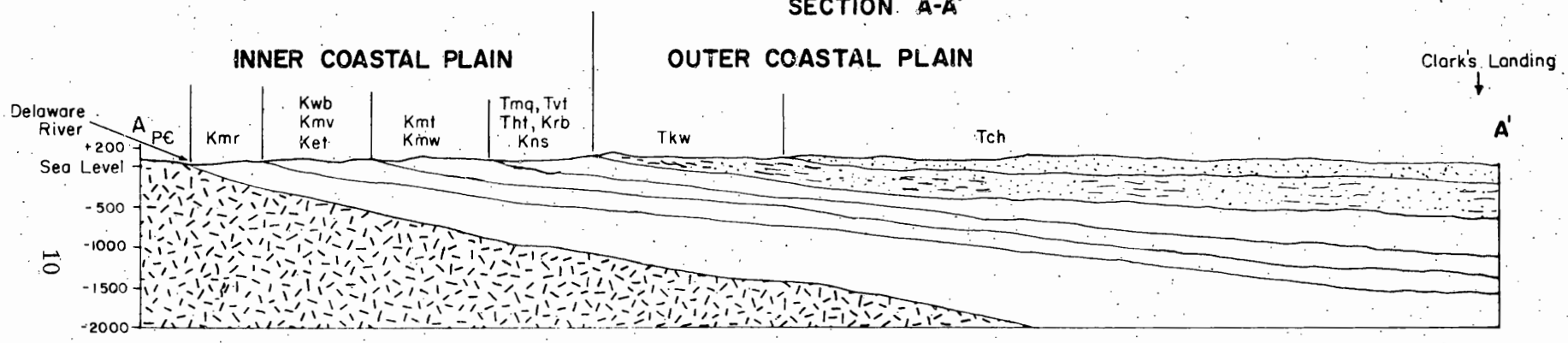
An abundant supply of ground water such as that beneath the outer coastal plain depends not only on adequate precipitation but on earth material of sufficient porosity to absorb and store significant quantities of water. It is the relative amount of clay and its bedding


RIDGE & VALLEY PROVINCE
HIGHLANDS PROVINCE
PIEDMONT PROVINCE
Triassic Lowlands
Upper Delaware
RIDGE & VALLEY PROVINCE
Kittatinny Ridge
Kittatinny Valley
HIGHLANDS
Triassic Lowlands
COASTAL PLAIN PROVINCE
Inner Coastal Plain
A
PIEDMONT PROVINCE
Piedmont (Non-Triassic Rocks)
Outer Coastal Plain
CONTINENTAL SHELF
(Submerged Portion of Atlantic Coastal Plain)
A'
Inner
COASTAL PLAIN PROVINCE
Outer
PHYSIOGRAPHIC PROVINCES OF NEW JERSEY

GEOLOGIC CROSS SECTION
OF
THE NEW JERSEY COASTAL PLAIN

NEW JERSEY GEOLOGICAL SURVEY 1977

SECTION A-A'



Horizontal Scale
Approximately 5 miles = 1 inch
4 2 0 4 Miles

Vertical exaggeration 15X

LEGEND

Tch	Cohansey Sand	Kns	Navesink Marl
Tkw	Kirkwood Sand	Kmw	Mount Laurel & Wenonah Sands
Tmq	Manasquan Marl	Kmt	Marshalltown Formation
Tvt	Vincentown Sand	Ket	Englishtown Sand
Tht	Hornerstown Marl	Kwb	Woodbury Clay
Krb	Red Bank Sand	Kmv	Merchantville Clay
		Kmr	Magothy & Raritan Formation
		Pε	Pre-Cambrian

Formation Contact

depth which determine the permeability of a formation. The Cohansey, because of its predominantly sandy nature, has very high porosity and permeability. The existence of pore space and bedding planes providing enough permeability to allow a relatively free movement of water from the storage area to springs and wells is also critical to render the supply useful. In unconsolidated sands and gravels such as are found in the Cohansey formation, the pore space capable of being filled with water averages 35 to 40 percent of the rock volume. Although it is not known with certainty, it has been estimated that the total amount of water in storage in the Cohansey aquifer system is in excess of 15 trillion gallons. The specific yield, or that quantity which can be freely drained from pore spaces, is about 20 percent of the rock volume, with the total usable water perhaps amounting to 10 trillion gallons. Currently, municipalities in Ocean, Atlantic, and Cape May Counties utilize the aquifer.

No significant quantities of water are brought into the coastal plain from outside areas by either surface or ground water. Precipitation falling on the coastal plain itself is thus the ultimate source of virtually all accessible water. The average annual precipitation over the Pinelands is about 45 to 48 inches.

The coarse sands and gravels overlying the Cohansey and Kirkwood formations permit easy infiltration and are quite permeable; therefore, little of the annual precipitation runs off overland or remains as standing water. The absorption capacity is estimated to range from two to five inches of precipitation per hour, rates that are rarely exceeded in local rainfall (Rhodehamel, 1971). Approximately half of the average annual precipitation is intercepted and evaporated to the atmosphere from undrained depressions, soil, and ground water. Plant transpiration accounts for the single largest source of water loss (Rhodehamel, 1971). The rate of recharge for the aquifer is estimated to be about 20 to 22.5 inches annually (Barksdale,1962; Rhodehamel, 1971). Some of this recharge enters a shallow local flow system in the Cohansey and the underlying upper sediments of the Kirkwood formation and discharges to surface streams at lower elevations. The Cohansey and upper strata of the Kirkwood are hydraulically linked and function as a single system in places, particularly Cumberland County. Elsewhere, some recharge to the deep Kirkwood aquifer may come from significant leakage of the overlying Cohansey. The linkage between the two aquifers is not entirely understood.

Ground water in the Pinelands has a low dissolved-solids content and is extremely acid (with a pH generally ranging from 4 to 6). This acidity contributes to the dissolution of iron from decaying vegetation and from soil and sediment minerals, which causes a high iron content in the water. This is also the cause of the typically clear, brown color of the Pinelands streams. Bog iron, which is common in the Pinelands, is the result of aeration and precipitation of the iron from the water when the water is exposed to the area through seepage. Once treated for acidity and the high iron concentrations, water from the Cohansey is suitable for most human uses.

The Cohansey aquifer is unconfined and thus subject to ground water table conditions in Atlantic, Ocean, and Cumberland Counties. Water table levels are extremely high, although generally more than two feet below the surface. Along the coast from Ocean County through Cape May County, the Cohansey contains saline water, as it does wherever there is a front between it and the ocean, bays, and streams or marshes with tidal influences. This makes safe development of a fresh water supply from the Cohansey along most of the coast impossible.

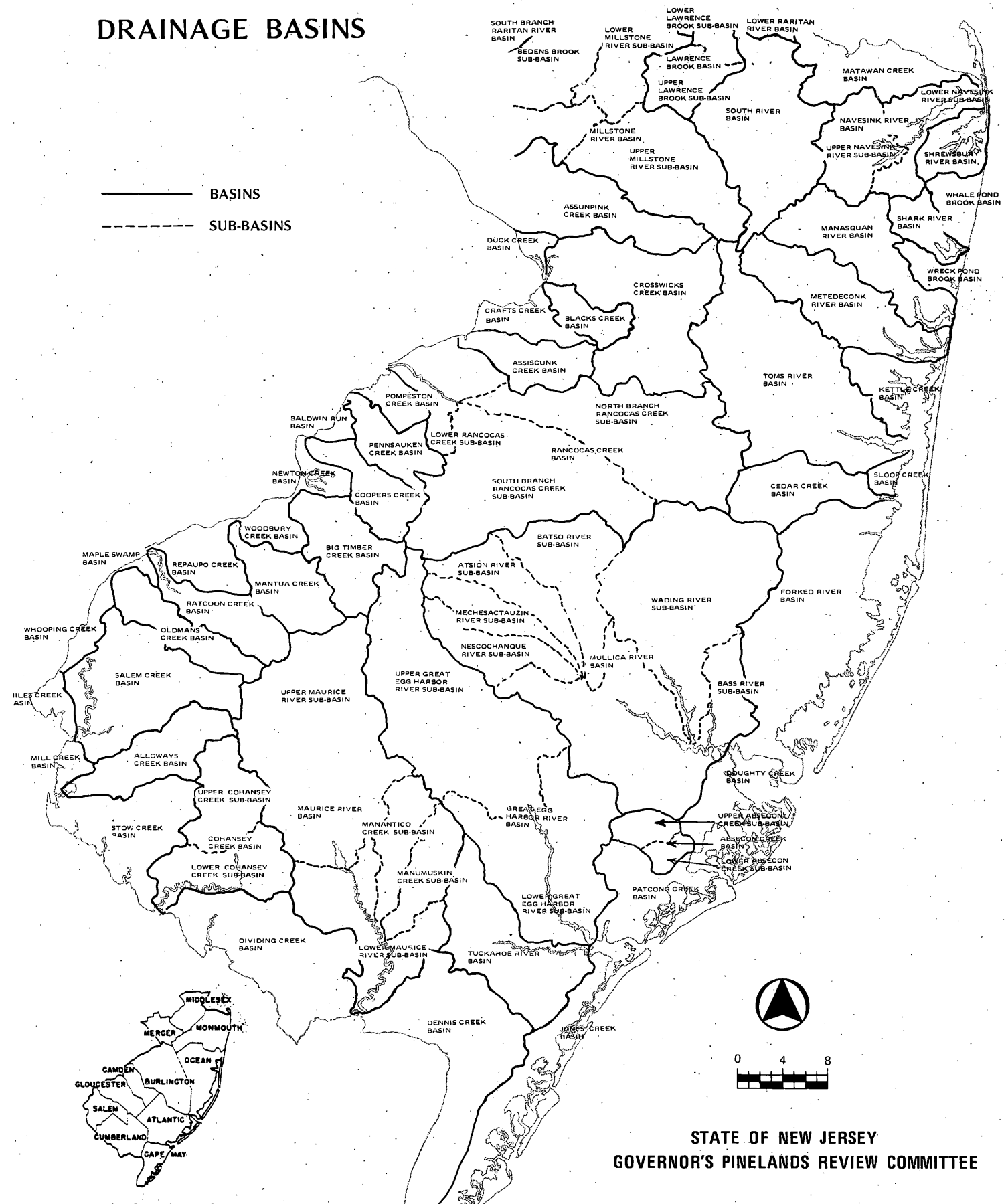
Streams in the Pinelands derive their water from two sources. That water obtained directly from overland flow is quite small, perhaps 2.5 inches a year. Base flow, or ground water runoff, contributes perhaps 20 inches per year. Because ground water discharge constitutes the vast majority of the total annual regional discharge, Pinelands streams have a very uniform flow throughout the year, and floods are infrequent. Upland streams in the Pinelands have low water yields, probably because ground water flowing through the regional system bypasses these small, local streams and discharges into lower lying distant rivers. Because most of the region's surface water ultimately derives from ground water, they are similar in quality except for generally lower iron concentration in streams, the iron being more readily removed by aeration and precipitation. (See page 13 for a map showing drainage basins.)

Pinelands water resources are particularly sensitive to pollution and contamination due to the shallow water table and the inability of the permeable soils and substrata to effectively filter out wastes by normally operative natural means. Because the Cohansey lacks significant amounts of clay or well-developed clay horizons, it thus has a low phosphorus fixing ability as well. Effluents are thus leached (passed down) directly into the ground water and, once within the system, pollutants and contaminants readily travel throughout the ground water reservoir. The quality and quantity of the Pinelands water resource are also closely tied to the vegetative patterns of the Pinelands. Any significant change in water table height, for instance, would probably be reflected in changed vegetative cover on the land surface, and, conversely, an alteration of vegetation patterns could be expected to have an impact on water quality and quantity.

I. C: HISTORICAL SETTING OF THE PINELANDS

Many people hold the misconception that the Pinelands is a barren and useless place; however, this is not borne out by the history of this area. The Pinelands has had a part in the history of New Jersey and the nation for almost 300 years. The bog iron industry, charcoal industry, and glass and textile industries have developed, flourished, and declined within the Pinelands. The factors responsible for the development of the Pinelands included stage coach lines, seaports, and the railroads. There is also a history of the misuse of the region in the lack of natural resource conservation and the leveling of the forests.

DRAINAGE BASINS



SOURCE: SEE BIBLIOGRAPHY

STATE OF NEW JERSEY
GOVERNOR'S PINELANDS REVIEW COMMITTEE

The founder of the Society of Friends, George Fox, traveled over much of New Jersey in 1671-2 and, upon his return to England, brought to William Penn's attention the great forests, the fertility of the land, and the access to the area by water. Settlement then began, and Burlington County was officially established on January 21, 1709. The Ocean County area had been divided by a deed of July 1, 1676, and Surveyor General Keith ran his famed line from Egg Harbor to the Delaware in 1687 to establish the formal divisions.

Settlers slowly broke their way through the wilderness to take their place throughout the two provinces along the rivers of the Pinelands. It is reported that Eric Mullica migrated from Swedesboro to Green Bank in 1625, and the river by which he lived was given his name. People were moving east from the Delaware. As early as 1727, Robert Eves was operating a mill near what is now Medford, and, thus, Evesham Township got its name. It is reported that Daniel Leeds in 1704 settled in the original township of Hanover. In 1693, William Budd owned considerable land in the vicinity of Pemberton Borough, and development went on there; but progress was slow, and settlers were isolated.

While bog iron had been discovered near Shrewsbury and an iron works built there about 1675, no progress was to occur in the Pinelands until Charles Read began acquiring land along Rancocas Creek and the Mullica River in 1751. About 1766, he and several associates built Taunton Furnace, Etna Furnace (now Medford Lakes), Batsto Furnace on Batsto Creek, and Atsion Forge in the southeastern part of Washington Township. This chain of plants was in full operation by 1768. A furnace produced pig iron from bog ore, charcoal, and flux (usually clam and oyster shells); and a forge took the plain pig iron, reheated it, and hammered it into many forms.

When the American Revolution came, Batsto Furnace supplied hundreds of cannon balls to the Colonial forces. Peaceful uses were also served; the grounds in back of Independence Hall were surrounded by a fence made by this furnace. Extensive as were Read's enterprises, he was not alone. At least 10 other furnaces were built between 1789 and 1795 throughout the Pinelands region.

Production on this scale increased the need for transportation. Tuckerton linked Philadelphia with the seacoast -- the main routes ran through Atsion, Quaker Bridge, Washington, McCartyville, Batsto, and Pleasant Mills. It should be noted as well that Tuckerton was the third officially established port of entry in the United States.

The flourishing bog iron industry, however, was to face serious competition. In 1840, a better grade of iron ore was discovered in Pennsylvania, free from sulphur and near large deposits of coal and limestone. In addition, improved methods of smelting were being developed, and, from 1846 to 1854, the conditions grew so critical that the bog iron industry in the Pinelands disappeared. The charcoal which formed a basic part of iron production became a product in itself. The woods of pine

were still there, so it followed that charcoal burning became a major industry between 1830 and 1850. At one time, all the charcoal needed by the Philadelphia Mint was hauled from the Pinelands. New York City also made heavy demands for charcoal. A fleet of 60 small schooners embarked regularly from Toms River to New York during the peak period. Mules were used to pull cars full of charcoal from Manchester (now Lakehurst) to the wharf at Toms River. During the 1850's, the charcoal and wood industry had expanded so that an advertisement appeared in the Emblem of Toms River that Edward W. Ivans would hire 1,000 woodchoppers. People in cities preferred coal to charcoal, however, and, by the mid-1850's, the competition from Pennsylvania with her major iron deposits and coal was too much.

Despite the decline of the basic iron and charcoal business, the resourcefulness of the people of the Pinelands region did not diminish. Around 1845, John Webb made a success of his first venture in cranberry agriculture, and the ship chandlers of Philadelphia vied with each other for the limited supply. It was found that cranberries were an excellent antidote for scurvy, and many ships carried barrels of the berries for the crew on long voyages. The cultivation of cranberries became popular after the Civil War, and a land boom was created. Swampland became valuable, and land sold for $100 per acre. Cranberries today are a very important crop harvested from the region and are valued at many thousands of dollars.

As industry began to decline, the construction of railroads began. The Tuckerton Railroad was constructed from Whiting, the seat of the charcoal industry, to Tuckerton. In 1854, the Raritan and Delaware Bay Railroad was initiated to carry passengers from New York to Atlantic City by a connecting link at Atco. The same line was also running trains to Camden in 1862.

One of the most auspicious Pinelands developments was at Harrisville, about eight miles northwest of New Gretna. William McCarty together with four associates incorporated and built the largest paper mill in New Jersey in 1835. There was plenty of water, necessary for paper manufacturing, and the raw material for pulp was the abundant salt marsh grass nearby. The mill was about 300 feet long, built of Jersey stone, and, together with numerous outbuildings, presented an industrial complex beyond comparison for the time. The plant could produce nearly a ton of paper a day. Successful years followed, but the competition of other mills with better access to railroads and using newer methods captured the markets; in the late 1880's, operations ceased. Harrisville was swept by a great fire in 1910, and the entire town and much of the adjoining woodland were destroyed. The walls of the factory ruins can be seen as one drives southeast from Chatsworth.

Atsion, which has been mentioned before as the site of one of Charles Read's ventures in iron in 1766, entered into a new phase. Samuel Richards bought the works in 1823 and built a stone mansion. In 1870, Maurice Raleigh constructed a 3-1/2-story stone cotton mill at this

location. With the rapid development of textile mills in New England, the Atsion mill closed down.

Glass manufacturing was also developed in the Pinelands. The Atlantic Glass Works was operated between 1851 and 1866. This plant was on the Mullica River about 2-1/2 miles below Batsto. Druggist wares, chemical apparatus, and bottles were made. There were two flint glass plants operating at Green Bank between 1840 and 1850.

As the industrial activity in the Pinelands region slowly faded, Joseph Wharton, a public spirited industrialist of Philadelphia, purchased the original Batsto Estate in 1876. His manager, General Elias Wright, gathered additional adjoining parcels of land for him until approximately 96,000 acres had been accumulated. Wharton's plan was to pipe water to Philadelphia as a new source of supply for that city, but the New Jersey Legislature intervened, and the project was abandoned. The State of New Jersey attempted unsuccessfully to acquire Wharton's acreage at the time of his death in 1909. Realizing the water supply to be a future problem, the State acquired the entire tract on September 29, 1955. The main house, store, and gristmill have all been rehabilitated and now provide a tourist attraction. The complete Wharton Tract actually covers 2.5 percent of the total land area of New Jersey.

The Pinelands represents a resource of unique national historical significance. It is the last area on the northeastern seaboard where industrial and domestic sites (generally abandoned around 1850) remain undisturbed over such an extensive area. The preservation of these places is important to our understanding of early American technology and culture in general and to the unique rural lifestyle of the Pinelands in particular. (This history is a summary from "The New Jersey Pinelands Region," compiled by the Pinelands Regional Planning Board in November 1963.)

I. D: LAND ACTIVITIES AND TRENDS

The Pinelands is composed of a variety of land uses ranging from concentrations of residential development to extensive holdings of publicly owned land. This section presents a description of the predominant land uses in the Pinelands and their implications.

1. Agriculture and Forestry

Two types of agriculture are practical within the Pinelands and include conventional or upland agriculture and wetlands cranberry and blueberry cultivation. The same factors that limit conventional agriculture within the area are responsible for the extensive cultivation of cranberries and blueberries which are both indigenous to the Pinelands -- the presence of sandy, acid soils coupled with availability of large amounts of pure, acidic water.

The Pinelands is composed of non-prime soils, and, therefore, conventional tillage is limited. Agricultural activity is largely restricted to cranberry-blueberry cultivation within the interior of the Pinelands. Truck farming occurs along the western boundary of the Pinelands, extending from southern Monmouth County through central Burlington, Camden, Gloucester, and Salem Counties and near Hammonton in Atlantic County and Vineland in Cumberland County. There were approximately 280,000 acres of farmland in the Pinelands in 1974 (New Jersey Department of Agriculture, "New Jersey Pinelands," 1977).

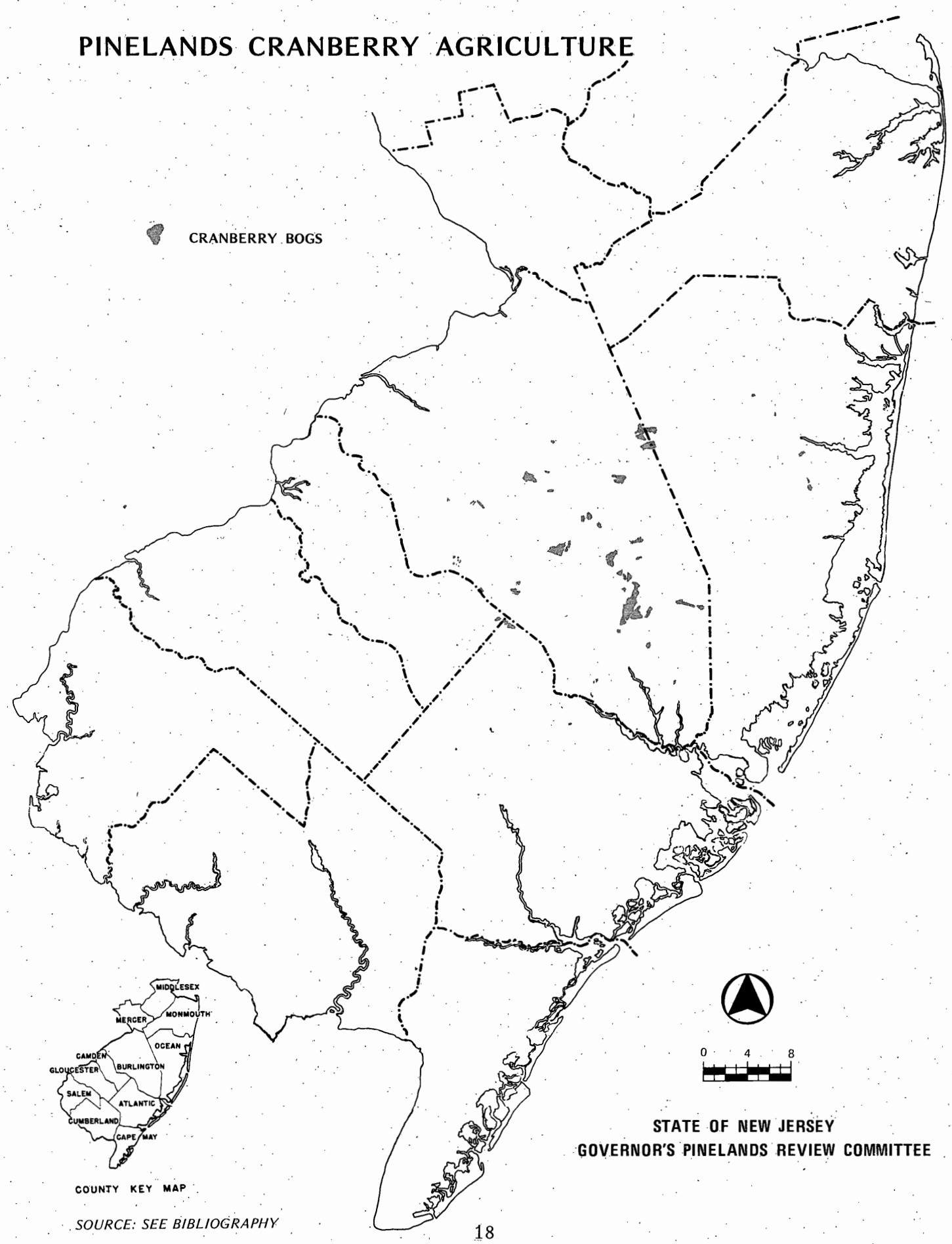
Agriculture is currently the major industry of the Pinelands (residential construction aside), with a $105 million market value of agricultural products and a value of $397 million for land, equipment, and buildings (1974 data). New Jersey ranked third in the nation in cranberry production in 1977, with 3,000 acres harvested (New Jersey Department of Agriculture, "New Jersey Agriculture Statistics," 1978). The value of the 1977 harvest totalled $2.8 million, and the value per acre harvested was $932. The State's cranberry bogs are primarily located in Burlington and Ocean Counties. Specifically, the bogs are concentrated in southeastern Burlington County in the vicinity of Chatsworth, extending to Tabernacle to the northwest and to Sim Place to the southeast. (See page 18 for a map of areas under cranberry cultivation.) Cranberry cultivation is concentrated in specific areas because of water needs -- a system of reservoirs and canals is required to alternately drain and flood the bogs.

New Jersey ranked first in the nation in blueberry production in 1977,with 7,700 acres harvested ("New Jersey Agricultural Statistics," 1978). The value of the 1977 harvest totalled $13.5 million, a record; and the value per acre harvested was $1,755. The State's blueberry production is concentrated in the Pinelands of Atlantic and Burlington Counties. A generalization of the location of major blueberry production areas is not possible because it is more widely dispersed than cranberry production, as blueberry cultivation is not restricted to bogs. The cultivation of blueberries requires the maintenance of the water table at a constant depth of two feet below ground level through a system of ditches and dams. Blueberry production has historically been scattered in small fields throughout the Pinelands; however, the recent trend in blueberry cultivation is to concentrate production in larger fields to facilitate mechanization.

The berry industry is economically valuable to the Pinelands. With the decline by the turn of this century in the lumber, bog iron, and glassmaking industries, the berry industry is the most extensive and profitable industry now active in the Pinelands (residential construction aside). Other economic characteristics of the berry industry are that it is not a labor intensive form of land use, relying on migrant (seasonal) labor, and it is a tax-paying land use.

In addition to its economic value, the berry industry is an ecologically compatible use in the Pinelands in that it must protect the ground water for its own survival. For example, to assure that the needed

PINELANDS CRANBERRY AGRICULTURE



SOURCE: SEE BIBLIOGRAPHY

amounts of high quality water will be available for cranberry production, growers acquire large tracts of surrounding uncultivated lands to provide watershed protection at a ratio of one cultivated acre to between four and ten support acres. The continued presence of the berry industry in the Pinelands assures the preservation of some amount of watershed lands, and, conversely, the continued presence of watershed lands within the Pinelands helps to assure the preservation of the berry industry. It should be noted that water quality degradation resulting from berry production (pollution from fertilizers) is minimal when compared to conventional tillage, which requires greater quantities of fertilizers, pesticides, and machinery, or other types of land development. Cranberries require even less fertilizer and pesticide than blueberries, but no water quality degradation has ever been reported from either crop in the Pinelands.

The berry industry, in addition to being economically and ecologically desirable, represents an aesthetic resource of incalculable value. The cultivation of berries contributes to the appeal of the Pinelands -- acres of berries amid stands of white cedar and clear-flowing streams -- and serves to preserve open space. The berry industry has become such an integral element of the natural landscape that visitors to the area have come to expect to see acres of cranberries and blueberries.

To ensure the continued viability of the berry industry, the Pinelands must be protected from incompatible development. Within the Pinelands area, the number of farms (not restricted to berry growing) has decreased from 6,000 in 1964 to 4,000 in 1974, and the acreage under cultivation within the same time period has decreased from 626,000 to 526,000 (New Jersey Department of Agriculture, "New Jersey Pinelands," 1977). The cranberry industry has been particularly susceptible to the loss of farm land. Since 1940, the number of acres devoted to cranberry production has declined from 11,000 to 3,000. Many cranberry bogs have been dredged, dammed, and deepened and now serve as the centers of lake communities. As development pressures continue to increase, the resultant loss of essential watersheds and crop lands will adversely effect the berry industry. While the total number of acres in cranberry cultivation has decreased, the berry industry has been able to offset the loss in acres cultivated by increasing the yield per acre. Record cranberry and blueberry harvests were achieved in 1976 because advanced technology and more intensive use of the land increased the yield per acre.

In addition to the loss of farm land to development, farmers in the Pinelands must now cope with ever increasing numbers of tourists to the area. Increased interest in the Pinelands has spurred increased visitation to the area. Unlike past visitors, the visitor of today appears to have less regard for the ecology and private property of the Pinelands. He litters waterways and tramples valuable bogs and cultivated fields. Even vandalism has increased. In addition, today's visitor often explores the Pinelands in a rough terrain vehicle, and the use of these vehicles can interfere with the ecology of the Pinelands as well as the cultivated land of the farmer.

The Pinelands contains 1.02 million acres of forest land of which 97 percent is classified as commercial forest and 3 percent classified as noncommercial forest land (New Jersey Department of Environmental Protection, "New Jersey Pinelands: Forestry Report," 1978). The majority of commercial forest land is comprised of upland pine and oak (75 percent of total). Ocean County with 247,000 acres, Burlington County with 227,000 acres, and Atlantic County with 197,000 acres contain the greatest areas of forest land within the Pinelands.

At present, the Pinelands region yields only a fraction of what could be grown and harvested if the area was placed under adequate forest management. Estimated production for 1977, which includes lumber, pulpwood, and firewood, was 84,000 cords (a cord is defined as 128 cubic feet of wood arranged in a pile 8 feet long, 4 feet high, and 4 feet wide), or 1 cord for each 10 acres of the Pinelands region. This low figure reflects the results of repeated destructive forest fires combined with unregulated cuttings over a long period of time. Wood products from the Pinelands are generally processed locally, although some of the harvest furnishes raw material to industries in northern New Jersey and other states.

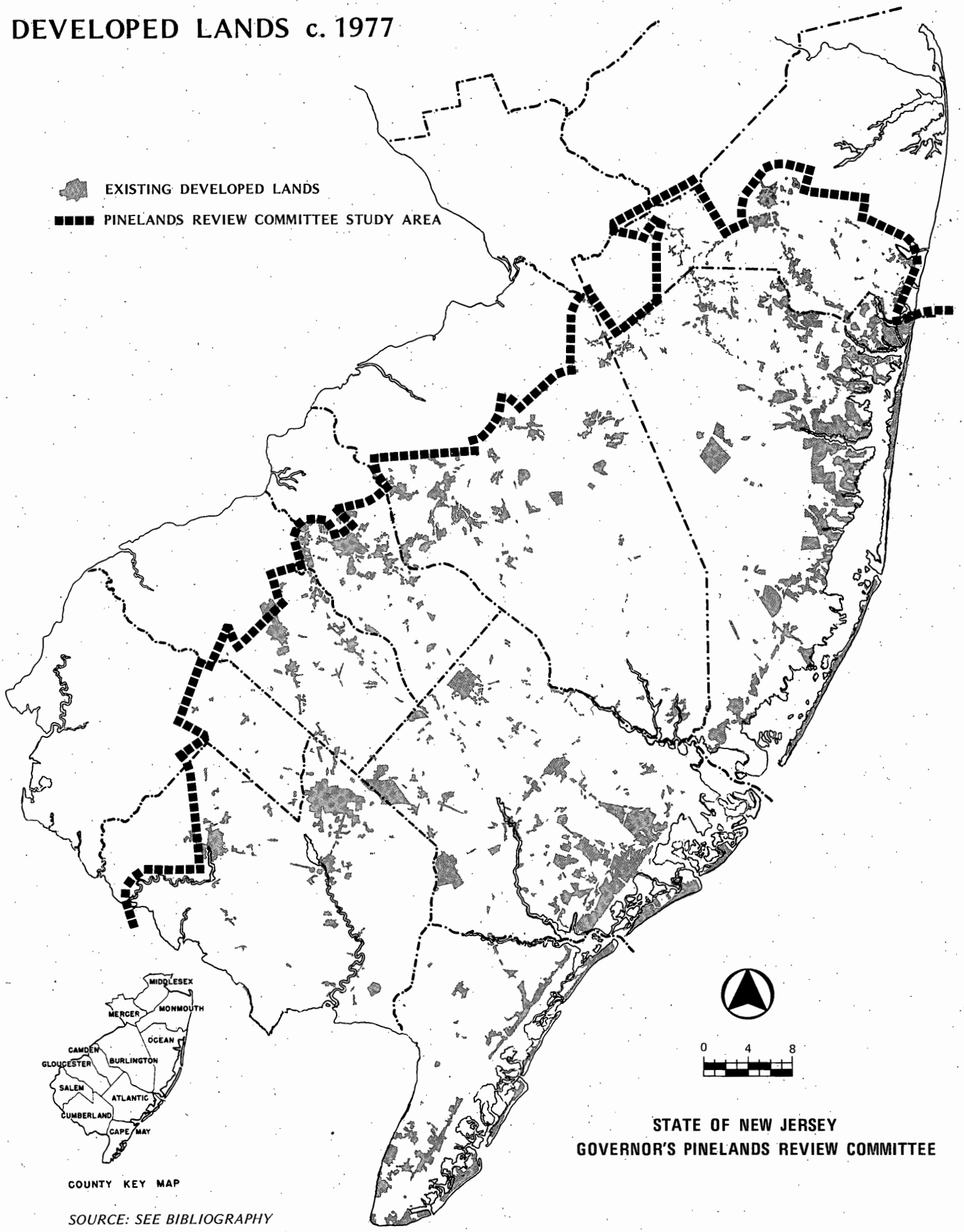
Under proper forest management, unproductive areas of the Pinelands could be brought into production, and the yields per acre of those areas presently producing could be increased. It is estimated that a total volume of about 573,000 cords of pine and 60,000 cords of white cedar could be grown annually in the Pinelands under better management practices. This would mean an annual stumpage value to landowners of $3.6 million instead of the present $504,000.

2. Development

Due to the large size of the Pinelands, patterns of development within the area vary greatly. On the east, the barrier beach communities, extending from Point Pleasant to Cape May, are almost completely developed. Extending inland from the Garden State Parkway, development generally decreases farther from the ocean. Along the western fringe of the Pinelands, development intensifies, particularly east of Camden. (See page 21 for a map of developed lands.)

The explanation for the pattern of development of the Pinelands may be generalized as follows: On the west, as the Philadelphia-Camden metropolitan area expanded, growth spread outward to the east along Route 30 to Berlin and to points north and south of this line; on the east, the completion of the Garden State Parkway spurred development along the coast to the extent that today, from Point Pleasant to Cape May, land lying east of the Parkway is almost completely committed to development while land lying to the west is largely undeveloped. The result of these development patterns is that the center of the Pinelands which contains the most significant ecological features remains largely undeveloped. Ocean County has experienced the most rapid development of any of the other counties located within the Pinelands largely due to the development of retirement communities. Development pressures are not restricted to

DEVELOPED LANDS c. 1977



SOURCE: SEE BIBLIOGRAPHY

Ocean County, however. A review of the municipalities within and bordering the Pinelands reveals that 17 municipalities located in six different counties are expected to experience rapid development within the next few years. An examination of the development pressures occurring within these counties follows.

Within Ocean County, the townships of Jackson, Lacey, Manchester, and Stafford are expected to grow rapidly. Jackson Township is expected to grow because of the advent of public sewers and the completion of Interstate 195. Growth in Lacey Township may be further stimulated by the proximity to the Garden State Parkway and Barnegat Bay. Manchester Township has become a center of retirement living in Ocean County. The influx of senior citizens to the township is encouraged because it has reduced the tax rate. Stafford Township is endowed with abundant open land and proximity to the Garden State Parkway and Long Beach Island.

OCEAN COUNTY-SELECTED MUNICIPAL PROJECTIONS

Municipality	Population Estimate July 1976*	Population Projections Year 2000**
Jackson	24,200	34,000 - 38,000
Lacey	12,100	31,000 - 35,000
Manchester	15,600	24,000 - 27,000
Stafford	7,300	19,000 - 22,000

*N.J. Department of Labor and Industry, "Population Estimates for New Jersey," July 1976.

**Greenberg and Neuman, New Jersey Toward the Year 2000: Population Projections, 1977.

Within Monmouth County, the townships of Millstone, Freehold, Howell, and Wall are expected to grow rapidly. Each municipality has access to a major highway (Interstate 195, the Garden State Parkway, or the New Jersey Turnpike) to speed commuting to employment centers, a good deal of vacant land, and access to the South Monmouth Regional Sewer Authority.

MONMOUTH COUNTY-SELECTED MUNICIPAL PROJECTIONS

Municipality	Population Estimate July 1976*	Population Projections Year 2000**
Freehold	17,800	31,000 - 38,000
Howell	28,000	37,000 - 45,000
Millstone	2,900	20,000 - 24,000
Wall	18,500	31,000 - 38,000

*N.J. Department of Labor and Industry, "Population Estimates for New Jersey," July 1976.

**Greenberg and Neuman, New Jersey Toward the Year 2000: Population Projections," 1977.

Two townships in Atlantic County anticipating growth are Galloway and Egg Harbor. Both of these municipalities are just west of Atlantic City and are expected to be impacted by casino gambling and offshore oil drilling. Greater development could be expected to occur in Galloway Township than in Egg Harbor Township because of the availability of sewers. Population projections for these two municipalities are not included because the present populations of each township -- 10,500 for Galloway Township and 14,500 for Egg Harbor Township -- have already equaled the Year 2000 projection.

Washington Township in Gloucester County is expected to grow due to the availability of sewers, a 15-minute commute to Philadelphia, and a good deal of vacant land. The population projections for Washington Township are not listed because the present population of 21,800 equals the population anticipated for the Year 2000.

Three townships anticipating rapid growth in Camden County are Gloucester, Voorhees, and Winslow. Gloucester and Voorhees Townships have sewers and proximity to the PATCO high-speed rail line to Philadelphia. Winslow Township has already experienced rapid growth in recent years primarily due to a Levitt development.

CAMDEN COUNTY-SELECTED MUNICIPAL PROJECTIONS

Municipality	Population Estimate July 1976*	Population Projections Year 2000**
Gloucester	37,800	48,000 - 49,000
Voorhees	11,500	28,000 - 29,000
Winslow	17,500	60,000 - 61,000

*N.J. Department of Labor and Industry, "Population Estimates for New Jersey," July 1976.

**Greenberg and Neuman, New Jersey Toward the Year 2000: Population Projections, 1977.

In Burlington County, Evesham, Pemberton, and North Hanover Townships are expected to grow rapidly. A building moratorium was recently lifted in Evesham Township, imposed when intense development spilled over from neighboring Cherry Hill. Evesham Township is the site of the largest Planned Unit Development (PUD) in the State and is only 20 minutes away from Philadelphia on Route 73. Pemberton Township is expected to experience rapid growth because of the availability of sewers and a good deal of vacant land. North Hanover Township has vacant land and proximity to the New Jersey Turnpike to spur development.

BURLINGTON COUNTY-SELECTED MUNICIPAL PROJECTIONS

Municipality	Population Estimate July 1976*	Population Projections Year 2000**
Evesham	18,400	23,000 - 24,000
North Hanover	9,700	17,000 - 18,000
Pemberton	26,500	35,000 - 38,000

*N.J. Department of Labor and Industry, "Population Estimates for New Jersey," July 1976.

**Greenberg and Neuman, New Jersey Toward the Year 2000: Population Projections, 1977.

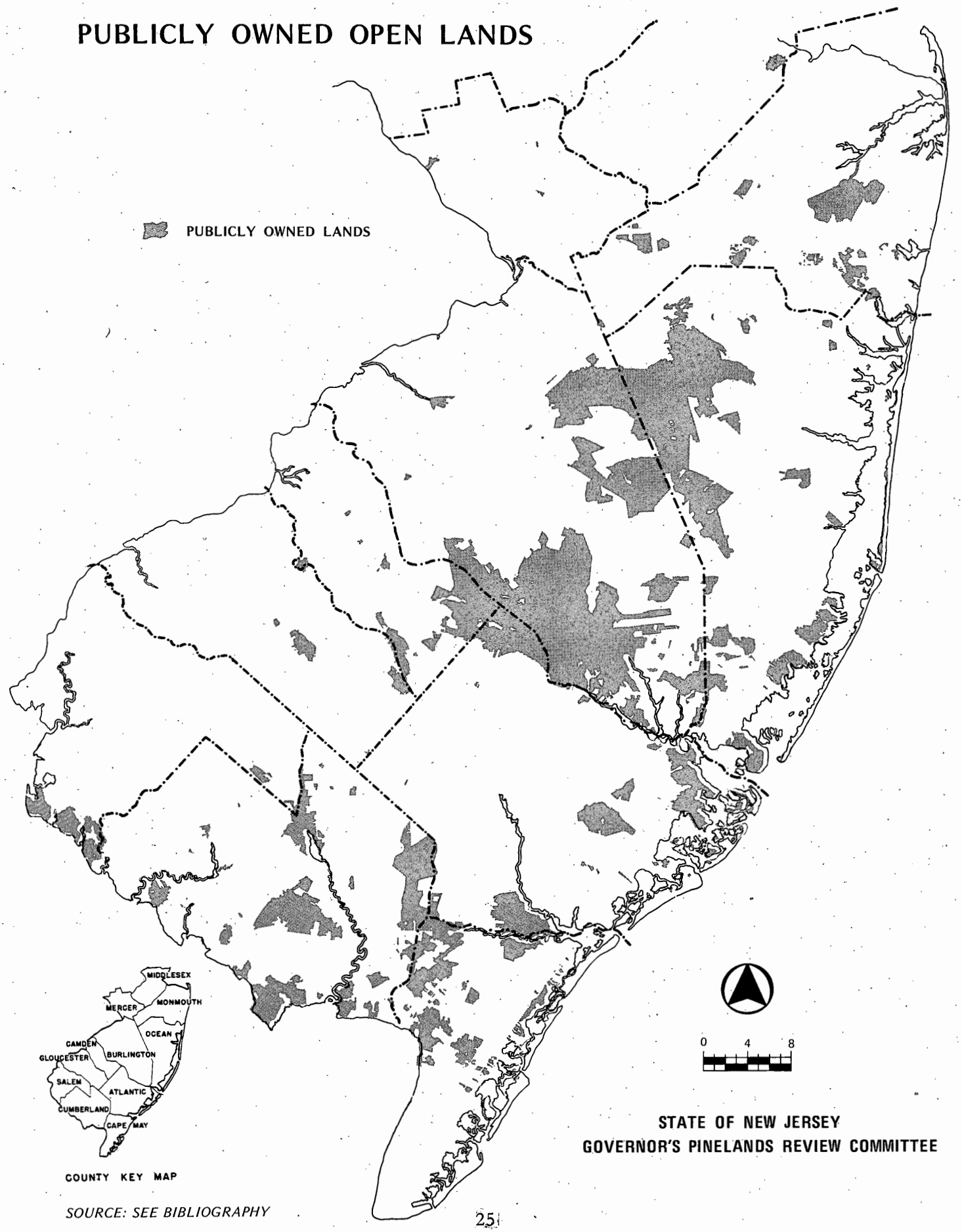
In summation, future development is anticipated within a portion of all counties comprising the area,with the exceptions of Cape May, Cumberland, and Salem Counties. At present, these counties are too remote from population and development centers to cause significant building pressures. An examination of development pressures within those counties anticipating growth reveals that proximity to high-speed transportation and employment centers and the availability of sewers are the major development catalysts. As development continues to encroach upon the fringes of the Pinelands, owners of vacant land and farm land will be induced to sell to builders when faced with speculative profits or spiraling taxes. Already large tracts within the Pinelands are being held by individual ownerships for speculative purposes, awaiting the day when sale or development is more opportune.

3. Recreation

There are approximately 315,000 acres of publicly owned land devoted to recreational use within the Pinelands study area, of which 290,000 acres are administered by the State and 25,000 acres administered by the Federal government. A total of 230,000 publicly owned acres is contained in a Pinelands district discussed later in this report. See page 25 for a map of publicly owned land. (N.J. Department of Community Affairs, "State Owned Real Property in New Jersey," 1978.) This land has been acquired to preserve the natural habitat as well as to provide recreational activities.

The Division of Fish, Game, and Shellfisheries in the Department of Environmental Protection administers 36 wildlife management areas (WMA's), totalling 125,000 acres. These WMA's are generally concentrated in two portions of the Pinelands: one portion parallels Route 539, extending from Assunpink Creek in Mercer County in the north to Little Egg Harbor in Ocean County in the south; the other, in the southern portion of the Pinelands, extends from Great Egg Harbor in Atlantic County west to the Cohansey River in Cumberland County. The wildlife habitats vary from coastal marshes to upland fields. Public use of WMA's is generally restricted to fishing, hunting, and hiking. Such recreational activities as horseback riding, swimming, camping, and picnicking are permitted only in designated areas.

PUBLICLY OWNED OPEN LANDS



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SOURCE: SEE BIBLIOGRAPHY

The Division of Parks and Forestry in the Department of Environmental Protection administers eight parks, totalling 14,000 acres. These parks are generally located along the eastern fringe of the Pinelands, extending from Monmouth County to Cape May County. The range of habitat varies from the sand dunes of coastal parks to the woodlands of inland parks. Depending upon the particular site, permitted recreational activities are swimming, camping, fishing, hiking, and picnicking.

The Division of Parks and Forestry also administers five forests, totalling 153,000 acres. These forests are concentrated within the center of the Pinelands (the area surrounding Chatsworth in Ocean and Burlington Counties) and are dedicated to forest research, timber production, and recreation. Depending upon the particular site, permitted public activities include swimming, camping, fishing, hiking, horseback riding, hunting, and picnicking.

The Federal government, through the Department of the Interior, administers 25,000 acres dedicated to wildlife management, which offer restricted recreational opportunities (N.J. Department of Community Affairs, "Federally Owned Real Property in New Jersey," 1978). This land is located north of Atlantic City and is comprised of two wildlife refuges that front the bay and/or the ocean. The refuges have been created to preserve the natural habitat, which ranges from coastal marsh to upland woods, for the management and protection of waterfowl along the Atlantic Flyway. Recreational activity is restricted to the observation of waterfowl from specified trails.

With growing public awareness of the Pinelands as well as the increase in private recreational costs, visitation pressures can be expected to increase. (Attendance figures for all State recreation facilities located within the Pinelands can be found in the Regional Influences section of this report under the State-Owned Lands topic). People drive through the area not only to visit the Pinelands but also as a side trip on their way to the shore. As the number of visitors to the Pinelands increases and development occurs closer to public recreation areas, the incidence of any or all of the following may increase: forest fires (accidental and deliberate); pollution of streams; dumping of trash and general littering; vandalism of facilities and the environment; illegal use of land (parties, etc.); illegal hunting; and illegal wood cutting.

4. Rights-of-Way

Within the Pinelands area, the following rights-of-way (ROW's) exist: pipeline (gas and oil); communication (Bell System); electric; and transportation (rail lines and roads). Generally, these ROW's are concentrated in the following populated regions on the borders of the Pinelands: Lakewood-Toms River in the northeast; Tuckerton-Pleasantville-Atlantic City in the southeast; Millville-Vineland-Bridgeton in the southwest; and Berlin-Camden in the west.

Most rights-of-way run in a north-south direction along the eastern and western fringes of the Pinelands. A limited number of ROW's run in an east-west direction through the Pinelands. Of these, only

two actually penetrate the heart of the Pinelands (that area generally between Wharton and Lebanon State Forests). An active rail line runs from Vineland through Winslow, Atsion, and Chatsworth to Lakewood. A New Jersey Central Power and Light electric transmission line ROW will run west from the Oyster Creek Nuclear Generating Station to north of Chatsworth, intersecting a Public Service Electric and Gas line near the Waterford-Medford Township line, and continuing west to the New Freedom Substation, about five miles beyond Chesilhurst in Camden County. (See page 28 for a map of major utility rights-of-way.)

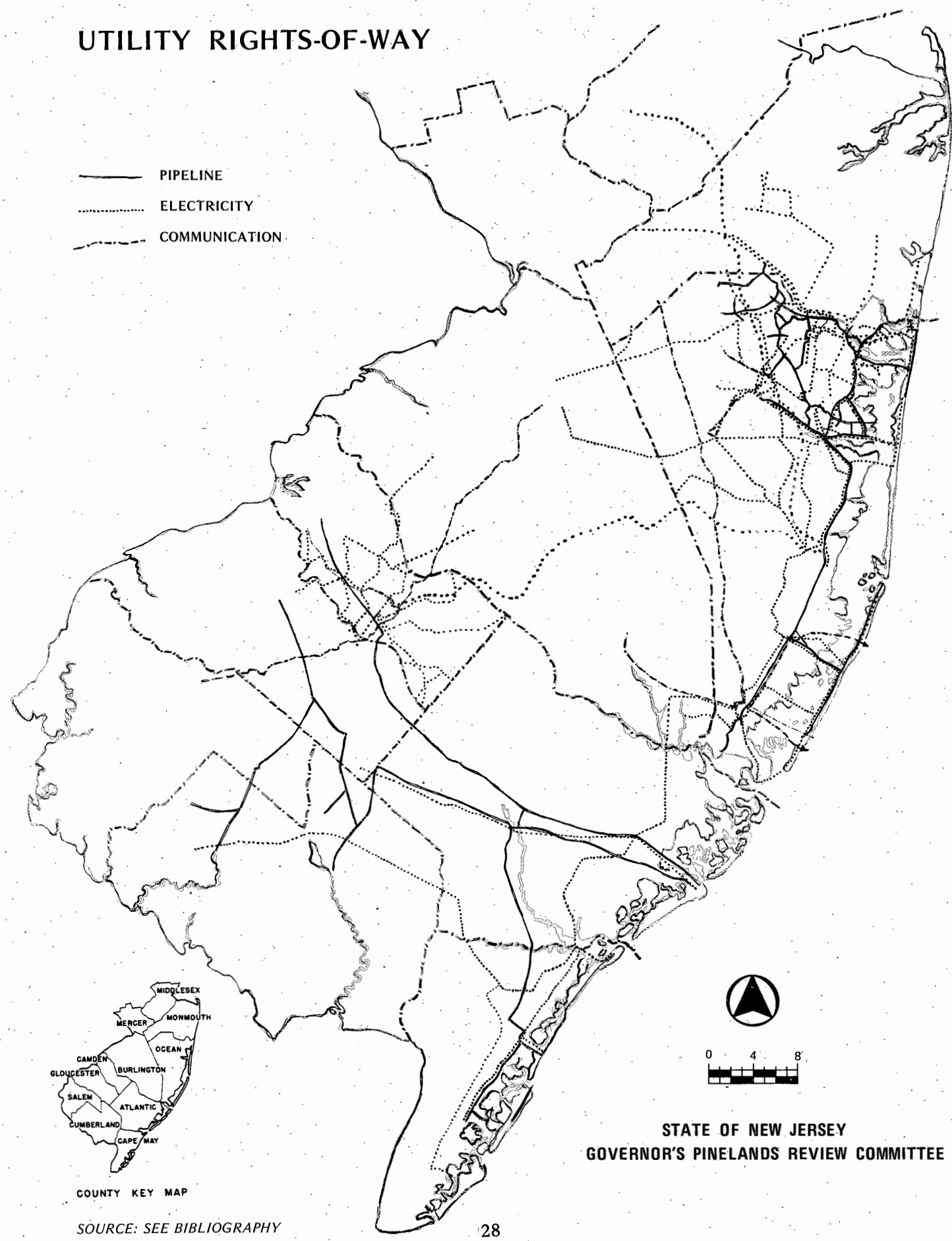
Two abandoned rail ROW's that traverse the Pinelands in an east-west direction merit mention because of potential future use. One line running from Pemberton to South Toms River could be used as a hiking, biking, and bridle way, connecting the Toms River area with Lebanon State Forest. The other runs from Winslow to Atlantic City, paralleling an active rail line and Route 30. This ROW could be considered for use, with the proper safeguards, to transport anticipated petroleum from off-shore wells near Atlantic City to storage-refining complexes along the Delaware River.

An extensive network of roads, ranging from expressway toll roads to unimproved secondary roads, crosses the Pinelands, providing a high degree of access to and through the area. The increased interest in the Pinelands over the past few years has attracted many people to the area, with consequences previously mentioned in the Agriculture and Recreation parts of this section of the report. Any improvements in the existing road system (such as the planned completion of Interstate 195 and the dualization of State Routes 70 and 72) will further increase accessibility to the area.

5. Resource Extraction Industries

Sand and gravel mining is the primary extraction industry located within the Pinelands. This industry is practiced because the resources are available and the operations are financially profitable. The sand and gravel industry may be classified into the following activities: borrow pits; sand and gravel pits; and industrial sand pits (Shea, 1978). In a borrow pit, dirt and sand are removed for use as fill material (e.g., roads, lot leveling, etc.). The extracted sand is hauled to a plant for processing since there is no processing equipment located in a borrow pit. With a sand and gravel pit, the extracted materials are washed and separated by processing equipment located at the pit. Materials extracted from these pits are used as construction aggregate. In industrial sand pits, the extracted sand is washed by nearby processing equipment. Industrial sand is used by foundries as a filler to make metals, as an ingredient in glass making, and in the abrasive, chemical, pottery, porcelain, tile, and metallurgical industries. Another extractive industry practiced within the Pinelands, although on a small scale, is the mining of ilmenite. Ilmenite is a mineral, an oxide of iron and titanium, used as a pigment in paints. Two ilmenite plants are located near Lakehurst.

UTILITY RIGHTS-OF-WAY



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SOURCE: SEE BIBLIOGRAPHY

The extraction of sand and gravel is a highly destructive form of land use which in the absence of renewal practices results in a scarred, denuded landscape, unsuitable for most land uses and susceptible to erosion. Excavation operations may create surface and ground water quality and supply problems; they may create problems in the future use of the sites themselves or adjacent areas; they may create erosion and subsequent siltation of surface streams; and they may create the destruction of large areas of vegetation and wildlife habitat.

Within the Pinelands, the sand and gravel industry is concentrated in Ocean and Cumberland Counties. There were 7,800 acres of sand and gravel extraction operations in Ocean County in 1977 (Shea, 1978). Extraction operations in the county primarily involve the mining of industrial sand, with a 4,000-acre-plus industrial sand pit in operation near Route 70 in Lakehurst. Cumberland County had 7,100 acres of sand and gravel extraction operations in 1977,which were primarily located in the eastern half of the county in Vineland, Millville, Maurice River, Commercial, and Downe Townships. Sand and gravel extraction operations in Cumberland County include the mining of industrial sand, which is a basic material to the county's glass industry, and the mining of sand and gravel, which is used as a construction aggregate by the construction industry of southern New Jersey and eastern Pennsylvania. In addition to the aforementioned county acreage totals, there may be a substantial amount of land in both counties which is being held by mine operators or industrial users as sites for the future expansion of their mining operations.

Prospective sand and (to a lesser extent) gravel sites exist almost everywhere within the Pinelands region. Since this industry is beneficial to the region's economy and the demand for these resources is expected to grow in the future, careful coordination between industry advocates and Pinelands conservationists is necessary to protect the industry and allow for practical removal while protecting the environment and adjacent land uses.

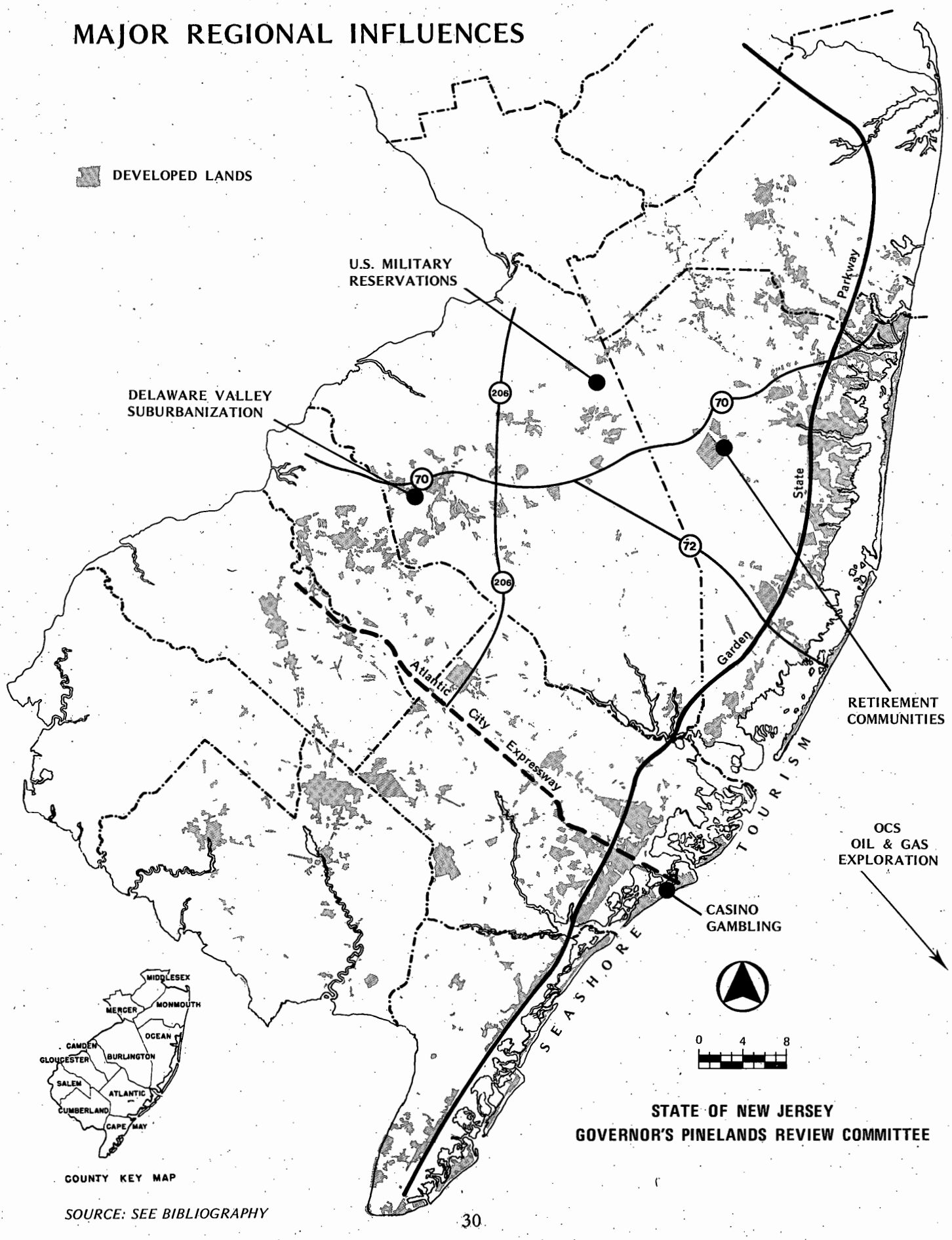
I. E: REGIONAL INFLUENCES

There are a number of factors which help shape the character of a region. This section reviews the major regional influences which act as stimulants and constraints to the growth and development of the Pinelands. The map on page 30 depicts major regional influences.

1. Retirement Communities

Within the past 20 years, the State's housing market has witnessed the birth and rapid growth of retirement (or adult) communities -- planned residential housing developments whose intended occupants are "retirement-aged" persons. These developments generally have minimum age requirements and prohibit schoolage children. Since 52 is the common minimum age requirement and many homeowners work, "retirement" is a misleading term. The State's shore areas of Monmouth, Ocean, Atlantic, and Cape May Counties have long served as retirement havens

MAJOR REGIONAL INFLUENCES



STATE OF NEW JERSEY
GOVERNOR'S PINELANDS REVIEW COMMITTEE

SOURCE: SEE BIBLIOGRAPHY

for older citizens who have been attracted by the mild climate (tempered by proximity to the ocean), numerous recreational opportunities, and summer homes which could be converted to year-round use. (The N.J. Department of Community Affairs report, "Housing Concerns Significant to the CAFRA Region," 1976, is the source of all factual information found in this section.)

In recent years, retirement communities have been constructed inland from the shore, in or near the Pinelands. The reasons for locating these developments inland are the availability of relatively inexpensive land, an increasing market (given a major boost by the urban disorders of the late 1960's), relatively unrestricted building conditions, low and stable tax rates due to the absence of school children, and an insufficient amount of adequate housing units to meet the demand for retirement living in other areas. Ocean County has become the center of retirement community development for New Jersey, containing more than 50 percent of all retirement units in the State. A significant portion of the total in-migration that has made Ocean County the fastest growing county in the State over the past decade has been the "senior" citizen. As of 1976, about 30,000 senior citizens were living in retirement communities in Ocean County, half of which arrived after 1970.

Within Ocean County, the areas that have experienced the largest growth of retirement communities are Lakewood, Berkeley, and Manchester Townships. Municipalities generally welcome retirement villages because of the tax revenue advantages they represent -- good ratables while avoiding school taxes. For example, in Manchester Township, the influx of senior citizens has reduced the tax rate from $4.40/$100 in 1962 to $1.53/$100 in 1976. Many, if not most, retirement communities provide for their own needs such as sewers, roads, and water. Some municipalities have encouraged retirement communities by allocating special zones which allow their development at higher densities. The influx of elderly people into Ocean County has caused a demographic shift in the county's population with a resulting overburdening of the region's hospital facilities and medical services.

The construction of retirement communities has continued unabated during the past few years, with an estimated 30,000 units currently planned for construction. To indicate the magnitude of retirement community development, the following table lists retirement communities that contain more than 100 units that are located in or near the Pinelands. The name of the retirement community, the location by municipality, and the number of registered units -- which may not be the actual number of units built or sold -- are listed for each retirement community.

Retirement communities have become the predominant form of construction within the Pinelands area, although they are generally concentrated in Ocean County. Construction can be expected to continue in the future because the market for planned adult communities is strong. People will demand conveniences to follow, and older citizens deserve the opportunity to have a dignified lifestyle in their later years. A possible restriction on future retirement community development may occur as a

REGISTERED* RETIREMENT COMMUNITIES
LOCATED IN THE PINELANDS STUDY AREA

Name	Location	Number of Registered Units
Cedar Glen Lakes	Manchester Township	277
Country Place	Lakewood Township	376
Crestwood Village	Manchester Township	4,624
Elm Towne Village	Winslow Township	135
Fawn Lakes	Stafford Township	206
Gardens of Pleasant Plains	Dover Township	432
Holiday City at Berkeley	Berkeley Township	4,883
Holiday City-Carefree	Berkeley Township	1,606
Lionshead	Brick Township	360
Leisure Knoll	Manchester Township	1,835
Leisure Towne	Southampton Township	1,571
Leisure Village	Lakewood Township	3,812
Leisure Village West	Manchester Township	1,117
Mystic Shores	Little Egg Harbor Township	232
Pleasant Gardens South	Jackson Township	148
Silver Ridge Park	Berkeley Township	586
Silver Ridge Park West	Berkeley Township	553
The Villages	Howell Township	671
U.S. at Greenbriar	Brick Township	1,994
Wemrock Farms	Freehold Township	145
Winding River	Brick Township	255
	Total	25,818

*Excludes units built or for sale prior to January 1, 1970.

Source: Department of Community Affairs, Retirement Communities Section, 1979.

result of the Woodland Township court decision which reviewed the legality of zoning for retirement communities which set minimum age requirements (Shepard vs. Woodland Township, 1976). In this case, the New Jersey Supreme Court recognized a need for specialized housing for the elderly which transcends economic status and results from the particular physical and social problems of the elderly. The Court held that a local regulation which authorizes the development of planned housing for the elderly is within the purview of the local zoning power. However, the Court also stated that the provision of housing for the elderly may not be used for improper exclusionary purposes and, consequently, housing for the elderly should be "assessed against the background of general land use regulation by the municipality."

The cumulative impacts of retirement community development are of concern because of their effects on resource conservation and land use within the Pinelands. As the highway transportation network improves and development pressures increase, more of the environmentally sensitive Pinelands region may be slated for leapfrog type development, as has already occurred with Crestwood Village in Ocean County, among others. This type of development (leapfrog), in addition to being wasteful of the land and its resources, results in relatively higher municipal, State, and Federal expenditures for sewers, roads, and emergency services. Municipalities in their efforts to attract new tax ratables often overlook these cumulative impacts of retirement community development.

2. State-Owned Lands

The State owns approximately 300,000 acres of land within the Pinelands study area, with the major acquisitions shown on the map on page 25. (The district discussed later contains 240,000 acres.) These lands, with few exceptions -- Ancora Psychiatric Hospital and New Lisbon State School, for example -- are devoted to conservation and recreation uses and draw people from all over New Jersey as well as the Delaware Valley and the New York City area. The Land Activities and Trends section of this report contains a description of State-owned lands located within the Pinelands that are devoted to recreation.

The following table, supplied by the Division of Parks and Forestry, indicates the number of visitors to State parks and forests during the last fiscal year.

VISITOR ATTENDANCE AT STATE PARKS AND FORESTS
LOCATED WITHIN THE PINELANDS
July 1977 - June 1978

State Parks		State Forests	
Allaire	26,673	Bass River*	99,288
Barnegat Lighthouse	88,651	Belleplain*	78,974
Cape May Point	121,217	Lebanon*	33,598
Corson's Inlet	104,857	Penn*	19,566
Double Trouble*	13,834	Wharton*	257,921
Island Beach	551,073		
Monmouth Battlefield	78,060		
Parvin	113,956		
Total	1,098,321	Total	489,347
State Parks	1,098,321		
State Forests	489,347		
Total Attendance	1,587,668		

Source: Division of Parks and Forestry, New Jersey Department of Environmental Protection, 1978.

*Facilities located within the proposed Pinelands Planning and Management District.

As indicated by the table, 1.6 million visitors attended State parks and forests located within the Pinelands during Fiscal Year 1978. In addition, many people visited the wildlife management areas located throughout the Pinelands. Although the Division of Fish, Game and Shellfisheries does not maintain attendance records for WMA's, it is estimated that almost 200,000 hunting visits were made to wildlife management areas in southern New Jersey in 1977 (no estimate is available

for the number of non-hunting visits). Adding this estimate to the State park and forest attendance total, almost 1.8 million visitors attended State-owned lands located within the Pinelands during a recent year.

The recreational impact on the Pinelands is obvious. The region lies within the most densely populated State in the nation and within driving distance of two of the nation's largest metropolitan areas -- the Philadelphia Metropolitan Area with 4.8 million people and the New York Metropolitan Area with 16.2 million people (1970 U.S. Census). As interest in and awareness of the Pinelands continue to grow, the region will experience an increased visitor demand on its own merits which will create stress on the very features that are attracting people in the first place as well as on existing facilities and services. There will be increased prospects for private recreation activities to provide facilities for all types of visitors, from relatively spartan experiences to highly developed facilities such as Great Adventure. This latter type of investment would more likely grow out of the new market stimulated by the rebirth of Atlantic City.

3. Atlantic City

The recent passage of an amendment to the State's constitution permitting casino gambling in Atlantic City is expected to create tremendous pressures on the city and surrounding areas for rapid change and growth. The primary objective of approving casino gambling in Atlantic City was the economic revitalization of a depressed urban area since it is hoped that gambling will provide new opportunities for employment, housing, and the overall quality of life. At the time of the 1976 casino gambling referendum, unemployment in Atlantic City was three times the national average, one-third of the population were senior citizens on fixed incomes, and one-half of the population were minorities.

A study analyzing the impact of casino gambling on the housing needs of Atlantic City and its metropolitan area estimates that by the year 1990 twelve casinos could be operating in Atlantic City, employing 50,000 persons in motels and hotels, drawing 10 million visitors, and raising employment in the Atlantic City labor market to 160,000 persons (Economic Research Associates, 1977). Present totals are 20,000 employed in motels and hotels, 63,000 total employment in the Atlantic City labor market area, and 2 million annual visitors. According to these statistics, casino gambling will result in a five-fold increase in tourists and a two-and one-half-fold increase in jobs. In March of this year, the Casino Control Commission estimated that 10 corporations would have applied for casino licenses by June 30, 1979, with three casinos to be in operation and 24,000 casino-related jobs created.

Revitalization of Atlantic City and increased employment opportunities are expected to foster significant population growth in the metropolitan area. Since Atlantic City and the adjacent communities on Absecon Island are almost completely developed, the population growth is expected to occur in the mainland suburban communities. The townships of Galloway and Egg Harbor are expected to experience rapid development within the next few years as indicated in the Land Activities

and Trends section of this report. The following tables, which present a range of population estimates, indicate the magnitude of growth to be expected in both Atlantic City and Atlantic County as a result of casino gambling activity.

POPULATION FORECASTS FOR ATLANTIC CITY

Year	Projected Population Range
1976	44,000
1980	48,000 - 64,000
1985	60,000 - 80,000
1990	64,000 - 85,000

POPULATION FORECASTS FOR ATLANTIC COUNTY

Year	Projected Population Range
1976	189,000
1980	223,000 - 297,000
1985	313,000 - 417,000
1990	397,000 - 528,000

Source: "Analysis of the Impact of Casino Gambling on the Housing Needs of the Atlantic City Market Area," Economic Research Associates, 1977.

Another concern of Atlantic City's related growth that should be addressed is the improvement and expansion of airport facilities to serve the expected increase in commercial and private air traffic to the city generated by casino gambling. A master plan study is being conducted to determine the extent and probable schedule for municipal terminal facility improvements and expansion at the National Aviation Facilities Experimental Center (NAFEC)/Atlantic City Airport for commercial passengers. The Atlantic City Planning Board recently decided to retain Bader Field where it is for continued general aviation and commuter traffic.

NAFEC/Atlantic City Airport is located approximately 10 miles northwest of Atlantic City, adjacent to the Atlantic City Expressway, the Garden State Parkway and the White Horse Pike. The airport is owned by the Federal Government and is operated by the Federal Aviation Administration. The City of Atlantic City owns about 86 acres at the site of its municipal terminal. A more detailed examination of NAFEC is presented in the Federal Government Establishments section of this report. NAFEC is bound by agreement with the City of Atlantic City to permit commercial air traffic serving the city to use the airport facilities.

The growth of Atlantic City and its metropolitan area is inevitable with casino gambling a reality. The major issue that confronts the city and its surrounding municipalities is whether they can accommodate the expected levels of demand resulting from the development and population growth of the area. In addition, as land values on Absecon Island rise due to the lack of land for development and more visitors come to Atlantic City (many of whom drive through the Pinelands), pressures will increase on the inland (Pinelands) area.

4. Offshore Oil and Gas Impacts in the Pinelands

Exploratory drilling for oil and natural gas deposits off the coast of New Jersey began during March 1978. While estimates of offshore oil reserves for the Mid-Atlantic region vary, the United States Geological Survey currently estimates that between .4 to 1.4 billion barrels of oil and 2.6 to 9.4 trillion cubic feet of natural gas may be found off the coast of New Jersey (Burlington County Planning Board, 1978). Exploration and development of the Outer Continental Shelf (OCS) could have a significant impact on the State of New Jersey and the Pinelands as well. Before discussing potential impacts on the Pinelands, the following overview is provided.

OCS-related activities may be divided into the following three stages: exploration, development, and production. The exploration phase will require a number of onshore support bases for providing support and services for offshore drilling activities. These bases generally require such facilities as warehouse and storage areas for materials and supplies, loading docks for cargo boats, heliports, and other related support activities. Assuming the discovery of deposits results from exploratory drilling and that it is economically feasible to continue production, the development stage will begin. This phase involves the development of permanent offshore drilling platforms and the transporting of oil and gas reserves to shore. The two available methods of transport include pipelines and tankers. Both industry and government favor the use of pipelines as they are viewed as the most environmentally sound method of bringing oil and gas onshore. The development phase also requires a number of other onshore support operations, particularly for platform fabrication and pipeline construction. Once the development phase has been completed and the oil and gas are being produced, the production phase begins. This involves modifying the oil and gas in refineries and processing plants. It is expected that existing oil refineries will be able to handle any significant oil finds, but new gas processing plants would be required. These processing plants are designed to remove any impurities

which may exist before the gas enters transmission lines and must, therefore, be located between the pipeline landfall and the major natural gas transmission lines.

It is unlikely that there will be any immediate OCS-related impacts which will effect the Pinelands during the exploratory phase due to the nature of specific siting and locational requirements. Potential impacts to the Pinelands, however, can occur during the development and production phases of OCS activity. During the development stage, pipeline routes will be selected which will generally follow the shortest route to existing refineries. Those pipelines going toward the Delaware Bay refineries would traverse portions of the Pinelands. Because of the greater likelihood of discovering significant gas deposits, it is expected that there will be greater impact to the Pinelands as a result of gas pipeline development. State and industry representatives expect that gas pipelines will run from gas deposits to the existing major trunk lines which run through New Jersey. These pipelines will follow existing rights-of-way, such as the Atlantic City Expressway (Atlantic County Planning Department, 1978). One or more gas processing plants, located somewhere along the gas pipeline routes, would be required as well.

The siting of OCS facilities during the development and production phases can be expected to result in several environmental impacts. Potential degradation of existing water quality levels may occur during the construction of oil and gas pipelines as a result of soil erosion and sedimentation during trench digging operations. Oil pipelines also pose the risk of contamination of the ground water in the event of a spill from a leak or break. The operation of gas processing plants may result in the discharge of waste water contaminants and air emissions.

Potential OCS impacts to the Pinelands may be minimized because of DEP's previously expressed coastal zone energy siting policy. DEP has proposed to limit the total number of pipeline corridors to existing rights-of-way and to prohibit the crossing of the 760 acres designated as the Pinelands Critical Area for sewerage purposes. While this policy would minimize impacts to a major portion of the Pinelands, pressures for the location and development of OCS-related facilities may be expected in other areas of the Pinelands in the event of significant oil and gas finds. The Department of Energy, however, has indicated that all energy facilities, except for gas pipelines and associated facilities, will be discouraged from the Pinelands. Gas pipelines and associated facilities would be permitted only where degradation of water quality would be minimal, resulting in minimal irreversible damage to the environment (N.J. Department of Energy, "Determination of the Need for Energy Facilities," May 1978).

Long term growth impacts in the Pinelands could also result because of significant oil and gas finds. The availability of energy sources in proximity to such a vast undeveloped area as the Pinelands might increase the desirability of the area for economic development.

5. Federal Government Establishments

The Federal government maintains a number of civilian and military installations in or near the Pinelands. These facilities range in size from

one-acre Coast Guard stations to 30,000-acre-plus military bases. Five military installations merit mention because of the significant regional influence they exert -- Fort Dix Army Base, McGuire Air Force Base, Lakehurst Naval Air Station, National Aviation Facilities Experimental Center, and Earle Naval Ammunition Depot. The primary regional impact of these facilities is economic because of the many people employed by the installations. In addition to providing on-base employment, the installations support jobs in the private sector.

The Federal establishment that exerts the greatest regional influence is Fort Dix Army Base. Fort Dix serves as an army training and personnel center, with approximately 40,000 troops trained annually. The base occupies 32,000 acres in Springfield, Pemberton, and New Hanover Townships and Wrightstown Borough in Burlington County and Plumstead and Manchester Townships in Ocean County. In light of concern in recent years that the U.S. Department of Defense would either close or scale down operations at the base, a study was prepared indicating the dependency of the local economy on Fort Dix (N.J. Department of Labor and Industry, 1975).

According to this study, the base employed 6,000 military personnel and 3,000 civilians. The combined payroll for the first quarter of 1975 was $19 million. However, to assess the full impact of base operations on the economy of the region, the concept of supporting or indirect jobs must be addressed. The Office of Economic Adjustment of the Department of Defense estimates that 1.5 supporting sector jobs result from each civilian employee at the base, thereby creating 4,500 jobs in the private sector. This same Federal agency estimates that .6 supporting jobs result from each military job, thus creating 3,600 supporting jobs; and .06 supporting jobs result from each trainee on base, an additional 600 supporting jobs. In sum, almost 18,000 jobs (including both on-base and supporting jobs) were created by operations at Fort Dix.

Other statistics are available in this study that indicate the magnitude of operations at Fort Dix and the ramifications that would result if the base were either closed or scaled down. As of 1975, the total resident population resulting from Fort Dix was 25,000, and an estimated $120 million was pumped into the general economy of the area as a result of operations at the base. Fort Dix is the largest employer in Burlington County. The municipality of Wrightstown depends largely on Fort Dix for most of its business and a significant portion of its population.

In 1978, two developments have occurred that could drastically effect operations at Fort Dix. Under one proposal, the U.S. Department of the Army is considering relocating troops of the Second Infantry Division now stationed in Korea to Fort Dix. Fort Dix would become the headquarters for a reorganized, mechanized infantry division but would lose its basic training mission (U.S. Army Corps of Engineers, 1978). Although the new increase in on-base population would be only 600, the 12,500 veteran troops, better paid and accompanied by their families, would have a much greater impact on the community than basic trainees, and the relocation of the Second Division would pump $200 million into the local economy and create 16,000 jobs.

Regarding the other recent development, on April 27, 1978, the Pentagon announced the launching of a 10-month study to close or realign work at Fort Dix and other military bases throughout the nation. If this study recommends that operations at the base be curtailed or completely eliminated, the economy of Burlington County would be adversely affected. According to the latest available data, Fort Dix currently employs 9,000 military and civilian personnel with a $152 million annual payroll; in addition, 8,000 military dependents and 13,000 retired military personnel live near the base.

The other Federal government establishments located within the Pinelands are also important to the region's economy, although their influence is less. McGuire Air Force Base occupies 3,500 acres in North Hanover and New Hanover Townships and Wrightstown Borough in Burlington County. The facility is the largest Military Airlift Command (MAC) port of aerial embarkation and debarkation on the East Coast. The mission of MAC is to maintain, in a constant state of war-readiness, the strategic airlift capability necessary to fulfill all tasks assigned by the Joint Chiefs of Staff (such as airlifting of forces and equipment anywhere in the world). McGuire Air Force Base is also the home of the New Jersey National Guard and the New Jersey Civil Air Patrol.

McGuire Air Force Base has a population of 5,200 military and 1,800 civilian personnel and 8,500 dependents (McGuire Air Force Base, 1978). The base has assets valued at $744 million, operating expenditures of $97 million, and a payroll of $80 million (1977 data). Although statistics are not available to indicate the number of support jobs made available by operations at McGuire Air Force Base, the standards developed by the Department of Defense indicate that about 6,000 support jobs are created in the private sector; however, many of these would serve Fort Dix at the same time.

The National Aviation Facilities Experimental Center (NAFEC/ Atlantic City Airport is a part) is located on 5,060 acres in Egg Harbor, Hamilton and Galloway Townships in Atlantic County, approximately 10 miles northwest of Atlantic City. The Center, owned by the Federal government, is operated by the Federal Aviation Administration (FAA) of the U.S. Department of Transportation. It is the FAA's national test center. Testing and evaluation of concepts, procedures and equipment are conducted for air traffic control, navigation, communications, airports and aircraft safety. The Center also accommodates an office of the National Weather Service, the 177th Fighter-Interceptor Group of the New Jersey Air National Guard, and the Atlantic City Municipal Terminal.

As of 1977, NAFEC was the largest employer in Atlantic County, with a work force of 2,100 and a payroll of $60 million (NAFEC, 1978). Other facility expenses totaled $27 million for 1977, of which 80 percent of this amount was spent locally ($22 million). The FAA estimates that, for every permanent job at the center, another 1.5 to 2 support jobs are made available in the immediate area's economy. Therefore, another 3,000 to 4,000 jobs are a direct result of the center's existence. It is also estimated that the total population resulting from NAFEC employment plus service employment is from 12,000 to 15,000.

A proposed $42 million construction improvement program has been approved for the center. A planned technical and administrative complex will replace outmoded buildings and consolidate the widely scattered NAFEC functions into a modern structure. The building program will create 1,800 construction jobs over a 2 1/2-year period. The FAA estimates that the construction project will result in an impact on the total economy of $147 million, assuming a dollar spent in capital goods will attract a dollar of investment and generate a dollar-and-a-half of additional consumption spending for a total leverage of 3.5.

Lakehurst Naval Air Station is located on 7,400 acres in Jackson and Manchester Townships in Ocean County. The facility is maintained by the Navy to perform aeronautical research and development, test and evaluation of aircraft systems, hardware, and ground support equipment. The air station employs 2,340 military personnel and 2,500 civilians (Lakehurst Naval Air Station, 1978). Lakehurst has assets valued at $340 million, operating expenditures of $150 million, and a payroll of $57 million (1977). Operations at the base pump $30 million into the local economy in contracts, services, and purchases annually.

Earle Naval Ammunition Depot occupies 11,000 acres in Middletown, Howell, Colts Neck, and Wall Townships and New Shrewsbury Borough in Monmouth County; it is utilized by the Navy to store and dispose of excess ammunition. Since the work force maintained to operate the facility is relatively small (400 employees), Earle's regional influence is not economic. The facility's significance is that it occupies and consequently prohibits development of a large land area in a fast growing section of the State.

The operations of the Federal government establishments located within the Pinelands are important to the region's economy. If any or all of the aforementioned facilities were to close or be scaled down in size, the effects on the region's economy would be significant. If Federal government establishments are to be included within the final Pinelands administrative boundary, the Pinelands plan must be aware of its direct and indirect impacts on these facilities. In addition, if the Federal government decides to close any of the facilities, the questions of who assumes ownership and how to use this surplus land (land that is largely undeveloped) must be resolved.

6. The Seashore

New Jersey's shore line extends from Arthur Kill on the north to Cape May Point on the south for 126 miles. The shore is the mainstay of the State's second largest industry, tourism, and generates about $3 billion annually. Several million people visit this area each year (a definitive number is not available), with over 550,000 people visiting Island Beach State Park alone in 1977, according to the Department of Environmental Protection.

Seashore tourism has a significant impact upon the Pinelands for numerous reasons. Many visitors drive through the Pinelands on their way to shore destinations, either because it is the most direct route or as a scenic side trip. The problems incidental to people driving through the Pinelands -- such as wildfires, littering, and vandalism -- have been increasing and are detailed in the Land Activities and Trends section of this report.

Another tourism-related activity which impacts the Pinelands is the increasing number of people that are camping near the shore, in or near the Pinelands, and making trips from campsites to the shore's beaches and bays. Camping requires roads, sanitary facilities, etc. With costs of long-distance vacations rising, camping and seashore vacations will increase in popularity.

The advent of casino gambling will significantly increase the number of visitors coming to the Atlantic City region. As previously indicated, Atlantic City tourism is expected to increase from the present 2 million to 10 million by 1990 as a result of casino gambling. Many of these anticipated visitors will be traveling through the Pinelands on their way to Atlantic City.

In addition to tourism, seashore land use is influencing the Pinelands in another way -- the growing resident population of the coastal area. The conversion of seasonal housing units into year-round use and the rapid growth of retirement communities have created a greater demand on the development of coastal and near coastal lands. People desiring a coastal environment are locating further inland to find available housing that they can afford. The following table compares the population growth of the four counties which comprise the coastal area (Monmouth, Ocean, Atlantic, and Cape May) to the growth for the entire State from April 1970 to July 1976. The table indicates that coastal counties are growing at a rate faster than that of the State as a whole.

POPULATION GROWTH OF COASTAL COUNTIES

County	Population As Of April 1970*	Population As Of July 1976**	Percent Growth
Atlantic	175,000	189,000	8%
Cape May	59,500	74,300	25%
Monmouth	461,900	492,200	7%
Ocean	208,500	305,900	47%
State Total	7,170,000	7,340,000	2%

*1970 U.S. Census
**N.J. Department of Labor and Industry Estimate

A final point to be mentioned concerning the seashore's influence upon the Pinelands is the passage of the Coastal Area Facility Review Act (known as CAFRA) in September 1973. Inadvertently, the enactment of CAFRA may have placed added development pressures upon the Pinelands region. Developers, to take advantage of cheaper land costs and less regulatory control, may be locating developments in the Pinelands inland from the CAFRA jurisdictional boundary.

The potential impact of the New Jersey seashore upon the Pinelands is immense. The seashore provides recreational opportunities primarily to the over seven million residents of New Jersey as well as to the residents of nearby Pennsylvania and New York. As the population of the Tri-State area grows, the New Jersey shore will experience an increased visitor demand, and, since many of these visitors will travel routes to reach their shore destinations that will take them through or along the Pinelands, the Pinelands will also be subject to ever increasing visitor pressures.

7. Highways

Roads are a significant regional influence to the growth of a region. New roads and improvements to existing roads make previously remote areas more accessible. Many major highways presently bring people to and through the Pinelands. Among these are the Garden State Parkway, the Atlantic City Expressway, Interstate 195, U.S. Routes 9, 30, 40 and 206, and State Routes 55, 70, 72 and 73.

The Garden State Parkway exerts the greatest influence. The opening of the Parkway in the 1950's stimulated the development of the New Jersey seashore and adjacent inland areas. Traffic on the road has increased to the point that, in 1977, 196 million vehicles travelled the Parkway (New Jersey Highway Authority, 1978). Traffic on the Parkway is projected to increase at an annual rate of 4 percent. To accommodate this anticipated growth, the New Jersey Highway Authority is planning to widen the road from the Asbury Park toll plaza to South Toms River (Exit 80) by adding one lane in each direction. This improvement will bolster existing efforts to develop the inland shore area and the nearby Pinelands.

Other roads that are important in placing added pressures on the Pinelands are the Atlantic City Expressway and Interstate 195. The Atlantic City Expressway provides the primary link between the Delaware Valley and the Atlantic City/Ocean City area. With the advent of casino gambling in Atlantic City, more tourists will be utilizing the Expressway to reach the casinos. When completed, Interstate 195 will provide a high-speed connection between the northern shore region and the Trenton-Central New Jersey area. However, development pressures resulting from completion of this interstate road may be a few years off, whereas pressures resulting from increased usage of the Atlantic City Expressway could be immediate.

Many new roads and improvements to existing roads within the Pinelands have been proposed over the past few years. Principal among the proposed new roads is the Governor Alfred E. Driscoll Expressway. This road would provide a connection between the New Jersey Turnpike (at East Brunswick) and the Garden State Parkway (at Toms River). Improvements to existing roads generally comprise dualization -- specifically Routes 9, 30, 70, 72 and 206. Completion of these projects may be years away, if undertaken at all.

8. Sewers

Sewers are as much, if not more, of an influence on the growth of a region as highways. Sewerage facilities, as opposed to on-site disposal systems, increase the developability of a piece of land. The presence of sewers makes possible development at higher densities than would be achievable on individual septic systems since lot size and soil properties are much less important. As a result, development often not only follows the course of an interceptor or collection system but the rate of growth increases; also land values will increase where sewerage service is immediately available.

At this time a number of large-scale sewerage systems that would affect the Pinelands counties are either planned or under construction. While the present service areas of the various sewerage authorities are largely concentrated on the outer part of the Pines, future plans for extensions of interceptors may well penetrate the Pinelands region. (Many Pinelands municipalities in Ocean County, in fact, are already within service areas.)

The existence of sewers, while not the only factor related to growth, does remove a major constraint to development. As such, secondary impacts associated with the development stimulated by the availability of sewers can cause as much or more pollution than without sewers. While primary impacts of public investments such as sewers and highways are known (e.g., removal of vegetation) the secondary impacts are not easily measured. Secondary impacts stem from the effects of new development and increased population, e.g., higher traffic levels, increased run-off from roads and lawns, degradation of air and water quality, attendant service costs and taxes, etc.

Given the close relationship between sewers and growth, it becomes critical to address the potential impact on the Pinelands of the expansion of regional sewerage systems. The increased pressure for development which may occur once systems are in place could serve to jeopardize the objectives for preservation and protection of the Pinelands. Sewers must, therefore, be regarded as a factor which poses a potential threat as well as a benefit.

I. F. COMPATIBLE AND INCOMPATIBLE LAND USES

Any resource planning and management program must create a careful balance between land use activities and the natural environment. The need for such a balance is especially critical in New Jersey's Pinelands where the two primary natural systems, the vegetation and the ground and surface water hydrology, are so closely related and so extremely susceptible to deterioration as a result of human activities. The degree of disturbance which these systems can tolerate before they are degraded beyond acceptability derives from three primary functions: the natural characteristics of the systems, the type and intensity of the disturbing activities, and the overall goals and objectives of the preservation and management program itself. There is, however, no scientific consensus regarding an acceptable level of tolerance by these systems.

The preceding sections of this report described the structure and function of the natural systems, land use activities, and major regional influences. The overall goals and objectives which have guided the Governor's Pinelands Review Committee in its efforts to develop a planning and management program were provided in Executive Order #56. The goals and objectives include: the preservation of the unique environmental resources of the Pinelands; the promotion of agriculture, forestry, and recreational uses compatible with the protection of the environment; the encouragement of needed commercial, residential, or other development where compatible with the preservation of unique environmental resources; and the discouragement of scattered and piecemeal development in open space areas. This section of the report analyzes specific land uses to determine their impact on the Pinelands vegetative and hydrologic systems and to determine the degree of compatibility or incompatibility of each use with the desired maintenance of these systems as expressed by the objectives of the Executive Order.

1. Agriculture and Forestry

Cranberry agriculture is unique among the land uses of the Pinelands in that it has been so closely associated with the area for such a long period of time that it has come to be considered a "natural" component of the Pinelands environment. (The map on page 18 shows cranberry bogs presently under cultivation.) Wetlands cultivation occurs on the sites of natural bogs which have been extensively renovated to facilitate large-scale commercial cranberry production. It is critically dependent upon the maintenance of existing ground water conditions in the Pinelands: it requires a reliable supply of unpolluted, acidic ground water as well as the maintenance of a water table level of only a few inches below the surface of the soil. The supply of water must be sufficient to allow the bogs to be flooded to a depth of at least 12 inches from December to May for protection against winter kill, and additional water must be available for harvesting and for spring and fall frost protection. To this end, cranberry growers often own amounts of land far in excess of the acreage actually cultivated. The ratio ranges

from four to ten acres of land maintained in its natural state (to safeguard the water supply) to each acre of cranberry bog in production (Mahn and Darlington, 1978). It should be noted that the major amount of activity lies within the area commonly accepted as the "Heart of the Pinelands."

Two factors are particularly significant with respect to the impact of cranberry agriculture (as a land use) on the water resources -- the environment and the ecology of the Pinelands. Cranberry agriculture is often considered to be a part of the natural environment of the Pinelands; and, through the reservation of extensive, non-cultivated lands, cranberry agriculture promotes the maintenance of the quality and quantity of the ground water and surface water resources and plays a significant role in preserving undisturbed Pinelands vegetation of both lowland and upland types. For these reasons, not only is cranberry agriculture considered to be a land use compatible with the goals and objectives of the preservation and management program, but, due to its close relationships to the natural environment and its critical dependence on ground water quality and water table height, it is also necessary to protect cranberry agriculture from the adverse impacts of other types of land uses.

Blueberry cultivation has, to a lesser extent, also become identified with the natural environment of the Pinelands. Generally speaking, it too is a form of wetlands agriculture with unpolluted, acidic water and a high water table in sandy soil as the prime requirements. Heavy fertilization is not required for commercial production, and, therefore, blueberry cultivation does not adversely effect water quality through the leeching of organic nutrients into the aquifer. Blueberry agriculture is spread widely throughout the Pinelands and is a land use that is generally compatible with the goals and objectives of the preservation and management program.

Conventional tillage agriculture is not a widespread land use in the Pinelands. It occurs primarily along the western edge of Pinelands vegetation and, to some extent, along the Atlantic City Expressway/Route 30 corridor. In the remainder of the Pinelands, the infertility of the soils precludes conventional tillage agriculture. The potential exists for an adverse impact on the ground water of the Pinelands from the leeching of fertilizer nutrients into the Cohansey Aquifer; however, problems are not known to presently exist. Therefore, conventional tillage agriculture, at its present geographic extent and method of operation, may be considered to be compatible with the goals and objectives of the preservation and management program. It is expected that monitoring of ground water quality in conjunction with 208 Water Quality Planning and the Department of Environmental Protection's activities regarding the recently designated Critical Area for water quality and onsite wastewater disposal will provide early indications of any future problems.

The degree of compatibility that lumbering has as a Pinelands land use is dependent in large part on factors which are not easily measured, e.g., the forest's role in maintaining water quality and its value to people for hiking, camping, nature studies, etc. Therefore, in determining compatibility, the furthering of established objectives for Pinelands preservation and protection should govern the conditions and locations under which timbering would occur. Timbering activity should be related to a specific forest management plan.

The preservation of characteristic Pinelands vegetation has been shown to be closely related to the frequency of forest fires. Basically, forest fires remove the oak tree vegetation which would supplant the pine forests if natural succession were to be allowed. The fires also remove the accumulation of organic ground litter and thus provide favorable conditions for the propagation of pine seedlings. It is possible that properly managed lumbering in combination with controlled burning of the litter remaining after the lumbering operations could serve the same purpose -- that is, the maintenance of characteristic Pinelands vegetation. In order to be fully compatible with the goals of Pinelands preservation, lumbering would have to be carefully planned so as to cause the least possible adverse aesthetic impacts on areas of the Pinelands devoted to recreational activities. Operations would also have to be designed to ensure that the vegetation that becomes re-established on cut-over sites is of the same types and mixtures that would occur following a naturally occurring fire. In other words, management of the forest to achieve a uniform stand of timber to maximize profit in future cuttings (as is commonly done in many of the country's national and private forests) may not be a desirable goal for the Pinelands because such management limits the variety of the understory as well as primary vegetation which is allowed to become re-established in favor of a single species and maximum growth rate of that species.

There is no doubt that lumbering can be compatible with the preservation and protection of the Pinelands and that improved timber management and lumbering practices can benefit the economy of the region. However, the Pinelands Review Committee emphasizes its concern that, in developing forest management techniques and lumbering operations, the primary Pinelands preservation and protection objectives should be maintained.

2. Recreation

Recreation is usually thought of as an activity rarely in conflict with resource preservation and conservation of the natural environment, and this perception is often correct. For some resources and environments, however, the "intensity" of a recreational use (commonly measured in terms of the number of users at any given time) may have an important impact. Recreation planners also distinguish between intensive and non-intensive recreational use referring to: (a) the level of public and private services required, (b) the effect on the environment, and (c) potential incompatibilities with other activities or preservation or management efforts. An extreme example of intensively used recreation sites would be the beaches of the New Jersey shore; the intensity of use means large numbers of visitors and a high demand for services. Less extreme but nonetheless intensive recreational activity can be found at the campgrounds, historic sites,

picnic areas, and lake and streamfront beaches in the Pinelands. In addition, the intensity of the utilization of the Pinelands' recreational resources is expected to increase as more and more people are made aware of this unique area. The increased awareness by the public regarding the canoeing experiences available in the Pinelands, for example, has already begun to make this activity more popular, and the increased numbers of participants are having an increasingly negative impact on the natural environment as well as the recreational experience itself.

The facilities, public or private, that are developed for any recreational activity should be responsive to the limits of the environment to tolerate human activity. The attainment of this goal in a Pinelands resource planning and management program may be aided significantly through the technique of controlling access to environmentally or ecologically vulnerable areas. In a highly sensitive area such as a bog or wildlife refuge, overall access can be restricted, while certain uses such as hiking, bird watching, nature studies, etc., may be allowed on a basis compatible with the type of area. In situations of desirable high-intensity use (lake bathing or picnicking, for example), access may be upgraded to accommodate a large number of users. Conversely, in situations where intensive recreational use is not compatible with resource preservation or management goals, access should not be improved, nor should public or private construction of facilities to service visitors' needs or to exploit the recreational resource be allowed. Control over access in recreational activities is a tool that can be used to ensure that different areas operate in the way that best serves a wide range of recreational activities while maintaining the integrity of the resource.

Just as unlimited access to the wilderness areas of New Jersey's Pinelands might open the opportunity for overuse and possible degradation of the environment or careless destruction of unique habitat types or species, too restricted access or service in areas appropriate for heavy visitation would unnecessarily restrict the range of recreational experiences in the Pinelands. Some level of recreational activity is compatible almost anywhere within the Pinelands; however, the lowland vegetation areas are the most susceptible to potential damage from overuse. Rare and endangered plants and animals, for example, may quickly succumb beneath the boots of even the most careful hikers, bird watchers, or specimen collectors if their numbers become too great. Similarly, cranberry and blueberry agricultural operations are susceptible to damage from visitors if access to the bogs and even the upland watersheds is not restricted. Areas of upland vegetation are able to withstand active recreational use of greater intensity. Opportunities certainly exist in areas of both vegetation types for additional development of such recreational uses as picnic areas, canoe runs, horse and hiking trails, nature observation trails, etc. The primary consideration regarding the goals and objectives of the Pinelands planning preservation and management program relative to recreation will be to manage the intensity of recreational uses according to the abilities of the various vegetation types and animal species to withstand the impact of human visitation.

3. Lines of Communication, Circulation, and Transport

Linear facilities include lines of communication, circulation, and transport -- for example, highways, rail lines, electrical and communication transmission lines, and oil and gas pipelines. (The map on page 28 shows utility rights-of-way in the Pinelands area.) While the route of each linear land use effects the natural environment, some of the facilities have potential impacts beyond their mere presence. All linear facilities require the removal of vegetation along their rights-of-way, and their construction generally calls for the use of heavy equipment. In most cases, natural vegetative patterns are not allowed to become re-established after completion of the facility. In the case of roads and railroads, re-vegetation is an obvious impossibility. In the case of electric power transmission lines, communication networks and gas and oil pipelines, revegetation is severely restricted to facilitate access to the rights-of-way for inspection and maintenance.

In the case of high voltage transmission towers, the most obvious additional impact is their interference with the aesthetics of an otherwise scenic landscape. Gas and oil pipelines share somewhat in this type of impact, but they also have the potential for serious, major impacts on the natural environment and ecology of the Pinelands. The pipelines which have been proposed to carry the gas and oil from potential Atlantic Ocean well fields to the refineries along the Delaware River are of particular concern. Obviously, the "staging" area for offshore exploration could be the focal point of significant damage to estuarine ecology in the event of accidental petroleum spillage. In addition, however, any oil pipelines traversing the Pinelands would have a tremendous potential for damaging the ground water quality in the event of a major breakage or leakage, as it would be impossible to restrict the percolation of oil through the sand and into the Cohansey Aquifer. Once such contaminants enter the aquifer, it is reasonable to assume a high potential for damage to the water-quality-sensitive vegetation, and there is no way to estimate the geographic area throughout which such contamination might spread, given the geologic structure and hydrologic patterns of the aquifer. A fire hazard may also be created. Also, there is at present no estimate available as to whether areas of the aquifer near such a spill would become unfit as sources of supply for human consumption nor how far such areas might extend. At the very least, however, prudence dictates that any pipelines which traverse the Pinelands should avoid areas with bog, swamp, or lowland vegetation and gravitate toward established corridors.

Potential impacts of these kinds must receive detailed consideration under the Pinelands preservation and management program. Also, additional data are needed concerning the vulnerability of pipeline and powerline facilities from the frequent fires in the Pinelands. There may be a conflict between such facilities and the use of controlled burning as a Pinelands management technique. It may be possible to limit the potential for adverse impacts by stringently requiring multi-use of existing rights-of-way even though such paths may not be the most cost effective in all instances. The compatibility or incompatibility of such facilities with the goals of Pinelands preservation must be judged on an individual case basis.

Highways and rail lines differ from the other linear land uses which have previously been discussed because of their ability to attract other related land uses, thereby generating secondary impacts. Primarily, it is the impact of those related land uses that is of concern, since new highway or railroad construction is not anticipated in the near future of the Pinelands.

Rail lines in the Pinelands region of southern New Jersey are an under used and largely abandoned means of transporting goods. The only line of potentially major significance with respect to the Pinelands runs from the Philadelphia area to Atlantic City. Although current utilization of the line is low, there is a potential for increased utilization as the impact of casino gambling in Atlantic City begins to effect the economy and population patterns of the Philadelphia-Atlantic City corridor. The existence of the Lindenwold Hi-Speed Line, the Pennsylvania-Reading-Seashore Line track, and an adjacent, abandoned right-of-way could become prime factors for influencing the location of future development in the region.

Abandoned railroad rights-of-way in general have been receiving increased public attention. Possibilities exist for conversion to other linear facilities (such as pipelines) or for recreational facilities (such as hiking, bicycle, or bridle trails). There are some abandoned rights-of-way in the Pinelands which could present an opportunity for compatible recreational development, particularly since use of existing roadbeds would reduce any impacts on surrounding watersheds, and major new clearing of vegetation would not be required.

Highways and roads have a major effect on the development of all other land uses; improved road access hinders the retention of an area as a wilderness site and promotes the development of adjoining and nearby lands. In this context, the upgrading of any existing road or the construction of a new one may be an incompatible use, especially if the facility stimulates development in a manner inconsistent with the primary goals and objectives of a Pinelands planning and management program. Highways are the most likely of any of the linear land uses to be incompatible with the preservation of the Pinelands resources, though the improper design and location of any of these land uses would tend to make them incompatible as well. Among the reasons for the absence of widespread development within the Pinelands have been the relative lack of access and the excess travel time to existing employment centers. These factors have combined to offset the attractiveness of relatively inexpensive land costs. Now, however, in the face of population shifts, travel time is less important as a limiting factor for many persons, and any improvements to the highways into or through this natural area should be viewed in terms of potential encouragement of additional development.

4. Extractive Industries

Sand and gravel mining is a highly destructive form of land use in terms of protection of the environment. The complete destruction of natural vegetation and the as yet unknown degree of impact that the removal of large amounts of water-filtering sands may have on the quality of the water in those parts of the Cohansey aquifer and the surface streams where

such activity takes place are of particular concern. In addition to these impacts, there is aesthetic degradation, noise, dust, heavy truck traffic, and other undesirable impacts associated with sand and gravel mining. Some of the annoying impacts such as dust and noise can be lessened by the use of screening, proper site planning, and the wetting down of areas where dust is raised. Other impacts, such as the scarring of the landscape and destruction of vegetation, may not be easily dealt with in a satisfactory manner. Revegetation of a stripped site, for example, may be only partially successful and require constant and expensive maintenance for many years to prevent the site from reverting to a barren, desolate pocket of raw earth. Such impacts and subsequent problems present tempting reasons for declaring sand and gravel mining to be incompatible with preservation and protection of the Pinelands.

Sand and gravel, however, are raw materials which are found throughout the Pinelands and are important to a diverse range of industries. User industries include general construction, metallurgy, chemicals, abrasives, glass, porcelain, and pottery. The total cost of the raw sand and gravel to these industries is made up in large part by the cost of transporting the materials. Thus, it is easy to see that the sands and gravels of the Pinelands are strategically placed with respect to the State and the New York, Philadelphia, and Wilmington metropolitan areas. As population growth continues and the demand for highways, buildings, and consumer products increases, the demand for sand and gravel will remain as well. In recognition of this need, provision should be made to allow the continued extraction of sand and gravel from southern New Jersey.

The Pinelands Review Committee believes that, in areas where the goal of Pinelands planning and management is to integrate human land uses with the natural environment, it may be possible through careful planning and regulation in conjunction with adequate environmental safeguards to permit the operation of extractive industries in spite of their apparent degree of incompatibility with the general objective of protecting the Pinelands. In areas which will be devoted to the preservation of the Pinelands, however, it is the Committee's view that extractive industry must be considered to be a totally incompatible land use and should be prohibited.

5. Development

Development, be it residential, commercial, or industrial, will be the major influence on the realization of the goals and objectives of the Pinelands planning and management program. (The map on page 21 shows existing development throughout southern New Jersey.) However, since residential development is by far the largest land user, it is used here as illustrative of the issue of compatibility and incompatibility for all types of development.

The Pinelands is, considering its location, an incongruity, composed of an extremely large, undeveloped, sparsely populated, extensively forested region within the most urbanized state in the nation. Conventional development proposals in this environmentally special area will be of major concern to any regional planning or resource management effort. The compatibility or incompatibility of certain types and intensities of

development is to be found through an evaluation of the primary and secondary impacts of such development in terms of the immediate and cumulative effects on the hydrology, the Pinelands vegetation, and on other land uses.

The vegetation of the Pinelands is the first and the most noticeable recipient of the impacts associated with development. The Pinelands vegetation falls generally into two categories: upland vegetation which consists primarily of oak-pine or pine-oak associations; and lowland vegetation which consists largely of pitch pine lowlands, swamp hardwood lowlands, cedar swamp lowlands, and bogs. A study done by Rutgers University for Bass River Township examined in part the feasibility of using naturally occurring vegetation and soil types as indicators of the suitability for development of the various lands within the township. The following excerpt from the Bass River report illustrates the controlling parameters of the study and the determinative factors regarding suitability for development:

> Early in the project work it was determined, first, that the critical environmental parameter that should be of controlling influence on land use planning in Bass River Township concerned water quality. To protect public health and safety it is essential to maintain the designated DEP standards and existing high quality of surface water in all rivers flowing through Bass River Township. Second, it was determined that in an area such as Bass River Township where the water table is very high and the predominantly sandy soils have little ability to filter out effluents, the quality of surface water is controlled to varying degrees by the quality of ground water. Therefore, it was concluded that the primary objective of the environmental inventory field work in this project should center around studies of the two environmental resources which would be prime indicators of the water quality characteristics of the area -- soil and vegetation. (Rutgers University, Center for Coastal and Environmental Studies, The Bass River Township Project, Report of the First Phase Research, 1978, pp. 7 and 8.)

While the major concern of the Bass River study was the impact of development on water quality, it must be noted for the purposes of this report and the ultimate recommendations of the Governor's Pinelands Review Committee that the Committee must deal with other controlling factors in addition to water quality; that is, the basic mandate in Executive Order #56 is to preserve and protect all of the Pinelands' unique environmental qualities. While the Bass River study dealt with only about 2 percent of the Pinelands Committee's 2,000,000-acre study area from a water quality perspective, the basic principles and conclusions retain their validity over most of the Pinelands due to the basic uniformity of geology, hydrology, and vegetation throughout the region.

Regarding the use of vegetation in the analysis of sites for development, the Rutgers Bass River study determined that some of the

Pinelands vegetation types provide an excellent primary indicator of the suitability of specific sites for development and concluded that: "vegetation confirmed absolutely the presence of very wet soils;" and, in locations where there are wet soils, "vegetation was more useful and accurate than existing large-scale soil maps for locating undesirable locations for development." (Bass River Study, p.9.) In previous sections of this report, it was indicated that lowland vegetation associations occur essentially on sites where the water table level is hardly ever further below the surface than about 18 inches and where, in fact, it is commonly at the surface of the ground for at least part of the year, particularly in bogs and swamps. Obviously, such areas are minimally suited for development. (This judgement is predicated primarily on the assumption that, in the absence of municipal or regional sewerage systems in much of the Pinelands area, septic tanks must be used.) Septic waste disposal systems in areas of lowland vegetation will not function in an acceptable manner, and both water quality and natural vegetation would be expected to be severely damaged from point (septic systems) and non-point sources of pollution (roof and pavement runoff and lawn, flower bed, and garden fertilization, for example). In addition, construction costs could be expected to be high because of the increased costs which would be necessary for site improvements due to the severity of conditions. Given these facts and the absolute coincidence of high water table conditions and lowland vegetation types, it is obvious that development with septics must be considered an incompatible land use in all areas of lowland vegetation and that severe restriction, if not outright prohibibition of development in such areas, is warranted.

The following discussion of development on upland sites within the Pinelands is not intended to be exhaustive but, rather, to indicate and analyze some of the important characteristics which must be evaluated as definitive plans are made to guide development of the Pinelands area. Upland vegetative associations cover approximately 80 to 85 percent of the Pinelands. These areas are more capable of accepting development with less environmental damage than are the lowland areas; however, the potential for much environmental damage and for interfering with the goals and objectives of a Pinelands planning and management program does exist. Therefore, the test of compatibility must rest in a careful analysis of the various impacts which development may be expected to have on the parameters of natural system functions and on the overall goals and objectives of the preservation and management program.

Unlike the sites of lowland vegetation, in which the Bass River study found a strong relationship between that vegetation and unsuitable development conditions, areas which support upland vegetation cannot be automatically declared either acceptable or unacceptable for development. The controlling parameter on upland sites is the ability or inability of the soil to function as one part of a biologically efficient pollution purifier and filter (the other part of which is the septic tank itself). The study investigated the capabilities of various types of soils as effluent renovators (i.e., the ability of a given soil to further purify and filter the discharge from a septic tank). Assuming that the Rutgers study of Bass River Township is indicative of the entire Pinelands, the following points are significant in determining the suitability of upland sites for development:

1. Depth to seasonally high water table is only a controlling factor in terms of how efficiently a septic system will pass effluent. Many of the coarse soils of the Pinelands will allow a septic system to function in a hydraulically efficient manner and yet provide virtually no filtration or purification and thus will pass pollutants directly into the ground water system. In such cases, the possibility of dilution of the septic pollution by rain water was determined to be the controlling factor for limiting the density at which development could be allowed.

2. The coarseness or fineness of an individual soil type is a controlling factor in determining the ability of the soil to filter and purify effluent (nutrient renovation).

3. There are limited areas of soil in the Pinelands which have both good drainage and a fine enough texture to accomplish significant nutrient renovation and which can therefore be developed at somewhat higher densities.

4. Analysis of the information generated by the Rutgers study yields indications of acceptable development densities for each of the water table/soil texture types evaluated. These are: (a) No development is acceptable on soils in which the water table is so high as to preclude the proper functioning of a septic system. (b) On soils which because of their texture are unable to accomplish significant nutrient renovation and on which the only factor contributing to the dilution of phosphorous pollution is the infiltrating rainfall, the allowable development density is 1.88 acres per person. (Given an average household size in New Jersey of around three persons, this equates to approximately one dwelling unit per six acres -- that is, using septic systems and not degrading the water quality.) (c) In areas where sufficiently fine-textured soils and adequately low water table heights exist, the septic system carrying capacity is .29 acres per person or approximately one dwelling unit per acre.
   Note: The reader should note that the above information is not a recommendation of the Pinelands Review Committee but a report of conclusions of a scientific study done by Rutgers University.

Dr. Lowell Douglas of Rutgers University is presently engaged in a further study to index all of the soil types which occur in the Pinelands relative to the ability of each to assimilate or chemically purify nitrate and phosphate pollutants. When his study is completed, it will be easier to determine the ability of uplands sites in the Pinelands to support development using on-site wastewater treatment; however, protection of water quality alone will not prevent scattered and piecemeal development. Water quality programs are not suited to land management, and, therefore, a comprehensive approach is necessary.

In addition to the suitability of Pinelands soil to serve as an integral part of a septic waste purification system, the question of non-point sources of pollution in conjunction with development is also important. Roofs, roads, sidewalks, driveways, and parking lots all serve to increase the concentration of non-point source pollutants in the areas where the runoff finally enters the aquifer. Additionally, the common desire of homeowners and apartment managers to surround their dwellings with suburban lawns, flower beds, and vegetable gardens allows the introduction of nutrient pollutants into the aquifer through the very rapid leeching which takes place in the Pinelands soils. For these reasons, it is apparent that ways must be sought to prevent pavement runoff from carrying too great a load of pollutants to the aquifer, and site designs and conditions which restrict the heavy use and impact of fertilization must be investigated.

It is beyond the scope of this report to create a specific land use plan based on this information; additional studies would be needed to validate the conclusions for use throughout the Pinelands. Nonetheless, an analysis of the effluent renovation capabilities of the various Pinelands soil types should be considered in any effort to manage development on the areas of upland vegetation.

Another, and probably the most obvious, impact on the natural systems which is caused by development is the removal of vegetation. Such removal is not compatible with preservation of the Pinelands. However, when properly accomplished, such removal may be compatible with the management of the Pinelands for the purpose of integrating development and other social and economic needs with the natural environment. Removal of vegetation is also one of the most significant impacts in light of the close relationship between vegetation and water quality and fire. Although overland runoff from rains and floods is ordinarily minimal in the Pinelands due to the coarse, sandy nature of the surface soils, removal of vegetation during construction, along with any earth moving that takes place, tend to increase the natural erosion and may result in added sedimentation in nearby streams or areas of lowland vegetation, thereby causing changes which may destroy the more fragile features. Removal of vegetation or activities which result in increased tendencies for erosion and sedimentation should be minimized, particularly in areas adjacent to natural lowland vegetation, streams, and bogs.

A third set of factors which must be considered in determining the compatibility of development in the upland areas of the Pinelands is the secondary impacts on areas of special concern. For example, increased development may result in the lowering of the water table height through increased withdrawal from wells and through reduced recharge of the aquifer due to increased overland runoff (a function of roofs and paving). It may also result in a change in the pH of the ground water. Such situations, if allowed to develop in proximity to ecologically fragile areas such as cranberry or natural bogs or other lowland vegetation areas, would have tremendous negative impacts on the sensitive vegetation. Similarly, development which encroached upon the pigmy forest areas, the East and West Plains, while it might not damage the vegetation, could cause a loss of the unique character and aesthetic attributes of the areas.

In addition to the secondary impacts of development itself, the impacts associated with increased population densities must be considered. Areas of fragile vegetation and the habitats of unique wildlife may be destroyed by mere proximity to man or by too great a level of casual visitation. Cranberry and blueberry operations may suffer damage from trespass and vandalism. Finally, development is basically incompatible with the fire ecology which must be maintained in order to preserve the Pinelands. According to Dr. V. Eugene Vivian, New Jersey's Pinelands must be actively managed to "safeguard the continuance of rare and endangered plant species" (Vivian, 1978). The pine trees and other plants which dominate in the pine forest area known as the "Heart of the Pinelands" are predominately species which flourish in New Jersey only in transitional succession stages. These species would eventually disappear, being gradually succeeded by oak and other hardwood species, if natural transition were allowed to occur. Fire has been the predominant factor in maintaining the typical Pinelands vegetational patterns. Evidence of this is found in the fringe areas of the Pinelands, areas where the frequency of forest fires has been so reduced through fire prevention activities that oak is now the dominant forest species -- so much so that certain areas could well be known as "Oaklands" instead of Pinelands.

Both large-scale, high density development and scattered, low density development severely restrict the degree to which fire can be used as an effective forest management technique; and fire is necessary if the Pinelands are to be preserved. In line with this, development is also incompatible with the maintenance of a "wilderness" character which is part of the Pinelands' uniqueness. These two parameters, then, the need to maintain a fire ecology and the need to preserve the wilderness character of at least some portion of the Pinelands, present a strong basis for the Pinelands Review Committee's primary recommendations. These recommendations are:

1. That a control area devoted to the preservation of the Pinelands ecosystem be created wherein the forest can be actively managed to maintain its wilderness characteristics, its unique flora and fauna, and its typical pine forest aspect; and

2. That outside of this Pinelands preservation area be established a Pinelands protection area wherein growth and development can be managed to satisfy social and economic needs while integrating such development with the natural environment to maintain the high water quality and the environmental attributes of the Pinelands.

SECTION II: THE CASE FOR REGIONAL RESOURCE-BASED MANAGEMENT

II. A: THE EXPERIENCE OF OTHER STATES

During the past decade, certain States have begun to create planning programs to manage and conserve natural resources. In doing so, these States have attempted to balance settlement and development needs with a determination of the types of land use activities compatible with the natural features and processes of the region under study. The description of four specific State and regional initiatives outlined below details the composition, planning powers, and methods of review utilized by each agency. In studying these initiatives, the economic and political climate in each State, the extent of development activity motivating each program, along with the type of interaction between the natural features in each region all combine in the formation of that State's program. This research is not seeking a program to copy but a general approach to comprehensive planning sensitive to the particular needs of New Jersey's Pinelands. New York's Adirondack Park Agency, for example, reviews and coordinates private land development in an area much farther removed from metropolitan areas than the Pinelands; in Vermont, permit review and approval are conducted Statewide, though the bulk of applications involve activity in the southern one-third of the State. In each case, land management and planning techniques are employed to alter the rate of low density residential development in environmentally sensitive areas, while providing an indication of where new development may be undertaken in a harmonious manner.

1. Florida

This resource-based legislation, "The Environmental Land and Water Management Act, 1972," is based upon the American Law Institute Model Land Development Code and establishes procedures to identify areas and activities of state and regional concern in two distinct categories, "areas of critical State concern" and "developments of regional impact."

The Act is administered by the Bureau of Land and Water Management, which is within the Division of State Planning. This Bureau operates on an annual budget of $500,000, employing 22 full-time staff whose responsibilities are to make recommendations on designated critical areas and to recommend development guidelines in critical areas and for developments of regional impact (DRI's) anywhere in the State. The 11 regional planning councils in Florida also interact with the Bureau in the review of DRI's and designation of "critical areas;" while these agencies receive some compensation from the State for their participation, the funds do not come from the Bureau's operating budget.

"Areas of critical State concern" contain or impact upon environmental, historical, or natural resources of significant Statewide impact. These areas are nominated for designation by local governments, planning councils, or other interested groups or organizations. A State agency review and report to the Governor precedes the public hearing, during which time municipalities must establish land use regulations in the designated area to prevent State development control over the "area of critical State concern." Not more than five percent of the State may be so designated.

"Developments of regional impact," the second category, requires the developer to provide information on the environmental resources, nearby public facilities, housing market, and project economics to the local municipality, Multi-County Planning District, and the State Division of Planning. Public hearings, followed by a 30-day open record, lead to a local decision that may allow for the issuance of a development order.

While no specific size limitation is involved, the "threshold" is established by local or planning council designation of a given area. In the case of "areas of critical State concern," the Governor or Cabinet makes the initial designation. Enforcement of these designations is attributed to existing State agencies, where there does not, at present, appear to be a definite administrative appeal process.

In the present designation process, the outline of an "area of critical State concern" permits very few compatible uses other than conservation and existing agriculture; coupled with the absence of any compensatory mechanism for landowners within the designated area, the process is therefore open to legal challenge as a form of taking. The method by which designation effectively halts development has significantly effected the local tax base in municipalities within a given designated area. The question at hand involves the development of meaningful standards at the level where the designation occurs (the State) to accompany the shift of regulatory authority from the local to the State level. The identification of standards that distinguish those local governments able to protect State/regional interests from those either unable or unwilling to do so is also required in order to augment and strengthen the existing legislation (Levin, 1974). In August 1977, the Florida First District Court of Appeals ruled that the critical areas portion of the Act was unconstitutional in that the statute did not provide adequate standards for designating such areas. The case is presently being reviewed by the Florida Supreme Court.

2. Vermont

Vermont's Act 250, "An Act to Create an Environmental Board and District Environmental Commissions," was passed into law in 1970. The legislation provides for the establishment of a new State Environmental Board, District Commissions served by Regional Coordinators,

and a State Agency 250 Review Committee. The Act also delegates certain review and approval powers to existing Boards of Local Selectmen and/or Regional Plan Commissions. The State of Vermont allocates approximately $300,000 annually for the administration of Act 250. This allocation pays the salaries of 17 full-time staff, as well as providing the 36 citizen members with $25 plus expenses per diem.

The State Environmental Board is in but not of the Vermont Environmental Agency, with nine gubernatorial appointments, each serving four-year terms. The planning and policy functions of the Board include the adoption of a comprehensive land use policy in three stages: Interim Land Capability Plan, Capability and Development Plan, and Land Use Plan. Hearings are conducted by the Board for permits, which are required for: improvements over 10 acres; projects over one acre where the affected town or township lacks its own land use controls; housing developments of 10 units or more; any development over 2,500 feet in elevation. The Board has the power to issue or deny the necessary permits, hear appeals from the District Commissions over which the Board has administrative control, and conduct investigations on appeals to the State Supreme Court.

The District Commissions, a total of nine throughout the State, are each composed of three members serving four-year terms, appointed by the Governor from that district's area. Aided by a full-time Regional Coordinator, each Commissioner conducts hearings on permit applications, issuing them to unappealed applications. As the primary public contact for Act 250, these District Commissions make the initial evaluation on each proposal.

A single, coherent State position is developed by the Agency 250 Review Committee, whose technical input, assembled from affected State agencies, is introduced before the District Commission at the initial permit hearing. The overall criteria by which the development is evaluated are summarized here. The applicant must prove that the proposal will not result in undue water or air pollution; has sufficient water supplies and will not unduly burden public supplies; will not cause undue soil erosion; and conforms with local, regional, and Statewide plans. Those who object to the plan must prove that the development will cause unsafe highway conditions; or will burden local educational or municipal services; or may affect the aesthetics, historic sites, or rare and irreplaceable natural areas. The criteria used by those who object to the plan cannot be used as the only reasons for denial of the application, though they may add weight to the deliberations.

The restrictions between time of application and date of hearing are clearly spelled out, in order that the hearing and appeal processes occur within a certain time. The option for the developer's appeal may be made by the applicant through either the State Environmental Board or through the Superior Court and thence to the Vermont

Supreme Court. Practice has shown that roughly 80 percent of the appeals remain and are reviewed by the Board as opposed to the courts. Vermont's Act 250 is predicated on extensive local participation and has been augmented by the passage of an Administrative Procedures Reform Act (Act 211, July 1976) that affected activities of public agencies. A land gains tax (1972) augments the legislation described above, dealing with anyone subdividing/developing land and is applied as a combined function of the percentage of value added relative to the number of years the land has been held; if the development occurs within the year of purchase, 60 percent of the value added is taxed, declining to the regular capital gain schedule with no penalty six years after the date of purchase (Bosselman and Callies, 1971).

3. New York

The Adirondack Park Land Use and Development Plan (1973) is directed toward the privately owned lands and development within a six million-acre area that was designated as "forever wild" by the New York State Legislature during the late 1800's. The development of this plan follows the State Land Master Plan (1972), which outlined the preferred management plan for that 40 percent of the area which is publicly held.

The agency responsible for the planning program in this area is the Adirondack Park Agency, an 11-member agency appointed by the Governor with eight citizen members, five of whom are from the area under jurisdiction and not more than five of whom may be members of the same political party.

The Adirondack Park Agency (APA) is monitored by the Adirondack Park Local Government Review Board, with 12 members appointed by each of the counties under the jurisdiction of the APA; this Review Board monitors the APA, reporting to the Governor, State Legislature, and county governments on its operation.

The agency has a full-time staff of 39 persons, which is funded by the State of New York. The budget for 1977-1978 is $889,000.

The APA has review and permit granting authority over "regional projects" defined as those activities with a potential regional impact. Class A projects, which include infrastructural improvements (sewerage authorities, road improvements, large shopping centers, etc.) are to be retained by the APA, while Class B projects are reviewed until the local governments develop land use programs that gain APA approval, after which time Class B projects will be locally controlled.

The APA is assisting local governments in preparation of compatible land use programs, providing general guidelines that

classify all privately held land into one of six categories: hamlet, moderate intensity, low intensity, rural, resource management, and industrial. Each category is described according to the intended uses allowed within that area, along with the number of acres per building lot and overall number of buildings per square mile. "Moderate intensity," as a category, allows for development of 1.3 acres per lot or 500 buildings per square mile, while the "rural" category calls for 8.5 acres per lot or 75 buildings per square mile. The determination that preservation of recreational, agricultural, and forest uses is a main goal led to the designation of over half (2 of 3.7 million acres) of the privately held land in the "resource management" category, allowing 42.7 acres per building lot, or 15 buildings per square mile. When a variance is sought against the established categories under APA jurisdiction and the court finds the regulations in that use to be excessive or unnecessary, the State must then either purchase the property in fee simple or allow the variance to stand.

As the categories combine physical factors, biological information about the area, and proximity to "critical" State lands along with adherence to the State's goal of providing open space, the ranking and selection of areas effectively double-weight the open space aspect of the plan. Such a weighting process is reflected in that portion of APA-regulated land designated under "resource management."

As a fiscal management method, the APA plan intends to stabilize property taxes that have risen rapidly in anticipation of speculative development by limiting the area to be developed. The impact of APA actions on land values and the property tax base has been the subject of controversey since the early 1970's. The State Legislature, in adopting the Land Use and Development Plan in 1973, recognized the divergent viewpoints regarding the potential economic impact of the plan; and so the Legislature mandated the State Board of Equalization and Assessment to conduct objective studies of land values in the Park prior to and subsequent to enactment of the Plan.

Three years and approximately $350,000 later, the State Board issued its final report in which it concluded that: 1) it could not comply with the legislative mandate; 2) there had not been enough property transfers in the Park since the Plan was adopted on which to base any conclusions; 3) any conclusions it might present would be subjective, given the above reasons and the fact that it was difficult to separate regional from national trends; and, 4) since the Board is part of State government, any conclusions it reached would be considered suspect by those opposed to State control over the Adirondack region.

At this writing, the APA has contracted with an impartial agency, i.e., the Academy for Contemporary Problems in Columbus, Ohio, to develop the research design for the economic impact study.

This study is not expected to be completed for at least two years at a cost of about $500,000. On completion, this will be one of the few available studies relating to the economic impact of restrictive land use plans.

4. California-Nevada

The Tahoe Regional Planning Agency (TRPA) was created by compact between the States of California and Nevada and ratified by the United States Congress on December 18, 1969. The legislation granted the TRPA broad authority in the areas of land use and environmental policy in the approximately 510 square miles of the Lake Tahoe Watershed Basin.

The agency responsible for plan adoption and decision-making is the TRPA Governing Board, an 11-member agency including one non-voting representative of the Federal government, the Governors of each State, the Resources Agency Director of each State, and all six of the local governments with jurisdiction in the region. Thus, the States have equal numbers of representatives.

The Advisory Planning Commission (APC) to the TRPA reviews proposed plans and ordinances, amendments to plans or ordinances, and public works projects. The APC is strictly an advisory body, with no authority to adopt or approve proposals. The APC is a 19-member body consisting of Federal representatives and equal representation by the States.

The TRPA staff is responsible for the formulation and drafting of plans and ordinances, the technical review of proposed land use activities, intergovernmental coordination, citizen involvement, and other administrative matters. The 17-member staff has an annual budget of approximately $500,000.

The Tahoe Regional Planning Compact (PL 91-148) requires that the TRPA adopt a regional plan for the Basin, with the following elements as a minimum: land use plan, transportation plan, conservation plan, recreation plan, and a public services and facilities plan. The regional plan was adopted in 1971 and has as its basis a map dividing the Basin into land use districts. The districts are based on a land capabilities system, which was developed for the Basin by the U.S. Forest Service and which incorporates factors such as steep slope, potential for soil erosion, and amount of impervious surfaces. Thus, the TRPA plan is first and foremost a resource-based management plan.

Approximately 60 percent of the land within the Tahoe Basin is under the control of the U.S. Forest Service, while the TRPA has zoning and regulatory power over all of the private lands within the Basin. All private lands are assigned to one of eight land use zones. The highest densities permitted are 15 dwelling units per acre in the

"high density residential" and "tourist commercial" zones. In two of the zones - "general forest" and "recreation" -- no new development is permitted, except for single-family dwellings on individually owned lots which were subdivided previous to enactment of the compact legislation.

In carrying out its land use regulations, the TRPA makes a distinction between projects which require a review by the Governing Board and those which may be allowed to proceed merely with the approval of the local government in which it is proposed. All projects must first be approved by the local government. Type A permits are those which do not require agency review following local government approval, whereas Type B permits require both agencies' approval. Under TRPA, most single-family dwellings and commercial developments less than three acres in size are the two major categories of land use that do not require agency review (Bosselman and Callies, 1971).

TRPA activities have been the subject of many court cases. To date, the courts have upheld the authority of the Agency against attacks of inverse condemnation and other such claims.

5. Conclusion

The problems and responsibilities of the agencies described above should be clarified so that a comprehensive set of requirements for any new planning and management agency for the Pinelands may eventually be developed. Each of these agencies operates within a specific jurisdiction, whether a State boundary, a series of counties grouped together, or a bound determined by natural features, such as an aquifer outcrop. Newly created agencies must have a clear relationship to the existing State government structure, include a governing structure either elected or appointed, and operate according to State legislation. Most importantly, a regional agency involved in resource-based management must have powers of enforcement and provisions for policy-making adequate to the task they are expected to perform. The agency must have a process for appeal of its decisions that includes a time limit along with clearly laid out routes for a given appeal. Each of these responsibilities must be developed in response to the body of law related to land use activities within the particular State; this requirement alone limits the transfer of planning agency programs from one State to another.

II. B. THE NEW JERSEY EXPERIENCE

The State of New Jersey has had a considerable amount of experience in responding to land use and natural resource problems of regional character. Each of the three State responses which are detailed below represents a specifically tailored attempt to solve a regional problem that was beyond the capabilities of municipalities acting on an individual basis.

1. Hackensack Meadowlands Development Commission

The Hackensack Meadowlands Development Commission was created by the New Jersey Legislature in 1969 by the passage of the Hackensack Meadowlands Reclamation and Development Act (N.J.S.A. 13:17-1 et seq.) and was given the responsibility for regulating development within the Hackensack Meadowlands District. The District consists of 19,730 acres of largely undeveloped tidal salt meadow and marsh and takes in parts of 14 municipalities (Carlstadt, East Rutherford, Little Ferry, Lyndhurst, Moonachie, North Arlington, Ridgefield, Rutherford, South Hackensack, and Teterboro in Bergen County and Jersey City, Kearny, North Bergen, and Secaucus in Hudson County).

The Legislature had recognized that extensive portions of this area had resisted comprehensive, planned development because of such factors as low elevation, exposure to tidal waters, unfavorable soil composition, and, in some instances, the very multiplicity of municipal jurisdictions. The piecemeal development and land reclamation that had occurred were destroying the ecological functions of the area and creating an aesthetically unattractive expanse of one-storied cinder block warehouses and sanitary landfills. Accordingly, the State Legislature granted to the Meadowlands Commission most of the land use control authority ordinarily wielded by individual municipalities. The Commission was charged with creating a comprehensive land use plan for the District and was given the power to implement the plan through the review of applications for development and the issuance of zoning certificates, site plan approvals, variances, special exceptions, minor subdivision approvals, major subdivision approvals, improvement plan approvals, building permits, fill permits, construction plan approvals, sanitary landfill permits, and certificates of occupancy, among others.

The Commissioner of the Department of Community Affairs is an ex officio member of the Meadowlands Commission and serves as its chairman. The remaining six Commission members are unsalaried and are appointed by the Governor with the advice and consent of the Senate. No more than three of the six may be of the same political party, two must be residents of the constituent municipalities of Bergen County and two of the constituent municipalities of Hudson County, one must be a resident of Hudson County, and the final member a resident of Bergen County. The Commission's budget for Fiscal Year 1977 was $840,000, which included funds for a 28-member staff.

2. Coastal Area Facilities Review Act

The Coastal Area Facilities Review Act, commonly known as CAFRA, became law in 1973 (P.L. 1973, Chapter 185, N.J.S.A. 13: 19-1 et seq.). The Legislature recognized that New Jersey's coastal waters and estuaries constituted a unique, irreplaceable, and delicately balanced natural resource and that serious adverse environ-

mental impacts were occurring in certain coastal areas as a result of development and existing facility and activity impacts. The Legislature also specifically recognized the legitimate economic aspirations of the inhabitants of the coastal area and the need for development. Thus, the law charges the Department of Environmental Protection with preparing comprehensive programs and policies to protect the environment of an area comprising 1,376 square miles (890,640 acres) along the Atlantic Ocean and Delaware Bay. The CAFRA area extends along the coast from Raritan Bay on the north to the Delaware Memorial Bridge on the south and ranges in width from a few thousand feet to as much as 24 miles inland. It encompasses ocean and bay beaches, wetlands, portions of the New Jersey Pinelands, old residential communities, newly developing suburbs, and the principal ocean-oriented resort and recreation communities of the State.

Under CAFRA, the Department of Environmental Protection is given final jurisdiction over proposals (both public and private) for specific facilities which could have significant impact on the area, including the construction of residential (25 or more dwelling units), industrial, transportation, utility, and energy-related facilities. Permits from the Department are required before construction may begin on any such facility or use. This requirement is in addition to all relevant local zoning, subdivision, or other requirements. Applications for development under CAFRA must contain detailed information about the proposed facility or use in the form of an environmental impact statement that describes the project and assesses its environmental, social, and economic implications for the immediate vicinity and for the coastal zone.

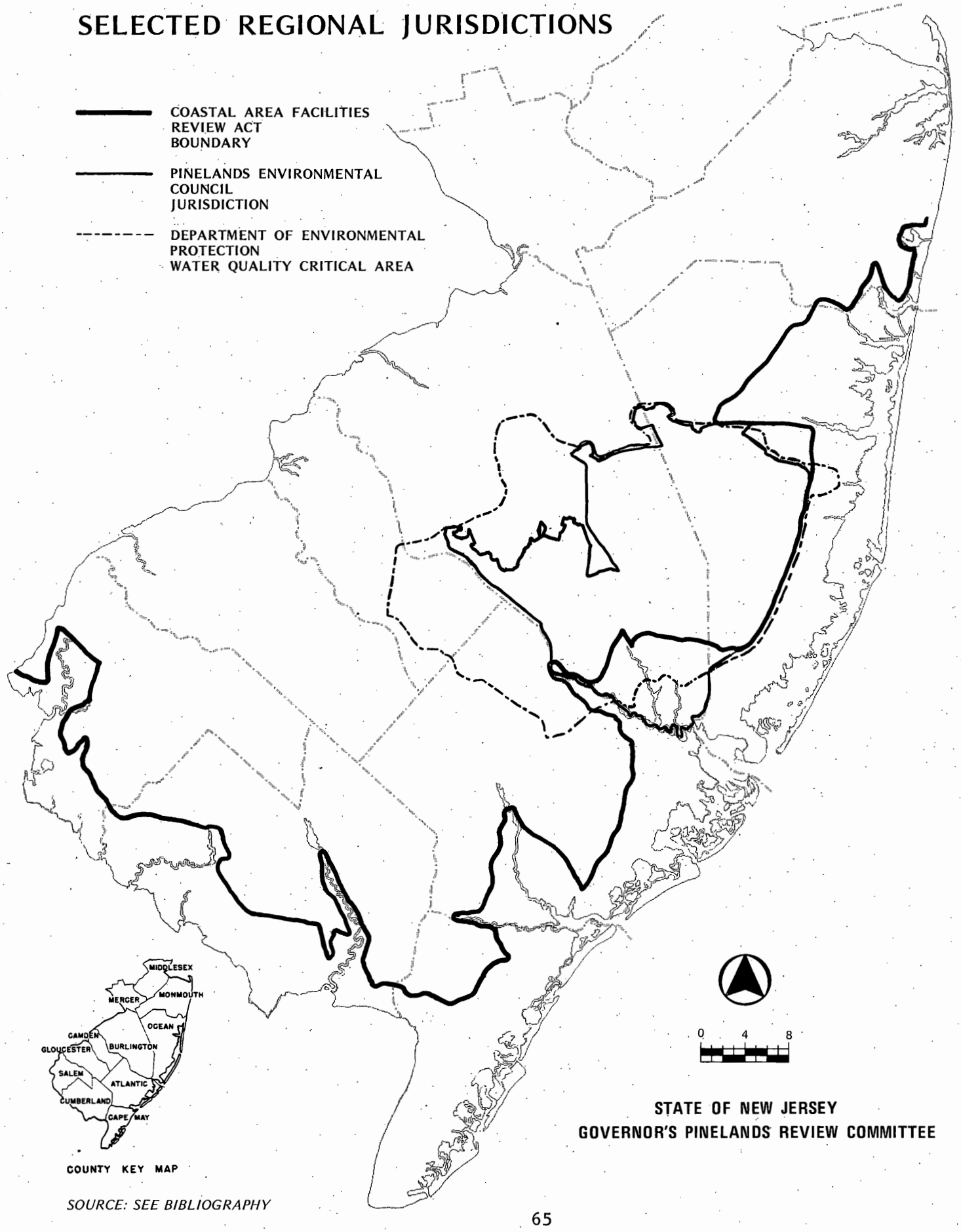
The CAFRA program is administered by the Office of Coastal Zone Management within the Department of Environmental Protection. Its budget for Fiscal Year 1978 is $934,000 and it has a 35-member staff. (A map of the CAFRA jurisdiction is shown on page 65.)

3. Pinelands Environmental Council

The Pinelands Environmental Council was created by an act of the New Jersey Legislature which was signed into law in January 1972 (N.J.S.A. 13:18-1 et seq.). The purpose of the Council as stated in the act is

> the protection of the water resource and other natural assets of the Pinelands region from misuse and pollution; the conservation of the scientific, educational, scenic, and water resources and the recreational values of the region; the encouragement of the continuation and development of compatible land uses in order to improve the overall environmental and economic position of the area; and the preservation and promotion of the agricultural complex of the Pinelands region.

SELECTED REGIONAL JURISDICTIONS



SOURCE: SEE BIBLIOGRAPHY

The Council is made up of 15 members, all of whom are residents of the Pinelands area. Approximately 320,000 acres or about one-fourth of the total Pinelands region is included within the Council's jurisdiction.

One of the primary tasks of the Council is the preparation of a comprehensive plan for the preservation, enhancement, and development of resources of the region. The Council has the authority to review any project that would destroy or substantially impair significant historic or recreational resources or bring about a major change in the appearance or use of any area of the Pinelands region. The Council has 30 days to conduct its initial review of a project and may delay the project for an additional 60 days if it is not in substantial conformance with the Council's plan or if it might have an unreasonably adverse effect upon the Pinelands' resources. (The jurisdiction of the Pinelands Environmental Council is shown on the map above.)

II. C. SUPPORTIVE JUDICIAL ATTITUDES IN NEW JERSEY

Land ownership carries with it a bundle of rights. Among those rights are the rights to hold or sell the land, to mine or sell the mineral rights under the land, and to use the land in any way one sees fit. Some private interests think land ownership rights are inviolate and view any governmental attempt to restrict the use of the land as an unwarranted diminution of those rights. On the other hand, government is charged with protecting the public interest. Government must ensure that private landowners do not develop or otherwise use their land in such a way that the action becomes a nuisance or infringes on the rights of others. Utilization of government regulations in the form of land use control is one method of meeting these responsibilities.

The term "taking issue" derives from a land use control question that is often subject to litigation. The courts are asked to decide whether a particular method of exercising the police power restricts an owner's use of property to such an extent that his enjoyment and/or potential profit from the land are reduced. The courts must then decide whether 1) the zoning is justifiable, thereby giving the owner no compensation, or 2) if the action is a taking. If a taking is found, the zoning is invalidated as applied to the particular case, and the landowner is enabled to do what he wishes, unless the government acquires the property (Costonis, 1977).

The courts have wrestled with this dilemma for many years. Over the past decade, a trend of upholding governmental regulations which are determined as serving the public interest has emerged. Decisions are influenced not just by the times but also according to whose interests are being served by the restrictions and what level of government has called for those restrictions.

The history of the taking issue from the early twentieth century through to the early 1960's has been excellently set forth in the publication appropriately entitled The Taking Issue which was prepared for the President's Council on Environmental Quality (Bosselman, 1973). As that publication clearly indicates, contemporary legal precedent in New Jersey, and perhaps in the nation, with respect to the application of the Fifth Amendment taking* provision for preserving environmentally sensitive lands was established in the case of Morris County Land Improvement Company vs. Parsippany-Troy Hills Township, 40 N.J. 539 (1963).

Morris County dealt with a 1,500-acre parcel of swampy land which the township had zoned so that only agricultural uses, outdoor recreational uses, public utility transmission lines, radio or television transmission facilities, and township sewerage treatment plants and water supply facilities were allowed. The New Jersey Supreme Court carefully reviewed all of the evidence presented by the township to support the regulations and concluded:

> "It is equally obvious from the proofs, and legally of the highest significance, that the main purpose of enacting regulations with the practical effect of retaining the meadows in their natural state was for a public benefit. This benefit is twofold, with somewhat interrelated aspects: first, use of the area as a water detention basin in aid of flood control in the lower reaches of the Passaic Valley far beyond this municipality; and second, preservation of the land as open space for the benefits which would accrue to the local public from an undeveloped use such as that of a nature refuge by wildlife (which paid taxes on it)."

While the Court acknowledged the validity of the public purpose, i.e., conservation and flood control, the Court found that a taking without just compensation had occurred. Excessive regulation under the police power in effect rendered the landowner's property virtually useless. Therefore, acquisition rather than simply regulation was required under the circumstances in the case. In the decision written by Justice Frederick J. Hall, a nationally acknowledged land use expert among the judiciary, the Court stated:

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*The Fifth Amendment states in part "...Nor shall private property be taken for public use, without just compensation."

> "While the issue of regulation as against taking is always a matter of degree, there can be no question but that the line has been crossed where the purpose and practical effect of the regulation is to appropriate (sic) private property for a flood water detention basin or open space. These are all laudable public purposes and we do not doubt the high-mindedness of their motivation. But such factors cannot avoid unconstitutionality." (193 A.2d at 232.)

For many years, the Parsippany-Troy Hills decision served as a benchmark on the taking issue and was often referred to in other States' judicial decisions. As the environmental movement gained momentum, however, courts began to distinguish the New Jersey decision in an attempt to broaden the use of zoning regulations to protect environmentally sensitive areas. Many States, New Jersey among them, enacted legislation in the early 1970's with the objective of protecting sensitive wetlands. While the degree of regulation varies from State to State, the effect of the regulations is to restrict new development, almost to the extent of the Parsippany-Troy Hills zoning.

The date of a case is often an influential factor in predicting how an issue will be resolved. While New Jersey courts did not deviate from the Morris County decision for several years, other courts in the nation grew more favorable toward upholding restrictions which were in the public interest. The most notable decision came from the Wisconsin Supreme Court in the case of Just vs. Marinette County, 201 NW 2d 761, decided in 1972. In this case, the Court questioned whether the "ownership of a parcel of land is so absolute that a man can change its nature to suit any of his purposes." In deciding this issue, the Court specifically referred to Morris County and criticized the decision because too much stress was laid on the right of an owner to change commercially valueless land when that change does damage to the rights of the public. The landowner in the Just case definitely suffered a financial loss by being prohibited to sell his land; however, the extent of the loss must be modified by the realization that the highest and best use of a bog area is not and cannot be the same as the potential uses to which a well drained and level area might be put. For these reasons, the Wisconsin Court upheld the county shore land zoning, which had been approved by the State as well.

Shortly after the Just decision, the New Jersey courts faced a wetlands regulation case which also concerned the taking issue. Unlike the Morris County case 10 years earlier, the Superior Court upheld the level of restriction as being in the public interest and ruled that the wetlands regulations did not result in a taking.

The effect of the New Jersey Wetlands Act was similar to that in the Parsippany-Troy Hills zoning ordinance in that new development in the wetlands was virtually prohibited by enactment of the Department of Environmental Protection regulations. Nevertheless, in the opinion of Sands Point Harbor, Inc., vs. Richard J. Sullivan, Commissioner, Department of Environmental Protection, the court distinguished that case from Morris County on the basis that the regulations in the latter case permitted hunting or fishing on a wildlife sanctuary as the only possible uses (N.J. Superior Court, Appellate Division A-76S-73, 1975).

In Sands Point, the court said the property owners had not demonstrated as was done in Morris County, that no practical use could be made of the property. The court noted that only a few activities were absolutely prohibited. In deciding whether a specific activity is allowed under the Wetlands Act, N.J.S.A. 13: 9A-1 et seq. the Commissioner must consider the effect of the proposed activity on the public health, safety and welfare, as well as general environmental concerns. Therefore in the eyes of the court, Sands Point was distinguishable from Morris Land and was not a taking without just compensation.

It should be noted, however, that while the Wetlands Act did not prohibit development per se, this was the effect. The performance standards associated with the Wetlands regulations served to increase development costs to the extent that development in the wetlands was not economically feasible. As a practical matter, the Wetlands Act produced a result similar to the Parsippany-Troy Hills zoning.

On July 31, 1978, another wetlands case was decided in the New Jersey Superior Court (American Dredging Co. v. State of New Jersey, Department of Environmental Protection (161 N.J. Super. 504 391A.2 1265)). In this case the company was depositing dredge spoil on 80 of its 2500 acres of wetlands. The court found that it was not unreasonable and did not constitute a taking to prohibit this activity. Among other reasons, the Court said that "while loss of value is to be considered in determining whether a restriction is a constructive taking, value based on changing the character of the land at the expense of harm to public rights is not an essential factor or controlling." This conclusion, in fact, is a citation from the 1972 Wisconsin case (Just v. Marinette County, 56 Wis.2d 7,201 N.W.2d 761 (Sup.Ct. 1972) which remains as the most far reaching decision to date regarding the degree of public interest in private property. Again the Morris Land case was cited with the Court distinguishing the instant case from it by stating that "The thrust of the Wetlands Act is the prevention of harm to the public, not the enhancement or improvement of a governmental activity or purpose"..."such as flood control or preservation of land for a park or recreation area..."

The New Jersey judiciary was obviously beginning to rethink the basis which justified the Parsippany-Troy Hills decision. Given the environmental movement of the 1970's, the legal literature, and

decisions of other States' courts, the New Jersey courts began to rule more favorably with regard to governmental regulations in the public interest.

The change in thinking is not attributable just to the times, however. Morris County dealt with municipal authority, whereas Sands Point upheld the legality of a State regulatory decision responding to a specific statute. The Wetlands Act was intended to address issues of regional rather than simply local concern. The import of protecting the wetlands was recognized and endorsed by the Legislature, and so the restrictions carried more weight.

Although the State judiciary was still wary of excessive restrictions on private property, it is obvious that the courts were beginning to distinguish between State and local authority. In fact, Justice Hall, who wrote the opinion in the Morris County case, observed this distinction in a case some 10 years after Morris County. While the issue in the subject zoning case is not relevant to this discussion, a footnote to the opinion is appropriate.

> "It is to be emphasized that we deal in this case with the split lot situation where there is a deprivation of all practical use of the smaller portion thereof. The approach to the taking problem, and the result, may be different where vital ecological and environmental considerations of recent cognizance have brought about rather drastic land use restriction in furtherance of a policy designed to protect important public interests wide in scope and territory, as for example, the coastal wetlands act N.J.S.A. 13: 9A-1 et seq., and various kinds of flood plain use regulation. Cases arising in such a context may properly call for a reexamination of some of the statements 10 years ago in the largely locally limited (emphasis added) Morris County Land case, supra (40 N.J. 539). See generally, Bosselman, et al., The Taking Issue (Council on Environmental Quality, 1973)." AMG Associates v. Township of Springfield, 65 N.J. 101.

Courts throughout the nation have come to uphold land use restrictions which they would have quickly struck down under the aegis of Morris Land. California and Wisconsin are notable examples. Massachusetts, Florida, and Rhode Island also have restrictive wetlands and other legislation dealing with critical areas. New York courts, in particular,have upheld aesthetic zoning and other severe zoning restrictions in the Adirondack Park region, using as justification that the park is a "unique and natural area" recognized as such by the State Legislature and so suitable for police power controls far greater than normal. The U.S. District Courts have used a similar rationale in upholding regional zoning in the Tahoe (California-Nevada) Basin.

The significant point about many of the above decisions is that the majority concerned regulations imposed by a unit of government above the local level. In the case of Just v. Marinette, for example, the shore land zoning plan was developed by county government, then approved by the State. These decisions indicate that the courts are increasingly willing to support regional resource-based management plans as being in the public interest, particularly if such plans carry with them legislative endorsement.

New Jersey is no exception to this trend. The State courts continue to be wary of municipalities enacting strict environmental legislation if the purpose or result is exclusionary zoning; however, they are favorable to a regional approach, as evidenced in Sands Point.

To understand the distinction made between local and regional interests, it is appropriate to look at two relatively recent decisions of the New Jersey Supreme Court. In the first case, involving Mount Laurel Township, Justice Hall, again speaking for the Court, indicated that where challenges on the basis of exclusionary zoning occurred the municipality had the burden of proving the validity of its environmental defense. It should be observed that the Court was not ready to cast aside an environmental defense. The Court said, "This is not to say that land use regulations should not take due account of ecological or environmental factors or problems. Quite the contrary. Their importance, at last being recognized, should always be considered. Generally only a relatively small portion of a developing municipality will be involved, for, to have a valid effect, the danger and impact must be substantial and very real (the construction of every building or the improvement of every plot has some environmental impact) -- not simply a makeweight to support exclusionary housing measures or preclude growth..." (67 N.J. at 187). A similar message was contained in a decision involving Madison Township (now Old Bridge Township). The basic theme of these two decisions is that individual municipalities acting for their own good, and not necessarily for the general welfare of the region or the State, might abuse the environmental defense.

To summarize, the New Jersey judiciary at the present time appears to have reached a point in its thinking which might support heavily restrictive land use regulations in the Pinelands. However, these regulations must have the conceptual support of the State Legislature; they must be developed and implemented on a regional basis; and the rationale for the regulations must be sufficiently documented and defensible. Furthermore, the case must be made that the area under consideration includes critical environmental factors significant to the State and region, as well as to the affected municipalities.

II. D. MANAGEMENT TECHNIQUES FOR THE PINELANDS

Managing growth in an area as extensive and ecologically unique as the Pinelands calls for a comprehensive and efficient system

of planning and management techniques. While the most effective technique for maintaining control over the future of the Pinelands is for government to acquire all rights to the land, this course is neither economically feasible nor necessarily desirable.

Acquisition is only one of many techniques which might be utilized in the Pinelands. In addition to public ownership and management of the land, alternative mechanisms exist which might also be appropriate for protecting and preserving this unique area of the State. The following section describes a number of management techniques which might be utilized within the framework of a Pinelands management program. Several of these, in particular, the transfer of development rights (TDR) and easement purchase offer a way to achieve the goals of preservation while alleviating the financial burden on the individual landowner. Instead the costs would be spread throughout the community. These techniques will be mentioned again in Section III, which contains the Committee's recommendations for a Pinelands Management Program.

1. Acquisition

1a) Fee Simple

Government acquires full title to privately held land.

Advantages of fee simple acquisition:

a) government owns land outright; therefore, can manage as it deems proper, e.g., with fire ecology, keeping all development out;

b) no strings attached: eliminates legal complications which might occur if less than full interest is acquired;

c) historically, there has been public support in New Jersey for government acquiring open space lands;

d) offers a technique of last resort if all else fails.

Disadvantages of fee simple acquisition:

a) most expensive type of acquisition; therefore, vast amounts of acreage will normally be beyond financing ability;

b) removes land from tax rolls, increasing burden on existing residents to pay for services;

c) government intent to purchase land may drive land prices up;

d) premised on willing seller; otherwise, government must pursue eminent domain procedure which is an unpopular tactic.

1b) Bargain Sale

Land transfers may occur in what is called a bargain sale. While fee simple title changes hands, the full market value is not paid. Instead, the owner who chooses to sell his land to a nature conservancy, public agency, etc., accepts less than fair market value for his land. He may then take as a charitable deduction on his Federal income taxes the difference between the fair market value and the price actually paid. In effect, the seller is taking a loss only on paper. Essential to the success of this technique is a thorough and competent appraisal of the properties which will verify to the Internal Revenue Service that a gift has been made.

Advantages of bargain sales:

a) public acquires land at lower cost;

b) technique has been used successfully in New Jersey, Massachusetts, and Vermont, among other states;

c) attractive to persons who are in 50% or higher income tax brackets because available tax deduction results in greatest savings; lower tax bracket owners may benefit as well, however;

d) psychological or public relations element in person who "gives" portion of profits in public interest.

Disadvantages to bargain sales:

a) technique is not well known or understood at this time; therefore, there is a time lag until public is made aware of advantages of bargain sales;

b) possible problems with arriving at consensus on "fair market value."

1c) Installment Buying

The State, or other purchasing agency, remits a certain amount each year to the landowner; the owner continues to use his land until full payment is made. Such a technique could be utilized when the State is unable to purchase the land in one lump sum. The exchange of promissory notes between buyer and seller ensures that the land will be acquired regardless of whether the State has sufficient funds at the time to purchase the land in its entirety.

Advantages of installment buying:

a) seller may spread his capital gains over a number of years, thereby reducing taxes on the sale;

b) if the bargain sale method is used, the result is even smaller capital gains spread over a number of years;

c) more land may be acquired and kept from development, even though the agency cannot purchase land outright all at the same time;

d) State is relieved of maintenance costs until purchase is completed.

1d) Land Donations

The donation of land to a nonprofit or governmental agency for conservation purposes can benefit both the donor as well as the public which receives the land at no cost. The donor may deduct such donations from his income taxes, may specify how the land is to be used, and may even be accorded life rights to the property. The donor may also instruct that the land be dedicated to a specific person or cause, thereby serving as a type of memorial.

In cases where the landowner does not wish to relinquish all rights to the property, he may voluntarily restrict the use of the property by granting easements or covenants which will run with the land. While a partial donation carries with it lesser tax advantages than a gift of the land and all rights, the donor would still merit a deduction on income taxes as well as reduced property taxes on the land with restrictions.

Advantages of land donations:

a) public acquires land gratis;

b) donor may deduct gifts from income taxes; for persons in 50-percent-plus tax bracket, this is particularly attractive;

c) land may be dedicated and utilized as donor wishes, e.g., serve as memorial, testamentary gift;

d) donation of less than full rights keeps land on tax rolls yet restricts use to conservation purposes;

e) property taxes on land where easement has been given are reduced; therefore, less of a burden on landowner; additionally, landowner retains responsibility for maintenance of property.

Disadvantages to land donations:

a) donation of fee simple rights takes land off tax rolls.

1e) Easement Purchase

Easements may be purchased for any purpose, including conservation or agricultural purposes. Easements involve governmental

acquisition of less-than-fee-simple interest, or non-possessory interest in the land.

Advantages of easement purchase:

a) less than fee simple; therefore, less expensive; therefore, more lands can be acquired;

b) land remains in private ownership and on tax rolls, though at reduced level;

c) landowner is compensated for restricted use;

d) maintains existing character of area.

Disadvantages of easement purchase:

a) can be almost as expensive as fee simple purchase; therefore, may not be worth the difference in cost;

b) changing conditions over time may make the area no longer suitable for agriculture; can conditions of agreement be changed in future?

c) difficulty in monitoring property owners' conformance with easement agreement;

d) question of the extent of the public's right of access to easement lands.

1f) Purchase and Leaseback

Purchase and leaseback is a mechanism whereby government purchases fee simple title to the land, then leases it for specific purposes and periods of time, e.g., for agricultural uses. Purchase and leaseback may be used as a method for maintaining the agricultural character of an area or perhaps as a way to freeze the use of the land until such a time as it is used for park land, urban expansion, etc. -- may be particularly suitable for cranberry farms within Pinelands.

Advantages of purchase and leaseback:

a) maintains character of area while allowing public lands to be income producing:

b) monies derived from rents can be channeled to the municipality to offset the impact of property removed from tax rolls;

c) landowners can pursue agricultural activities, relieved from pressures to sell, such as speculators or rising property taxes;

d) landowner is compensated by government;

e) preserves some of New Jersey's agricultural base.

Disadvantages of purchase and leaseback:

a) utilizes fee simple acquisition; therefore, still very costly;

b) removes land from tax rolls;

c) government acts as a landlord of sorts with all attendant managerial problems.

1g) Purchase and Saleback

Purchase and saleback is similar to purchase and leaseback. In purchase and saleback, government first purchases the fee simple title to the land and at some future date sells it to the private sector with deed restrictions attached. Except for such restrictions, however, the government transfers the title and all rights to another party.

Advantages of purchase and saleback:

a) land is returned to tax rolls;

b) government maintains some control over use of land through deed restrictions;

c) purchase of land protects environmentally sensitive areas from development pressures.

Disadvantages of purchase and saleback:

a) very costly in terms of initial outlays;

b) question of whether government should be involved in real estate which is not intended for public use. (For further advantages and disadvantages along this line, see Land Banking.)

1h) Land Banking

Land banking is a form of public acquisition which involves the purchase and holding of land where urban expansion is anticipated or channeled until such time as that area is deemed ready for development. Land slated for private development may be retained in public ownership and leased to private interests or sold with deed restrictions.

Advantages of land banking:

a) minimizes urban sprawl by governmental retention of land until development is considered appropriate and timely;

b) helps to limit public land speculation;

c) provides for public uses;

d) helps promote sound planning practices by giving public officials a more direct interest in property and its regulation;

e) use of eminent domain by a land bank has been upheld by the Supreme Court of Puerto Rico; therefore, only case to date has been favorable.

Disadvantages of land banking:

a) very costly; government must purchase land far in advance, may not realize any income from leases for years;

b) the need to acquire enough revenue to service debts may conflict with responsibility of the bank to pursue the most effective land use policy;

c) government is acting as land speculator;

d) question of constitutionality by casting government in the role of land speculator.

2. Zoning

Zoning may be used in the Pinelands administrative area to ensure compatible land uses. The key issue revolves around how restrictive zoning can be before a court holds it to be confiscation without compensation. Judicial attitudes toward restrictive zoning have been changing as courts give more credence to the public right with regard to private property, thereby modifying the "absolute rights" view often posited by private property interests. The use of zoning carries with it a heavy burden to demonstrate the basis for restriction as well as how the public interest is involved.

2a) Exclusive Agricultural Zoning

Agricultural zoning may be utilized in areas presently under wetlands cultivation. Exclusive agricultural zoning may also be applicable in areas of blueberry cultivation as well as some conventional tillage agriculture.

Advantages of agricultural zoning:

a) land remains on tax rolls;

b) cranberry cultivation is a low intensity use and therefore consistent with concept of maintaining undeveloped character of portions of the Pinelands;

c) cranberry cultivation depends on water table and water quality which Pinelands management aims to maintain;

d) cranberry agriculture properly undertaken is a profitable business.

Disadvantages of agricultural zoning:

a) land holders may oppose restrictions;

b) cranberry agriculture may not remain economically viable in the future;

c) restrictions on dwelling units allowed must be spelled out clearly; otherwise, large lot subdivision could occur.

2b) Timber Zoning

Like exclusive agricultural zoning, the establishment of timbering or forestry districts precludes other forms of development. Low-intensity recreational uses, e.g., hiking, backpacking, etc., are compatible with timbering activities.

Advantages of timber zoning:

a) land remains on tax rolls;

b) ensures that land will remain undeveloped yet provides for residual use;

c) provide habitats for certain bog plants.

Disadvantages of timber zoning:

a) unregulated timbering practices may have adverse impact on Pinelands ecological balance.

2c) Rural Zoning

Also referred to as large lot zoning, rural zoning generally involves minimum lot sizes of five acres or more. Justification for rural zoning has been related to natural resource restraints.

Advantages of rural zoning:

a) ensures low density uses; generally restricts to residential and agricultural uses;

b) land remains on tax rolls; on-site water and sewer facilities are possible, thereby decreasing need for various capital improvements.

Disadvantages of rural zoning:

a) allows growth to occur in a scattered fashion;

b) can be challenged on grounds of exclusionary zoning;

c) does not prevent development; therefore, is not suitable as technique to preserve open space;

d) legally supportable lot sizes may be below threshold size needed in many parts of the Pinelands which are particularly sensitive.

2d) Cluster Zoning

Cluster zoning allows developers to reduce the size of individual residential lots as long as the overall density of the parcel is maintained. The remaining land may be kept as green area or common open space. The developer is clustering the units on a smaller portion of the tract. The clustering provision is usually an option in a zoning ordinance, but it is possible to require clustering.

Advantages of cluster zoning:

a) provides for contiguous tract of open space;

b) clustering reduces length of road areas and utility lines which must be extended to service development; therefore, may result in savings to developer and home buyer;

c) protects environmentally sensitive portions of tract, e.g., floodways, natural areas;

d) may be more aesthetically pleasing.

Disadvantages of cluster zoning:

a) problem of maintaining common green area, e.g., costs, responsibility, etc.;

b) homes may not be as marketable as conventional tract developments;

c) generally dependent on existence of public sewer and water or on ability of land to support on-site water and sewer at higher densities.

3. Transfer of Development Rights

The basic concept in the transfer of development rights (TDR) is that the right to develop land can be treated as an independent aspect of landownership. Under a TDR scheme, a landowner may sell or

otherwise transfer his right to develop the land to another party while retaining ownership of the land itself. TDR plans can be used as a means to achieve a number of objectives including the preservation of buildings or other properties of historical or architectural significance; the preservation of scenic areas, agricultural lands, or open space; and for general land planning and management.

The ability to sell development rights while otherwise retaining one's property serves to lessen the fiscal inequities which fall on landowners when their property is subjected to restrictive land use controls. Landowners with property designated as open space, for example, may be compensated for the deprivation of use by selling their rights either to a public agency or to a developer within an area designated as appropriate or feasible for development. The TDR concept can therefore be seen as a form of accommodation and a means to alleviate the controversy between private and public interests over the taking issue. The United States Supreme Court published a decision in June 1978 which acknowledged transfer of development rights as an acceptable method for land use control in the case of Penn Central Transportation Company vs. City of New York. The Court held that the application of the transfer did not constitute a taking of one's property because it permitted a reasonable beneficial use and was substantially related to the promotion of the general welfare.

The transfer of development rights may be orchestrated in a number of ways. The system may depend on voluntary transfers among individual landowners or could provide for a public agency serving as the intermediary/depository for the rights. Development rights themselves may be defined and distributed in various fashions. For example, the rights can be distributed in proportion to the unused density permitted under existing zoning in proportion to the assessed or market value of the property or according to land area.

TDR may not be applicable in all areas. There must be a market for the development rights, or else the landowner whose property is under restriction will be no better off financially than before the TDR plan was enacted. Such an example exists in Bass River Township, Burlington County. The previously cited Bass River study concluded that much of the land is environmentally sensitive and therefore unsuitable for development. As a result, the number of transferable development rights per parcel is so small that TDR becomes impractical, except by allowing a high density cluster development in a very small area which would be out of character with the surrounding area.

Advantages of TDR:

a) allows for the preservation of open space and provides a means of compensation to landowners without direct cost to government;

b) allows for large tracts of open land to be amassed, which is superior to the practice of creating small, fragmented parcels of open space via the clustering mechanism;

c) creates a lower cost value of open land which may make more acquisition feasible.

Disadvantages of TDR:

a) no history of applying TDR on intermunicipal basis in New Jersey; current Municipal Land Use Law does not expressly permit TDR on inter-or intramunicipal basis;

b) depends upon the existence of a market for development rights at densities increased by the transfer;

c) necessity of creating higher densities for transfer rights in order to make rights marketable may lead to development incompatible with protection of the Pinelands;

d) government may have to be a purchaser of last resort of development rights.

4. Performance Controls/Environmental Standards

Performance controls attempt to minimize the adverse impacts to the immediate and surrounding environment resulting from proposed development. They specify a level or degree of care which must be met before development will be permitted.

Advantages of performance controls:

a) allow development to occur within the confines of the protection of the environment;

b) do not deprive the owner of reasonable use of his property.

Disadvantages of performance controls:

a) administration of performance standards is complex and difficult;

b) do not prohibit development; only concerned with quality of development;

c) do not discourage scattered and piecemeal development; may in fact encourage it;

d) do not provide for the cumulative impacts of individually approved decisions.

5. Pinelands Region Official Map

Identification on an official map of properties slated for public acquisition in effect freezes that land for a specified period of time.

Advantages of official map:

a) prevents properties from being developed until state is ready and able to acquire them;

b) legally sustainable and administratively practical.

Disadvantages of official map:

a) not authorized under existing law;

b) State may have to give percentage of value (option price) to landowner each year if land is not acquired immediately, thus paying more for property over the long run.

6. Master Planning

A Pinelands master plan should include both short and long term objectives for the Pinelands administrative area and establish the rationale behind the operation of the development management system. The elements of this comprehensive plan might include, but not be limited to, a land use plan which: considers natural conditions such as topography, soil conditions, water supply, drainage, and flood plain areas; shows existing and proposed location, extent, and intensity of future land uses, including both public and private land uses; and includes a statement of standards of population density and development intensity recommended for the Pinelands region. All of the above should be related to some definition of planning capacity in the Pinelands which refers to the ability of a region to accommodate growth and development within the limits defined by existing infrastructure and natural resource capabilities.

Advantages of master planning:

a) establishes framework for decision-making, removing discretion and arbitrariness from decisions;

b) should provide some guidance in terms of future needs of Pinelands region, e.g., housing, utilities, employment, preservation, etc.

7. Development Timing

Development timing involves a system where a specified amount of development is allowed per year, in accordance with a comprehensive plan and a capital improvement program. Development limits are generally determined

according to the capacity of municipal services, with capital improvement planning and investment an integral part of the comprehensive planning process. Thus, development timing does not seek to prohibit development but rather seeks to channel growth into those areas where it can best be accommodated and to exercise reasonable control over the rate of growth.

Development timing, or phased growth, has also been referred to as a system of continuous re-zoning. Land becomes suitable for development (in the eyes of the municipal regulatory body) only when services become available to that area of the municipality. Availability is itself a decision by local authorities. The utilization of a special permit procedure rather than a conventional subdivision procedure affords the governing/regulatory body even greater authority in exacting desirable development patterns and types.

Advantages of development timing:

a) prevents haphazard growth patterns;

b) allows municipal services to keep pace with expanding population;

c) its special permit procedure ensures greater control over quality of development;

d) regulates rate of growth but does not freeze it.

Disadvantages of development timing:

a) criticized as exclusionary; potentially violative of First Amendment right to travel, although it has been upheld in several instances outside New Jersey;

b) attacked as violative of due process clause, in that landowner on outskirts of municipality may be deprived of reasonable use of his property, i.e., developing the land when he desires;

c) cannot prohibit development.

8. Project Review

This is a process of evaluating the expected environmental and socio-economic effects of a proposed project. The project review process incorporates and is closely related to the utilization of performance standards and environmental controls. Project review generally involves the submittal by the developer of an Environmental Impact Statement and the determination by the reviewing agency that the project will not create adverse impacts.

Advantages of project review:

a) provides greater control over proposed development; ensures conformance with environmental standards;

b) keeps State and other agencies apprised of development activity;

c) allows development decisions to be made in terms of a regional perspective;

d) could permit a sound working relationship with local government.

Disadvantages of project review:

a) is a reactive, not a positive force; cannot direct where growth should occur; merely prevents or minimizes adverse impact of development;

b) cannot control growth;

c) its application of guidelines can be attacked as arbitrary;

d) adds another layer to regulatory procedures;

e) confusion may arise due to overlapping State and other regulatory procedures.

9. Taxation

While tax and fee systems are normally constructed to generate revenues, the power of taxation may also serve as a deterrent to development. The fact that land is usually taxed according to its highest and best use serves to encourage development, as landowners attempt to maximize returns on investment. The implementation of a taxing system which is constructed as part of a growth management program therefore implies that changes must be made in New Jersey's tax system, i.e., tax reform.

9a) Preferential Assessment

Land is taxed according to its present use rather than its "highest and best" use. New Jersey presently has a Farmland Assessment Act whereby farmers and agricultural landowners receive reductions in taxes as long as land is kept in agricultural activity. California employs a preferential assessment technique: landowners elect to place land under "enforceable restrictions," i.e., restrict to open space or agricultural use, and may thereby escape "burdensome taxes."

Advantages of preferential assessment:

a) decreases tax burden for farmers and landowners on urban fringe; therefore, rising property taxes are no longer key factor in decision to sell or develop;

b) Farmland Assessment Act of 1964 contains conditions for tax abatement; therefore, it is supportive of New Jersey agricultural industry.

Disadvantages of preferential assessment:

a) no guarantee that land will not be developed; only a three-year rollback tax is assessed when farming activities cease;

b) New Jersey Tax Policy Committee has concluded that the FAA has had little impact in decelerating the conversion of farmland for urban development;

c) may be difficult to impose preferential tax system in only one portion of the State.

9b) User and Benefit Fees

User and benefit fees are not really taxes; rather, they are charges by a governmental agency for providing a service such as public sewer and water. While most utility fees are based on the amount of use, an alternate method of marginal cost pricing could be employed.

New users are charged the regular use fee as well as an additional fee based on the cost of transporting the service to the user. For new developments on the fringe or outside the boundaries of settled areas, user fees might be substantially higher than fees within the existing developed area.

Advantages of user/benefit fees:

a) assess penalty on outlying development; therefore, discourage scattered development patterns;

b) existing residents do not assume financial burden for extending services to fringe areas.

Disadvantages of user/benefit fees:

a) serve only as deterrent to scattered development patterns; differences in cost to user may be minimal; therefore, no assurance that sprawl patterns will cease;

b) limited to areas served by public water and sewer, where such user fees could be imposed.

9c) Urban and Rural Service Areas

Areas are distinguished by the level of services they are expected to receive, and landowners pay taxes accordingly. The extension of public services is a decision influencing those areas to be developed and those where development will be deferred. Since service levels are low, taxes may be low, thereby significantly reducing the tax burden on farm and open space lands.

Advantages of urban and rural service areas:

a) relieve some of the pressures to sell or develop;

b) specify development versus nondevelopment/ deferred zones; therefore, they are part of the conscious policy decision by the governing body concerning future land uses;

c) discourage sprawl, or at least channel it to limited areas.

Disadvantages of urban and rural service areas:

a) cannot prevent development in rural areas;

b) may subsidize land speculators who are holding lands in a rural area until they are ready to develop these properties;

c) utility authorities operate to expand their service area and are not attuned to environmental goals.

9d) Windfall Taxes

A windfall is any increase in the value of real estate other than that caused by the owner or by general inflation. (Success in speculation in real estate constitutes a windfall.) The British term "betterment" is roughly synonymous with windfall; the concept of "recouping the betterment" which has accrued to a piece of property as a result of central or local government action is therefore analagous to windfall taxes.

Some measure of windfall is always recaptured by taxes, be they capital gains or income sales or property taxes. However, these taxes are not designed to recapture part of the windfall nor to redistribute part of the gain to those property owners who have experienced a "wipeout" i.e., where land values have been diminished by central or local government action.

Advantages of windfall taxes:

a) windfall recapture is a good revenue source, and the community is only asking for a return of increases in land wealth it creates;

b) less socialistic than public land ownership, which is a competing technique for keeping land value increases in the public domain;

c) windfall recapture tax (charge, exaction, levy fee, etc.) would not raise land prices because supply is fixed;

d) when the public needs to acquire land, it should not have to pay a price increased by its own activities.

Disadvantages of windfall taxes:

a) generate opposition from those who feel that they have a right to keep those windfalls they are lucky enough to obtain;

b) may be difficult to agree on definition of "windfall," in order to arrive at tax;

c) agency which administers tax system must be impartial.

10. Development Moratoria

Development moratoria involve bans on new construction within a given area for a specified period of time. Moratoria are generally interim measures enacted to enforce the status quo until such time as a comprehensive plan is completed for the area. The moratorium can be implemented via techniques such as the cessation of building permits and/or a freeze on new water and sewer hookups.

Advantages of development moratoria:

a) permit planning and ordinance writing to proceed relatively free of development pressures;

b) prevent uses that will not conform to the adopted ordinances;

c) promote public debate on issues involved, as planning commission now has sufficient time to generate citizen participation;

d) there is prior experience in New Jersey with the use of a moratorium on a regional level, i.e., Hackensack Meadowlands.

Disadvantages of development moratoria:

a) courts have rarely upheld total prohibitions on development; time period must be "reasonable" so as not to be a total stop-growth measure;

b) may actually accelerate development of an area, as developers speed up activities so as to avoid the imposition of the moratorium.

11. Incentives for Low Technology Lifestyles

The phrase "low technology lifestyles" is used by the Committee to describe a series of innovations in conventional living patterns that could be encouraged in the special environment of the Pinelands. The overriding concern is with the impact of "conventional" residential development -- the single-family, detached house on one-quarter to two acres that is the prototype for new construction. The encouragement of innovative approaches to residential development is viewed here as a method of management that seeks the best in design ideas and allows variance within the framework of existing design standards where a new method of design or living would be environmentally compatible with the Pinelands resources.

The Committee recognizes that the concept of low technology lifestyles is a limited opportunity situation, to be pursued if feasible, and is not a region-wide objective. It is not the absolute elimination of subdivision requirements or a back-to-nature objective. The intent is to provide opportunities for those who wish to live as closely as possible within the limits of the Pinelands natural environment.

The Pinelands will be extensively damaged or destroyed if typical development continues. Destruction of vegetation is often the immediate result. Conventional development practice usually requires immediate leveling of the land and removal of vegetation. Since green lawns are a part of most developments, sod or seed, lime, and fertilizer soon complete the development. To keep the lawns green, nutrients are added to the soil each year. The loose sands allow these materials to sink quickly into the ground water. If private septic systems are used, the effluent also adds to the ground water pollution.

Extensive covering of the land surface with paved roads, driveways, sidewalks, and roofs prevents the rain from entering the ground. Storm water is channeled off, causing erosion, siltation, and destruction of swamps, marshes, lakes, streams, and rivers as a result.

Combining increased storm water run-off, heavy concentrations of ground water nutrients, and non-point source pollution results in the pollution of Pinelands surface waters and a marked change in characteristics. The normally acidic water may become neutral and conducive to new plant growth.

Forest fire, a common necessary element for Pinelands preservation, is not welcome in developed areas. Without fire, the pine forests will change and be gone forever. Alternatives do exist. Man and the

Pinelands can exist side by side if we plan development that is in harmony with the ecological needs of the Pinelands. Development should not take place in specific areas such as the Plains, stream corridors, head water areas, agricultural lands, and lowland sites. Low-density development may take place in other upland zones. Development should include and be guided by a number of environmental considerations.

Large lot size may be a major requirement for any development. Depending on local conditions, 10-, 20-, or 50-acre lots may be appropriate. Low density is also a requirement which is consistent with large lot size.

Well planned low technology housing would feature: no hard paving, no lawns requiring lime and fertilizer, native plant landscaping, composting toilets, super insulation, minimal electric appliances, water conserving devices, and possible sonic clothes washing.

Interior roads would have permeable surfaces. Major shopping and medical facilities would be more distant, and municipal services would be limited.

Commercial and industrial operations should be based on the limited Pinelands natural resources. Individual craft persons, such as potters, woodworkers, weavers, and blacksmiths, might establish commercial enterprises and serve the tourist industry. Canoeing and camping outfitters would also provide recreation services for visitors to the region.

People can live and work in the Pinelands without destroying it if the natural character and ecological interrelationships are understood and integrated into the planning and development process. Such a low technology lifestyle would provide individuals with an opportunity to live within the Pinelands while maintaining sensitivity to its unique environmental features.

II. E. ECONOMIC IMPACT OF PLANNING AND MANAGEMENT

This section of the report presents economic impact information that was generated in the absence of a specific comprehensive plan for the Pinelands. The Committee's report and recommendations are not a detailed land use plan or zoning scheme; rather the report recommends land use policies for the Governor and Legislature to consider that could form the basis for a land use plan. As a result, traditional economic impact analyses are not possible. There are simply too many unknowns regarding the specific rules, regulations, zoning, environmental controls, real estate transfers, etc. which one needs for a specific assessment. This is particularly true with regard to the Pinelands Protection Area.

However, given the nature of the Committee's recommendations for the Preservation Area, it is possible to do some basic economic impact analyses for the towns in this Area. The Pinelands Review Committee has recommended that further development be restricted to maintain this land area as closely as possible in its near wilderness state. The techniques which the Committee reviewed to accomplish this include outright and lesser purchase of land, exclusive agricultural zoning, recreation zoning

and the transfer of development rights among others. Some of the techniques would remove land from municipal tax rolls. The ultimate degree of impact that could be experienced by municipalities within the Preservation Area would depend on the extent to which purchase of land or interests in land would remove land from the tax base or new zoning would reduce value. While a traditional economic impact analysis cannot be performed, it is possible to estimate the extreme economic impact on individual municipalities in the Preservation Area with respect to their real property tax revenues.

The hypothesis is that this extreme impact would occur if all the vacant land within the Preservation Area was acquired by government and removed from the local real property tax base. It is assumed that land which is already developed for residential, commercial, industrial and agricultural use would not be acquired or removed from the tax rolls. In addition, it is not anticipated that all of the vacant land would be acquired. However, in order to initiate discussion with some measure of the economic impact of the Preservation Area proposals, the assumption is made that all vacant land would be removed from the property tax base.

It is important to note that real property tax revenues constitute only a portion of the total revenue base of a municipality. A complete list of components of the municipal revenue base includes:

1. Property taxes collected (this is generally a stable figure readily predictable and not normally erratic from year to year);

2. Payments in-lieu-of taxes (this revenue source is subject to change);

3. Delinquent tax and lien collections (this revenue source is subject to wide fluctuation);

4. Business personalty replacement taxes (this revenue source is relatively stable);

5. Taxes from public utilities (this is also a stable revenue source and for some communities represents income almost equal to property tax revenues);

6. Other miscellaneous tax revenues (this revenue source is subject to wide variations);

7. State aid revenues (this revenue source is subject to wide variations);

8. Federal aid revenues (this revenue source is subject to wide variations);

9. State and Local Fiscal Assistance Act Utilized (this revenue source is relatively stable);

10. Sale of acquired property (this revenue source is subject to wide fluctuations);

11. Other miscellaneous revenues (this revenue source is subject to wide variations);

12. Prior years surplus appropriated (this revenue source is subject to wide variations).

The actual degree of impact which removal of vacant land would have on the total revenue base is a direct function of the ratio of revenues realized from property taxes to revenue from all other revenue sources. The significance of this fact can be illustrated using Lacey Township and Washington Township as examples. The 1976 Lacey Township "Property Taxes Collected" amounted to $3,471,415.41, or 38.4 percent of the total municipal revenues of $9,031,014.92. "Taxes from Public Utilities" amounted to $3,169,255.21, or 35.1 percent of the total revenues. The remaining 26.5 percent of municipal revenues realized came from all other categories listed above. If all of the vacant land in Lacey Township lying within the Preservation Area were acquired, an estimated property tax revenue reduction of 13 percent would result ($444,264 using 1976 figures). This represents an actual impact of about 4.9 percent in relation to the total revenue base of Lacey Township.

Lacey Township is unusual in that a very large source of its revenue is derived from the gross sales of an electric generating station. In contrast, Washington Township derived 74.1 percent of its 1976 total revenues from property taxes ($451,511.56 out of total revenues of $609,380.01). As a result, Washington Township would be impacted far greater than Lacey by a 12 percent reduction in its property tax base. In terms of the total revenue picture this percentage decrease would amount to 8.9 percent, or $54,181.39 using 1976 figures. Lacey Township would experience only a 4.9 percent decrease if its property tax revenue was reduced 13 percent.

As noted above, the Lacey and Washington Township examples use 1976 data while 1977 data was used in the original analysis of each Preservation Area municipality. 1977 data was not yet available for the several components which make up the category "Revenues-Realized." Thus, the financial impacts shown in the following analysis are "extreme case" impacts which apply only to the property tax portion of the municipal revenue base. Other sources of municipal revenues could serve to lessen these impacts.

The methodology used in the individual municipal analyses was as follows. First the maximum acreage of vacant land lying within the Preservation Area was determined. This acreage consisted of the total land within the Preservation Area minus all State, Federal and County-

owned land, all existing developed acreage, and all active agricultural acreage.* It was then assumed that all the vacant land would be acquired by the State and thus removed from the local tax rolls. Individual municipal impacts were computed by multiplying the average assessed value of vacant land per acre by the municipal tax rate per $100 (not equalized) to get the total potential revenue that could be produced assuming tax collection at 100 percent.** The total potential revenue that could be produced through taxes on vacant land was then subtracted from the total potential property tax revenue to obtain the financial impact for each municipality which is given in the "Summary of Financial Impact" table which follows.

The Governor's Pinelands Review Committee recognizes that additional and more refined analyses are needed. Subjects which remain to be dealt with include the effects of municipal budget "Caps", the effects of reduced rates of tax collection in some municipalities, the nature of future land uses which would constitute the future rateables of the area, and others. It is probably safe to assume that the predominant land use, not only in the Pinelands, but throughout New Jersey, will continue to be the single family residence: a use which most often represents a tax deficit to a town. The Pinelands have traditionally provided housing that is often, and sometimes substantially, lower in cost than the State average. With the exception of retirement developments and very expensive homes, single family housing does not normally produce enough tax revenues to meet its own service costs, particularly for education. Future economic impact analyses must have the benefit of some concept of future development.

This general analysis shows that some municipalities would be impacted significantly more than others. Nevertheless it is important to note that the extreme case financial impact of the Preservation Area proposals is about $2.2 million for the twenty-four municipalities. This is a relatively small amount in light of the public goals for the Preservation Area.

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* The estimates for agricultural acreage were provided by County Agricultural Agents and Soil Conservation District Conservationists. It should be noted that in all cases except Woodland, Washington and Tabernacle Townships in Burlington County, the acreage supplied are estimates of land in active agricultural production. Forested areas which may be receiving farmland assessment as woodlots are not included.

**In actuality, tax collection in the Preservation Area municipalities is substantially less than 100 percent. Specific examples include: Woodland Township 74.27%; Bass River Township 84.12%; Lacey Township 83.55%; Shamong Township 90.64% and Tabernacle Township 83.22%. It must be noted, however, that municipal budgets are based on projections of revenues receivable, not on total assessment values. Thus by assuming 100 percent collection for this analysis, an extreme impact format is maintained. (N.J. Department of Community Affairs, Thirty-Ninth Annual Report of the Division of Local Government Services, Trenton 1976.)

SUMMARY OF FINANCIAL IMPACT
POSSIBLE WITHIN THE PRESERVATION AREA*
(by municipality)

COUNTY & MUNICIPALITY	1977 Population (estimated)	Preservation Area (acres)	Preservation Area Agriculture (acres)	Preservation Area Vacant Land (acres)	Vacant Land (assessed value/acre)	Tax Rate (Equalized Tax Rate)	Potential Revenue Loss	Total Potential Tax Revenue	Percent Decrease in Potential Revenue
ATLANTIC									
Egg Harbor	14,837	2,276	0	2,276	$ 141	2.84 (3.62)	$ 9,114	$1,181,530	0.8%
Galloway	10,678	3,013	100	2,913	$1,037	2.82 (2.73)	$ 85,186	$3,558,375	2%
Hammonton	12,081	8,311	0	0	-----	4.43 (2.96)	0	$3,419,624	0%
Mullica	3,744	5,430	300	1,998	$ 411	3.04 (2.94)	$ 24,964	$1,441,282	2%
Port Republic	760	1,280	30	495	$ 463	3.59 (1.89)	$ 8,227	$ 259,026	3%
BURLINGTON									
Bass River	1,087	38,542	370	26,994	$ 210	3.54 (2.28)	$200,673	$ 634,525	32%
Pemberton	1,495	9,454	360	3,021	$1,045	2.81 (2.51)	$ 88,710	$5,272,607	2%
Medford	13,008	1,710	0	163	$3,336	2.52 (2.68)	$ 13,702	$6,249,221	0.2%
New Hanover	17,082	4,800	0	0	---------	1.77 (1.74)	$ 0	$ 112,008	0%
Shamong	2,782	22,544	760	4,700	$ 799	2.26 (2.12)	$ 84,869	$ 845,158	10.0%
Tabernacle	3,960	19,470	4,900	4,203	$1,015	2.32 (2.31)	$ 98,972	$1,102,546	9.0%
Washington	714	68,672	8,965	11,939	$ 118	3.06 (2.04)	$ 43,229	$ 356,083	12.0%
Woodland	2,258	61,056	12,453	31,686	$ 552	2.04 (1.71)	$356,509	$ 545,206	66.0%

SUMMARY OF FINANCIAL IMPACT
POSSIBLE WITHIN THE PRESERVATION AREA*
(by municipality)

COUNTY & MUNICIPALITY	1977 Population (Estimated)	Preservation Area (acres)	Preservation Area Agriculture (acres)	Preservation Area Vacant Land (acres)	Vacant Land (assessed value/acre)	Tax Rate (Equalized Tax Rate)	Potential Revenue Loss	Total Potential Tax Revenue	Percent Decrease in Potential Revenue
CAMDEN									
Waterford	5,835	13,570	0	0	$-----	4.25 (2.64)	$ 0	$1,825,139	0%
Winslow	17,508	492	0	0	$-----	2.54 (2.81)	$ 0	$5,351,812	0%
OCEAN									
Barnegat	6,815	6,038	100	3,913	$1,952	2.45 (2.43)	$187,135	$2,543,825	7%
Berkeley	16,717	2,665	0	8,043	$1,791	2.97 (2.22)	$108,673	$7,008,122	2%
Eagleswood	993	1,974	0	827	$1,070	3.19 (2.60)	$ 28,232	$ 492,297	6%
Jackson	24,223	18,100	0	0	$-----	2.73 (2.93)	$ 0	$8,520,090	0%
Lacey	12,219	29,878	200	21,496	$1,441	1.76 (1.18)	$545,172	$4,185,311	13%
Little Egg Harb.	7,538	9,690	0	5,881	$ 657	2.88 (2.30)	$111,278	$3,365,311	3%
Manchester	21,711	24,816	0	3,959	$1,416	1.76 (1.93)	$ 98,664	$5,039,983	2%
Plumstead	4,695	11,151	0	0	$-----	2.24 (2.17)	$ 0	$ 878,419	0%
Stafford	8,008	426	0	241	$2,211	2.01 (1.67)	$ 10,710	$3,159,638	0.3%

* 1. Assessment and tax rate data from: a) "Three Year Rateable Comparison Report, 1975-76-77", N.J. Division of Taxation, Local Property Tax and Public Utility Branch.
b) "Thirty-Ninth Annual Report of the Division of Local Government Services", 1976, N.J. Department of Community Affairs.

2. Acreage data from: County Agricultural Agents, Soil Conservation Districts and N.J. Atlas Sheet map series.

3. Population estimates from: "Population Estimates for New Jersey, July 1, 1977," Division of Planning and Research, N.J. Department of Labor & Industry.

II. F. PUBLIC PARTICIPATION

Public involvement is a widely accepted practice in land use planning today. It has therefore become a useful process for providing more responsive public policies and planning programs more reflective of the public's view. By providing opportunities for the public to enter the decision-making process, a higher level of communication, comprehension, and even concurrence can be achieved. Officials will become more aware of the priorities, values, and needs of the public, and the citizens will be able to exert a measure of control over their destiny.

Land use decisions directly effect private property rights and, ultimately, the community at large. While citizens may not personally favor a specific decision, they may be less vigorous in their opposition -- if not supportive -- if they have their fair opportunity to be heard. The following section describes several regional and State citizen participation programs now in operation.

The State of Washington's public participation program is a highly structured process where the citizens express their preferences on broadly defined issues such as growth or no growth, the conservation of energy, etc. A Statewide Task Force consisting of representatives from citizen groups and technical analysts prepares "statements of purpose." These are forwarded to the Governor and the Legislature as recommendations to be used as an input to legislative and fiscal actions. The communication techniques used consist of mass mailings, surveys, TV and radio coverage, areawide conferences, and a series of intensive three-day seminars.

Public involvement is a top priority of Oregon's land use planning process, and the people actually make the choices. The State's Land Conservation and Development Commission (LCDC) is responsible for developing land use goals and guidelines for the State. Public involvement was included in each stage of the decision-making process. LCDC staff prepared material and conducted public meetings throughout the State, during which time the goals and guidelines were formed. Two final hearings were held before the goals were adopted by the Commission, which then gave them the full force of the law.

New Jersey's Department of Environmental Protection's Office of Coastal Zone Management (OCZM) is required by law (under the Federal Coastal Zone Management Act of 1972) to have a public participation program. Their main objectives are to raise the level of public awareness and to obtain knowledge and opinions from citizens. The Act calls for two public hearings on the draft plan before it is submitted to the Federal government. In addition to the public hearings, public meetings, and workshops, OCZM holds monthly meetings with an Environmental Advisory Group composed of leaders of civic and environmental organizations.

California's citizen participation program was initiated by a referendum vote which established the Coastal Zone Conservation Commission and six regional commissions. Authority was granted to prepare a Coastal Plan and to exercise permit control during the time the planning process was underway. Under the guidance of the State Commission, citizen participation programs were designed around the role of the regional commissions.

The regions used a variety of approaches; however, the general communication techniques used consisted of the distribution of literature at informal meetings and public hearings where specific portions of the Coastal Plan were formally considered. With a coastal area as large as that of California, the use of the six sub-commissions provided for the diversity of the affected citizens' interests and goals.

A primary step in initiating any citizen involvement program, after careful consideration of defining what the process is to accomplish, is informing the public of the basic concepts and processes of decision making. This will improve comprehension and communication between the decision maker and the citizen. This step, along with providing information about current policy issues and notifying the public about opportunities to participate, can avoid delay by having a well informed, up-to-date public.

Workshops and public meetings are two common mechanisms for initially educating the public and for providing information on current policy issues. Communication techniques often used are mass mailings, questionnaires, mass media coverage, public hearings, and advisory councils. A broad variety of citizens and citizen groups should be represented in any program to ensure that a wide range of perspectives is addressed. The goal of any effective citizen participation program is to ensure that its interests and desires are properly accounted for.

Any planning and management program for the Pinelands should develop and carry out a program of citizen participation. While those citizens residing in the Pinelands will be directly affected by such a program, citizens and interested groups throughout the State should be invited to participate. Regardless of how it is to be accomplished, effective citizen participation requires a commitment of staff and financial resources.

An advisory committee should be established to involve the public in the decision making of a Pinelands program and assist in developing goals and guidelines for the agency. The advisory group could be composed of subgroups representing each of the counties within the District. This citizen group should serve an advisory function to the county representative on the Commission. The group could have the responsibility for conducting workshops and informing the public at large of the various activities of the Pinelands Planning and Management Program, as well as the effect on the specific county. Also, the group could relate issues of concern to the Commission and advise their respective county representative.

Whatever structure is utilized, citizen involvement in the Pinelands management program should be an ongoing process. The benefits to be derived from an informed and active citizenry far outweigh the investment of staff time and monies utilized to make this mechanism effective.

SECTION III: RECOMMENDATIONS

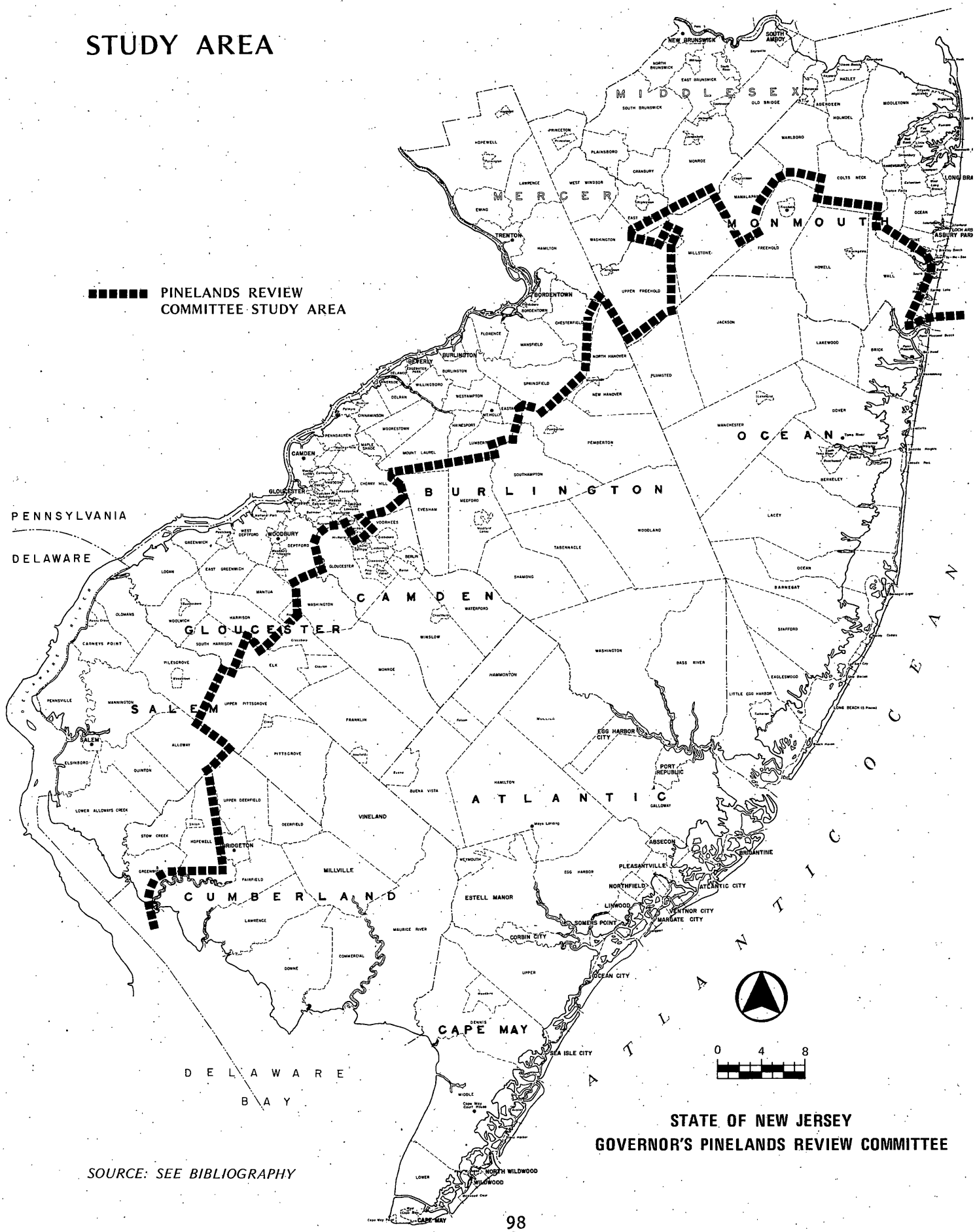
III. A: THE PINELANDS PLANNING AND MANAGEMENT COMMISSION

The Pinelands Review Committee has investigated the various environmental and ecological features which make up the Pinelands and has identified those factors which threaten its continued existence. (A map showing the Committee's Study Area is shown on page 98.) Early in its deliberations, the Committee recognized that the planning and management of the Pinelands is a regional issue, requiring some kind of regional agency which would have authority for the area.

The problems and issues facing the Pinelands are regional in character and amply documented. The planning, administration, and provision of significant support for solutions to those areawide problems require commensurate resources, authority, and jurisdiction. Accepting this premise is a prerequisite to understanding why the administration of on-going State government programs over the long term is incapable of achieving the objectives outlined in Executive Order 56 and further elaborated by the Pinelands Review Committee. The Committee believes that near term (interim) objectives can be achieved by calling for creative administration of current programs, but the probability of their being sustained over time is unlikely.

State government, in reality, is composed of hundreds of individual operations that derive their reason for being from a host of widely dispersed statutory mandates and Federal requirements. These have been organized within cabinet departments and collectively comprise the missions of those departments. In some cases, reordering some of these mandates and requirements may not be legally or technically feasible since the primary mission may be altered too much. Further, some of these programs may not have the ability to be administered in accordance with a comprehensive plan. In cases where such re-focusing could take place, the spectre of coordination, of reaching into different departments to achieve a common set of objectives established outside of the primary department mandate(s), is an enormous and difficult undertaking. Consequently, it is appropriate to ask who would have the day-to-day responsibility for this. Certainly the Governor is the figurehead, but for operations it is impractical to involve the Governor directly. The position carries a cabinet-level responsibility. In fact, if the person who occupies this position has the ability to intervene with department operations which are inconsistent with certain Pinelands' objectives, his status actually is somewhat above cabinet level. Effectively, this person would be operating as a planning and management czar over hundreds of thousands of acres. As a practical matter, it would be naive to think that such a position could be maintained over the long run - possibly not even over the short run.

STUDY AREA



SOURCE: SEE BIBLIOGRAPHY

STATE OF NEW JERSEY
GOVERNOR'S PINELANDS REVIEW COMMITTEE

Further, those programs within departments which would be focused on the Pines may be placed at a competitive disadvantage within that department for such things as budget requests and the like, since their mission would now be incidental to the primary mission of the department. This is further complicated by the identification and location of a competent staff which would have as its long term assignment the planning and management program for the Pinelands and coordination responsibilities in other departments.

The discussion so far has centered on State government and its inherent weaknesses at reorganizing toward a commonly agreed upon set of objectives, but the biggest gap occurs between the State and local levels. County-wide planning agencies are more attuned to regional issues than are municipal governments. Therefore a county structure could be seen as a way to bridge the gap between the state and municipal levels. However, counties lack the statutory authority to regulate land uses to the degree of both state and municipal governments. In addition, since management of the Pinelands is a regional task, county governments would have to be coordinated in this effort. The necessity of expanding county authority as well as coordinating seven individual governments presents a dual problem which is not immediately resolvable.

Municipal government, with some notable exceptions, has virtually exclusive authority over land use within its jurisdiction. This small jurisdiction is insufficient to provide the perspective required to enhance and protect regional values. In fact, it would be unusual for a town to do anything but advocate its own interest. Local government by itself, particularly in the rural areas of the State, lacks the financial and technical resources to deal with complex regional environmental problems and, while its authority is extensive in the subject of land use, the administration of that authority generally breaks down at the municipal boundary, especially where regional problems are involved.

This gap between local and regional interest regarding land use and environmental protection cannot be bridged by the State's various programs. In the first place, the vast majority of acreage in the region -- upland forests -- is relatively free of State regulatory programs. In the second place, those programs that can be applied are single-purpose in nature and may even work against the objectives. As an example, the Pine Barrens Water Quality Program is not a land management program and, taken by itself, would actually encourage scattered and piecemeal development. Also, the effect of Chapter 199 is not in land management but in waste water management through the promulgation of specifications for on-site disposal.

The inescapable conclusion is that implementation of regional objectives over the long term cannot be accomplished through the magic of coordinating the administration of State and other governmental responsibilities. It demands, if one is serious, a legislative and executive mandate of its own. It should be noted, however, that this does not make local planning administration mutually exclusive with regional objectives. What is required is a system that ensures the follow-through of regional objectives.

The Pinelands Review Committee therefore recommends the establishment by law of a new agency, the Pinelands Planning and Management Commission, which shall be responsible for the preservation and protection of the resources of the Pinelands within the jurisdiction defined as the Pinelands Planning and Management District.

The Commission would be composed of fifteen members, seven of whom represent the seven Pinelands counties and are appointed by their respective governing bodies as provided for in the National Parks and Recreation Act of 1978. Seven of the members would be appointed by the Governor with some residing in the District. The fifteenth member would be a representative of the U.S. Secretary of the Interior. It is recommended that the members who are appointed to serve as the planning entity under the Federal Pinelands legislation be carried over into the Pinelands Regional Commission as provided for in the state legislation, with a staggered term procedure superimposed on the initial appointments.

Article 5, Sec. 4, paragraph 1 of the 1947 New Jersey Constitution states: "All executive and administrative offices, departments and instrumentalities of the State government...shall be located by law among and within not more than twenty principal departments..." To accomplish the greatest degree of autonomy from the many different and sometimes conflicting day to day operating responsibilities of a cabinet officer and his department, it is recommended that the Commission be located "in, but not of" either the Department of Community Affairs or Environmental Protection.

III. B. PINELANDS PLANNING AND MANAGEMENT DISTRICT

The Pinelands Review Committee was charged by Executive Order No. 56 to identify the boundaries of the Pinelands of New Jersey and to recommend to the Governor a delineation of that portion of the Pinelands necessary to accomplish the purposes of the Executive Order. The Committee was further charged with the responsibility of designating areas within the Pinelands for special treatment or strategies to help achieve the objectives of the Order. In order to meet the goals and objectives of planning and managing the various environmental, ecological, and natural features of the Pinelands, the Committee recommends the establishment of the area to be known as the Pinelands Planning and Management District. This District is further delineated into a Pinelands Preservation Area and a Pinelands Protection Area for the development and implementation of specific planning and management objectives.

The Committee recognizes that the ground water supply within the District, particularly that from the Cohansey aquifer, is a critical element of the Pinelands ecology and economy, e.g., cranberry agriculture. With proper management and monitoring of withdrawals, this ground water supply should be maintained for the use of the future Pinelands area population. Until it can be proven that water diversion would not adversely affect the Pinelands ecosystem, the Committee recommends against the exportation of ground water.

The goal of the Pinelands Preservation Area is to preserve a contiguous block of land of sufficient scale with its attendant environmental and ecological features which comprises the unique ecology of the region in a state which approaches wilderness to the greatest extent possible.

This Area, which includes the "Heart of the Pines," contains lands which are significant because of their value as wildlife habitat, recreation areas, or places where the natural features of the land are so extraordinary and unique that the area should be maintained and perpetuated in a natural state. Additionally, the Pinelands Preservation Area represents one of the few remaining extensive masses of undeveloped land within close proximity to the New York and Philadelphia metropolitan areas, all of the remainder of urban New Jersey, and the highly developed Mid-Atlantic region. The following are goals for the planning and management of all lands within the Pinelands Preservation Area:

1. To preserve an extensive and contiguous undeveloped land mass in its natural state which would have as its purpose the preservation of a Pinelands wilderness containing the unique ecological features which have distinguished the Pinelands as being more than a large expanse of undeveloped forest.

2. To promote compatible agricultural, forestry, and recreational land uses within the framework of maintaining a wilderness area.

3. To prevent all development which is incompatible with the preservation of lands which are primarily undeveloped.

4. To provide a sufficient amount of undeveloped land to accommodate specific wilderness management practices, such as selective burning, which are necessary to ensure the maintenance of the area's ecology.

5. To protect and preserve the quantity and quality of existing surface and ground water for the citizens of the Pinelands.

The goal of the Pinelands Protection Area is the management of growth and conservation of natural resources and the enhancement of a living environment that will afford people the opportunity to live in a Pinelands setting. While much of the land within the Protection Area is significant from the standpoint of the protection and maintenance of the Pinelands environment, the lands do not contain the distinctive or unique features to the extent they are found within the Preservation Area. The planning and management of all lands within the Protection Area shall be governed by the following goals:

1. To maintain, through planned management, the essential vegetative character in order to afford existing and prospective residents the opportunity to live in a Pinelands environment.

2. To protect and maintain existing surface and ground water quality for the region's current and prospective users.

3. To promote the continuation and expansion of compatible conventional tillage agriculture and livestock production.

4. To discourage piecemeal and scattered development.

5. To encourage appropriate settlement patterns of residential, commercial, and other development which is compatible with the protection of the Preservation Area and the maintenance

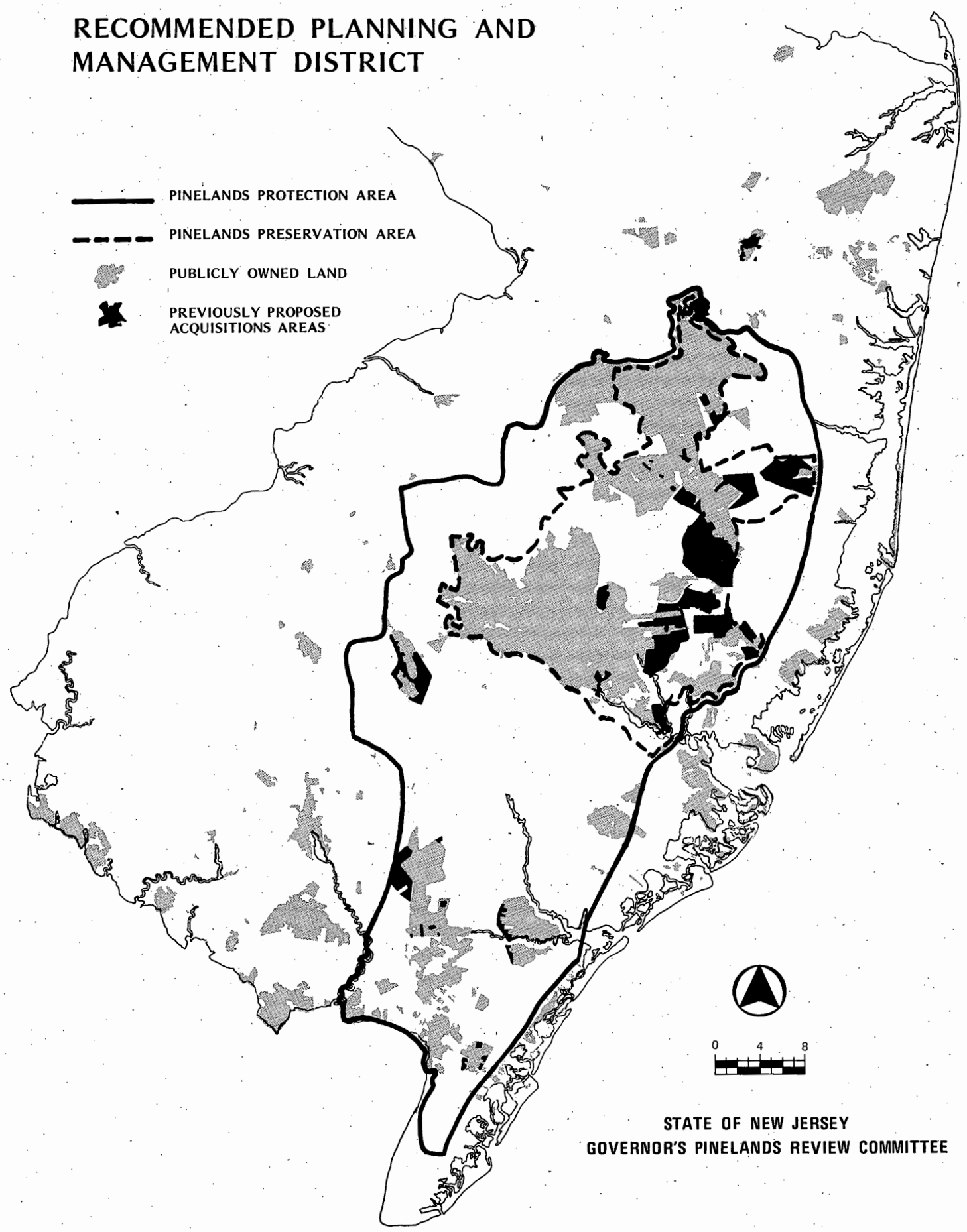
of a Pinelands living environment and reflective of the economic forces in and surrounding the Area.

6. To accommodate in an orderly way existing and future regional growth influences while being particularly sensitive to the potential cumulative adverse impacts of growth and development on the residents and the environment.

The delineation of precise boundaries for the Pinelands Review Committee's recommended Planning and Management District is based, wherever possible, upon easily identifiable cultural and natural features such as roads, municipal and public property boundary lines, and streams. The Committee is well aware that such features do not necessarily coincide with the precise locations of environmental, ecological, or natural resource boundaries. However, the Committee has determined that for the purpose of preservation and protection of the Pinelands, the advantages to be gained through the use of readily identifiable features for boundary delineations outweigh the advantages inherent in a survey of boundary lines based solely on ecological or natural resource factors. At the least, the cost of such a survey would be great, diverting ever diminishing funds that might be put to better use in accomplishing the goals and objectives. Also, the Committee has utilized cultural features that are reasonably congruent with the locations of specific areas of environmental and ecological concern and which, therefore, provide logical boundary lines. The primary concern of the Committee in developing the boundary lines is to include within the boundaries a major portion of the State's characteristic Pinelands vegetation and to include to the greatest extent possible the areas of lowland vegetation due to the unique species of flora and fauna which are found in that vegetative association as well as the sensitivity of the wet soils found there. Inclusion of a major portion of the area underlain by the Cohansey aquifer was also considered an important factor.

The Pinelands Review Committee recommends the following boundary for the Pinelands Planning and Management District: (Note that the Pinelands Protection Area represents the jurisdictional extent of the District within which the Pinelands Preservation Area is included. A map of the District appears on page 103. The boundary description provided here follows the boundary as depicted on the Governor's Pinelands Review Committee's Official Map of the Pinelands Planning and Management District, 1/11/79. The base for the Official Map is the New Jersey Department of Transportation, General Highway Map series, sheets 33-64, showing state highways as of July 1, 1976, scale: one inch equals one-half mile. However, please note that wherever, in the following boundary descriptions, Federally or State-owned lands serve as a boundary, the actual, surveyed boundary of the public property is the intended boundary line. The public property lines shown on the Committee's official map are for illustration only.

RECOMMENDED PLANNING AND MANAGEMENT DISTRICT



PINELANDS PROTECTION AREA BOUNDARY

1. Follow the Garden State Parkway south from Toms River crossing to Stafford Forge and Bass River State Forests where they extend east of the Parkway. Follow the State forest boundaries wherever they extend east of the Parkway, then continue along the Parkway southward to junction with N.J. State Route 47.

2. Follow N.J. State Route 47 north to southern boundary of Dennis Creek Fish and Wildlife Management Area.

3. Follow Dennis Creek Fish and Wildlife Management Area southern boundary west to the Delaware Bay shore.

4. Follow the Delaware Bay shore north and west to "East Point" on the Maurice River Cove.

5. At "East Point" follow the east bank of the Maurice River north to the confluence of the Maurice River and the Manamuskin River.

6. From the confluence follow the east bank of the Manamuskin River north to N.J. State Route 49.

7. Follow N.J. State Route 49 northwest to its intersection with Cumberland County Route 671.

8. Follow Cumberland County Route 671 and then Atlantic County Route 671 (both are known as Union Road) north to Atlantic County Route 557.

9. Follow Atlantic County Route 557 north to its intersection with U.S. Route 40.

10. Follow U.S. Route 40 northwest to its intersection with Gloucester County Route 555.

11. Follow Gloucester County Route 555 north to intersection with U.S. Route 322 and Gloucester County Rt. 536.

12. Follow Gloucester County Route 536 (New Brooklyn Road) east to intersection with Camden County Route 705 at New Brooklyn Lake.

13. Follow the western shoreline of New Brooklyn Lake northward to the main stem of the Great Egg Harbor River.

14. Follow the east bank of the Great Egg Harbor River north to its intersection with the east bank of Tinkers Branch.

15. Follow Tinkers Branch northeast to the corporate boundary of Berlin Boro.

16. Follow the Berlin Boro corporate boundary east to its intersection with the New Jersey Department of Environmental Protection's Central Pine Barrens Critical Area boundary (as shown on N.J.D.E.P. official map).

17. Follow the Central Pine Barrens Critical Area boundary north and east to its intersection with the Burlington County-Camden County boundary.

18. Follow the Burlington-Camden County boundary north to its intersection with N.J. State Route 73.

19. Follow N.J. State Route 73 north to its intersection with N.J. State Route 70.

20. Follow N.J. State Route 70 east to its intersection with U.S. Route 206.

21. Follow U.S. Route 206 north to Burlington County Route 530.

22. Follow Burlington County Route 530 east to Pemberton Borough boundary.

23. Follow Pemberton Borough boundary south, east, north, and then west to Burlington County Route 616.

24. Follow Burlington County Route 616, Burlington County Route 663 and thence north to Springfield Township boundary.

25. Follow Springfield Township boundary east to Fort Dix/McGuire Air Force Base Military Reservation boundary.

26. Follow Military Reservation boundary east to Colliers Mills Fish and Wildlife Management Area.

27. Follow Colliers Mills Fish and Wildlife Management Area boundary to intersection of Prospertown-Toms River Road with Ocean County Route 571.

28. Follow Ocean County Route 571 south to intersection with Bowman Road.

29. Follow Bowman Road northeast to main branch of the Toms River.

30. Follow Toms River to Garden State Parkway (point of origin).

PINELANDS PRESERVATION AREA BOUNDARY

1. From the Garden State Parkway (at north bank of the Mullica River) follow the Parkway south to its crossover of Atlantic County Route 624.

2. Follow Atlantic County Route 624 northwest to intersection with Atlantic County Route 563.

3. Follow Atlantic County Route 563 northwest to Weekstown and intersection with Elwood Weekstown Road.

4. Follow Elwood Weekstown Road west to intersection with Atlantic County Route 643.

5. Follow Atlantic County Route 643 northwest to local road* south of Nescochague Lake, thence west to Atlantic County Route 542, and thence northeast along Atlantic County Route 542 to the boundary of Wharton State Forest.

6. Follow the Wharton State Forest Boundary northwestward to its intersection with Burlington County Route 648.

7. Follow Burlington County Route 648 to Indian Mills at the junction of Burlington County Route 620 and Indian Mills - Bozarthtown Road.*

8. Follow Indian Mills-Bozarthtown Road to Bozarthtown and thence, via most direct local road (as shown on the Governor's Pinelands Review Committee's Official Map of the Pinelands Planning and Management District) to its intersection with Burlington County Route 532.

9. Follow Burlington County Route 532 east to its intersection with Patty Bowker Road and a local road (Irick's Causeway Road).

10. Follow the local road (Irick's Causeway Road)**northeast to its intersection with Vincentown-South Park Road.

11. Follow Vincentown-South Park road southeast to Sooy Road.

12. Follow Sooy Road east to its intersection with the Woodland Township boundary.

13. Follow the Woodland Township boundary northwest then northeast to its intersection with the Lebanon State Forest boundary and Burlington County Route 644 at Four Mile Circle.

14. Heading northwest along Burlington County Route 644 follow the Lebanon State Forest boundary to the easternmost common junction of the Lebanon State Forest boundary, the Woodland Township boundary and N.J. State Route 70.

15. Follow N.J. State Route 70 northeast to its next intersection with the Lebanon State Forest boundary.

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*Unnamed on the N.J. Department of Transportation Map and on U.S.G.S. 7.5 minute series quadrangle.

**Name Irick's Causeway Road appears on the Burlington County, Tabernacle Township tax map.

16. Follow the Lebanon State Forest boundary west and then north to its intersection with the south boundary of Fort Dix Military Reservation at South Boundary Road.

17. Follow the Fort Dix Military Reservation boundary northwest to its intersection with Burlington County Route 667.

18. Follow Burlington County Route 667 north to its intersection with the northern boundary of Fort Dix Military Reservation.

19. Follow the Fort Dix Military Reservation boundary east to its intersection with the Colliers Mills Fish and Wildlife Management Area boundary.

20. Heading north first, follow the Colliers Mills Fish and Wildlife Management Area boundary to Lakehurst Naval Air Station boundary.

21. Heading east first, follow Lakehurst Naval Air Station boundary to local road* at northeastern corner of Manchester Fish and Wildlife Management Area.

22. Follow the local road* south to, and continuing on, Beckerville Road to N.J. Route 70.

23. Follow N.J. Route 70 southwest to Fort Dix Military Reservation boundary.

24. Follow the military reservation boundary south and then northwest to its junction with the Lebanon State Forest boundary.

25. Follow Lebanon State Forest boundary south to Pasadena Fish and Wildlife Management Area boundary.

26. Follow Pasadena Fish and Wildlife Management Area boundary to the northern ridge line of Cedar Creek Drainage Basin.**

27. Follow the northern ridge line of Cedar Creek Drainage Basin east to the Garden State Parkway.

28. Follow the Garden State Parkway south to the southern ridge line of Cedar Creek Drainage Basin.

29. Follow the southern ridge line of Cedar Creek Drainage Basin west to the Greenwood Forest Fish and Wildlife Management Area Boundary.

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*Unnamed on the New Jersey Department of Transportation Map and on U.S.G.S. 7.5 mile quadrangle.

**No cultural features are available coincident with the drainage basin. The approximate location of the ridge lines of Cedar Creek basin are shown on the Official Map of the Pinelands Planning and Management District.

30. Follow the Greenwood Forest Fish and Wildlife Management Area boundary to the Oswego River at N.J. State Route 72.

31. Follow the Oswego River south to its intersection with Ocean County Route 539.

32. Follow Ocean County Route 539 south to Stafford Forge Fish and Wildlife Management Area boundary.

33. Heading generally southeast follow a combination of existing Stafford Forge Fish and Wildlife Management Area boundaries and local dirt roads, which generally outline the Department of Environmental Protection's proposed additions to Stafford Forge, to the southernmost junction of Stafford Forge Fish and Wildlife Management Area with the Garden State Parkway.

34. Follow the Garden State Parkway south to Bass River State Forest.

35. Follow the Bass River State Forest eastern boundary back to the Garden State Parkway.

36. Follow the Garden State Parkway south to the Bass River.

37. Follow the eastern bank of the Bass River north to the East Branch of the Bass River.

38. Follow the East Branch of the Bass River north to its intersection with the Atlantic City Electric Company's electric transmission line.

39. Follow Atlantic City Electric Company's transmission line west and then south to Burlington County Route 542.

40. Follow Burlington County Route 542 northwest to the Wading River at the Merrygold Branch.

41. Follow east bank of the Wading River south to the Mullica River and the Garden State Parkway (point of origin).

The total Pinelands Planning and Management District encompasses approximately 1,100,000 acres, about 365,000 of which are in the Preservation Area. The District includes the following 55 municipalities which are totally or partially within the Protection and Preservation Areas:

Atlantic County
Buena Boro
Buena Vista Township
Corbin City
Egg Harbor City*
Egg Harbor Township
Estell Manor City
Folsom Borough
Galloway Township*
Hamilton Township
Hammonton Town*
Mullica Township*
Port Republic City*
Somers Point City
Weymouth Township

Burlington County
Bass River Township*
Evesham Township
Medford Lakes Borough
Medford Township*
New Hanover Township*
North Hanover Township
Pemberton Township*
Shamong Township*
Southampton Township
Springfield Township
Tabernacle Township*
Washington Township*
Woodland Township*
Wrightstown Borough

Camden County
Berlin Borough
Berlin Township
Chesilhurst Borough
Waterford Township*
Winslow Township*

Cape May County
Dennis Township
Middle Township
Upper Township
Woodbine Borough

*Municipalities totally or partially in the Preservation Area.

Cumberland County
Maurice River Township
Vineland City

Gloucester County
Franklin Township
Monroe Township

Ocean County
Barnegat Township*
Beachwood Borough
Berkeley Township*
Dover Township
Eagleswood Township*
Jackson Township*
Lacey Township*
Lakehurst Borough
Little Egg Harbor Township*
Manchester Township*
Ocean Township
Plumsted Township*
South Toms River Borough
Stafford Township*

Note: A map depicting the recommended Pinelands Planning and Management District boundaries in relation to municipal and county boundaries appears on page 111.

III. C: THE BOUNDARY DELINEATION PROCESS

This section of the report discusses the rationale and basis for the selection and identification of the boundaries for the Pinelands Planning and Management District as recommended by the Pinelands Review Committee. The Committee first delineated the boundary of the Pinelands Study Area in order to focus the efforts of this study on an "identifiable and all inclusive" Pinelands area. (A map of the Study Area appears on page 98.) The Study Area was purposefully all inclusive and encompasses all of the land areas known to exhibit Pinelands-related ecological factors, bolstered by the premise that such a large area would aid in the identification of those special Pinelands areas that would require planning and management strategies and techniques.

The Committee considered only ecological factors in its determination of the Study Area. A review of the literature and available research on the topic was conducted. No new research or observations were utilized in the identification of the Study Area boundary. The Committee limited its investigation to Pinelands habitat studies of flora and fauna, soil surveys and soil types, watersheds and

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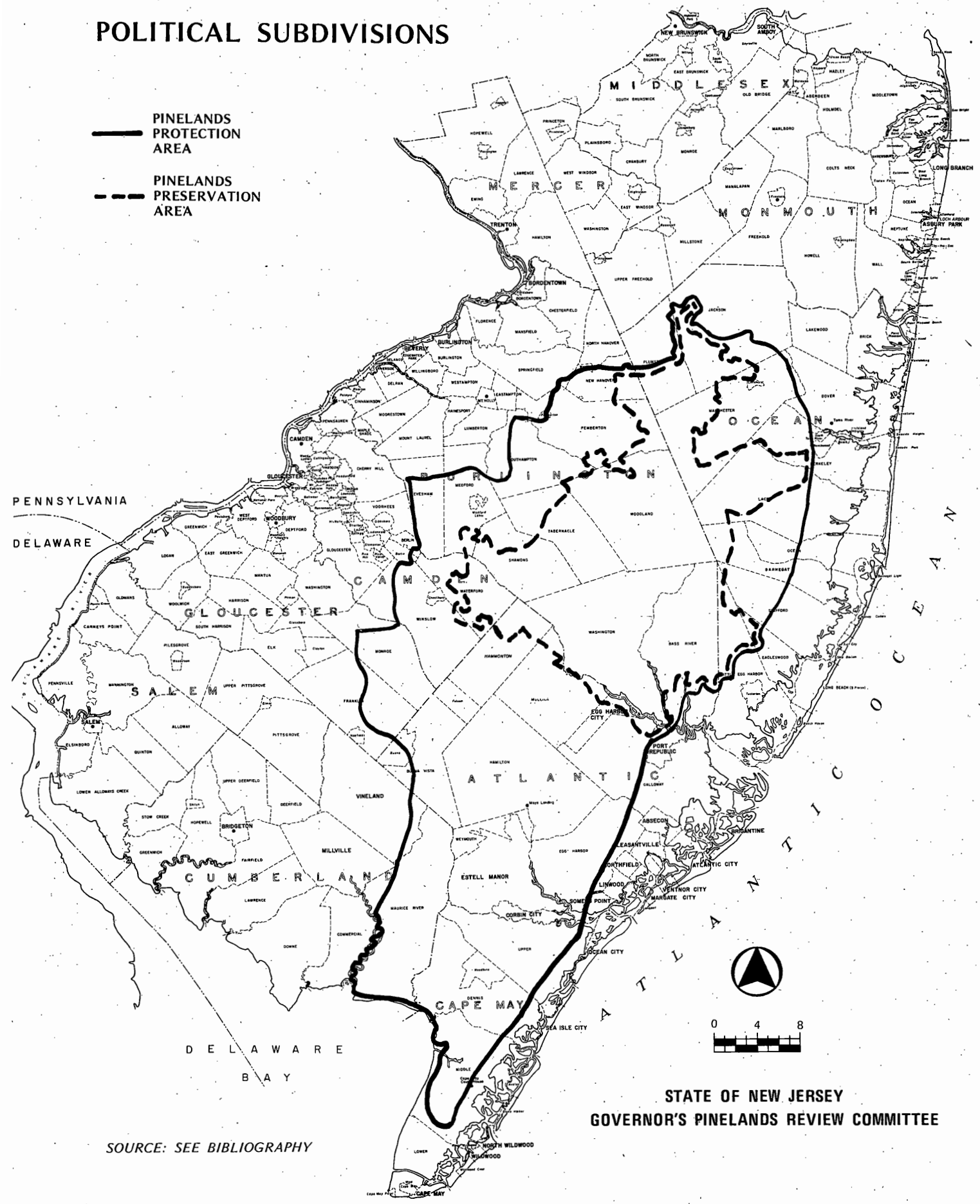
*Municipalities totally or partially in the Preservation Area.

POLITICAL SUBDIVISIONS



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SOURCE: SEE BIBLIOGRAPHY

drainage patterns, and ground water hydrology (Cohansey aquifer). The Committee also reviewed the Pinelands boundaries used or suggested by State and Federal agencies such as the New Jersey Pinelands Environmental Council and the U.S. Bureau of Outdoor Recreation.

The overriding environmental factor considered was the ground water system -- the Cohansey aquifer. It was felt that the environmental "constants" in the Pinelands ecosystem were the hydrologic and geologic factors. The hydrology of the Cohansey aquifer with its related soil types and topography is inescapably tied to most, if not all, of the unique flora and fauna of the Pinelands. As a result, the Study Area boundary was drawn to follow the closest municipal boundary beyond the Cohansey Aquifer outcrop area based upon the Geological Map of New Jersey.

On September 12, 1977, the Pinelands Review Committee approved the Study Area boundary that included the hyrdo-geologic formation of the Cohansey aquifer. A public hearing on the Study Area boundary was conducted in Chatsworth, Burlington County, on October 24, 1977. The report of the public hearing, "Memorandum - Public Hearing - October 24, 1977," as well as the transcript are available for inspection at the Department of Community Affairs, Division of State and Regional Planning.

It is important to note that the Study Area boundary (the Cohansey aquifer) was not selected as one of the "final" boundaries for Pinelands administrative and implementation purposes. Although it is recognized that the aquifer and the Pinelands flora and fauna are intimately related in a total ecosystem, it was felt that the Committee should not become involved with the establishment and regulation of ground and surface water criteria. The New Jersey Department of Environmental Protection, Division of Water Resources, is best suited for that task, and the Committee encourages and supports the efforts of this Division to promulgate water quality standards that will ensure the continuance of the Pinelands ecosystem.

The boundaries for the Pinelands Planning and Management District were developed through an extensive process of data analysis and Committee discussion. The maps produced for this report are reductions from the original done on State Atlas Sheets at a scale of one inch equals one mile. The maps, in combination with an extensive review of Pinelands technical literature, served as the basis for the delineation of the Pinelands Protection Area and the Pinelands Preservation Area.

The concentration and extent of ecologically sensitive areas in the Pinelands Protection Area are considerably less than in the area identified for preservation. Much of the vegetation is of the oak-pine uplands association with lowland areas being much less abundant than in the Preservation Area. Research has indicated that the plants typical of a fire ecology habitat are not generally found throughout

the Protection Area. This and the fact that oak is the dominant forest specie mean that fire ecology as a management strategy would not be uniformly required in this area. In addition to these environmental factors, development in this area is already much more extensive than is development in the Preservation Area, and pressures for additional development are expected to increase. Retirement community development in Ocean County, casino-and offshore oil-related development in Atlantic County, and suburban expansion from the Philadelphia metropolitan area are examples of the social and economic factors the Committee considered in delineating the Pinelands Protection Area. These social and economic factors in combination with the environmental factors indicate that certain appropriate and compatible types of development can be accommodated in the Protection Area if carried out under proper regional planning and management.

The Pinelands Protection Area follows the Garden State Parkway from its intersection with the Toms River in Ocean County to the intersection of the Parkway and Route 47 in Cape May County. The Parkway in this area is coincident with the eastern extent of characteristic Pinelands vegetation types. At Bass River State Forest and at Stafford Forge Fish and Wildlife Management Area, the Protection Area boundary follows the boundaries of these existing public lands which extend east of the Parkway.

From the intersection of the Parkway and Route 47, the western boundary of the Protection Area follows a combination of roads, a short distance along the Delaware Bay shore line, streams, and the western boundaries of public properties north to the vicinity of Route 322. This area represents what has been characterized as the southern Pinelands. Oak-pine forest associations predominate, and there are some fairly extensive areas of lowland vegetation. The population density of the area is low enough to make it desirable to include it within the Protection Area to assure the environmentally sound integration of future development with the natural systems. To the west of the Protection Area boundary line, development and conventional tillage agriculture have altered the vegetation patterns to such an extent that the area is no longer truly Pinelands.

From Route 322 north to the Fort Dix Military Reservation, the Protection Area boundary follows as closely as possible the demarcation between relatively undeveloped Pinelands and a combination of suburban development and conventional tillage agriculture which extends eastward to the Pinelands from the Delaware River. This section of the Protection Area includes much of the headwaters of the Rancocas Drainage Basin and is generally experiencing a great amount of pressure for development.

The northern segment of the Protection Area boundary follows the Fort Dix Military Reservation and Colliers Mills Fish and Wildlife Management Area over to the main stem of the Toms River and thence

downstream to its intersection with the Garden State Parkway. The Fort Dix and Colliers Mills boundaries coincide well with the northern extent of Pinelands vegetation. The Toms River portion of the boundary was chosen because the river marks the southwestern extent of most of the present development extending from Lakewood and the shore area communities into the Pinelands.

In summary, the purpose of the Pinelands Protection Area is to provide for the realization of legitimate economic and social needs for development while at the same time providing for the protection of the natural flora and fauna and the Pinelands ground water and other natural resources. The Pinelands Review Committee believes that the Protection Area delineated will facilitate the reaching of this broad objective to a greater extent than would be possible if a less inclusive delineation were made.

The Pinelands Preservation Area which the Committee has delineated coincides with the area known as the "Heart of the Pinelands." It is the largest relatively undeveloped area in New Jersey. The village of Chatsworth is the primary settlement, with other typical development limited to cranberry and blueberry agriculture, widely separated residences, and vast tracts of pine forests.

Upland vegetation in the Preservation Area is dominated by pine trees and extensive areas of lowland vegetation. Flora and fauna that are extremely sensitive to environmental change are present, and this entire area will require intensive management to preserve the unique ecosystems.

The Preservation Area is actually a forest area in an arrested stage of "transition" or "ecological succession." Over a period of years, it would normally be expected that oak would gradually replace pine as the dominant upland species and the vegetation of the cedar swamps and bogs of the lowlands would gradually change to hardwoods. Such succession to oaks and lowland hardwoods would significantly alter the ecological habitat of the most rare and endemic species of flora and fauna and preclude their continued existence in the area. This natural biological succession has been thwarted by repeated cuttings and frequent ecological disturbance of fire. This fact has been substantiated by extensive research on Pinelands habitats and forest succession. From this information, it can only be concluded that management techniques, particularly fire, will be required to maintain the characteristic Pinelands vegetation of the Preservation Area.

In order to employ fire as a management strategy, a contiguous land area encompassing the ecological factors noted above was identified. In addition, the area identified for preservation was chosen for its value as a "wilderness" open space area. Fire ecology vegetation, lowland areas, cranberry agricultural areas, lands presently in public ownership, lands previously proposed for public acquisition, and Pinelands areas having unique ecological significance were all considered

in delineating the Pinelands Preservation Area. The existence of large public land holdings (Wharton State Forest in the south and Lebanon State Forest, Fort Dix, McGuire Air Force Base, and Lakehurst Naval Air Station in the north) provided convenient boundaries for the Preservation Area. The use of acquisition and other preservation techniques for the land area between these large public parcels will produce a mass of land large enough to permit the maintenance of the wilderness character of the area and allow the use of appropriate vegetation management techniques. Heavily developed areas were not included within the boundary. It should be understood that development must be severely restricted within the Preservation Area. If the wilderness character of the area is to be maintained and fire is to be used to sustain this ecosystem, then traditional residential, commercial, and industrial development must be restricted.

The Preservation Area boundary begins at the intersection of the Garden State Parkway and Atlantic County Route 624. From that point, the boundary extends westward, following roads, to the Atlantic and Camden County line. In so doing, the Mullica River and the lowland areas along its southern banks would be preserved. At the county line, the boundary follows the boundary of Wharton State Forest to a point just northwest of where Route 206 enters the Forest. At this point, the Preservation Area boundary extends northeast along local roads to include the headwaters and areas of lowland vegetation of the Batsto River Drainage Basin. From there, the boundary follows the Woodland Township boundary to Lebanon State Forest. The State Forest boundary and Route 70 are then followed, excluding the highly developed areas near Browns Mills, to the Fort Dix Military Reservation.

At Fort Dix, the Preservation Area boundary goes north along the Browns Mills-Cookstown Road from the southern to the northern border of the Military Reservation. The military property to the west of this road is considered by the Committee to be too developed to be included in the Preservation Area. Also, the vegetation has been significantly altered and even removed. The central area of the military property to the east, however, remains forested and, unless military needs intervene, could become an important component of the Pinelands Preservation Area at some future time.

The Preservation Area boundary merges with that of the Protection Area and follows the military reservation and the Colliers Mills Fish and Wildlife Management Area boundaries until it meets Lebanon State Forest again to the west of Whiting. From that point, the Preservation Area boundary follows a line made up of public property boundaries until it reaches the northern ridge line of the Cedar Creek Drainage Basin. Then the boundary follows the Cedar Creek basin eastward to the Parkway and then back to the Greenwood Forest Fish and Wildlife Management Area. The Cedar Creek basin has long been recognized as being environmentally important. Its high

water quality and large area of Pinelands vegetation which is practically free of development are reasons for including it within the Pinelands Preservation Area.

From the point where the Cedar Creek basin meets the Greenwood Forest boundary, the Preservation Area boundary follows a line comprised of public property boundaries, roads, and streams which represent the eastern extent of areas which have been recommended for public purchase by the Department of Environmental Protection and the Pinelands Environmental Council. (Lands previously recommended for public acquisition are shown on the map on page 117.) These areas include the East and West Plains pigmy pine forest areas and several smaller parcels. The areas to the east of this line, while they contain large undeveloped tracts, have experienced a great deal of retirement housing construction which has taken place in the last decade and which is expected to continue. Areas to the west of the line, however, remain predominantly undeveloped.

To complete the closure of the Preservation Area boundary from Stafford Forge south to Atlantic County Route 624, the Committee followed the Garden State Parkway, Bass River State Forest, local roads, and the Mullica River. In the New Gretna area, the boundary moves inland to exclude salt marsh areas and areas of existing development.

In summary, the Pinelands Review Committee believes that in order to meet the goals and objectives of preserving and protecting the various environmental, ecological, and natural resource features of the Pinelands, an area actively devoted to, and managed for, Pinelands preservation is necessary. The criterion of preserving the unique flora and fauna associated with the very vulnerable lowlands vegetation systems, the need to protect the ground and surface water, the need to use fire as a primary forestry management technique, and the desire to maintain the unique wilderness character of a major area of the Pinelands provide the rationale for the creation of the Pinelands Preservation Area as delineated here.

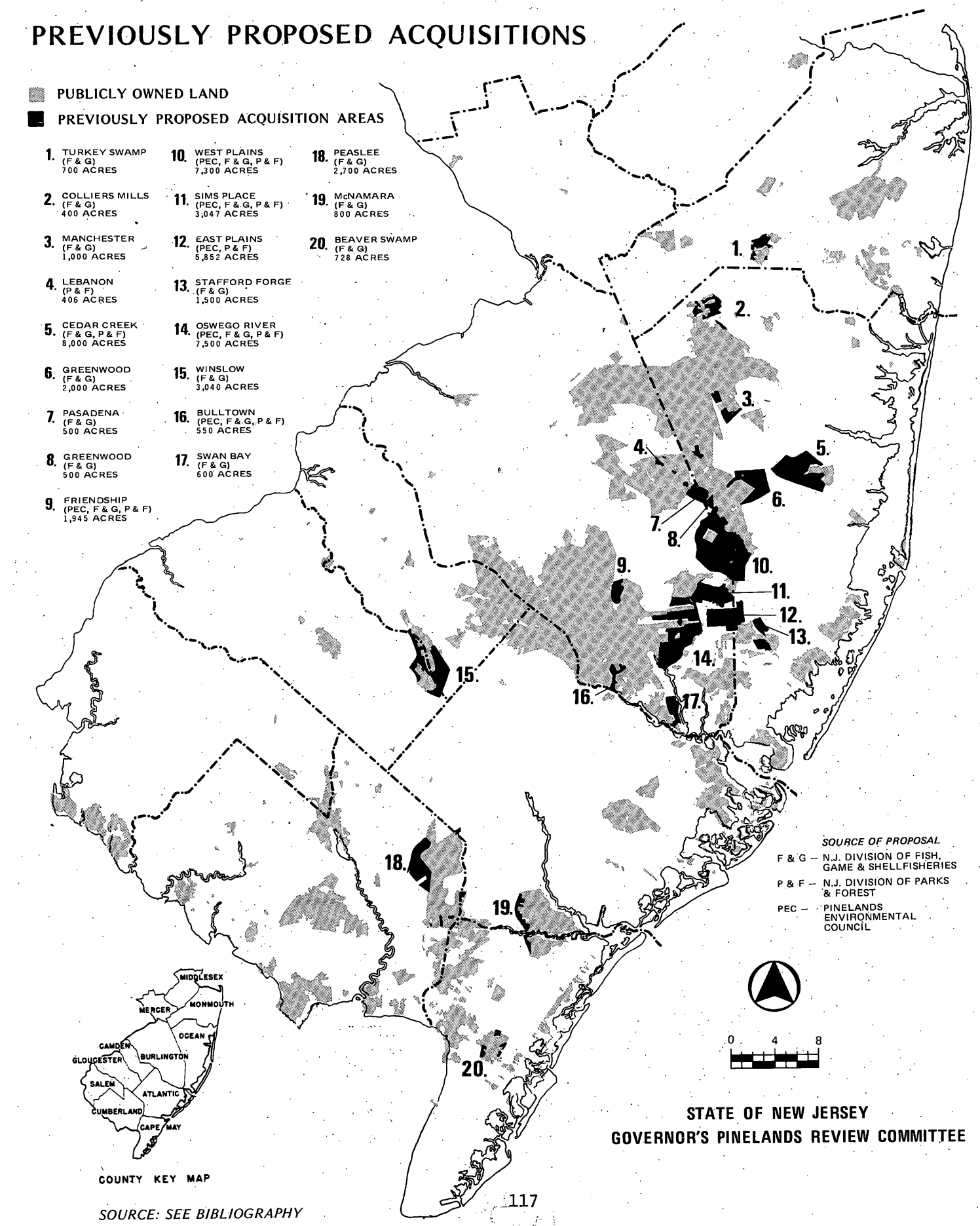
III. D. POWERS AND AUTHORITY OF THE PINELANDS PLANNING AND MANAGEMENT COMMISSION

1. Pinelands Regional Plan

The Commission should prepare, adopt, maintain, and revise as necessary a regional plan for all lands within the Pinelands Planning and Management District. This plan should be prepared within one year of the establishment of the Commission.

In preparing the plan, the Commission should consult with all affected municipal and county planning agencies. The technical documents as well as the general planning capabilities present in these agencies are a resource which should be utilized during the preparation of the plan as well as on an ongoing basis. In particular these agencies may have available natural resource inventories and land use plans for certain portions of the District which would prove particularly useful to the planning process.

PREVIOUSLY PROPOSED ACQUISITIONS



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SOURCE: SEE BIBLIOGRAPHY

The plan should establish the current planning capacity* for all lands within the District and be used to define an orderly, phased progression for growth and development in the District. The establishment of current planning capacities should include an analysis of the District's ability to accommodate growth and development within the limits defined by its natural resource capabilities and the existing and proposed infrastructure. The tolerance of the ecosystem as a result of water diversion and the impact of development on water quality should be addressed in the plan. The plan should designate appropriate population densities and development intensities throughout the District, distinguishing among various land areas based upon their suitability to accommodate development as well as the cumulative effects of development throughout the District. The plan should identify areas for public acquisition and appropriate forms of regulation.

As previously mentioned, the plan would incorporate the technical documents and expertise of local governments. Additionally the draft plan would be circulated to the governing bodies of all municipalities and counties within the District. A reasonable period of time would be allowed for review, comment and advice to the Commission before the final plan is prepared and adopted.

Alternatively or additionally the Municipal Committee could act through its own executive committee, functioning as a standing committee during the preparation and implementation of the plan.

An official map should be prepared and adopted as part of the regional plan which identifies those properties proposed for public acquisition in the District. Upon application by persons wishing to develop properties slated on the map for acquisition, the Commission should have one year in which to determine whether to acquire the property or allow development to proceed in accordance with the comprehensive plan.

This plan should be periodically reviewed, e.g., every five years, and should take into account improvements in technology as well as changes in regional influences.

2. Special Planning and Zoning Districts

The Commission should have, by right, zoning authority for all lands within the District. Zoning authority should be delegated to municipal units of government where the municipal planning programs have been found to conform to the Pinelands planning program as determined by the Commission.

The Commission should identify and designate special land uses as being compatible with the planning and management objectives for the

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*The ability of a municipality to support development determined in terms of loading factors by considering natural resources, critical areas, and current infrastructure and development.

Preservation and Protection Areas. Such compatible uses would include, but not be limited to, area-dependent agriculture, village or hamlet areas, timbering, and low intensity recreation. The Commission should establish special zoning districts within the Preservation Area where such uses could be practiced. Exclusive agricultural uses should be confined to cranberry and blueberry cultivation, which could include wetland areas presently under cultivation as well as sufficient adjacent upland areas to ensure the maintenance of the lowland water table and water quality.

The Commission should, if feasible, establish a system of transfer of development rights within the District which should be consistent with the objectives of the regional plan. Such a system may be utilized on either intramunicipal or intermunicipal levels, e.g., if a municipality has adequate land in both the Protection and Preservation Area, transfers could occur on an intramunicipal level; if a municipality is located totally or predominantly within the Preservation Area, an intermunicipal or regional process would be more appropriate.

The highest and most immediate priority for establishing such a system should be given to the Preservation Area.

3. Local Plan Assessment

The Commission should prepare guidelines and standards, derived from the Pinelands regional plan, for the purpose of local plan assessment and preparation. The Commission should, within 90 days of adopting the regional plan, determine the consistency between its plan and existing local plans. Those local plans which are found to be consistent would be so certified, and local plan administration would continue. In cases where plans are found to be inconsistent with the Pinelands regional plan, the Commission would provide a statement to the local government, identifying the inconsistencies which exist. In cases of inconsistencies, the local government could be granted a period of up to six months to revise its plan accordingly. The Commission should then re-evaluate the local plan for consistency. The Commission should assume the responsibility for revising the local planning program for those local governments whose plans continue to be inconsistent with the regional plan after which the local jurisdiction would carry out administration.

The Commission should be empowered to establish a monitoring and notification procedure for the region's municipal land use planning and regulatory activities. Where approvals are issued in disregard of the certified plan, the Commission, with notice to the municipality and applicant, should have the authority to stop action on that approval. As a last resort, the Commission should assume planning administration for that municipality.

4. Interim Controls and Guidelines

A review should be made of Federal and State actions that are predicated on growth assumptions which are likely to change as a result of the formal planning process. Where it can be determined that proceeding with the action is likely to cause significant environmental damage

or would be substantially inconsistent with the goals for the Preservation and Protection Areas, the action should be deferred until the availability of the regional plan.

Within 60 days of the appointment of the Commission, guidelines for the review of certain development in the Protection Area should be prepared which would serve as mandatory guidelines for local planning administration. These guidelines would stay in effect and be succeeded by the certified municipal planning program. The purpose would be to deal with development of regional impact determined on the basis of its size, location, or nature and its prospective impact on the Pinelands.

5. Environmental Programs and Standards

The Commission should prepare minimum mandatory standards and guidelines for land disturbance, after consultation with appropriate agencies, which should include, but not be limited to, excavation, clearing and removal of vegetation, and filling of all lands within the District. These standards should distinguish between areas of upland and lowland vegetation.

The Commission, in consultation with the Department of Environmental Protection, should be given the authority under the Pinelands legislation to protect freshwater wetlands within the District. Freshwater wetlands would include, but not be limited to, marshes, swamps, bogs, ponds, rivers, river and stream flood plains and banks, areas subject to flooding or storm flow, and all areas of lowland vegetation where depth to seasonally high water table is eighteen inches or less.

The Commission, upon adoption of the regional plan and upon demonstration of its ability to administer other regulatory programs within its jurisdiction, should be able to be delegated by mutual agreement the authority to administer other State regulatory programs within the District. It should have this authority for the purpose of eliminating duplication of multi-governmental review within the District.

6. Consistency with Other Plans and Programs

Plans and capital programs of other State agencies should be consistent with the regional plan. Overlapping jurisdictions should not result in duplicate reviews. Where overlapping jurisdictions exist, the more comprehensive program should prevail and the concerns of the eliminated jurisdiction be integrated into the prevailing program.

To expedite the review process, the Commission should explore the concept of a comprehensive permit application, as well as the consolidation of procedures such as hearings and timetables.

7. Acquisition and Management of Public Land

The Commission should develop priorities for acquisition of public open lands within the District which should be the operating priorities for the State. The Department of Environmental Protection

through the Green Acres Program should have the responsibility for the administration of the acquisition program within the District; all such activities undertaken by the DEP within the District should be consistent with the Commission's plan.

The Department of Environmental Protection should retain the authority for the management and maintenance of all State-owned lands within the District. All State and Federal open lands should be managed in a manner consistent with the policies of the Preservation and Protection Areas.

The Commission should be aware of competitive public recreation facilities and the advantages that they could have over private recreation facilities. Any recreation planning should be done in cooperation with the private recreation industry of the area in order to maximize opportunities and minimize unnecessary public expenditures.

8. Pinelands Municipal Committee

A Pinelands Municipal Committee should be established to give formal standing to municipal officials within the District. The function of this Committee is to ensure that municipal interests are properly accounted for.

The Committee should consist of one representative from each of the affected municipalities and should coordinate its activities through an executive committee of manageable size, selected in a manner acceptable to the full Municipal Committee. The Committee should be able to initiate a review of official decisions of the Commission. In those instances when the Committee disagrees with an official Commission action or when changing conditions or other considerations warrant a change in the regional plan, environmental standards, or local planning guidelines prior to the periodic review, the Committee could petition the Commission for a review. The Committee would prepare a report which would establish the reasons by which it has determined its disagreement and its suggestions for alternatives. The disposition of the matter would require another vote of the Commission.

A modest budget should be made available to the Municipal Committee to pursue its activities. Staff assistance from the Commission should also be available.

9. Municipal Incentives

The Commission could develop a system of incentives which would be designed to stimulate and encourage municipal government participation in the Commission's programs. These incentives could include grants for local planning, technical assistance, information for the development of local plans, and others. The Commission could provide legal assistance for Court challenges to those municipalities whose planning programs are consistent with that of the Commission.

The Commission could be empowered to establish revenue generating activities. Possibilities might include the owning of rights-of-way that cross the District for leasing to energy transporting and transmission interests; leasing of public forest lands for commercial timbering; and responsibility and authority to deal with solid waste disposal in the region. A percentage of any revenues generated from these or other activities could be used to compensate municipalities for actual tax burdens. Also, such revenues could be used to back up a transfer of development rights program.

10. Public Participation and Information

A framework for citizen participation, which may be referred to as a Citizens Council, should be established. Those persons interested in participating in some type of formal structure should determine the number of members to be on the Council. As one suggestion, the Citizens Council could consist of twenty-four members appointed by the Commission.

The Council should conduct two public hearings each year in order to gather public comment, opinion, and testimony on the Commission's activities. These hearings should provide the basis for a written report to the Commission who would provide a written response within 30 days. Financial and staff support would come from the Commission.

The Council would provide a sounding board for Commission actions prior to their final adoption and bring matters of public concern to the Commission's attention for purposes of assisting the formulation of District policies. This Council should be composed of various interests. Among these should be an agricultural advisory group which should be established through the county boards of agriculture.

The Commission should sponsor an Annual Pinelands Conference to provide a forum for the exchange and dissemination of information and views covering as broad a spectrum of subjects and issues as desired.

The Commission should prepare annually a State of the Pinelands report to the Governor, Legislature, and public-at-large. This report would assess the previous year's activities regarding progress toward the regional plan's objectives and describe the activities to be undertaken in the ensuing year.

11. Pinelands Memorial and Gift Fund

There should be established a Pinelands Memorial and Gift Fund within State government for the purpose of receiving gifts or donations of land within the District or money which would be dedicated to the purchase of critical lands within the District. Such a program would give persons the opportunity to create a "living" memorial to loved ones as well as the principle of Pinelands preservation.

12. Staff and Funding

The Commission should employ a professionally qualified Executive Director and have the authority to employ and discharge such personnel as required for its operations separate and apart from the Civil Service statutes governing such practices.

The National Parks and Recreation Act of 1978 has allocated up to $3 million for planning within the Pinelands National Preserve. It is anticipated that the State will also provide funds, both for planning as well as for acquisition of lands within this area. Based on the experiences of other regional planning and management agencies, an operating budget, after the preparation and initial setting up of the Commission and its program, should be a minimum of $500,000 per year.

SECTION IV: INTERIM PLANNING AND MANAGEMENT STRATEGY

The Pinelands Review Committee has recommended the creation of a permanent agency with authority over a planning and management district for the Pinelands. These recommendations must be considered and evaluated by the Governor, the Legislature, local governments, and the public. During this period of consideration and prospective governmental action, pressures will continue to threaten the unique and fragile resources of the Pinelands. It is for this reason that an interim planning and management strategy needs to be devised to protect the Pinelands. In addition to development pressures, an interim strategy is necessary so that a number of issues which will influence the future of the Pinelands can be addressed, including $10 million that Governor Byrne has designated for acquisition of land in the Pinelands and Federal legislation recently passed which may provide $23 million for acquisition of lands.

The objective of an interim strategy is to provide relatively short term planning and management for both the Pinelands Preservation and Protection Areas. The objective within the Preservation Area is to preserve the land area and its attendant environmental features in a near wilderness state to the greatest extent possible. Land within this zone is significant because of its value for wildlife preserves, cranberry and blueberry farming, recreation areas, and unique natural features as well as the desire to provide a large contiguous block of open land. The primary objective in the Protection Area is management and conservation to guide growth and development in a manner consistent with a high level of environmental protection but in recognition of legitimate economic interests.

The Committee believes that an interim planning and management strategy will help promote the following objectives which Governor Byrne outlined in Executive Order #56:

- the preservation of the unique environmental resources of the Pinelands;
- the promotion of agricultural, forestry, and recreational uses compatible with the protection of the environment;
- the encouragement of needed commercial, residential, or other development within existing developed areas or other areas which may be developed compatible with preservation of unique environmental resources;
- discouragement of scattered and piecemeal development in open space areas.

In consideration of the above objectives, the Committee recommends that the following measures be adopted as part of an interim planning and management strategy for the District: 1) a moratorium, not to exceed eighteen months, on all construction in the Preservation Area; 2) a moratorium, not to exceed eighteen months, on all new applications in the Protection Area; 3) an exemption procedure for both areas where the determinant will be whether financial hardship outweighs ecological damage; and 4) an administrative process for lifting the moratorium in the Protection Area for projects that conform to and carry out the intent of the goals and objectives for this Area.

In accordance with the recently passed Federal legislation, i.e., the National Parks and Recreation Act of 1978, a planning entity is being established for the Pinelands National Reserve. This entity will have fifteen members, seven members appointed by the Governor, seven by the respective governing bodies of each of the affected Pinelands counties, and one representing the Secretary of the U.S. Department of the Interior. This entity has been charged with developing, within an eighteen month period, a comprehensive management plan for the Pinelands National Reserve which shall include a resource assessment, a detailed boundary map, a land use capability map, a coordination and consistency component, and a program for State and local governmental implementation, and other components.

The eighteen month planning and moratorium periods will generally be concurrent. During this time, and particularly until the administrative process above is established, State Government must take the responsibility to utilize its existing powers to manage growth in the Pinelands. When the administrative process is in place, but prior to the completion of the plan, the State regulatory programs would serve to supplement that process. It is appropriate that, even when the administrative process is underway and the comprehensive plan is completed, the State should continue to supplement the Commission's overall program by ensuring consistency among the many State and regional programs.

The Governor's Office of Planning and Policy should serve as the State's official focus for activities regarding the Pinelands. All individual departmental activities within the State government should be coordinated through this office.

While numerous planning and regulatory programs exist among the various State departments, there are several which appear to have more merit than others within the context of developing interim strategies to deal with significant issues and problems. The Federal project review and notification function (A-95) can be utilized to monitor and comment on Federally funded programs and activities within the Pinelands Planning and Management District. State financial projects may be reviewed by the Department of Environmental Protection under the aegis of Executive Order #53. The Office of Environmental Review should provide notification of all proposed projects within the District to the Office of Planning and Policy with respect to probable impact.

The Department of Environmental Protection should determine the cumulative effect of the Pine Barrens ground and surface water quality

standards within the 760-square-mile critical area. This review should assess the consistency of the water quality program with the objectives of the Preservation Area and suggest any necessary changes. To protect the water quality throughout the District, the Department of Environmental Protection should proceed to establish the remainder of the District as a critical area, pursuant to the Realty Improvement Act of 1954, as amended (Chapter 199).

If problem areas should arise, whether from the direct result of individual decisions or the prospective conflict of two or more, the staff of the Office of Planning and Policy would prepare reports on the matter, identifying the probable impact and suggesting one or more alternative solutions. These reports would be the primary source of input to policy-level resolution of such problems. Individual parties with direct interest in any problem would have the opportunity to represent their points of view.

Numerous planning and regulatory programs presently exist among the various state departments which may be helpful in providing a mechanism to deal with development proposals and other alterations of the land within the Pinelands. These programs, which could be important during an interim planning and management period, are inventoried on the following pages. Due to the diversity of programs, each program is categorized into one of the following four groups: functional planning, capital planning, administrative procedures, and regulatory programs. Functional planning includes topical programs that plan on a general basis; capital planning includes those programs that provide expenditures for land acquisition and facility construction; administrative procedures include those programs that coordinate actions among departments (both State and Federal); and regulatory programs include programs that require approval prior to taking any action. Such an inventory of existing planning and regulatory programs provides an indication of the legislation that is presently available as well as what legislation could be utilized on a short term basis to accomplish the interim strategy. It will be the primary task of any interim program to select those programs that provide the best opportunity to successfully carry out any interim strategy.

IV. A. FUNCTIONAL PLANNING PROGRAMS

State Planning Program

Statute: Federal Housing Act of 1954, as amended, Section 701; and New Jersey Laws of 1961, Chapter 47.

Department: Community Affairs

Program: The Section 701 Program of the Housing Act of 1954 provides funds for State, metropolitan, and non-metropolitan planning agencies and for cities for comprehensive planning. It also requires the State-designated 701 agency (the Department of Community Affairs) to prepare a comprehensive State plan. Chapter 47 of the Laws of 1961 authorizes the creation of a Division of State and Regional Planning (DSRP). Among the duties of DSRP are to prepare and maintain a comprehensive guide plan for future development and improvement of the State, to

achieve fuller coordination of development activities of the several State departments, and to coordinate local, county, and regional planning activities. In compliance with these two mandates (Federal and State), DSRP has prepared and is circulating a preliminary State Development Guide Plan (SDGP), consisting of a text and a concept map. The purpose of the Plan is to generally indicate areas appropriate for future development, those areas in which development should be constrained, and places where natural resources should be preserved. The Plan is intended as a guide for State investment decisions and suggests priority for State investment be given to existing growth areas. A procedure is underway to develop consistency between the SDGP and other plans and programs as well as cross acceptance with county plans.

Application: The SDGP designates the northern portions of the Pinelands, which the Pinelands Review Committee has defined as Protection and Preservation Areas, as areas of public open space or limited growth that should be managed through a combination of acquisition and regulatory programs. It is possible for the Division of State and Regional Planning to undertake more detailed planning for the Pinelands as a part of its continuing State planning program. The DSRP will seek to discourage growth-inducing capital facilities and improvements in the Pinelands through its coordinated activities with plans and programs of other State agencies. The SDGP and the State planning program may be effective interim tools to serve as a basis for the coordination and evaluation of functional planning programs of other agencies in the absence of detailed planning and management programs for the Pinelands.

Energy Master Plan

Statute: N.J.S.A. 52:27F-1 et seq.

Department: Energy

Program: Empowers the Department of Energy to create an energy master plan which will consider the production, distribution, consumption, and conservation of energy in the State. The act requires that State agencies must give proper consideration to the provisions of the master plan with regard to siting in administrative actions and that decisions of State government conform to the maximum extent practicable and feasible with the plan.

Application: Although only a preliminary policy statement has been prepared as part of the energy master plan (entitled, "Determination of the Need for Energy Facilities"), one of its recommendations is that all energy facilities, except for gas pipelines and associated facilities, will

be discouraged from the Pinelands. (Oil pipelines will be discouraged from crossing the Pinelands due to the spill danger.) Gas pipelines and associated facilities will be permitted in the Pinelands only when water quality degradation would be minimal. It is the finding of the preliminary plan that the Pinelands should be preserved from further unnecessary development.

Water Supply Master Plan

Statute: N.J.S.A. Chapter 58, Water and Sewerage Statutes

Department: Environmental Protection

Program: The Plan, presently being formulated, assesses the near and long term water needs of the State, evaluates various alternatives for meeting these needs, and provides a framework for the future planning and management of the State's water supplies. Specific recommendations will be made for water supply development projects, conservation and management policies, interconnection programs, and emergency response plans.

Application: The Plan could have a significant impact upon the Pinelands since this area is the source of a vast, untapped water supply. However, specific proposals are not yet available, and the Plan is not scheduled to be completed until sometime in 1980.

State Transportation Master Plan

Statute: N.J.S.A. 27:1A-5 et seq.

Department: Transportation

Program: The Department of Transportation is charged with the responsibility of developing and maintaining a comprehensive transportation plan for the State and is in the process of revising the State Transportation Plan. The Plan establishes priorities for projects and selects optimum route designations for highways, taking into account the location of significant natural features. It is intended to serve as a policy document for transportation improvements and expansions. An informal agreement exists between the Department of Transportation and the Department of Community Affairs regarding the State Development Guide Plan in that the Department of

Transportation intends to use the Plan as a basis for preparing its revised master plan.

Application: The development or expansion of transportation facilities often plays a major role in the growth of a region. New roads and road improvements make previously remote areas more accessible, thus opening them up to development pressures. The revised State Transportation Master Plan should reflect the goals and objectives for the planning and management of the Pinelands. Any interim Pinelands plan could be made a part of the SDGP, thereby giving guidance to the New Jersey Department of Transportation for policies on highways (new or improved), rail lines, and airports.

Air Quality Maintenance Planning

Statute: Federal Clean Air Act of 1977, P.L. 95-95; N.J.S.A. 26:2C-1 et seq.

Department: Environmental Protection

Program: The Federal Clean Air Act establishes a series of standards for certain pollutants within the air and requires that each State must achieve and maintain these standards within a specified time period. The Department of Environmental Protection has designated certain regions within the State as maintenance areas where preliminary examination indicates the potential for violation of the established ambient air quality standards.

Application: The metropolitan Philadelphia air quality control region, which includes the counties of Mercer, Burlington, Camden, Gloucester, and Salem, has been designated as a maintenance area to monitor particulate and sulphur dioxide pollutant levels. Also, the counties of Atlantic and Ocean have each been designated maintenance areas to monitor particulate pollutant levels. The designation of these counties in and around the Pinelands as maintenance areas will help prevent the degradation of air quality within the general Pinelands region.

Water Quality Planning

Statute: Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500, Sections 208 and 303e

Department: Environmental Protection

Program: Directs the preparation of comprehensive water quality planning programs in order to restore and maintain the chemical, physical, and biological integrity of the waters of the State.

Application: Water quality management plans are being prepared for the entire Pinelands administrative area. Atlantic, Cape May, and Ocean Counties are each preparing their own plans. The plans for the counties of Burlington, Camden, and Gloucester are being prepared by the Delaware Valley Regional Planning Commission; and the plans for the counties of Monmouth, Cumberland, and Salem (non-designated areas) are being prepared by the State (DEP). An important aspect of the prospective strategies to deal with the problems is the preparation of "non-structural" solutions. This runs the range from prohibitions on fertilizers to land use planning and zoning. While there is no statutory provision for direct control of local land use programs, there are strong regulatory measures available based on the issuance of discharge permits and the development of special standards, i.e., the Pinelands ground water standards.

Statewide Comprehensive Outdoor Recreation Plan (SCORP)

Statute: Federal Land and Water Conservation Fund Act of 1965, P. L. 94-422

Department: Environmental Protection

Program: Serves as the basis for actions to improve the State's recreational resources and serves to fulfill eligibility requirements for Federal Land and Water Conservation Fund Act grants. The plan establishes policies and priorities to guide the State's Green Acres Program in recreational development, open space acquisition, and assistance programs for local projects.

Application: SCORP inventories existing recreation facilities and projects future recreation needs for all counties in the State. As such, it would provide a planned framework for Pinelands land acquisition as well as a guide to assess the recreation needs for areas within the Pinelands. Also, SCORP would provide a planned basis for Pinelands' bond issue requests that must be reviewed by the Commission on Capital Budgeting and Planning.

Coastal Zone Management Planning

Statute: Federal Coastal Zone Management Act of 1972, P.L. 92-583; N.J.S.A. 13:19-1 et seq.

Department: Environmental Protection

Program: The Coastal Area Facility Review Act (CAFRA) requires the Department of Environmental Protection (DEP) to prepare a comprehensive plan and management strategy for the legislatively designated coastal area. The administrative area includes all riparian tideland as well as wetland acreage. The Federal Coastal Zone Management Act of 1972 (P.L. 92-583) also requires the development of a plan and resource management strategy for the coastal zone which includes lands beyond the CAFRA jurisdiction that are subject to riparian and wetlands statutes.

Application: A portion of the Pinelands lies within the jurisdiction of CAFRA and will be covered under the CAFRA and the Coastal Zone Management Program (CZMP) plans. Efforts should be undertaken to ensure consistency between the CAFRA and CZMP management strategies and the planning and management objectives of the Pinelands.

Solid Waste Management Planning

Statute: N.J.S.A. 13:13A-1 et seq.

Department: Environmental Protection

Program: The Department of Environmental Protection is in the process of developing regional solid waste planning guidelines and regulations to be used by the 22 solid waste districts in the State (21 counties and the Hackensack Meadowlands District). The guidelines will explain the methods and procedures to be used by the districts in preparing acceptable plans for efficient and environmentally safe solid waste management.

Application: As the solid waste management districts have been established on a county basis, solid waste planning for the Pinelands could encompass seven districts. Due to the number of districts involved, it is necessary that coordination be achieved among all parties to ensure that the Pinelands management and planning goals are integrated within any solid waste

planning objectives and that illegal dumping within the Pinelands is stopped. The Pinelands cannot continue to be used as the solution to overfilled landfills in New Jersey and other States. There are landfills in the Pinelands that are presently leaching contaminants into the ground water, and illegal nighttime dumping is a continuing problem that must be stopped.

Natural Areas System Plan

Statute: N.J.S.A. 13:1B-15 et seq.

Department: Environmental Protection

Program: The system is established to identify, protect, and preserve natural and ecological resources of the State for present and future generations. A natural area is defined as an area of publicly owned land or water which has retained its natural character or which has rare or endangered species of plant and animal life worthy of preservation. These areas are designated for scientific and educational use rather than for recreation.

Application: The natural areas system includes 14 areas located within the Pinelands that are administered either by the Division of Parks and Forestry or the Division of Fish, Game, and Shellfisheries. More lands will be identified and acquired in the future using Green Acres funds. Areas proposed for designation should be consistent with the Pinelands Review Committee's planning and management objectives. This program will be most applicable to the management of existing and proposed State-owned lands.

Wild and Scenic Rivers Plan

Statute: Federal Wild and Scenic Rivers Act of 1968, P.L. 90-542; New Jersey Wild and Scenic Rivers Act, N.J.S.A. 13:8-45 et seq.

Department: Environmental Protection

Program: Designates rivers or parts of rivers for inclusion within a State system. Authorizes the Department of Environmental Protection (DEP) to adopt land use and other regulations for lands delineated as floodways, flood fringe, or flood hazard areas and to acquire or otherwise manage lands in order to promote scenic and recreational objectives. The purpose of the Act is to

preserve rivers or sections of rivers which possess outstanding values (e.g., scenic, recreational, wetland). Modelling the State Act after the Federal Statute permits New Jersey to apply for Federal recognition of individual components of the State's system as part of the national one and increases the potential for receiving Federal grants for land acquisition.

Application: The first rivers to be designated under this Act are the Mullica River, from Atsion Lake in Wharton State Forest (Burlington County) to the Route 542 crossing at Pleasant Mills, and the Cedar Creek in Ocean County. Both rivers are located within the Pinelands Preservation Area and, being so designated, provide the initial steps to achieving a preservation status. Other rivers within the Pinelands, such as the Wading, Batsto, and Oswego Rivers, may receive this designation in the future. The designation of rivers under the New Jersey Wild and Scenic Rivers Act and the promulgation of rules and regulations for the administration of the Wild and Scenic Rivers System should be consistent with the planning and management goals for the Pinelands. Detailed planning and management could be immediately undertaken for those river areas designated under this Act.

IV. B: CAPITAL PROGRAMS

Green Acres Program

Statute: N.J.S.A. 13:8A-19 et seq.

Department: Environmental Protection

Program: The Green Acres Program relies on the periodic passage of bond issues to provide money primarily for the purchase of urban and rural open land or interests therein. Money derived from the voters' authorization may be used by the State to make acquisitions of land for the State's program as well as providing 50-50 matching grants to municipalities and counties to acquire land.

Application: The Green Acres Program provides the machinery for any acquisition program for the Pinelands. Ten million dollars from the 1974 Green Acres bond issue have been set aside by the Governor to acquire land within the Pinelands. Also, the State receives about $9 million

annually from the Land and Water Conservation Fund which is administered by the Green Acres Program. The acquisition of lands with these and other funds should be consistent with the Pinelands Review Committee's recommendations and objectives.

Commission on Capital Budgeting and Planning

Statute: N.J.S.A. 52:95-1 et seq.

Department: Treasury

Program: The Commission was created to act in an advisory role to the Governor and the Legislature and is charged with preparing the State's annual Capital Improvement Plan. In preparing the Plan, the Commission must (1) develop and maintain, on a continuing basis, short- and long-range capital spending plans for the State; (2) analyze and report what the impact of capital spending programs will be on actual budgets; and (3) recommend to the Governor and the Legislature each year items for inclusion in the next annual budget and present the plans for short- and long-range capital investments. If appropriate, the Commission may recommend that bond issues be placed before the voters of the State.

Application: The Commission will play an important role in any land acquisition proposals for the Pinelands. Any request for utilizing existing funds for land acquisition or requests for future bond issues to finance land acquisition within the Pinelands must be reviewed by the Commission.

Public Sewerage Facilities Planning and Construction

Statute: Federal Water Pollution Control Act Amendments of 1972, P.L. 92-500, Section 201

Department: Environmental Protection

Program: This program provides guidelines for development and implementation of waste treatment facilities on an areawide basis. The Department of Environmental Protection grants construction and planning monies to local municipalities or authorities for public sewerage facilities.

Application: The Division of State and Regional Planning has documented that a causal relationship exists between sewers and the rate and intensity of growth of an area in The Secondary Impact of Regional Sewerage Systems. Due to the largely undeveloped nature of the Pinelands, the concept of secondary impacts would be of primary concern in this area since the existence of sewers can stimulate growth and, conversely, the absence of sewers can act as a constraint to development. Under Federal law, DEP is required to develop criteria by which to rank 201 projects on a priority basis, and this ranking should be reflective of the objectives to be achieved in the Pinelands. A key to managing development patterns through the regulation of sewerage facilities lies in the coordination of the sewer decision-making process and the Pinelands management objectives.

IV. C: ADMINISTRATIVE PROCEDURES

Project Notification and Review (A-95)

Statute: Demonstration Cities and Metropolitan Development Act of 1966, P.L. 89-754, Office of Management and Budget Circular No. A-95

Department: Community Affairs

Program: The Division of State and Regional Planning (DSRP) functions as the State's "clearinghouse" agency. Its responsibilities defined by law are: (1) to receive from prospective applicants all notices of intent to apply for Federal aid under programs covered by OMB Circular No. 95; (2) to determine the State, regional, or local interests in the project in light of comprehensive development plans of the agencies represented by the clearinghouse; (3) to arrange conferences between the applicant and the appropriate agencies to resolve conflicts pursuant to the application; and (4) to prepare evaluative comments to be submitted with the final application.

Application: Since the Division of State and Regional Planning is the State clearinghouse agency, it receives notification of all eligible Federally funded projects. If the DSRP or any of the interested agencies, e.g., DEP, finds that a particular project will adversely impact the Pinelands, it can arrange a conference among all concerned parties to resolve conflicts. If the problems cannot be resolved, negative comments will accompany the application. Although the final decision for approval rests with the Federal funding agency, that

decision can be influenced by and, if there is a strong enough case, probably determined by the comments of the clearinghouse agency. A limitation of the A-95 review and notification process is that it is restricted only to Federally funded projects and cannot be utilized to comment upon projects which are exclusively funded by State or local governments.

Pinelands Environmental Council

Statute: N.J.S.A. 13:18-1 et seq.

Department: Environmental Protection ("in" but not "of")

Program: The Pinelands Environmental Council (PEC) was created to protect the water resources and other natural assets of the Pinelands from misuse and pollution; to conserve the scientific, educational, scenic, and recreational values of the region; and to develop compatible land uses to improve the environmental and economic position of the area. The PEC has been directed to develop a comprehensive plan for the Pinelands region and to guide public and private agencies and persons to undertake projects and activities in accordance with said plan. The PEC functions as an advisory body with the power of review but not approval over projects within its 320,000-acre district in Burlington and Ocean Counties. The agency has no regulatory authority, but it may suspend municipal approval of a project for 90 days during which time it can seek changes or withdrawl by the applicant or denial by the municipality.

Application: Although the authority of the PEC should be superseded by a Pinelands Planning and Management Agency, until such a regional planning agency is functioning, the PEC can continue to review projects located within the Pinelands. A properly prepared plan for the PEC district consistent with the objectives developed by the Pinelands Review Committee and the relevant interim State government strategies could provide guidance to property owners and municipal planning programs. It could also provide a sound basis for legal action.

Environmental Assessment

Statute: Executive Order #53

Department: Environmental Protection

Program: Empowers the Department of Environmental Protection to review descriptions and identification of the environmental impact of State-financed construction projects exceeding $1 million undertaken by local, county, or regional governments or agencies. It also applies to State-financed projects of less than $1 million which are located in sensitive areas or require special construction methods to prevent adverse environmental impact.

Application: This Executive Order was implemented in recognition of the fact that the wise use and protection of the State's natural resources are dependent upon the proper location and design of State facilities. This Order can be used immediately to assess the impact of State projects within the Pinelands before final approval is given.

Municipal Land Use Law

Statute: N.J.S.A. 40:55D-1 et seq.

Department: Community Affairs

Program: The Municipal Land Use Law (MLUL) provides statutory authority for site plan review and approval by municipal planning and zoning boards. The MLUL requires that a municipal master plan contain a statement of consistency with any county master plan and any comprehensive guide plan. The law calls for the filing of applications for developments of at least 150 acres or 500 dwelling units at the Division of State and Regional Planning.

Application: Given an interim Pinelands plan as part of a State guide plan, guidelines could be developed which would outline the procedure and content for purposes of preparing a statement of consistency with said plan for use by municipalities. Such a strategy would necessitate a more aggressive posture by the State to ensure compliance. Also, the DSRP could review developments submitted for filing and make comments, orally or in writing, to the local planning agency.

Interagency Agreements

Statute: Agreement

Departments: U. S. Departments of Housing and Urban Development (701) and Commerce (Office of Coastal Zone Management);

U. S. Environmental Protection Agency; New Jersey Departments of Community Affairs and Environmental Protection

Program: The Department of Housing and Urban Development (HUD) and the Office of Coastal Zone Management (OCZM) of the Department of Commerce have entered into an interagency agreement which provides for coordination of the HUD 701 Comprehensive Planning Assistance Program and the Coastal Zone Management Program. Also, an interagency agreement has been worked out between HUD and the Environmental Protection Agency (EPA) to coordinate 208 areawide waste treatment management planning and 701 comprehensive planning.

Application: The intent of these interagency agreements is to encourage contacts among all concerned agencies for the purpose of formulating common goals and objectives, selecting common data bases, and assuring ongoing coordination. The Department of Community Affairs, as the State's designated 701 agency, can promote goals and objectives that are consistent with the planning and management recommendations of the Pinelands Review Committee.

IV. D: REGULATORY PROGRAMS

Coastal Area Facility Review Act (CAFRA)

Statute: N.J.S.A. 13:19-1 et seq.

Department: Environmental Protection

Program: Requires the Department of Environmental Protection (DEP) to issue permits for the construction of residential (25 or more dwelling units) and certain commercial, industrial, transportation, and utility- and energy-related facilities within the CAFRA area, which includes all riparian, tideland, and wetland acreage in a 1,376-square-mile land area.

Application: In reviewing applications, the DEP must consider each application within the context of the Coastal Zone Management Plan. Since some land within the Pinelands lies within the CAFRA boundary, the CAFRA process could be used to regulate development within this area. The proposed Coastal Management Program's Bay and Ocean Shore segment could incorporate Pinelands strategies consistent with its own mandates

where the jurisdictions overlap.

Wetlands Permit

Statute: N.J.S.A. 13:9A-1 et seq.

Department: Environmental Protection

Program: Requires permit to excavate, dredge, fill, or erect structures on coastal wetlands. Type A permits are required for minor projects including excavation of small boat mooring slips, maintenance or repair of bridges, roads, highways; and construction of catwalks, piers, docks, landings, and observation decks. Type B permits are required for projects that dredge, fill, excavate, or alter the marsh contour.

Application: The review of applications must be done within the context of the Coastal Zone Management Plan and the Wetlands Act. Since some land within the Pinelands falls under wetlands jurisdiction, the wetlands regulatory program could be used to regulate development within this area. The proposed Coastal Management Program's Bay and Ocean Shore segment (including wetlands acreage) could incorporate Pinelands strategies consistent with its own mandates where the jurisdictions overlap.

Riparian Permit

Statute: N.J.S.A. 12:5-1 et seq.

Department: Environmental Protection

Program: Requires permit prior to the development of water front upon any tidal or navigable waterway. Water front development means docks, wharves, piers, bulkheads, bridges, pipelines, cables or pilings, or the dredging or removing of sand or other materials from lands under tidal waters.

Application: The issuance of riparian permits must be done within the context of the Coastal Zone Management Plan and the riparian statutes. Since some land within the Pinelands lies within riparian jurisdiction, the riparian permit program could be used to regulate development within this area. The proposed Coastal Management Program's Bay and Ocean Shore segment (including riparian land) could incorporate Pinelands

strategies consistent with its own mandates where the jurisdictions overlap.

Pinelands Critical Water Quality Area

Statute: N.J.S.A. 58:11-43 et seq.

Department: Environmental Protection

Program: A 760-square-mile region of the central Pinelands has been designated as a "critical water quality area" for sewerage purposes, requiring that all septic systems be approved by the Department of Environmental Protection prior to the issuance of a building permit. The critical area designation is the means by which DEP's proposed non-degradation water quality standards for the region will be implemented. The more stringent surface and ground water quality standards were adopted under the New Jersey Realty Improvements Sewerage and Facilities Act, commonly known as Chapter 199.

Application: The critical area designation has been enacted to prevent degradation and preserve the present water quality within the "Heart of the Pinelands," including the Mullica River, the Cedar Creek, and parts of the Rancocas and Toms River watersheds in Ocean, Atlantic, Burlington, and Camden Counties. DEP has set ground and surface water standards which could slow the rate of growth within the Pinelands since a one-acre cutoff is being used pending results of more detailed studies. However, if proposed development complies with the standards, it will be permitted. It should be noted that, in 1972, DEP designated as a "critical area" those sections of Atlantic, Cape May, Monmouth and Ocean Counties, and parts of Burlington County adjoining the Mullica River and its tributaries, lying between any tidal waterway and 10 feet above the mean sea level. The "critical area" designation for these areas remains in effect to control septic tank installations.

Certification of 50 or More Realty Improvements

Statute: N.J.S.A. 58:11-25.1 et seq.

Department: Environmental Protection

Program: Requires that no subdivision approval shall be granted by any municipal or other authority in the State to

cover 50 or more realty improvements until the Department of Environmental Protection has certified that the proposed water supply and sewerage facilities comply with State standards. Realty improvement is a dwelling unit not served by an approved sewerage facility or water supply.

Application: This permit program could be utilized to regulate those developments of 50 or more units that are proposed within the Pinelands which are located outside the aforementioned critical areas. However, as with the other programs, if the proposed development complies with the established standards, it will be allowed.

Solid Waste Facility Registration

Statute: N.J.S.A. 13:13A-1 et seq.

Department: Environmental Protection

Program: Empowers the Department of Environmental Protection to supervise solid waste collection and disposal facilities or operations and requires the registration of all new and existing solid waste collection and disposal facilities and operations (including landfills).

Application: This act requires the registration of all solid waste operators and collection/disposal facilities and, as such, prohibits the illegal dumping of solid waste within the Pinelands. In reviewing registration statements for new facilities, DEP must consider the application in the context of a comprehensive regional solid waste collection and disposal plan. The comprehensive solid waste plan for the Pinelands area should be consistent with the planning and management goals of the Pinelands Review Committee.

Soil Erosion and Sediment Control Plan Certification

Statute: N.J.S.A. 4:24-1 et seq.

Department: Agriculture

Program: Requires municipalities to condition development project approvals upon local soil conservation district certification of a plan for soil erosion and sediment control. Certification is required for projects, excluding an individual single-family dwelling unit,

that disturb more than 5,000 square feet of land for which the State uniform construction code would require a building permit. No project may be undertaken unless it has been approved by the local Soil Conservation District according to approved standards.

Application: Although this is not a State program per se (the State establishes standards which are administered on a local soil conservation basis), a notification program could be established whereby the local Soil Conservation District informs the State of applications for projects located within the Pinelands. Also, it is conceivable that standards could reflect the unique aspects of the Pinelands soils and vegetation.

Flood Plain Act

Statute: N.J.S.A. 58:16A-50 et seq.

Department: Environmental Protection

Program: Empowers the Department of Environmental Protection to delineate flood hazard areas and adopt minimum land use standards and to identify floodways to preserve their flood-carrying capacity and to minimize threats to public health, safety, and welfare.

Application: While the State has enacted the Flood Plain Act, it is of limited immediate use in the Pinelands since the required mapping delineation of the flood plains of streams within the Pinelands has not been done. The Act could be utilized, however, if a municipal government adopted a local flood plain ordinance. It is expected that delineation of flood plains within the Pinelands would begin as the Wild and Scenic Rivers System gets underway.

Stream Encroachment Permit

Statute: N.J.S.A. 58:1-26 et seq.

Department: Environmental Protection

Program: Requires permit for the construction, installation, or alteration of any structure or permanent fill along, in, or across the channel or floodway of any stream itself.

Application: Until rules and regulations under the Flood Plain Act

are available (presently restricted to the rebuilding of damaged buildings in certain areas), the stream encroachment permit program is being utilized to review development applications within floodways. This program can be utilized to regulate, but not prevent, development along streams within the Pinelands.

Sewerage Facilities

Statute: N.J.S.A. 58:12-3 et seq.

Department: Environmental Protection

Program: A permit is required from the Division of Water Resources to construct and operate any components of a sewer system, to construct and operate any plant that will treat domestic sewage, and to change, extend, or alter a sewer system or waste water treatment plant.

Application: The Department of Environmental Protection must review plans for sewerage facilities within the context of a comprehensive regional sewerage system. This requirement should be helpful in minimizing the secondary impacts associated with sewer construction since it has been determined that a causal relationship exists between sewers and the rate and intensity of growth. If sewers are appropriate, their proper timing, sizing, and routing can serve as a mechanism to guide development in the Pinelands in a manner consistent with the Pinelands Review Committee's management and planning objectives. The key to managing development patterns through the regulation of sewerage facilities lies in the coordination of the sewer decision-making process with the planning and management objectives of the Pinelands.

Water Supply

Statute: N.J.S.A. 58:11-2 et seq.

Department: Environmental Protection

Program: A permit is required from the Division of Water Resources to divert a water supply to establish a public or semipublic water supply system, to divert water from sub-surface or percolating sources, to divert surface waters, and to drill a well.

Application: These permits could be used to protect the vast water

supply of the Pinelands by regulating the amount of water taken out of an aquifer or out of a stream; however, most of the reviews are on a case-by-case basis. A comprehensive review of these permits may indicate that more stringent regulations be applied to water diversion within the Pinelands. When completed, the Water Supply Master Plan should provide the framework for the planning and management of the State's water supplies. These goals should be consistent with the planning and management objectives of the Pinelands Review Committee.

Water Facilities

Statute: N.J.S.A. 58:1-18 et seq.

Department: Environmental Protection

Program: A permit is required from the Division of Water Resources to construct and operate a water works, to construct facilities for a water distribution system, to change or alter a water treatment facility, and to install or maintain a physical connection between an approved potable water supply and a non-approved supply.

Application: Water supply systems have the potential for influencing the rate, location, and intensity of growth in an area. If the existence of a water supply system can stimulate growth, then, conversely, the absence of such a system can constrain development. The water facilities permit program of the Department of Environmental Protection could be utilized to guide development within the Pinelands in a manner consistent with the goals of the Pinelands Review Committee. The Water Supply Master Plan, when completed, should provide a basis for the planning and management of the State's water supplies, and these goals should be consistent with the objectives of the PRC.

Safe Drinking Water Act

Statute: Federal Safe Drinking Water Act of 1974, P.L. 93-523; N.J.S.A. 58:12A-1

Department: Environmental Protection

Program: The Federal Safe Drinking Water Act of 1974 allows the Environmental Protection Agency to set national standards for drinking water and requires that the States

enforce these standards and otherwise supervise public water supply systems. The New Jersey Safe Drinking Water Act of 1977 enables the New Jersey Department of Environmental Protection to take over enforcement of the Federal regulations.

Application: The safe drinking laws require that water suppliers are responsible for providing safe drinking water to the public. In addition, the Federal law requires that, in an area dependent upon a single aquifer as the principal drinking water source, the Environmental Protection Agency may withhold Federal funds from any project which may contaminate the aquifer. This sole-source aquifer concept could be helpful in preventing ground water degradation within the Pinelands since most of the area is dependent upon the Cohansey Aquifer as its principal drinking water source. However, due to the background studies required for such a program, it is unlikely that such a program could serve an interim period.

National Pollutant Discharge Elimination System (NPDES)

Statute: N.J.S.A. 58:10A-1 et seq.

Department: Environmental Protection

Program: The National Pollutant Discharge Elimination System is a permit program instituted on a national basis to control the discharge of pollutants into the nation's water. A NPDES permit is required for any discharge of pollutants into any waters, surface or ground.

Application: The NPDES permit program for New Jersey has been administered by the Environmental Protection Agency. However, with the passage of the New Jersey Water Pollution Control Act of 1977, the State is in the process of assuming jurisdiction of NPDES. No matter which agency, Federal or State, administers the program, the NPDES program could help to prevent the degradation of the water quality within the Pinelands by requiring a permit for any discharge of pollutants into any waters.

Air Pollution Control

Statute: N.J.S.A. 20:2C-1 et seq.

Department: Environmental Protection

Program: The New Jersey Air Pollution Control Act requires that certain standards be established to control factory and auto emissions. In compliance with the Act, a program has been established requiring, among other things, a permit to construct, install, or alter any equipment capable of causing the emission of air contaminants. The Act also prohibits open burning within the State except in the case of prescribed burning. Open burning means any fire whose products of combustion are emitted directly into the open air, and prescribed burning involves the open burning of plant life under the stipulation that the fire is confined to a predetermined area and accomplishes the environmentally beneficial objective of prevention and control of wildfires.

Application: This Act is beneficial to the Pinelands for two reasons: first, it prohibits degradation of air quality by prohibiting open burning; and secondly, it allows prescribed burning which is essential to the continuance of the Pinelands as we know it today. Prescribed burning is presently being practiced on State-owned lands by the Department of Environmental Protection's Divisions of Parks and Forestry and Fish, Game and Shellfisheries, and by cranberry bog owners on private lands, among others.

BIBLIOGRAPHY

Academy for Contemporary Problems, "Background on Adirondack Park Property Values and Municipal Finance Impact Study," June 1978.

Academy of Natural Sciences of Philadelphia, "A Study of Significance of the Pine Barrens of New Jersey," December 1967.

Adirondack Park Agency, selected technical reports, news articles, telephone interviews.

American Society of Planning Officials, Land Use Law and Zoning Digest, various issues, 1975-1978.

American Society of Planning Officials, "Urban Growth Management Systems," Planning Advisory Service Report Nos. 309 and 310, undated.

Atlantic County Planning Board, "Offshore Oil and Atlantic County," January 1978.

Ballard, J. and M.F. Buell, "The Role of Lowland Vegetation Communities in the Evapotranspiration Budget of the New Jersey Pine Barrens," Bulletin of the New Jersey Academy of Science, 20:26-28, 1975.

Barksdale, J.C., "Ground Water in the New Jersey Pine Barrens Area," Bartonia, 26:36-38, 1952.

Berry, David et al., "The Preservation of Open Space in the New Jersey Pinelands," Regional Science Research Institute Discussion Paper Series #73, May 1974.

Betz Environmental Engineers, "Environmental Assessment of Proposed Technical and Administrative Building Complex, Federal Aviation Administration National Aviation Facilities Experimental Center," August 20, 1976.

Bosselman, Fred and David Callies, The Quiet Revolution in Land Use Control, December 1971.

Bosselman, Fred, David Callies, and John Banta, The Taking Issue, July 1973.

Buell, M.F. and J.E. Cantlon, "A Study of Two Communities of the New Jersey Pine Barrens and a Comparison of Methods," Ecology, 31:567-586, 1950.

Buell, M.F. and J.E. Cantlon, "Effects of Prescribed Burning on Ground Cover in the New Jersey Pine Region," Ecology, 34:520-528, 1953.

Burlington County Planning Board, "Outer Continental Shelf and Energy Facility Planning Program," January 1978.

Byrne, Brendan, "Remarks of Governor Brendan Byrne at the Pine Barrens Conference," December 17, 1976.

Carlson, Fred, Principal Wildlife Biologist, New Jersey Department of Environmental Protection, Division of Fish, Game and Shellfisheries, telephone interview, March 1978.

Chavooshian B. Budd, Dr. George H. Nieswand, and Thomas Norman, "Growth Management Program: A Proposed New Approach to Local Planning and Zoning," Rutgers University, New Brunswick, New Jersey, 1974.

Chavooshian, B. Budd, Thomas Norman, and Dr. George H. Nieswand, "Transfer of Development Rights: A New Concept in Land Use Management," Rutgers University, New Brunswick, New Jersey, 1975.

Connecticut Inland Wetlands Agency, telephone interview.

Costonis, John J., Curtis J. Berger, and Stanley Scott, Regulation vs. Compensation in Land Use Control: A Recommended Accommodation, a Critique and an Interpretation, University of California Institute of Governmental Studies, Berkeley, California, 1977.

Economic Research Associates, "An Analysis of the Impact of Casino Gambling on the Housing Needs of the Atlantic City Area," December 1977.

Fairbrothers, D.E. and M.Y. Hough, "Rare or Endangered Vascular Plants of New Jersey," New Jersey State Museum Science Notes, No. 14, 1973.

Folkman, William S., Public Involvement in the Decision Making Process of Natural Resource Management Agencies, University of Washington, Seattle, Washington, 1973.

Greenberg, Michael R. and Nancy Neuman, New Jersey Toward the Year 2000: Population Projections, Rutgers University Center for Urban Policy Research, New Brunswick, New Jersey, 1977.

Hagman, Donald and Dean Misczynski, Windfalls for Wipeouts, American Society of Planning Officials, 1978.

Harshberger, John W., Vegetation of the New Jersey Pine Barrens, Christopher Sower Company, Philadelphia, Pennsylvania, 1916.

Helb, J.V., B. Budd Chavooshian, and Dr. George H. Nieswand, Development Rights Bibliography, Rutgers University, New Brunswick, New Jersey, May 1976.

James, Franklin J. and Dennis E. Gale, Zoning for Sale: A Critical Analysis of Transferable Development Rights Programs, The Urban Institute, Washington, D.C., 1977.

Kweit, Robert W. and Mary Kweit, The Search for Effective Citizen Participation, University of North Dakota, Grand Forks, North Dakota, 1978.

Levin, Melvin R., Jerome G. Rose, and Joseph Slavet, New Approaches to State Land Use Policies, Lexington Books, 1974.

Little, S., "Eighteen-Year Changes in the Composition of a Stand of Pinus Echinata and Pinus Rigida in Southern New Jersey," Bulletin of the Torrey Botanical Club, 100:94-102, 1973.

Mahn, Fred, District Conservationist, Burlington County Soil Conservation District, personal interview, April 1978.

McCormick, J., "The Pine Barrens: A Preliminary Ecological Inventory," New Jersey State Museum Research Report No. 2, 1970.

McCormick, J. and M. Buell, "The Plains: Pigmy Forests of the New Jersey Pine Barrens, a Review and Annotated Bibliography," Bulletin of the New Jersey Academy of Science, 13:20-34, 1968.

McCormick, Jack and Leslie Jones, "The Pine Barrens: Vegetation Geography," New Jersey State Museum Research Report No. 3, 1973.

McPhee, John, The Pine Barrens, Farrar, Straus, and Giroux, New York, New York, 1968.

Middletown, New Jersey, Environmental Commission, Save Open Space, undated.

New Jersey Department of Agriculture, "New Jersey Agricultural Statistics 1978," N.J.D.A., Crop Reporting Service, Trenton, New Jersey, August 1978.

New Jersey Department of Agriculture, "The New Jersey Pinelands: An Agricultural Perspective," N.J.D.A., Trenton, New Jersey, December 12, 1977.

New Jersey Department of Community Affairs, "Cumberland County Land Use Issues," N.J.D.C.A., Division of State and Regional Planning, Trenton, New Jersey, January 1976.

New Jersey Department of Community Affairs, "Federal-Owned Real Property in New Jersey," N.J.D.C.A., Division of State and Regional Planning, Trenton, New Jersey, January 1978.

New Jersey Department of Community Affairs, "Housing Concerns Significant to the CAFRA Region," N.J.D.C.A., Division of State and Regional Planning, Trenton, New Jersey, October 1976.

New Jersey Department of Community Affairs, "Retirement Communities," N.J.D.C.A., Bureau of Housing and Renewal Services, Trenton, New Jersey, 1979.

New Jersey Department of Community Affairs, "State-Owned Real Property in New Jersey," N.J.D.C.A., Division of State and Regional Planning, Trenton, New Jersey, January 1978.

New Jersey Department of Energy, "Determination of the Need for Energy Facilities," N.J.D.O.E., Trenton, New Jersey, May 1978.

New Jersey Department of Environmental Protection, "Attendance at State Parks, Forests, and Historic Sites," N.J.D.E.P., Division of Parks and Forestry, Trenton, New Jersey, June 1978.

New Jersey Department of Environmental Protection, "Guide to Wildlife Management Areas," N.J.D.E.P., Division of Fish, Game and Shellfisheries, Trenton, New Jersey, 1977.

New Jersey Department of Envir onmental Protection, "New Jersey Pinelands: Forestry Report," N.J.D.E.P., Bureau of Forestry, Trenton, New Jersey, March 30, 1978.

New Jersey Department of Labor and Industry, "Dependency of Local Economy on Fort Dix, New Jersey," N.J.D.L.&I., Division of Planning and Research, Trenton, New Jersey, August 1, 1975.

New Jersey Department of Labor and Industry, "Population Estimates for New Jersey," N.J.D.L.&I., Office of Demographic and Economic Analysis, Trenton, New Jersey, March 1978.

New Jersey Highway Authority, telephone interview, July 1978.

Nieswand, Dr. George H. and Peter Pizor, Current Planning Capacity: A Practical Carrying Capacity Approach to Land Use Planning, Rutgers University, New Brunswick, New Jersey, June 1977.

Ocean County Planning Board, "Outer Continental Shelf and Energy Facility Planning Study," April 1978.

Pinelands Advisory Committee, "Report of the Pinelands Advisory Committee," July 1970.

Pinelands Environmental Council, "Plan for the Pinelands," 1975.

Pinelands Review Committee, "Selection of a Pine Barrens Study Area Boundary," August 16, 1977.

Pinelands Review Committee, Testimony at Pinelands Review Committee Public Hearing held at Trenton, New Jersey, April 3, 1978.

Public Information Officer, Lakehurst Naval Air Station, telephone interview, March 1978.

Public Information Officer, National Aviation Facilities Experimental Center, telephone interview, March 1978.

Rhodehamel, E.C., "A Hydrology Analysis of the New Jersey Pine Barrens Region," U.S. Geological Survey Typscript, 1971.

Rhode Island Statewide Planning Program, "Regulation of Critical Areas through a State Land Management Program," Technical Paper No. 57, September 1975.

Robichaud, B. and M.F. Buell, Vegetation of New Jersey, Rutgers University Press, New Brunswick, New Jersey, 1973.

Rose, Jerome G., Transfer of Development Rights, Rutgers University Center for Urban Policy Research, New Brunswick, New Jersey, 1975.

Rose, Stu and John Membrano, "If Army Closes Dix," Trenton Times, April 27, 1978.

Rosenbaum, Nelson M., Citizen Involvement in Land Use Governance, The Urban Institute, Washington, D.C., 1976.

Rutgers University Center for Coastal and Environmental Studies, "Onshore Support Bases for OCS Oil and Gas Development: Implications for New Jersey," September 1977.

Rutgers University Center for Coastal and Environmental Studies, "The Bass River Township Project: Report of the First Phase Research," undated.

Shea, Thomas K., Chief Mine Safety Engineer, New Jersey Department of Labor and Industry, Office of Safety Compliance, personal interview, February 27, 1978.

Siegan, Bernard H., Other People's Property, Lexington Books, 1976.

Herbert H. Smith Associates, A Series of 26 Unpublished Technical Memoranda on the Pinelands, various dates from 1962-1964.

Herbert H. Smith Associates, "The New Jersey Pinelands Region," November 1963.

Herbert H. Smith Associates, "The New Jersey Pinelands Region: Future Development Plan Alternatives," March 1965.

Tahoe Regional Planning Agency, selected technical reports, news articles, telephone interviews.

Tedrow, J.C.F., "Soil Conditions in the Pine Barrens of New Jersey," Bartonia, 26:28-35, 1952.

Thomas, Alexander G., "Transfers of Land to the State for Conservation Purposes: Methods, Guarantees, and Tax Analysis for Prospective Donors," Ohio State Law Journal, 36:545-587, 1975.

Towle, Van, New Jersey Bell Telephone Company and the American Right-of-Way Association, Utility Rights-of-Way Maps, 1977.

"Transferable Development Rights," proceedings of a seminar co-sponsored by the National Conference of State Legislatures and the New Jersey Law Revision and Legislative Services Commission held at Saddle Brook, New Jersey, September 30 - October 1, 1977.

Urban Land Institute, Management and Control of Growth, Urban Land Institute, Washington, D.C., 1975.

U.S. Department of the Air Force, "Fact Sheet, McGuire Air Force Base," March 23, 1978.

U.S. Department of the Army, Army Corps of Engineers, "Draft Environmental Impact Statement Concerning the Restationing of Troops Redeploying from Korea," March 20, 1978.

U.S. Department of Commerce, Bureau of the Census, Census of Population, 1970.

U.S. Department of Housing and Urban Development, "Citizen Involvement in 701 Activities," 1976.

U.S. Department of the Interior, National Park Service, "Pine Barrens of New Jersey," undated.

U.S. Department of the Interior, National Park Service, "New Jersey Pine Barrens: Concepts for Preservation," 1976.

U.S. Department of the Interior, National Park Service, "The Pine Barrens of New Jersey: A Study of Alternatives" (unpublished working draft), May 1969.

Vivian, Dr. Eugene, testimony at Pinelands Review Committee Public Hearing held at Trenton, New Jersey, April 3, 1978.

Waldron, Martin, "Work on 10 Casinos Envisioned by 1979," New York Times, March 29, 1978.

Widmer, K., The Geology and Geography of New Jersey, Nostrand Company, Princeton, New Jersey, 1964.

Williams, Norman, American Land Planning Law (5-volume edition), 1974.

SOURCES OF MAPPED INFORMATION

"Pinelands Review Committee Study Area" - Established by the Governor's Pinelands Review Committee, September 1977.

"Publicly Owned Open Lands" - New Jersey Department of Community Affairs, Division of State and Regional Planning, 1977.

"Previously Proposed Acquisitions" - New Jersey Department of Environmental Protection and the New Jersey Pinelands Environmental Council, 1960-77.

"Drainage Basins" - New Jersey Department of Community Affairs, Division of State and Regional Planning, 1978.

"Utility Rights-of-Way" - New Jersey Bell Telephone Company and the American Right-of-Way Association, 1977, and the New Jersey Department of Environmental Protection, Bureau of Geology, Utility Map Series, 1977.

"Pinelands Vegetation" - Jack McCormick and Leslie Jones, The Pine Barrens: Vegetation Geography, Research Report Number Three, New Jersey State Museum, January 1973.

"Selected Regional Jurisdictions" - New Jersey Department of Community Affairs, Division of State and Regional Planning and New Jersey Department of Environmental Protection, Division of Water Resources, 1977.

"Developed Lands" - Compiled by the New Jersey Department of Community Affairs, Division of State and Regional Planning from the following sources.

1. New Jersey Department of Community Affairs, Division of State and Regional Planning:
   a. applications for residential development filed under the Municipal Land Use Law;
   b. applications for residential, industrial, transportation, utility and energy facility development reviewed under the Coastal Area Facilities Review Act;
   c. aerial photographs of New Jersey by Mark Hurd Associates, 1972.

2. New Jersey Department of Environmental Protection:
   a. Bureau of Geology - Land Use Overlay Map Series-1978-based on 1972 aerial photographs by Mark Hurd Associates;
   b. Division of Water Resources - 1977 aerial photographs of the "Pinelands Critical Area for Water Quality."

3. Burlington County Planning Board, map of "Areas with Development Limitations in Burlington County," September 1976.

4. Ocean County Planning Board, "Street Map of Ocean County," 1977.

5. Atlantic County Planning Board, "Land Use Map of Atlantic County," 1977.

"Recommended Planning and Management District" - Governor's Pinelands Review Committee, June 1978.

"Major Regional Influences" - New Jersey Department of Community Affairs, Division of State and Regional Planning, 1978.

"Pinelands Cranberry Agriculture" - Compiled by the New Jersey Department of Environmental Protection, 1977.

"Political Subdivisions" - New Jersey Department of Community Affairs, Division of State and Regional Planning, 1978.

STATE OF NEW JERSEY
EXECUTIVE DEPARTMENT

EXECUTIVE ORDER NO. 56

WHEREAS, the New Jersey Pinelands is an area of special environmental, scenic, recreational, educational, historic and agricultural interest; and

WHEREAS, the Pinelands provides a habitat for the preservation of wildlife in forests, streams and wetlands and contains vast surface and ground water supplies; and

WHEREAS, the Pinelands is vital to the agricultural resources of the State through extensive cultivation of blueberries, cranberries and other agricultural products; and

WHEREAS, existing State law recognizes the special environmental, scenic, recreational, educational, historic and agricultural resources of the Pinelands; and

WHEREAS, the protection of the unique resources of the Pinelands is in the interest of the State and Nation which requires the planning and coordination of State actions affecting such resources;

NOW, THEREFORE, I, BRENDAN BYRNE, Governor of the State of New Jersey, by virtue of the authority vested in me by the Constitution and by the statutes of this State, do hereby Order and Direct:

1. (a) There is hereby established a Pinelands Review Committee ("the Committee") consisting of the Commissioner of the Department of Environmental Protection, the Commissioner of the Department of Community Affairs, and the Secretary of Agriculture, or their designated representatives, and such citizens who may be appointed by and shall serve at the pleasure of the Governor. The Governor shall designate the chairman of the Committee. The Division of State and Regional Planning in the Department of Community Affairs shall serve as staff to the Committee.

(b) The Committee shall review all major State activities significantly affecting the special and unique environmental resources of the Pinelands. Consistent with Federal and State law, the Committee shall approve only projects consistent with the protection of the unique resources of the Pinelands.

(c) All State departments and agencies shall submit for review to the Committee pending or proposed major State actions significantly affecting the Pinelands. These actions shall include, without limitation, State capital construction projects, construction regulations, soil erosion standards, environmental quality regulations, acquisition of open space lands and all public or private actions requiring State review or funding.

(d) Within 90 days of the date of this Order, all State departments and agencies shall submit to the Committee an inventory of all pending or proposed projects, programs or regulations administered by the department or

agency which may affect the Pinelands. The Committee shall review the inventory, and may approve or propose plans, guidelines or standards necessary to make departmental plans consistent with the purposes of this Order. The Committee shall develop a plan and program to guide and control State actions affecting the Pinelands. The Committee may approve departmental plans, guidelines or standards for the administration of programs affecting the Pinelands, and authorize the department to review particular projects or regulations consistent with such approved plans.

(e) The Committee shall advise the Governor if it determines that any action would be inconsistent with the protection of the unique resources of the Pinelands.

2. Within 90 days of the date of this Order, the Division of State and Regional Planning shall submit to the Committee a report outlining the options for delineation of the Pinelands; this report may designate areas within the Pinelands which require special treatment or strategies to achieve the purposes of this Order. The Committee shall review this report, and hold a public hearing to receive comments concerning the report. The Committee shall recommend to the Governor a delineation of the Pinelands needed to accomplish the purposes of this Order. Upon approval, by the Governor, the recommendation shall be utilized to define the Pinelands for purposes of this Order. Until a revised delineation is approved, the Pinelands shall be defined as the area included in P.L. 1971, c.417 (C.13:18-6).

3. Within one year of the date of this Order, the Division of State and Regional Planning shall submit to the Committee a plan for approval which shall guide State actions affecting the Pinelands. The plan shall be developed after public hearing and consultation with relevant public and private agencies and groups, including county and local governing bodies, planning boards, agricultural, environmental and sportsmen groups. The plan shall have the following primary objectives:

(a) the preservation of the unique environmental resources of the Pinelands;

(b) the promotion of agricultural, forestry and recreational uses compatible with the protection of the environment;

(c) the encouragement of needed commercial, residential or other development within existing developed areas or other areas which may be developed compatible with preservation of unique environmental resources;

(d) the discouragement of scattered and piecemeal development in open space areas.

4. The Committee shall review the effect of all State actions on private property rights and values. It shall prepare a report summarizing these effects and analyzing the justification and options for compensation of private property owners, including direct payments, tax credits or adjustments and the use of development rights or other land-use concepts. The report shall also review the effect of all State actions on county and municipal tax revenues and analyze the feasibility of financial or other assistance to counties or municipalities which incur substantial revenue losses as a result of State actions to protect the Pinelands. In preparing this report, the Committee shall consult with and be assisted by the Treasurer, the Attorney General, the Director of the Division of Local Government Services and other relevant State officials.

5. The Department of Environmental Protection shall, after receiving public comments and consultation with interested officials, groups and individuals:

(a) adopt water quality standards and regulations for the rivers and waters in the Pinelands required to maintain and protect the purity of these waters;

(b) designate the Pinelands as a critical area for sewerage purposes, and develop regulations for the approval and control of all sewage and septic systems;

(c) review existing State-owned lands in the Pinelands and designate appropriate "natural areas" pursuant to the Natural Areas Systems Act, P.L. 1975, c. 363 (C.13:1B-15.12a et seq.);

(d) identify potential sites eligible for designation as historic preservation areas.

6. Within 90 days of the date of this Order, the Department of Agriculture shall review and identify agricultural activities and uses within the Pinelands and submit to the Committee a report recommending methods and actions to preserve and strengthen agricultural activities and uses consistent with the protection of other resources.

7. The Department of Education and the Department of Higher Education shall promote appropriate educational and research activities involving the Pinelands with an emphasis on bringing urban primary and secondary school students to the region for ecological education.

8. This Order shall take effect immediately.

GIVEN, under my hand and seal
this 24 day of May in
the year of Our Lord,
one thousand nine hundred
and seventy-seven, and of
the Independence of the
United States, the two
hundred and first

GOVERNOR