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Tri-State Transportation Commission

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TRI-STATE TRANSPORTATION COMMISSION

The Tri-State Transportation Commission, an interstate planning agency, defines and seeks solutions to immediate and long-range transportation, land-use and comprehensive planning problems of the New York metropolitan region covering 22 counties in New York and New Jersey and six planning regions in southwest Connecticut.

Established by legislative action of the states of Connecticut, New Jersey and New York in 1965, the Commission succeeds the Tri-State Transportation Committee formed by the governors of these states in 1961.

Designated by the federal government as the official planning agency for the Tri-State Region, the Commission is also a central supporting resource for subregional and local planning. It provides assistance in solving problems that spread beyond local jurisdictional control. It also encourages coordination among all agencies charged with an interest in planning or providing transportation and other federally aided public facilities within the Tri-State Region.

The three states and the federal government finance the work of the Commission. Federal funds come from highway planning and mass transportation grants provided by the Department of Transportation, and also from planning grants provided by the Department of Housing and Urban Development.

Commissioners representing the three states are appointed by the governors in accordance with the laws of their respective states. Federal representatives are appointed by the appropriate officer holding such authority within the Executive branch.

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regional development guide

technical perspectives

This technical report reflects staff work that may be of interest to other specialists. The report should not be quoted or reproduced without approval of the executive director.

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introduction.

The regional development plan of the Tri-State Transportation Commission arranges the Tri-State Region's future physical elements to reflect a set of human values and achieve a set of long-range goals. *The Regional Development Guide*, dated October 1968, describes the major policies and strategic elements of the plan and relates each to these values and goals. It also notes, for each strategic policy, alternatives previously considered and the reasons for their rejection.

A previous report, *Regional Development Alternates*, issued in March 1967, presented seven different concepts for the Region's development. The regional development plan selects from the policies of several of the alternates, those that can most effectively achieve the desired goals. Chapter I that follows summarizes the regional development plan and reviews the process of choosing policies from the seven alternates.

This report principally explains and justi-

fies the step-by-step reasoning that translates these assumed values and chosen goals into physical patterns and features, and determines specific locations of differing environments, facilities and activities on the surface of the Region. Chapters II and III present this reasoning. Its bases are the known facts about the Region and the projected estimates of its future growth. Tri-State Transportation Commission's numerous inventories assembled existing facts. *Measure of a Region*, dated May 1967, summarizes them. The transportation network that helped determine some of the likely locations for development was an adaptation of *Tri-State Transportation 1985 an Interim Plan*, dated May 1966, modified to fit the land-use requirements derived from these known facts. *Regional Forecast 1985*, dated December 1967, presented the projections of the Region's growth, which determined the total quantities of people and facilities to be physically arranged on the Region's surface by the method described here.

I. values, goals, policies.

a. the regional plan

To improve the Tri-State Region effectively, a plan for its development must take advantage of the changing environment through the skillful management of public works investment. An investment's purpose is to achieve policies and objectives; these lead step by step to long-range goals; goals should accord with the values held by society. Measurement against long-range goals will help determine whether public investment policies will move the Region in the direction its people want it to go.

Our society recognizes three sets of human values. It seeks to **harness natural forces** to enhance personal and collective happiness and wealth. It wants to **organize a stable society**, endowed with standards of equity and order, where every person receives a just share of society's benefits. It tries to **build with skill and purpose** a handsome environment that delights the senses and inspires the mind.

Within these dimensionless values we seek three sets of measurable goals for the development of the land. **Smoother performance of the urban machine** requires efficiency of economic







performance, cheap power, wide communication, fast transport, and an arrangement on the land of urban development that balances collective efficiency with personal amenity. **Wider opportunities for full participation** provide every individual with equal rights to decent housing, education, jobs, health and recreation, a guaranteed minimum standard of personal welfare, increased opportunities to improve his position, and a wide choice of public services and private options. The creation of a **richer environment for urban life** would reduce noise, ugliness and pollution, protect unique natural features, and in general preserve and create beauty, variety and interest.

To achieve these goals the land-development plan for the Tri-State Region proposes three principal policies: preserving open lands, gathering economic activities and dispersing residential activities.

Preserving open lands widens opportunities for recreation, enhances natural endowments and creates variety in the urban environment. The plan reserves generous areas of open land where nature will predominate, situated primarily in the hills and along the shores of the



MAP 1
REGIONAL DEVELOPMENT PLAN

-  MANHATTAN ECONOMIC CLUSTER
-  PRIMARY, SECONDARY AND NEW ECONOMIC CLUSTERS
-  CLUSTER RESIDENTIAL
-  INDEPENDENT RESIDENTIAL
-  OPEN LAND, INCLUDING LOW-DENSITY RESIDENTIAL
-  RECREATION

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Region. Public ownership or control and zoning would protect these areas from normal pressures of urban expansion. The open lands would enclose the Region's major parks, reservoirs, watersheds and natural features, interspersed with a thin scattering of residences compatible with open uses.

Conversely, all areas not so reserved would be subject to more intensive human settlement. In those places also a sufficiency of recreation and open space must exist as an integral part

of urban development for the local daily use of the population.

Gathering economic activities into a hierarchy of concentrations or "clusters" furthers the goal of smoother performance and greater efficiency, by bringing larger quantities and a greater variety of activities closer together. Almost all such clusters should occur within areas designated for urban development. The urban environment needs them there for jobs and services, and their presence there will attract urban development to places where it is wanted.

Conversely, clusters should not occur in areas of predominantly open land. Their absence there will reduce development pressures in the places where it is not wanted.

Dispersing residential activities provides improved housing in keeping with rising incomes and predominant tastes. American society prefers by far the detached single-family dwelling, even though multifamily dwellings have predominated in the Tri-State Region primarily because of the special historic characteristics of New York City. Single-family dwellings should therefore predominate at middle densities in most new development on vacant land. High-rise or garden apartments, always endowed with private open space for the use of their residents, as well as townhouses at equivalent densities, should concentrate within and around the economic clusters. The Region's open land areas would contain residential development only on large lots or in scattered villages surrounded by the open countryside, to accommodate those who prefer or can afford this kind of environment. These policies imply the renewal and thinning out of older areas, with the gradual elimination of the obsolete "walk-up" tenement predominant in the ghettos of older cities.

Map 1 is the regional development plan prepared in accordance with the values, goals and policies described above. Map 3 on page 12 presents this same plan schematically to permit greater legibility of its elements. A brief description of the plan's geographic arrangement appears at the conclusion of this chapter.

This and other maps in this report use a square-mile-grid system to express graphically the distribution of land use across the Region. Each square mile is a specific geographical location identified by x/y coordinates corresponding to that square's distance from Columbus Circle in New York City. For planning a region as large as Tri-State's, a unit smaller than the square mile would be too small. The Tri-State Region contains almost 8000 square miles. The elements of the regional development plan pertain to the characteristics and content of these square-mile units. The detailed arrangement of elements within any given square mile is most effectively the business of subregional and local planning work.

b. evaluating alternates

The seven alternate arrangements of development in the Tri-State Region presented in *Regional Development Alternates* provided a full range of options for selecting the policies of the regional development plan. Evaluation of these alternates was not an attempt to select in its entirety one above the others. It identified, rather, the merits and drawbacks of each. It guided further analytical studies in the di-



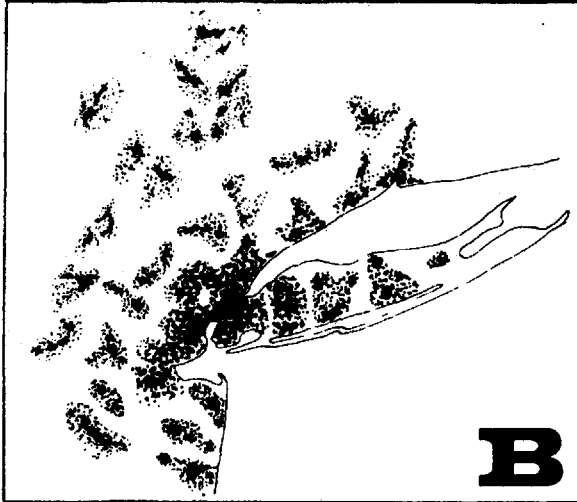
rection of highest return, which permitted informed decisions on every major issue. The regional development plan selected those policies in each of the alternates that appeared preferable and feasible and rejected those that were not.

Alternate A recognized the individualistic American family's apparent preference for the detached single-family home on increasingly large lots and for complete individual mobility provided by the private automobile. The resulting land development pattern was uninterrupted suburban development on the entire surface of the Region and beyond, tied together by a tight grid of expressways, with rail transit limited to serving the core.

The regional development plan's policy of residential dispersal respects these preferences. But it also provides multifamily housing in every locality, so that mobile and small families, either young or old, and low-income families, would not need to purchase and maintain a house

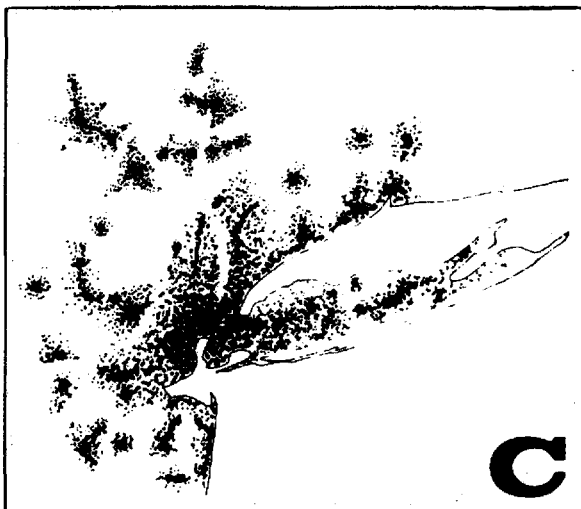
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to obtain adequate housing. Furthermore, the plan rejects the oppressive monotony of uninterrupted and undifferentiated development by specifying lot sizes smaller than the current



averages in areas designated for urbanization, but considerably larger lots combined with extensive publicly owned open space in areas designated for openness.

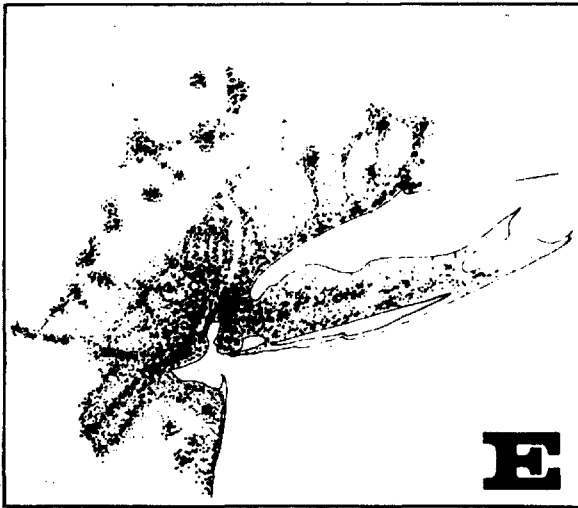
Alternates B, C and D proposed various forms of clustering around economic concentrations. The number of such concentrations ranged from 33, each serving populations of 0.5 to 1 million (Alternate B); to 12, including seven "new cities" each serving 0.75 to 1.5 million (Alternate C); to eight, each serving 2 to 3.5 million, the latter at the head of a hierarchy of secondary and minor subcenters (Al-



ternate D). Techniques for achieving these forms of clustering included establishing new universities to generate new centers (Alternate B); building genuine new cities on the Region's periphery, by combined public and private action (Alternate C); or intensifying existing centers to polarize the Region's land development (Alternate D). Various patterns of open space—grids, strips, wedges or greenbelts—separated the resulting urban agglomerations. In all cases, Manhattan remained the Region's main center, surrounded by a fully urban "core" area, different in size in each case, with populations ranging from 10 to 14 million.



The regional development plan's clusters of economic activity surrounded by intense residential areas incorporate some of the characteristics of all three of these alternates. Avoiding the repetitious uniformity of Alternate B, the structure of the system is hierarchic, most similar to the proposals of Alternate D. In some instances new universities or other types of public facilities would generate new centers as in Alternate B. The development of fairly intensive urban areas on the Region's periphery, separated from existing suburbs by low-density open-land areas, could produce the equivalent of some of Alternate C's "new cities." The plan's arrangement of open-land areas to interrupt the continuity of urban development will have an effect equivalent to all the various greenbelt, grid or wedge proposals of these three alternates, but without the constraints that rigid concepts impose. The presence of openness, with its vividly contrasting effect



and its ready accessibility for recreation, are what is noticeable on the ground, rather than the stratospheric eyeview of its physical form—belt, grid or wedges—as it appears on a map.

Alternate E's guiding principle was the development of each part of the Region "in harmony with its special characteristics." It reflected the great diversity of the Region's natural and man-made resources in a wide variety of development patterns, some very special. It provided "a place within the Region to accommodate every specialized need, interest or activity."

The regional development plan's physical elements and arrangements generally differ from those of Alternate E, but the purposes are the same: to achieve variety, to satisfy a diversity of tastes and needs and to respect the special characteristics of every locality. Wider opportunities for full participation and a richer en-



vironment for urban life were major goals achieved in this manner. The next chapter of this report describes how the plan's framework emerged from a correlation of observable and measurable natural conditions and human decisions that exist on the land surface of the Region, and which, as in Alternate E, the plan proposes to respect, even enhance. The procedure for allocating future development to each square mile of the Region, described in Chapter III, calculated future density as a function of existing density, again in order to respect or enhance, in each locality, those special characteristics that the existing density might reflect.

The guiding principle of alternates F and G was the overwhelming importance of Manhattan as the Region's "greatest asset, principal resource and strongest magnet." To reinforce Manhattan's functions as the economic and cul-



tural capital of the nation and the financial and political capital of the world, these alternates concentrated almost the entire future growth of the Region into a single giant urban agglomeration within a 35-mile radius of Manhattan. By the year 2000 it would contain a population ranging from 22 to 26 million, knitted together at high densities by a closely spaced mass-transit grid. Its boundary would enclose little more than the area now undergoing suburban development. Beyond would lie a broad greenbelt of permanent open space, beyond which in turn would occur the secondary agglomerations surrounding New Haven, Bridgeport and Trenton, and the mid-Hudson area. Alternate G differed from F by postulating a

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limit to the population and density of this giant central urban mass, so that future growth exceeding this limit would have to locate within other adjacent metropolitan areas.

The regional development plan concurs with alternates F and G in recognizing the world-wide significance of Manhattan's concentration of business, financial, cultural and governmental functions. It does not foresee, however, any appreciable growth of employment in this center, since congestion there is already excessive. Nor does it require any larger population than the present one to house both its leadership and its labor force.

Consequently, the degree of concentration proposed in alternates F and G appears both unnecessary and undesirable. The plan has a policy of residential dispersal in suburban-type environments where single-family dwellings will predominate, in accord with the known preference of our individualistic culture. The present suburban railroad network, improved with higher speeds, greater efficiency and direct delivery of all passengers to Manhattan, will make the latter sufficiently accessible from the entire Region.

By implication, finally, the regional development plan accords with Alternate G's policy that sets a limit to the capacity of the land within the Region's boundaries as presently defined. The plan maintains large "open land" areas to interrupt the continuity of urban development, and a predominance in newly developed areas of suburban-type lot sizes with adequate private open space for every dwelling. In order to maintain such amenities, a total population of slightly over 28 million appears to be the capacity within the 22 counties and six planning regions presently defined as the Tri-State Region, a level it may reach by the year 2000. The expectation of running out of land in this and other urban regions is regarded by some with alarm. But packing more population at higher densities into the same space would create the kinds of environment from which Americans consistently try to escape. There is no scarcity of land in the United States or even in the Northeast. As the population of the presently legislated Tri-State Region approaches the Region's capacity, the population

will simply spill over into adjacent counties beyond the Region's borders, where policies similar to those proposed in this plan can insure the same persistence of all the various types of environment that are satisfying to the American people.

c. choosing policies

The following nine headings describe further the policies that guided the preparation of the regional development plan. They reflect the values, goals and major policies listed at the beginning of this chapter, which in turn contain the conclusions derived from evaluation of the seven development alternates. Under each heading the juxtaposition of policies adopted and of those rejected should make the plan's position entirely clear.

1. The Tri-State Region will experience moderate growth in the future. Its population and jobs will increase from 17.9 and 7.7 million respectively in 1963, to 23.2 and 9.9 million in 1985, and 27.4 and 11.7 million in 2000. Space is available within the Region to accommodate this moderate growth without exceeding, for the most part, conventional suburban densities. Total floor space in the Region was 9 billion square feet in 1963; this will increase to 14 billion by 1985.

The plan rejects as unnecessary any policies that would repel or divert part of this growth to other areas within the time period of these forecasts. It also rejects as undesirable any programs to accelerate growth at the expense of quality and prosperity.

2. Manhattan's supply of jobs and its population must stabilize. In contrast to the current trend of actual population decline and impending employment decline in the center of the Region. Thus the number of jobs in Manhattan's central business district south of 59th Street, now 1.8 million, would vary no more than 10 percent up or down, ranging from 1.6 to two million in 1985. A much higher degree of specialization will prevail, however. Office employment will continue to supplant manufacturing, which will almost inevitably tend to depart from the borough. Thus, by 1985, office employment in Manhattan's central business district will increase by 200,000 over the 1963 figure of 818,000. Manhattan's resident population should likewise

stabilize near its present level of 1.6 million. But the number of dwelling units must increase, as this population will consist more and more of single-person and two-person families, at an average of less than two per family, compared to 2.1 in 1963, and 4.8 in 1900.

To prevent the decline of Manhattan's employment will require considerable effort: the plan rejects the declining trend, but also rejects the assumption that a substantial increase of either jobs or population, and therefore of congestion, is possible or indeed desirable.

3. Preservation of open land, distributed throughout the Region, takes maximum advantage of the Region's natural character—its mountains, beaches, streams and other scenic sites. The plan combines large-scale regional open space with a careful delineation of low-density areas. At the same time recreational open space for local daily use must be an integral part of urban development. The Region contained 312,000 acres of recreational open space in 1963 (including all types of private open space) or 17 acres per 1000 population. The plan provides 780,000 acres for the year 2000, or 28 acres per 1000, most of which the Region must have reserved by 1985.

The plan rejects a strictly controlled and very costly greenbelt or system of greenbelts to enclose developed areas, which would remove much land from the developable category. It also rejects the trend of letting large expanses of the natural environment exist only at the leading edge of outward development, always farther and farther from the center of the Region, and always in a losing competition with urban development.

4. Gathering of nonresidential development in clusters, that is, central places and other concentrations, will insure efficiency in the performance of work and the obtaining of services. Nonresidential floor space is where the jobs are. "Clusters" may include one or several types of work or service, including manufacturing, trade, business, professions, education, recreation and government. Existing clusters will grow to some extent. A large number of emerging clusters will grow very substantially. In addition the plan proposes a few "new towns," primarily through the development of nonresidential clusters at their nuclei, in close-

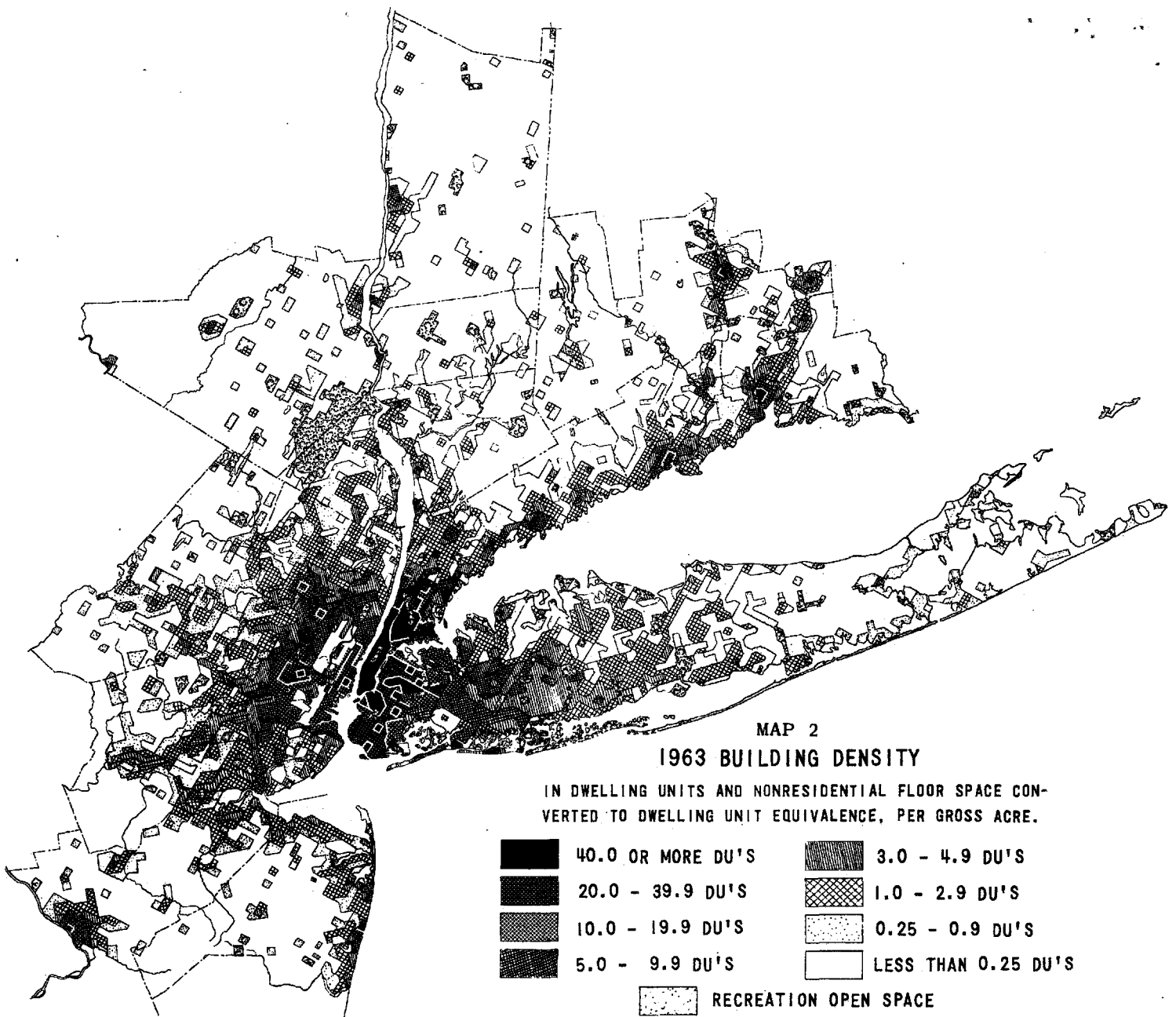
in locations such as the Hackensack Meadowlands, the Bayonne waterfront and Staten Island, as well as in the Region's peripheral areas. Taking advantage of the automobile's greater flexibility and higher speeds of travel, the plan proposes a larger proportion of smaller clusters than that contained in existing development.

The plan does not propose to accommodate a major part of the Region's growth in large "new cities." Conversely, it also rejects scattering nonresidential development to the degree to which the population would tend to spread naturally if left to itself.

5. Residential development will fan out around the nonresidential clusters, both existing and new, at relatively high densities adjacent to them, decreasing with distance until merging gradually into the rural densities of the open-land areas. The land area per dwelling in new development around clusters must be smaller than currently prevailing practices. New clusters will attract surrounding residential development. The higher densities that should prevail in these locations will increase the efficiency of the land development pattern and insure the availability of suitable housing in all parts of the Region for every income group. The ratio of the preferred single-family dwelling to the total housing stock in the Region should continue upward: 31.3 percent in 1940 grew to 39.7 percent by 1960 and should reach about 50 percent by 1985.

In harmony with the policies for nonresidential development, the plan does not accommodate a major part of future growth in "new cities," nor does it accept the current trend of low-density scatteration evenly spread across the entire surface of the Region.

6. Four interconnected classes of transport will service the Region, in full harmony with the land-use plan. An improved **urban mass-transit** system, consisting of rapid transit and bus, mostly for short journeys, will distribute trips in the Region's high-density center in and around Manhattan; busses will serve short trips in and around the larger nonresidential clusters elsewhere in the Region. Improved **suburban commuter service** by rail and express bus will provide radial transportation from the remainder of the Region to Manhattan. Between points beyond the high-density areas within and surround-



values, goals, policies ...

ing Manhattan, trips by **private automobile** will prevail, serviced by a suitably spaced expressway grid. The regional limited-access highway system will carry a higher percentage of the Region's vehicle miles of travel than now. A system of **33 publicly owned airports** will service the Region's air-travel needs—four major jet-ports, 14 primary and 15 secondary general-aviation airports. New facilities and equipment will achieve more efficient intermodal transfer of goods between boat, rail, car, truck and aircraft.

The plan rejects either the massive expansion of commuter and urban mass-transit

facilities and services, or their continued decline. Likewise, it favors neither a reduced program of highway construction, nor its expansion to the exclusion of rail.

7. Technological change will be continuous but gradual. The Region's physical and social structure and character will assimilate the changing technologies of transport, communication, construction, etc., as they become operational.

The plan does not assume any swift breakthrough in technology that could quickly provide economical and widespread utilization of a significant new device. Likewise it does not foresee drastically changing patterns of living, but

rather a gradual evolution, probably in the general direction of traditional preferences.

8. Public services will improve as a result of this gradual technological change. Although it will be necessary to bring some of the Region's needed water supply from far away, a more efficient utilization of water available within the Region is a first priority--by conservation, pollution control, recycling and other methods. Upgrading of sewage treatment will permit such recycling and help to preserve the ecological balance. Increase in nuclear power generation will reduce air pollution. Solid-waste disposal will increasingly supplant compaction and other new approaches for landfill and incineration.

The plan avoids, as much as possible, dependence on areas outside the Region's boundaries to supply its water, dispose of its wastes and to provide the assets of livability.

9. The governmental structure should balance local control with the power of states, supported by federal aid. For these purposes the existing governmental structure is a suitable base. The three states that share the Region have primary jurisdiction and must exercise it over regional functions: transportation, recreation, sanitation, public facilities and other factors affecting the general welfare. The further consolidation of particular functions, and the development of new institutional approaches, can deal effectively with interstate problems. Conversely, in the larger old cities including but not limited to New York, the genuine decentralization of certain functions, which already prevails in most of the Region's suburbs, should improve their efficiency and effectiveness. Those functions that derive the greatest benefit from decentralized local community control and leadership, supported wherever necessary by state and federal financial assistance, are those that must deal directly with the individual, who is most accessible at the community level: education, health, neighborhood improvement, self-help projects, programs for recreation, youth, the elderly, etc. Acknowledging the problems of the existing local tax structure in the older cities as well as in the developing suburbs, the plan should develop more "user charge" taxes. Likewise, a continuation of "creative federalism," including

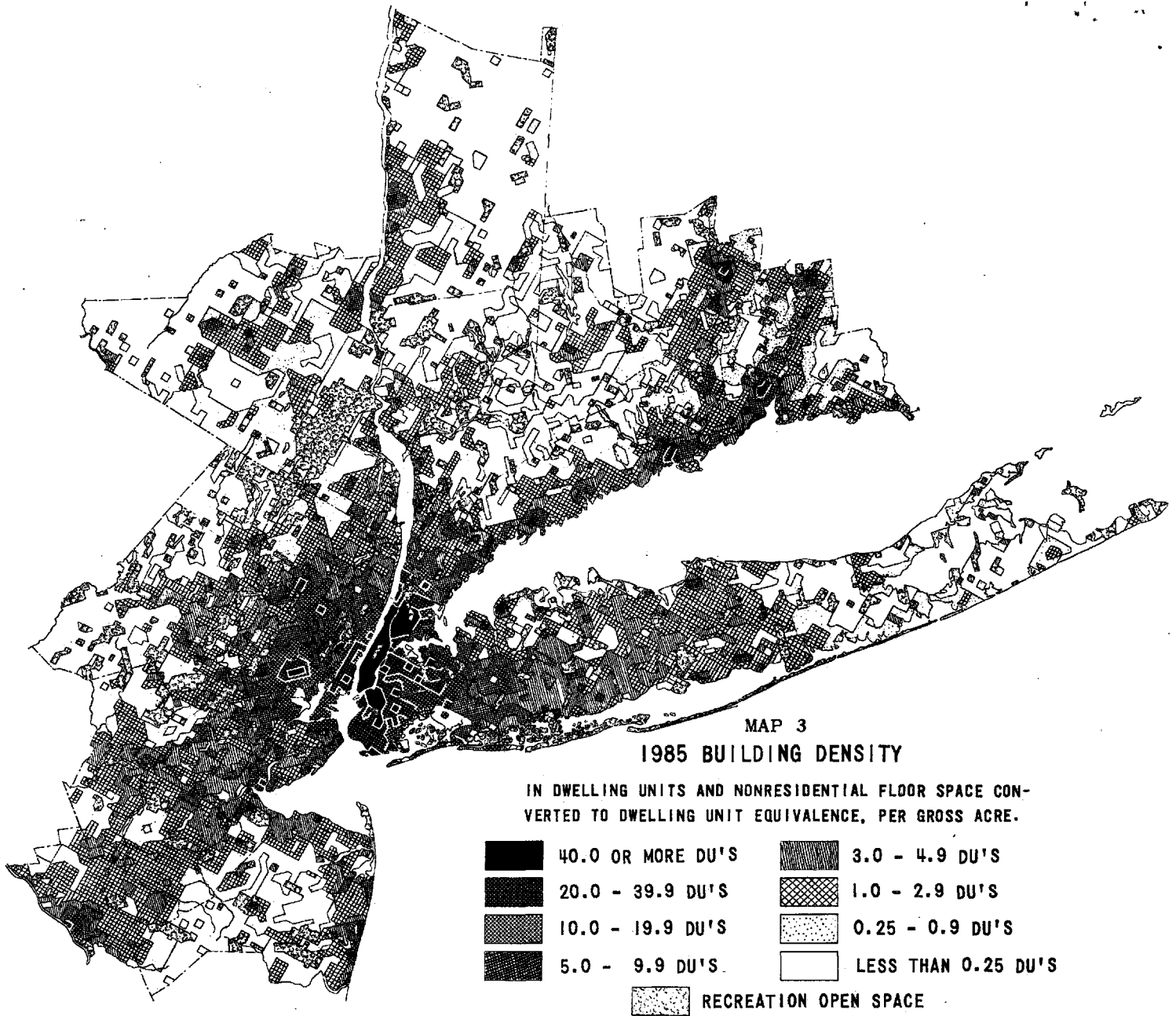
block grants to states, would promote federal-state-local partnership for the achievement of the plan's objectives.

The plan rejects any form of regional government with special land controls and tax powers, except when no alternative is feasible. It also opposes blind acceptance of the present structure and continued heavy reliance on the property tax.

Map 2 is a schematic representation of how the Region is presently arranged. Map 3 shows, in the same vernacular, how the Region's development would look in 1985 if the plan based on the values, goals and policies just described went into effect. A brief description of the geographical arrangement that Map 3 portrays will assist the reader in examining the map itself, in evaluating the nature and extent of the changes that the plan proposes, and in understanding the reasoning and procedures described on subsequent pages.

The center of the Region will remain, self-evidently, at its existing point of highest concentration, the Manhattan central business district. A ring of major adjacent satellite clusters will continue to surround the Manhattan CBD, some of them considerably enlarged: The Jersey City-Hoboken, Weehawken-North Bergen and Ridgefield clusters extended into the Meadowlands; Morningside Heights, Harlem, Long Island City, Greenpoint, Downtown Brooklyn, and Red Hook-Erie Basin. A second ring of smaller clusters in New York City, also considerably enlarged or new, would include, among others, South Bronx, Hunt's Point, Flushing, Jamaica, Kennedy Airport, Flatlands, St. George, Stapleton, and Staten Island's "Heartlands."

The Region's second largest focus will continue to be the Newark-Kearny-Harrison cluster, the dominant commercial and industrial cluster in metropolitan New Jersey. It is the apex of a chain of primarily industrial concentrations that extend from Paterson to Perth Amboy, including, among others, Passaic, Hackensack, Teterboro, Elizabeth, Linden and Woodbridge. These concentrations and the urban areas surrounding them, already defined by existing development, will constitute the most intensely developed area of New Jersey's portion of the Region. It includes the Hackensack Meadowlands, which reclamation will convert into a balanced area of residential, industrial and



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commercial development surrounding a major reserve of recreational open space.

Urban development will intensify in Connecticut's coastal "corridor," interconnecting its major concentrations at Stamford, Norwalk, Bridgeport and New Haven, and extend up the Quinnipiac Valley to Wallingford and Meriden. A branch corridor will extend northward from Bridgeport up the Housatonic and Naugatuck valleys through Derby and Ansonia to Waterbury; another will extend eastward along the shore to Guilford. The mid-Housatonic area in

western Connecticut will become a large new developed area with principal clusters at Danbury and New Milford, extending into Dutchess County's Harlem Valley with its principal cluster at Pawling.

New York State's portion of the Region outside of New York City comprises Long Island; Westchester, Putnam and Rockland counties; and the mid-Hudson area. Except for parts of the north shore and of Suffolk's eastern extremity, development will cover almost all of Long Island, with frequent clusters of diverse sizes, shapes and characteristics to supply jobs and services for this very extensive suburban

area. The dominant cluster will remain Nassau County's central area encompassing Garden City, Mineola, Hempstead and Roosevelt and Mitchel fields.

A ring of clusters will surround lower Westchester's urban area (including Port Chester, New Rochelle, Mount Vernon, Yonkers, Tarrytown and White Plains, the latter the dominant concentration) with an arm extending westward into Rockland (Nyack, Spring Valley, Suffern and others). Clusters at Peekskill, Yorktown Heights, Somers, etc., will serve a separate new suburban area in northern Westchester and southern Putnam counties.

The mid-Hudson area, with its major cluster at Poughkeepsie, extending southward from there in a crescent through Beacon and Newburgh to Goshen and Middletown, will become a major area of future urban development only partially complete by 1985.

In northern New Jersey's Essex, Passaic and Morris counties, away from the Newark-dominated industrial corridor, strips of urban development will alternate with predominantly open areas, the latter in the uplands and along the upper Passaic River. Principal clusters will be those of Morristown, Dover, Totowa-Wayne, Whippany, Madison and Summit.

In central New Jersey development will connect the major clusters of Somerville-Manville-Bound Brook and New Brunswick to that of Trenton by means of two urban corridors separated by openness along the Millstone River, meeting at the Princeton cluster.

Coastal New Jersey will receive considerable development within a strip extending five miles inland from the north shore on Raritan Bay and from the ocean beaches on the Atlantic. Matawan and Asbury Park will be important clusters, and Red Bank will be dominant.

The balance of the Region's land surface will remain predominantly open, either in public ownership for recreation and other purposes, or in private ownership at low density for residential purposes. The largest predominantly open expanse will be the range of hills and mountains known as the Appalachian Highlands or the Reading Spur, which, within the boundaries of the Region, extends from northern Somerset across western Morris and Passaic counties to the Ramapos in Rockland and Orange and across

the Hudson River into Putnam and southern Dutchess. The second largest expanse of predominantly open uses extends across the uplands of northern Westchester County, the northern part of Connecticut's South Western and Greater Bridgeport regions, and the southern part of the Housatonic Valley Region.

Other predominantly open areas on the mainland include: in Connecticut, the uplands east and west of the Quinnipiac Valley's urban corridor in the South Central Region; in New York State the northwestern portion of Dutchess County, the hills covered with fruit orchards in northern Orange County, the onion-growing mucklands and the Shawangunk Ridge and areas west of it, also in Orange County; and in New Jersey, substantial parts of central and western Monmouth County, which include its truck-farming areas as well as the northern parts of the "pinelands" on New Jersey's coastal plain. Other smaller, predominantly open areas in New Jersey include parks combined with low-density residential areas on portions of the Watchung Ridge, along the Passaic River's wetlands including Great Piece and Troy meadows and the Great Swamp, in parts of the Millstone Valley, and in the Sourland Mountains. On Long Island the plan preserves the low densities of Nassau and western Suffolk counties' north shore, and proposes to maintain the openness of parts of eastern Suffolk, including the North Fork and more than half of the South Fork. Public ownership of all undeveloped portions of the barrier beaches is mandatory.

The remaining two chapters of this report describe the processes and reasoning that led from the values, goals and policies described in this chapter, to the specific physical arrangements of urban development on the surface of the Tri-State Region as depicted on maps 1 and 3. Chapter II describes the relationships of values, goals and policies to observable existing conditions on the land, and concludes with a set of determinants of development derived from these correlations. Chapter III describes the step-by-step procedure for designing the plan in detail on the basis of these determinants and the policies behind them, and for the quantitative allocation of its physical elements to each locality within the Region for the target date of 1985.

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II.

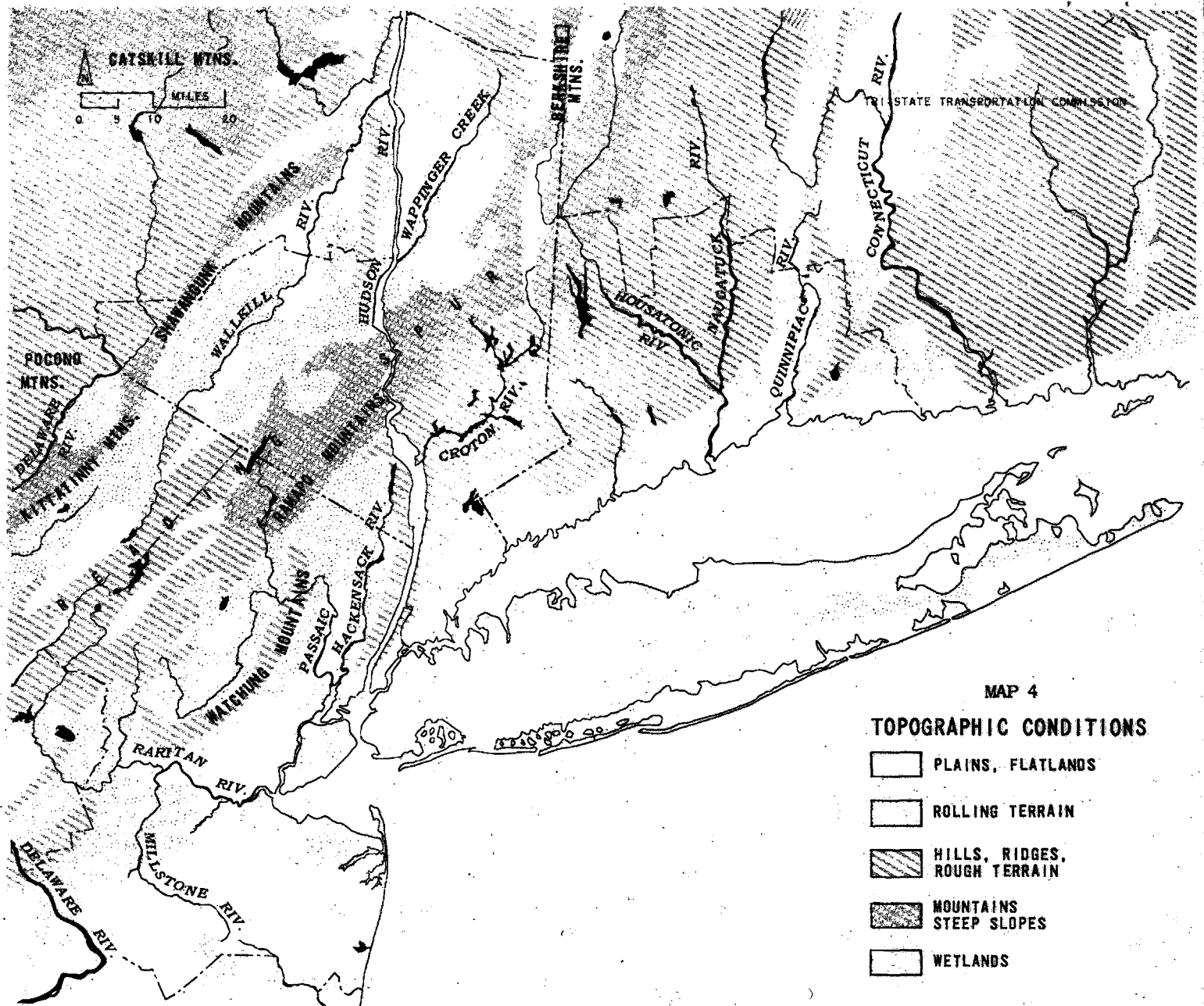
framework for the plan.

How do we decide on the arrangement of the elements of urban development on the surface of the Tri-State Region that will best satisfy our values and achieve our goals? The most reliable clues are existing facts, both natural and man-made. Some decisions are fairly obvious: developed areas will remain developed, generally with functions comparable to those that exist; Manhattan will always be the center of the Region, and the viability of this center is essential to the Region's well-being; the public requires access to most of the ocean beaches; high mountains are desirable and suitable as open space. But other geographic decisions are less obvious: most remaining rural areas would like to remain so, yet they are the very places where much of the Region's new urban development is both likely and feasible, and often desirable as well; the easiest place to build a new highway is where no development exists, but highways bring development in their wake, and some of these places may be where development should not occur.

We shall therefore look with some precision, by the use of maps, at seven sets of **existing facts** observable on the Tri-State Region's surface, with added comments about other related facts. The relationships of these seven sets of facts to the values, goals and policies that we have identified will emerge from their **analysis**. From these relationships we will be able to derive a set of **determinants** to guide us in building a framework for the Region's development plan.






a. facts

Three of the seven sets of significant facts concern **natural** conditions and resources: (1) topography and (2) geology determine which places are most easily developed, and which are not; (3) hydrology depicts the Region's water cycle, and concerns its only significant natural resource other than land and air. The other four sets of facts are **man-made**: (1) vacant land is where new development will occur; (2) residen-



MAP 4

TOPOGRAPHIC CONDITIONS

-  PLAINS, FLATLANDS
-  ROLLING TERRAIN
-  HILLS, RIDGES, ROUGH TERRAIN
-  MOUNTAINS, STEEP SLOPES
-  WETLANDS

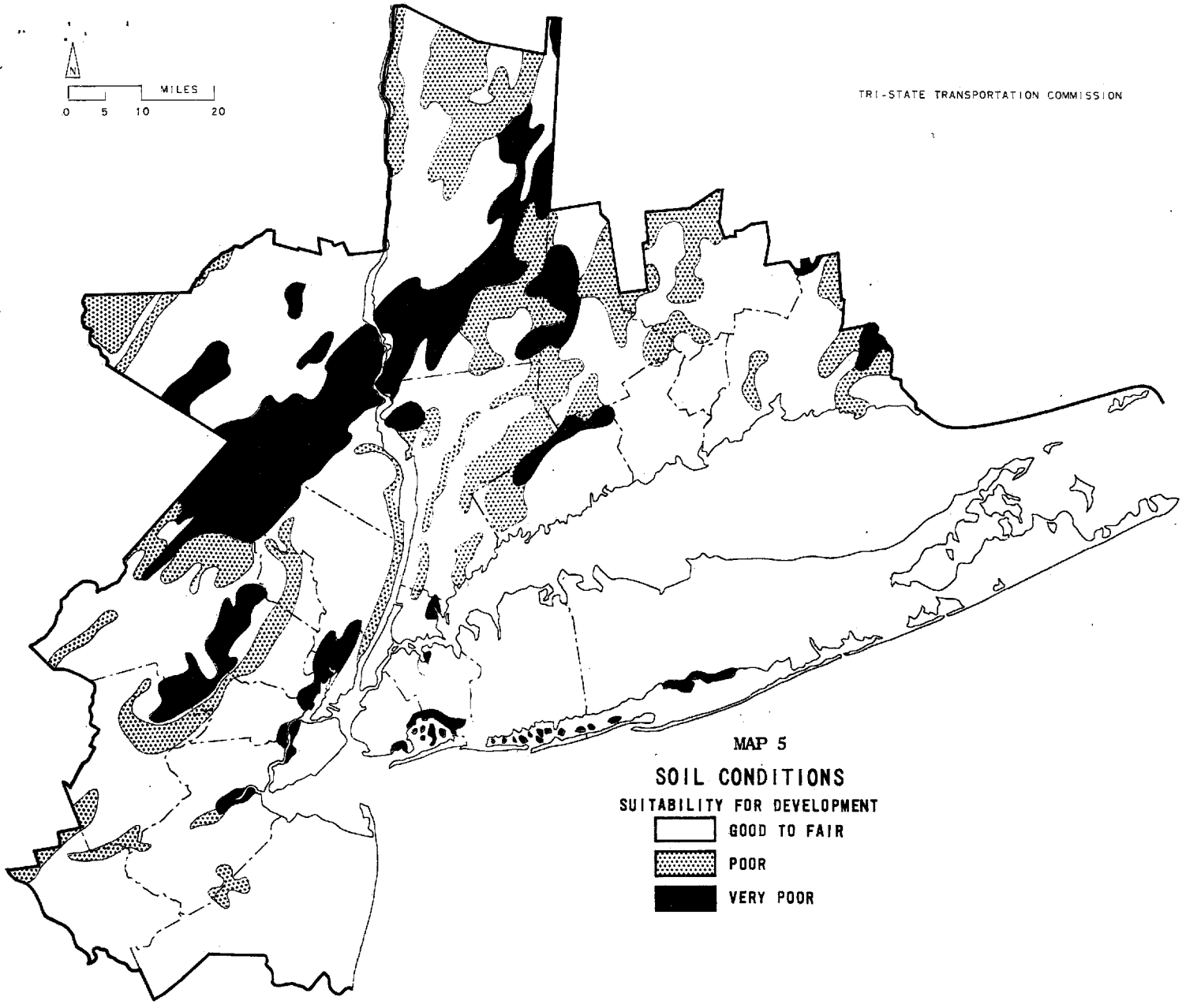
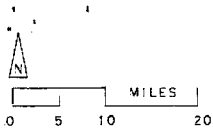
building a geographic framework ...

tial density describes the environments where people live; (3) open space is land where development will not occur; (4) nonresidential concentrations are where economic and social activities converge.

The Tri-State Region's natural geography contains great variety. Its topography shown on Map 4 includes flat coastal plains, rolling

piedmont terrain, hills and ridges, and mountains. Its geology includes alluvial, glacial, volcanic and metamorphic formations. Soils and subsoils are of muck, sand, gravel, boulders, clay, shale and rock. Map 5 displays the effects of soil and subsoil conditions on the suitability for development of each part of the Region.

The Region borders the Atlantic Ocean, Long Island Sound and the Hudson River. Innumerable tidal bays and inlets, rivers, brooks,



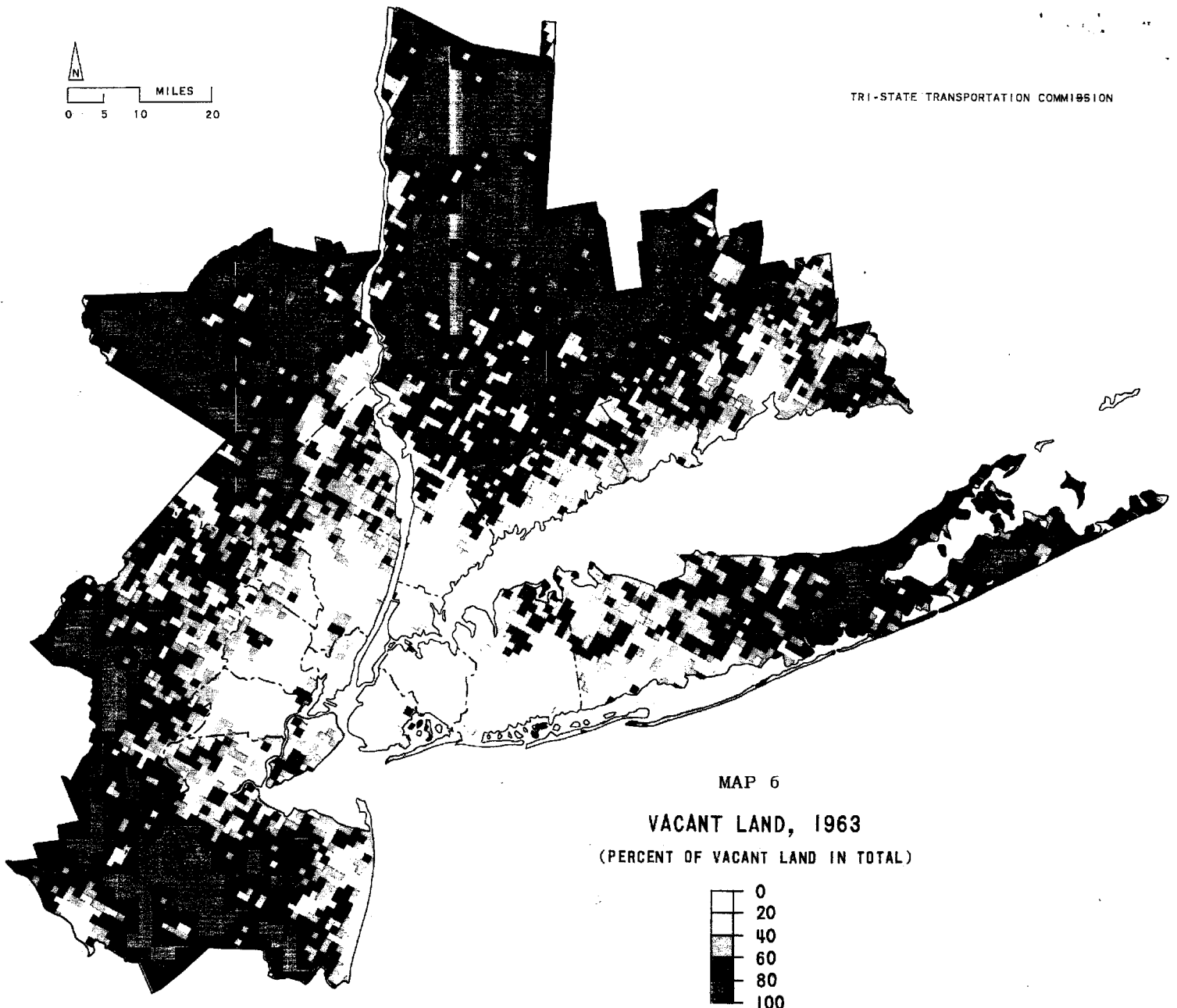
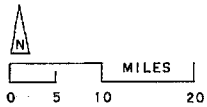
MAP 5
SOIL CONDITIONS
 SUITABILITY FOR DEVELOPMENT
 [White Box] GOOD TO FAIR
 [Stippled Box] POOR
 [Black Box] VERY POOR

lakes, ponds, swamps and marshes carve its surface. The Region's hydrology, showing its principal waterways and their headwater areas, appears on Map 11. (See page 27.)

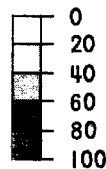
Another facet of the Region's natural environment is its ecology, also highly varied: crops, meadows, orchards, woods, forests and wetlands cover those parts of its surface where urban development has not yet occurred. Topography, soils, groundwater and special micro-

climatic conditions create the Region's few economically significant agricultural resources: truck-farming in central Monmouth County and on Orange County's mucklands; potatoes in eastern Suffolk County; and fruit orchards on the hillsides along the Wallkill Valley and elsewhere in the mid-Hudson area.

The Tri-State Region's existing man-made geography likewise contains much variety. Some parts of its land surface are occupied by urban



MAP 6
VACANT LAND, 1963
 (PERCENT OF VACANT LAND IN TOTAL)

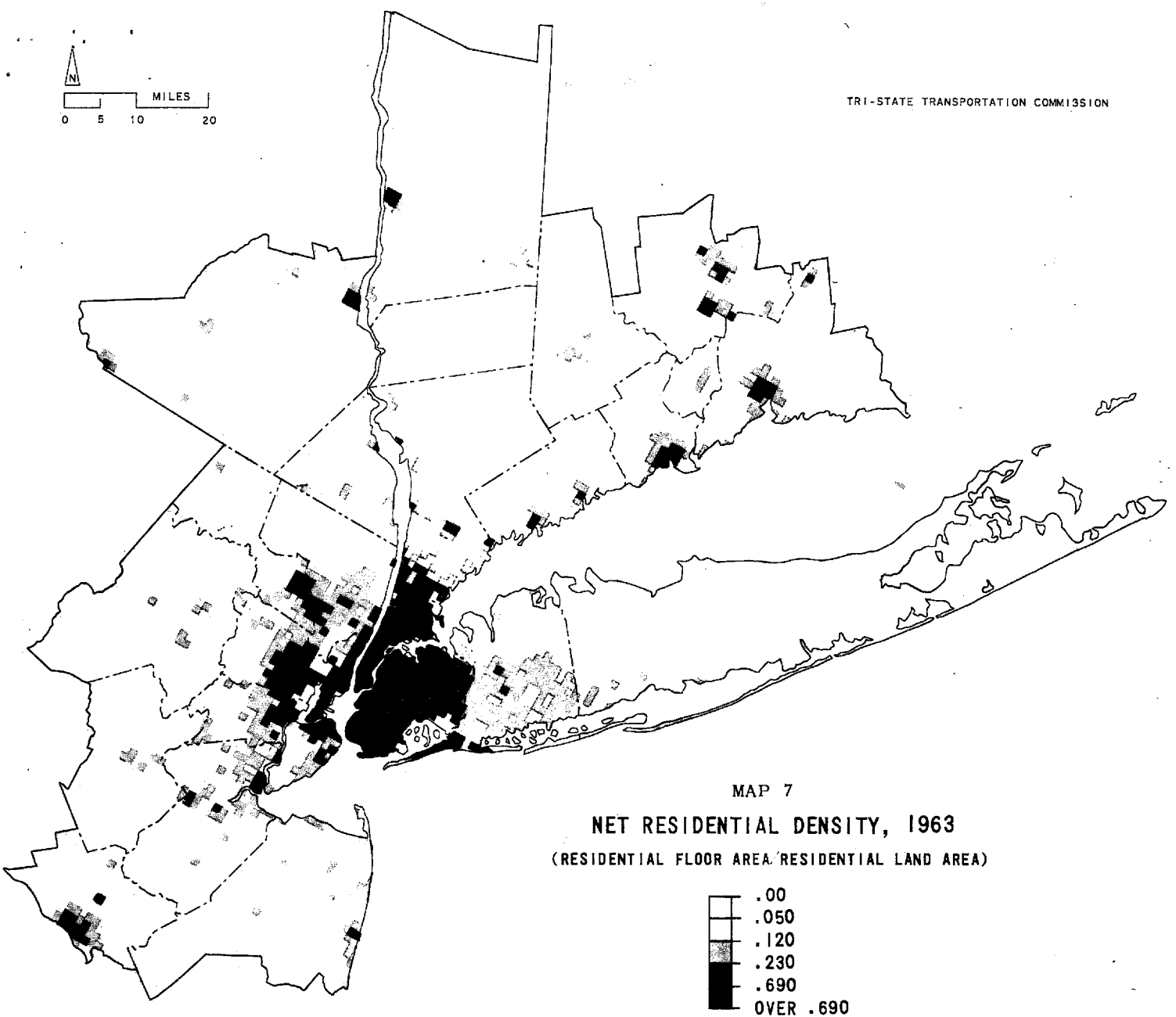
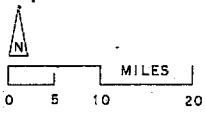


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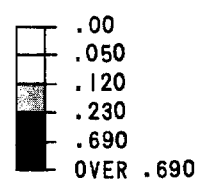
uses, and some parts are vacant. The Region contains a total of 4916 square miles of vacant land, of a total land area of 7886 square miles. Map 6 shows, in four ranges, the percentage of land that is vacant on each of the Region's square miles. Vacant land is where most future development will occur.

Vacant land will most probably develop in harmony with the characteristics of neighboring uses in each place. Density is a convenient

measure of the characteristics of development. Net density may be expressed as floor-area ratio (FAR), or the quotient of the floor area divided by the area of the land it occupies. **Net residential density** describes the characteristics of the environment in the places where the people live. The Region contained in 1963 a total of 5735 million square feet of residential floor space on 1278 net square miles of land area, at a regionwide net floor-area ratio of 19.4 percent. Map 7 shows, in four ranges, the variations of net residential densities on the Re-



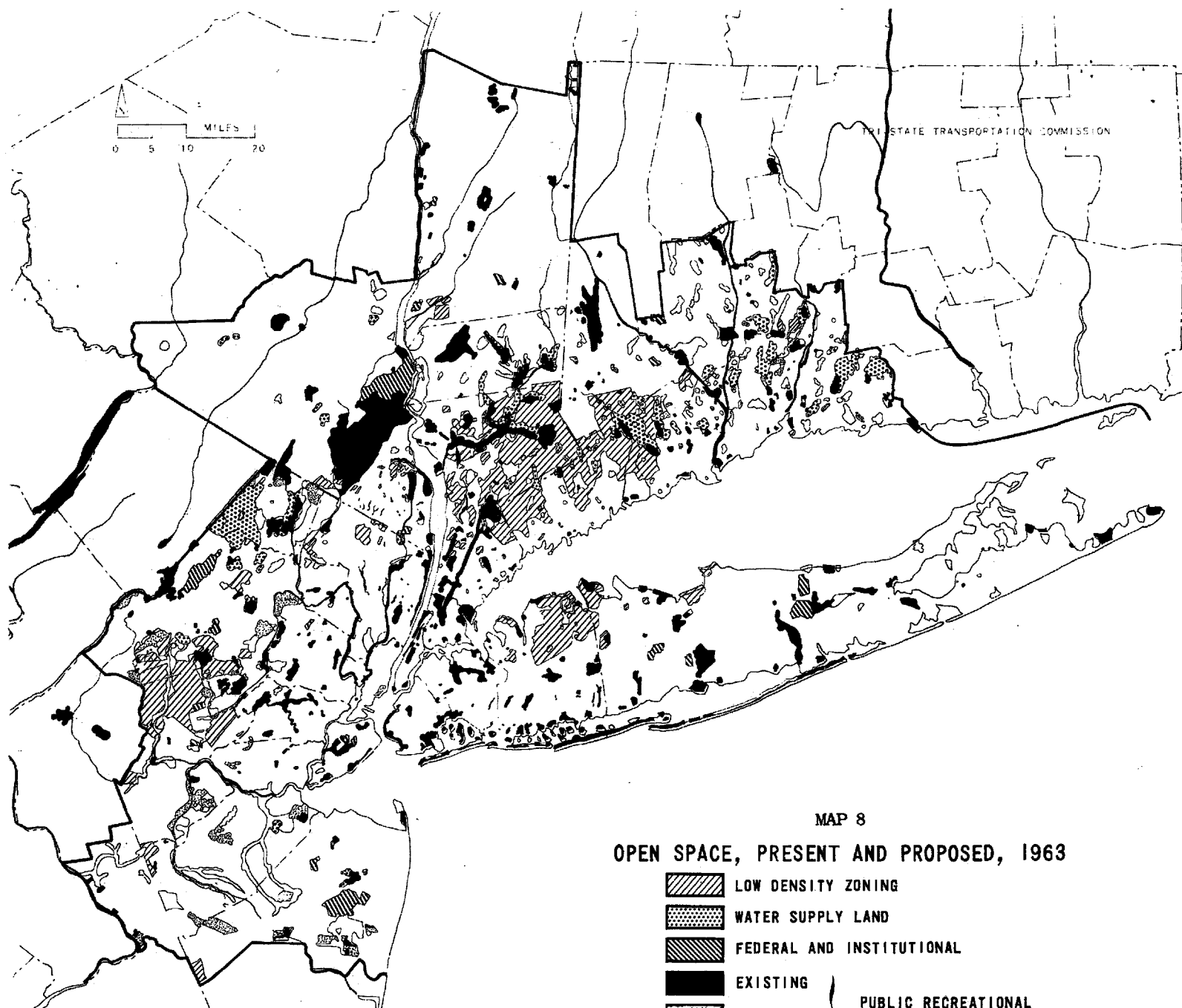
MAP 7
 NET RESIDENTIAL DENSITY, 1963
 (RESIDENTIAL FLOOR AREA / RESIDENTIAL LAND AREA)









gion's surface. These floor-area ratios range from less than 1.0 percent in locations where large lots predominate, to more than 1000 percent in midtown Manhattan. Between these extremes, the variety of the residential densities that occur on the Tri-State Region's surface is a continuum embracing almost every conceivable level. Table 3, page 51, presents the distribution of population in 1963 by counties and planning regions corresponding to these densities.

In some places, for a variety of purposes,

public or private action has prevented or proposed to prevent urban development. In these places the density is in effect zero or close to zero. Map 8, derived from Tri-State's open-space and zoning inventories, shows all forms of existing public **open space** on the Region's surface, as well as those areas currently programmed for acquisition and those that existing government agencies have proposed. The Region at present contains 312,000 acres of recreational open space, including school playgrounds. Water-supply lands, institutional and military lands,



MAP 8
 OPEN SPACE, PRESENT AND PROPOSED, 1963

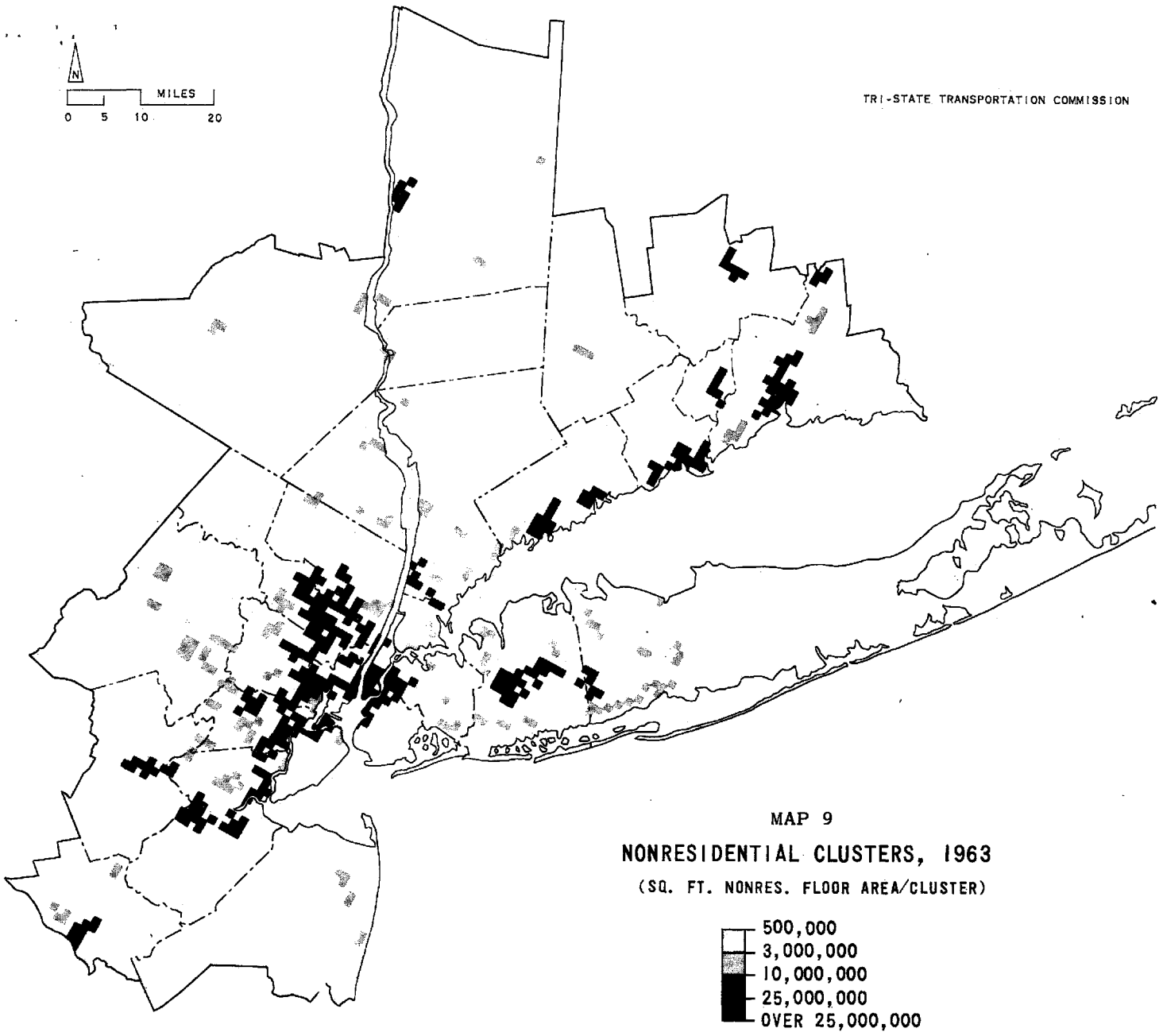
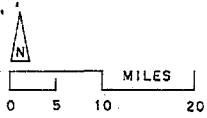
- | | | |
|---|---------------------------|-------------------------------------|
|  | LOW DENSITY ZONING | |
|  | WATER SUPPLY LAND | |
|  | FEDERAL AND INSTITUTIONAL | |
|  | EXISTING | } PUBLIC RECREATIONAL
OPEN SPACE |
|  | PROGRAMMED | |
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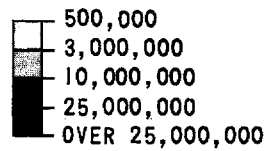
and low-density zoning are also shown as forms of open land. Table 1 on page 39 presents the distribution in 1963 of existing recreation open space by counties and planning regions.

In other places, finally, urban development is more intense than the surrounding averages, primarily where economic activities are con-

centrated. Map 9 shows existing concentrations of economic activity, or nonresidential "clusters," in the Tri-State Region. Jobs, shopping, education, hospitals, government are nonresidential "economic activities." In 1963 the Region contained 3275 million square feet of nonresidential floor space. Every square mile in the Region contains some economic activity on nonresidential floor space. Predominantly



MAP 9
NONRESIDENTIAL CLUSTERS, 1963
 (SQ. FT. NONRES. FLOOR AREA/CLUSTER)



nonresidential square miles are those that contain at least 500,000 square feet of nonresidential floor space, and where nonresidential exceeds 35 percent of total floor space. This percentage is the regionwide ratio of nonresidential to total floor space.¹ A concentration or "cluster" of economic activity is any single square mile or group of square miles so constituted.

¹ Not including residential-oriented (RESO) non-residential floor space.

In 1963 the clusters contained 2000 million square feet of nonresidential floor space. Such clusters in the Tri-State Region are highly diversified in size and function. Map 9 shows the Region's existing nonresidential clusters in four ranges of total nonresidential floor space. Table 2, page 48, presents employment distribution in 1963 by counties and planning regions, corresponding generally to this distribution of existing clusters.

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b. analysis

A characteristic of the facts observable in the Tri-State Region is their great variety. This variety is partly the result of the Region's geographical site itself, partly the result of the history of human activities that it has contained, and partly the simple result of its very great size.

The Region's varied natural characteristics require diversity of land-development patterns. **Harnessing natural forces** most effectively in the Region requires the right use or pattern of development for each different natural feature or characteristic.

Most human societies are composed of many different kinds of people. They include a full range of age groups, family sizes, income and educational levels, talents, skills, jobs, interests and activities. Each type of person has his own special requirements of environment and facilities. American society is also culturally "pluralistic" due to the multiplicity of its people's national origins. Cultural pluralism is especially significant in the Tri-State Region, because New York has been historically the major port of entry for European immigrants. Each cultural group has different tastes and habits. Since social and economic diversity is likely to increase with a region's size, and since the Tri-State Region is the largest urban region in the world, its diversity is therefore greater than that found in most other urban regions, and is probably its greatest economic and social asset. To preserve and foster this diversity may be essential to the Region's continued economic prosperity and social well-being. **Organizing an equitable society** and maintaining it in the Tri-State Region requires satisfaction of the many diverse needs and wants of

this diverse people, while making sure that everyone has the common essentials.

In many places in the Region the people have created or preserved its diverse man-made characteristics, and will wish to continue doing so to satisfy their needs and wants. **Building with skill and purpose** in each part of the Region therefore requires recognition of and respect for these diverse characteristics, and the fostering of continued opportunities to create them wherever they are suitable for the people who use them.

The man-made variety probably reflects, to some extent, the natural variety and satisfies the needs of the diversified society. When humans operate with some degree of freedom, they tend to establish their many activities and build their many environments in appropriate locations to suit themselves. Furthermore, the natural characteristics of the Region's vacant land are as varied as the people who will need to settle there. A suitable place probably exists within the Tri-State Region for the appropriate development to accommodate every type of person and every kind of activity. **Effective use of the Region's natural assets, to build it skillfully for the greatest benefit of the society it contains, requires finding for each activity its right location and for each person his preferred environment.**

Every member of the society will seek, somewhere in the Region, within the limits of his economic capabilities, the environment he wants, accessible to the people and things he needs: high density, low density, middle density, highly skilled or semiskilled job markets, education, entertainment, recreation, crowds, solitude, the companionship of other people with similar tastes and needs. But no group can exist in isolation, especially in over-large segregated areas, neither young families, nor the elderly, nor the very poor, nor the very rich, nor even

the middle aged and the middle classes, nor any ethnic "minority." To insure for every person sufficiently wide opportunities for full participation in the benefits of the urban Region, communities should exist where each individual can find the lifestyle that he would choose and can afford, yet remain accessible to most other kinds of places, ranging from high concentrations to wide open spaces, with no artificial bars preventing him from moving to another community if he should so decide.

For the arrangement of the Region's land uses to perform satisfactorily, all its different kinds of people and activities must collaborate with reasonable convenience. All must therefore be accessible to one another and to all the facilities they need. Except for special functions such as those in Manhattan, more than an hour's time is too far to go for daily requirements. Yet any place within one quarter to one half hour's travel time is close enough. Before the advent, first, of motor mass-transit, and, more recently, the automobile, a full range of environments, facilities and activities therefore could not be more than one or two miles apart, in order to function adequately as parts of an urban agglomeration. Today, thanks to the automobile and motor mass-transit, these components need not be closer to each other than ten to twenty miles, but cannot be any farther apart. The diameter of the Tri-State Region is close to 150 miles, but for smooth performance of the urban machine within it, the separation of its "everyday" parts cannot exceed ten to twenty miles. A "grain" of urban development exceeding this dimension would not be compatible with the patterns of normal and convenient daily living. This ten-to-twenty-mile grain of urbanization within the Region means that from any given point, most if not all types of environments, facilities, activities and people should lie within such a distance.

At the regional scale, three categories of

environment will classify all conceivable types. A place is **predominantly open** if nature dominates the environment. **Predominantly urban** areas are places where human activities dominate the environment. A **concentration** accommodates larger quantities and varieties of activity at higher densities than the urban areas that surround it. In concentrations, the artifacts of man cover most of the land: usually they occur at central locations, within easy reach of many, and are predominantly nonresidential. In predominantly urban areas, the artifacts of man are in evidence but not exclusively; such areas usually surround and are within easy reach of one or more concentrations. Predominantly open lands lie beyond the edges of the urban areas; some people may live or work there, but the artifacts of man, if present, are unobtrusive components of the environment. Maps 6 to 9 have shown the present locations of these three types of areas in the Tri-State Region. A rich environment for urban life requires all three types of areas in locations reasonably accessible to one another. A ten-mile trip from any point in the Region in at least one direction should cross each of these three types of areas.

The line separating predominantly open from predominantly urban areas will define the basic outline of the Region's pattern of development. It will determine where most of the people should be, in contrast to where the fewest people should be. The location of this boundary line should establish the desired ten-to-twenty-mile grain of the Region's future urban form. The urban parts containing the people should also contain most of the concentrations and transportation arteries. Finding this line makes possible the design of a transportation system that responds to the requirements of an optimum arrangement of land development, rather than requiring the design of the transport system before land development can be defined.

c. determinants

To determine the location of the line between predominantly urban and predominantly open areas in the Region, seven criteria are pertinent, in two sets corresponding respectively to the significant **natural** and **man-made** characteristics presented in Part A of this chapter.

Topography, geology and hydrology are the **natural determinants**. The varied characteristics of the Region's natural geography should help determine the best places for the Region's varied components, thus harnessing most effectively its natural resources to serve its inhabitants.

Human choices lead to the **man-made determinants**. Areas containing substantial percentages of vacant land are the places where choices are possible. Areas that are already substantially preempted by present uses will tend to continue development comparable to that existing today. Net residential density should represent the kind of environment each individual, within his means, wants and chooses for himself. Zoning and permanent open space presumably represent what government and institutions do to confirm and enhance the aggregate choices of their constituents. The pattern of concentrations of economic activity reflects the people's need for accessible jobs and services. Such existing conditions may tend to represent what individuals and communities have decided they want in each place. They may serve as evidence that characteristics deserving of such choices are present there, and that people are there who have chosen them. These are reasonable assumptions, and for building a stable society the people's choices are worthy of respect.

The relative significance of these natural and man-made determinants and their frequent concordance on the surface of the Region will help to establish the future locations for the

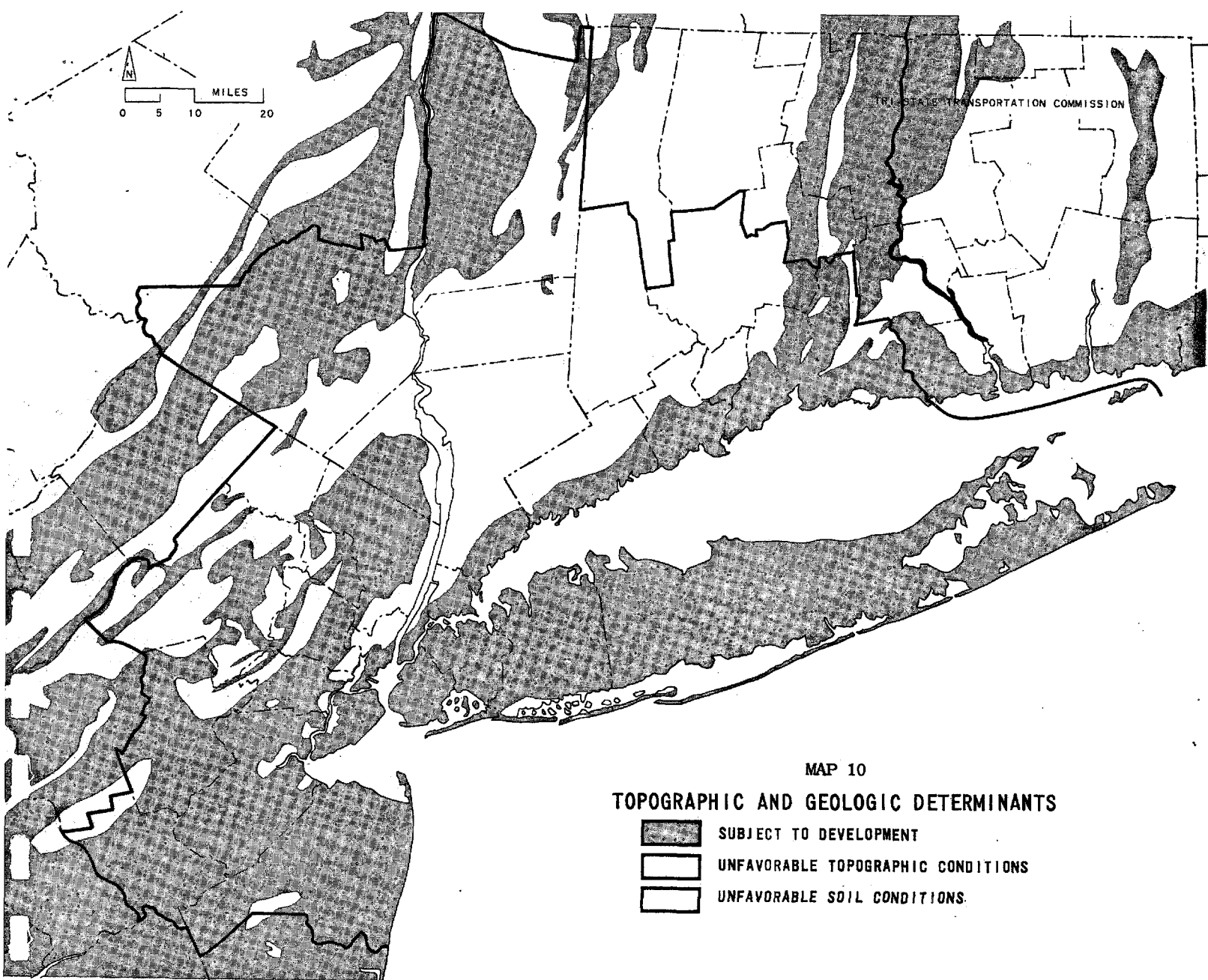
boundaries between its predominantly urban and its predominantly open areas.

1. natural determinants

The topographic landforms are partial determinants of where more development will locate if the market is left free to make its own choices. Map 4 showed five categories of landforms: flat, rolling, rough, mountainous and swampy. Though it can occur and has occurred on every kind of site, **urban development is more likely to occur on flat or rolling terrain than where it is rough, mountainous or too wet.** The darkest shaded areas on Map 10 correspond to flat and rolling terrain where urban development is more likely, and the gray areas are those where topographic conditions may reduce developability.

Subsoil conditions may also determine where development will locate. Sand, gravel or shale are easy to build upon, but muck, swamps and rock are not. Furthermore, permeable and well-drained soils can accommodate private sewage disposal on smaller lots; such areas tend to be subject to more early land speculation and scattered development by individuals, so that the market is ready sooner for the large-scale developer. Map 5 showed three categories of soil conditions. **The last two are less readily developable, and utilization of the last (rock or swamp) is especially difficult.** The white areas on Map 10 are where such soil conditions substantially reduce development potential.

Though not shown in map form, the Region's special agricultural areas may also qualify, in some cases, as determinants of land development, if other criteria concur or at least do not decisively preempt the area for another use. Agriculture can rarely resist by itself the market pressures of urban development, once they begin to rise. Nevertheless, some forms may persist, if given adequate assistance: eastern Suffolk County's potato farms, Monmouth and Orange counties' truck farms and the fruit orchards of the mid-Hudson area may be worth protecting.



The Region's hydrologic cycle, with its network of rivers and streams, is its natural waterworks. Naturally available water is the Region's most important natural resource. For smoother performance the Region must use this resource as completely and effectively as possible. Accordingly, the form of this resource and the way it functions may determine where development **should locate**, and where it should not.

An urban region needs a plentiful and continuous supply of water for many different purposes, both direct and indirect. There are many more such purposes requiring much greater quantities than we usually suspect.

● **Household, industrial and public water supplies** are essential to the existence of an urban region: its streams and ground water aquifers are, so to speak, the Region's natural water supply and distribution systems.

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● **Water bodies and streams are the outdoor recreational features** in highest and most substantially increasing demand in our society.

● **The dilution and removal of wastes** by its streams to the ocean is the Region's natural sewage disposal system: the more water in the river, the less purification of effluent is necessary.

● **The ground water reserves**, which maintain a minimum flow in the streams and can be tapped by wells, are some of the Region's natural water-supply reservoirs: rainfall replenishes them where the ground is permeable and through aquifers. Urbanization makes the ground less permeable and the streams more flood-prone.

● **Plentiful irrigation** in dry years is essential in the Region's open spaces, public and private, to maintain their cover of vegetation, and therefore the significance and usefulness of their openness.

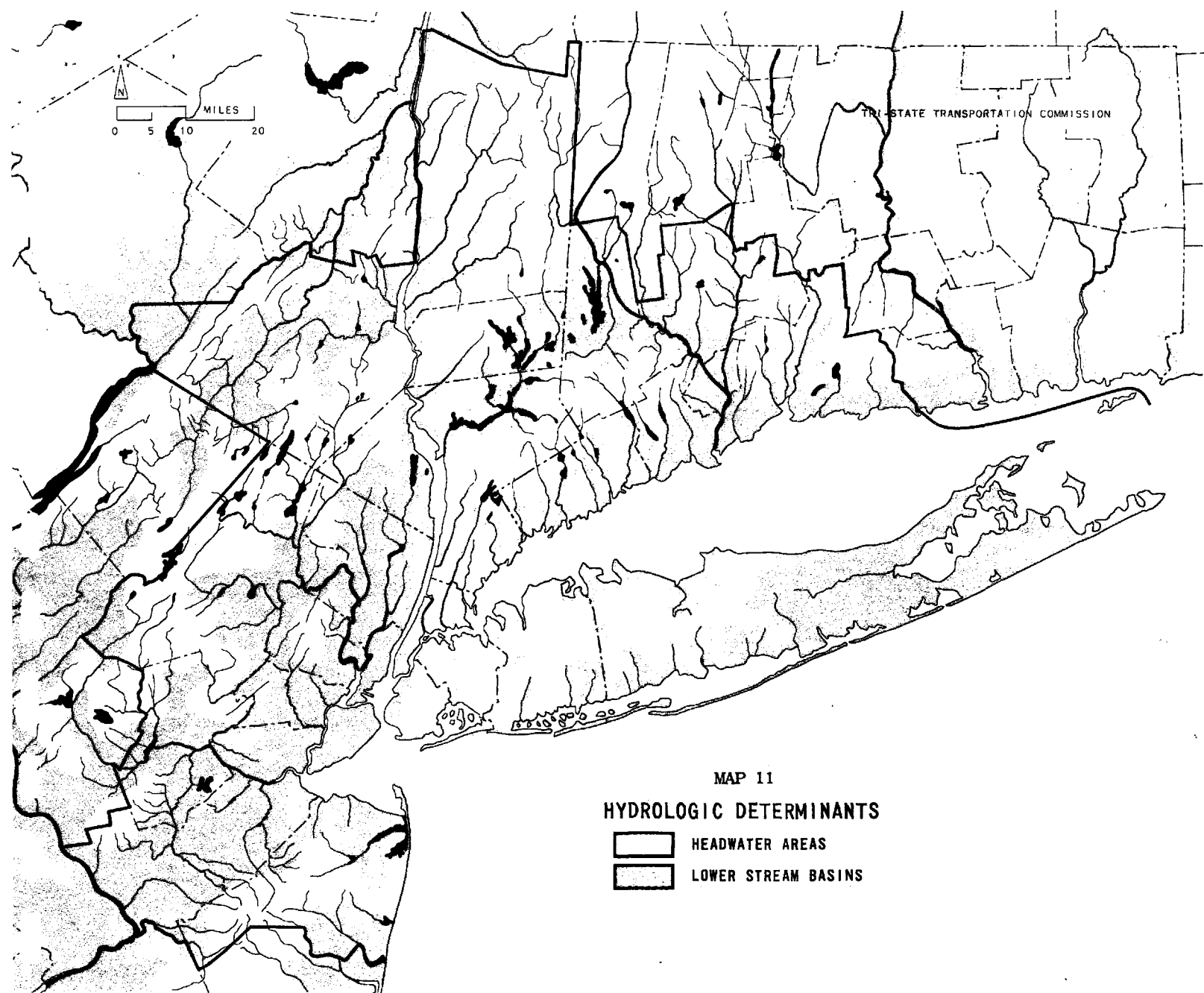
● **Forest cover**, to survive, requires enough water in the ground: the Region's forests are its **natural water-supply regulators**, its **natural flood controllers**, its **natural purifiers of the air**, and may even play a part in maintaining the level of **annual rainfall**.

Thus water is a critical resource. Though plenty of water is available urbanization wastes it. Urbanization pollutes water and makes it unusable. Urbanization substitutes instant runoff and discharge through storm-sewers and streams into the ocean, for percolation, which stores water in the ground, and for evaporation and transpiration, which return water to the air. If urban development were to cover the entire land surface of the Region, its water supply would have to depend on an increasingly elaborate system of cisterns to capture it, reservoirs to store it and treatment plants to purify it. Or superregional systems of aqueducts would have

to bring it from increasingly faraway places. Desalting plants are another alternative. These devices are expensive--feasible and perhaps necessary in part for public water supplies, but certainly not feasible for recreation, irrigation, waste removal and climate control. It is surely less costly for most purposes, first to use the water that is already in the Region, the 40 inches of rainfall that nature delivers each year to every square inch of its surface. Careful conservation and the fullest possible utilization of nature's built-in water-supply and control system is the way to do it.

The **headwater areas** of the Region's streams are the places that "produce" and regulate the Region's water. Their higher elevations catch and hold more snow in the winter. Summer rainclouds tend to discharge there. In the natural state their forest ground absorbs the rainwater like a sponge, reduces flood crests by retaining the water after heavy rainfall, and holds it there in storage for continuous discharge throughout the year. It is the water that percolates into the ground at these higher elevations that recharges the Region's aquifers, including those of Long Island. Indeed, natural lakes, ponds and swamps, both large and small, in the headwater areas are always water collectors and holders, forming a huge natural reservoir system that artificial reservoirs can enlarge, if necessary, many times over. Finally, the rainwater that falls in the headwater areas has the longest distance to go before it is lost in the ocean. During this journey the largest number of people have the greatest chance to use and reuse it, and more of it will be able to percolate into the ground to recharge the groundwater table.

The Tri-State Region must therefore deal carefully with its headwater areas. If they can remain predominantly **in the natural state**, where the artifacts of man have only an incidental ef-



MAP 11
 HYDROLOGIC DETERMINANTS
 [White outline] HEADWATER AREAS
 [Dark shading] LOWER STREAM BASINS

fect on the natural landscape, the Region's headwater areas will continue to function effectively as important natural suppliers of its water. Map 11 shows all the principal streams in and near the Region. Shown in white on this map are the headwater areas, both within and adjacent to the Region's boundaries, that feed the streams on the Region's surface. Headwater areas that do not appear entirely on this map, principally those of the Delaware, Hudson and

Housatonic rivers, are also of significant concern to the Tri-State Region. Each headwater area delineated on the map includes only those parts of the upper watersheds of its streams that are still predominantly open (see vacant land on Map 6) and can therefore remain so permanently if we take the required steps. Conversely, those parts of the Region shown in a darker tone are more suitable, according to this criterion, for urban development.

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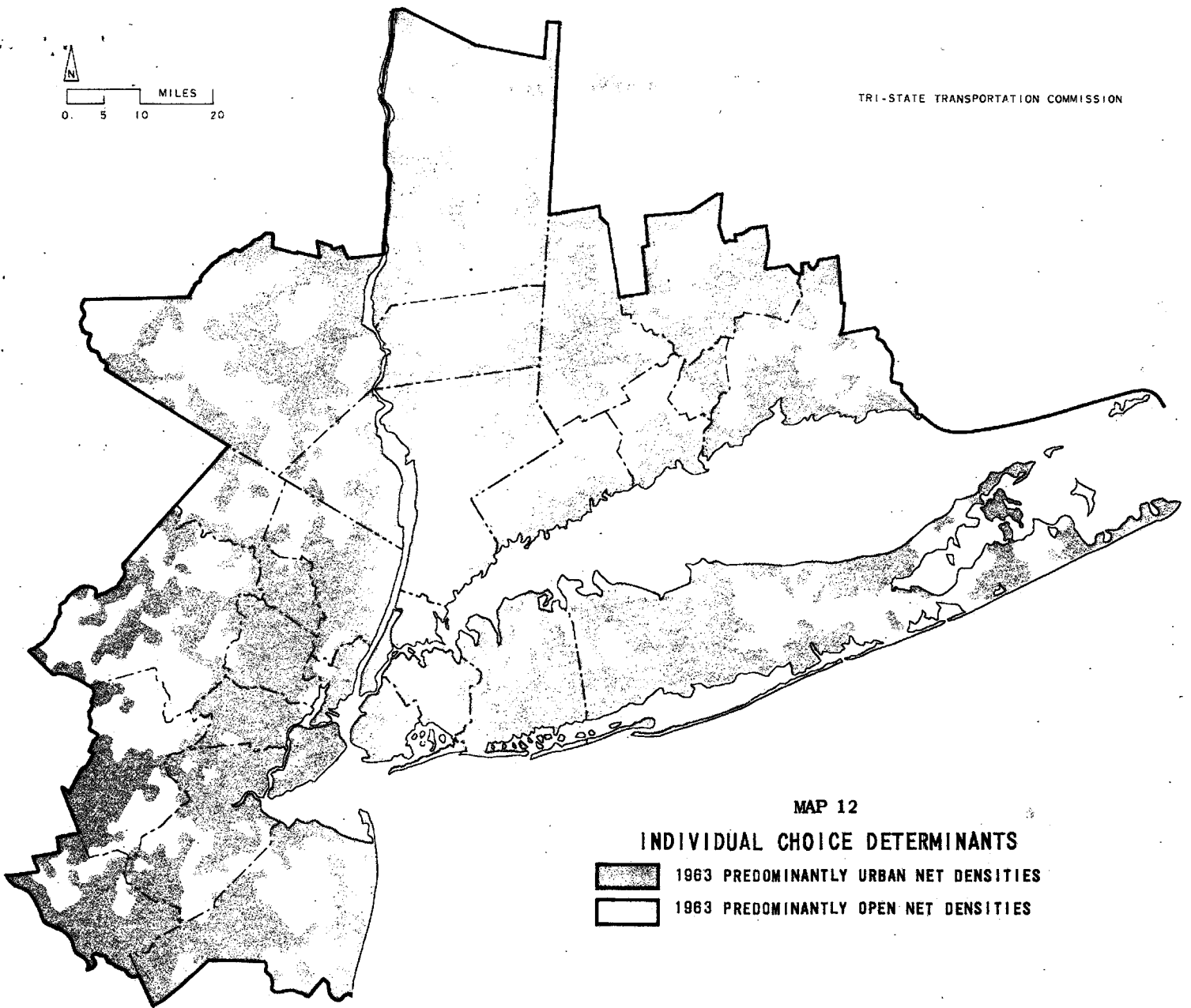
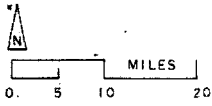
2. man-made determinants

The distinction between existing **developed land** and **vacant land** on the Region's surface, as shown on Map 6, is not significant by itself as a determinant of the location of future development, except that where urban development exists, it will probably persist. The location of vacant land does serve, however, as a guide in delineating determinants based on other criteria. For example, as noted above, to include a substantially developed territory in a stream's headwater areas that we wish to propose for conservation would be absurd. A substantially utilized area cannot become "predominantly open" unless its present development is at a very low net density or it is largely public open space.

The **existing net residential density** in a given place represents individual choice of environment, if the individuals residing there were free to choose. Ultimately, the environment must satisfy the individuals who use it. The distribution of net densities on the Region's surface should correspond to what the Region's people **individually want** and where they want it. Map 7 shows the present distribution of net residential densities. Expressed as floor-area ratio (FAR), a density of zero means completely open space; very low densities are 1 percent and 2 percent; 2.5 percent corresponds to one-acre residential lots; 5 percent to 15 percent are conventional suburbs with single-family homes; 20 percent to 50 percent are the "garden-apartment" and "town-house" levels. A large area at the center of the Region, mostly in New York City, has densities per square mile in excess of 75 percent. Manhattan's average residential FAR is 350 percent.



Map 7 does not show how many people live on each square mile, but rather how close together they have elected to live, whatever their number. Where the net floor-area ratio is 2 percent or less, lot sizes are greater than one acre, frequently more than two acres, interrupted only by an occasional village or cluster of homes. Many of the people living in those places have chosen to live there because the landscape is open. On the other hand, where the FAR is 5 percent or more, even if there are only a few dozen homes in that square mile, lot sizes are small enough so that a suburb exists or is probably in the making. Many people decide to live in a suburban environment because they prefer it, just as others prefer to live in the "high-rise" environment of the city. Map 12 shows the general boundary between those areas where the residential densities are low enough to qualify as "predominantly open," and those where the suburbs actually or potentially begin. **This boundary represents the effect of personal choice and action on the location of the Region's urban areas.**

Openness or nondevelopment may also result from the **deliberate acts of government** at every level, and from acts of important corporate entities in the private sector whose functions have some degree of permanence. In places where government or others have so acted or intend to do so, in any of several ways, predominantly natural characteristics will remain. In contrast, in those places where such action does not take place, or contrary action occurs, the works of man will become clearly evident. Map 8 shows all the major areas in the Region where governments at every level, as well as other institutions, appear to have taken or may take action to restrain or prevent development, to achieve not just temporary fiscal relief but permanent



MAP 12

INDIVIDUAL CHOICE DETERMINANTS

-  1963 PREDOMINANTLY URBAN NET DENSITIES
-  1963 PREDOMINANTLY OPEN NET DENSITIES

land-use objectives. These areas therefore represent either positively or negatively what the Region's people jointly want and where they want it, and have therefore acted or intend to act to bring it about. There are six principal types, all shown on the map.

● **Low-density zoning** is the least costly governmental action to preserve openness in the form of private open space. The map shows

only those places where such zoning has persisted more than ten years, more probably representing the genuine objective of preserving an "open" or rural environment, and therefore less likely to have been mere "fiscal" zoning to reduce temporarily the rate of development and the escalation of school taxes: parts of Westchester County, southwestern Connecticut, central New Jersey and the North Shore of Long Island. Since the occupants have freely chosen to accept jointly such restrictions on land

building a geographic framework ...

development and speculation, and to assume the resulting financial responsibilities, they should have the right to enjoy the results of what they have bought, as long as their choice does not unduly restrict the rights of others to participate in the Region's opportunities.

● **Private open space**, in addition to large lots occupied by private homes, also includes the following types of facilities which, in the future, may become increasingly numerous, especially in an area like the Tri-State Region: estates operated as resorts by a large variety of organizations such as unions, corporations, clubs, religious and service organizations, United Nations delegations, nonmedical therapy centers, etc.; commercial recreational facilities such as golf courses, ski slopes, bathing beaches and pools, marinas, riding academies, hunting grounds; camping grounds for the scouts, YMCA, 4H, and the public. Facilities of this type that are known specifically appear on Map 8. Low-density zoning helps to insure their persistence in accessible locations.

● **Water-supply lands** under public or private ownership are the most significant forms of nonrecreational open space. Especially significant are the large reservations in southern Connecticut's uplands serving that state's shore communities; the lands bordering New York's Croton system in northern Westchester; and those serving the North Jersey Water District, Jersey City and Newark, in northern New Jersey's "Skylands" areas. Current programs of New Jersey's Department of Conservation and Economic Development foresee the Skylands' development for multiple open-type utilization, including recreation. Such a policy is proposed for the Six Mile Run and Confluence reservoirs in New Jersey's Raritan Basin, as it already

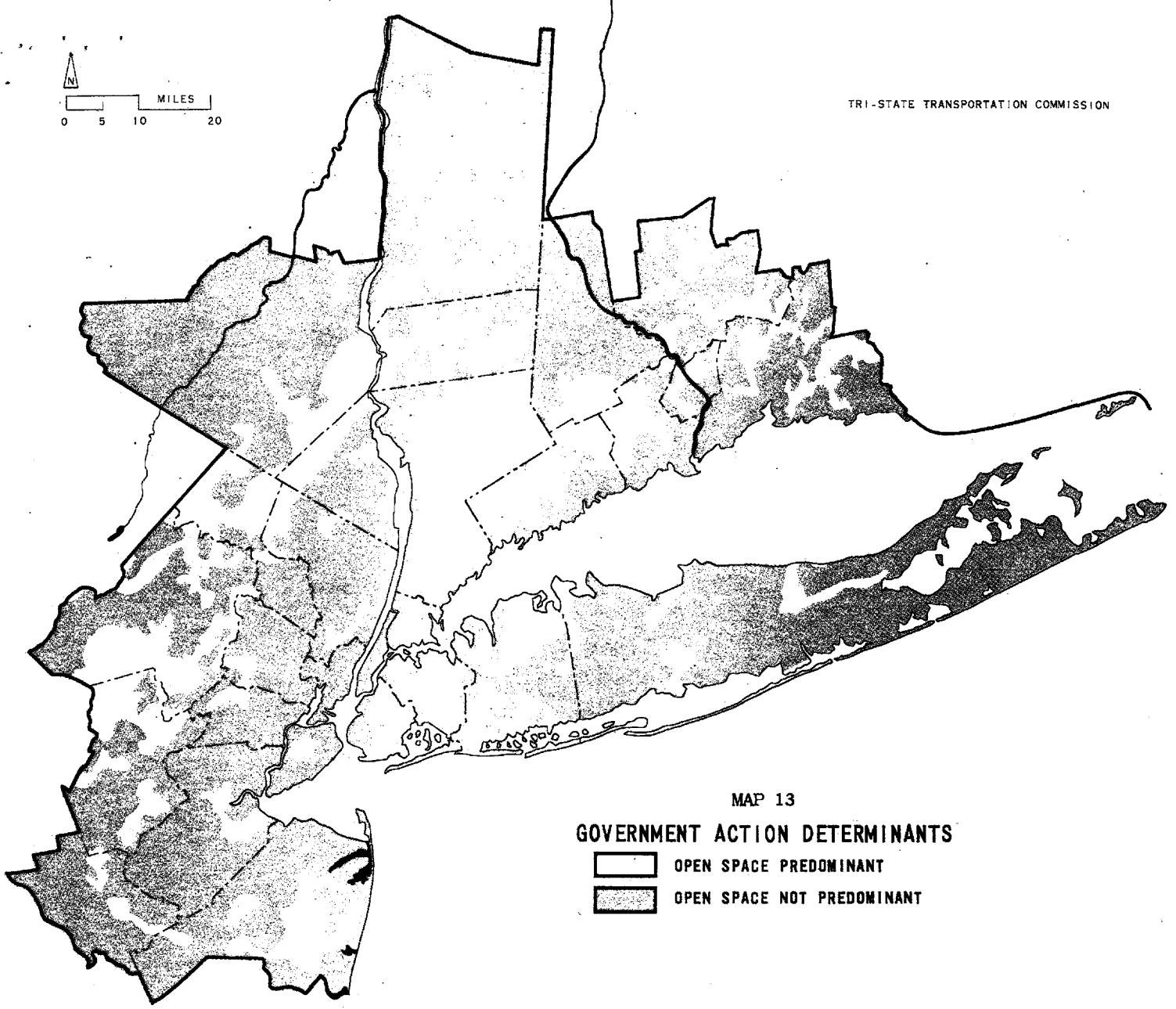
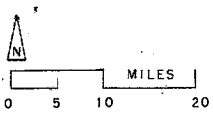
is in force upstream at Round Valley and Spruce Run.

● **Institutional open space** includes cemeteries, and the lands surrounding schools, colleges, public, private and veterans' hospitals, institutions for the mentally ill and physically incapacitated, correctional institutions and the like, where the density of land occupancy is and will remain low.

● **Nonrecreational federal lands** are primarily military or former military reservations that have required openness. The largest in and around the Region are the lands of the United States Military Academy (West Point), Brookhaven National Laboratory in Suffolk County, Picatinny Arsenal in Morris County, Earle Ammunition Depot in Monmouth County and Fort Dix just south of the Monmouth County line.

● **Government owned recreation land**, finally, includes publicly owned parks, reservations and recreation areas of all kinds. In addition to those that exist, Map 8 shows those currently programmed for acquisition at federal, state, county or municipal levels, as well as those proposed or being considered. Reasons for governments to acquire or propose to acquire recreation lands are many and varied. Generally it is reasonable to assume that wherever a government at any level has considered buying land for open space, a quality or factor is present to support the decision. The Region's foreseeable and measurable requirements for recreational open space exceed considerably the sum of all the proposals advanced to date shown on Map 8.

Map 13 "generalizes" the information shown on Map 8 by surrounding with a simple boundary every grouping of present or potential open spaces. **The resulting areas shown on the map, though they may contain some urban development, are those which, as a result of currently**

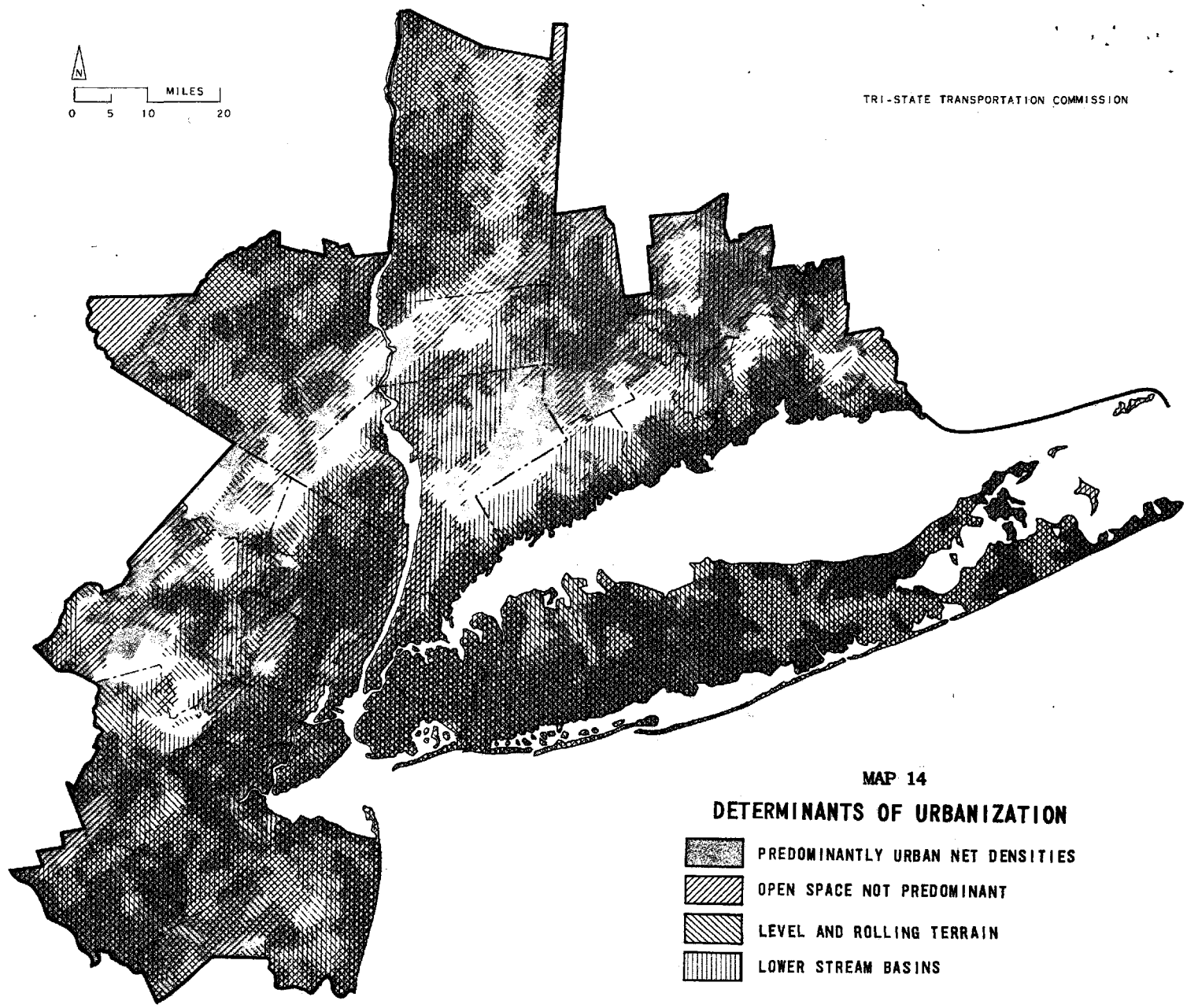
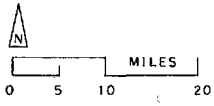


MAP 13
GOVERNMENT ACTION DETERMINANTS
 [White Box] OPEN SPACE PREDOMINANT
 [Shaded Box] OPEN SPACE NOT PREDOMINANT





known government action, past, present or already initiated, will tend to remain predominantly in their natural condition.

If the urban machine is to perform smoothly, the Region's existing nonresidential clusters, shown on Map 9, should continue to attract urban development. In a rural area, the locations that are likely to receive the earliest development are those adjacent to an existing town or village, where some of the services necessary for urban (or suburban) living already exist. Like-

wise, the location of a manufacturing plant in a rural setting requires the presence of housing, and will attract housing if it is not already there. A new cluster in a rural area will create urban development around it. The locations of existing clusters therefore served as guides for delineating the other determinants. Thus, except in a few special cases, there are no clusters in the "headwater areas" or the areas of low residential density depicted on maps 11 and 12 respectively.



MAP 14
DETERMINANTS OF URBANIZATION

-  PREDOMINANTLY URBAN NET DENSITIES
-  OPEN SPACE NOT PREDOMINANT
-  LEVEL AND ROLLING TERRAIN
-  LOWER STREAM BASINS

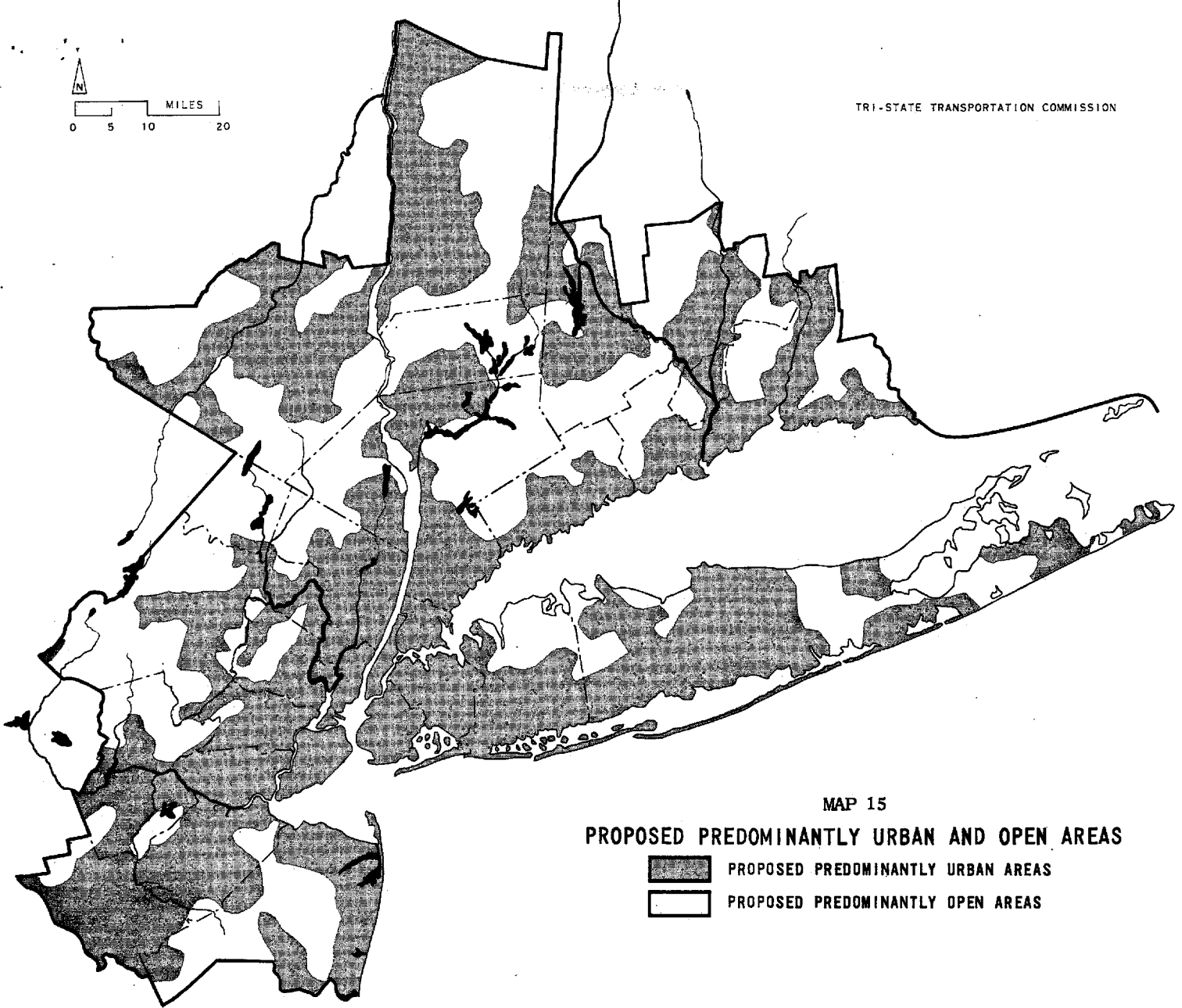
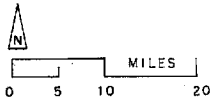
building a geographic framework ...

3. concordance of determinants

Map 14 is a composite of the four preceding maps, combining the effects of all seven determinants. The blank areas and those covered with only one or two screens are the places where the least urbanization is either likely or desirable. The areas where several screens occur together are those where urban development will or should probably occur.

A judicious search was then undertaken for the concordance of the determinants depicted

separately on maps 10 to 13 and together on Map 14, in order to define the single boundary line shown on Map 15. This is the line that will separate those areas of the Region most suitable for urban development from those areas that should remain predominantly open. Wherever possible the evidence was used to obtain the desired ten-to-twenty mile grain of urban development. The vacant-land map and the cluster map were consulted during the process of concordance to insure the feasibility of the line's location. The procedure always recognized the predominance of present or potential open space,



MAP 15
PROPOSED PREDOMINANTLY URBAN AND OPEN AREAS
 ■ PROPOSED PREDOMINANTLY URBAN AREAS
 □ PROPOSED PREDOMINANTLY OPEN AREAS

and generally gave priority to the policy of maintaining the natural landscape in the headwater areas. The only exception to the procedure was eastern Long Island, where the only significant criterion considered so far, that of low existing densities, is meaningless by itself. The proposed open areas, especially the North Fork, are necessary to insure the ten-to-twenty-mile grain. The preservation of farming and the need to prevent saline intrusion into the groundwater supplies provide a further justification of the choice.

The resulting boundary line shown on Map 15 encloses those areas of the Region best suited for the residence and most of the activities of most of the Region's population. Outside of this line lie those parts of the Region best suited for more openness, for recreation requiring open space and for less intensive permanent occupancy by people. The boundary line on Map 15 serves as the initial framework for locating all the elements of future development on the Region's surface and the transportation network to serve them.

**detailing
the plan
within**

III.

its geographic framework.

The reasoning outlined in the preceding chapter has divided the surface of the Tri-State Region into two geographically distinct sets of areas, as shown on Map 15: those to be **predominantly urban**, where most of the Region's development should occur; and those to be **predominantly open**, where, for the most part, development should not occur. Chapter II explained how the geographic delineation of this simple two-part division, with its ten-to-twenty-mile grain of urban development, was guided entirely by land-use determinants, and reflects the plan's important values and goals described in Chapter I. The present chapter will explain how various existing conditions, policy decisions, transportation criteria and other more detailed criteria lead from this two-part geographic framework to the quantitative geographic location of the important elements of the Tri-State Region's development plan.

Detailing the plan requires two kinds of decisions: those concerning the **locations** of regionally significant activities, facilities and types of environment on the Region's surface; and those concerning the **quantity** of each activity or land use in each and every geographic location on the Region's surface. In regional planning these two types of decisions are distinct but interrelated. The plan for a region as large as this one cannot effectively consider a unit-area smaller than the square mile. Nevertheless, **any facility, activity or environment, the location of which has regional significance, will probably significantly affect the mixture of activities within the square mile where it is located.** Therefore, it is necessary to know the locations of such regionally significant elements. How to determine these locations is the principal purpose of this chapter.

As just stated, however, almost every

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square mile must contain a mixture of activities. **Determining the quantity of each activity occurring in each and every square mile in the Region is necessary in order to define fully the locations of regionally significant facilities.** This effort is called "allocation." Brief descriptions of the principles underlying the allocation processes, and of the steps involved for each of the major categories of activity, will also appear in this chapter, though other reports provide fuller descriptions of the procedures used.¹

Following are six sets of general principles that should guide the location and allocation processes. They are corollaries of the definitions of the two parts of the Region shown on Map 15. Each is again related to the plan's goals. They are given in a roughly "ascending" order, starting from the home environment of the individual, who is the ultimate beneficiary of the Region's amenities, leading through the more regional considerations of economics and transportation, to those involving primarily the geographic characteristics of the Region's land.

1. By definition, though some people will reside everywhere, **most of the Region's population should reside within the predominantly urban areas shown on Map 15.** Therefore, for smooth performance of the urban environment, and to provide for everyone opportunities for full participation, **at least normal suburban density levels should prevail within those areas, interspersed with higher densities in appropriate**

locations. The most appropriate and convenient locations for higher densities are those closest to concentrations of activity, or clusters. **Lower "exurban" densities should prevail in the predominantly open areas,** with a higher frequency of zero densities, or open space, in appropriate locations. In all cases, however, to provide a richer environment for urban life, and to reflect the special conditions prevailing in each square mile, **future densities should not be unduly different from the existing densities established and preferred by the people who already live there.**

2. For smooth performance of the urban environment, and to insure opportunities for full participation for everyone, **each person should be able to find most of the things he will need and want in accessible locations within that part of the predominantly urban area where he lives:** employment, shopping, government, education, daily recreation and the transportation needed to get there. All these elements must therefore be present either within the mix in each square mile, or in clusters favorably located to serve every set of urban square miles. Locations most accessible to the largest amount of activity across the Region will develop sooner and develop at higher densities.

3. As noted in the first two principles, the locations of clusters, either existing or new, will determine where higher residential densities should occur, and which places will develop most rapidly. As a consequence of the second principle, **clusters will perform most smoothly if their locations are easily accessible to the largest number of people.** A place is accessible to many people either because of its central position in relation to the urban areas surrounding it, or in relation to transport arteries giv-

¹ For references to reports describing in detail the allocation procedures, see notes in this chapter under Section A (Recreation), Section C (Economic Activities) and Section D (Residential).

ing access to it. Thus transport will serve to detail the plan. In any case, the best places for clusters are always within predominantly urban areas.

4. A sufficiently close spacing of the Region's highway network should prevail within the predominantly urban areas to insure a suitable level of performance in those places where most of the travel will occur. In the more open areas, a wider spacing is adequate and probably preferable. The greater the intensity of urban development, the closer the spacing required. Conversely, to provide a closer spacing increases accessibility and therefore the forces generating urban development. Mass transit facilities must serve all the predominantly urban areas, to provide access from them to the Region's center in Manhattan. Thus the general framework of the Region's urban development is a prerequisite to the design of its transport network.

5. Some recreation is a daily need. To provide for everyone an opportunity for full participation, the open space and facilities needed for daily use should be immediately accessible to most of the people, therefore within the predominantly urban areas, and preferably within each square mile, in quantities generally proportional to the population. The unavailability of vacant land may, of course, unavoidably restrict the total quantity feasible in each square mile. The presence of open space within the predominantly urban areas will produce, at the small grain of the neighborhood and the community, the desired richness of the urban environment.

6. Other recreational activities require larger areas of land in more natural settings, sufficiently accessible but only for daylong use.

To use more effectively the natural setting, such areas should preferably be part of the more open sections of the Region, where the predominant openness will enhance each specific site. Availability of vacant land with appropriate scenic or recreational service characteristics is the prime determinant of location.

A rational procedure for detailing the plan in accordance with these principles would follow a reverse or "descending" order, starting with those decisions that are imposed by land characteristics, and concluding with those directly depending on the individual. First, the locations of open space, where no development whatever should occur, would derive from principles 5 and 6. All land not so used would remain available for urban development. Principle 4 would control the approximate design of the transportation networks, integrating future lines with those that exist. Knowing the shapes of urban areas and the locations of transport lines within them makes it possible to find the best sites for clusters, according to principles 2 and 3, placing the larger amounts of development in the better sites. All other land remains available for predominantly residential development in accordance with principles 1 and 2: highest densities around clusters; medium densities in the other parts of the predominantly urban areas; and the lowest densities in the predominantly open areas, with the necessary mixture of uses everywhere, and development occurring more rapidly in the more accessible places. A few additional criteria affecting the shape of the plan would include the possibilities of redevelopment in areas already developed, and the requirements in specific locations of land-consuming special facilities such as universities, hospitals and airports.

detailing the plan ...

a. outdoor recreation

This title is used instead of "open space", because open space has a broad meaning encompassing many unrelated functions, described in the preceding chapter and shown in part on Map 8. Since many of these nonrecreational functions are directly related to other uses, the other phases of the plan-detailing process can deal with them more effectively. Institutions are nonresidential uses; the locations of clusters will tend to separate higher from lower densities; the residential allocation process will define the locations of low-density or large-lot development, primarily in the "predominantly open" areas already defined. The multiplicity of all other types of nonidentifiable private open space is implicit in the process of residential development, especially at the lower densities. Even some purely local recreation land, as noted below, is an integral part of residential development. Finally, the plan's policies favor recreational use of any water-supply lands, which therefore become part of the recreational package described below.

Recreational open space is, for the most part, a separately measurable and predictable use of land, both in quantity and location. Of the land surface of recreational open space that the Region will require within its boundaries (780,000 acres in 2000, including schools) about 48 percent is for daily or "subregional" needs (playgrounds, swimming, other sports, neighborhood enhancement), and should occur in the predominantly urban areas where the people will be, in accordance with Principle 5 above. The 52 percent balance is for less frequent but more extended "regional" use, with locations dependent on site characteristics, rather than proximity to people, in accordance with Principle 6: ocean bathing, skiing, hiking, camping, fishing, hunting.² It is essential to identify and reserve most of these two types of recreational open space areas first, before allocating other uses, because the prime determinant of their location is available vacant

land, which, unless it is specifically reserved in advance for recreation, will never be available again. The procedure used to allocate recreational land to the square miles of the Region followed the principles and steps described below.

1. The grain of subregional recreation land is small. Specific sites are therefore not identifiable in the regional overview: their specific selection must remain the function of local planning agencies. At the regional scale, however, it becomes part of the land-use mix in each square mile. In principle, every square mile should receive its share of subregional recreation land, in proportion to the population which will settle there. If sufficient space is not available in a given square mile, the nearest accessible site is where it should occur.

2. The residential allocation process will distribute the local "neighborhood" portion of the subregional requirement (an increase of 21,880 acres of land, excluding school playgrounds, between 1963 and 1985) in direct proportion to the residential floor space increment allocated to each square mile,³ on condition that the total acreage of subregional recreation land assigned to that square mile should never exceed 18 percent of existing vacant land resources.⁴

3. Since the creation of recreation land is extremely difficult once development has occurred, it is necessary by 1985 to reserve, that is to plan for and to assure, if not actually to acquire, all the land needed by the population in 2000. The acreage of subregional recreation land obtainable in 2000, including the "neighborhood" requirements treated in Paragraph 2, above, is approximately 375,000 acres, including schools. The objective is to distribute this acreage to those square miles in the Region that will be as close as possible to the Region's future population.

² For estimates of recreation land requirements by types of activities, see Interim Technical Report 4064-6422, *Adequacy in Recreation Land and Open Space*, TSTC, June 1967.

³ See Section D of this chapter.

⁴ See Step 5 below for basis of the 18 percent limit.

4. The allocation of future population quantities to square miles was not yet available at this first stage, but the previously published *Regional Forecast 1985* provided pre-

Table 1

**RECREATIONAL OPEN SPACE DISTRIBUTION
BY COUNTIES AND PLANNING REGIONS, 1985 AND 2000
(ACRES)***

	1985	PLAN INCREMENT	YEAR 2000 TOTAL
CONNECTICUT.....	48,070	60,100	108,170
Central Naugatuck.....	11,220	15,450	26,670
Greater Bridgeport.....	3,860	6,960	10,820
Housatonic Valley.....	8,010	11,570	19,580
South Central.....	15,410	12,750	28,160
South Western.....	6,540	10,950	17,490
Valley.....	1,030	2,420	3,450
NEW JERSEY.....	58,520	184,670	243,190
Bergen.....	8,980	16,530	25,510
Essex.....	8,420	6,420	14,840
Hudson.....	850	3,080	3,940
Mercer.....	3,100	11,850	14,850
Middlesex.....	3,950	27,190	31,140
Monmouth.....	5,600	33,330	38,930
Morris.....	9,850	42,610	52,460
Passaic.....	7,670	19,630	27,300
Somerset.....	2,940	22,730	25,670
Union.....	7,160	1,290	8,450
NEW YORK CITY.....	23,810	7,960	31,770
Bronx.....	5,170	690	5,860
Kings (Brooklyn).....	5,580	1,260	6,840
New York (Manhattan)...	2,590	10	2,600
Queens.....	6,610	3,100	9,710
Richmond.....	3,860	2,900	6,760
NEW YORK OUTSIDE N.Y.C. .	161,390	172,010	333,400
Dutchess.....	9,710	32,660	42,370
Nassau.....	25,870	14,050	39,920
Orange.....	32,190	27,500	59,690
Putnam.....	9,420	13,990	23,410
Rockland.....	31,880	10,900	42,580
Suffolk.....	34,980	45,570	80,550
Westchester.....	17,540	27,340	44,880
TOTAL.....	289,790	424,740	714,530

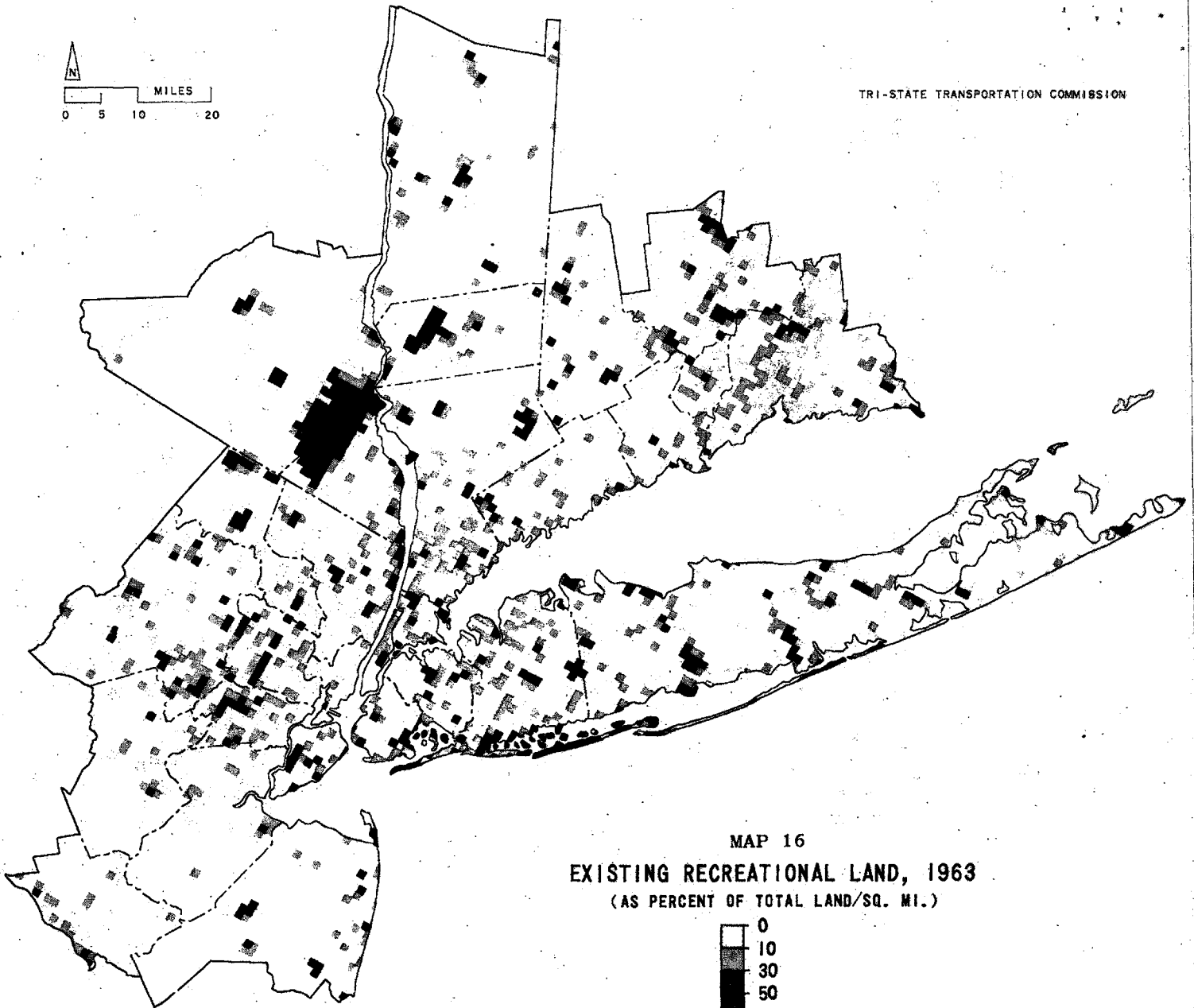
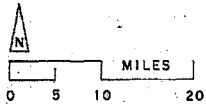
*NOT INCLUDING SCHOOL AREAS.

liminary population-growth projections to 1985 for each of Tri-State's counties and planning regions, based on an extrapolation of trends. Extension of these 1985 extrapolations provided population estimates for 2000 by counties and planning regions. Since most of a given jurisdiction's population will reside within its proposed predominantly urban portion, as shown on Map 15, the subregional recreation land requirements of that county's population can reasonably be assigned to the square miles within that proposed urban part. The requirement beyond what already exists in each predominantly urban portion of each jurisdiction was therefore distributed to the square miles within it in proportion to the available vacant land, the latter being a rough measure of their relative population growth capacity.

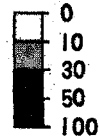
5. To avoid unrealistically shutting off continued development in any location, however, the maximum amount of vacant land usable for open space within any county or planning region was set at 18 percent, the present ratio of recreation land to land in urban use in the Region as a whole.

6. Thus every place received, if possible, recreation land increments wherever vacant land was available to accommodate future needs as well as to remedy existing deficiencies. Where not enough vacant land was available within the predominantly urban portion of the jurisdiction, the recreation land needs were allocated to the nearest predominantly open portion. If the area was still deficient, as in the case of the Region's interior high-density areas, its "subregional" recreation requirements were provided either by substituting facilities other than land (accounting for approximately 50,000 acres), or by considering the remaining requirements to be "regional" (accounting for approximately 78,000 acres) and allocating this remainder as part of the next step described below.

7. By 2000 the Tri-State Region will require within its boundaries 400,000 acres of "regional" recreation land, plus an additional 250,000 acres beyond. Together with all existing recreation lands exceeding 50 acres, Map 8



MAP 16
EXISTING RECREATIONAL LAND, 1963
(AS PERCENT OF TOTAL LAND/SQ. MI.)



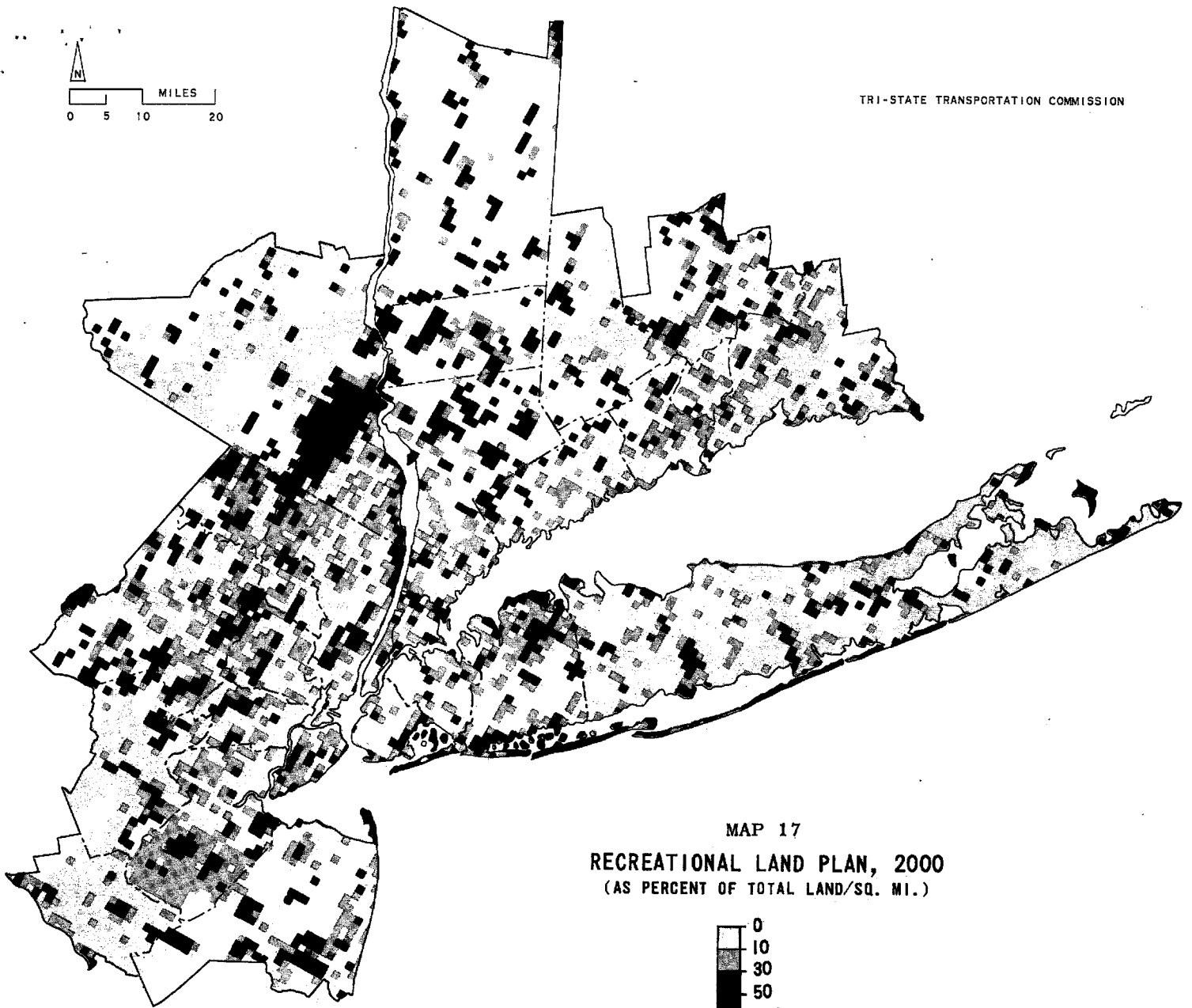
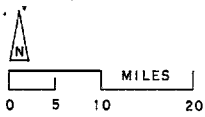
detailing the plan ...

shows all areas currently proposed or suggested for acquisition within the Region by responsible or interested agencies. Since the presence of existing or proposed open space was a significant component of the definition of the Region's "predominantly open" areas (see Chapter II), the latter must contain most of the proposed or suggested sites. It is reasonable to suppose that each of these sites exhibits some quality justifying its previous selection for openness. The regional development plan therefore accepts the proposed recreational use of almost all these sites, and thus recognizes the

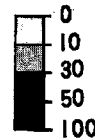
initiative and knowledge of the agencies that have proposed them.

8. Additional sites, carefully selected where appropriate resources or scenic qualities are present (beaches, river valleys, wetlands, lakes, escarpments, water-supply reservoir proposals as well as some existing water-supply lands to be converted to multiple use), also for the most part in the "predominantly open" areas, complete the plan's proposals to provide the required control total of "regional" recreational open land surface.⁵

⁵ For a survey of geographic resources suitable for recreational use, see Interim Technical Report 4117-6422, *Outdoor Recreation Land Resources and Potentials*, TSTC, April 1969.



MAP 17
RECREATIONAL LAND PLAN, 2000
(AS PERCENT OF TOTAL LAND/SQ. MI.)



In the majority of cases, the recreational open space allocated by this procedure used only a part of each affected square mile. In 614 of the Region's square miles, however, existing or proposed open space added to any other existing use excluded all other kinds of development. These are the square miles shown in solid green on Map 1, the regional development plan.

Map 16 shows the distribution in 1963 of recreation land across the surface of the Tri-State Region, in four ranges of total land per square mile reserved as recreational open space.

These data were derived from Tri-State Transportation Commission's open-space inventory.

Map 17 represents the proposed recreation land plan resulting from the design and allocation processes outlined on the previous pages, expressed in the same terms as on Map 16, to facilitate comparison of the plan's proposals with existing conditions.

Table 1 presents the distribution of recreational open space by counties and planning regions in 1963, and in 2000 (to be planned for and assured by 1985) as a result of these design and allocation processes.

detailing the plan ...

b. transport

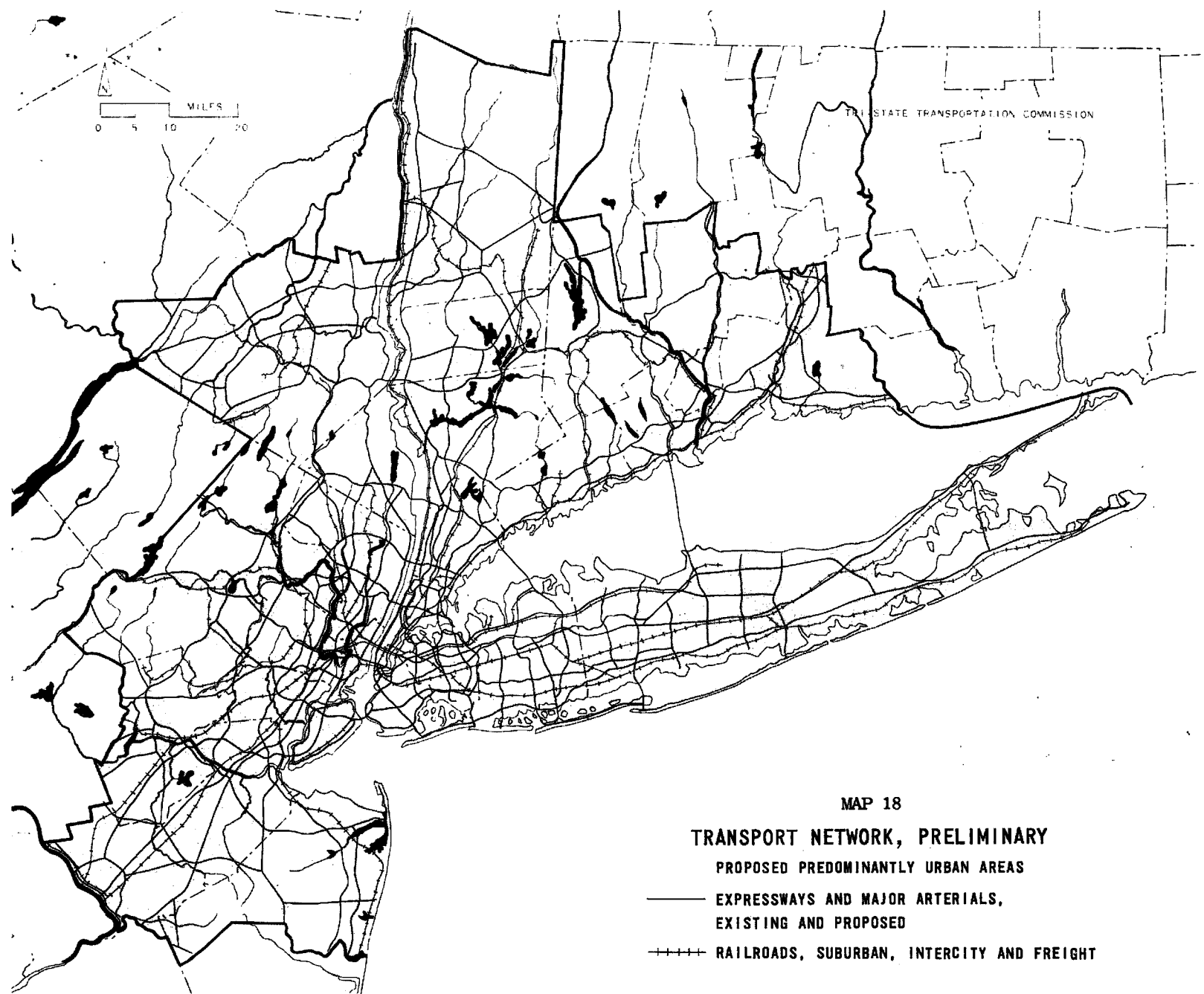
People tend to congregate at places they can get to easily. They can easily reach places made accessible by transport facilities. Therefore the arrangement of the Region's transport network will help determine where more of the Region's activities will tend to concentrate. The two critical elements for tentatively designing the Region's future transport network are now available—the existing network and the outline of the Region's potential urban areas that the future network must serve. Thus while the general arrangement of the Region's land use determines the shape of the transport network, the network in turn will help to detail the elements of the plan.

New transport facilities must interlock usefully with the existing network. An important purpose of the Tri-State Transportation Commission's 1985 interim plan was to interconnect the current programs of the three states to achieve this result. It provides, therefore, a sound basis for designing the network to serve any conceivable arrangement of urban development.

Those parts of the Region shown on Map 15 where the urban development should predominate will require a closely spaced grid of expressways and arterials. Wider spacing can adequately serve the predominantly open parts. Conversely, where the highway grid is closely spaced, intense development will tend to occur;

less development will occur where the spacing is wider. In addition the continued viability and smooth performance of the dominant concentrations of activity in the center of the Region (Manhattan and vicinity) will depend on the convergence there of its mass-transit lines, reaching out into all of the Region's potential areas of urban development. Air transport must also be accessible to every part of the Region.

In accordance with these principles, the tentative highway network shown on Map 18, comprising expressways and some major arterials, is similar to the 1985 interim plan, but modified to fit more closely the urbanization pattern of Map 15. The network thus illustrated is no more than a tool to assist in locating the elements of land development; it may need substantial modification to fit the potential travel needs of a completed land use plan. Some additions to the interim plan's proposals produce closer spacing in the proposed new urban areas, especially at the outer edges of the Region; conversely, some lines were omitted that would have traversed the length of proposed predominantly open areas. Suburban rail transit lines shown on Map 18 extend farther out than the interim plan provided, because more distant urban development will occur if openness and some lower densities persist, as proposed, closer to the Region's center. Finally, the Region's transport network must include the 33 airports proposed by Tri-State Transportation Commission's *General Aviation Airports for the Future*: four major jetports, 14 primary and 15 secondary general airports.



c. economic activities

Existing clusters of economic activity, as defined in Chapter I, appear on Map 9. They occur primarily within the Region's existing predominantly urban areas. These places will continue to attract some of the Region's activities, and will therefore grow. When growth is measured as a ratio of present size, large clusters will grow less rapidly than small ones. Since substantial growth requires vacant land,

clusters in fully urban areas will grow less rapidly than those in developing areas. In all cases, subject to the preceding constraints, those most favorably located with respect to the Region's urban areas will grow more than those less favorably located.

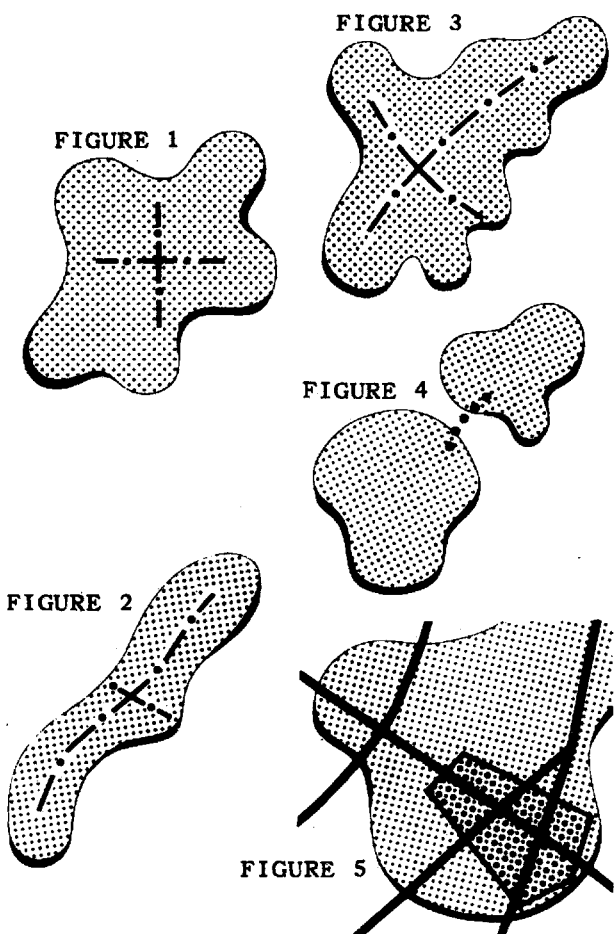
Other smaller concentrations of economic activity also exist, which are not shown on Map 9, because they did not qualify in 1963. Some may become much larger in the future, forming new clusters, also located for the most

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part in the potential urban areas defined on Map 15. Those most favorably located will again grow the most. Other new clusters of economic activity should also develop within the potential urban areas, but in locations where very little if any development exists today; they also

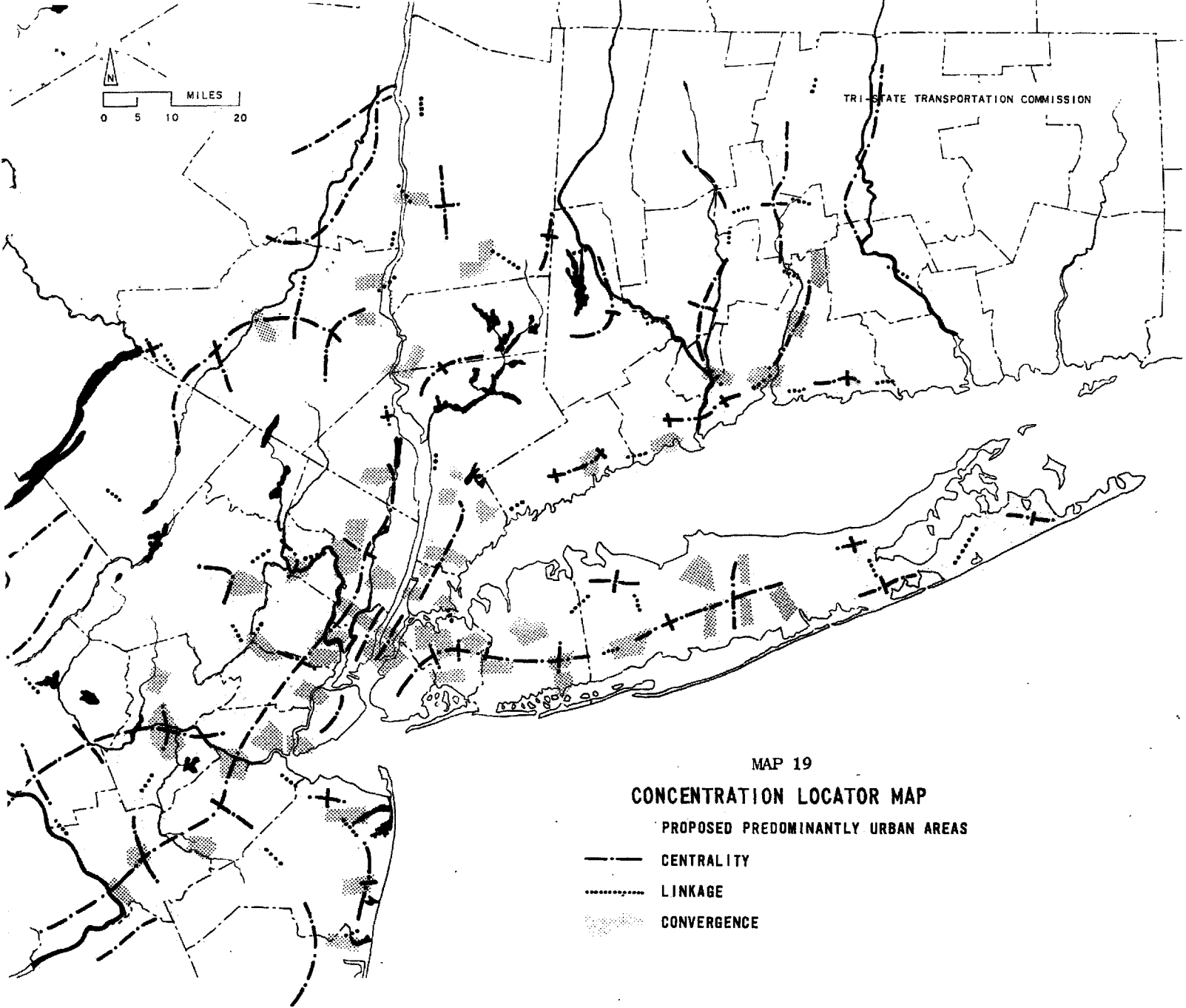
will tend to develop more forcefully in favored locations. Moreover, new clusters, wherever they are located, or existing clusters, if they grow substantially, will tend to attract development around them. Therefore, if they are developed in favorable locations within the proposed urban areas shown on Map 15, they will help bring about the intended development in those areas as proposed.

Reflecting these principles, three sets of simple rules called **concentration locators** were used to define favored locations. Termed **centrality**, **linkage** and **convergence**, they served to determine where existing concentrations should grow more, which should grow less, the best locations for new ones, and how large they should become. Map 19 shows all major occurrences of these three concentration locators within the Region's existing and proposed urban areas delineated on Map 15. The definitions given below, along with figures 1 to 5, explain specifically the nature and significance of each type of locator:



1. **Centrality:** the highest concentration of activity should occur at the center of an urbanized area (Figure 1). If the area is oblong or an urban corridor, activities will concentrate somewhere along its central axis. The best spot is halfway (Figure 2). If an urban area has an odd shape, two axes may exist, and the optimum site is where they intersect (Figure 3). Conversely, establish a concentration of activity on a given spot or along a given axis, and urban development will tend to surround it or expand alongside it.

2. **Linkage:** activities requiring larger markets or labor supplies will find their best sites at points of contact of two or more separate urban areas, rather than at the center of either



MAP 19
CONCENTRATION LOCATOR MAP
 ——— PROPOSED PREDOMINANTLY URBAN AREAS
 ——— CENTRALITY
 LINKAGE
 + CONVERGENCE

one (Figure 4). Such locations are normally at the edges of urban areas, therefore suitable also to serve residents of adjacent, predominantly low-density and open areas.

3. Convergence: concentrations will also occur at points of convergence of transport arteries (Figure 5). Every crossing of two expressways is such a place, easily accessible from domains extending in four directions. There are many such places in the Region. The transport network shown on Map 18 provides the means to identify all points of convergence. Of greatest significance are places where, within two or

three miles, expressways converge from five or more directions.

The nine steps described on the following pages summarize and explain further the principles and procedures used for determining the locations and sizes of the Region's clusters in 1985, and for allocating floor space to the square miles within them.⁶

⁶ For a full description of nonresidential allocation principles and procedures, see Interim Technical Report 4111-6371, *Nonresidential Allocation, The Procedure*, TSTC, August 1968.

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1. Forecasts indicate that in 1985 the Tri-State Region will contain 5.1 billion square feet of nonresidential floor space, adding some 1.8 billion square feet to the 1963 total. In addition to the Region's growth in employment, this increment will accommodate a 20 percent regionwide average increase of floor space per worker. The clusters are assumed to contain, in 1985, 63 percent of the Region's total nonresidential floor space compared to the existing 61 percent in 1963. The 2 percent increase reflects the plan's policy of promoting a slightly higher degree of concentration than has prevailed in recent years. Therefore, the clusters in 1985 will contain approximately 3.2 billion square feet of nonresidential floor space. The remainder, approximately 1.9 billion square feet, will develop as part of the land-use mix in predominantly residential square miles.⁷

2. The presence of one or more "concentration locators" on a site where no cluster existed in 1963 served to identify it as the site for a new cluster. Significant existing concentrations not yet large enough to qualify as "clusters" also became "new" clusters. The frequency distribution of clusters by size categories in 1963 determined by analogy the number of each size of cluster that should exist in 1985, subject to the policy that the total proportion of smaller clusters in the Region should increase. The total number of clusters increased from 172 to 354. The relationships in 1963 of larger clusters with smaller "satellite" clusters surrounding them assisted in determining sites and sizes of smaller new clusters in 1985.

3. The basic employment growth rates adopted for existing and new clusters varied with their sizes and the nature and degree of development surrounding them. These growth rates ranged from lower rates for larger clusters and those located in the more urban areas of the Region, to higher rates for smaller clusters and those located in suburban areas, to highest for those in peripheral areas and for new ones. Employment growth in Manhattan's central business district was assumed to be zero. In the other clusters, the basic growth rate ranged from 2 percent to 128 percent. A basic growth rate was thus assigned to every cluster in accordance

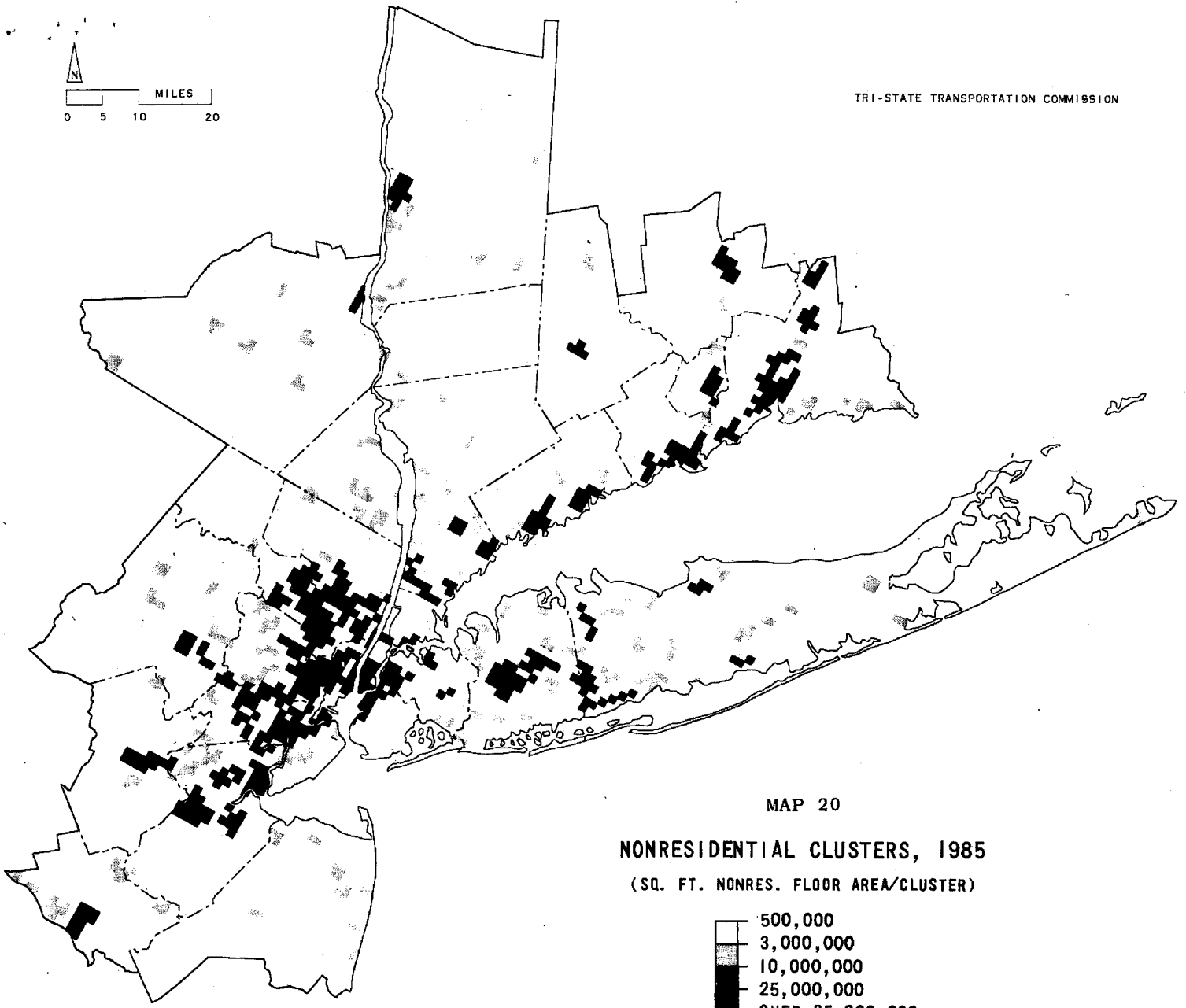
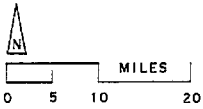
with the preceding principles. Moreover, the presence of a "concentration locator" doubled its basic growth rate; two locators tripled it, and so forth. In addition, every cluster received an added increment to provide for increased floor space per worker, ranging from 15 percent for the Manhattan CBD to 30 percent in peripheral locations.

4. Each square mile in a cluster received a share of the total increment of nonresidential floor space assigned to that cluster in proportion to its available vacant land at existing densities. Each also received an increment of residential floor space in proportion to its capacity. Conversely, every predominantly residential square mile not in a cluster would receive, as part of its land-use mix, its share of the 1.9 billion square feet of nonresidential floor space not assigned to clusters.

5. Further detailing required some additional study in special cases having significant regional impact. The most important is the Region's central economic cluster in Manhattan. The proposed net increase of nonresidential floor space in the Manhattan economic cluster from 1963 to 1985 is 81.4 million square feet. This number is 2.5 times the next largest increment to a single cluster in the Region, and four times the increment to the next one after that, this merely to accommodate the increased 1985 space needs of the same number of jobs in 1963. Furthermore, this net increase does not reflect the even more dramatic change in Manhattan from loft-based manufacturing jobs, which will continue to depart, to office jobs, which will continue to proliferate. As a result, new office space will continue to concentrate both downtown and midtown, while loft space will diminish in the areas lying between these two nuclei. Detailed studies of block data from 1940 to 1963, careful inventories of current construction projects and commitments, and recognition of future proposals such as the lower Manhattan plan, the Regional Plan Association's concepts for the midtown West Side, and numerous urban-renewal projects currently in process, served to allocate the results of these changes to individual square miles.⁸

⁷ See Section D of this chapter.

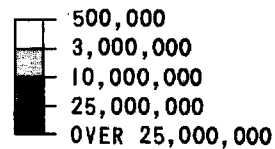
⁸ Interim Technical Report 4124-9311, *The Manhattan CBD*, TSTC, June 1969.



MAP 20

NONRESIDENTIAL CLUSTERS, 1985

(SQ. FT. NONRES. FLOOR AREA/CLUSTER)



6. The Hackensack Meadowlands in Hudson and Bergen counties are another significant special area, with 15,000 undeveloped acres (or 25 square miles) suitable for reclamation. The area's border lies only three miles from midtown Manhattan. Reclamation and development proposals for the area are being prepared, and legislation has been adopted to effectuate them. The regional development plan therefore proposes the addition of 11 reclaimed square miles within the Meadowlands to the six nearby existing economic clusters centered in Jersey City,

Kearny and Harrison, Rutherford, Hackensack, Ridgefield and Secaucus. A plan similar to two of the alternatives prepared in 1967 by the New Jersey Division of State and Regional Planning served as the basis for this selection. Residential and open space uses would occupy the balance of the reclaimed areas.

7. Airports and military installations are special cases requiring treatment without reference to the cluster locators. Commercial and general aviation airports require floor space to handle passengers, freight and aircraft storage

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and service. They will also attract industrial development. Each proposed airport may therefore determine the location of an economic cluster.

8. **Military installations** with the characteristics of economic clusters are the Picatinny Arsenal and the United States Military Academy. Their existing sizes were not obtainable for security reasons and therefore had to be assumed. The Brookhaven National Laboratory was similarly treated. But the Raritan Arsenal, recently closed and made available for industrial development, was designated a new "cluster" and treated accordingly.

9. **Universities and hospitals** are public facilities that will experience significant growth during the next two decades. The power to decide their locations is partly in the hands of the public sector, which in some cases can effectively determine, by this means, the location of economic clusters. Analyses of population projections and user needs defined tentative sizes and locations for future facilities. Firmly fixed locations became the nuclei for new or significantly expanded economic clusters. Rutgers' sites in Piscataway and Edison, New York State's Stony Brook and New York City's Richmond County College, are examples. Known tentative proposals and the "cluster locators" determined sites for the others.

Map 20 presents the nonresidential clusters proposed for the Region in 1985, in four size ranges corresponding to total nonresidential floor space. These size ranges are the same as those used on Map 9 showing the Region's existing clusters, which may therefore be compared with the proposed pattern. For a definition of clusters, see page 20. The quantity of nonresidential floor space represented on Map 20 is 3.2 billion square feet. The balance of nonresidential floor space in the Region occurs as part of the mix in predominantly residential square miles, the allocation of which is described in Section D, which follows. Table 2

presents employment distribution by counties and planning regions in 1963, and in 1985 as a result of these allocation processes; the figures include all jobs, both within and outside the clusters.

Table 2

**EMPLOYMENT DISTRIBUTION
BY COUNTIES AND PLANNING REGIONS, 1963 AND 1985
(THOUSANDS OF EMPLOYEES)**

	1963	PLAN INCREMENT	1985 PLAN TOTAL
TRI-STATE REGION.....	7,679	2,221	9,900
CONNECTICUT.....	578	375	951
Central Naugatuck.....	79	77	156
Greater Bridgeport.....	129	34	163
Housatonic Valley.....	36	49	85
South Central.....	188	150	338
South Western.....	124	45	169
Valley.....	20	20	40
NEW JERSEY.....	1,863	976	2,939
Bergen.....	280	136	416
Essex.....	449	39	488
Hudson.....	273	35	308
Mercer.....	126	123	249
Middlesex.....	177	197	374
Monmouth.....	113	136	249
Morris.....	77	113	190
Passaic.....	188	52	240
Somerset.....	54	105	159
Union.....	226	40	266
NEW YORK CITY.....	3,959	73	4,032
Bronx.....	251	46	297
Kings (Brooklyn).....	668	07	675
New York (Manhattan)....	2,518	-73	2,445
Queens.....	478	43	521
Richmond.....	44	50	94
NEW YORK OUTSIDE N.Y.C. ..	1,181	797	1,978
Dutchess.....	72	109	181
Nassau.....	475	57	532
Orange.....	65	129	194
Putnam.....	7	20	27
Rockland.....	49	54	103
Suffolk.....	198	277	475
Westchester.....	315	151	466

d. residential

Almost every place in the Region is a feasible and suitable location for residential development, each in its own way. By definition, **new residential growth should occur primarily on vacant land within the existing and potential urban areas, inside as well as outside the clusters.** Within a cluster, housing is secondary to the dominant nonresidential uses, but it is often built at higher densities than elsewhere. For efficiency, and to make suitable housing available for all income groups, areas close to the clusters should receive greater amounts at higher densities; development would be more spacious farther away. Housing may also develop within the Region's predominantly open areas on still larger lots, thus maintaining openness, consistent with the characteristics of the land or appropriate zoning controls. Subject to these variations, especially the intensification of development in the vicinity of clusters, it is reasonable and even desirable for residential densities or lot sizes to remain comparable to what exists at present in each vicinity. Respect for existing densities, and therefore existing environmental characteristics, within a reasonable range, in every square mile in the Region, will insure the persistence of such specific characteristics in the locations where the people have selected to establish them. The preceding are rules that reflect the policies adopted for the plan.

In addition to residential development, each square mile must also receive its proportional share of local recreational open space and of nonresidential floor space.

On a broader scale, existing conditions and the past performance of the development process suggest that development is more likely to occur sooner and at higher densities in those places that become more accessible to other parts of the Region.

New residential development should locate on the surface of the Region in accordance with these principles. The procedures employed to allocate residential development to the Region's

square miles, as described below, were designed to reproduce these principles.

1. Forecasts indicate that in 1985 the Tri-State Region will contain 8.9 billion square feet of residential floor space, adding some 3.2 billion square feet to the 1963 total. In addition to the Region's growth in population, this increment will accommodate a 20 percent regionwide average increase of floor space per person. If "predominantly residential" square miles contain, in 1985, the same approximate percentage of total residential floor space as in 1963, they would contain 6.8 billion square feet. The remaining 2.1 billion square feet were allocated as part of the land-use mix in the non-residential clusters.

2. The summation of costs of probable trips to each part of the Region from every other part provided a measure of every place's **accessibility**: from existing development via the 1963 transport network, for 1963; and from existing development plus the 1985 increments to clusters via the 1985 network shown on Map 18, for the development period from 1963 to 1985.

3. "Density norms" were developed from 1985 accessibilities as a 1985 floor-area ratio equivalent to the 1963 densities of places with corresponding levels of 1963 access. Changes in accessibility between 1963 and 1985 thus produced **1985 modified densities**: the 1963 FAR of each square mile weighted in proportion to the amount of existing development, averaged with the "density norm" weighted in proportion to the amount of vacant land. Averaging the "density norm" with the existing density maintains compatibility with the density of existing development, while enabling the assignment of realistic future densities to square miles that are predominantly vacant.

4. Each of the Region's 7,200 "predominantly residential" square miles fell into one of **three categories** based on previously established distinctions shown on maps 15 and 20. New development in the **predominantly open areas** should take place at reduced densities to insure relative openness: either 0.8 times the "modified" floor area ratio (result of Step

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3) in each square mile, or an FAR of 2.8 percent,⁹ whichever is less. In the **predominantly urban areas adjacent to clusters**, but not adjacent to predominantly open areas, new development should occur at higher densities: 1.75 times the modified floor area ratio in each square mile, plus 5.55 percent.¹⁰ In **all other predominantly urban areas** new development would occur at approximately the same density levels as those that existed before, or normally occur, in terms of average population per unit area: 1.5 times the modified FAR.¹¹

5. Total vacant land in each square mile, less the land area already assigned to open space (Section A), less the land needed for local nonresidential functions (Section C) and local recreation (Section A), less land needed for streets, equals vacant land available for residential use. This area, fully developed at the density previously calculated for each square mile (result of steps 3 and 4) corresponds to that square mile's **capacity**.

6. The Region's square miles were ranked by accessibility, using for this purpose a combination of each square mile's accessibility measure (Step 2) and its 1985 density (Step 4).

7. A formula to relate the probable development in each place to its capacity (Step 5), its accessibility rank in the Region (Step 6), the total capacity of the Region (Step 5) and the total development expected in the Region (Step 1) served to determine how much each square mile would develop by 1985.¹² This for-

⁹ Lot size per dwelling unit of one acre or more.

¹⁰ The combination of this multiplication by the factor of 1.75, with the addition of the constant 5.55 percent, has the effect of increasing densities only slightly in high-density areas, but of increasing them sharply where existing densities are low. In the latter cases, the combined effect is equivalent to multiplication by a factor of 3.0 or more.

¹¹ Due to the assumed increase in the floor area per new dwelling unit and the decrease in average family size, a multiplier of 1.5 produces approximately the same population per unit area.

mula, developed by Lathrop and Hamburg, determines what percentage of each square mile's capacity would probably develop by 1985.

8. This percentage determines how much new residential floor space to allocate to that square mile. By direct proportion, the local non-residential floor area and the local recreational land requirement are then derived.

The preceding devices achieved, among others, the following three intended purposes: (1) they respected the validity and desirability of existing man-made environments; (2) they reflected the normal forces of change inherent in the real-estate market; (3) yet at the same time they introduced the results of deliberate action taken according to the plan, such as the location and development of new concentrations, the balanced growth of existing concentrations, the design of the transportation network, the conservation of low-density or "open" areas, and in several respects a rational normalization of zoning policy and controls. They also assigned to each square mile, by special calculations, the land needed for streets and for local recreation, and the neighborhood nonresidential land and floor space to accommodate schools, local shops, small industry and other noncentral activities.

A few special conditions required some additional calculations prior to the allocation process described above. These steps modi-

¹² To simulate a continuous development process, the total residential growth from 1963 to 1985 was distributed across the Region's surface by the following formula in 11 two-year installments, using for each cycle the capacity remaining after the previous cycle.

$$\text{The formula is } A_j = A [e^{-\lambda O} - e^{-\lambda(O+O_j)}]$$

where A_j = the amount of activity to be allocated to Zone j,
 A = the aggregate amount of activity to be allocated,
 λ = probability of a unit of activity being sited at a given opportunity,
 O = the opportunities for siting a unit of activity rank ordered by access value and preceding Zone j, and
 O_j = the opportunities in Zone j.

Lathrop, George T. and Hamburg, John R., "An Opportunity-Accessibility Model for Allocating Regional Growth", *Journal of the American Institute of Planners*, Volume XXXI, Number 2, May 1965, p. 96.

fied the existing vacant land measurements in selected square miles in the Region to reflect potential redevelopment, land reclamation and

Table 3

POPULATION DISTRIBUTION
BY COUNTIES AND PLANNING REGIONS, 1963 AND 1985
(THOUSANDS OF PERSONS)

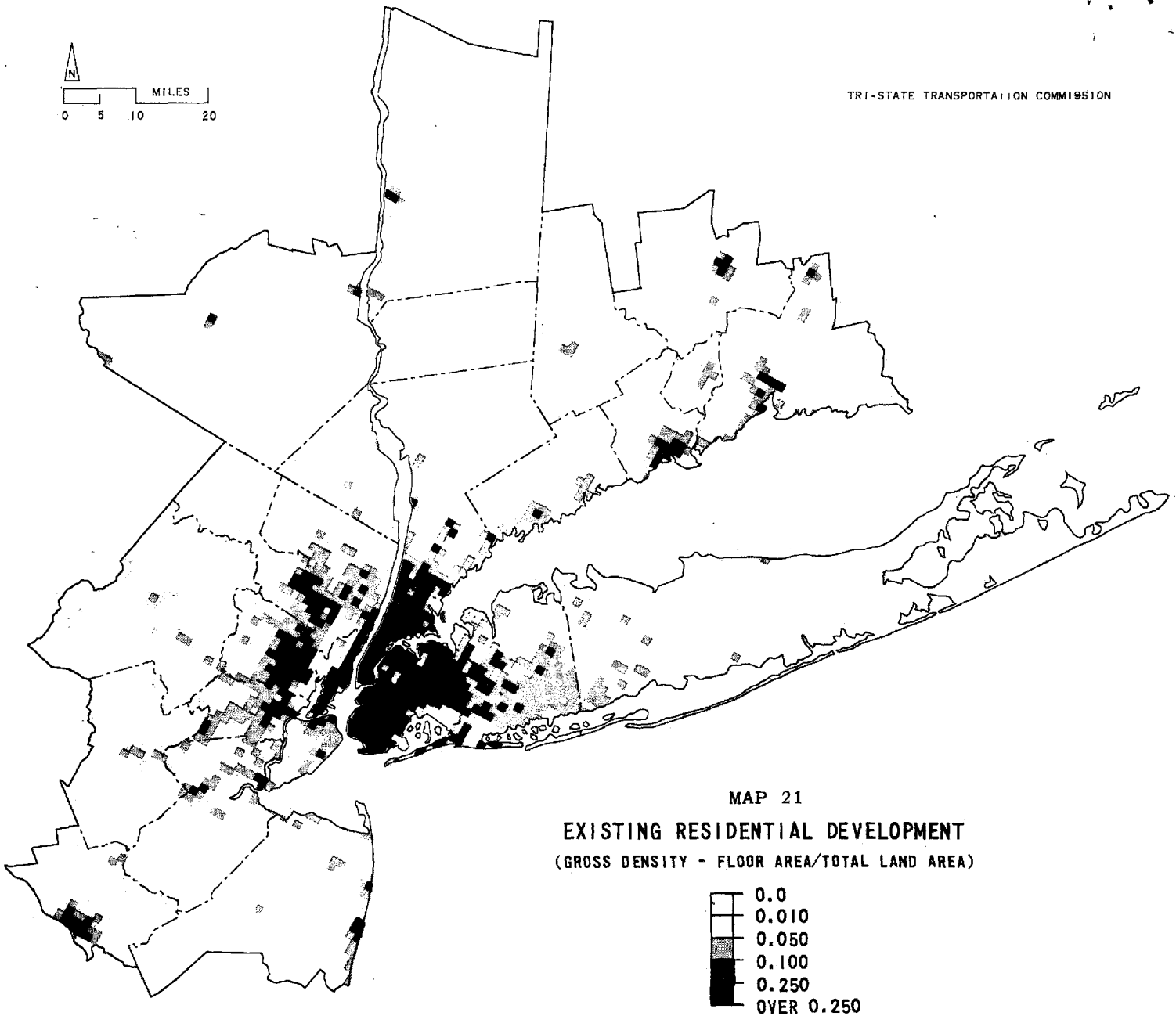
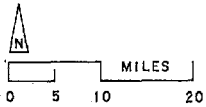
	1963	PLAN INCREMENT	1985 PLAN TOTAL
TRI-STATE REGION.....	17,890	5,310	23,200
CONNECTICUT.....	1,484	812	2,296
Central Naugatuck.....	208	254	460
Greater Bridgeport.....	297	46	343
Housatonic Valley.....	112	131	243
South Central.....	465	276	741
South Western.....	333	79	412
Valley.....	71	26	97
NEW JERSEY.....	4,984	2,457	7,441
Bergen.....	850	365	1,215
Essex.....	945	11	956
Hudson.....	602	26	628
Mercer.....	280	372	652
Middlesex.....	500	492	992
Monmouth.....	373	375	748
Morris.....	320	304	624
Passaic.....	425	99	524
Somerset.....	162	367	529
Union.....	527	46	573
NEW YORK CITY.....	7,820	173	7,993
Bronx.....	1,415	140	1,555
Kings (Brooklyn).....	2,640	-49	2,591
New York (Manhattan)...	1,866	-37	1,829
Queens.....	1,865	16	1,881
Richmond.....	234	103	337
NEW YORK OUTSIDE N.Y.C. .	3,602	1,868	5,470
Dutchess.....	200	237	437
Nassau.....	1,359	17	1,376
Orange.....	197	346	543
Putnam.....	38	51	89
Rockland.....	162	122	284
Suffolk.....	810	717	1,527
Westchester.....	836	378	1,214

the presence of uses incompatible with residential development.

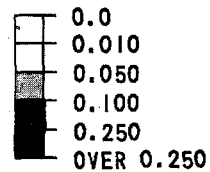
In some locations special **noxious conditions** should inhibit or prevent residential development. Existing vacant land in such locations was considered not suitable for residential development. The industrial corridor in New Jersey from Carteret and Linden to Kearny and the present and proposed industrial portions of the Hackensack Meadowlands are areas of this kind. They contain heavy manufacturing plants, chemical and petroleum refineries and tank farms, creating an environment manifestly unsuitable for residential development. Similarly, the areas under the approaches to the Region's three existing major jetports, and to the proposed primary and secondary general aviation airports, may be unsuitable for residential development due to the blighting effects of aircraft noise.

Demolition and new construction may affect the distribution of the housing stock in the Region. Places subject to **redevelopment** are those where little vacant land exists. The private market acts in high-income areas. Government acts elsewhere, resulting in conservation and rehabilitation in declining areas, demolition and rebuilding in substantially blighted low-income areas. Historical evidence indicates that the private market's building activity tends to rebuild at higher densities. But government action through urban renewal tends to maintain densities similar to what existed before. A wise policy in the "ghettos" would reduce crowding by a reduction of densities or the re-use of cleared land as open space. These principles modified the capacities or densities of 99 square miles in the Region.

Locations where redevelopment and more especially **land reclamation** should affect the residential development pattern and increase their capacities are Manhattan's central business district, including the lower Manhattan plan's proposals for developing housing on the waterfronts; the waterfront housing proposals in Tri-State Transportation Commission's *The Changing Harborfront*; and the proposed resi-



MAP 21
 EXISTING RESIDENTIAL DEVELOPMENT
 (GROSS DENSITY - FLOOR AREA/TOTAL LAND AREA)

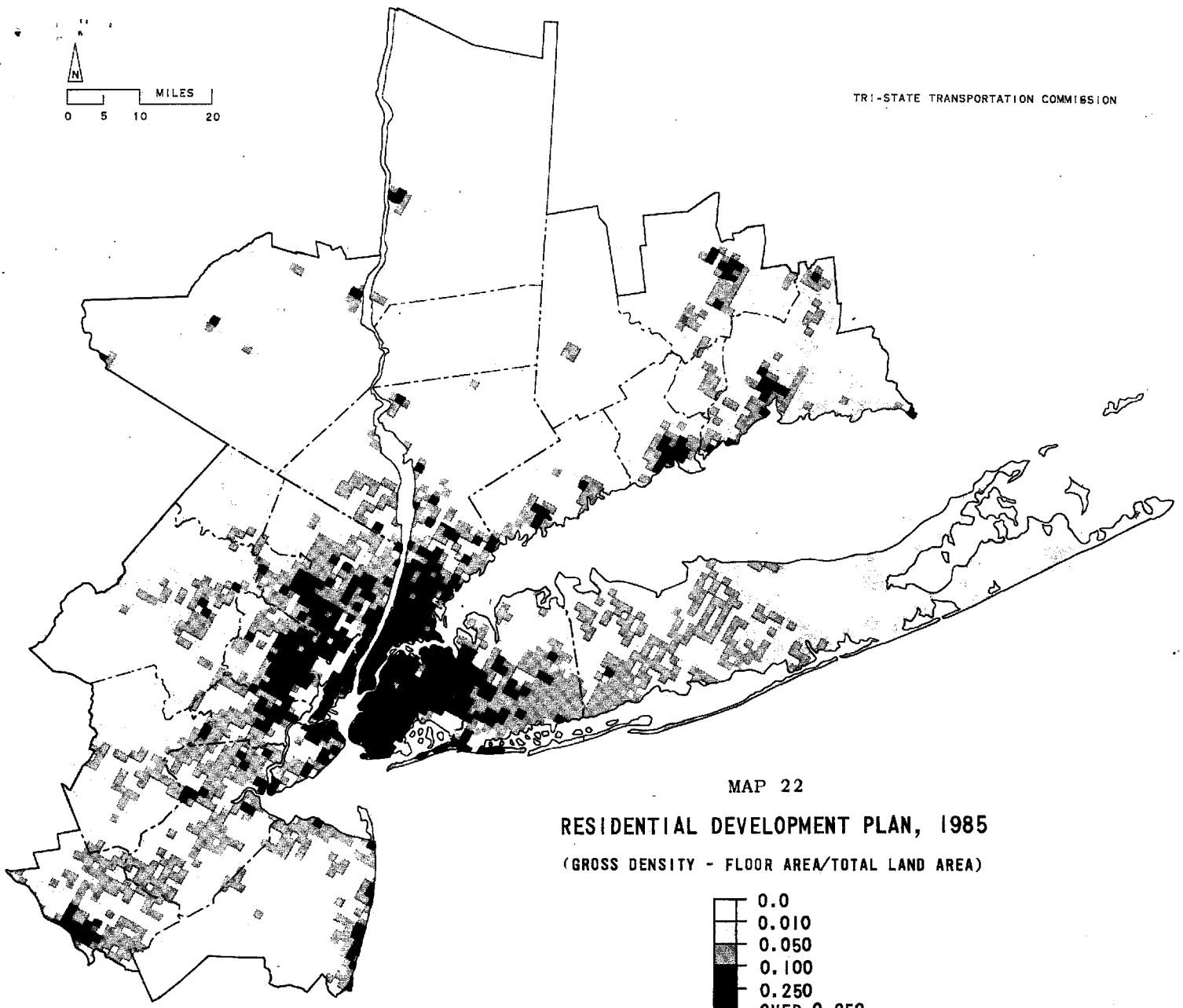
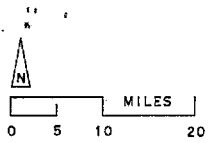


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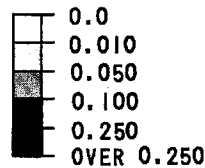
dential development on 12 square miles of the Hackensack Meadowlands. The regional development plan incorporates the results of all these proposals.

Table 3 presents population distribution by counties and planning regions in 1963 and, for the same set of jurisdictions, in 1985, the estimated population that would result from development in accordance with the plan reflected by the allocation procedure just described.

Existing (1963) residential development is represented on Map 7 in terms of its net residential density or "floor-area ratio" in each square mile of the Region. These figures measure the intensity of development, wherever development exists, but give no indication of how much land in a given square mile remains open or vacant, either from nondevelopment or public reservation of open land. Gross density would measure not only the intensity of development in each square mile, but also the amount of such development. Map 21 shows, in terms of gross density, the distribution of



MAP 22
RESIDENTIAL DEVELOPMENT PLAN, 1985
 (GROSS DENSITY - FLOOR AREA/TOTAL LAND AREA)



residential floor space in 1963, and Map 22 shows what this distribution would be in 1985 as estimated by the allocation procedures outlined on the previous pages.¹³ Both maps express the development in each square mile in terms of five gross density ranges, representing floor area per acre of total land area within that square mile. The higher gross density levels occur where net densities are higher, urbanization is complete, little vacant land re-

mains and little open space, either public or private, exists. The lower levels reflect large percentages of land not occupied by structures, including public and private open space as well as vacant land. Map 22 should therefore convey graphically to the reader the residential aspect of the Tri-State Region in 1985. Noticeable on this map are the prevalence of higher gross residential densities in and around the clusters shown on Map 20 (but with lower levels often within clusters themselves because of the prevalence there of nonresidential floor space) and the concordance of lower gross-

¹³ For a full presentation of residential allocation principles and procedures, see Interim Technical Report 4137-2133, *Development of the Residential Allocation Procedure*, TSTC, January 1970 (to be published).

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density levels with the predominantly open areas delimited on Map 15. The lowest level shown in white on the Map (0 to 1 percent) corresponds to places where the square mile is either almost entirely devoted to an open use, or to a nonresidential use (within a cluster), or will still remain almost entirely vacant in 1985.

Map 3 at the conclusion of Chapter I summarizes schematically the overall aspect of the Tri-State Region in 1985 resulting from the de-

tailing described in this chapter. It combines the measurements of recreational open space for the year 2000 shown on Map 17, the floor space and densities computed for the nonresidential "clusters" shown on Map 20, and the residential floor space and densities shown on Map 22 derived for all the other square miles of the Region. These quantities and distributions of the elements of land development, comprehensively combined by the processes that have been described, serve as bases for the Tri-State Transportation Commission's continuing work in the preparation, evaluation and adjustment of functional plans.

*This report was prepared by Stephen C.
Carroll under the direction of Paul C. Watt.*