Section 3 Potential Changes and Resources at Risk

Photograph by George M. Aronson

"The Nation does well if it treats natural resources as assets which it must turn over to the next generation increased and not impaired in value."

President Theodore Roosevelt

SECTION 3 POTENTIAL CHANGES AND RESOURCES AT RISK

This section uses past population growth to model future population growth and development in the Highlands, to determine how they could affect natural resources. By looking at these possible changes, the resource conservation values from Section 2, and land that is already protected, this section identifies land in the Highlands that is most in need of conservation. All population numbers, density, and growth, and demographic and housing trends in this section are from the U.S. Census Bureau (2001).

POPULATION GROWTH

The 2000 census found that the 108 municipalities in the New York and New Jersey portions of the Highlands have approximately 1,372,000 residents. Of that number, 46 percent live in New York and 54 percent in New Jersey. When compared with the 1990 figure of about 1,230,000 people, the region's population has grown by more than 11 percent (Table 3-1). The overall population density

Table 3-1. Population change in the Highlands, 1990-2000 (based on 2000 census data)

	Population		
Region	**1990**	**2000**	**Percent change**
New Jersey Highlands	665,257	743,680	+11.8
New York Highlands	565,067	628,743	+11.3
Total	**1,230,324**	**1,372,423**	**+11.5**

for the entire region was just below one person per acre (Figure 3-1). The region currently averages 2.76 persons per household. New York's Highlands have a slightly higher average of 2.9 compared with New Jersey's average of 2.6. The nine most densely populated municipalities in 2000 were these:

Municipality	Persons per acre
Pompton Lakes borough (New Jersey)	5.27
Washington borough (New Jersey)	5.36
Boonton town (New Jersey)	5.38
Butler borough (New Jersey)	5.54
Peekskill city (New York)	6.41
Phillipsburg town (New York)	7.10
Morristown town (New Jersey)	9.65
Dover town (New Jersey)	10.52
Victory Gardens borough (New Jersey)	16.55

The region's 10-year growth rate of 11 percent is lower than that of the United States (13 percent) but higher than that of either State (New Jersey grew 8.9 percent, while New York grew 5.5 percent). The fastest growing municipality in the New York – New Jersey Highlands, Greenwich Township, was also the fastest growing in New Jersey. Greenwich was the only municipality in the region to double its size between 1990 and 2000, with a population increase of 130 percent. Greenwich's rapid growth is due, in part, to having a small population in a relatively large area, so that a few new subdivisions caused a significant population increase. The next fastest growing municipalities were these:

Municipality	Growth rate (percent)
Mahwah Township, NJ	34
Montville Township, NJ	34
Chester Borough, NJ	35
Monroe Town, NY	36
Independence Township, NJ	42

A total of 21 municipalities had more than a 20 percent growth in population.

New Jersey also had the only two municipalities that lost more than 10 percent of their population during that period: Netcong Borough (22 percent loss) and Harding Township (13 percent loss). A total of 13 municipalities in the Highlands lost population. The growth and loss of population by municipality is shown in Figure 3-2.

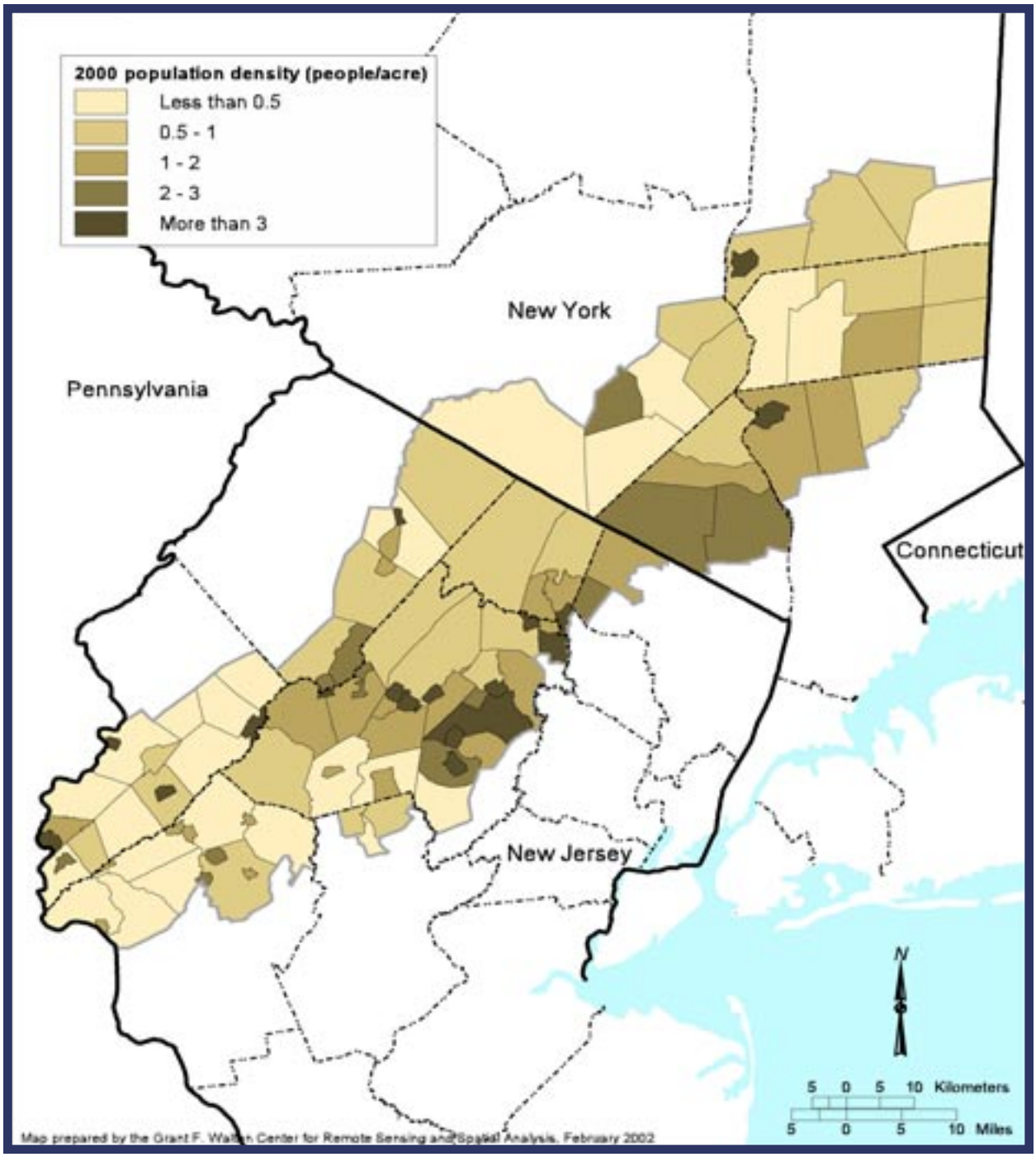

Figure 3-1. Population density in municipalities. The population density in the Highlands was about 1 person per acre in 2000. This map shows population density by municipality.

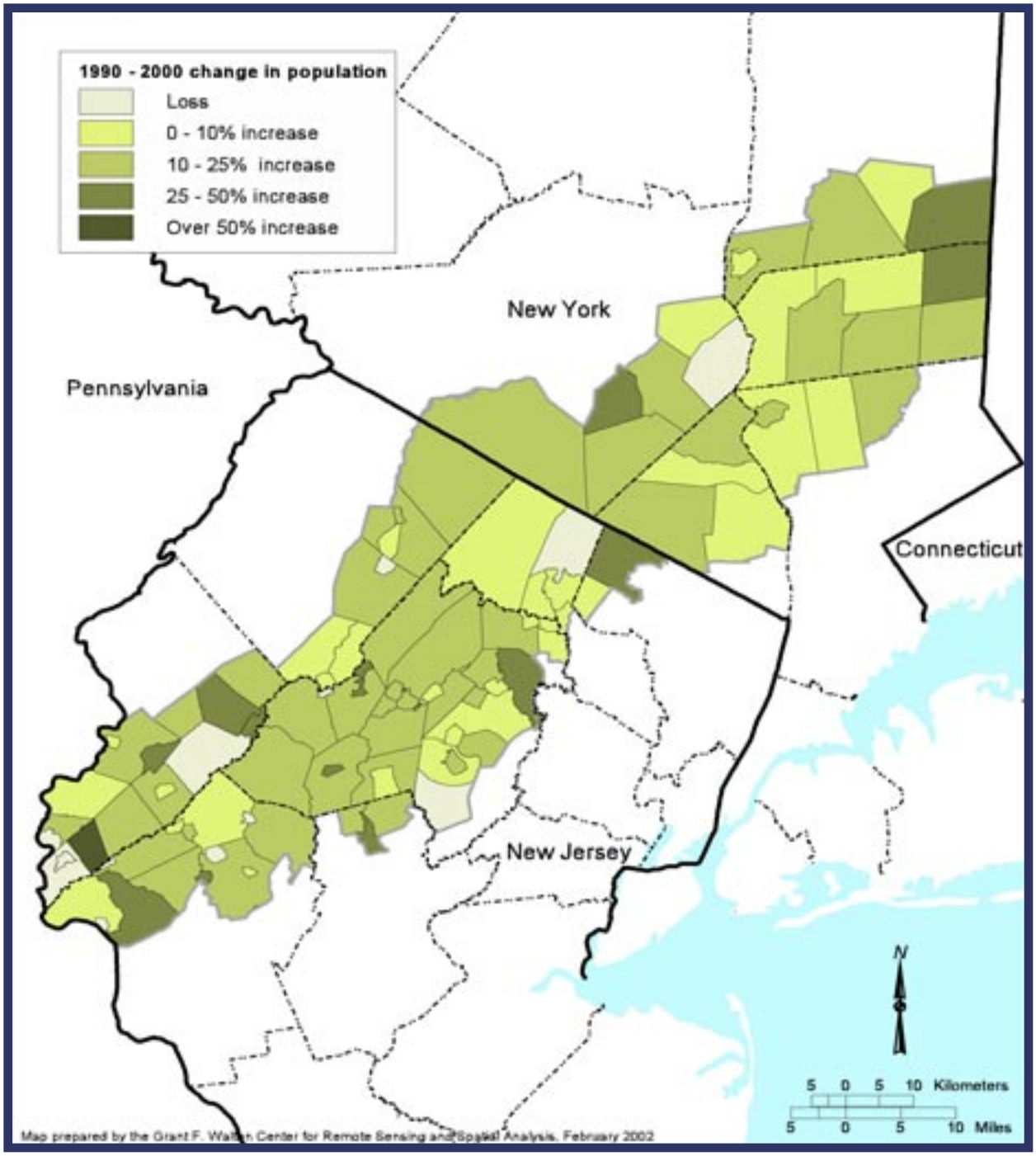

Figure 3-2. Change in municipality populations. The population change in the Highlands by municipality shows that 21 municipalities grew by more than 20 percent and 13 municipalities lost population, from 1990 to 2000.

POPULATION GROWTH

For the 108 municipalities included in the study, the average population was 12,708 while the median population was 7,471. Only three municipalities had more than 50,000 residents as shown in the following list of the nine largest municipalities:

Municipality	2000 Population
Warwick town (New York)	30,764
Monroe town (New York)	31,407
Carmel town (New York)	33,006
Haverstraw town (New York)	33,811
Yorktown town (New York)	36,318
Cortlandt town (New York)	38,467
Parsippany-Troy Hills township (New Jersey)	50,649
Clarkstown town (New York)	82,082
Ramapo town (New York)	108,905

The smallest municipality had less than 1,000 residents:

Municipality	2000 Population
Far Hills borough (New Jersey)	859
Bloomsbury borough (New Jersey)	886
Califon borough (New Jersey)	1,055
Lebanon borough (New Jersey)	1,065
Milford borough (New Jersey)	1,195

Due to the limited availability of the 2000 census data, some analyses were conducted at a county scale and, therefore, include data for the entire 12-county area (not just for the 108 municipalities formally regarded as the Highlands in the rest of this report). The Highlands region's population is representative of the overall populations of the larger New York and New Jersey State region in terms of gender ratio, population under 15 years of age, and population over 65 years of age (Table 3-2). Likewise, these figures have not changed significantly since 1990. The median age of the population in 2000 varied significantly across the various counties, ranging from 34.7 to 39.1 years, but was similar to the median age for New York and New Jersey (Table 3-2).

The Highlands counties have a less racially diverse population than that of the larger New York and New Jersey region. In 2000 the Highlands counties were 78.5 percent white, while the State of New York was 67.9 percent white and the State of New Jersey was 72.6 percent white (Table 3-2). There is great variability in racial diversity across the Highlands region. Counties with major urban centers with large minority and recent immigrant populations, such as Passaic County in New Jersey, which is 62.3 percent white, have more racially diverse populations than many of the more rural counties that are more than 90 percent white.

Occupied housing, at 96.1 percent, was slightly higher in the Highlands counties than in the larger New York and New Jersey region in 2000 (Table 3-3). There was a slight increase in the percent of occupied housing from 1990 to 2000. Owner-occupied housing was 67.9 percent versus 32.1 percent renter-occupied in 2000. The New York Highlands counties have a somewhat lower owner occupancy (65.2 percent) than New Jersey (69.9 percent). From 1990 to 2000 in New Jersey the more urban counties, such as Bergen and Passaic, showed a slight decrease in owner-occupied housing, while the more rural counties such as Hunterdon and Warren showed an increase. The various counties in New York showed no significant pattern over the decade.

KEY FINDINGS:

- According to the 2000 census, **the population of the Highlands region grew 11.5 percent** between 1990 and 2000 to a total of 1,372,423 residents.
- **A total of 21 municipalities in the Highlands grew more than 20 percent** between 1990 and 2000. Greenwich Township was the fastest growing municipality, doubling its population between 1990 and 2000, according to the 2000 census.
- **A total of 13 municipalities** in the Highlands **lost population** between 1990 and 2000.
- **Ramapo, New York was the largest municipality** with 108,905 residents. Far Hills, New Jersey was the smallest municipality with less than 1,000 residents.
- The Highlands counties' **population was representative of the overall population** of the larger New York and New Jersey State region based on gender ratios and age breakdowns in 2000.
- **The Highlands counties had a less racially diverse population** than that of the New York and New Jersey State region in 2000.
- **The percent of occupied housing, at 96.1 percent, was slightly higher in the Highlands counties** than in the States of New York and New Jersey in 2000.

POPULATION GROWTH

Table 3-2. Demographic trends in the Highlands, 1990-2000

State and County	Total population			Percent males			Percent under 15*	Percent under 18*	Percent over 65			Median age		Percent white		
	2000	1990	Percent change	2000	1990	Percent change	2000	1990	2000	1990	Percent change	2000**	1990	2000	1990	Percent change
New Jersey																
Bergen	884,118	825,380	7.1	48.1	48.0	0.1	19.3	20.4	15.2	15.3	-0.1	39.1	N/A	78.4	87.0	-8.6
Hunterdon	121,989	107,776	13.2	49.4	49.9	-0.5	21.8	24.1	10.0	9.5	0.6	38.8	N/A	93.9	96.3	-2.4
Morris	470,212	421,353	11.6	48.9	48.8	0.1	21.2	22.9	11.6	10.5	1.1	37.8	N/A	87.2	91.8	-4.6
Passaic	489,049	453,060	7.9	48.5	48.2	0.3	22.1	24.0	12.1	12.9	-0.8	34.8	N/A	62.3	71.9	-9.5
Somerset	297,490	240,279	23.8	48.8	49.1	-0.3	22.0	22.0	11.2	10.8	0.4	37.2	N/A	79.3	88.0	-8.6
Sussex	144,166	130,943	10.1	49.5	49.6	-0.1	23.4	27.8	9.1	8.9	0.2	37.1	N/A	95.7	97.6	-1.9
Warren	102,437	91,607	11.8	48.7	48.3	0.4	21.9	24.7	12.9	13.3	-0.4	37.6	N/A	94.5	97.2	-2.6
Total***	2,509,461	2,270,398	10.5	48.6	48.5	0.1	21.0	22.5	12.8	12.7	0.0	N/A	N/A	79.4	86.4	-7.0
New York																
Dutchess	280,150	259,462	8.0	50.0	50.3	-0.3	20.9	23.9	12.0	11.4	0.6	36.7	N/A	83.7	88.3	-4.7
Orange	341,367	307,647	11.0	50.1	50.3	-0.2	24.4	27.6	10.3	10.4	-0.1	34.7	N/A	83.7	88.9	-5.2
Putnam	95,745	83,941	14.1	49.9	49.9	0.0	22.3	25.8	9.6	9.0	0.5	37.4	N/A	93.9	97.5	-3.6
Rockland	286,753	265,475	8.0	48.8	48.6	0.2	23.5	26.0	11.8	10.1	1.7	36.2	N/A	76.9	83.9	-7.0
Westchester	923,459	874,866	5.6	47.8	47.5	0.4	21.2	21.7	14.0	14.4	-0.4	37.6	N/A	71.3	79.4	-8.0
Total***	1,927,474	1,791,391	7.6	48.8	48.6	0.2	22.1	23.9	12.5	12.4	0.1	N/A	N/A	77.3	83.8	-6.6
Highlands county total	4,436,935	4,061,789	9.2	48.7	48.6	0.1	21.5	23.1	12.6	12.6	0.1	N/A	N/A	78.5	85.3	-6.8
New Jersey (Statewide)	8,414,350	7,730,188	8.9	48.5	48.3	0.2	20.9	23.3	13.2	13.4	-0.1	36.7	34.4	72.6	79.3	-6.8
New York (Statewide)	18,976,457	17,990,455	5.5	48.2	47.9	0.3	20.7	23.7	12.9	13.1	-0.2	35.9	33.9	67.9	74.4	-6.5

Source: U.S. Census Bureau (2001)

*U.S. Census thresholds for the youngest age category changed from "Under 18" in 1990 to "Under 15" in 2000.
**The U.S. Census Bureau did not have information on median age available by county in 1990.
***The New Jersey county total and New York county total represent only those counties that include some portion of the Highlands. These county numbers include the entire county, including areas beyond the Highlands boundary.

Table 3-3. Housing trends in the Highlands, 1990-2000

State and County	Housing units			Percent occupied			Percent owner occupied		
	2000	1990	Percent change	2000	1990	Percent change	2000	1990	Percent change
New Jersey									
Bergen	339,820	324,817	4.6	97.4	95.1	2.3	67.2	67.9	-0.8
Hunterdon	45,032	39,987	12.6	97.0	94.8	2.2	83.6	80.5	3.1
Morris	174,379	155,745	12.0	97.3	95.5	1.8	76.0	74.0	2.0
Passaic	170,048	162,512	4.6	96.4	95.5	0.8	55.6	55.8	-0.2
Somerset	112,023	92,653	20.9	97.3	95.4	1.9	77.2	75.3	1.9
Sussex	56,528	51,574	9.6	89.9	86.2	3.7	82.7	82.3	0.4
Warren	41,157	36,589	12.5	93.9	92.9	1.0	72.7	69.5	3.2
Total*	938,987	863,877	8.7	96.5	94.6	1.9	69.9	69.0	0.9
New York									
Dutchess	106,103	97,632	8.7	93.8	91.7	2.1	69.0	69.1	-0.2
Orange	122,754	110,814	10.8	93.5	91.6	1.9	67.0	67.5	-0.4
Putnam	35,030	31,898	9.8	93.4	88.1	5.3	82.2	81.9	0.4
Rockland	94,973	88,264	7.6	97.6	96.2	1.4	71.7	72.1	-0.5
Westchester	349,445	336,727	3.8	96.5	95.0	1.4	60.1	59.7	0.5
Total*	708,305	665,335	6.5	95.6	93.8	1.8	65.2	65.0	0.3
Highlands county total	1,647,292	1,529,212	7.7	96.1	94.3	1.8	67.9	67.2	0.6
New Jersey (Statewide)	3,310,275	3,075,310	7.6	92.6	90.9	1.7	65.6	64.9	0.7
New York (Statewide)	7,679,307	7,226,891	6.3	91.9	91.9	0.0	53.0	52.2	0.8

Source: U.S. Census Bureau (2001)

*The New Jersey county total and New York county total represent only those counties that include some portion of the Highlands. These county numbers include the entire county, including areas beyond the Highlands boundary.

FUTURE CHANGE SCENARIOS—BUILD-OUT ANALYSIS AND ECONOMETRIC MODELING

One of the major trends in the Highlands is the increasing amount of development and the number of people who live there. Since this study is meant to assist with decisions about the future of land resource changes in the New York – New Jersey Highlands, it needs to first consider some possible future changes in the human population and the associated changes in developed areas.

We used two techniques to assess ways in which the landscape might change in the future: build-out analysis and econometric modeling. We chose these techniques for different purposes. Neither technique actually forecasts future change or predicts whether individual properties will be developed, but both techniques illustrate potential consequences of policy and market forces.

A simple way to consider future change would be to simply answer the question, "How much could be built today under the existing zoning and environmental constraints?" Basically, that is the question that build-out analysis seeks to answer. The analysis was expanded to include a few different future policy scenarios to demonstrate different future population distributions.

For the area being analyzed, the process begins by removing from consideration places that would not realistically be developed in the future. These areas might include lands that are rendered unbuildable due to natural features, areas in which an existing policy prohibits development, urban areas already developed to their fullest legal extent, and permanently protected properties (including public lands). The remaining areas are analyzed to find out how many houses could be built on them under the current zoning regulations, with some recognition of additional infrastructure needs.

Many different factors impact whether land is developed. In many areas, lands closer to existing built areas are more likely to be developed. Planners often assume that sewered areas are more likely to develop than other areas. Since the Highlands is a unique region, these broad assumptions were not seen as entirely reliable. Therefore, an econometric analysis was done to determine which factors were most important in driving change between 1995 and 2000, and—by reapplying them—to identify areas more likely to change in the future. An econometric model considers the many different factors that might impact property values that lead to decisions about whether to develop properties. The model assumes that past development has been a reflection of market forces, and that future change will be determined by those same forces.

The econometric analysis looks at two past moments in time (for example, Year A and Year B) and compares the change between the two. It also looks at many different known conditions in Year A, such as whether places are near urban areas or whether they are in sewered areas. The analysis then examines whether

any conditions were more closely related to the points that changed between Year A and B than they were related to the conditions that did not change. Finally, a statistical process helps to discard irrelevant conditions and provides measures of impact for the remaining factors. This final product of the analysis can be applied to the current factors as a measure of the likelihood of future change. While this analysis is informed by economic theory, it should not be confused with an economic analysis of the region.

BUILD-OUT ANALYSIS

The build-out analysis for the Highlands first removed from consideration places where population would not change. In order to show potential patterns of varying impacts, two different scenarios were constructed:

- Low-constraint scenario of areas that presumably would develop if existing policies (including zoning) were continued unchanged indefinitely (Figure 3-3), and
- High-constraint scenario of areas that presumably would develop if some policies (excluding zoning) were changed to increase the constraints on future development (Figure 3-4).

For both scenarios, areas that are already built as densely as allowed by current zoning were removed from consideration. Commercially and industrially zoned areas were also removed as places for future population change.

A map of areas where population could change was developed. These areas were then analyzed to compare the number of households allowed by zoning and the number of persons that might live in each household. In areas where new development was calculated, 20 percent of the area was removed to account for future infrastructure necessary to support the new development. The final numbers were summarized to describe the ultimate population that could inhabit the area.

LIMITATIONS OF BUILD-OUT ANALYSIS

Although zoning and associated policies will certainly change in the future, the build-out analysis of the Highlands provides a meaningful measure of the capacity of an area under an assumed set of constraints. To understand the results of the analysis, it is important to recognize some of the limitations, including problems related to:

- The temporal nature of the data assumptions;
- Generalized zoning data; and
- The scale of analysis.

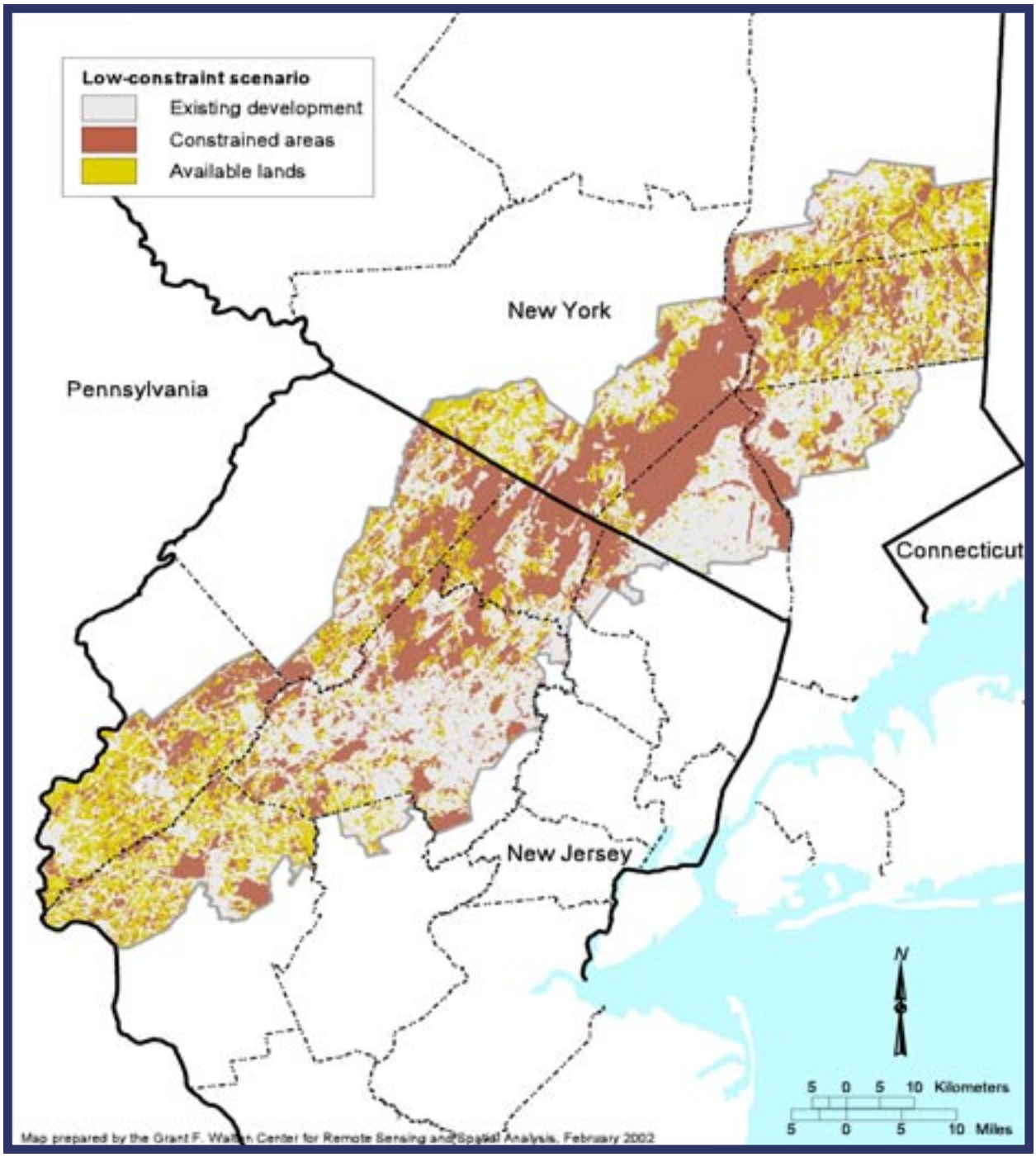

Figure 3-3. Available land for development, low-constraint scenario. The low-constraint scenario of the build-out analysis shows lands that presumably would be available for development, if existing policies—including zoning—continued unchanged indefinitely.

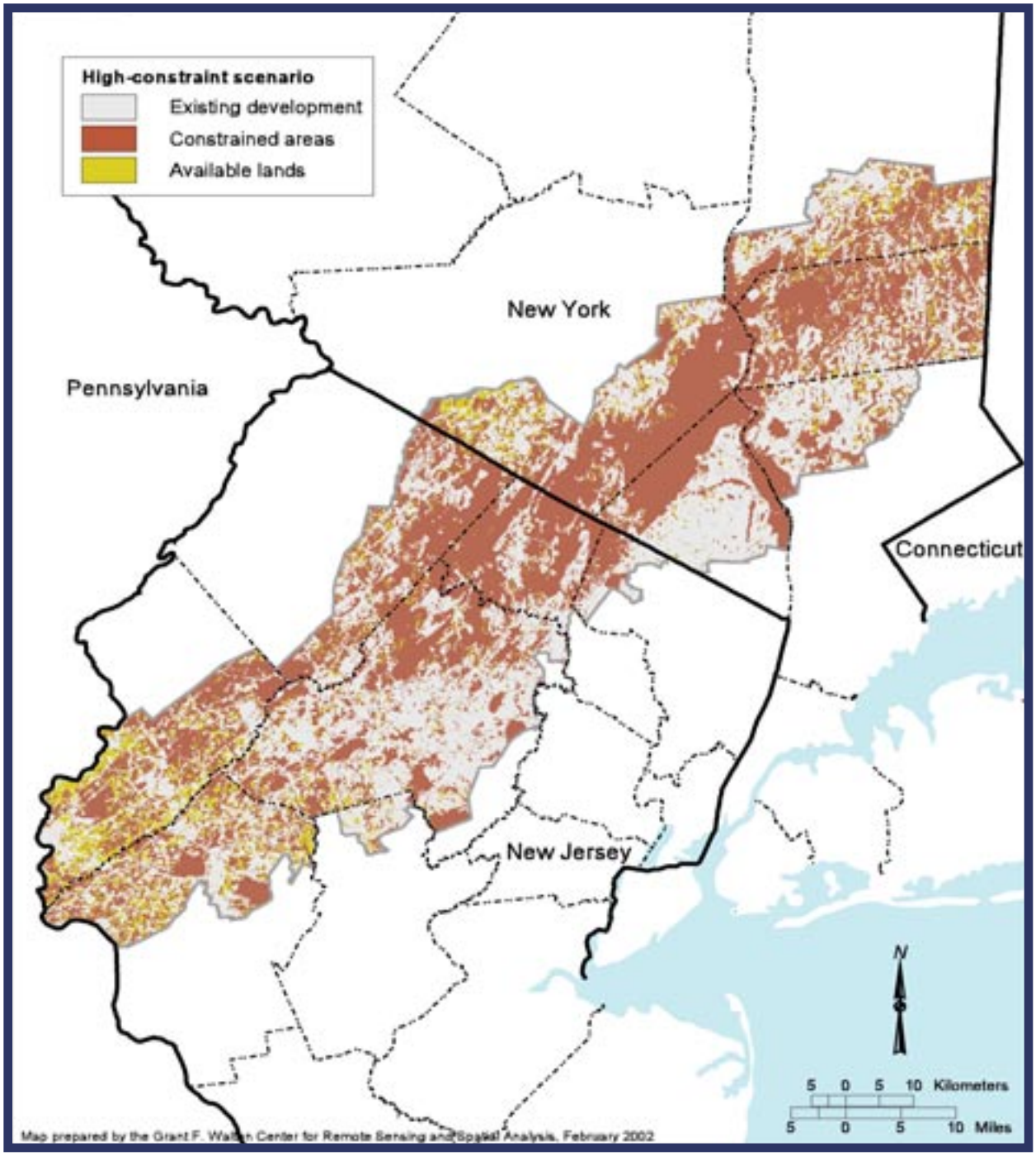

Figure 3-4. Available land for development, high-constraint scenario. The high-constraint scenario of the build-out analysis shows lands that presumably would be available for development, if some policies—excluding zoning—were changed to limit future development.

One of the basic problems with this type of analysis is that it relies heavily on current zoning data. Each of the 108 municipalities in the Highlands has the opportunity to change zoning for individual properties each month. Almost as quickly as a zoning map can be compiled, it begins to fade in its ability to reflect the zoning of the region. While some of the zoning adjustments are insignificant, a municipality could adopt a new plan for a new town center or apartment complexes that will lead to dramatic increases in population. This change would not be reflected in the build-out analysis and would result in an underestimate of future population. Also, additional properties will inevitably be bought or protected as open space, reducing the final built area and population numbers as compared with the build-out analysis. More dramatic policies and projects that were not included in this analysis such as new highways, environmental regulations, and land acquisition can all work to change the future of the Highlands.

A build-out analysis is based on a series of assumptions that are fairly limiting. Aside from the temporal assumption described previously, a build-out analysis assumes that all buildable properties will be built to their fullest capacity and that the houses built will hold the area's average number of people per household. These assumptions may reflect large regional trends but can be problematic in areas with unusual patterns of change, such as a sudden shift to two-person households, i.e., "empty nesters."

In order to analyze the entire region, the zoning ordinances from more than 100 different municipalities were generalized to make them comparable. Local variations and distinctions in the zoning ordinances get lost in this sort of analysis. The build-out analysis for the Highlands was conducted with an awareness of these issues in an attempt to minimize their impact, but many subtleties and complex mechanisms suffered from this necessary generalization.

Finally, because the build-out analysis for the Highlands was conducted at a large regional scale, it was impossible to include some of the careful intertwining of development and constrained areas. For example, a 100-acre parcel with 50 acres of wetlands and wetlands buffer might sometimes be carefully subdivided into 5-acre lots in a spatial arrangement that still achieves the maximum 20 houses, without infringing upon the wetlands. The build-out analysis would calculate the area as having room for only ten 5-acre lots.

CRITERIA FOR THE LOW-CONSTRAINT SCENARIO

The intent of the low-constraint scenario was to map those areas that presumably would develop if existing policies remain unchanged indefinitely. The following areas were excluded from this scenario:

- Known public lands and protected lands (this includes State parks, local parks, Federal properties, and known conservation easements);
- Open water with 50-foot distance buffers;
- Wetlands with 50-foot distance buffers;
- Slopes over 33 percent;
- Areas zoned for nonresidential use; and
- Residential areas already built to their zoning capacity.

The known public lands included only those water supply lands that were known to the study team to be permanently protected lands. For example, portions of the Newark water supply areas that are not protected by New Jersey's Green Acres Program (Appendix I) were considered eligible for development under the low-constraint scenario. For this scenario, wetlands were delineated based on the existing maps from the New York State Department of Environmental Conservation and the New Jersey Department of Environmental Protection delineation of regulated fresh water wetlands.

These constraints are based on a series of assumptions designed to reflect realistic patterns of future development. The 33 percent limitation on slope does not reflect existing zoning limitations in most places, but is meant to approximate a significant reduction of housing density on particularly steep slopes. The distance buffers do not generally reflect existing policies, but reflect that a limited amount of housing would be built directly on streambanks and edges of wetland areas.

CRITERIA FOR THE HIGH-CONSTRAINT SCENARIO

The intent of the high-constraint scenario was to map those areas that presumably would develop if current policies and conditions were modified to provide additional environmental protections. The following areas were excluded from this scenario:

- Known public lands and protected lands (this includes State parks, local parks, Federal properties, known conservation easements, and all water supply lands);
- Open water with 200-foot distance buffers;
- Wetlands with 150-foot distance buffers;
- Slopes over 15 percent;
- Areas zoned for nonresidential use; and
- Residential areas already built to their zoning capacity.

The known public lands included all water supply lands as permanently protected lands. The wetlands for the high-constraint map differed for each State. For New Jersey, the Department of Environmental Protection's delineation of wetlands was combined with the National Wetlands Inventory. For New York, Department of Environmental Conservation data were combined with the National Wetlands Inventory (U.S. Fish and Wildlife Service 2000).

FUTURE CHANGE SCENARIOS: BUILD-OUT ANALYSIS

Potential future constraints are difficult to determine, but the existing constraints were expanded based on patterns in other areas. The buffers used reflect some of the more restrictive buffers in forestry and planning regulations. The 15 percent limitation on slope reflects some of the more recent zoning ordinances in the greater New York – New Jersey region. These constraints help to compensate for other future constraints that are not plausible to include, such as private deed-restricted properties, sewer-related limitations, and future zoning changes.

RESULTS OF THE BUILD-OUT ANALYSIS

Comparison of the low-constraint population density (Figure 3-5) with the high-constraint population density (Figure 3-6) illustrates significant differences. The low-constraint scenario, perhaps a more realistic reflection of the current regulatory limitations, showed a population increase of 47.6 percent (Figure 3-7, Table 3-4). Under the high-constraint model, the population for the Highlands as a whole could increase by about 26.3 percent (Figure 3-8). Under both scenarios, rates of growth would be similar.

While the build-out analysis is a temporal measure of potential change, it can offer a glimpse of the existing problem. Under the assumptions of the build-out scenarios and the assumption that the Highlands population continues to grow at the same rate as it did between 1990 and 2000 (an average annual rate of about 1.1 percent), build-out would be reached by the next generation; however, these assumptions do not reflect the more complex growth patterns that would surely occur. Under the high-constraint scenario, build-out would be reached in 2021, and under the low-constraint scenario, build-out would be reached in 2035. These numbers suggest that the bulk of available lands will be committed within only a few decades (20-30 years).

Table 3-4. Highlands population in 2000 and estimates from the build-out analysis

	Total Population	Percent change from 2000
2000 census	1,372,423	--
Low-constraint scenario	2,026,301	47.6
High-constraint scenario	1,733,674	26.3

Under the low-constraint scenario, six different Highlands municipalities were already zoned in a manner that would allow more than a tripling of the population:

- Patterson Town (Putnam County, NY);
- Hardystown Township (Sussex County, NJ);
- Franklin Township (Warren County, NJ);
- Greenwich Township (Warren County, NJ);
- Harmony Township (Warren County, NJ); and
- White Township (Warren County, NJ).

Thirteen municipalities appeared to already be at or near build-out, with less than a 1 percent population increase under the low-constraint scenario. While this may mean that these municipalities have limited growth potential, it might instead reflect local zoning practices.

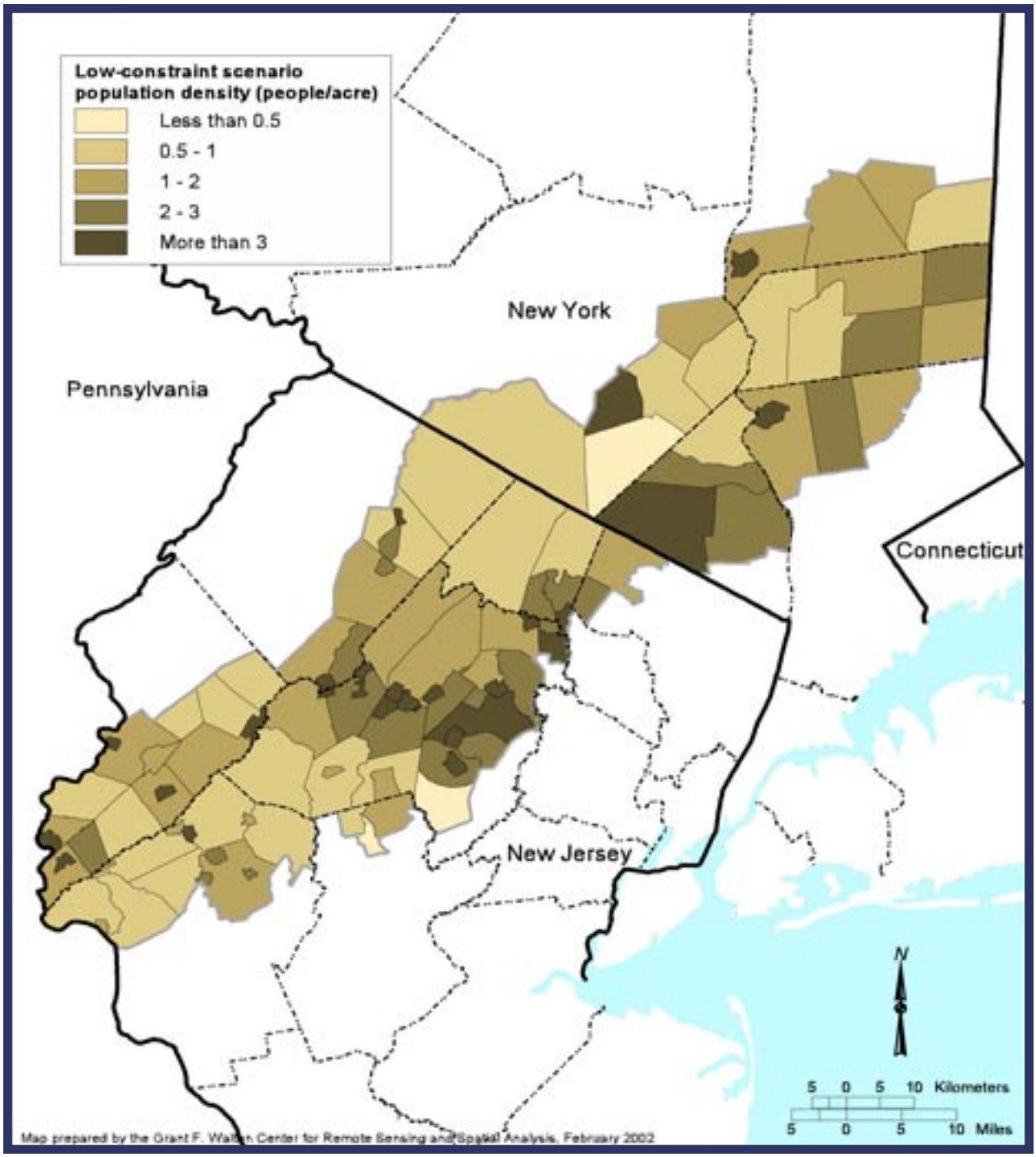

Figure 3-5. Population levels, low-constraint scenario. Population density under the low-constraint scenario of the build-out analysis differs significantly from that under the high-constraint scenario shown in Figure 3-6.

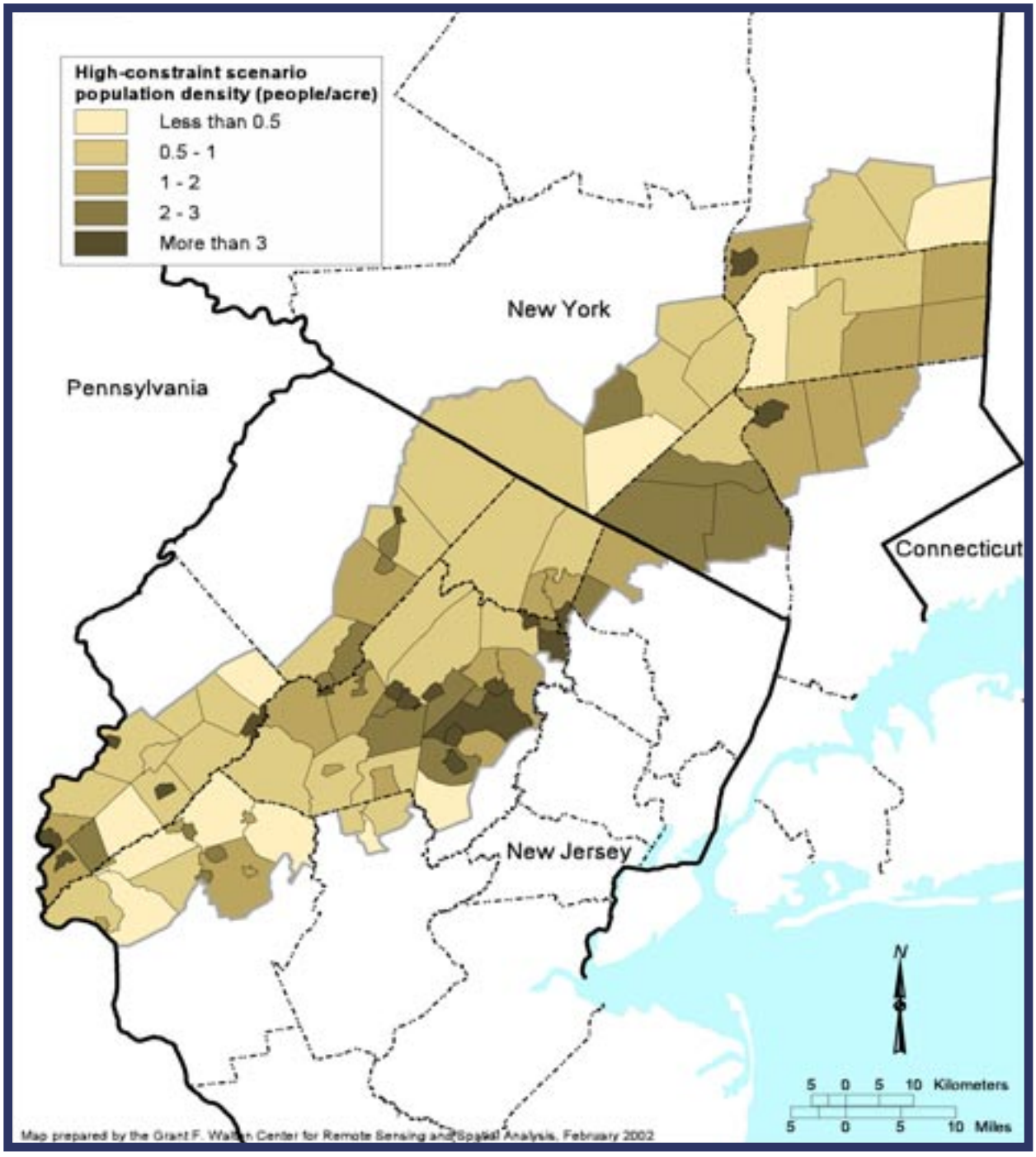

Figure 3-6. Population levels, high-constraint scenario. Population density would be much lower under the high-constraint scenario of the build-out analysis than under the low-constraint scenario shown in Figure 3-5.

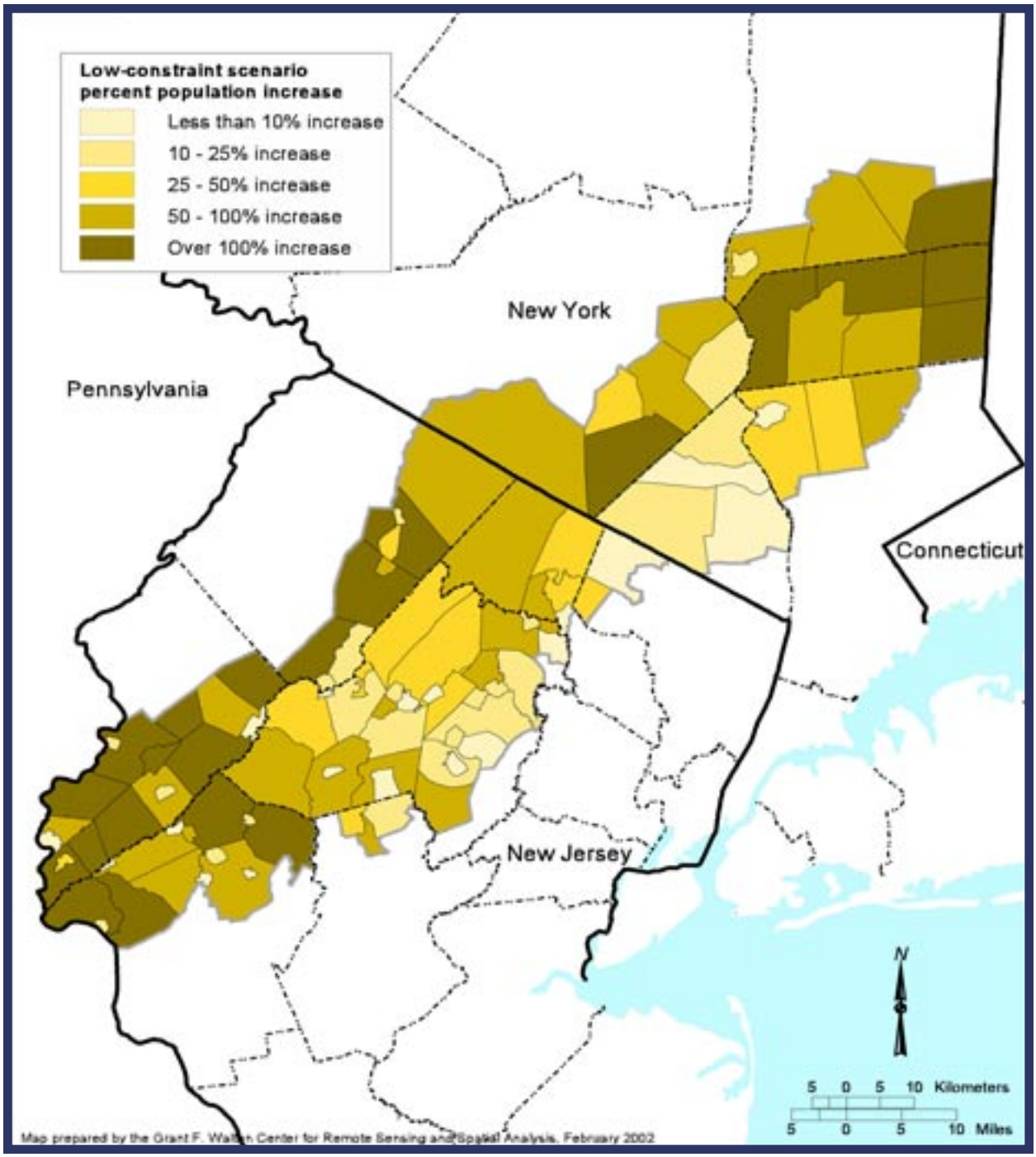

Figure 3-7. Population increase, low-constraint scenario. Under the low-constraint scenario of the build-out analysis, the Highlands population would increase by almost 50 percent from the population in 2000. This increase is almost double that modeled for the high-constraint scenario shown in Figure 3-8.

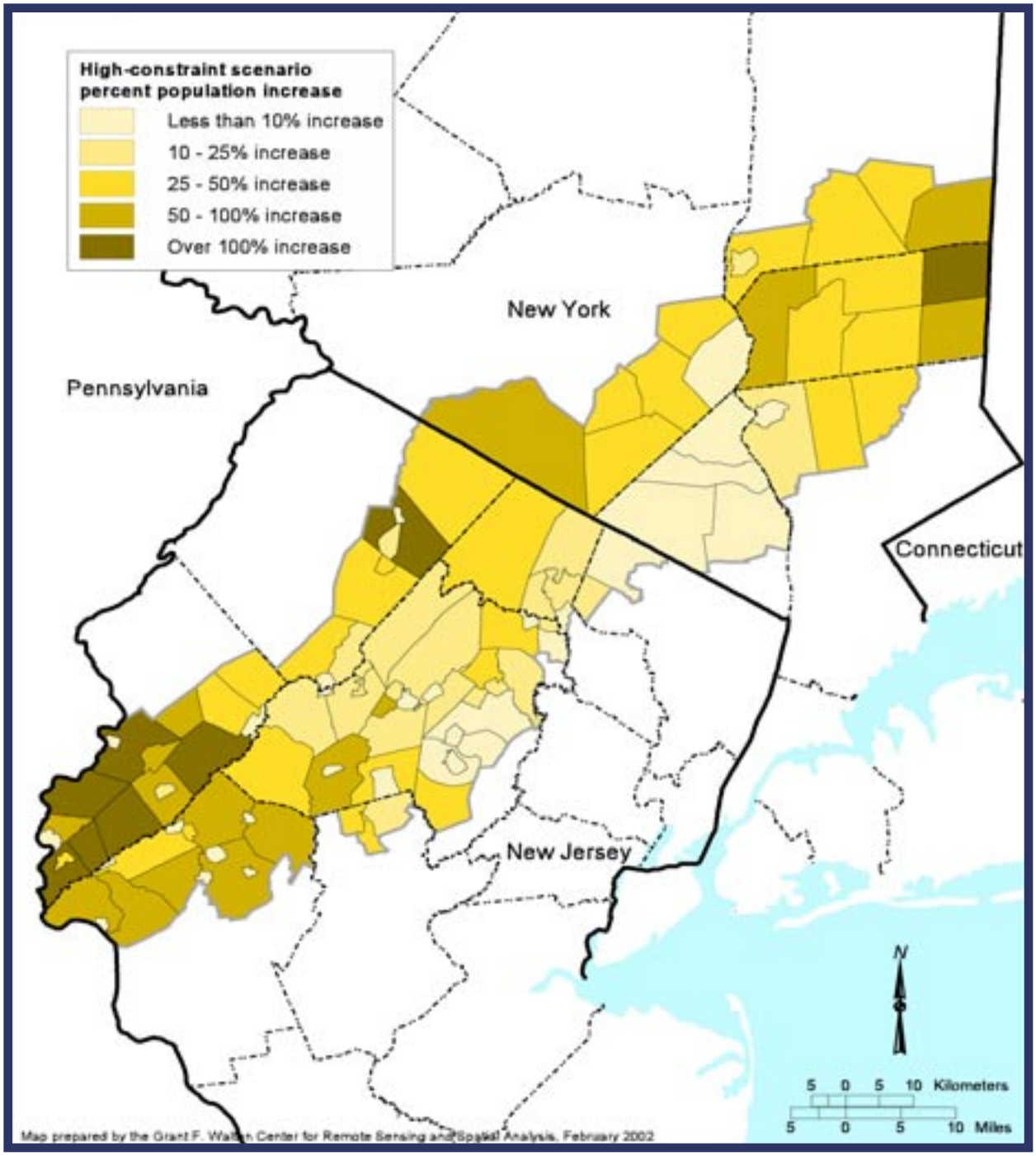

Figure 3-8. Population increase, high-constraint scenario. Under the high-constraint scenario of the build-out analysis, the Highlands population would increase by more than 25 percent from the population in 2000. This increase is a little more than half that modeled for the low-constraint scenario shown in Figure 3-7.

ECONOMETRIC ANALYSIS

The goal of the econometric analysis was to identify the forces involved in market-driven change and use those forces to identify lands most likely to change.

More than 4,000 randomly sampled points were compared across the Highlands. These points were selected from properties that were identified as undeveloped in 1995 and that were subject to market forces between 1995 and 2000. The analysis separated the points from properties that developed over that time period from those that did not.

The Highlands, as defined for this analysis, includes some extremely different areas. The unglaciated river valley farmlands of Hunterdon County are not subject to the same combination of market forces as are the ridgetops of the East Hudson Highlands. To reflect local processes, the Highlands was divided into four subregions, to reflect both policy differences (particularly across State lines) and physical patterns. The analysis did achieve a better "fit" for the regression curve using the subregions than for the total Highlands region.

A number of spatial variables were identified as being possible factors, with each sample point being evaluated for each variable. These factors were ultimately considered as part of the analysis:

- Distance to nearest existing developed lands;
- Participation in the Forest Stewardship Program (Appendix I);
- Floodprone areas;
- Prime farmland soils;
- Slope (angle of terrain);
- Distance to the nearest water body;
- Census measures of population density (by block group);
- Census measures of housing density (by block group);
- Census estimates of home value (by block group);
- Travel distance to employment centers;
- Travel distance to train stations;
- Travel distance to New York City;
- Zoning type (e.g., residential, commercial, industrial); and
- Zoning density (based on minimum lot sizes).

The randomly selected points and the full list of factors were analyzed using a statistical technique called multinomial logit regression. The analyses (run once for each of the four regions) identified the degree to which each factor was related to the change that occurred. Based on this past history of change from 1995 to 2000, these factors were updated and reevaluated to identify the current likelihood of change.

LIMITATIONS OF ECONOMETRIC ANALYSIS

While the econometric analysis is a useful tool, it is easily misinterpreted if the assumptions are not fully understood. Limitations include issues relating to:

- Specific factors,
- Limited history,
- Scale, and
- Economic assumptions.

One simple limitation is that the model is limited by the factors that it provides. Several important factors, like prior home sale values, were simply unavailable at a consistent level across the Highlands region.

Another important limitation is that some of the forces determining future development are almost impossible to model. Recent history is insufficient to predict how the more unusual parcels, like the larger, privately held tracts within Sterling Forest, might develop. It is also worth noting that the model is based on patterns of development over the years 1995-2000. Any short-term anomalous trends during that period could affect the model. An example might be a town that had a short building moratorium due to a problem with infrastructure, such as sewers or schools. Even though the circumstance no longer exists, the reduced development rate would still be reflected in the analysis.

The final likelihood of change analysis was performed at a regional scale resulting in data in a grid cell format (approximately 100- by 100-foot grid cells). However, the actual development pattern will occur at a resolution determined by existing property lines. For regional analysis, parcel maps are unavailable, so the grid cell approach is necessary. This approach provides a meaningful representation of market pressures at the regional scale, but it may not match well with individual parcels or provide the detail needed for local decisionmaking.

The econometric analysis is appropriate only for considering lands for which market forces can be considered to be in effect. This means that a property (such as a municipal property) that is being held for development is understood to have decisions about its development determined by more than simple free market economics. This does not mean that the property is not available for development, but it does suggest that the property is not affected by the same forces as other properties.

FUTURE CHANGE SCENARIOS: KEY FINDINGS

RESULTS OF THE ECONOMETRIC ANALYSIS

After analyzing past change, the model produced a complex formula for each of the four sub-regions describing the interaction of the factors impacting development. The formula was then applied to produce a map of likelihood of change (Figure 3-9). The map shows several areas as being most likely to change. The Interstate Highway 78, Interstate Highway 80, and Interstate Highway 87 corridors all appear as areas more likely for future development. The map also shows areas in which change is less likely to occur, or perhaps in which development will occur less intensely. Included are some of the northernmost and southernmost parts of the Highlands.

KEY FINDINGS:

- In the build-out analysis, **the low-constraint scenario identified** areas that would develop if existing policies (including zoning) were continued unchanged. Under this model, **the Highlands population could increase by 47.6 percent.**
- **The high-constraint scenario identified** areas that would develop if some policies (excluding zoning) were changed to increase constraints on future development. Under this model, **the Highlands population could increase by 26.3 percent.**
- The econometric analysis divided the Highlands into four subregions to reflect policy differences and physical patterns, especially across State lines. Results showed that **the Interstate Highway 78, Interstate Highway 80, and Interstate Highway 87 transportation corridors are most likely to be developed in the future**, while the northernmost and southernmost areas of the Highlands are least likely to change.

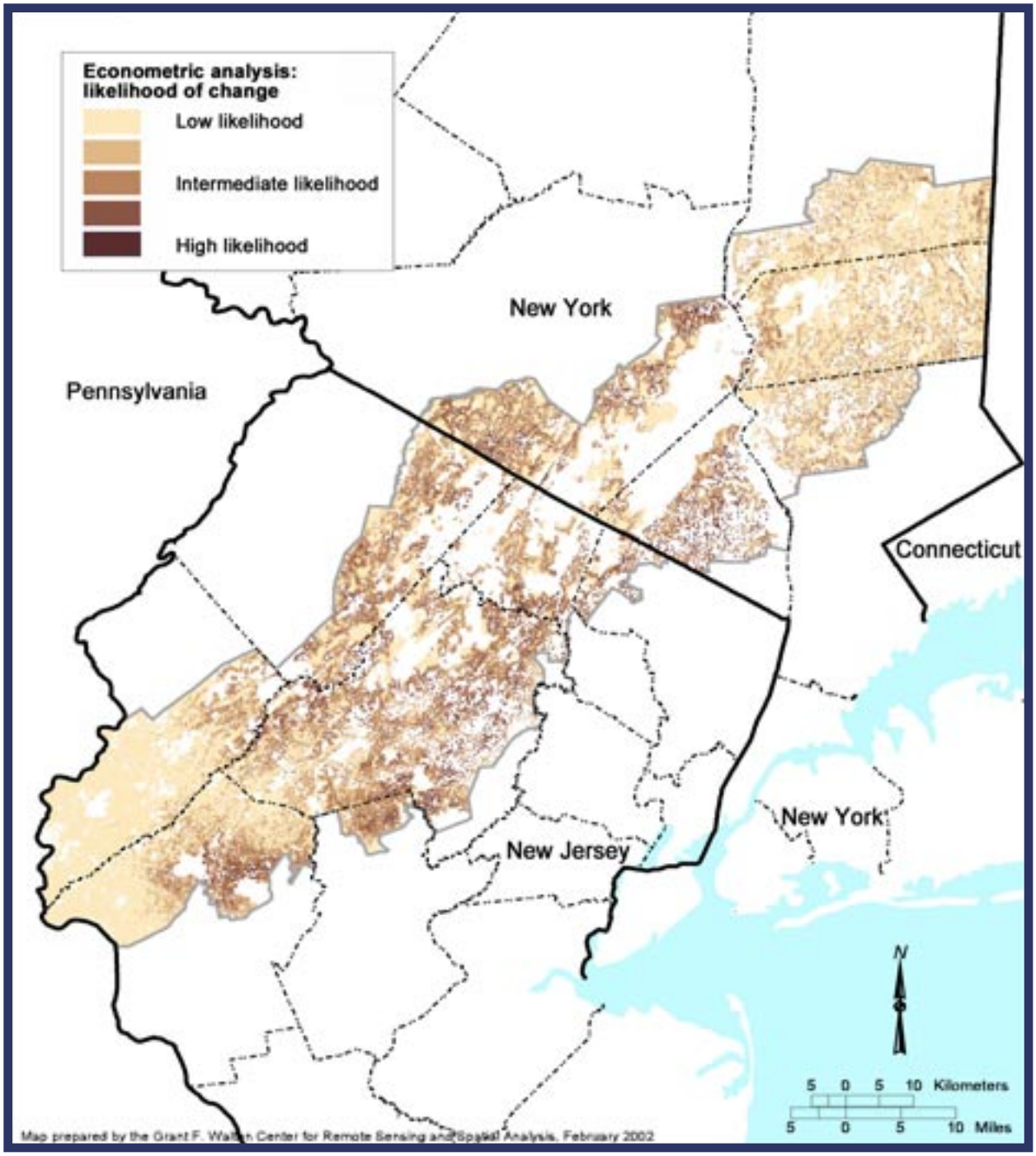

Figure 3-9. Likelihood of change. The econometric analysis identified areas that are most likely to change in the near future, given the history of land-use change in the Highlands from 1995 to 2000.