

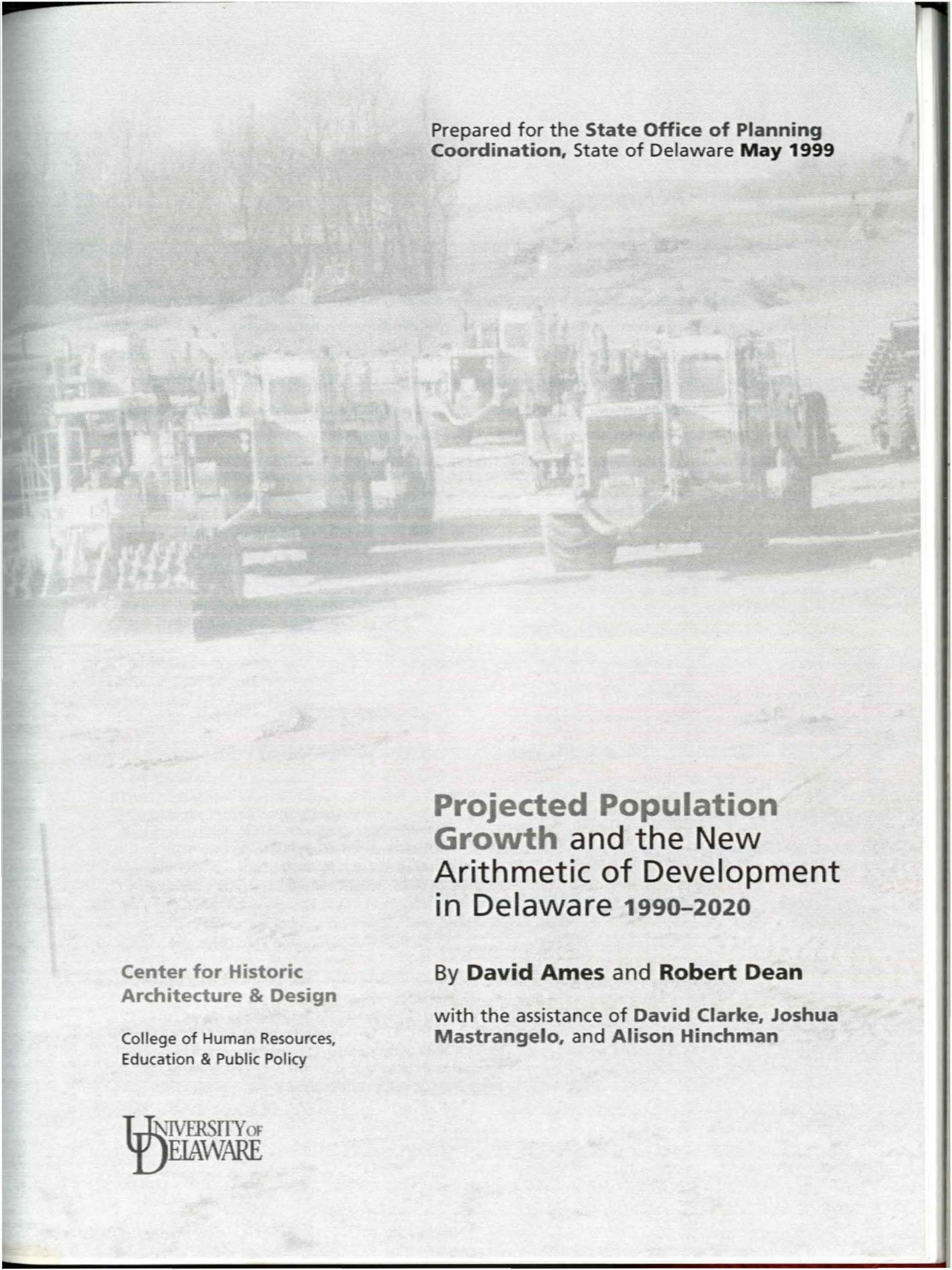
**Projected Population
Growth and the New
Arithmetic of Development
in Delaware 1990-2020**

**Center for Historic
Architecture & Design**

By David Ames and Robert Dean

with the assistance of **David Clarke, Joshua
Mastrangelo, and Alison Hinchman**

**UNIVERSITY OF
DELAWARE**



Prepared for the **State Office of Planning
Coordination**, State of Delaware **May 1999**

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PREFACE

In 1997, the Center for Historic Architecture and Design received a matching grant to undertake this study from the Delaware Office of Planning Coordination of which David S. Hugg III is Coordinator. The purpose of the study was to explore land use and demographic trends in Delaware that could influence state land use policy.

Robert Dean, an undergraduate research assistant majoring in history, was my co-author and did much of the data analysis. Mr. Dean is now a graduate student in urban and regional planning at Cornell University. Over the course of project we were assisted by David Clarke, Joshua Mastangelo, and Alison Hinchman. Mr. Clarke, a graduate student in geography, prepared the state and county locational maps and some other graphics. Mr. Mastangelo, a graduate student in urban affairs and public policy, produced the graphs and statistical computer maps in the report. Ms. Hinchman, a graduate research assistant in the Center for Historic Architecture and Design and graduate student in Art History, was our editorial assistant and production manager.

We would like to thank our external reviewers who commented on several drafts. They included Edward Rattledge of the Center for Applied Demography and Survey Research at the University, Don Berry with the Delaware State Data Center, Karen Horton with the Delaware State Housing Authority, and Mike Mahaffie with the Office of State Planning and Coordination. We would especially like to thank Dave Hugg who not only provided a close review of our work but supplemented it with friendly cross examinations from time to time. Our copy-editor, Susan Saulsberg, smoothed our writing.

David L. Ames, Ph.D.
Professor of Urban Affairs and Public Policy, and Geography
July 28, 1999

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INTRODUCTION AND SUMMARY

Overview of Population and Household Projections: 1990 to 2020

In 1998, the Delaware Population Consortium (DPC),¹ which produces the official population projections used by all levels of government in the State, forecasted that the population of Delaware will increase by 184,000 persons between 1990 and 2020, expanding by 28 percent. The State's 1990 population of 670,000 will grow to 854,000 by 2020 (Fig. 1, Table 1). Predicted to grow the fastest during the 1990s, with an estimated growth rate of 13 percent, the rate of population increase is projected to decrease to 8 percent from 2000 to 2010 and to 4 percent from 2010 to 2020.²

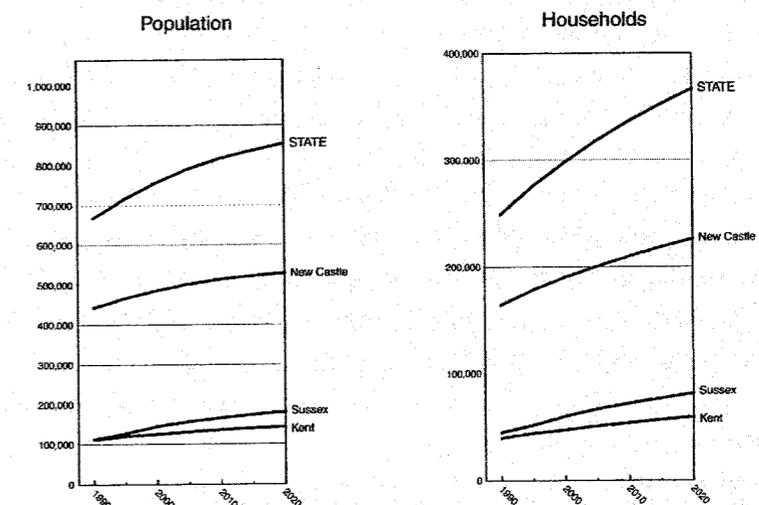


Figure 1. Delaware: Projected Change in Population and Households, 1990 to 2020. (Source: DPC, 1998)

Households are expected to increase nearly twice as fast as population -- by nearly one-half from 1990 to 2020. Overall, households are projected to follow the same pattern of initial higher growth in the 1990s that will then taper off in the next two decades. During this 30-year period, Delaware will become home to nearly 120,000 new households, increasing from 249,000 households in 1990 to 367,000 by 2020. Households will be increasing faster than population in all of the counties throughout the projection period.³

From 1990 to 2020, migration to Delaware is projected to account for an increasing share of its population growth, particularly migration to Sussex County. From 1990 to 2000, migration into Delaware

will comprise 55 percent of the state's new population. Natural increase, births minus deaths, will add the remaining 45 percent. The proportion of population growth contributed by migrants will increase to 67 percent in the years from 2000 to 2010, and to 70 percent by the decade 2010 to 2020. Over the 30-year period from 1990 to 2020, net migration to the state will number 114,000 people, or 62 percent of the total population growth.

Migration has a more extensive impact on land development than growth by natural increase because most in-migrants are adults who bring with them immediate demands for housing and other services.

In 1990, the population of Delaware was 81 percent white and 17 percent African-American, with the remaining residents consisting of "other nonwhites," including Asians. From 1990 to 2020, whites are projected to increase by 25 percent to 678,521, blacks are anticipated to increase in number by 39 percent to 158,814 persons, and "other nonwhites," primarily Asians, are projected to grow by 48 percent. By 2020, blacks will comprise 19 percent of Delaware's population, whites 79 percent, and other nonwhites 2 percent of the total.

A recent study by the Consortium found that the Hispanic population of Delaware increased from 10,339 persons in 1980 to 15,356 in 1990 and that by 1996 had reached 27,045 persons. Half of that increase took place in Sussex County where Hispanics grew by 245 percent from 1990 to 1996 increasing from 2,314 to 7,982 persons. While Kent County's numbered 3,165, New Castle County contained the largest number of Hispanics, at 16,000.

Over the next thirty years, then, in Delaware:

- Overall, population will grow at a declining rate of growth that cumulatively will amount to a significant number of new residents.
- The declining rate of growth is partly due to a declining rate of natural increase -- of births over death.
- Migration to Delaware is projected to account for an increasing share of its population growth, a majority of which will be accounted for by migration to Sussex County.
- Households will increase faster than population, and although some areas of the state will see population decline, all parts of the state will experience an increase in households.
- The higher rate of household formation will mean continued if not increasing development pressures as new households will prefer suburban locations, assuming present trends continue. This may continue to draw people from cities and small towns.
- There will be great geographic variations in the rates and amount of population growth across the State.

- Much of the new development will be dispersed, often negatively referred to as "sprawl."

"Sprawl" and the New Arithmetic of Development in Delaware

The word "sprawl" is used negatively to refer to the dispersed, spread-out suburban development occurring in American metropolitan areas in the late twentieth century. Thought by many to reflect poorly planned and poorly controlled development, sprawl has generated heated debate about what the alternative "good development" might look like and how to control sprawl. Although most consider sprawl a wasteful and inefficient use of land, some have found benefits in sprawl. Efforts to control sprawl and to limit the dispersal of development in the suburbs have nearly all failed.

These attempts to minimize sprawl have not worked because the process of land development itself has changed fundamentally in the last few decades. The debates about the undesirability of "sprawl" and the preference for more "normal" concentrated forms of development have obscured the reality that dispersed development -- sprawl -- is now the normal form of development. The transformation from concentration to dispersal reflects a "new arithmetic" of development in which land development proceeds at a faster rate than population growth.

This occurs because household size has been declining in this country to the point where the rate of household formation now exceeds the rate of population growth. Since new households are the demographic unit that consumes residential land, land development also occurs at a faster rate than does population growth. The rate of land development is accelerated further because, as average lot sizes increase, these smaller households are also consuming more land per household.

The great, almost exponential, increase in the use of automobiles has allowed the dispersal of development not only of residential land uses, but of other supporting commercial and job-producing uses. Thus, although households are smaller, most have gained more than one wage earner and its members require more trips to conduct their daily business. Expanded travel is reflected both in rise of multi-vehicle households and the increase in miles traveled per vehicle. In short, a "new arithmetic of development" has emerged in which land development in metropolitan areas has become virtually a perpetual-motion machine operating almost independently of population growth.

(It should be noted that although dispersed residential development is the focus of the discussion here, from 1984 to 1992, new commercial and industrial land uses in Delaware grew at a faster rate than did residential uses -- 60 percent compared to 49 percent.)⁴

If a suburban area can be defined as the territory within which one can travel on a daily basis to meet their needs for shelter, employment, shopping, and recreation, then Delaware is becoming increasingly a suburban state. In many ways, the traditional distinctions between urban, suburban and rural are obsolete in Delaware. The map of Delaware showing well-defined cities, towns, suburban areas, and open rural areas is increasingly a land use fiction. Rather than oriented to cities and towns, the settlement pattern in Delaware is more and more aligned to highway transportation corridors.

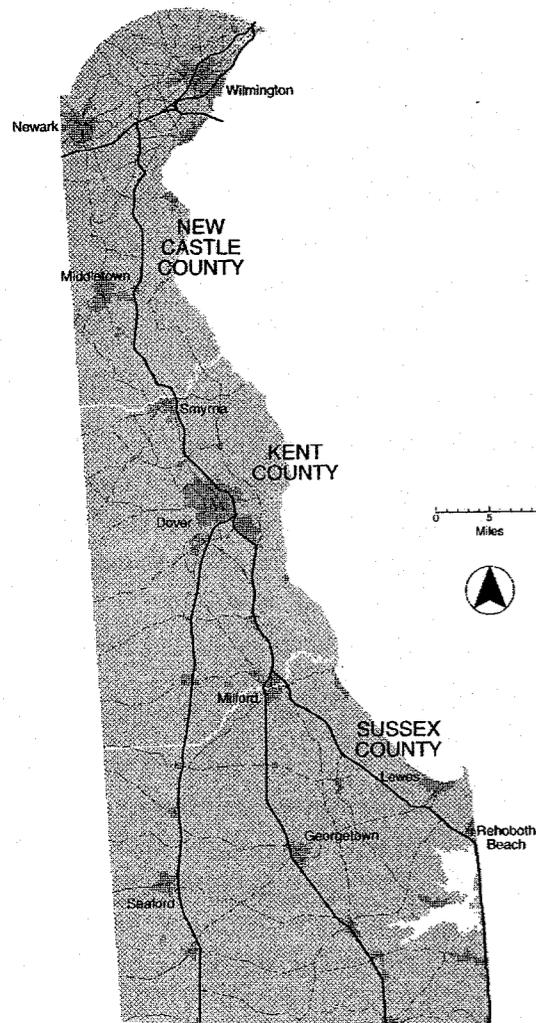


Figure 2. State of Delaware.

southernmost of the three. The third county, Kent County, lies in the center of the state between New

Statewide, these corridors form a "T" with a split stem. The cross bar is Interstate 95, running east-west through northern Delaware forming a 13-mile link in the spine of the northeast corridor of overlapping metropolitan areas of the United States -- known as "megalopolis." The stem is a north-south corridor centered on two highways: US 13 and State Route 1. Together these roads form an multi-lane highway from Wilmington and northern New Castle County to Dover. At Dover, US 13 continues southeast to Salisbury, Maryland, and on to Norfolk, Virginia. SR 1, built to take vacationers to the Delaware beaches, veers southeast, terminating at Fenwick Island. On these highways, the state can be traversed from north to south in less than two hours. By reducing travel time, the construction of new highways makes more land accessible to dispersed development.

Delaware is particularly vulnerable to dispersed development because of its small size and strategic location in the center of the intensifying swath of megapolitan development extending from Norfolk, Virginia to Portland, Maine. Covering 1,955 square miles, Delaware is the second smallest state in the United States (Fig. 2). The state is divided into three counties with the most populous and urban being New Castle County in the north. Sussex County, the most rural and largest in land area (covering nearly half the state's land area with 938 square miles) is the most

Castle and Sussex counties. In land area, Sussex is the largest. New Castle County has the smallest territory occupying a fifth of the state and 426 square miles. As in location, Kent holds the middle rank in area with 591 square miles and 30 percent of the state's territory.

The Geography of Population and Household Projections

Eastern coastal Sussex County and southern New Castle County are projected to be the fastest growing areas in the state. Growth in Sussex County will be fueled by retirees migrating into the county, while suburbanization will lead growth into southern New Castle County. Overall, Sussex County is projected to be the fastest growing of the State's three counties. From 1990 to 2020, the County's population is projected to increase by 60 percent and 68,000 persons while its households grow by 86 percent adding 38,000 new households from 1990 to 2020. Its population is forecast to increase from 113,000 to 182,000 persons and its households from 43,700 to 81,000.

Among the counties, Kent County is projected have the second fastest rate of population growth from 1990 to 2020 at 30 percent -- half the rate of Sussex County. Even with high growth in its southern portion, New Castle County will be the slowest growing of three counties with a projected population growth one third that of Sussex County -- 20 percent. In both counties, the rate of household formation will much higher than the rate of population growth. In Kent, over the 30 year-projection period, households increase by 51 percent and in New Castle County they increase by 38 percent.

Overall, New Castle County is projected to increase from a 1990 population of 442,000 to a 2020 population of 529,000, an increase of 87,000. Its household count is anticipated to move from 163,530 in 1990 to 226,023 in 2020. Because of its large population, New Castle County will exhibit the largest increases in numbers of persons and households from 1990 to 2020 among the three counties.

Relatively, Kent County is projected to lose ground to both Sussex and New Castle Counties during the projection period. In 1990, Kent County, with a population of 110,000, numbered only 2,000 fewer persons less than did Sussex County. By 2020, even with a population grown to 144,000, Kent County will have 38,000 fewer residents that Sussex County. Still Kent County is projected to gain 32,700 persons and 20,000 households from 1990 to 2020.

Contrasting Patterns of Demographic and Land Use Change within the Counties

Each county will exhibit a different pattern of land use development reflecting population and household changes:

New Castle County: In New Castle County, the historic pattern of a central city suffering population loss to growing surrounding suburbs has and is changing dramatically. Although the population of the city of Wilmington is projected to grow slightly, it will be surrounded by three types of suburban areas from 1990 to 2020:

- **Wilmington and the Older Suburbs as a Region of Stability and Decline:**
 - Although Wilmington is projected to post a slight overall gain in population from 1990 to 2020, it will continue to lose both blacks and whites to the suburbs.
 - Brandywine and Lower Christiana areas have been losing population since the 1970s and are projected to continue to do so through 2020.
- **West-central New Castle County as Region of Increasing Population Stability:**
 - Areas in central and western New Castle County that suburbanized from the 1960s into the 1990s are projected to see their population growth rates drop in the first decades of the next century.
 - Growth rates are projected to decline partly because of an aging population and empty nesting and partly because these areas are reaching their holding capacity for new development.
- **Southern Region of High Suburban Growth**
 - From 1990 to 2020, there will be a suburbanization boom in southern New Castle County where the population is projected to increase by two-thirds to 181,000 persons and households to nearly double to 36,000 households.
 - The Pencader area, from US 40 to the C&D Canal, will be the fastest growing in the state and county and the Odessa/Middletown area the second fastest in the county

In general, population growth in New Castle County will continue to shift south below the Chesapeake and Delaware Canal. However, even in areas with population loss, such as Brandywine Hundred, the number of households will continue to grow creating a demand for new residential land development.

Kent County: From 1990 to 2020, Kent County is projected to retain its historical and geographical structure of a single urban center -- Dover and the Dover metropolitan area -- surrounded by a suburban and agricultural hinterland or periphery.

- Kent County will continue to be the connector between New Castle and Sussex Counties. The construction of a major north-southeast state highway (SR 1) and increased traffic on US 13, that also runs through the county from the north to the southwest, are forming a development corridor in Kent County of an inverted "Y" centered on Dover.
- The geographic pattern of population change will be one of more rapidly growing northern and southern areas bracketing the more slowly growing but much larger Dover metropolitan area.

- Suburbanization will continue to move primarily to the west of the Dover metropolitan area and north and south along the major highways.
- As with Sussex County, the rural agricultural landscape areas are projected to see an increase in the overlay of dispersed residential development.

Sussex County: From 1990 to 2020, Sussex County will see the most substantial change in its land use among the three counties. It will lose much of its rural agricultural character as both the eastern and western sections experience rapid but different types of population and household growth.

- Eastern Sussex County will become increasingly urbanized along the spine of SR 1 as a rapidly growing influx of retirees adds year-round residents to coastal resort areas. By the year 2000 nearly all of the county's growth is projected to come from the in-migration of mostly older persons who will settle in the east.
- Western Sussex County will experience significant growth of population and households tied to the agriculture and agricultural processing industries. Households will tend to be oriented to the US 13 corridor extending through the county from Salisbury, Maryland, to Dover.
- Although western Sussex will remain predominantly agricultural, its rural landscape will be overlaid by dispersed residential development and bisected by highway-oriented commercial development.
- Land development in eastern Sussex County will tend to displace poorer Sussex residents to the western part of the county. Western Sussex County will also continue to attract a younger Hispanic population drawn to employment opportunities in the poultry processing industry.

Organization of the Monograph

The purpose of this paper is to analyze population trends projected for Delaware from 1990 to the year 2020 and to examine some of their implications for land development and land use planning over the next two decades. It is organized into five chapters and conclusions. Chapter 1, "Elements of the New Arithmetic of Growth and Land Development in Delaware," examines the relationships between demographic trends and their impact on land development and why the conventional notion that the rate of land development should be proportional to population growth no longer applies.

Chapter 2, "Statewide Population Projections and Demographic Trends," presents the population trends projected for the state as a whole from 1990 to 2020. It further looks at the changing elements of demographic change within the State. Chapters 3, 4, and 5 examine in detail the population projections for each of the three counties -- New Castle, Kent, Sussex. Each chapter looks both at countywide trends and the distinctive demographic regions that are emerging in each county from 1990 to 2020. The last chapter is devoted to conclusions about Delaware's demographic future and its possible impact on aspects of land use development in the state.

1. ELEMENTS OF THE NEW ARITHMETIC OF GROWTH AND DEVELOPMENT IN DELAWARE

The Origins and Elements of the New Arithmetic of Growth

The factors used in the "New Arithmetic of Development" are derived from the work of urban economist Anthony Downs in two books -- *Stuck in Traffic*⁵ (1992) and *New Visions for Metropolitan America* (1994).⁶ Struck by the fact that traffic congestion continued to get worse in many cities where there was little or no population growth, Downs tried to isolate the factors causing this growth of congestion. As presented in *Stuck in Traffic*, he found both short- and long-term congestion. The causes of congestion in the short term include rapid population and job growth, more intensive use of automotive vehicles, failure to build new roads, and failure to make drivers bear the costs they generate. The long-term causes are more rooted in land use patterns. An important contributing factor to congestion is that many commuting trips to and from work are concentrated in a few hours in the morning and afternoon. The major long-term cause of congestion, however, is the great desire by Americans to travel in private vehicles, usually alone, instead of public transit. The wide availability of private automobiles allows people to act on other desires that are long-term causes of traffic congestion. These include wanting to choose where to work and live, to live in low-density neighborhoods, and to work in low-density work places. In short, acting on the desire to spread out over the landscape has contributed greatly to congestion by increasing the need to travel in frequency and length of trip. This sets up a vicious cycle as more sprawl creates a great need and capacity to travel which creates for more sprawl. New highways built to relieve the resulting congestion have the opposite effect of facilitating more travel.

In his second book, Downs moved to the related question of why land use growth control plans have not worked. He concludes that these plans failed because their framers did not understand how land development and growth actually work. He finds that the authors of the plans underestimated the strength of land development because they were sabotaged by a simplistic concept of growth. Their simple notion saw a nearly one-to-one relationship between population growth and development and did not recognize the factors or relationships between them that explained the growth of traffic congestion.

In Delaware too, the combination of land development and traffic congestion has been a mysterious force, one that has been complained about and that also seems to elude control, despite the best efforts of many. Clearly, a premise of this paper is to provide a context for understanding how development is tied to population growth through the relationships of the "New Arithmetic of Growth." We believe that the concept of the New Arithmetic gives powerful insights into the forces that are creating dispersed sprawl and an inefficient and unworkable landscape. This concept must be a part of projecting and managing future land use development in Delaware.

The impact on the land of this new population growth in Delaware will be great. The relationship between the rate of population growth and the resulting rate of land development is not one-to-one. In fact, it has become almost exponential: land development proceeds at a much faster pace than the population growth that stimulated it. Identifying the factors causing this is what the "new" arithmetic of development is about. Hence, the growth of developed land from 1990 to 2020 in the State of Delaware -- land changed from agricultural and natural uses to developed uses -- will be higher than the 30 percent by which its population is projected to grow. By creating a demand for residences, new households are the means by which population growth is translated into the consumption of land for development. Residences, in turn, create a demand for supporting land uses such as commercial and public uses, including transportation and schools. Thus, each new person to Delaware is part of a household that will demand and consume a mix of new land uses to provide shelter, goods, services, and jobs to support their household and additional land for transportation right-of-ways to accommodate their movement, largely by automobile.

Three of the factors that are multiplying the impact of population growth on land consumption in Delaware, and will be considered here, are:

1. That households increase faster than population as household size declines,
2. The amount of land used per household is increasing and residential densities are declining, and
3. Automobiles are being used more intensely.

Households Increasing Faster than Population as Household Size Declines - Households increase at a faster rate of growth than does population -- which is one reason why land is developed at a rate that is faster than the rate of population growth (see Fig. 1 and Table 1). Thus, in Delaware, whereas population is projected to grow by nearly 30 percent from 1990 to 2020, the number of households will increase by nearly 50 percent -- from 249,062 in 1990 to 366,582 households by 2020. This will amount to 177,520 new households over the 30-year period.

But even when population stops growing, new households continue to be formed. They form as children grow up and leave their parents' households to establish new households through marriage and other arrangements. They are also created as events such as divorce break up households -- a "traditional family with children" can become a single person living alone and a second single-parent household. Existing households change size and composition over time as two-person families expand by having children and then become smaller again as the children leave, a process called "empty nesting." Finally, they become one-person households when one partner dies.

Table 1

Population/Households	Change 1990-2000				Change 2000-2010				Change 2010-2020				Change 1990-2020			
	Number		Difference In		Number		Difference In		Number		Difference In		Number		Difference In	
	1990	2000	Change	Percent	2000	2010	Change	Percent	2010	2020	Change	Percent	Total	Change	Percent	
Delaware																
Population	669069	757325	88256	13%	817517	60192	8%	853982	36465	4%	853982	184913	28%			
Households	249062	297437	48375	19%	335760	38323	13%	366582	30822	9%	366582	117520	47%			
New Castle County																
Population	441946	486546	44600	9%	514522	27976	6%	529008	14486	3%	529008	87062	20%			
Households	163530	204019	26538	16%	209878	19810	10%	226023	16145	8%	226023	62493	38%			
Sussex County																
Population	113229	145382	32153	28%	166327	20945	14%	181197	14870	9%	181197	67968	60%			
Households	43682	60297	16615	38%	71884	12877	21%	81371	9487	13%	81371	37689	86%			
Kent County																
Population	110993	125392	14403	13%	136660	11264	9%	143778	7118	5%	143778	32785	30%			
Households	39249	47074	7825	20%	53998	6924	15%	59185	5187	10%	59185	19936	51%			

Table 1 - Delaware: Population and Household Projections for the State and Counties: 1990-2020.

The reason that households increase at a faster rate than does the general population is because household size -- the number of persons per household -- has been declining steadily since the 1950s, both nationally and locally. In Delaware, the average household size in 1950 was 3.4 persons. By the year 2000, it is projected to have declined to 2.6 persons per household. During this 50-year period, the annual rate of growth in households was 2.4 percent, while the annual rate of growth of the population was 1.1 percent.⁷ By 2020, household size is projected to decline still further to 2.3 persons per household. This seemingly slight decline of 0.3 of a person per household, from 2.6 persons in 2000 to 2.3 persons per household, in 2020 will, however, mean that there will be 3,800 more households by 2020 than if household size remained constant at 2.6 persons.

The four major reasons causing household size to decline are declining fertility rates, an increase in the number of single-parent households, the greater longevity of the population, and a general increase in single-person households.⁸ Fertility rates -- the number of children expected by women over their lifetime -- have fallen by about 40 percent over the last 50 years. In addition to reflecting changing values about family size, this decline reflects women getting married later and an increase in the number of women who remain unmarried. Indirectly, the decline is also tied to the dramatic increase in female participation in the labor force -- up from 30 percent to 60 percent since about 1950.⁹ Single-parent households have also increased because of rising divorce rates and the increased number of households headed by women who have not married but choose to have children. Finally, as people live longer, they spend more of their lives as couples, as two-person households, after their children leave. Then after one partner dies, the survivor continues as a single-person household.

Not only do households increase at a faster rate than does the population, but when population growth stops, the demographic processes that create households continue -- children still leave home, marriage and divorce continues, and mortality takes its toll. By the 2020s, and certainly in the 2030s, Delaware will be approaching population stability (or zero population growth) overall. In that situation, not only will the rate of household formation exceed that of the population, but the absolute numbers of new households formed will exceed the new population. That will happen in New Castle County in the decade from 2010 to 2020 when the county's population growth of 14,486 new residents will be exceeded by 16,145 new households. Put differently, population will grow by 3 percent and households by 8 percent. In the state as a whole from 2010 to 2020, there will be 30,822 new households compared to 36,465 new persons. In an era of population stability, there will still be a demand for new housing, but it will be created by structural changes in the population, such as the aging of individuals and restructuring of households, rather than by growth in numbers of people.

Land Used Per Household Increasing and Residential Densities Declining - In terms of land consumption, however, while household size has been declining, the amount of land used per new

dwelling unit to shelter a household has been increasing. In the 1950s, under the impact of the baby boom after World War II, New Castle County experienced explosive 95 percent growth rate, nearly doubling its population from 108,000 in 1950 to 211,000 in 1960. This growth of 103,000 persons at 3.4 persons per household produced about 30,294 new households. The resulting new residential development, much of it in Brandywine Hundred northeast of Wilmington, was nearly all single-family houses in suburban subdivisions. The average lot size was about one-fifth of an acre -- 0.2 acres per single-family detached dwelling unit. Thus, not including supporting land uses such as roads, the new households in New Castle County in the 1950s were accommodated on about 6,000 acres of residential lots.

In the 1990s, the fastest growing suburban area in New Castle County has been the Central Pencader area in the west central part of the county. From 1990 to 2000, its population is projected to grow 63 percent from 17,719 to 28,420 persons, yielding 4,500 new households. In New Castle County in 1995, average lot size for new subdivided residential lots was 0.78 acres -- a more than three-fold increase since the 1950s; in the Pencader area, average lot size was .61 acres. Thus, the 4,500 new households expected in the Pencader area will consume about 3,510 acres. In the 1950s, these 4,500 households on lots of 0.2 acres would have consumed only 900 acres -- one-third of the amount of land. Moreover, in the 1950s, with household size higher at 3.4 persons per household rather than the 2.6 persons of the 1990s, these 900 acres of development would have supported a larger population of 15,000.

Put in terms of population density per acre, new residential development from the 1950s to the 1990s has dropped from 17 persons per acre to 13 persons per acre -- a decline of 30 percent. This trend of using more land to accommodate fewer households and people is a central mechanism in creating sprawl -- dispersed patterns of new residential sites and subdivisions.

More Intensive Use of the Automobile - This dispersal -- sprawl -- is amplified by the more intensive use of the automobile. The mobility of the automobile, supported by road construction and increased travel speeds, makes more land accessible to households and available for development. Indeed, major highways such as State Route 1 built as connector to the beaches in Sussex County have the secondary, and largely unintended, effect of opening more land to suburban development all along its right-of-way. Thus, the New Arithmetic of Development -- the fact that development proceeds at a far higher rate than population growth -- reflects the ratcheting of population growth by more and smaller households using more land per household and dispersing themselves by the increased use of the automobile. Of all of these factors, the use of the automobile has been increasing the fastest.

The growing spread of suburban development reflects a population able to be more mobile because of the automobile. In the United States and Delaware in the past twenty years, there has been an explosion in the population of motor vehicles and the intensity of their use. In Delaware, the use of the automobile, measured in number of registered vehicles and miles traveled, has been increasing faster than the growth of either population or households. From 1985 to 1995, the population of registered vehicles in Delaware increased faster than the population of people -- 22 percent compared to 15 percent.¹⁰ By 1985, the number of registered vehicles in Delaware outnumbered licensed drivers by a ratio of 1.13. This meant that there were 1,130 vehicles for every 1,000 licensed drivers in the state. By 1995, the vehicles had extended their numerical superiority to 1,210 cars for every 1,000 licensed drivers.

Not only have the number of vehicles in the state increased, but they are being driven more. Trips to work, to shop, and for recreation and other purposes originate at the household. While the number of persons per households has been decreasing, the number of vehicles per household has increased from 1.79 in 1970 to 2.24 in 1990. By the year 2000, each Delaware household will have, on average, nearly one vehicle for each person in the household.¹¹ From 1970 to 1990, the number of households in Delaware with two or more vehicles increased from 40 percent to 60 percent. The actual number of such households more than doubled from 66,416 to 146,766. This increase in multi-vehicle households reflects more workers per household commuting to more dispersed jobs.

The increase in cars per household partly reflects an increased need to travel. The increase in two-income families has increased the number of trips to work as both wife and husband must commute. (However, because of the large increase in single-person households the average number of workers per household has been declining and was 1.35 workers per household in Delaware in 1990).¹² The dispersal of residential locations has meant that trips to work have become longer. Places of employment have become more decentralized as well. In New Castle County, for example, employment destinations are no longer concentrated in the vicinity of Wilmington but are dispersed in a broad corridor centered on I-95, extending from the Claymont area in the northeast to Newark in the west. Trips to work account for about 18 percent of weekly trips in Delaware.¹³ Shopping trips account for more trips than work trips in all three counties.

As trip destinations -- work, home, shopping, and others -- have become more geographically dispersed, the number of trips is increasing and their lengths have become longer. From 1990 to 1996, average home-based work trips in New Castle County increased from 8.16 to 8.70 miles, slightly more than half a mile.¹⁴ Because of the large number of work trips, small increases in the length of trips add up to large increases in vehicle miles traveled (VMT) -- the number of miles a vehicle travels in a year

(Fig. 3). For example, in New Castle County in 1994 there were an average of 226,900 work trips per week out of 1,238,610 total trips. The Delaware Department of Transportation expects that by 2010, work trips will have increased to 9.23 miles. In part, this reflects population and households moving away from the central core faster than employment.

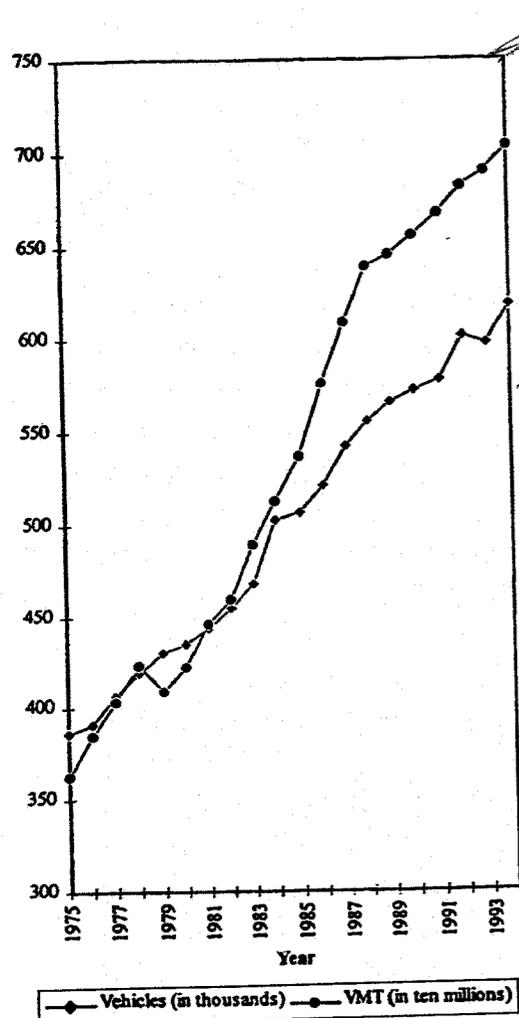


Figure 3. Delaware: Annual Vehicle Miles Traveled v. Number of Registered Vehicles, 1975 to 1994. (Source: Division of Planning, DelDOT, January 1997.)

grows. The first factor is explaining higher rate of land development is that the demand for new residential development stems from new households that, as their size declines, grow at a faster rate than does the population. New households would be formed even when the population stops growing.

Spurred by increasing numbers of drivers, more automobiles, and a greater need to travel, vehicle-miles-traveled grew 4.5 times faster than did the state's population from 1980 to 1990 -- 55 percent. The growth of VMT has slowed since 1990 as roads have become more congested and their capacity nears saturation. Still, from 1990 to 2020, VMT in Delaware is expected to increase from nearly 7,000,000 miles to almost 9,500,000 miles.¹⁵

In the new arithmetic of development, it is the ability of the population to travel and to cover more territory that extends development, creates congestion, and leaves a dispersed and sprawled landscape in its wake. Today, more than 95 percent of the driving age population in Delaware has a license. With more registered vehicles than people in the state, it is but slight exaggeration to say that population projections also project new vehicles and each new resident to Delaware comes equipped with a car.

Understanding Sprawl as the Product of the New Arithmetic of Development

Sprawl is dispersed residential and commercial suburban development connected by highways and roads. The new arithmetic of development says that land develops at a much faster rate than the population

New households create not only a demand for new houses, preferring single-family detached houses, but for other supporting land uses such as places of employment, schools, shopping center, recreational areas, and others.

The second factor of the new arithmetic that leads to sprawl is that the increased use of automobiles and trucks. This has made it possible for new development to be built in a more dispersed pattern. The mobility provided by the automobile allows households to seek out less expensive vacant land on the periphery of the metropolitan area. In general, the price of land in developed areas is four times more expensive than in agricultural areas. This has meant that new development scatters over rural areas and more territory is used to accommodate less development. This, in turn, creates a greater demand for travel and automobile use as well as for roads. Thus new development has become almost a perpetual motion machine needing little population growth to fuel it.

Yet, throughout the discussion of trends and statistics in this report, it must be remembered that land development is the reflection of resident values. Urban economist Anthony Downs suggests that this pattern of dispersed, low-density growth is created by the "overwhelmingly successful realization of Americans' common vision of how growth ought to occur" over four decades.¹⁶ The dominant American vision or shared values of the best place to live has five elements, according to Downs.

- The first is the desire to live in a single-family house on a spacious lot.
- The second is ownership of automotive vehicles for mobility.
- The third is the desire to work in a low-rise workplaces in park-like settings.
- The fourth element is the wish to live in small communities with strong local governments or authority over local issues, such as land use and schools.
- Finally, there is, according to Downs, the preference to live in an environment free from the signs of poverty.¹⁷

Ironically, the attainment of this suburban vision by individuals can result in a larger metropolitan landscape with many collective problems. The quest for the free road results in congestion and pollution, the desire for new housing results in a lack of affordable housing, and the less-well-to-do who cannot afford the vision are relegated to older cities and towns. Recently, the Governor's Office published a report entitled *Shaping Delaware's Future*, a vision of the state's future developed through a broad community outreach and the involvement of decisionmakers from across the state. One purpose of this report is to provide an understanding of how the growth of Delaware's population, acting through the "New Arithmetic of Development," may influence that future.

Delaware's Vulnerability to Land Development

Delaware is especially vulnerable to sprawl and dispersed development because of its small size geographically. With 1,955 square miles of territory, Delaware is second only to Rhode Island as the

smallest state in the country. To get sense of how Delaware compares to other areas in terms of population, it is useful to compare Delaware to metropolitan areas in the United States. In 1995, Delaware's population was estimated to be 716,000. The four metropolitan areas in the United States closest to Delaware in population in 1996 were Albuquerque, New Mexico with 682,000 persons, Omaha, Nebraska, with 684,000, El Paso, Texas with 745,000, and Syracuse, New York with 756,000.¹⁸

Delaware is also vulnerable because it is part of one of the largest metropolitan systems in the world – the megapolitan complex extending from Boston, Massachusetts through the metropolitan areas along the east coast to Richmond, Virginia. In that, Delaware lies on the southern edge of the Philadelphia metropolitan area. According to the U.S. Census, the greater Philadelphia consolidated metropolitan area – which includes northern Delaware and extends to Atlantic City – contained a population of 5,893,000 in 1996. The 442,000 Delawareans who lived within the Philadelphia metropolitan area as defined by the U.S. Census were but 7.5 percent of that metropolitan area. Consequently, Delaware is subject to the influences of demographic trends of both the Philadelphia and Baltimore metropolitan areas. Small can be beautiful, but for Delaware, being a small part of a larger regional economic and demographic system means that many trends effecting the state are driven by influences beyond its borders and control.

2. STATEWIDE POPULATION PROJECTIONS AND DEMOGRAPHIC TRENDS¹⁹

Overall Population Projections

By the year 2000, the population of Delaware is projected to reach 757,325, having increased by 13 percent since 1990 (Table 1, Fig. 4). Nearly two-thirds of that population, 486,546 residents, will live in New Castle County, the most densely settled of the State's three counties. Sussex County, the most rural and southerly of the state's three counties, is anticipated to have a population 145,382 by 2000, while the middle county of Kent will contain 125,392 residents. Sussex and Kent Counties will contain 19 and 17 percent of the State's population respectively. In the 1990s, Sussex County's population has exhibited the highest growth rate among the three counties at 28 percent, while Kent County has had the second highest growth rate at 13 percent. New Castle County trailed with the slowest rate of growth at nine percent, although it has gained the greatest number of people.

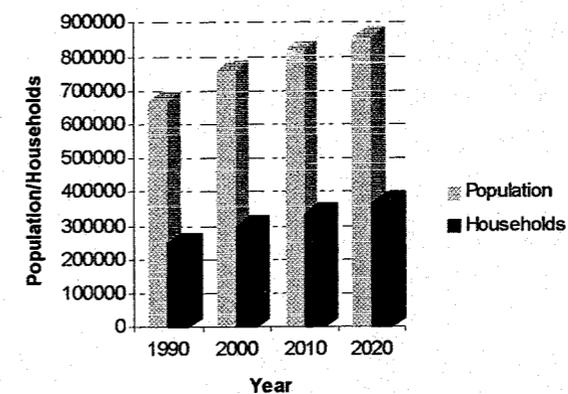


Figure 4. Delaware: Comparison of Population and Household Projections by Decade, 1990 to 2020.
(Source: DPC, July 1998)

Projected to increase by 13 percent in the 1990s, the first decade of the twentieth-first century, the rate of population growth in the state will decline slightly to eight percent, increasing the state's population to 817,517 by 2010 (Table 1, Fig. 5). The rates of population growth will also decline in each of the counties, with Kent County's at nine percent, Sussex County's at 14 percent and New Castle's rate slipping to six percent. In the next decade, from 2010 to 2020, growth rates will continue to decline in all three counties and in the state as a whole: the state's growth rate will drop by nearly half to four percent, pulled down by New Castle County's rate of three percent. Kent County's population will grow at a rate of five percent and Sussex County will

continue to lead the three counties with a rate of nine percent.

Even with declining rates of population growth in the first two decades of the next century, the absolute numbers of new people being born and moving to Delaware will be substantial. From 1990 to 2020, Delaware's population will increase by 185,000, a 28 percent increase. Geographically, there will

be an uneven pattern of population growth and decline across the state's territory. Because of its large population base, New Castle County will have to accommodate nearly half of this new population -- some 87,000 people -- growing by 20 percent during this period. Among the three counties, Sussex County is projected to grow the fastest to 60 percent adding 67,968 new residents. Kent County is anticipated to grow by 30 percent and 32,785 persons. By 2020, the population of New Castle County will reach 529,008. Sussex County will have reached 181,197 persons and Kent County will stand at 143,777. The two fastest growing subareas of the State from 1990 to 2020 will be the coastal area of Sussex County which will grow by 75 percent and southern New Castle County which is projected to expand in population by 67 percent.

Household Growth

From 1990 through 2020, while Delaware's population is projected to increase by 28 percent, the number of households will increase by 47 percent (Table 1). In 1990 there were 249,062 households in the state. By 2020, the number of households is projected to increase by 117,520 reaching 366,582 by 2020. In other words, for every one percent increase in the population, there will be a 1.7 percent increase in households. Since vacancy rates in the existing housing stock are low there will be a substantial demand for new housing units and developable land, especially in suburbanizing areas.

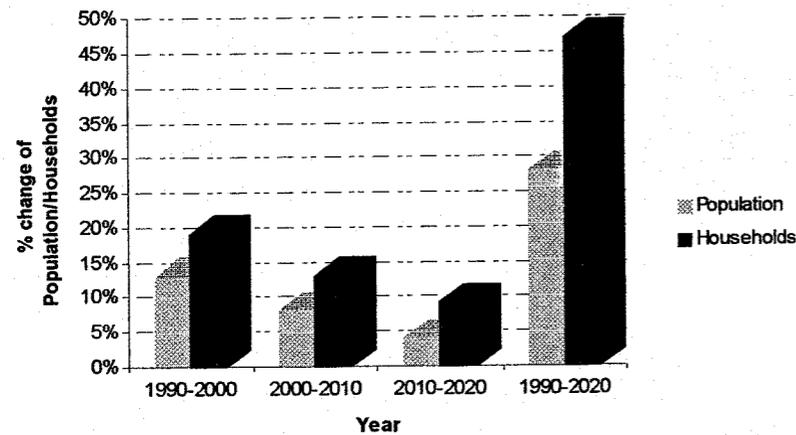


Figure 5. Delaware: Comparison of Projected Percent Change in Population and Households by Decade, 1990 to 2020.

Among Delaware's three counties, households in Sussex County will grow at the fastest rate from 1990 to 2020, expanding by 86 percent from 43,682 in 1990 to 81,371 in 2020 (Figs. 6 & 7). There

will be 37,689 new households in Sussex County by 2020. Kent County is projected to have the second fastest rate of household growth expanding by 51 percent and the number of households in New Castle County will increase by 38 percent. However, because of its large existing population, New Castle County will produce the greatest number of new households, 62,493 between 1990 and 2020. This compares to 37,689 new households in Sussex County and 19,936 households in Kent County by 2020.

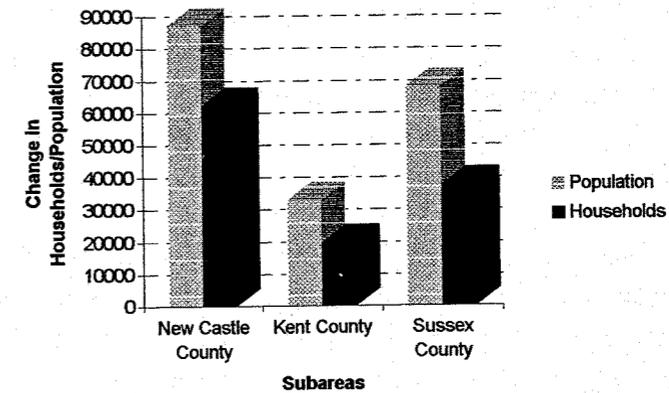


Figure 6. State of Delaware: Comparison of Population and Household Projections by County, 1990 to 2020.

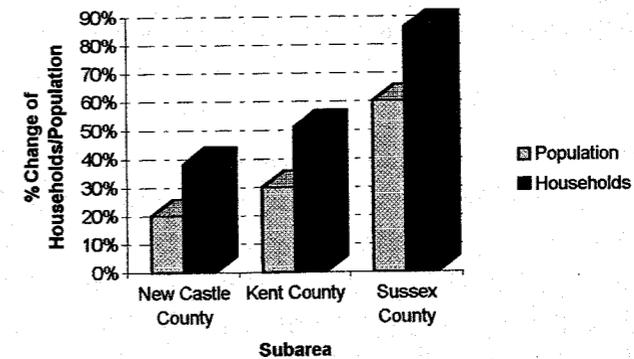


Figure 7. Delaware: Comparison of Population and Household Projections by County, 1990 to 2020.

Household growth, and hence land development, will proceed faster than population growth in all of the counties by a substantial percentage. In New Castle County population will grow 20 percent while households grow 38 percent; in Kent County household growth will outpace population 51 percent to 30 percent; and in Sussex, the fastest growing county in the state, population will increase by 60 percent while households expand at 86 percent. Development will proceed at an even faster pace than households.

Like population, the rate of household formation declines in each decade from 1990 to 2020. Overall for the state, the rate of household growth declines from 19 percent between 1990 and 2000 to 9 percent in the decade 2010 to 2020. Each of the counties follows the same general pattern. Sussex County starts with the highest rate of household formation in the 1990s at 38 percent – compared to 20.0 percent and 16.0 percent in Kent and New Castle counties, respectively.

Natural Change and Migration

Population change over time has two components: natural change and migration. Natural increase is the growth of the population resulting having more births than deaths. (Of course, when deaths exceed births, decrease occurs.) Migration is the net sum of the number of persons who move into an area minus the number of people who moved out during the same period. When more people move in than leave, migration contributes to the growth of the population and when more leave than move in, the population declines. Of the two components of population change, natural increase is the more predictable and stable because birth and death rates are a function of the age distribution of the existing population. Because growth by natural increase is growth by newborns, the effects on an area which grows by natural increase is also more predictable. After children are born, the demands they make on society for health care system, schools, and other public services as they grow up are quite predictable. 20

Migration, on the other hand, is much more unpredictable. For one thing, migrants are attracted by some condition in the area such as job opportunities for working age people or the living environment, for example, for retirees. Thus, migration projections are tied to projections about the state of the economy. A recession in the state's economy would reduce migration attracted by job formation. Because the majority of migrants are adults, they have a more immediate impact on the economy of an area than does growth by natural increase. But when many migrants are older, as will be the case in Sussex County, they also effect natural increase by raising the death rate. They also make more demands on health care system and other services as they age than does a younger population. At the same time, they also create the need for more jobs and more, younger migrants.

From 1990 to 2020, migration to Delaware is projected to account for an increasing share of its population growth, much of which will be accounted for by migration to Sussex County. From 1990 to 2000, migration into Delaware will comprise 55 percent of the state's new population. Natural increase, births minus deaths, will add the remaining 45 percent. This proportion of population growth contributed by migrants will increase to 66 percent in the years from 2000 to 2010, and then to 69 percent by the decade 2010 to 2020. Over the 30-year period from 1990 to 2020, new migrants to the state will number 114,000 people, or 62 percent of the total population growth. Natural increase will provide 71,000 people.

A majority of the migrants to the state will be moving to Sussex County. Overall, from 1990 to 2020, Sussex will account for 55 percent of all migrants to Delaware – 62,300 people. Most of these will be retirees. This influx of older people will accelerate the aging of that county's population to the extent that by the decade 2010 to 2020, there will be more deaths than births in the county. Natural increase will be negative, and migration will provide all of the county's new population. Still, the number of people migrating to Sussex County in each decade will decline as overall population growth slows. Migration will fall from 27,847 newcomers between 1990 and 2000 to 15,135 between 2010 and 2020.

This same pattern of declining growth rates will occur in New Castle and Kent Counties as well. But in those counties, migration and natural increase will be more balanced. Over the 30 years from 1990 to 2020, natural increase will provide 57 percent of New Castle County's population growth and 50 percent of the growth of Kent County. Because of declining growth rates of both natural increase and migration, significantly fewer people will be added to the state's population than in the previous decade. In New Castle County, new population from natural increase will fall from 27,509 persons for the decade 1990 to 2000 to 8,000 for the decade of 2010 to 2020. The net migration will decline from 15,456 to 6,519 people in the same periods. In Kent County, contrasting the decades 1990 to 2000 and 2010 to 2020, natural increase will fall from 8,537 to 3,574 persons, while migration into the county will decline from 5,217 to 3,548.

Racial and Ethnic Composition

In 1990, the population of Delaware was 81 percent white and 17 percent African-American, with the remaining residents consisting of other nonwhites, including Asians. In numbers of people, this translated to 543,911 whites, 113,893 African-Americans and nearly 12,000 other nonwhites. Nonwhites, primarily Asians, are projected to be the fastest growing of these three groups from 1990 to 2020 at 48 percent. During this 30-year period, the black population is projected to increase by 39 percent to 158,814 persons while the white population is expected to expand by 25 percent to 678,521. By 2020, blacks will comprise 19 percent of Delaware's population, whites 79 percent, and other nonwhites two percent of the total.

Hispanics in Delaware were not included as a separate group in the projections of the Delaware Population Consortium because, under the U.S. Census definitions, Hispanics are categorized by their Spanish surname and racially may be either white or black. A special study conducted by the Consortium, however, found that the Hispanic population in Delaware increased from 10,339 persons in 1980 to 15,356 in 1990 and that by 1996, that population had grown by an additional 74 percent statewide, reaching 27,045 persons. Half of that increase took place in Sussex County where Hispanics grew by 245 percent from 1990 to 1996 increasing from 2,314 to 7,982 persons. New Castle County contained the largest number of Hispanics, however, where 16,000 lived in 1996 having increased 33 percent since 1990. During that same period, Kent County's Hispanic population grew by 33 percent and numbered 3,165.

In 1990, the percentage distribution of blacks and whites among the counties was nearly the same. New Castle County contained nearly two-thirds of both the African-American and white population of the state while Kent and Sussex Counties each sheltered about 17 percent of each group. Of "other minorities," including Asians, some 70 lived in New Castle County with 19 and 11 percent located in Kent and Sussex Counties respectively.

However, within the counties, blacks and other minorities were more concentrated in cities and towns than were whites. In 1990, the city of Wilmington was 52 percent black containing 32 percent of the state's black population. Of the black population in Kent County, 35 percent lived in the city of Dover and 65 percent resided in Dover and its suburbs. In Sussex County in 1990, the percent of blacks was less urban, but a higher percentage of African Americans lived in the largest towns of Seaford, Georgetown, and South Milford than in the county as a whole.

Among the three counties, Sussex's black population is projected to be the most stable, leveling off in absolute growth by 2010. Because of the great growth from migration, Sussex will also see the white proportion of its population increase while that of blacks declines. From 1990 to 2020, whites are projected to increase from 93,421 to 156,574 persons an increase from 80 to 86 percent of the total population. During the same period, blacks will decline from 18 percent to 13 percent although the total black population will grow by 21 percent over the 30-year projection period. Sussex will have the smallest population of "Other nonwhites" at 1.0 percent. The pattern of demographic change among races will be different in each of the counties.

Kent County, overall, will remain almost constant in the proportions of blacks and whites in its population with whites projected to decline from 1990 to 2020, slightly from 79 to 77 percent while blacks will increase from 19 to 21 percent. The black population of Kent County will grow by 46 percent,

whereas the white population will increase by 26 percent. "Other nonwhites" are anticipated to remain constant at 2 percent.

In New Castle County, virtually all of the black growth will be in the suburbs, where that population will increase by 78 percent and 31,432 people from 1990 to 2020. Wilmington's black population is anticipated to grow only slightly. From 1990 to 2020 the city will decline from being home to 50 percent of New Castle County's black population to 37 percent. "Other nonwhites" in New Castle County will more than double during the 30-year projection period increasing from 8,000 to 13,200. By 2020, the population of New Castle County will be 78.0 percent white, 20.0 percent black, 2.0 percent "Other Nonwhite."

Atlas of Projected Changes in Population and Households

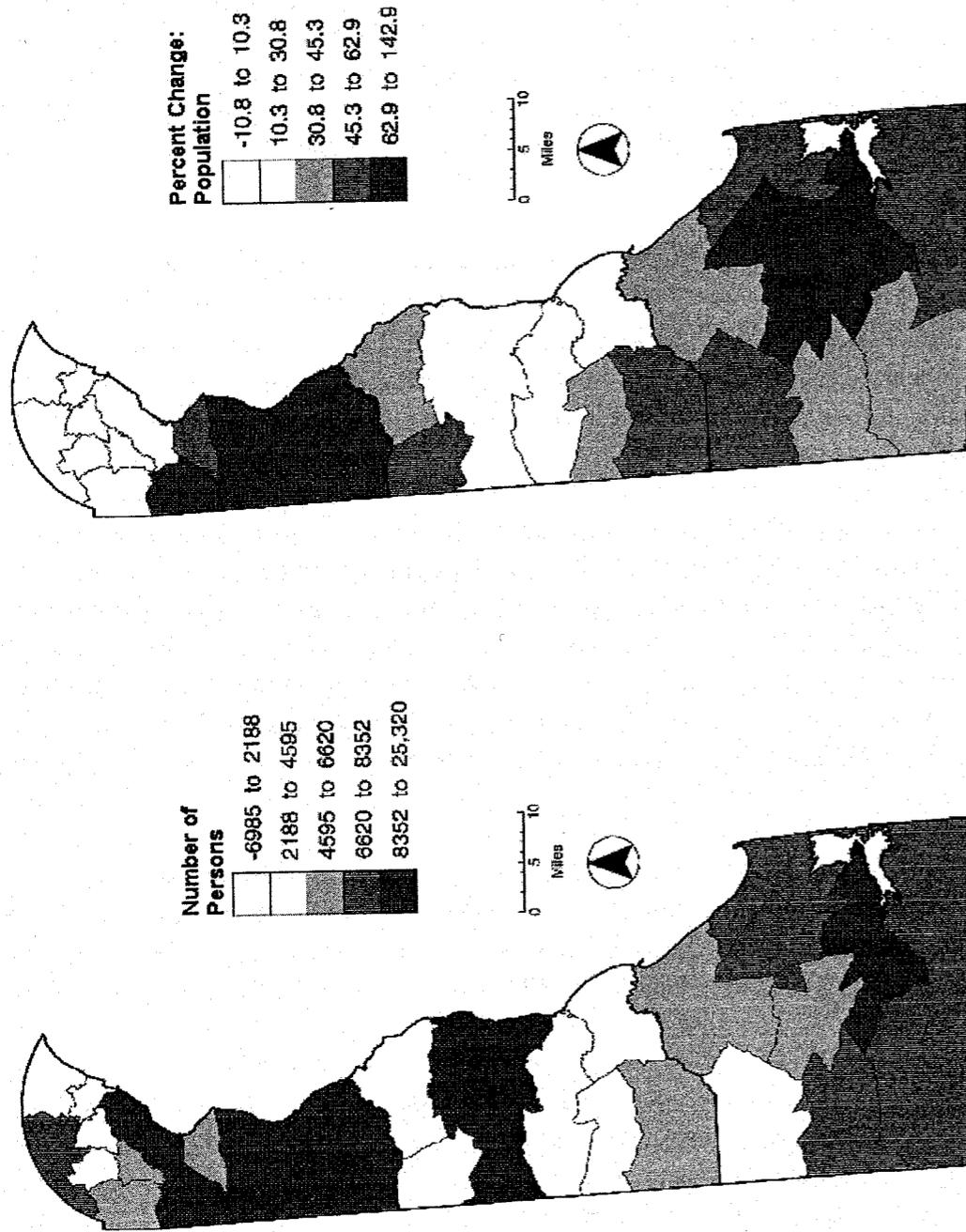
To show the geographic pattern of absolute and relative changes in population and households, four maps have been plotted showing from 1990 to 2020 by county census division: absolute change in population, percent change in population, absolute change in households, and percent change in households (Fig. 8a, 8b, 8c, 8d).

On the maps showing the absolute growth of population by County Census Division (Fig. 8b), Southern New Castle County, central Kent County around Dover, and east central Sussex County contain the CCDs with the greatest growth in numbers of persons (darkest areas on the map). The CCDs experiencing the least growth or decline (shown in white and light gray), are found in northeast New Castle County, including Wilmington, and in the CCDs north and south of central Kent County. Southern Kent and northern Sussex County taken together form the largest geographic area in the state of small to modest population increases (white to medium gray).

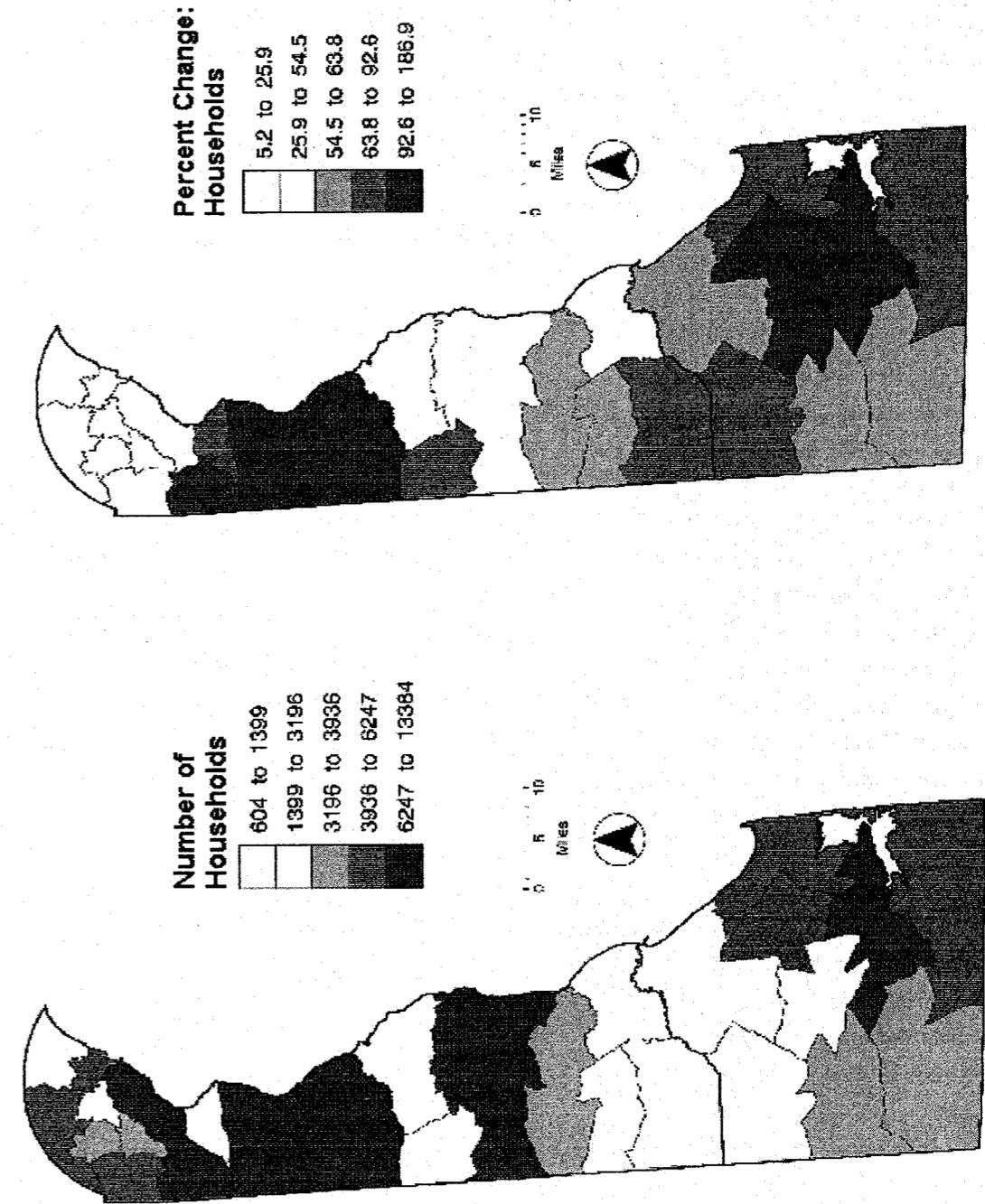
When absolute increases in population are converted to percent increase by CCD (Fig. 8b); Delaware is shown as a state of alternating bands of low and high growth from north to south. The most northern band in northern New Castle County becomes an area ranging from population loss to the category of lowest percent increase in population (white and light gray). Southern New Castle County forms a band of high growth.

In the translation from absolute to relative growth, central Kent County becomes the second band low to moderate growth. In the CCDs along the northern Kent border, however, the high growth in New Castle County appears to be spilling into northern Kent County. The lowest growth area is in the southeast part of county centered on Milford.

Figures 8a and 8b. Delaware: Projected change in population in number of persons and percent by county census division 1990 to 2020.



Figures 8c and 8d. Delaware: Projected change in population in number of households and percent by county census division 1990 to 2020.



The next band of high growth extends from southwestern Kent County and includes all of Sussex County. Especially striking is the quadrupling of the number of CCDs in east central Sussex County in the highest percent growth categories (darkest areas on the map.)

Figures 8c and 8d show absolute and percent changes in households statewide. These maps of household change show essentially the same geographic patterns as the maps for population change did.

3. NEW CASTLE COUNTY DEMOGRAPHIC AND DEVELOPMENT TRENDS

The County as a Whole

From 1980 to 1990, the population of New Castle County, the most populous county in Delaware, increased by 11 percent, reaching 441,946 persons by 1990 (Figures. 9,10 & 11, Table 2). By 2020, the population of the county is anticipated to reach 529,008, an increase of 20 percent and 87,062 persons. Over that 30-year period, however, the growth rate per decade will decline from nine percent for the decade from 1990 to 2000 to three percent for 2010 to 2020. The number of new people in the county in each decade, by birth and migration, will drop significantly, from an increase of 44,600 between 1990 and 2000 to 14,486 in the decade 2010 to 2020.

The falling rate of growth will be partially due to a decline in the rate of natural increase in the population. As New Castle County's population ages, death rates will increase while birth rates will fall. Whereas natural increase yielded 27,500 new residents in the 1990s, by the decade of the 2010s, it will produce only about 8,000 new citizens. Migration, on the other hand, is projected to remain relatively steady through 2010, at 15,456 in the 1990s and 14,493 in the first decade of the next century, and it will then drop by more than half to 6,500 from 2010 to 2020. Overall, from 1990 to 2020, natural increase will shift from accounting for 64 percent of the county's growth in the 1990s to 55 percent from 2010 to 2020.

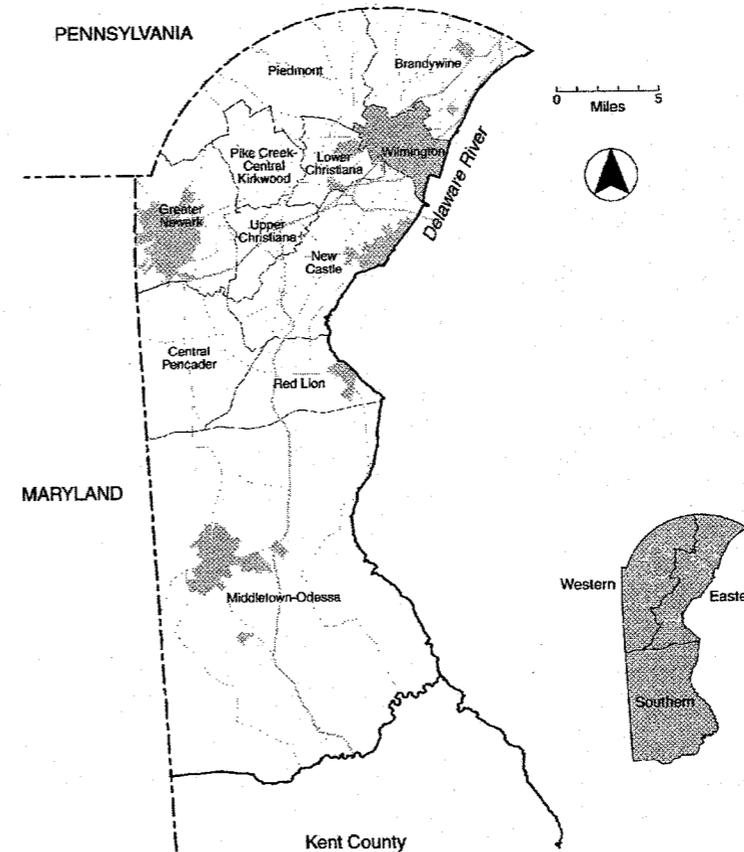


Figure 9. New Castle County, Delaware, with County Census Divisions.

Households will grow faster than population from 1990 to 2020, increasing by 38 percent, compared to 20 percent for the population (Table 3, Figures 10, 11). In that period, 62,493 new households are anticipated in New Castle County. As the county's population growth stabilizes in the 2020s, it will face a new demographic phenomenon. In the decade 2010-2020, the absolute number of new households created will exceed the new population. Whereas the population of New Castle County will grow by 14,486 from 2010 to 2020, the number of new households will increase by 16,145 (Figs. 10 & 11). This is because even when deaths and out migration offsets births and newcomers to yield no overall population growth, the existing population continues to grow up and form new households. For example, individual households with two teenage children could become as many as three households as the children leave home. If the parents subsequently divorce, one household could potentially split into four households.

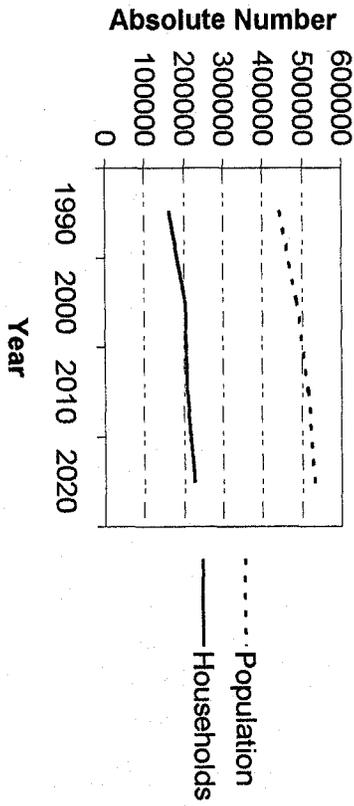


Figure 10. New Castle County: Projected Change in Population and Households, 1990-2020.

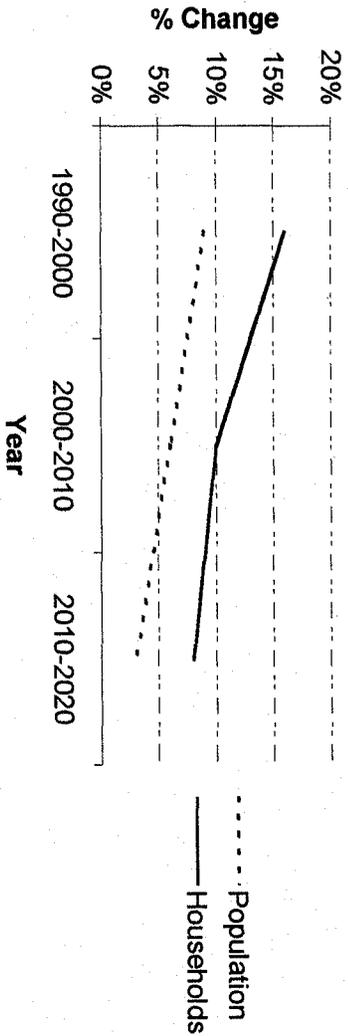


Figure 11. New Castle County: Projected Percent Change in Population and Households, 1990-2020.

Table 2

Census County Divisions	Population Change 1990-2000				Population Change 2000-2010			Population Change 2010-2020			Population Change 1990-2020		
	#Persons		Difference In		#Persons	Difference In		#Persons	Difference In		#Persons	Difference In	
	1990	2000	Number	Percent	2010	Number	Percent	2020	Number	Percent	Total	Number	Percent
Northeastern													
Brandywine	80434	77759	-2675	-3%	75563	-2196	-3%	73449	-2114	-3%	73449	-6985	-9%
Wilmington	71526	72682	1156	2%	73759	1077	1%	74852	1093	1%	74852	3326	5%
Lower Christiana	36543	35263	-1280	-4%	33807	-1456	-4%	32555	-1252	-4%	32555	-3988	-11%
Subtotal	188503	185704	-2799	-1%	183129	-2575	-1%	180856	-2273	-1%	180856	-7647	-4%
West Central													
Greater Newark	61003	65202	4199	7%	67043	1841	3%	67623	580	1%	67623	6620	11%
Pike Creek	38733	43038	4305	11%	42219	-819	-2%	41302	-917	-2%	41302	2569	7%
Upper Christiana	21177	24373	3196	15%	25955	1582	6%	26743	788	3%	26743	5566	26%
Piedmont	24402	28603	4201	17%	30474	1871	7%	31407	933	3%	31407	7005	29%
Subtotal	145315	161216	15901	11%	165691	4475	3%	167075	1384	1%	167075	21760	15%
Southern													
Central Pencader	17719	28920	11201	63%	37698	8778	30%	43039	5341	14%	43039	25320	143%
Middletown/Odessa	18578	28098	9520	51%	37204	9106	32%	42763	5559	15%	42763	24185	130%
New Castle	67798	77466	9668	14%	84758	7292	9%	88706	3948	5%	88706	20908	31%
Red Lion	4033	5142	1109	27%	6042	900	18%	6569	527	9%	6569	2536	63%
Subtotal	108128	139626	31498	29%	165702	26076	19%	181077	15375	9%	181077	72949	67%
Total	441946	486546	44600	9%	514522	27976	6%	529008	14486	3%	529008	87062	20%

Table 2 - New Castle County: Population Projections by County Census Divisions and Subareas: 1990 - 2020.

Table 3

Census County Divisions	Household Change 1990-2000				Household Change 2000-2010				Household Change 2010-2020				Household Change 1990-2020			
	#Households		Difference in		#Hhs		Difference in		#Hhs		Difference in		#Hhs		Difference in	
	1990	2000	Number	Percent	2010	Percent	2020	Number	Percent	Total	Number	Percent	Total	Number	Percent	
Northeastern																
Brandywine	31337	32284	947	3%	33106	822	3%	33792	686	2%	33792	2455	8%			
Wilmington	28444	30227	1783	6%	31141	914	3%	33206	2065	7%	33206	4762	17%			
Lower Christiana	14304	14710	406	3%	14882	172	1%	15049	167	1%	15049	745	5%			
Subtotal	74085	77221	3136	4%	79129	1908	2%	82047	2918	4%	82047	7962	11%			
West Central																
Greater Newark	20215	23025	2810	14%	24984	1959	9%	26462	1478	6%	26462	6247	31%			
Pike Creek	15182	17977	2795	18%	18610	633	4%	19118	508	3%	19118	3936	26%			
Upper Christiana	7841	9616	1775	23%	10807	1191	12%	11693	886	8%	11693	3852	49%			
Piedmont	8313	10384	2071	25%	11675	1291	12%	12635	960	8%	12635	4322	52%			
Subtotal	51551	61002	9451	18%	66076	5074	8%	69908	3832	6%	69908	18357	36%			
Southern																
Central Pencader	6140	10680	4540	74%	14691	4011	38%	17613	2922	20%	17613	11473	187%			
Middletown/Odessa	5881	9477	3596	61%	13242	3765	40%	15983	2741	21%	15983	10102	172%			
New Castle	2457	29900	5343	22%	34523	4623	15%	37941	3418	10%	37941	13384	55%			
Red Lion	1316	1788	472	36%	2217	429	24%	2531	314	14%	2531	1215	92%			
Subtotal	37894	51845	13951	37%	64673	12828	25%	74068	9395	15%	74068	36174	95%			
Total	163530	190068	26538	16%	208878	19810	10%	226023	16145	8%	226023	62493	38%			

Table 3 - New Castle County: Household Projections by County Census Divisions and Subareas: 1990 - 2020.

Projections for 1990 to 2020 forecast a net gain of 62,493 new households in New Castle County, many of which will require new housing. In 1997, when the average gross residential lot size in the total county was 0.78 acres,²¹ it was as high as 1.35 acres in newly suburbanizing areas of the county. To accommodate the 62,493 new households at the average lot size will require some 49,000 acres.

Nearly all of the population growth in New Castle County will take place in the suburbs outside of Wilmington from 1990 to 2020. In 1920, 75 percent of New Castle County's 148,239 residents lived in Wilmington. After declining dramatically from a high of 112,504 persons in 1940 to 70,195 in 1980, Wilmington's population stabilized in the low to mid-70,000s in the 1990s. It is projected to reach 74,852 by 2020, which will be about 14 percent of the County's total population. The city has also reached a racial balance. Blacks constituted 52.3 percent of the city's 1990 population and are projected to be about the same proportion in 2020. Hence, from the year 2000 to 2020, 95 percent of all growth in the black population in New Castle County - 42,816 persons- will occur in the suburban areas.

Racial and Ethnic Composition

In 1990, the racial composition of New Castle County's population was 81.6 percent white and 16.6 percent black, and other minorities made up 1.8 percent. There were 73,783 blacks and 361,872 whites. By 2020, blacks will be one-fifth of the total population and whites will make up 78 percent, with other minorities constituting the remainder. Increasing at a faster rate than the white population from 1990 to 2020, the black population will grow by 42 percent and increase by 312,431 persons. For the same period, the white population will increase by 14 percent and 48,715 persons. Virtually, all of this growth of both races will occur in the suburbs and by 2020, the racial composition of suburban New Castle County is projected to be 78 percent white, 20 percent black, and two percent other minorities.

In each of the three decades from 1990 to 2020, the black population will exhibit a higher growth rate than will the white population. Growing by 16 percent in the 1990s, the rate of growth for blacks will decline to 10 percent by the decade 2010 to 2020. During the same period, the white population will have gone from a 7.7 percent growth rate in the 1990s to nearly zero growth from 2010 to 2020. Although there are no projections for the Hispanic population, recent estimates indicate that the population grew from 10,829 in 1990 to 15,989 in 1996, an increase of 48.8 percent.²²

Suburbanization of New Castle County and Decline of Wilmington: 1940s to 1970s

The history of the suburbanization of New Castle County parallels that of the United States. ²³By 1940, when Wilmington's population peaked at 112,504 persons, 67,000 people lived in the county outside the city. A majority were suburbanites living in bedroom communities found mostly northeast of

the city in Brandywine Hundred. The post-World War II baby boom brought a suburban boom to New Castle County. From 1940 to 1960, the suburban population of the county increased by 475 percent, expanding to 320,142 persons. This suburban wave was two pronged, moving north in Brandywine Hundred and west along Kirkwood Highway toward the city of Newark.

The suburban boom continued into the 1960s when 93,851 new residents ballooned the county's population outside of Wilmington. In the 1970s, population growth fell substantially, with the growth rate for the county as a whole shrinking to 3.2 percent as its population increased from 398,115 to 441,946. Suburban growth rates -- that is growth in New Castle County outside of Wilmington -- dropped from 95.0 percent in the 1950s, to 24.2 percent in the 1960s, to 7.8 percent in the 1970s. This decline partly reflected a national, and unexpected, drop in fertility rates that became known as the baby bust. The decline in fertility rates was due to, among other things, the availability of oral contraceptives since the mid-1960s, the great influx of women into the labor market, and postponement of having children. The declining population growth rate in suburban New Castle County also reflected Delaware's share of regional migration out of the northeastern (Frostbelt) United States, including Delaware, to the southwest (Sunbelt) region.

While the suburbs boomed after World War II, Wilmington, like many central cities in the United States, declined precipitously losing nearly 40 percent of its total population -- 42,309 people -- from 1940 to 1980. The directions of change in the nonwhite and white populations were opposite during this period -- the nonwhite population grew within the city while the white population left the city and suburbanized rapidly. From 1940 until 1980, when the city's population bottomed out, the number of white residents declined from 98,176 to 31,663 persons -- a loss of 66,513. During these same four decades, the nonwhite population grew from 14,329 to 38,532, an expansion of 168.9 percent. Most of both the loss in white population and the gain in black population occurred from 1950 to 1970. From 1940 to 1980, the racial composition of the city had shifted from being 87 percent white to 55 percent black.

Both the fall in the suburban growth rate and the depth of Wilmington's population decline surprised demographers. Projections made in the 1960s, which could not anticipate the coming drop in birth rates, anticipated that the population of suburban New Castle County would grow rapidly by 50 percent in the 1970s. They saw Wilmington's loss bottoming out to about 86,000 persons in 1970 and then rebounding to 101,000 by 1980. By that same year, New Castle County was expected to have reached a population of 582,700, a number New Castle County is not anticipated to reach until about 2015, according to current projections.

In some ways, New Castle County's modest overall growth rate of 3.2 percent was misleading because it was the average of a suburban boom in the western part of the county offset by population loss in the eastern part. There, the loss of population spread to the older suburbs around Wilmington. New Castle County is divided into 11 county census divisions (CCDs), one of which is south of the Chesapeake and Delaware Canal. In 1970, 70 percent of the county's population lived in the five CCDs in the eastern part of the county. The county's population began to shift westward in the 1970s as the five eastern CCDs north of the canal declined by 6.0 percent, losing 15,828 people. The five western CCDs grew by 23.6 percent, gaining 24,940 people. The eastern CCDs include Wilmington; Brandywine, north of Wilmington; Lower Christiana, including the towns of Elsmere and Newport west of Wilmington; and, south of the city, the CCDs of New Castle and Red Lion. The six western CCDs include Piedmont in the northwest; Greater Newark in the west central portion of the county bordering Maryland; Pike Creek and Central Kirkwood in the central part of the county; and Upper Christiana and Pencader in the south central area above the C&D Canal.

Significantly, in the 1970s, blacks joined whites in suburbanizing -- 93.0 percent of all black population growth in New Castle County took place outside Wilmington, where the increase of black population was 2.2 percent. While nearly all white population growth occurred in the five western CCDs, blacks mostly suburbanized in the older eastern suburban CCDs, especially in the Brandywine and New Castle CCDs. White population decline continued to be most severe in Wilmington, where the city lost nearly one-third of its white population -- 13,238 people. Although Wilmington's black population remained stable in total numbers, a substantial number of the 11,000 blacks who suburbanized from the city were middle-income people, who were replaced by births and newcomers to the city. The pattern of white population decline also extended north and east of the city, where, together, the Brandywine and Lower Christiana CCDs lost nearly 16,000 whites. In Brandywine much of the loss was the result of aging and "empty nesting" as children born in the 1950s left home.

The greatest growth in both numbers of people and rate of growth in the 1970s occurred in the west-central part of the county. The Upper Christiana CCD -- east of Newark and centered on the Christiana Mall area -- gained nearly 6,000 people, and the Greater Newark CCD, on the western edge of the county, gained almost 9,000 new residents. The fastest growing CCD was Pencader, in the southwest corner of the county above the canal. It more than tripled its numbers, approaching a population of 9,000 in 1990. South of the Chesapeake and Delaware Canal, the Middletown-Odessa CCD, which occupies more than one-third of the county's territory, grew by 31.3 percent to a population of 13,187.

Suburbanization Shifts West and South in the 1980s

In the 1980s, as the population of New Castle County grew 11 percent to a 1990 population of 441,946, western New Castle County continued to suburbanize rapidly. The five western CCDs gained 34,417 residents from 1980 to 1990. The continued suburban development moved in two prongs. One shifted northeast into the Piedmont CCD toward Pennsylvania. The second prong took a left turn south at Newark and moved along SR 896 into the Pencader CCD south of U.S. 40. By the end of the 1980s, as the Piedmont began to reach its holding capacity, nearly all new suburban development shifted south of the C&D Canal toward Middletown.

The five CCDs making up the eastern half of the county stemmed their decline overall, gaining 6,024 residents and growing by two percent. For the first decade since the 1930s, Wilmington's population grew slightly, with a four percent increase in blacks and minorities offsetting a four percent loss of whites. This was the smallest percentage decline of whites in the city since the 1940s. Wilmington also experienced a 10 percent increase in new households. In the older suburbs north and west of the city, however, population loss persisted as the Brandywine CCD declined by 4,332 people and Lower Christiana CCD by 2,737 persons, declines of five and seven percent respectively. In spite of its population loss, the number of households in Brandywine Hundred increased by four percent. The New Castle CCD, on the other hand, doubled its growth rate as its southern reaches underwent suburbanization.

The Piedmont CCD, in the northwest corner of the County, was tied as the second fastest growing CCD in the county with 7,000 new residents and a 41 percent growth rate. Household grew at a faster rate of 48 percent, adding 2700 new households. The southern prong of suburban development, centered on the Pencader CCD south of U.S. Route 40 continued in the 1980s as the fastest growing CCD in the county, doubling its population to 18,000 people and adding 9,000 new households. South of the C&D Canal, the Middletown-Odessa CCD grew at the same high rate as Piedmont to the north and increased its households by 54 percent from 1980 to 1990.

To the east, the New Castle CCD, which extends from Wilmington to the town of New Castle and west along the U.S. Route 40 corridor to the town of Bear, grew rapidly in its less developed southwestern half. Meanwhile, the area between New Castle and Wilmington declined. To the north, the more centrally located western CCDs of Upper Christiana and Pike Creek/Center Kirkwood, which rapidly suburbanized in the 1950s and 1960s, resumed their population growth in the 1980s increasing by 35 percent and 23 percent respectively. Greater Newark, the most developed of the western CCDs and nearly at capacity for new construction, grew by only six percent although households grew by 17 percent.

Future Regions of Population Growth: 1990 to 2020

The population trends of the 1970s and 1980s are projected to continue and result in three distinct demographic regions in New Castle County by 2020. During this period, the geography of population gain and loss in New Castle County will have shifted from one of loss in the eastern part of the county and gain in the west to one of relative decline and loss in the northern section of the county and gain in the south. (Figures 12, 13, 14, 15, & 16, Table 2 & 3)

New Castle County north of the I-95 corridor, from Wilmington north to Brandywine Hundred to the presently rapidly growing Piedmont CCD, is projected to become an area of growing population stability and even decline in some areas from 1990 to 2020. The area south of I-95, south of U.S. Route 40, and south of the Chesapeake and Delaware Canal will experience the greatest population growth in the county during the period. In those three decades, the CCDs of New Castle, Red Lion, Pencader, and Middletown/Odessa are projected to have increased by 72,949 persons and grown by 67 percent.

All CCDs in the county that are projected to experience population increases from 1990 to 2020 will follow the decade-by-decade pattern of population growth rates in the county. The highest growth rates in the county are projected to occur in the 1990s and to decline thereafter each decade to 2020. Specifically, the county rates will decline from nine percent in the 1990s, to six percent from 2000 to 2010, and to three percent from 2010 to 2020. (Table 2)

The three demographic subareas will be (See Fig. 9):

- Wilmington and the inner suburbs as northeastern subarea of stability and decline:
- West-central New Castle County as region of increasing population stability
- Southern subarea of high suburban growth

Stability and Decline: Wilmington and the Inner Suburbs. - The CCDs that will make up the northern region of stability by the year 2020 in New Castle County are of two types. The first is an area of stability and decline in the northeast that includes the City of Wilmington and the older eastern CCDs of Brandywine and Lower Christiana (Table 2 & 3, Fig. 16). Although no longer losing population, Wilmington is projected to increase only by two percent in the 1990s and one percent in each of the following decades. Brandywine and Lower Christiana CCDs have been losing population since the 1970s and are projected to continue to do so through 2020. To the west, CCDs that have been growing in population -- Greater Newark, Pike Creek, Upper Christiana, and Piedmont -- are expected to level off in population growth by 2020 and even to lose population in one case (Figs. 12 & 13).

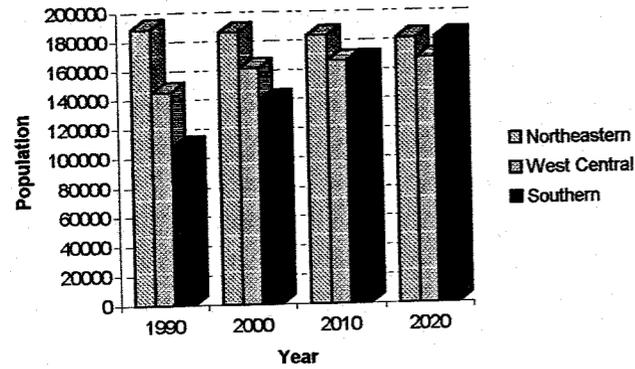


Figure 12. New Castle County: Comparison of Projected Change in Population by Subarea, 1990 to 2020.

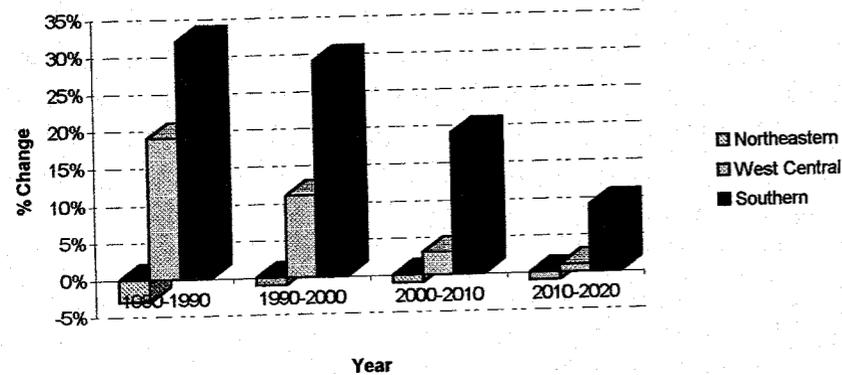


Figure 13. New Castle County: Comparison of Projected Percent Increase in Population by Subarea, 1980 to 2020. (Source: DPC, July 1998)

This pattern of population decline spreading from the inner city to the older suburbs follows a national pattern. Although Wilmington posted a slight overall gain in population from 1980 to 1990, it continued to lose both blacks and whites to the suburbs. The population gain was a result of the increase of new blacks and especially other minorities, which offset the loss. The heaviest losses of population were on the edge of the city. Both blacks and whites declined in the western portion of the city and whites left the northeast corner. The most significant gains of both white and black population took place in the central part of the city.

Both the Brandywine CCD, north of Wilmington, and Lower Christiana CCD, west of the city, contain some of the oldest suburban development in the county, much of it from the immediate post-World War II period. In the Upper Christiana CCD, the towns of Elsmere and Newport are nineteenth-century industrial suburbs of Wilmington. Kirkwood Highway extending west to Newark was a corridor of early suburbanization in the 1950s.

The Brandywine CCD, with a population of 80,434 in 1990 is expected to decline to 73,449 by 2020, a loss of nine percent. Following the same pattern, the Lower Christiana CCD directly west of the city is projected to decline by 11 percent from a 1990 population of 36,543 to 32,555 by 2020. Wilmington is expected to increase its population from 71,526 to 74,852 during the same period. As a whole, this eastern area of stability is projected to decline from 188,503 persons in 1990 to 180,856 by 2020, a loss of four percent.

In spite of this decline in population, and reflecting the new arithmetic of growth, the area will experience an increase of 7,962 households or 11 percent. The greatest number will be in Wilmington, followed by Brandywine Hundred, and Lower Christiana (Figs. 14, 15 & 16).

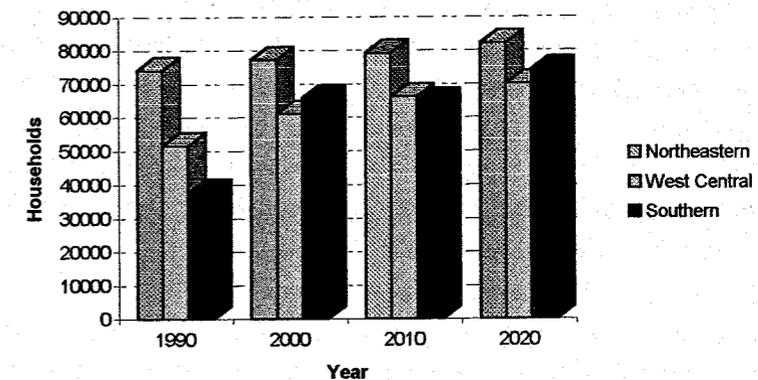


Figure 14. New Castle County: Comparison of Projected Change in Households by Subarea, 1990 to 2020.

Transition to Stability in West Central New Castle County - Four CCDs that have been growing rapidly in the 1980s and 1990s and before -- Upper Christiana, Pike Creek/Central Kirkwood, Greater Newark, and Piedmont -- are projected to see their population growth rates drop in the first decades of the next century (Tables 2 & 3, Figures 12, 13 & 16). This area, the population of which grew 19 percent in the 1980s, is projected to see its growth rate continue at 18 percent in the 1990s and

decline to one percent by 2010-2020 decade. From 1990 to 2020 the population of these areas will increase from 145,315 to 167,075, an increase of 15 percent. Part of the reason for this declining rate of growth is that as the population of this area ages, the empty nesting that reduced the population of the Brandywine CCD in the 1970s is moving west into CCDs that were suburbanized later. Another reason is that these CCDs are reaching their holding capacity for new development.

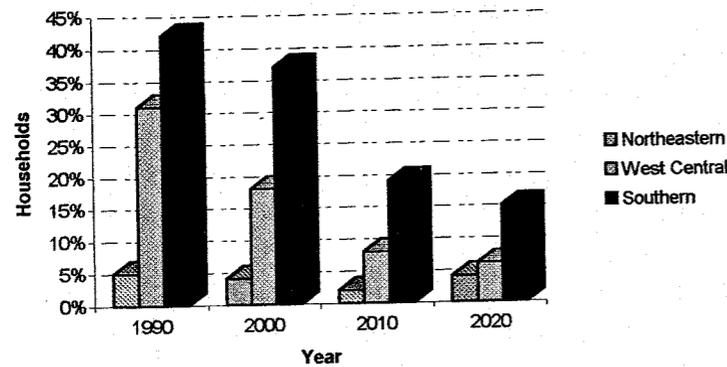


Figure 15. New Castle County: Comparison of Projected Percent Change in Households by Subarea, 1990 to 2020.

Still, household growth, and development, will proceed at a faster rate than population (Table 3, Figures 14, 15 & 16). From 1990 to 2020, households will increase by 36 percent, more than twice the rate of population growth. Between 1990 to 2020, 18,357 new households are expected to be formed in west central New Castle County.

The Pike Creek/Central Kirkwood CCD straddles Kirkwood Highway in the north-central part of the county. Upper Christiana just to the south is bisected by the I-95 corridor and contains the major shopping, office, and institutional complex in New Castle County. Both CCDs grew rapidly in population in the 1980s, Pike Creek/Kirkwood by 23 percent and Upper Christiana by 35 percent. In the 1990s, the population growth rate of the Pike Creek/Kirkwood Highway CCD is projected to fall to 11 percent and Upper Christiana's by more than half to 15 percent. The population growth rates of both CCDs will continue to decline until by the decade 2010-2020; that of Upper Christiana will be three percent, while the Pike Creek/Kirkwood area will lose two percent of its population. Overall from 1990 to 2020, these two CCDs are expected to increase their population from 59,910 to about 68,000, or 12 percent.

The Greater Newark CCD -- located on the western edge of New Castle County and with 1990 population of 61,003 -- is centered on the City of Newark. The city contained 26,504 people in 1990, which was 43 percent of the total population of the CCD. As a major employment center with the

University of Delaware, manufacturing plants for automobiles, and various chemical products, Newark has extended its suburbs westward beyond the Delaware state line into eastern Cecil County, Maryland. Functionally, "Greater Newark" includes these Maryland suburbs as well as Brookside, and others to the south of the city.

Although anticipated to grow by seven percent in the 1990s, the population growth rate of Greater Newark CCD is projected to fall to three percent from 2000 to 2010 and to one percent from 2010 to 2020. From 1990 to 2020, the Greater Newark CCD will increase by 6,620 persons and reach a 2020 population of 67,623. Increasing by 11 percent, the City of Newark, will grow at the same rate during that period, reaching a population of nearly 30,000 by 2020. This is partly due to infilling within the city, as the demand for housing increases.

The Piedmont CCD, in the northwestern part of New Castle County along the Pennsylvania border, is the population roller coaster in New Castle County. Its population growth rate accelerated to 21 percent in the 1980s, and is projected to continue at 17 percent for the 1990s. From 1980 to 2000, its population will have increased from 17,295 to 28,603 persons -- or 65 percent. Its rate of population growth, however, is expected to drop to seven percent from 2000 to 2010 and to three percent between 2010 and 2020.

However, whereas the population of the West Central CCDs will increase by 15 percent from 1990 to 2020, the number of households will increase by 36 percent. More than 18,000 new households will be forming in this area from 1990 to 2020. The highest rates of growth will be in the Upper Christiana CCD, including the Metroform area, and the Piedmont CCD where households will grow by 49 and 52 percent respectively. Households in the Greater Newark CCD will increase by 31 percent and in the Pike Creek/Kirkwood CCD by 26 percent. As with population growth, the highest rate of household growth is projected to occur in the 1990s at 18 percent and then taper off to 6 percent in the 2010 to 2020 decade.

Several factors help explain the decline in development in the Piedmont CCD. Until the late 1970s and 1980s, much of the land in the Piedmont CCD was still in large farms and estates. In the hilly and wooded Piedmont area west of the so-called "Chateau Country" of the great Delaware estates, there was a pent-up demand for more expensive suburban and "country" houses. This demand intensified in the early 1980s when a number of large banks were attracted to New Castle County, bringing with them their own executives and housing needs. When some of the farms and estates were sold -- in whole and in part -- in the mid-1980s, expensive suburban residential development followed. At the same time, both zoning and the hilly terrain promoted low-density, high cost development. Moreover, land for development was limited because extensive tracts in the White Clay Creek watershed were converted to parks and other public uses. Hence, the Piedmont CCD reached its holding capacity for housing rather

quickly and the demand for new expensive suburban development moved north into Chester County, Pennsylvania.

Southern Subarea of High Suburban Growth - From 1990 to 2020, there will be a suburbanization boom in southern New Castle County. The four southern CCDs of the county -- Central Pencader, Middletown/Odessa, New Castle, and Red Lion -- are projected to increase their population by 67 per cent and households by 95 percent (Tables 2 & 3, Figs. 12, 13 & 16). In new persons and households this translates to 72,949 more people from 1990 to 2020 and 36,174 new. By 2020, the four southern CCDs are projected to have a population of 181,077 persons in 74,068 households. The fastest growing area in the County from 1990 to 2020, growth rates of the southern region will follow the county's pattern of high growth in the 1990s followed by declining rates of growth in the following decades.

The eastern half of the southern region of the county consists of the New Castle CCD in the north and the Red Lion CCD to the south, bordering the Chesapeake and Delaware Canal. It is the southern half of the New Castle CCD that will grow rapidly. The northern half of the New Castle CCD, which abuts Wilmington, is part of the declining older suburban area. The Pencader CCD occupies the western half of the southern growth region above the C&D Canal. The Middletown/Odessa CCD south of the canal makes up the rest of the southern growth area and covers about 40 percent of the county's land area.

In the western side of the southern region, State Route 896 and U.S. Route 301 share a north-south right-of-way from Newark south to Middletown south of the C&D Canal. Since the 1970s, the traffic capacity of SR 896/US 301 has been steadily expanded, until by the early 1990s, it provided four-lane accessibility to a point about three miles north of Middletown. In the 1970s, new population growth and suburban development began moving south along the SR 896/US 301 corridor and boomed in the 1990s. The Pencader CCD, which is bisected by SR 896 and is located between the canal and Newark, has been the site of the greatest growth in the southern region.

Since the 1970s, the Pencader CCD has been the fastest growing of all of the CCDs in the county. In that decade its population grew by 312 percent from 2,091 to 8,605 persons. In the 1980s, the population of the Pencader CCD more than doubled, from 9,102 people to a 1990 population of 17,719. The number of households also more than doubled reaching 6,140 by 1990. From 1990 to 2020, according to projections, the Pencader CCD will be the fastest growing CCD in the State. By 2020, it is expected to have increased its population by 143 percent to 43,039 persons and to have expanded its households by 187 percent to 17,613.

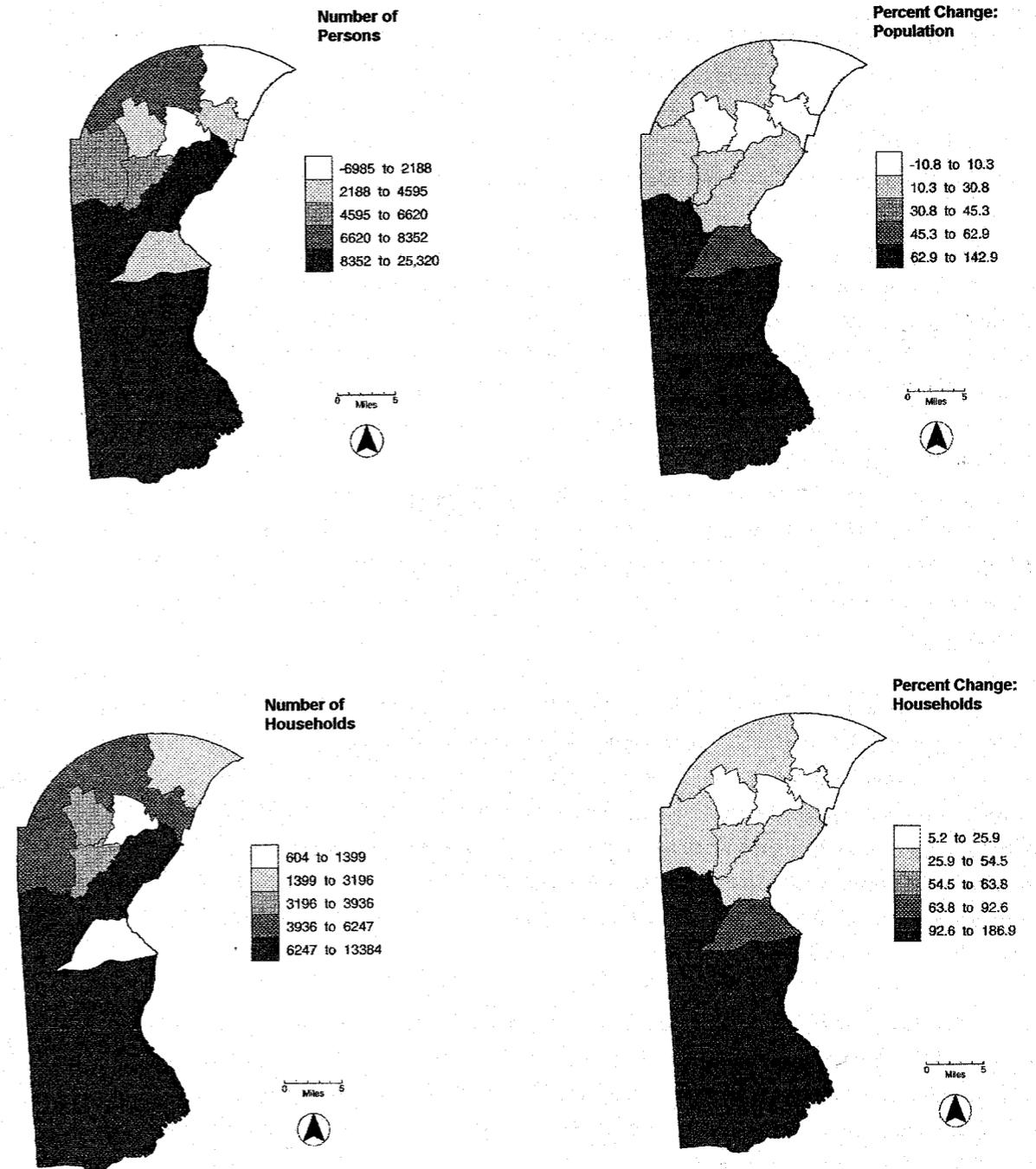


Figure 26. New Castle County: Projected Change in Population and Households by County Census Division, 1990 to 2020.

The greatest growth of both population and households in the Pencader CCD is anticipated for the 1990s, when population will increase by 63 percent and households by 74 percent. Growth rates for population and households will be lower in the first two decades of the next century. From 2000 to 2010, population will increase by 30 percent and households by 38 percent and from 2010 to 2020 the growth rates will decline by about half to 14 and 20 percent respectively for population and households.

South of the C&D Canal, the Middletown/Odessa CCD is projected to be the second fastest growing CCD in the county from 1990 to 2000 with its population expected to increase in 130 percent and households by 187 percent. Being farther south, the Middletown-Odessa area began its population growth later than did Pencader. In the 1970s, the Middletown/Odessa CCD grew by 3,147 people. This amounted to a 31.3 percent increase over its 1970 population of 10,040. In the 1980s, population growth here increased to 40.9 percent while households grew by 54 percent. In 1990, this area contained a population of 18,578 divided into 5,881 households. Population projections from 1990 to 2020 indicate that the population of the Middletown/Odessa CCD will reach 42,763 by 2020 and households will stand at 15,983. Decade-by-decade, growth rates for population and households will be 51 and 61 percent respectively in the 1990s, 32 and 40 percent from 2000 to 2010 and from 2000 to 2010, 15 and 21 percent. Most of the new population growth is likely to be concentrated in an area north of Middletown and Odessa.

In the eastern part of the southern area in the New Castle and Red Lion CCDs, projected population growth is also related to highways. The major north-south highway in the southeastern part of the County has been U.S. 13 which has been the spine of a corridor developing between Dover and Wilmington. Since 1990, construction has begun on a second major four-lane highway, State Route 1, paralleling U.S. 13 south to the Kent County border and to Dover. Intended to relieve traffic congestion to the beaches, the road will contribute to increased development, and sprawl, in the southeastern quadrant of the county. Coming from the west, an east-west highway, U.S. 40, joins U.S. 13 west of the city of New Castle.

Most of the growth in the New Castle CCD is projected to occur in its southern half along the U.S. 40 and U.S. 13 corridor. From 1990 to 2020, the New Castle CCD is projected to grow from 67,798 to 88,706 persons, an increase of 20,908 persons and 31 percent. Households are projected to increase by 55 percent from 24,557 in 1990 to 37,941 by 2020. Most of this growth will occur in the southern half of the CCD.

The Red Lion CCD, south of the New Castle CCD and bordering the canal, is the smallest CCD in New Castle County, with a 1990 population of 4,033 persons. The Red Lion CCD contains the town of Delaware City. Although small in population, it will be the third fastest growing CCD in the county

spurring from three percent population growth rate in the 1980s to a 27 percent rate in the 1990s. Similarly, the rate of household formation will increase from 16 percent in the 1980s to 36 percent from 1990 to 2000. The Red Lion CCD will continue to add population, at a rate of 18 percent from 2000 to 2010 and 9.0 percent from 2010 to 2020. The rate of increase for households for the same decades is projected to be 24 and 14 percent. By 2020, the Red Lion CCD is expected to have a population of 6,569 and 2,531 households. However, because of its small size and location in the southern growth region, it may grow more even than predicted.

4. KENT COUNTY DEMOGRAPHIC AND DEVELOPMENT TRENDS

The County as a Whole

From 1990 to 2020, the population of Kent County is projected to increase by 30 percent, growing from 110,993 to 143,778 persons (Fig. 17, Table 4). Households are expected to increase at a higher rate of 51 percent and number 59,185 by 2020 (Figures 18, 19 Table 5). In numbers, that translates to an increase of 32,785 persons and 19,936 households in 30 years. (Figs. 18 & 19).

from 1880 to 1940, the county grew by only 1,500 people from 32,800 to about 34,500. Increasing modestly in the 1940s by 10 percent, the county's population growth rate swelled by nearly 75 percent in the 1950s, producing a population of 65,651 by 1960. Since then, Kent County has continued to grow but at a declining rate, slipping to a 24 percent rate of population increase in the 1960s, to 20 percent in the 1970s, and to 13 percent in the 1980s.

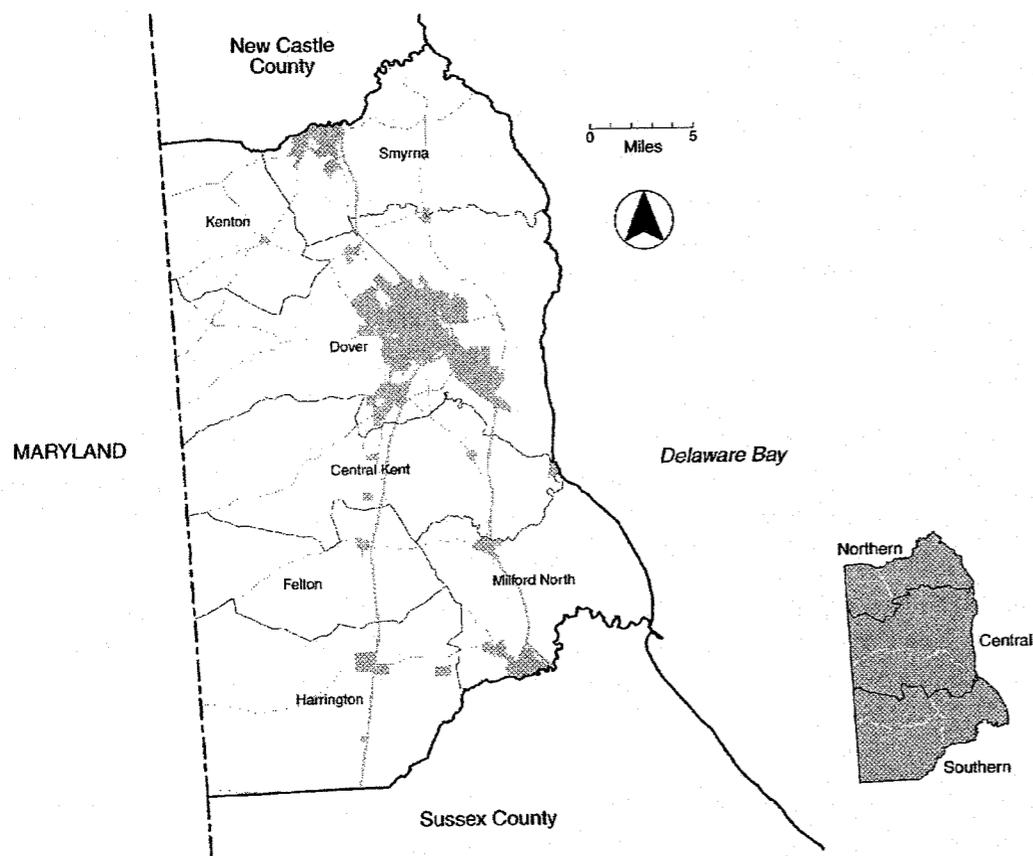


Figure 17. Kent County, Delaware, with County Census Divisions.

From 1980 to 1990, the population of Kent County increased by 15 percent, from 98,219 to 110,993. The number of households, which reached nearly 40,000 by 1990, increased at the faster rate of 21 percent as average household size declined from 3.0 to 2.8 persons, (Tables 5 & 6, Figures 18 & 19). Historically an agricultural county, the population of Kent County had been extremely stable until 1950. Indeed, in the six decades

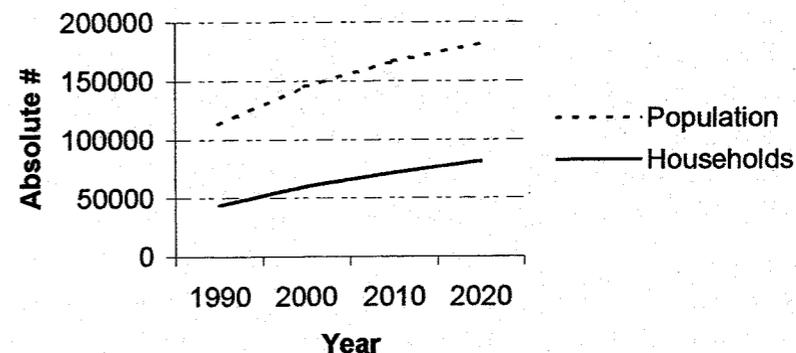


Figure 18. Kent County: Projected Change in Population and Households, 1990-2020.

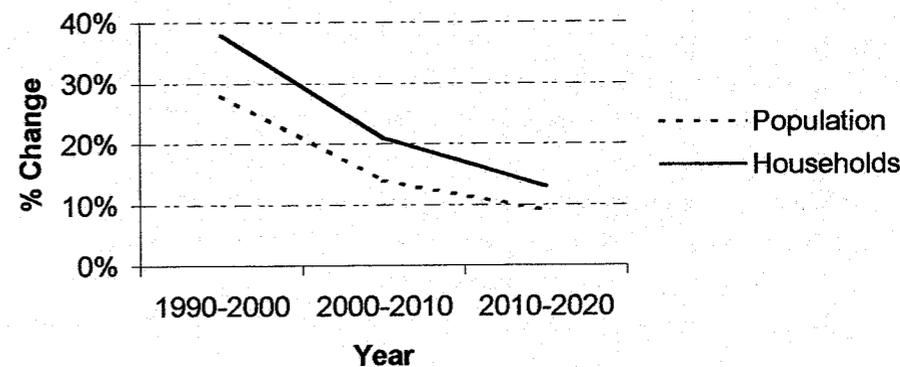


Figure 19. Kent County: Projected Percent Change in Population and Households, 1990-2020.

Kent County is expected to maintain a growth rate of 13 percent in the 1990s, yielding 14,403 new residents. By 2000, Kent County is projected to have a population of 125,396. In the first decade of the next century, Kent County's growth rate is anticipated to decline to nine percent and to five percent in the second. These rates of increase will yield a population of 136,660 persons in 2010 and 143,778 in 2020. Although the cumulative growth rate of 30 percent from 1990 to 2020 will result in nearly 33,000

new residents in the county, the continuation of these trends could bring Kent County to nearly a steady state in population growth by the 2030s.

Accounting for 62 percent of new population in the 1990s the show of population growth provided by natural increase will drop to 43 percent from 2000 to 2010, the number of new residents accounted for by natural increase is projected to decrease as birth rates decline, the county's population ages, and the death rate increases. Although the number of births is projected to average about 18,000 per decade from 1990 to 2020, deaths are expected to increase from 10,000 in the 1990s to nearly 15,000 in the decade from 2010 to 2020. Projections for net migration are more uneven. From 1990 to 2000, newcomers to the county will add 5,217 people to its population, 40 percent of new growth. The number of immigrants will rise to 6,400, nearly 60 percent of added population from 2000 to 2010, and then fall by more than half to 2,548 from 2010 to 2020, accounting for 50 percent of the county's growth.

Whereas the population of Kent County is projected to increase by 30 percent from 1990 to 2020, the number households are expected to increase by 51 percent. In the 1990s, growing at a rate of 20 percent, 7,825 new households are projected, bringing the total to 47,074 by 2000. From 2000 to 2010 and from 2010 to 2020, households are expected to expand by 15 percent and 10 percent, respectively. Accordingly there will be 12,711 new households formed in the first two decades of the next century, and that number will reach nearly 60,000 by 2020.

In its development in the last two decades, Kent County has retained its historical geographical structure of a single urban center -- Dover -- surrounded by a suburban and agricultural hinterland or periphery. However, the construction of a major north-southeast state highway (SR 1) and increased traffic on the major federal highway (U.S. 13), that also runs through the county from the north to the southwest, are creating the conditions for the formation of a development corridor in Kent County, especially from Smyrna on the New Castle County line, to Dover. The corridor would take the shape of an inverted "Y." North of Dover, U.S. 13 and SR 1 run parallel to Dover, where SR 1 branches southeast toward Milford and Rehoboth Beach and U.S. 13 branches south toward Harrington and Seaford in Sussex County.

Racial and Ethnic Composition

In racial composition in 1990, 18 percent of the population of Kent County were black, 80 percent were white, and the remaining 2 percent were classified as other minorities by the U.S. Census and were mostly Asian. In numbers of people in 1990, there were 88,618 whites, 20,934 blacks and 2,088 other minorities. Projections to the year 2020 indicate that the white population will grow by 26 percent, the black population by 46 percent, and other minorities will remain fairly constant. By 2020, the white

Table 4

Population Change 1990-2000		Population Change 2000-2010		Population Change 2010-2020		Population Change 1990-2020						
#Persons 1990	Difference In		#Persons 2010	Difference In		#Persons 2020	Difference In					
	Number	Percent		Number	Percent		Number	Percent				
4429	5253	824	19%	6003	750	14%	6617	614	10%	6617	2188	49%
10633	12434	1801	17%	14012	1578	13%	15228	1216	9%	15228	4595	43%
15062	17687	2625	17%	20015	2328	13%	21845	1830	9%	21845	6783	45%
59473	66067	6594	11%	70725	4658	7%	73013	2288	3%	73013	13540	23%
15838	17829	1991	13%	19341	1512	8%	20233	892	5%	20233	4395	28%
75311	83896	8585	11%	90066	6170	7%	93246	3180	4%	93246	17935	24%
4844	5621	777	16%	6287	666	12%	6780	493	8%	6780	1936	40%
6758	7243	485	7%	7481	238	3%	7451	-30	0%	7451	693	10%
9018	10949	1931	21%	12811	1862	17%	14456	1645	13%	14456	5438	60%
20620	23813	2416	15%	26579	2766	12%	28687	2108	8%	28687	8067	39%
110993	125396	14403	13%	136660	11264	9%	143778	7118	5%	143778	32785	30%

Table 4 -- Kent County: Population Projections by County Census Divisions and Subareas: 1990 - 2020

Table 5

Census County Division	Population Change 1990-2000		Population Change 2000-2010		Population Change 2010-2020		Population Change 1990-2020	
	#Persons 1990	Difference In Number	#Persons 2010	Difference In Number	#Persons 2020	Difference In Number	#Persons Total	Difference In Number
Northern								
Kenton	1511	1968	2449	481	2910	461	2910	1399
Smyrna	3538	4152	4656	504	4984	328	4984	1446
Subtotal	5049	6120	7105	985	7894	789	7894	2845
Central								
Dover	20692	24574	27886	3312	30206	2320	30206	9514
Central Kent	5817	7104	8289	1185	9233	944	9233	3416
Subtotal	26509	31678	36175	4497	39439	3264	39439	12930
Southwestern								
Felton	1735	2141	2525	384	2842	317	2842	1107
Milford North	2647	2968	3179	211	3251	72	3251	604
Harrington	3309	4167	5014	847	5759	745	5759	2450
Subtotal	7691	9276	10718	1442	11852	1134	11852	4161
Total	39249	47074	53998	6924	59185	5178	59185	19936

Table 5 - Kent County: Household Projections by County Census Divisions and Subareas: 1990 - 2020.

population will have increased by 22,742 persons and number 111,360 persons. By the same year, the black population will have expanded by 9,559 people and will stand at 30,493. Although there are no projections available by race for CCDs, in 1990, 66 percent of the black population was living in the Dover CCD and 28 percent in the City of Dover. In 1990, the Hispanic population of Kent County numbered 2,384. By 1996, it had grown 33 percent to 3,165 persons.

Regions of Population Growth in Kent County

The seven CCDs in Kent County can be divided into three tiers from north to south (Table 4 & 5, Figures 20, 21, 22, 23 & 24). The northern tier is formed by the Smyrna CCD in the northeast corner of the county and the Kenton CCD in its northwest corner. Moving south, the Dover CCD and Central Kent CCD form the central tier. The City of Dover, the capital of Delaware, is located in the Dover CCD. Both of these CCDs extend across the county from the Maryland border on the west to the Delaware River on the east. The southern tier of CCDs consists of the Felton and Harrington CCDs on the west and the Milford North CCD to the east.

Of these, the northern tier of Kenton and Smyrna CCDs are projected to have the highest rate of population growth from 1990 to 2020 at 45 percent (Figs 20 & 21). They are anticipated to increase from a population of 15,062 in 1990 to 21,845 in 2020 (Figs. 24 & 25). They will also have the faster rate of household formation increasing households by 56 percent and contain 7,894 households by 2020 (Figs. 22, 23, 26 & 27). The second fastest growing area of the county is projected to be the southern tier of Felton, Harrington, and Milford North CCDs. Taken together they will grow by 39 percent and become home to 8,067 new residents increasing from 20,620 persons in 1990 to 28,687 by 2020. Households in these CCDs will increase by 54 percent from 7,691 in 1990 to 11,852 in 2020.

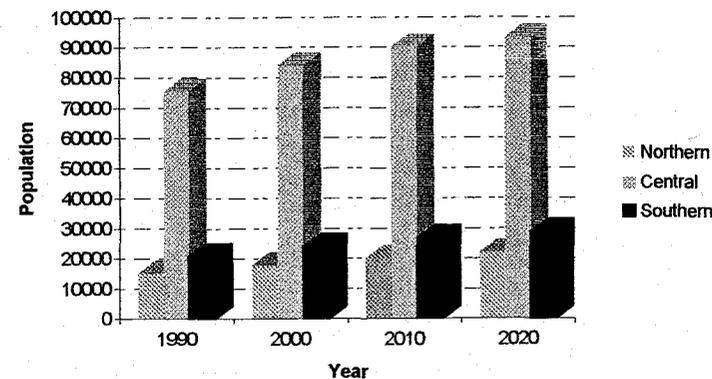


Figure 20. Kent County: Comparison of Projected Population by Subarea, 1990 to 2020. (Source: DPC, July 1998)

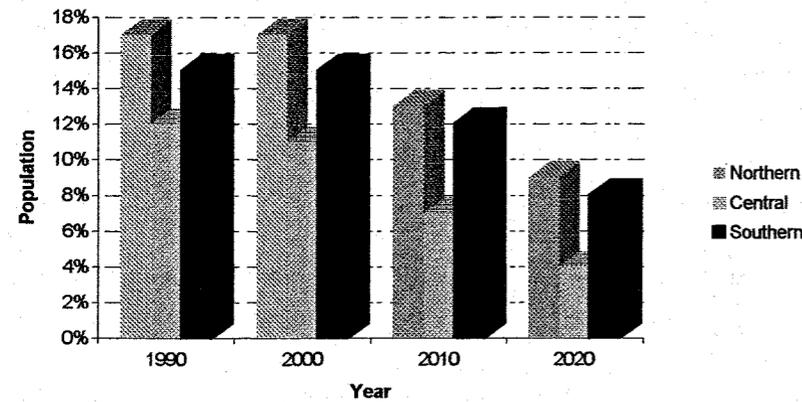


Figure 21. Kent County: Comparison of Percent Change in Population Projections by Subarea, 1990 to 2020.

Among the three tiers of CCDs, the Dover and Central Kent CCDs are predicted to have the lowest rate of population growth from 1990 to 2020 at 24 percent. But because they are the CCDs with the largest populations in the county, they will experience the greatest increase in persons, adding 17,935 people from 1990 to 2020. They will also produce the largest number of new households among the three areas although ranking third in rate of growth. Households in the Central CCDs will increase by 49 percent from 26,509 in 1990 to 39,439.

In 1990, 68 percent of the county's population lived in the Central CCDs, 18 percent lived in the Southern CCDs, and 14 percent lived in the Northern CCDs. By 2020, the population of the county will be, to some extent, more uniformly distributed. The two CCDs with the highest projected rates of population growth from 1990 to 2020 are Harrington in the southwest corner, with a rate of 60 percent, and Kenton in the northwest corner of the county, with a growth rate of 49 percent. The other six CCDs in the County were anticipated to have population growth rates from 1990 to 2020 ranging from 10 percent to 43 percent. Thus, unlike New Castle County where new growth pushed west and south like a wave, leaving a wake of decline, population increases in Kent County will be more uniform with all CCDs gaining population.

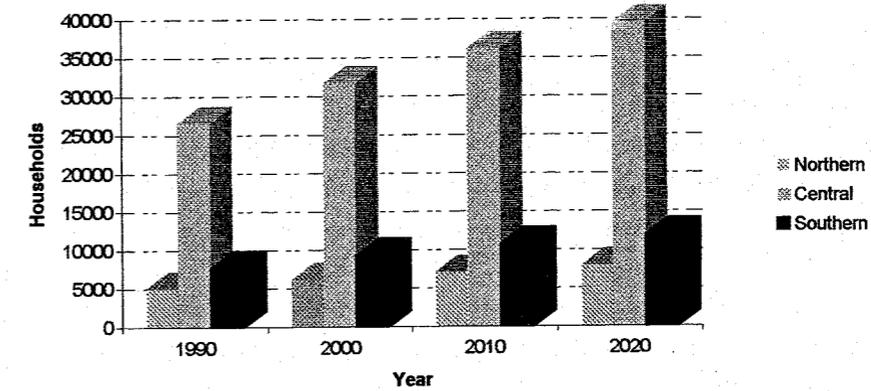


Figure 22. Kent County: Comparison of Household Projections by Subarea, 1990 to 2020. (Source: DPC, July 1998)

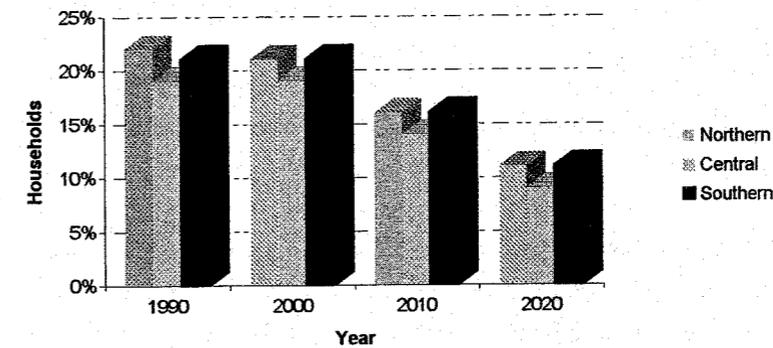


Figure 23. Kent County: Comparison of Projected Percent Change in Households by Subarea, 1990 to 2020.

The Northern Area of the County.- The two northern CCDs Smyrna and Kenton contained 14 percent of the county's population in 1990, with 15,062 residents. From 1990 to 2020, their population is projected to grow by 45 percent to 21,845 persons. (Tables 4 & 5) Households are predicted to increase by 56 percent to 2,845. The Smyrna CCD takes its name from Kent County's third largest town, the population of which stood at 5,231 in 1990. Nearly identical in their population growth rates, both CCDs are anticipated to grow by about 18 percent in the 1990s and decline to about an eight percent rate of growth by in the years from 2010 to 2020.

Future population and household growth, however, may be underestimated for these CCDs. The Smyrna CCD is divided by two four-lane highways that form the spine of the Dover-to-Wilmington corridor which serves increasing numbers of commuters, truck traffic moving from the northeast into the south and vacationers going to the beaches in the summer. Located within easy commuting time from both Dover and Wilmington, and adjacent to the high growth area of southern New Castle County, this northern area of Kent County may become increasingly attractive to households that must commute in both directions.

Dover and the Central Area of Kent County.— The Dover and Central Kent CCDs occupy the middle of Kent County (Fig. 17). Geographically, the population the County is centered on Dover, a city of 27,754 in 1990 and the state capital and county seat. Dover exhibited the greatest absolute population increase of any town or city in Delaware from 1990 to 1996 reaching a population of 30,414 persons by 1996.²⁴ By 2020, the city is projected to surpass 35,000 people. The city is at the core of the Dover CCD, the most populous CCD in Kent County, which contained a population of 60,000 and 46 percent of the county's population in 1990. It is projected to reach 73,013 persons by 2020.

The Central Kent CCD to the south is the second largest CCD in the county, with a population of 15,838 in 1990 and is anticipated to increase to 20,233 persons by 2020. Together, the Dover and Central Kent CCDs contained a population in 1990 of 75,311 -- nearly 60 percent of the county's total. From 1990 to 2020, the two CCDs are projected to grow by 24 percent and reach a population of 93,246 (Tables 4 & 5, Figures 20, 21, 22, 23 & 24).

The metropolitan area of Dover is contained within the Dover and Central Kent CCDs. However, because the Dover CCD extends across the county from the Maryland border on the west to the shoreline of Delaware Bay on the east, it is not possible to get a sense of the dynamics of suburban growth in the Dover metropolitan area from the population projections based on CCDs. A sense of changing Dover metropolitan population patterns can be gained from the 1980 and 1990 U.S. Census. For this purpose the Dover CCD has been divided into three subareas based on census tracts. The three parts are West Dover, consisting of the tracts in the western part of the city and the western Dover CCD. The second part, Central Dover, is made up of the core tracts in the city, and East Dover, the third subarea, is the area between Dover and the Delaware River. As in New Castle County, but on a much smaller scale, suburban development is moving to the west from the city to the Maryland border.

From 1980 to 1990, the five fastest growing tracts in the county, with growth rates from 27 percent to 62 percent, were located in West Dover. The fastest growing tract among these was located in the northwest corner of central Dover. Yet, because the 1980 population was relatively small in West

Dover, the actual population growth from 1980 to 1990 was about 2,500, rising from 11,837 in 1980 to 14,341 in 1990.

Conversely, the tracts in the county exhibiting population decline from 1980 to 1990 were located in the southeastern corner of Dover and adjacent to the city on the east. Overall, the portion of the Dover CCD east of the city remained almost stable from 1980 to 1990, declining by less than one percent. Thus, while the Dover CCD grew 11.5 percent from 53,321 in 1980 to 59,473 in 1990, more than 90 percent of that growth occurred in the area west of downtown Dover to the Maryland/Delaware state boundary, a pattern that is likely to continue.

From 1990 to 2000, the population of the Dover CCD is projected to expand by 11 percent to slightly more than 66,000 people. From 2000 to 2010 and from 2010 to 2020, the population growth rates for the Dover CCD are expected to decline, relatively, to 7 percent and 3 percent, respectively. By 2020, the Dover CCD is projected to have reached a population of 73,013 -- an increase of 7,000 in the first two decades of the next century. During the 1990 to 2020 period households in the Dover CCD are expected to increase by 46 percent adding 9,514 new households to the area. If 80 percent of the projected increase in population and households were prorated to the West Dover area, the area from downtown Dover westward would gain close to 9,500 new residents and 7,612 new households from 2000 to 2020.

From 1990 to 2020, the population of the Central Kent CCD, bordering the Dover CCD to the south, is projected to increase by 28 percent to 20,233 persons. It will follow the projected Kent growth pattern of declining growth rates and is projected to grow by 13 percent in the 1990s, eight percent in the next decade, and five percent from 2010 to 2020. During the same period, households will increase by 59 percent to number 9,233 by 2020. Together, the populations of the two Central CCDs are projected to grow by 24 percent from 1990 to 2020, from a population of 75,311 persons to 93,246 residents. Households will increase 50 percent and number 12,930 by 2020.

The Southern Area of the County - The three CCDs making up the southern tier of Kent County are Felton and Harrington on the west and Milford North on the east (See Fig. 17). In 1990, this southern, very rural, area contained a population of 20,620. By 2020, it is expected to have grown by 39 percent to 28,687 persons. In number of households, it is projected to increase 54 percent from 7,691 in 1990 to 11,852 by 2020. This southern area contains the CCDs projected to be both the fastest and slowest growing in the county -- Harrington in the southwest and Milford North in the southeast, respectively. (Tables 4 & 5, Figures 20, 21, 22, 23 & 24)

Of the three CCDs in the southern tier, Harrington, in the southwest corner of the county, is projected to have the fastest growing population in the county from 1990 to 2020, expanding by 60 percent. The Felton CCD will increase about 40 percent. Much of this growth is tied to U.S. 13, which runs south through western Kent County into Sussex and on to Salisbury, Maryland and points south. U.S.13 is becoming a development corridor as it attracts highway oriented land uses and pulls commercial development from nearby towns such as Harrington.

The Harrington and Felton CCDs are also projected to have high rates of household formation. Harrington is expected to see a 74 percent increase in the number of households in the CCD from 1990 to 2020 while Felton's households will increase by 64 percent during the same period. The number of households will increase from 3,309 in Harrington in 1990 to nearly 6,000 by 2020. For Felton, the numbers will be 1,735 for 1990 and 2,842 for 2020.

The Milford North CCD will experience the slowest growth rate and smaller absolute increase in population and households of any CCD in the county. From 1990 to 2020, population will grow by 10 percent while households will increase at twice the rate at 23 percent. Its population is projected to increase from 6,758 in 1990 to 7,451 in 2020 while households will grow from 2,647 to 3,251.

However, it is important to reemphasize that although the cumulative projected growth of persons and households can be substantial over the projection period, the greatest growth will occur in the 1990s following by declining rates of increase.

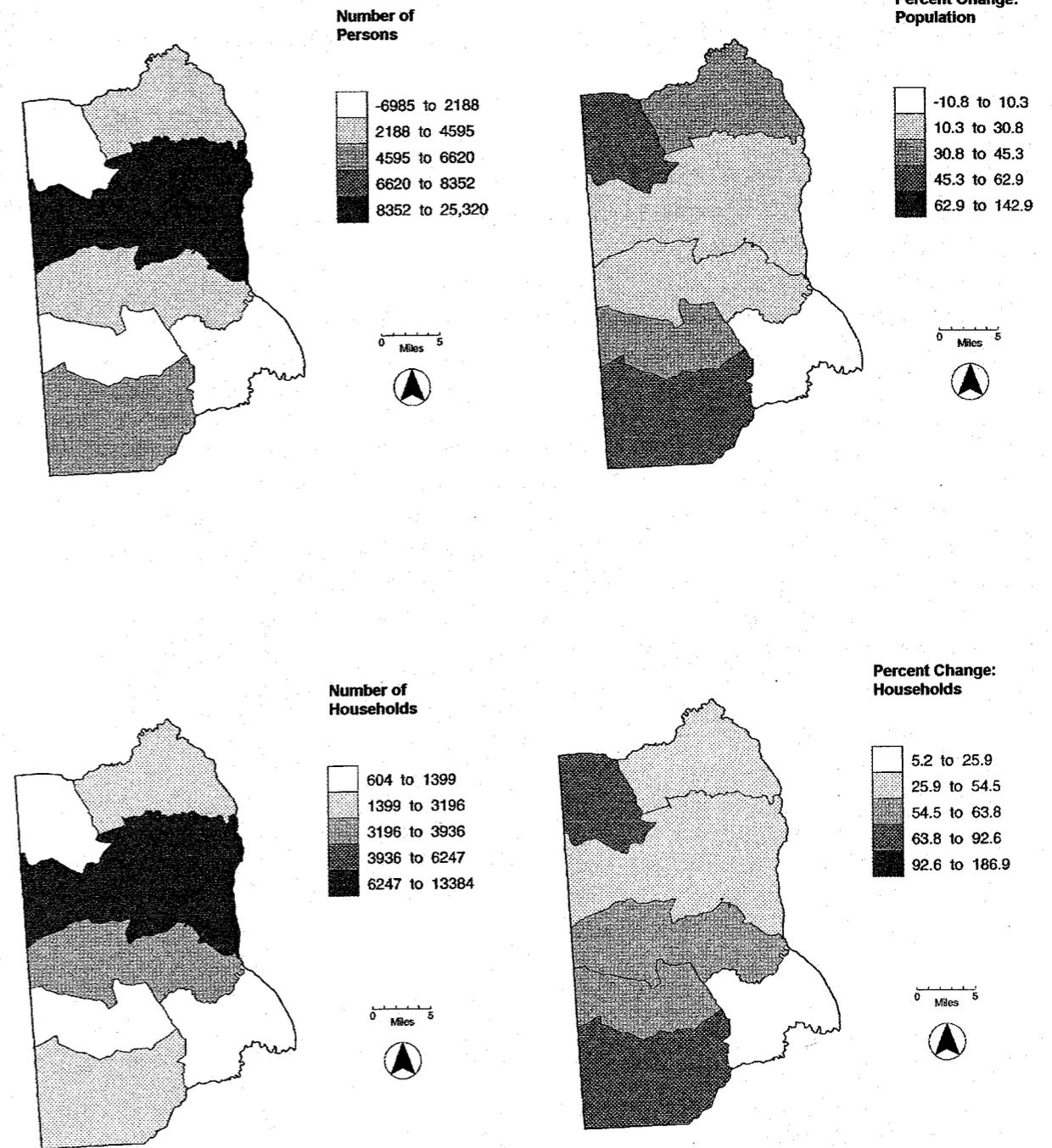


Figure 24. Kent County: Projected Change in Population and Households by County Census Division, 1990 to 2020.

5. SUSSEX COUNTY: DEMOGRAPHIC AND DEVELOPMENT TRENDS

The County as a Whole

From 1990 to 2020, Sussex County (Fig. 25) is projected to be the fastest growing county in the State with its population increasing by 60 percent and number of households by 86 percent (Tables 6 & 7 and Fig. 26). In numbers, that translates to an increase of 67,724 persons and 37,689 households in 30 years. By 2020, the county's population will number 181,197 and its households 81,371. Within the County, the greatest population and household growth is projected to occur in the eastern, coastal section. Two County Census Divisions -- Milton and Millsboro -- will more than double their population and increase their households by 150 percent from 1990 to 2020. (Tables 6 & 7, Figures 26 & 27)

Historically an agricultural county, the population of Sussex County remained almost stable at about 26,000 from 1810 until the 1860s. In 1870, it stood at 31,600 residents, only slightly larger than Kent's 27,804 people. But, unlike the population of Kent County, which grew little until 1940, that of Sussex County increased at a steady rate of 10 percent per decade, reaching 52,502 in 1940. Sussex County's population growth rate increased from 14 percent in the 1950s to 20.3 percent in the 1960s. After falling to a 10 percent increase in the 1970s, in the 1980s the county's population growth rate rebounded to 22 percent. In the 50 years from 1940 to 1990 the population of Sussex County more than doubled, expanding from 52,502 to 113, 229, an increase 116 percent.

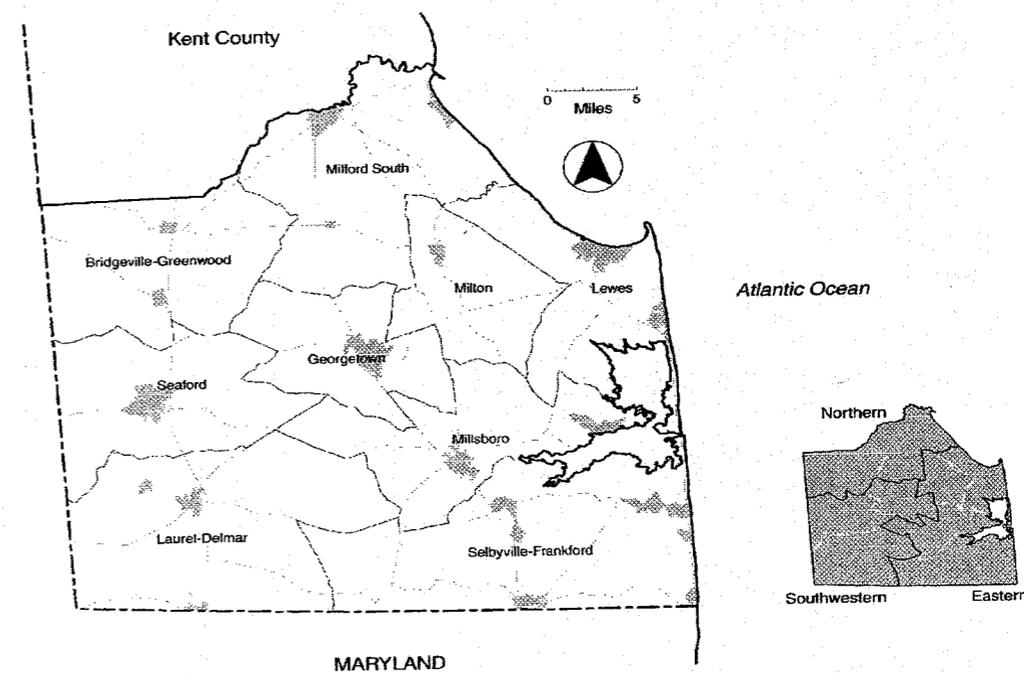


Figure 25. Sussex County, Delaware, with County Census Divisions.

Census County Divisions	Population Change 1990-2000				Population Change 2000-2010			Population Change 2010-2020			Population Change 1990-2020		
	#Persons		Difference in		#Persons	Difference in		#Persons	Difference in		#Persons	Difference in	
	1990	2000	Number	Percent	2010	Number	Percent	2020	Number	Percent	Total	Number	Percent
Northern													
Bridgeville/Greenwood	6899	8732	1833	27%	9824	1092	13%	10499	675	7%	10499	3600	52%
Milford	14044	17500	3456	25%	19386	1886	11%	20399	1013	5%	20399	6355	45%
Subtotal	20943	26232	5289	25%	29210	2978	11%	30898	1688	6%	30898	9955	48%
Eastern													
Milton	7671	10790	3119	41%	13491	2701	25%	16023	2532	19%	16023	8352	109%
Lewes	13628	17402	3774	28%	19754	2352	14%	21300	1546	8%	21300	7672	56%
Millsboro	12897	18192	5295	41%	22811	4619	25%	27169	4358	19%	27169	14272	111%
Selbyville/Frankford	16331	20453	4122	25%	22772	2319	11%	24083	1311	6%	24083	7752	47%
Subtotal	50527	66837	16310	32%	78828	11991	18%	88575	9747	12%	88575	38048	75%
Southwestern													
Georgetown	7776	10199	2423	31%	11892	1693	17%	13171	1279	11%	13171	5395	69%
Seaford	18897	23334	4437	23%	25614	2280	10%	26707	1093	4%	26707	7810	41%
Laurel/Delmar	15086	18780	3694	24%	20783	2003	11%	21846	1063	5%	21846	6760	45%
Subtotal	41759	52313	10554	25%	58289	5976	11%	61724	3435	6%	61724	19965	48%
Total	113229	145382	32153	28%	166327	20945	14%	181197	14870	9%	181197	67968	60%

Table 6 - Sussex County: Population Projections by County Census Divisions and Subareas: 1990 - 2020.

Census County Divisions	Household Change 1980-1990				Household Change 1990-2000			Household Change 2000-2010			Population Change 1990-2020		
	#Households		Difference in		#Hs	Difference in		#Hs	Difference in		#Hs	Difference in	
	1990	2000	Number	Percent	2010	Number	Percent	2020	Number	Percent	Total	Number	Percent
Northern													
Bridgeville/Greenwood	2546	3417	871	34%	3949	532	16%	4319	370	9%	4319	1773	70%
Milford	5093	6726	1633	32%	7647	921	14%	8231	584	8%	8231	3138	62%
Subtotal	7639	10143	2504	33%	11596	1453	14%	12550	954	8%	12550	4911	64%
Eastern													
Milton	2949	4489	1540	52%	5884	1395	31%	7300	1416	24%	7300	4351	148%
Lewes	6111	8341	2230	36%	9803	1462	18%	10906	1103	11%	10906	4795	78%
Millsboro	4947	7522	2575	52%	9848	2326	31%	12203	2355	24%	12203	7256	147%
Selbyville/Frankford	6664	9281	2617	39%	11130	1849	20%	12634	1504	14%	12634	5970	90%
Subtotal	20671	29633	8962	43%	36665	7032	24%	43043	6378	17%	43043	22372	108%
Southwestern													
Georgetown	2952	4242	1290	44%	5249	2297	54%	6148	899	17%	6148	3196	108%
Seaford	6869	8942	2073	30%	10024	1082	12%	10636	612	6%	10636	3767	55%
Laurel/Delmar	5551	7337	1786	32%	8350	1013	14%	8994	644	8%	8994	3443	62%
Subtotal	15372	20521	5149	33%	23623	4392	21%	25778	2155	9%	25778	10406	68%
Totals	43682	60297	16615	38%	71884	12877	21%	81371	9487	13%	81371	37689	86%

Table 7 - Sussex County: Household Projections by County Census Divisions and Subareas: 1990 - 2010.

The fastest growing among Delaware's three counties from 1980 to 1990, Sussex County grew by 16 percent from 98,004 to 113,229 persons. Households also grew at a faster rate, increasing by 23 percent from 35,400 in 1980 to 43,682 in 1990 – an increase of 8,282 households. The more rapid rate of growth in households was due to declining household size. In Sussex County, household size declined from 2.8 persons per household in 1980 to 2.6 in 1990, mirroring the statewide decline from 2.9 to 2.7 persons per household.

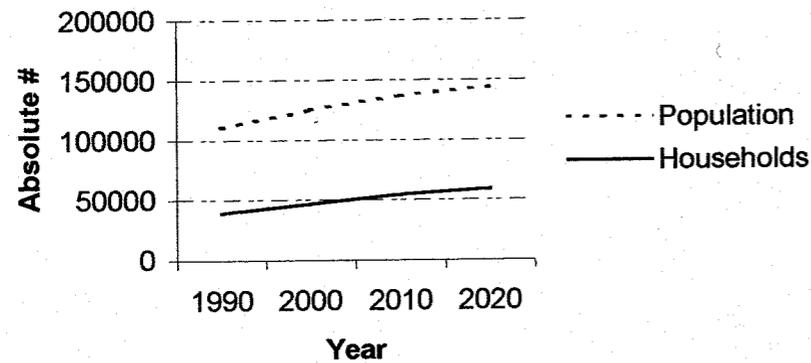


Figure 36. Sussex County: Projected Change in Population and Households, 1990-2020.

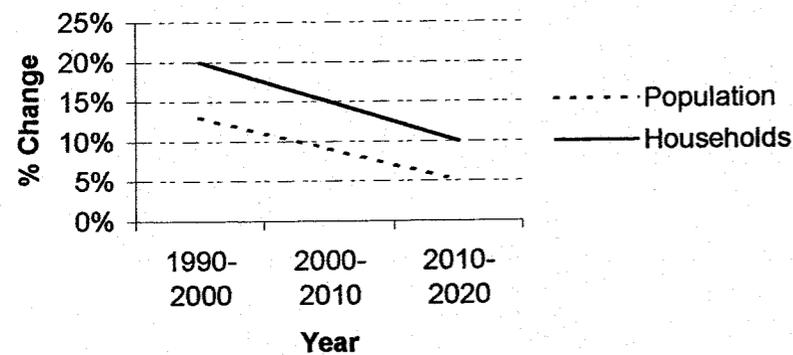


Figure 27. Sussex County: Projected Percent Change in Population and Households, 1990-2020.

In the 1990s, Sussex County is projected to achieve the highest population growth rate – at 28 percent – for any decade in its history and is expected to reach 145,382 persons by the year 2000. The growth rate of the county's population will slow after the turn of the century increasing by 14 percent from

2000 to 2010 and by 9 percent in the next decade. Households are projected to increase by 21 and 13 percent respectively in those decades.

Overall, households will increase from 43,682 in 1990 to 81,371 by 2020 – an addition of 37,689 households. Average household size is predicted to decrease from 2.6 persons per household to 2.2 during that period. Assuming an average of one-half acre for each new dwelling unit to house a new household, including roads, 6,750 acres of agriculture and woodlands would have to be developed residentially by 2020 – a land area as large as the City of Wilmington, if all of the development were contiguous. The decade-by-decade pattern of growth of households parallels that of population growth experiencing the highest rate of growth in the 1990s at 38 percent and tapering off to a still significant 13 percent growth rate from 2010 to 2020.

The population growth projected for Sussex County from 1990 to 2020 will change in the geography of land use in the county. Historically, the major economic activities of the county have been agriculture and seasonal tourism at its coastal resorts. Eastern Sussex County borders the Atlantic Ocean in its southern half, below Cape Henlopen, and Delaware Bay in its northern half. Centered on Rehoboth Beach on the Atlantic Ocean since the 1880s, the shoreline of Sussex County has been a summer resort destination in the eastern United States. Since the 1960s, the Atlantic beach has been a regular summer destination for vacationers from Baltimore and the Washington, D.C., metropolitan area, as well as from areas to the north. Being seasonal, summer residents did not expand the year-round population. Since the late 1970s, however, many of the former summer visitors and others as well have been coming to retire in the shore area of the county, a trend that is expected to continue until 2020.

This explains why the major source of new population in Sussex County from 1990 to 2020 will be migration into the county. Indeed, it is predicted that from 1990 to 2020 90,145 persons will have migrated to Sussex County and established homes there. This figure exceeds the predicted overall gain of 67,968 because it is offset by deaths. For Sussex County, it is important to understand the interaction of the components of change in the population – the natural increase of births offset by deaths and immigration. The actual number of new people in an area during a given time period are the in-migrants plus the newborns. In Sussex County from 1990 to 2020, the 90,145 in-migrants will be joined by 67,166 newborns. In the 1990s, the decade of greatest growth, the number of births is predicted to be 31,534, while the immigrants – mostly retirees – will number 27,847.

However, the older age of the migrants is reflected in the growing number of deaths. From 1990 to 2020, the 55,215 births will be offset by 50,165 deaths, and the number of deaths will increase from 13,341 to 20,357 deaths from 1990 to 2000, an increase of 52 percent. In the decade between 2010 and 2020, deaths will exceed births for the first time – by 260 – and Sussex County will have entered a

period of negative natural increase. Already the county with the oldest population in the state in 1980 and 1990, the percentage of the population over 60 years of age increased from 19 percent to 23 percent in that decade. By 2020, nearly one-third of Sussex county residents — 56,000 — will be over the age of 60 and some 45 percent — 81,637 — will be 50 years of age or older. Because of the aging population, the deaths, in rate and number, will increase over the 30-year period from 13,300 in the 1990s to 20,300 between 2010 and 2020.

But the migration picture is more complicated than in-migration of an older population. From 1985 to 1990, there was significant inmigration of persons between the ages of 25 to 44 indicating that jobs are being created in Sussex County. At the same time significant numbers of persons between the ages of 15 and 24 left the county. ²⁵ Still, there will be a large population of young persons. Many of these will be minorities who are projected to experience the highest birth rates from 1990 to 2020. Minorities, including blacks and Hispanics, are also among the poorest groups in the county. Thus in the next 30 years, Sussex County may be faced with the dual prospect of meeting the needs of both an elderly mostly white population and a young, relatively poor, minority population.

Race and Ethnicity

In 1990, 82 percent of the population of Sussex County were white, 17 percent were black, and one percent were other minorities. In that year, there were 93,421 whites, 19,175 blacks, and 1,253 other minorities. By 2020, because of the great influx of mostly white retirees, the white population will have grown by 70 percent to 156,574 persons and account for 86 percent of the county's population. The black population will have grown by 22 percent to number 23,107. Yet, because the white population is projected to increase at a faster rate than the black population, the proportion of the black population will have declined to 13 percent of county's total by 2020. The proportion of other minorities is projected to stay the same.

Between 1990 and 2020, both the black and white populations are anticipated to experience their highest growth rates in the 1990s, 30 percent and 16 percent respectively, and then to decline in the next two decades. However, by the 2010 to 2020 period, the black population will have reached zero population growth, while the white population will post an increase of 10 percent in that decade.

A new element in the ethnic composition of Sussex County is the great growth of the Hispanic population since 1990. Because the Hispanic population is defined by Spanish surnames, it includes individuals that are counted elsewhere as black or white. It is estimated that from 1990 to 1996, the Hispanic population increased from 2,314 to 5,668, an increase of 244.9 percent. Most of this increase has been to meet the labor needs of the poultry processing industry in the county. In the county, the birth

rates among Hispanics increased five-fold from 1989 to 1997. Were it to only double in the next decade, the increase in the Hispanic population would be substantial. However, projections of the growth of the Hispanic population have not yet been calculated.

Demographic Subareas within the County: 1990 to 2020

Sussex County is divided into nine County Census Divisions (CCDs) (See Fig. 34). Two are side-by-side across the northern part of the county, Bridgeville-Greenville to the west and Milford South to the east. These are the Northern CCDs. In the eastern half of the county, there are four CCDs: the Milton CCD, the Lewes CCD, the Millsboro CCD, and along the Maryland border the Selbyville-Frankford CCD. The Southwestern CCDs consist of Seaford, south of Bridgeville-Greenville, the Georgetown CCD, and the Laurel Delmar CCD in the southwestern corner of the county. (Tables 6 & 7, Figures 28, 29, 30, 31 & 32)

The four Eastern CCDs include the shoreline and an approximation of the coastal development area. The three Southwestern CCDs include much of the agricultural heartland of the county. The two Northern CCDs were combined for analysis because they exhibit different demographic characteristics from the more southern CCDs and have a great deal in common with the Southern CCDs in Kent County, such as the Milford North CCD.

From 1980 to 1990, the four Eastern CCDs grew nearly twice as fast as the western and northern areas. The four Eastern CCDs grew by 21 percent gaining 8,610 people in the decade. The three southwestern CCDs grew by 11 percent, adding 4,280 residents, while the 2,335 new residents in the two northern CCDs produced a growth rate of 13 percent. In 1990, 45 percent of Sussex County's population lived in the eastern CCDs, 37 percent lived in the southwestern CCDs, and the remaining 18 percent lived in the northern CCDs.

From 1990 to 2000, the population growth rates of the Northern and Southwestern CCDs will increase more rapidly than that of the Eastern CCDs (Figs. 28 & 29). Whereas, the population of the Eastern coastal area is projected to increase rapidly at 32 percent from 1990 to 2000, the other sections will begin to catch up. The rate of population growth in the Southwestern CCDs is projected to increase to 25 percent. The Northern CCDs are projected to almost double their rate of population growth from the 1980s to the 1990s to 25 percent. In the next decade from 2000 to 2010, the Eastern CCDs will continue to lead with an 18 percent rate of population growth while the other sections will grow at 11 percent. In the decade from 2010 to 2020, the rate of population growth of all three sections declines — to 12 percent in the Eastern CCDs, and to nine and six percent in the Southwestern and the Northern CCDs, respectively.

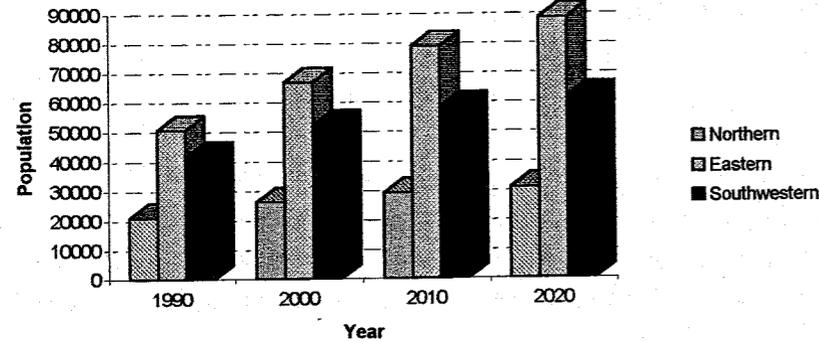


Figure 28. Sussex County: Comparison of Population by Subarea, 1990 to 2020. (Source: DPC, July 1998)

By 2020, the population of Eastern CCDs will be larger than that of the City of Wilmington and stand 88,575. They will contain half of the 181,197 people expected to be residents of the County in 2020. The Northern CCDs will have a 2020 population of 30,898 while the Southwestern CCDs will exceed 61,000.

But, whereas population in the Eastern CCDs is projected to grow by 75 percent from 1990 to 2020, households will more than double in number increasing from 20,671 in 1990 to 43,043 in 2020 (Figs. 30, 31 & 32). In the Northern and Southwestern CCDs, households will increase by 64 and 68 percent respectively. Decade by decade, household growth in Sussex County will reflect population growth with the greatest increase of 38 percent occurring in the 1990s and declining to a still significant 13 percent by 2010 to 2020.

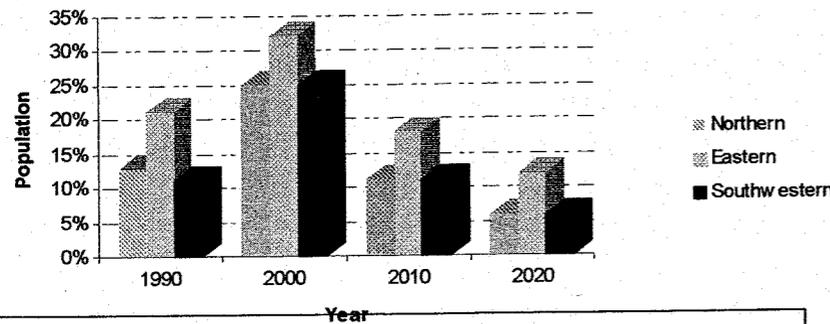


Figure 29. Sussex County: Comparison of Projected Percent Change in Population by Subarea, 1990 to 2020. (Source: DPC, July 1998)

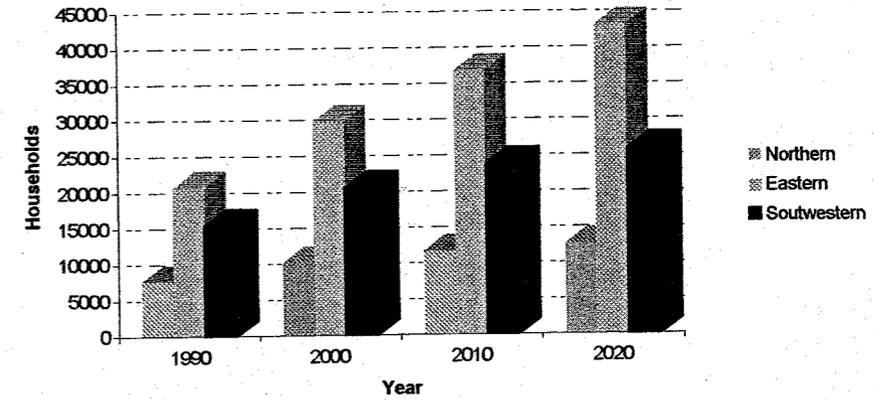


Figure 30. Sussex County: Comparison of Projected Change in Households by Subarea, 1990 to 2020. (Source: DPC, July 1998)

The Northern Demographic Subarea - From 1990 to 2020, the Bridgeville-Greenwood and Milford South CCDs, are projected to increase their population from 20,943 to 30,989 persons or by 48.0 percent (Table 6, Figs. 28, 29 & 32). Overall from 1990 to 2020, households will increase by 64 percent and 4,911 households expanding from 7,639 in 1990 to 12,550 in 2020. As elsewhere in Delaware, the highest growth rates are projected for the 1990s during the 30-year projection period.

- The **Bridgeville-Greenwood CCD**, in the northwest corner of the county, is projected to grow from a population of 6,899 in 1990 to 10,499 in 2020 -- 52 percent. After experiencing population growth of 27 percent from 1990 to 2000, the rates of growth will fall off to 13 and seven percent in the following two decades to 2020. Households are expected to increase by 70 percent and reach 4,319 by 2020.
- The **Milford South CCD**, in the northeast section of the county and containing part of the town of Milford, is projected to increase its population from 14,044 in 1990 to 20,399 in 2020. After experiencing population growth of 25 percent from 1990 to 2000, the rates of population growth will decline to 11 and five percent in the following two decades to 2020. Households are expected to increase by 62 percent and reach 3,138 by 2020.

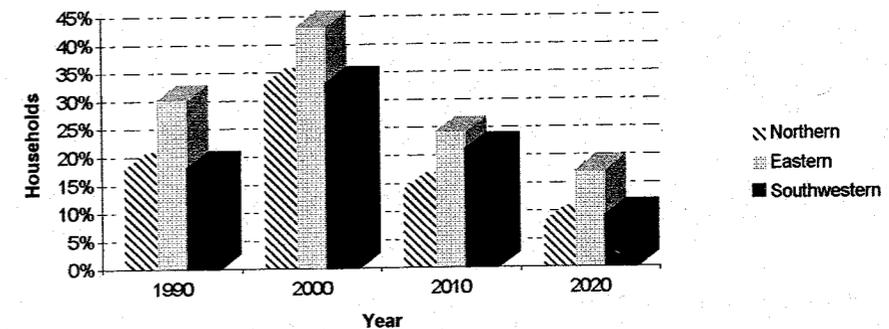


Figure 31. Sussex County: Comparison of Projected Percent Change in Households by Subarea, 1990 to 2020.

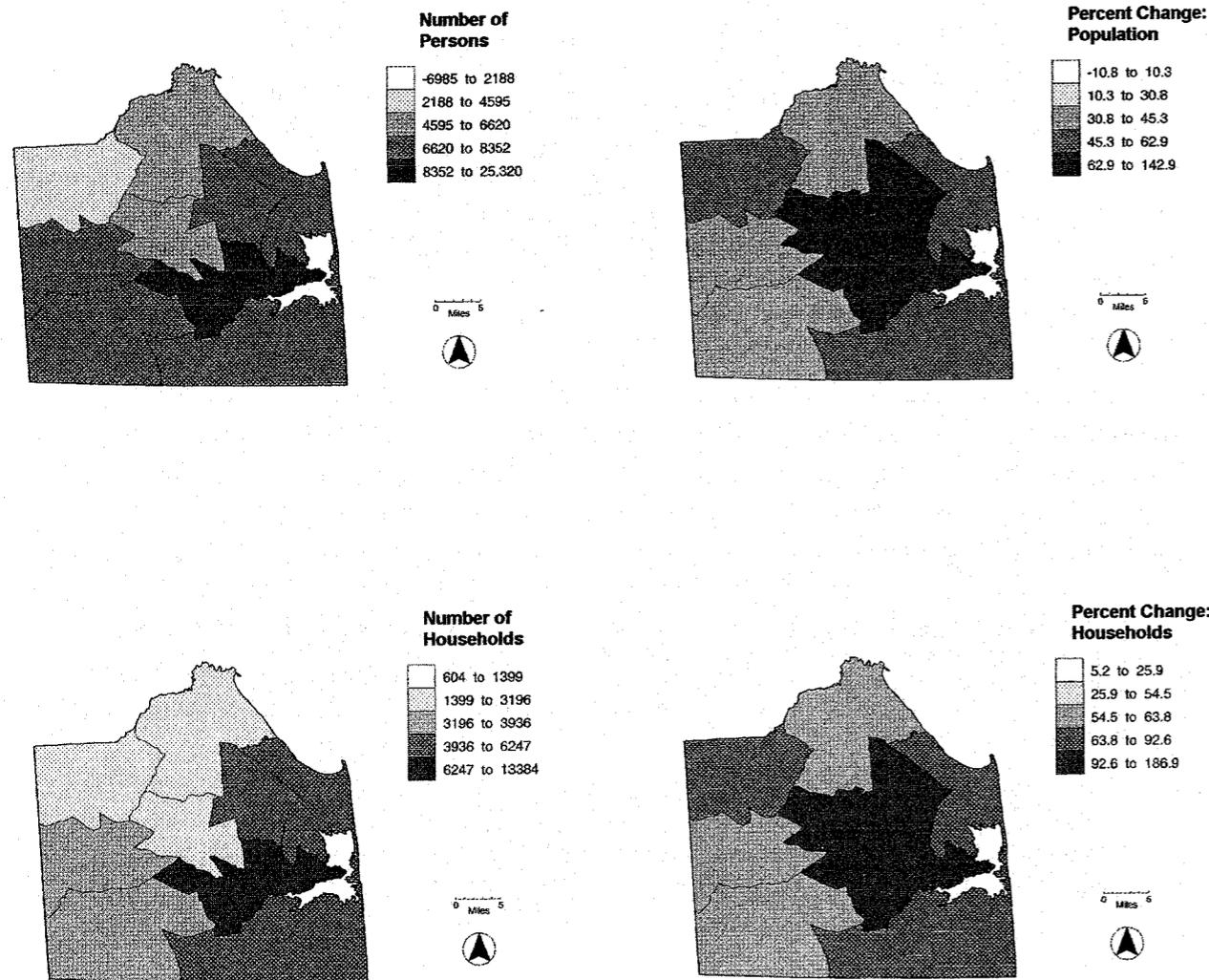


Figure 32. Sussex County: Projected Change in Population and Households by County Census Divisions, 1990 to 2020.

The Eastern Coastal High Growth Subarea.- From 1990 to 2020, the four CCDs of the Eastern/Coastal section of the County will grow from a population of 50,527 to one of 88,575 – accounting for nearly 50 percent of the county's population (See Figs. 27, 28, 31 & 32). In addition, they will host much of the substantial seasonal resort and retirement population. This increase of 38,048 persons represents a projected growth of 75 percent. Households will increase by 108 percent during the same period increasing from 20,671 in 1990 to 43,043 in 2020 (See Figs. 29, 39 & 32). Most of the population and household growth in the county will be occurring in the three northernmost of the four eastern coastal CCDs: Lewes, Milton, Millsboro, and Selbyville-Frankford CCDs.

- The **Milton CCD** will increase its population by 109 percent, increasing from 7,671 in 1990 to 16,023 persons in 2020; households are projected to increase by 148 percent to number 4,351 by 2020.
- The **Millsboro CCD** population will more than double increasing by 111 percent, expanding from 12,287 persons in 1990 to 27,169 in 2020. Households are projected to increase by 147 percent to number 12,203 by 2020.
- The **Lewes CCD** population will grow by 56 percent, from 13,628 in 1990 to 21,300 in 2020. Households are anticipated to increase by 78 percent to number 10,906 by 2020.
- The **Selbyville-Frankford CCD**, the most southern CCD in the eastern group, extends halfway into the county to the west and includes the sparsely populated Cypress Swamp area. Most of its 47 percent increase in population from 16,331 in 1990 to 24,083 in 2020 is expected to occur in the east along the coast. Households are projected to increase by 90 percent to number 12,634 by 2020.

The Southwestern Subarea of the County -The southwestern subarea of Sussex County--including the CCDs of Seaford, Laurel-Delmar, and Georgetown, which contains Georgetown, the county seat. The Georgetown CCD, home of many of the poultry processing plants in the county, is traversed north to south through the Seaford and Laurel-Delmar CCDs by U.S. 13, the major highway connector between the northeastern U.S. and eastern Virginia and the Carolinas. The population projections for the three Southwestern CCDs from 1990 to 2020 are that:

- The **Georgetown CCD** is predicted to have the fastest growing population among the CCDs in the southwest increasing by 69 percent from 7,776 persons in 1990 to 13,171 by 2020. Since most of the recent Hispanic growth in Sussex County has occurred mostly in the Georgetown CCD, its growth rate may be higher than the projections indicate. By 2020, households are projected to increase by 108 percent to 8,994 households.
- The **Laurel-Delmar CCD** population in the southwestern corner of the county is projected to grow from 15,086 in 1990 to 21,846 by 2020, an increase of 45 percent. By 2020, households are projected to increase by 62 percent to 6,148 households.
- To the north, the population of the **Seaford CCD** is anticipated to increase by 41 percent from 1990 to 2020, reaching 26,707 persons by 2020. By 2020, households are projected to increase by 55 percent to 10,636 households.

Together, these three CCDs are projected to increase by 48 percent to a population of 61,724 from 1990 to 2020. By decade, they are predicted to grow by 25 percent in the 1990s, and by 11 percent from 2000 to 2010 and to decline to a six percent from 2010 to 2020. From 1990 to 2020 the Southwest CCDs will increase their population by 48 percent from 41,579 in 1990 to 61,724 in 2020. Households will increase from 15,372 in 1990 to 25,778 in 2020, expanding by 68 percent (See Figs. 27, 28, 29 & 30).

Racial and Ethnic Shifts Between Areas in Sussex County

There appears to be a redistribution of the population occurring in Sussex County in terms of ethnic and racial characteristics. Although the population projections for 1990 to 2020 do not estimate racial and ethnic characteristics for CCDs, a geographical pattern of change could be seen in the 1980 and 1990 U.S. Census. It is a pattern that may be continuing. In the 1980s, growth rates among racial and ethnic groups varied greatly between the Northern, Eastern, and Southwestern CCDs. The Eastern CCDs combined the highest growth rates for whites in the county -- 27 percent -- with an absolute loss of seven percent of the black population. Whites increased by nearly 10,000, whereas blacks declined by more than 500 persons. The Southwestern CCDs experienced the reverse pattern. Black population grew at the fastest rates in the county at 25 percent, adding about 1,600 new persons. The most rapid Hispanic growth has also occurred in this area since 1990, especially in the Georgetown CCD. Although whites grew at a rate of 8 percent in the 1980s, that rate was the lowest in the county for the white population. The Northern CCDs led in the growth of other minorities, a group that increased by 324 percent from 1980 to 1990. Numbering 110 people in 1980, they increased to 357 by 1990. At the same time, the two Northern CCDs experienced no increase in black population.

For the 1980s period, further evidence of this pattern of change can be seen by looking closely at the smaller geographic areas of U.S. census tracts. Four-fifths, or 82 percent, of all white growth in Sussex County between 1980 and 1990 was concentrated in the three census tracts bordering the Atlantic Ocean from the Lewes-Rehoboth area south to Fenwick Island at the Delaware state line. Of the nine census tracts in the Eastern CCDs, all but two lost black population in the 1980s. Conversely the two tracts experiencing the greatest increase in black population were those centered on the Georgetown CCD in central Sussex and in the Seaford CCD along the western boundary of the state.

If the trends of the 1980s have continued, rapid growth of mostly white-middle income in-migrants in the eastern part of the county may be displacing lower-income blacks and minorities to the western part of the county. At the same time, lower-income Hispanics are being attracted to and recruited for jobs in the agricultural poultry processing industry in the western area. Consequently, Sussex County may be evolving into two distinct social and economic regions consisting of an eastern resort/retirement area of middle- and upper-income households and a western agricultural area where most of the county's low-income population will live -- both white and minority.

CONCLUSIONS

A foreboding combination of demographic and land use trends may be converging in Delaware. Demographically, in the 30 years from 1990 to 2020, the state will experience a substantial increase in population, but by 2020 growth rates will have fallen and it will be approaching low levels of population growth overall. By the 2020s, Delaware will be making a transition from dealing with the impact of a significant new population to preparing for a more stable, but aging population. It will be a landscape in which complex demographic and economic trends will have created regions of distinctive identities within the state. While in the north, the New Castle model of suburbanization will continue to play out in a new variation of familiar forms, in a more dispersed manner, southern Delaware may witness the emergence of a landscape in which a service-based retirement and resort community of aging residents in the east overlaps in the west with an industrial agricultural economy that needs a large, and preferably youthful, labor force. Kent County may be the transition and corridor area between the two.

The stabilizing population will probably offer little if any respite from land development and sprawl. Land in Delaware through 2020 will be developing at a faster rate than the state's population will grow and will continue developing even if zero population growth is reached. If current trends continue, development will take the form of increasingly dispersed sprawl. Population growth will have such an impact on land development because of "The New Arithmetic of Development," which finds that land develops more rapidly than population because households, the consumers of residential land, grow faster than population. Moreover, households are simultaneously becoming smaller and consuming more land per household. The great increase in recent years in the use of automobiles (and other rubber-based transportation), both in numbers of cars in a household and the miles they are driven, has further dispersed development while causing congestion. Automobiles, supported by road construction, create a demand for land development by providing access to it, increase the territory over which individuals can conduct their daily activities and allow development to occur at increasingly lower densities. Continued household formation and increases in individual mobility, acting through the New Arithmetic, and in combination with geographical shifts in the population, will be the source of new development. And as computers increase home-based work, the new development may become even more dispersed.

In short, the "New Arithmetic" finds that land development has become virtually a perpetual motion machine operating almost independently of population growth. It also finds that the development it creates is increasingly dispersed -- as sprawl. Thus, while communities have tried to deal with sprawl through land use plans, zoning, and growth controls, these approaches have not dealt with the core causes of sprawl, which are the American devotion to the automobile and insistence on living at low densities, preferably in single-family houses. The interaction of these preferences produces a vicious circle in which increasingly dispersed development creates greater dependency on the automobile.

Acting on these preferences has undercut the demand for already built-up towns and cities, which in fact constitute some of the best designed living areas in the state.

From 1990 to 2020, Delaware will become a suburban state -- that is, much of the state will become characterized by a land use pattern of dispersed suburban-type development -- even as population growth slackens. The exceptions to this will be already built-up areas of towns and cities and, at the other end of the continuum, land that is in programs of environmental or agricultural preservation from which development is excluded. Although extensive agricultural land use will remain, it will be dotted and broken up by dispersed residential and commercial development, if current trends continue. As reflected in the population projections, increasingly, the statewide development pattern will take the form of a wishbone centered on Dover -- with SR 1 and US 13 forming the spine as a corridor from Wilmington to Dover, with SR 1 forking southeast to eastern Sussex County and US 13 forking southwest to southwestern Sussex County and further south.

As Delaware becomes more suburban in its development pattern, the land issues related to growth and decline that have historically played out between older central cities and towns and new suburbs may be determined between older and newer suburban areas and rural residential areas. The central questions for future land use policy and planning will be: what are the implications for public services when nearly all population groups live a dispersed suburban landscape? Will the contrast between older, poorer central cities and towns and more affluent suburbs be replaced by a contrast between older and newer suburbs? What sort of social and economic environment do suburban areas create for an aging population beyond its peak earning years? As the shortage of affordable housing mounts, will suburban slums be formed? As suburbs are increasingly detached from a central city or town, will rural suburbs emerge as isolated subdivisions or mobile-home parks, with little access transportation and other community services?

Shaping Delaware's Future

Increasing sprawl, the decline of cities and towns, and the loss of agricultural land and environmental areas have made land use a key public policy issue in Delaware in recent years. In 1994 and 1995, Governor Thomas R. Carper's Cabinet Committee on State Planning Issues undertook an extensive effort to determine Delawareans' views of what their state should look like in the year 2020. In a report entitled *Shaping Delaware's Future*, the Committee concluded that "most Delawareans hope to create strong communities and enhance our quality of life" and set out 10 goals for Delaware supported by 11 guiding principles.

Implicitly, the Cabinet Committee concluded that sprawl was a major threat to Delaware's quality of life because the goals it promulgated explicitly call for the reclaiming and enhancement of the state's historic land use pattern of clearly delimited communities set in extensive agricultural and natural landscapes. The first goal calls for state investment and future development to be directed toward "existing communities, urban concentrations, and designated growth areas." The second and third goals require protecting agricultural and critical environmental resources from "ill-advised" development. Other goals call for the redevelopment of existing communities and underused commercial and industrial sites and the creation of incentives and disincentives to channel growth in desired areas. Another goal is to reduce the dependence on the automobile by calling for a "balanced, multi-modal transportation system."

In its 1995 annual assessment report to the Cabinet Committee on State Planning Issues, the Office of State Planning Coordination commented on both negative and positive aspects of Delaware's current development. On the one hand, it observed that prime farmlands and open spaces are being lost to scattered development, called sprawl, while the traditional cities and towns that gave Delaware its current sense of place were being poorly utilized and ignored. In positive contrast, it noted that the state's economy is strong and increasingly varied and that educational attainment is high, as are workers' skills and availability. It also suggested that some towns and cities are rediscovering elements -- such as their downtowns -- that lend them uniqueness. The report concluded that although "the issues will continue to be tough," a shared vision of Delaware's desired future is emerging.

How Population Growth, Acting Through the New Arithmetic of Development, May Shape Delaware's Future

Delaware faces a future in which the containment of sprawl by the redirection of growth into designated areas -- whether existing or new growth areas -- coupled with the protection of vulnerable agricultural and natural areas will be very difficult, if not impossible. Even if possible, there may be very few years in which to accomplish this. For one thing, much of the population growth will have occurred by 2010 and the patterns of land use will have been set. For another thing, the trends of automobile ownership and highway construction that will disperse this growth already have great momentum. Moreover, the desire for low-density housing is bolstered by the economic reality that travel costs less than land. Although the average household spends 26 percent of its annual income on housing, it spends only 16.7 percent for transportation.²⁶ This means that increases in transportation costs associated with moving further out for the same or better quality housing are less than the savings in housing costs.

As growth rates of population and households flatten and the numbers fall off from 2010 to 2020, housing in older areas will be at an increasing disadvantage in competing with new housing on the fringe because factors of modernity and obsolescence play an important role in selling new housing. Put

differently, the market for new housing will depend more on drawing households from existing housing than on a growing number of households. Thus, the effect of increased dispersion of fewer households drawn from existing towns and cities may lower the value of their housing and increase the concentration of the lower income households there. Consequently, the New Arithmetic of Development could cause the reverse of the goal for shaping Delaware's future. Rather than well articulated, healthy communities within a larger area of extensive agriculture and natural areas, the state could evolve into concentrations of the less well-to-do and poor in an auto dependent landscape of dispersed sprawl.

It has not been the purpose here to try to spell out all of the implications of the projected population of Delaware, acting through the New Arithmetic of Development, but to give the reader a sense of what and where the future population of Delaware is expected to be and how that might effect where the reader lives. Each reader needs to ask: What do the factors described here mean for the areas in which I live and work? The goals for Shaping Delaware's Future are sound and well-intended, but the lesson of the New Arithmetic is that they need to be pursued with greater urgency because time is running out.

ENDNOTES

1. As noted the population projections used in this paper are those of the Delaware Population Consortium (DPC). Established in 1975 under the auspices of the State Planning Office, the DPC, an informal organization of public and private agencies interested in a common set of reliable projections, has the goal of producing a single set of population projections for Delaware and a consistent set of subareas within the state that can be used for planning purposes. The other objectives of the DPC are to make projections over a thirty-year time period utilizing a single methodology, to conduct an ongoing review of methodology and factors influencing the projections, and to issue an annual update and other updates if warranted. The DPC issues their projections as a series of statistical tables to be used and interpreted according to the needs of consuming groups and agencies. (The DPC projections can be found on the world wide web at <http://www.state.de.us/dedo/index.html>)
2. Unless otherwise cited, all population figures cited in this monograph are based on various U.S. Census publications and the Delaware Population Consortium, *Annual Population Projections*. Version 1998.0, January 1998, Dover, Delaware.
3. As this monograph was going to press, the DPC released a draft of their 1999 update of 1990 to 2020 projection series. The projections for 2020 for the state as a whole and for New Castle, and Kent Counties remained virtually unchanged with increase 0.02 percent, 0.8 percent, and 1.8 percent respectively. Although the 2020 projection for Sussex County did decline 2.4 percent, this reflected a benchmarking of deaths, a technical correction in the projection methodology.
4. David L. Ames, Robert Dean and David Clarke, *1997 Annual Assessment Report on the Cabinet Committee on State Planning Issues*, (Dover, Delaware: Office of State Planning Coordination, State of Delaware, July, 1998), p.4
5. Anthony Downs, *Stuck in Traffic*, (Washington, D.C.: The Lincoln Land Institute, 1992)
6. Anthony Downs, *New Visions for Metropolitan America*, (Washington, D.C.: The Brookings Institution, 1994)
7. Edward C. Ratledge and David P. Racca, *Demographic and Commuting Trends in Delaware*, (Newark, DE: Center for Applied Demography and Survey Research, University of Delaware, 1996) This report is an extensive and excellent discussion of the demographic dynamics at work in Delaware. The discussion of household formation in Delaware is found on pp. 12-15
8. Ratledge and Racca, 1997
9. Ratledge and Racca, 1997
10. Delaware Department of Transportation, *Technical Report #1, System Assessment: Statewide Long Range Planning*, (Dover, DE: DELDOT, January, 1997), p. 9-12
11. Delaware Department of Transportation, *Technical Report #2, Policies and Actions: State Long-Range Transportation Plan* (Dover, DE: DELDOT, January, 1997), p. 18
12. Ratledge and Racca, p. 26

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13. Delaware Department of Transportation, *Technical Report #2, Policies and Actions: State Long-Range Transportation Plan* (Dover, DE: DELDOT, January, 1997), p. 30
146. DelDot Technical Report #2, p. 23
15. DelDot Technical Report #2, p. 22
16. Anthony Downs, *New Visions for Metropolitan America*, (Washington, D.C.: The Brookings Institution, 1994), p. 5.
17. Anthony Downs, *New Visions for Metropolitan America*, (Washington, D.C.: The Brookings Institution, 1994), p.5.
18. U.S. Bureau of the Census, *Estimates of the Population of Metropolitan Areas, July 1, 1996*, (Washington, D.C.: Bureau of the Census, 1996), p. 3
- 19 See also Edward C. Ratledge and David P. Racca, *Demographic and Commuting Trends in Delaware*, (Newark, DE: Center for Applied Demography and Survey Research, University of Delaware, 1996) pp. 3-14
20. Office of State Planning Coordination, *1996 Annual Assessment Report to the Cabinet Committee on State Planning Issues*, (Dover, Delaware: May, 1997), p. 13
21. Delaware Population Consortium, *Hispanic Origin of Delawareans, 1990-1996*, Dover, DE, May 1, 1998
22. For a more complete analysis of demographics dynamics suburbanization in New Castle County see David L. Ames, Mary Helen Callahan and Edward C. Ratledge, *Demographic Dynamics in New Castle County, 1970 to 1980*. (Newark: College of Urban Affairs and Public Policy, University of Delaware, 1984)
23. "Local-Area Population Estimates, 1990 -1996," Delaware State Data Center/Business and Industry Data Center, *Delaware Dataline*, Vol. 12, No. 1, p. 1
24. Ratledge and Racca, p. 10
25. Downs, *Stuck* , , , , p.