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TECHNICAL REPORT NUMBER 22

RECENT POPULATION GROWTH AND CHANGE IN SOUTHEASTERN WISCONSIN 1970-1977

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Special acknowledgement is due Sandra L. Retert, SEWRPC Specialist-Demographer, for her efforts in the conduct of this study.

TECHNICAL REPORT
NUMBER 22

RECENT POPULATION GROWTH AND CHANGE IN SOUTHEASTERN WISCONSIN: 1970-1977

Prepared by the
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September 1979

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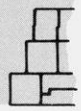

September 21, 1979

STATEMENT OF THE EXECUTIVE DIRECTOR

Rapid change is one of the basic characteristics of the modern world. Urban growth, decay, and renewal are among the most important aspects of this change. An important and necessary step in the regional planning process is the attempt to forecast the probable nature and approximate magnitude of those changes which, while beyond the scope of a comprehensive plan for the physical development of a region, must be considered in the preparation of such a plan. Among the more important of such changes are those relating to population size, distribution, and composition. Accordingly, the Regional Planning Commission must carry out demographic studies—including forecasts of the probable future size, distribution, and composition of the resident population—pertinent to the proper performance of its primary responsibility to make and adopt an advisory plan for the physical development of the Region.

No one, of course, can "predict" the future, and all forecasts involve uncertainties. Nevertheless, forecasts are essential if a plan is to be prepared that can serve as a point of departure for sound decision-making with respect to regional development. Given the uncertainties underlying any forecasts, it must be recognized that planning must be a continuous process involving the periodic reassessment of the supporting forecasts and attendant revision of the plans. This report provides such a periodic assessment for the Commission's design year 2000 population forecasts in view of estimated changes in the size, distribution, and composition of the Region's resident population since 1970.

The current regional population forecast for the design year 2000 of 2.2 million residents—selected by Commission staff and advisory committees in 1974 as one of the guides for the preparation of long-range land use and supporting physical facilities plans—envisioned quite modest increases in the Region's resident population over the 30-year forecast period when compared to historic rates of population growth. Comparison of the regional population forecast with annual population estimates has made it increasingly apparent, however, that even the modest population growth forecast for the first decade of the forecast period will, in all probability, not be realized. Since the population forecasts represent an important basis for all of the Commission's planning efforts, the increasing deviations between the annual estimates and the forecast have been cause for concern.

The data analyzed in this report show that the failure of the Region's resident population to grow as anticipated is the result of unanticipated changes in the net difference between regional in-migration and regional out-migration. Regional net out-migration is occurring at levels greater than anticipated and is offsetting much of the population growth that would have accrued to the Region through natural increase. Natural increase, on the other hand, is occurring at approximately the levels that were forecast. While a deviation does exist between the actual population change and the forecast population change, at the present time the deviation is not sufficiently large to affect the basic structure of the land use and physical facilities plan into which the forecast has been incorporated.

While change or lack of change in the size of the Region's resident population is an important issue, the population forecasts cannot be evaluated on this issue alone. Within the controlling framework of the regional population forecast, the county forecasts finally selected from among the projections considered were normative ones based upon the Commission's adopted land use development objectives. The county forecasts assume that the continued diffusion of urban development into the outlying areas of the Region will be curtailed in the public interest through the exercise of land use controls and other public policy actions. They further assume that the present trends in population decentralization will be stabilized and then reversed in the mid to late 1980's, and that the central areas of the Region will again experience population growth. While at variance with existing trends, these assumptions are consistent with recent federal objectives—which seek to discourage urban sprawl and protect critical environmental areas and prime agricultural lands—as well as with similar but much longer-standing Commission objectives. The selected county population forecasts, therefore, support national urban policy as well as adopted regional development objectives.

Even in the absence of regional population growth, however, the diffusion of urban development throughout the Region continues. As discussed in the report, both the decrease in Milwaukee County's proportion of the Region's total resident population and the increase in Waukesha County's proportion of the Region's total resident population have been more rapid than planned and certainly more rapid than necessary given the less than anticipated regional population growth. Achievement of the population distribution envisioned in the county forecasts is dependent not only upon correctly anticipating the future size of the Region's resident population and upon correctly anticipating the differential operation of nativity, mortality, in-migration, and out-migration in each of the Region's seven counties, but also upon successful implementation of the Commission's adopted land use plan for the design year 2000.

An additional important issue in evaluating the population forecasts pertains to the changes in the age structure of the population envisioned in the forecast, and to the forecast changes in household composition and size. Age structure of the population and household characteristics are important determinants of the demand for the various types of land use and of the demand for various types of facilities and services, since these demands are partially a function of the characteristics of the resident population. Different subgroups of the population place different demands upon society for public facilities and services. Different household and living arrangements likewise produce differential demands for land uses and facilities and services.

In the absence of a complete population census since 1970, a quantitative assessment of the changes that have occurred in the general characteristics of the population of the Region and of the seven constituent counties has not been attempted. The results of special censuses of population that have been taken in a number of regional civil divisions since 1975 as reported and analyzed herein, however, indicate that the regional population—as a single entity—is becoming older, that the average household size is decreasing, and that the number of one-person and two-person households is increasing. These changes hold special meaning for long-range land use and supporting physical facilities and services planning in view of the fact that the changing age structure and the changing household characteristics of the Region's resident population may be expected to create a continuing demand for land and public facilities and services in excess of what might be expected given the absence of any significant growth in the Region's population during the 1970's.

Respectfully submitted,

Kurt W. Bauer
Executive Director

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Chapter I

INTRODUCTION

In June 1961, the Southeastern Wisconsin Regional Planning Commission, as an integral part of its initial work program, undertook a regional population study. The results of that study were published in 1963 in SEWRPC Planning Report No. 4, The Population of Southeastern Wisconsin. That report presented the basic historical and current background information concerning the size, composition, spatial distribution, and possible future size of the population of the Southeastern Wisconsin Region, and thereby provided an important basis for the Commission planning efforts. Estimates of the possible future size of the population of the Region presented in the report were projections,[1] as opposed to forecasts, and were based solely on demographic analyses.

During the course of the Commission's initial land use-transportation study initiated in January 1963, the population projections prepared under the initial Commission work programs were updated and projected to the year 1990. Additional population projections were also made, utilizing varying natural increase and migration assumptions, and supporting economic analyses, projections, and forecasts were prepared. As a result of this work, a 1990 regional population forecast was established at approximately 2,678,000 persons. The results of these additional population analyses and forecasts were published in SEWRPC Planning Report No. 7, Volumes 2 and 3, June 1966 and November 1966, respectively.

Under the Commission's continuing regional land use-transportation study begun in August 1967, population estimates were made annually and compared with the population forecasts prepared under the initial land use-transportation study. These estimates were used to monitor the continued validity of the regional population forecasts and were published in the annual reports of the Commission. In 1971, the results of the 19th decennial U. S. Census of Population, conducted in April 1970, were compared to the regional population forecasts. The census-enumerated population of approximately 1,756,100 persons was about 114,200 persons, or approximately 6 percent, less than the 1970 forecast population of 1,870,300 persons. This deviation was attributable to the significant changes in the rates of natural increase and migration which occurred within the Region during the late 1960's.

In light of the findings of the 1970 Census of Population, the need for a major reevaluation of the changes in the size, composition, and spatial distribution of the regional population, as well as an updating of the Commission's regional population forecasts to the year 2000, was indicated. Accordingly, under the continuing regional land use-transportation study, such a reevaluation was undertaken in order to permit assessment under the continuing planning process of the impact of these changes on the physical development of the Region. In addition, new forecasts of population within the Region were prepared to the year 2000.

The results of the reexamination and the updating of the demographic data contained in SEWRPC Planning Reports Nos. 4 and 7 and the presentation of new forecasts of regional population levels to the year 2000—prepared with the assistance of the Socioeconomic Subcommittee of the Technical Coordinating and Advisory Committee on Regional Land Use-Transportation Planning—were presented in SEWRPC Technical Report No. 11, The Population of Southeastern Wisconsin, December 1972. As reported in that document, selection of a year

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[1] *The Commission in its work has always maintained a careful and important distinction between the terms "projection" and "forecast." With respect to population levels, "projections" are defined as pure mathematical extrapolations of existing trends based upon simple assumptions concerning the rate of natural increase and net migration. "Forecasts" are projections which have been qualified by a series of more carefully detailed assumptions regarding the future growth patterns of the Region and may be based upon economic, as well as demographic, analyses. Forecasts represent the Commission estimate of the most probable future population levels and, as such, are one basis for long-range plan preparation. Projections are intended to serve as points of departure in the preparation of forecasts.*

2000 regional population forecast of approximately 2,590,100 persons was recommended.

In 1974 the year 2000 population forecasts published by the Commission in 1972 were reexamined due to the unprecedented declines in fertility rates since 1970 and to the apparent continuation of out-migration from the Region over this period. The assumptions underlying these forecasts were reappraised in light of these two factors, and new year 2000 population forecasts were prepared. As reported in the SEWRPC 1974 Annual Report, a revised year 2000 regional population forecast was established at approximately 2,219,300 persons. The revised population forecasts were reported in greater detail in SEWRPC Planning Report No. 25, A Regional Land Use Plan and a Regional Transportation Plan for Southeastern Wisconsin: 2000, Volume Two, May 1978.

Since the preparation in 1974 of new year 2000 population forecasts for the Region, current population estimates have been obtained annually and compared with the population forecasts. These annual comparisons are an important component in monitoring the continued validity of the regional population forecasts. The results of these comparisons continue to be published in the annual reports of the Commission.

Based on current estimates of population made by the Wisconsin Department of Administration,[2] it would appear that the regional population is no longer continuing to grow at a significant rate. In 1977 the estimated resident population of the Region was 1,776,400, only 20,300 persons, or about 1 percent, above the 1970 figure of 1,756,100 (see Table 1). The regional population from 1970 through 1977 is estimated to have increased only about 2,900 persons annually. This average annual growth rate contrasts sharply with the average annual growth rate during the 1960 to 1970 decade of about 18,200 persons per year, and even more sharply with the average annual growth rate in the preceding decade of 33,300 persons per year.

While regional population growth has thus apparently come to a virtual halt, the distribution of the population in the Region has continued to change significantly (see Table 1). The populations of Ozaukee and Washington Counties have each grown in excess of 25 percent since 1970, while the population of Waukesha County has increased

[2] *Current population estimates are made by the Department of Administration, which has the responsibility of preparing such estimates as a basis for distributing state-shared taxes to local governments. The estimates are based on symptomatic indicators of population change, including the number of automobiles registered, the number of persons filing income tax returns, and the dollar value of exemptions for dependents on those income tax returns. These estimates—the methodology for which was developed in 1973—represent an important, relatively new source of information on population change in the Southeastern Wisconsin Region.*

Table 1

ESTIMATED POPULATION CHANGE AND FORECAST POPULATION CHANGE IN THE REGION BY COUNTY: 1970-1977

County	Total Population			Estimated Change 1970-1977		Forecast Change 1970-1977		Difference (estimate-forecast)	
	Actual 1970	Estimated 1977	Forecast 1977	Number	Percent	Number	Percent	Number	Percent
Kenosha	117,900	124,600	132,300	6,700	5.68	14,400	12.21	- 7,700	- 6.53
Milwaukee . . .	1,054,300	982,700	1,022,800	- 71,600	- 6.79	- 31,500	- 2.99	- 40,100	- 3.80
Ozaukee	54,500	68,400	69,700	13,900	25.50	15,200	27.89	- 1,300	- 2.38
Racine	170,800	177,200	180,700	6,400	3.75	9,900	5.80	- 3,500	- 2.05
Walworth. . . .	63,500	68,800	71,300	5,300	8.35	7,800	12.28	- 2,500	- 3.94
Washington . .	63,800	80,900	82,700	17,100	26.80	18,900	29.62	- 1,800	- 2.82
Waukesha . . .	231,300	273,800	274,200	42,500	18.37	42,900	18.55	- 400	- 0.17
Region	1,756,100	1,776,400	1,833,700	20,300	1.16	77,600	4.42	- 57,300	- 3.26

Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

by almost 20 percent. The populations of Kenosha, Racine, and Walworth Counties have also grown since 1970, but at more moderate rates of less than 10 percent. Milwaukee County's population, however, declined by about 7 percent from 1970 through 1977, representing an absolute population loss of nearly 72,000 persons.

Because of the very modest growth of the Region's resident population since 1970, the current estimates have shown an increasing divergence from the forecasts (see Table 1). By 1977 the estimated regional population of 1,776,400 persons was about 3 percent less than the forecast 1977 level of 1,833,700 persons. Since the population forecasts represent an important basis for the Commission's planning efforts, this increasing divergence—while still sufficiently small as to not be alarming—is cause for concern. It is also important to note that while these annual comparisons of population estimates and population forecasts are illuminating, they do not represent a complete and sufficient evaluation of the continued validity of the regional population forecasts. The annual population estimates are estimates of total resident population and, as such, provide information only about the size and distribution at the county level of the Region's resident population. While these are important components of the population forecasts, the forecasts also provide additional information about anticipated future levels of population characteristics such as age composition, racial composition, number of households and household sizes, and, implicitly through the forecast assumptions, the anticipated future levels of the fertility, mortality, and migration characteristics of the Region's resident population. Any evaluation of the continued validity of the Region's population forecasts must also include an effort to address the ability of the forecasts to correctly identify the direction and magnitude of change of the compositional characteristics of the resident population.

PURPOSE OF THIS REPORT

Due to the continued concern of the Commission staff over the difference between the current population estimates and the population forecasts, the Commission staff in 1978 examined and analyzed in greater detail—to the extent possible based upon available data—the changes in size, distribution, and composition of the Region's resident population since 1970. These changes have been evaluated in comparison to both the assumptions underlying the forecasts and the anticipated growth and change in the size, distribution, and composition of the Region's resident population as envisioned in the forecasts. It is the purpose of this report to present the results of that analysis.

This report is divided into four major chapters. The first major chapter is an overview of the historical trends in the size, composition, and spatial distribution of the regional population, with special emphasis on the period 1950 to 1970. The second major chapter presents a summary of anticipated growth and change in the size, composition, and spatial distribution of the regional population in the period 1970 to 2000 as envisioned in the current regional population forecasts. The third major chapter reports recent growth and change in the size, composition, and spatial distribution of the regional population in the period 1970 to 1977. The fourth major chapter evaluates the degree to which the regional population forecasts have correctly forecast changes to date in the size, composition, and spatial distribution of the Region's resident population. It also assesses the degree to which the forecasts' assumptions correctly foresaw changes in the fertility, mortality, and migration characteristics of the Region's resident population.

Chapter II

HISTORICAL POPULATION GROWTH AND CHANGE, WITH SPECIAL EMPHASIS ON THE PERIOD 1950-1970

INTRODUCTION

Since comprehensive planning is intended to improve the environment in which people work and live, and since the primary purpose of all public facilities and services is to meet the needs of the resident population, an understanding of the size, composition, and spatial distribution of the population is essential to any planning for the future development of an area in an environmentally sound manner. While the resident population of the Region is treated for the purposes of this report as though it is a self-contained topic, it is important to remember that the population is a complexly interwoven part of the geopolitical, socioeconomic complex that is the Southeastern Wisconsin Region. The size, composition, and spatial distribution of the population is greatly influenced by the change in regional economic activity levels which are in turn influenced by the physical resource base of the area and the collectively perceived political position of the area toward economic development and change. Changes in economic activity levels in other regions of the State and in the nation also have an effect on population change in the Region. Changes in population and economic activity greatly influence the types and amounts of public financial resources available to the various units of government that must provide public facilities and services. Similarly, decisions concerning the types and levels of public facilities and services provided have an impact on the total system.

This chapter presents a brief description and analysis of the historic demographic trends in the Region, particularly as they relate to land use and supporting public facilities planning.

DEMOGRAPHIC BASE OF THE REGION

An important factor in the study of the population of an area is an examination of the changes in the size, composition, and spatial distribution of that population over time. Such a time series analysis provides an overview of cumulative population change and thereby provides important insights essential to the proper conduct of any comprehensive planning program. This section presents a brief description and analysis of the historic demographic trends in the Region, particularly as they relate to long-range land use and facilities planning. This presentation of the demographic base includes descriptions of the population size, spatial distribution, and characteristics with emphasis on such factors as age composition, racial composition, household size, number of households, and levels of net migration and natural increase.

This section is based in part on the historic data collected in the socioeconomic inventories conducted as part of the regional land use-transportation planning program. It is not intended to comprise an in-depth analysis of the demographic base and structure of the Region. More detailed demographic analyses were previously completed by the Commission as an integral part of the continuing land use-transportation study and are presented in SEWRPC Technical Report No. 11, Population of Southeastern Wisconsin, which analyzes changes in the demographic base and structure of the Region for the period 1850 to 1970 with particular emphasis on the period 1960 to 1970.

Population Size

The population of an area constantly changes with the occurrence of vital events such as births and deaths, and through the inflow and outflow of persons migrating from one area to another. Population increases result from births and the in-migration of persons; population decreases result from deaths and the out-migration of persons. Thus, population change is not a simple phenomenon, but is comprised of four major components: fertility (births), mortality (deaths), in-migration (inflows), and out-migration (outflows). The balance between births and deaths is termed "natural increase" and the balance between in-migration and out-migration is termed "net migration."

In 1970 the resident population of the Region totaled approximately 1,756,100 persons, or about 1 percent of the total population of the nation and about 40 percent of the population of the State. The largest civil division in the Region—the City of Milwaukee—was the twelfth largest city in the nation in that year.

The federal census first included what is now the Southeastern Wisconsin Region in the 1850 Census of Population. The population of the Region has increased every decade since then. In the late 19th and early 20th centuries, the regional population increased rapidly, at rates of up to 222,000 persons per decade. Much of the population growth in this early period reflected the flow of immigrants into the United States, and, in particular, the immigration of German and Polish nationalities into the Region. After a relatively small increase of only about 62,000 persons during the Depression years from 1930 to 1940, the population grew by about 173,000 persons from 1940 to 1950, by about 333,000 persons from 1950 to 1960—an historic peak—and by about 182,000 persons from 1960 to 1970.

The rate of population increase in the Region since 1850 has generally been higher than for the nation as a whole, with the exception of the 1860's, 1870's, 1930's, and 1960's. Similarly, when compared to the population growth rate of the State of Wisconsin, the Region experienced higher rates of growth than the State during 7 of the 12 decades since 1850 (see Table 2, and Figure 1). By 1970 the population of the Region had increased to 1,756,100 persons, an increase of 1,642,700 persons over 1850. In 1970 the Region's population level was more than 14 times greater than the 1850 level. During this same period, the nation's population was slightly over seven times its 1850 level, while Wisconsin's population was over 13 times its 1850 level. Thus, the rate of increase of the regional population during this 120-year period was nearly twice that of the national increase, but only slightly greater than that of the State. As a result of this rapid growth, the regional share of the total national population increased from 0.49 percent in 1850 to 0.86 percent in 1970, and the regional share of the state population increased from 37 percent in 1850 to nearly 40 percent in 1970.

Since 1930, natural increase has been the dominant component in the Region's population growth, accounting for all of the population growth in the 1930's and 1960's, about 70 percent of the population growth in the 1940's, and 67 percent of the population growth in the 1950's (see Table 3). Since the 1920's—since which time the registration of births and deaths has been sufficiently complete to allow accurate calculation of net migration and natural increase rates—net migration has been the dominant component in the Region's population growth only during the 1920's, when it accounted for about 60 percent of the population growth.

Patterns and trends in both population growth components—net migration and natural increase—within the Region generally resemble those in the other large urbanizing regions of the United States. Viewed within the context of a larger historical record, these patterns and trends, both nationally

Table 2

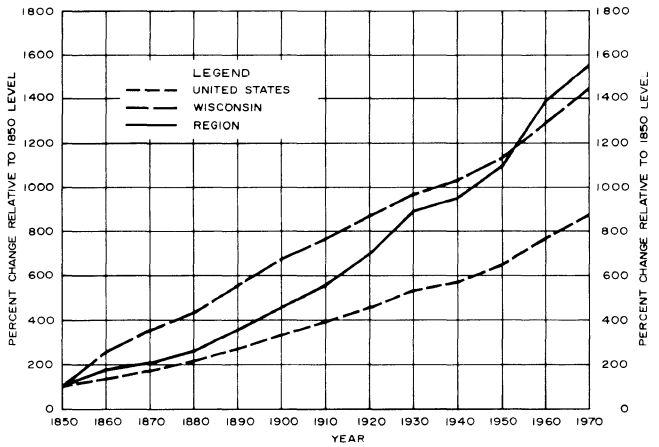
POPULATION TRENDS IN THE REGION, WISCONSIN, AND THE UNITED STATES: 1850-1970

	Region			Wisconsin			United States			Regional Population as a Percent of:	
		Change from Preceding Time Period			Change from Preceding Time Period			Change from Preceding Time Period			
Year	Population	Absolute	Percent	Population	Absolute	Percent	Population	Absolute	Percent	Wisconsin	United States
1850	113,389	--	--	305,391	--	--	23,191,876	--	--	37.1	0.49
1860	190,409	77,020	67.9	775,881	470,498	154.1	31,443,321	8,251,445	35.6	24.5	0.60
1870	223,546	33,137	17.4	1,054,670	278,789	35.9	38,448,371	7,005,050	22.6	21.2	0.58
1880	277,119	53,573	24.0	1,315,497	260,827	24.4	50,155,783	11,707,412	30.1	21.2	0.55
1890	386,774	109,655	39.6	1,693,330	377,833	28.7	62,947,714	12,791,931	25.5	22.8	0.61
1900	501,808	115,034	29.7	2,069,042	375,712	22.2	75,994,575	13,046,861	20.7	24.2	0.66
1910	631,161	129,353	25.8	2,333,860	264,818	12.8	91,972,266	15,977,691	21.0	27.0	0.69
1920	783,681	152,520	24.2	2,632,067	298,207	12.8	105,710,620	13,738,354	14.9	29.8	0.74
1930	1,006,118	222,437	28.4	2,929,006	306,939	11.7	122,775,046	17,064,426	16.1	34.2	0.82
1940	1,067,699	61,581	6.1	3,137,587	198,581	6.8	131,669,587	8,894,541	7.2	34.0	0.81
1950	1,240,618	172,919	16.2	3,434,575	296,988	9.5	151,325,798	19,656,211	14.9	36.1	0.82
1960	1,573,620	333,002	26.8	3,952,771	518,196	15.1	179,323,175	27,997,377	18.5	39.8	0.88
1970	1,756,086	182,466	11.6	4,417,933	465,162	11.8	203,184,772	23,861,597	13.3	39.7	0.86

Source: U. S. Department of Commerce, Social and Economic Statistics Administration, Bureau of the Census; and SEWRPC.

Figure 1

RELATIVE INCREASE IN POPULATION IN THE UNITED STATES, WISCONSIN, AND THE REGION 1850-1970



Source: U. S. Bureau of the Census and SEWRPC.

Table 3

RATES OF POPULATION CHANGE BASED ON NATURAL INCREASE AND NET MIGRATION IN THE REGION: 1920-1970

Decade	Total Change (percent)	Natural Increase (percent)	Net Migration (percent)
1920-1930	28.4	10.9	17.5
1930-1940	6.1	6.2	- 0.1
1940-1950	16.2	11.4	4.8
1950-1960	26.8	18.1	8.7
1960-1970	11.6	12.9	- 1.3

Source: U. S. Bureau of the Census and SEWRPC.

and regionally, appear to signal the completion of two long-term demographic phenomena. The first is the high natural population growth rate—characterized by rapidly increasing birthrates and declining deathrates—which marked the post-World War II period. The second is the massive rural to urban migration which occurred over a long period of time and contributed to the high concentration of the nation's population in its metropolitan regions.

In the 1950's, the metropolitan areas of the United States, including the three metropolitan areas within the Region, experienced unprecedented population increases. Nationally, high rates of in-migration coupled with high rates of natural increase came to be the expected trend in metropolitan areas. Evidence now exists that nationally this trend changed during the 1960's. Migration trends were reversed in many of the large older metropolitan areas of the United States from high rates of in-migration during the 1950's to high rates of out-migration during the 1960's. This reversal also occurred within the Region and particularly within Milwaukee County. Moreover, by 1970 birthrates nationally and within the Region were approaching the levels of the 1930's—previously the lowest such rates ever recorded.

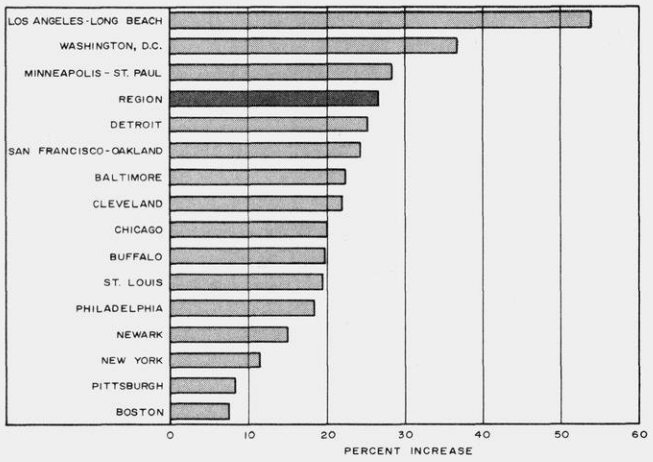
The combined effect of these two primary components of population growth—natural increase and net migration—was to increase the regional population by more than 333,000 persons from 1950 to 1960 and by more than 182,000 persons from 1960 to 1970. During the 1950's natural increase accounted for an increase of more than 224,000 persons, or 67 percent of the total regional population growth, while net migration accounted for the remainder of the regional population growth from 1950 to 1960—more than 108,000 persons, or 33 percent. From 1960 to 1970, however, the population increase in the Region was entirely accounted for by a natural increase of about 203,000 persons, which more than offset the net out-migration of more than 20,000 persons over this same 10-year period.

From 1950 to 1960, only 3 of the 15 largest standard metropolitan statistical areas of the nation experienced higher rates of growth than the Southeastern Wisconsin Region[1] (see Figure 2). During this period, the regional population increased by 27 percent, from 1,240,600 persons to 1,573,600 persons. From 1960 to 1970, however, 8 of the 15 largest standard metropolitan statistical areas in the nation experienced higher rates of population growth than the regional increase of about 12 percent over the same decade, from 1,573,600 persons in 1960 to 1,756,100 persons in 1970 (see Figure 3). These declining population growth rates in the Region since 1950 are similar to the trends exhibited in many of

[1] *The Southeastern Wisconsin Region contains three separate Standard Metropolitan Statistical Areas, as defined by the federal government, and a single, non-SMSA county. For purposes of comparing the Region with other U. S. metropolitan areas, it is considered a single metropolitan, socioeconomic unit.*

Figure 2

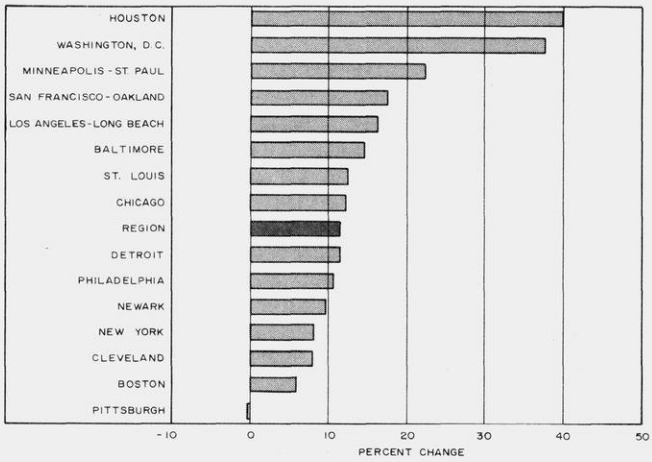
PERCENT INCREASE OF POPULATION IN THE 15 LARGEST STANDARD METROPOLITAN STATISTICAL AREAS IN THE UNITED STATES AND IN THE REGION: 1950-1960



Source: U. S. Bureau of the Census and SEWRPC.

Figure 3

PERCENT INCREASE OF POPULATION IN THE 15 LARGEST STANDARD METROPOLITAN STATISTICAL AREAS IN THE UNITED STATES AND IN THE REGION: 1960-1970



Source: U. S. Bureau of the Census and SEWRPC.

the large Standard Metropolitan Statistical Areas (SMSA's) in the northeastern and midwestern United States. In contrast, many of the large SMSA's located in the southern and western sections of the nation have experienced increasing or stable population growth rates since 1950.

Population movements between metropolitan areas accounted for some migration observed between states during the 1960's, especially from the mature, industrialized states to the rapidly developing southern and western states. Contributing to this movement were such factors as the out-migration of industry from the mature manufacturing centers of the nation to the southern and southeastern United States; increased job opportunities in the southern states; and retirement to warmer climates and to states with favorable tax treatment of estates and inheritance.[2]

In earlier phases of the rural to urban transition, relocation of persons both nationally and regionally was due principally to increasing job opportunities in the urban areas, to the increasing economic dominance of large farms in the agricultural industry, and to the related increased mechanization of farming processes. Since the 1960's, however, this rural migration pool has diminshed and is no longer a major migration force.

Population Distribution

The total number of inhabitants and their spatial distribution are important factors to be considered in any physical facilities planning effort. The Southeastern Wisconsin Region, like most metropolitan regions in the United States, has become increasingly urban. In 1850 the population of the Region was approximately 75 percent rural (farm) and 25 percent urban (nonfarm). By 1900 this relationship had nearly reversed to 30 percent rural and 70 percent urban. By 1960 almost 98 percent of the regional population was urban and only about 2 percent was rural. The rural-urban distribution of the regional population did not change significantly in the 1960's, so that in 1970, slightly more than 98 percent of the regional population was urban, while less than 2 percent was rural. The entire 120-year rural-urban population distribution change is shown graphically in Figure 4. This trend toward continuing urbanization has been one of the most significant distributional changes taking place within the Region, State, and nation since the mid-1800's.

Population growth since 1900 has not been uniform throughout the Region. From 1900 to 1930,

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[2]*Jon G. Udell, "Taxation and Changes in Residency," Wisconsin's Economy as Seen by Industry, Labor, and the General Public, Bureau of Business Research and Service, Graduate School of Business, University of Wisconsin-Madison, January 1973.*

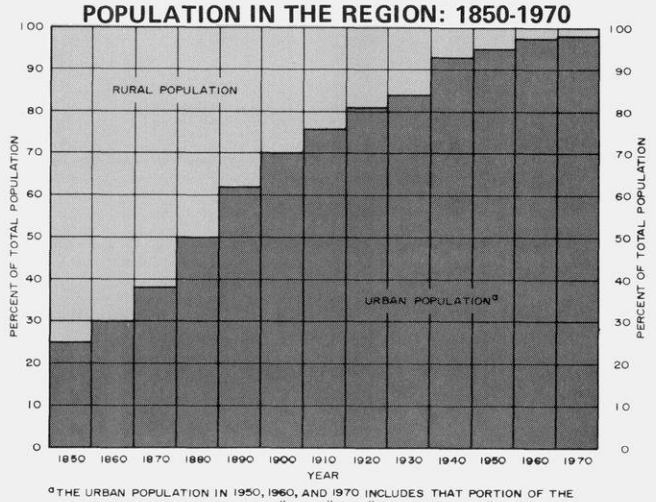
the highest rates of population increase occurred in the three urban counties of Milwaukee, Kenosha, and Racine. From 1930 to 1970, dispersion of the urban population and decentralization of urban work- and leisure-related activities reversed this trend. Varying rates of change in population growth in the Region have resulted in significant distributional shifts of population among the seven counties. The outlying counties, notably Ozaukee, Washington, and Waukesha, show the highest rates of population increase (see Figures 5 and 6). As shown in Table 4, the most dramatic changes in population distribution from 1900 to 1970 occurred in Milwaukee and Waukesha Counties. The Milwaukee County proportion of the total regional population increased by about 6 percentage points from 1900 to 1930, and then decreased by about 12 percentage points from 1930 to 1970. In contrast, the Waukesha County proportion of the total regional population decreased by approximately 2 percentage points from 1900 to 1930, and increased by about 8 percentage points from 1930 to 1970.

The result of recent changes in population distribution has been an areawide spread of population around the three primarily urban counties of Milwaukee, Kenosha, and Racine. From 1960 to 1970, these three counties experienced a decrease in their proportion of the total regional population of about 5 percentage points, from 81 percent in 1960 to 76 percent in 1970, while Ozaukee, Washington, and Waukesha Counties experienced a 4 percent increase in their proportion of the total regional population, from 16 percent in 1960 to 20 percent in 1970. This diffusion of population has resulted in the creation of certain areawide developmental and environmental problems related to the changing pattern of land use, including traffic congestion, air and water pollution, flooding, the loss of prime agricultural lands, and the general deterioration and destruction of the natural resource base.

As might be expected, given the differential population growth rates of the Region's counties, the relationship between natural increase and net migration has varied widely with respect to individual counties in the Region (see Table 5). From 1950 to 1960, Ozaukee and Waukesha Counties each experienced more growth from net in-migration than from natural increase, while Kenosha, Milwaukee, Racine, Washington, and Walworth Counties experienced more growth from natural increase than from net in-migration.

Figure 4

DISTRIBUTION OF URBAN AND RURAL POPULATION IN THE REGION: 1850-1970

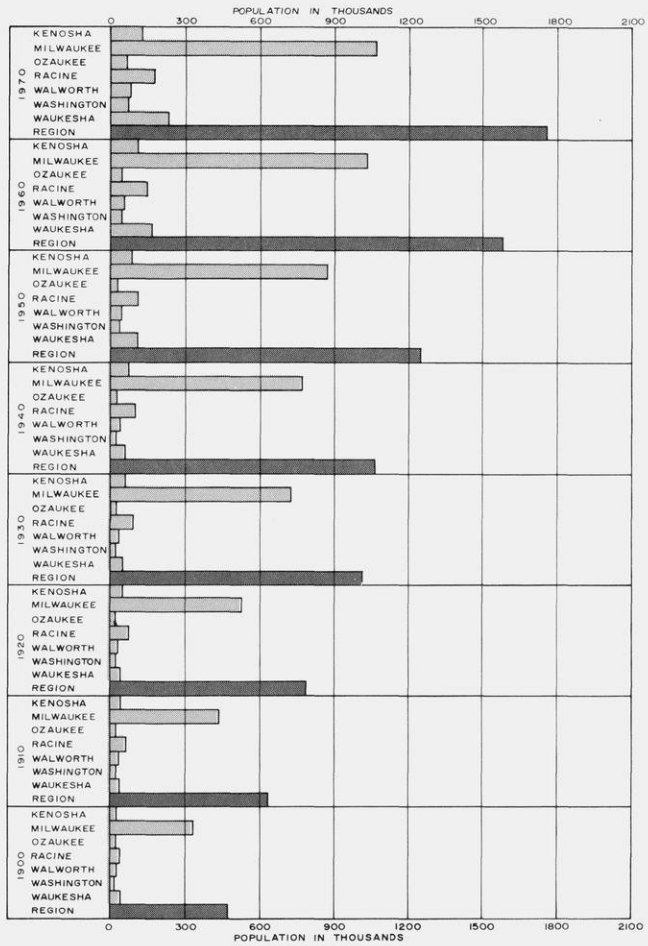


[a]THE URBAN POPULATION IN 1950, 1960, AND 1970 INCLUDES THAT PORTION OF THE POPULATION CLASSIFIED AS BEING "URBAN" AND "RURAL NONFARM" BY THE U.S. BUREAU OF THE CENSUS.

Source: U. S. Bureau of the Census and SEWRPC.

Figure 5

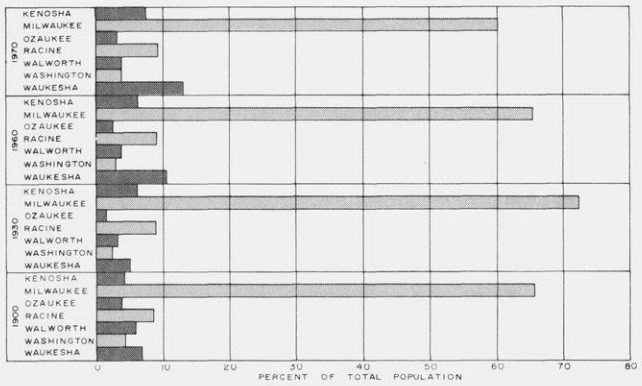
POPULATION DISTRIBUTION IN THE REGION BY COUNTY: 1900-1970



Source: U. S. Bureau of the Census and SEWRPC.

Figure 6

PERCENTAGE DISTRIBUTION OF POPULATION IN THE REGION BY COUNTY SELECTED YEARS 1900-1970



Source: U. S. Bureau of the Census and SEWRPC.

The relationship between natural increase and net migration observed during the 1950's remained the same from 1960 to 1970 in each county except Walworth and Washington which, in contrast to their 1950 to 1960 trend, experienced more population increase from net in-migration than from natural increase. Milwaukee County was the only county in the Region to experience a net out-migration of persons from 1960 to 1970. The magnitude of this out-migration was substantial enough to offset the net in-migration observed in the other six counties and to result in a net regional out-migration of more than 20,000 persons over this 10-year period.

Population Characteristics

Equally as important as population size and spatial distribution are certain population characteristics

Table 4

POPULATION DISTRIBUTION IN THE REGION BY COUNTY: SELECTED YEARS 1900-1970

County	1900		1930		1960		1970		Change 1960-1970	
	Population	Percent of Region	Population	Percent of Region	Population	Percent of Region	Population	Percent of Region	Absolute	Percent
Kenosha	21,707	4.3	63,277	6.3	100,615	6.4	117,917	6.7	17,302	17.2
Milwaukee . . .	330,017	65.8	725,263	72.1	1,036,047	65.8	1,054,249	60.1	18,202	1.7
Ozaukee	16,363	3.3	17,394	1.7	38,441	2.5	54,461	3.1	16,020	41.7
Racine	45,644	9.1	90,217	9.0	141,781	9.0	170,838	9.7	29,057	20.5
Walworth. . . .	29,259	5.8	31,058	3.1	52,368	3.3	63,444	3.6	11,076	21.1
Washington . .	23,589	4.7	26,430	2.6	46,119	2.9	63,839	3.6	17,720	38.4
Waukesha . . .	35,229	7.0	52,350	5.2	158,249	10.1	231,338	13.2	73,089	46.2
Region	501,808	100.0	1,005,989	100.0	1,573,620	100.0	1,756,086	100.0	182,466	11.6

Source: U. S. Bureau of the Census and SEWRPC.

Table 5

NATURAL INCREASE AND NET MIGRATION IN THE REGION BY COUNTY: 1950-1970

County	Natural Increase			Net Migration		
	1950-1960	1960-1970	1950-1970	1950-1960	1960-1970	1950-1970
Kenosha	13,932	15,166	29,098	11,445	2,136	13,581
Milwaukee	150,141	122,489	272,630	14,859	- 104,287	- 89,428
Ozaukee	5,924	6,072	11,996	9,156	9,948	19,104
Racine	21,472	20,481	41,953	10,724	8,576	19,300
Walworth.	5,732	4,685	10,417	5,052	6,391	11,443
Washington . . .	7,501	8,136	15,637	4,716	9,584	14,300
Waukesha	19,746	25,743	45,489	52,602	47,346	99,948
Region	224,448	202,772	427,220	108,554	- 20,306	88,248

Source: United States Vital Statistics 1960; Wisconsin State Board of Health; U. S. Bureau of the Census; and SEWRPC.

having particularly important implications for land use and supporting facilities planning. These characteristics include age composition, race, household composition, and household size. Some of these characteristics, such as age, have indirect implications for land use and physical facilities planning since they affect the rate of population growth and change through natural increase. Age also is a factor in migration. These population characteristics also have a direct effect on housing needs and on certain important considerations in transportation planning such as travel demand, travel habits, and travel characteristics—including the choice of transportation mode. The number, composition, and size of households have direct implications for almost all aspects of facilities planning, including sanitary sewerage and water supply facilities planning.

Knowledge of the age composition of a population is vital to comprehensive planning since age governs the time at which a person completes his schooling, enters the labor market, marries, forms a family, and retires from the labor force. Each of these events has implications for land use, housing, transportation and other public facilities planning. Since each age group exerts different demands on the society for facilities and services, it is important to know the number of persons in each age group now and the probable number which may be expected in the future. The needs of an older, more mature population are quite different from those of a younger, growing population. Moreover, each group contributes differently to the support of society.

The changing distribution within selected age groups of the Region's population is shown in Table 6. The proportion of persons 65 years of age and older has steadily increased from 5 percent in 1930 to nearly 10 percent in 1970. Proportionately, the more mature working age group—45 to 64 years—has been the most constant over time, ranging from 20 to 23 percent of the total regional population between 1940 and 1970. The younger working age group of the population, aged 15 to 44, has declined since 1920 from about 50 percent of the total regional population to only 40 percent in 1970. The proportion of persons within the Region under 15 years of age has fluctuated widely since 1920. Nearly 30 percent of the population was under 15 years of age in 1920 and again in 1970. However, this proportion was under 23 percent in 1940 and over 30 percent in 1960. Much of the change in the proportional relationships of these age groups in the Region can be accounted for by fluctuations in the birth and death rates during these periods, especially in those groups under 15 years of age and 65 years of age and older.

Table 6

GENERALIZED AGE COMPOSITION OF THE POPULATION IN THE REGION: 1920-1970

Age Group	Population											
	1920		1930		1940		1950		1960		1970	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total
Under 15 . . .	224,528[a]	28.7	266,523	26.5	240,544	22.5	304,077	24.5	494,704	31.4	523,391	29.8
15-44.	395,281	50.4	513,442	51.0	523,384	49.0	553,142	44.6	615,034	39.1	708,236	40.4
45-64.	163,872	20.9	173,383	17.2	233,864	21.9	283,898	22.9	322,943	20.5	354,845	20.2
65 and Older . .	--[b]	--	52,209	5.2	69,907	6.6	99,501	8.0	140,939	9.0	169,415	9.6
All Ages	783,681	100.0	1,006,118[c]	100.0	1,067,699	100.0	1,240,618	100.0	1,573,620	100.0	1,755,887[d]	100.0

[a] *This number is an estimate.*

[b] *The number of persons age 65 and older for 1920 is included in the total for persons 45 to 64 years of age.*

[c] *This column does not add to total because 561 persons did not report their ages.*

[d] *The 1970 regional population of 1,755,887 excludes 199 persons who were added subsequent to the conduct of the 1970* census *and not allocated to the various age group categories.*

Source: U. S. Bureau of the Census and SEWRPC.

A more detailed breakdown of the age composition of the regional population for 1950, 1960, and 1970 is shown in Table 7 and Figure 7. As shown, 6 of the 17 age groups increased their proportion of the total population from 1950 to 1960 and from 1960 to 1970. In addition, 3 age groups which had experienced decreases between 1950 and 1960 increased in proportion between 1960 and 1970. The largest increase in the share of the total regional population from 1950 to 1960 was about 3 percentage points in the 5 to 9 year age group, which increased from nearly 8 percent of the total in 1950 to nearly 11 percent in 1960. From 1960 to 1970, the largest increase in the share of total regional population was in the 15 to 19 year age group, which increased from almost 7 percent of the regional population in 1960 to over 9 percent in 1970. Proportionately, the second largest increase in the share of total regional population was in the 10 to 14 year age group, which increased by 2 percentage points in each decade from 1950 to 1970.

The increases in the share of total regional population in the youthful and elderly age groups from 1950 to 1970 are significant when compared to the decreasing proportionate shares of the population in the 30 to 49 year age groups. The two age groups from 30 to 39 actually decreased by more than 23,000 persons from 1960 to 1970. The gains at the upper and lower ends of the age structure bear with them important implications for public policy formulation in the areas of education, recreation, health and welfare, transportation, and housing.

In 1950 and 1960 the age group under 5 years comprised the largest proportion of the Region's population—10 and 12 percent, respectively. The second largest group in 1950 included persons 25 to 29 years of age—8 percent of the Region's population—and in 1960 included persons 5 to 9 years of age—nearly 11 percent of the Region's population. By 1970, the 10 to 14 year age group formed the largest proportion—10.6 percent—of

Table 7

DETAILED AGE COMPOSITION OF THE POPULATION IN THE REGION: 1950, 1960, AND 1970

Age Group	Population									
	1950		1960		1970		Net Change 1950-1960		Net Change 1960-1970	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent	Number	Percent
Under 5	127,140	10.2	190,197	12.1	153,243	8.7	63,057	49.6	- 36,954	-19.4
5- 9	96,595	7.8	166,608	10.6	183,283	10.4	70,013	72.5	16,675	10.0
10-14	80,342	6.5	137,896	8.8	186,865	10.6	57,554	71.6	48,969	35.5
15-19	78,949	6.4	103,817	6.6	163,033	9.3	24,868	31.5	59,216	57.0
20-24	93,453	7.5	94,011	6.0	132,672	7.5	558	0.6	38,661	41.1
25-29	102,038	8.2	100,014	6.4	114,042	6.5	- 2,024	- 2.0	14,028	14.0
30-34	96,252	7.8	108,477	6.9	98,001	5.6	12,225	12.7	- 10,476	- 9.7
35-39	94,477	7.6	108,543	6.9	95,857	5.5	14,066	14.9	- 12,686	-11.7
40-44	87,973	7.1	100,175	6.4	104,631	6.0	12,202	13.9	4,456	4.4
45-49	81,577	6.6	94,877	6.0	103,140	5.9	13,300	16.3	8,263	6.3
50-54	77,227	6.2	85,559	5.4	93,714	5.3	8,332	10.8	8,155	9.5
55-59	68,622	5.5	76,281	4.8	85,424	4.9	7,659	11.2	9,143	12.0
60-64	56,472	4.6	66,226	4.2	72,567	4.1	9,754	17.3	6,341	9.6
65-69	41,591	3.4	55,454	3.5	57,494	3.3	13,863	33.3	2,040	3.7
70-74	27,736	2.2	40,977	2.6	46,711	2.7	13,241	47.7	5,734	14.0
75-84	25,716	2.1	37,468	2.4	52,762	3.0	11,752	45.7	15,294	40.8
85 and Older	4,458	0.3	7,040	0.4	12,448	0.7	2,582	57.9	5,408	76.8
All Ages	1,240,618	100.0	1,573,620	100.0	1,755,887	100.0	333,002	26.8	182,267	11.6

Source: U. S. Bureau of the Census and SEWRPC.

the Region's population. This is the same cohort which was under 5 years of age in 1960. The 5 to 9 year age group formed the second largest proportion of the Region's population—10.4 percent—in 1970.

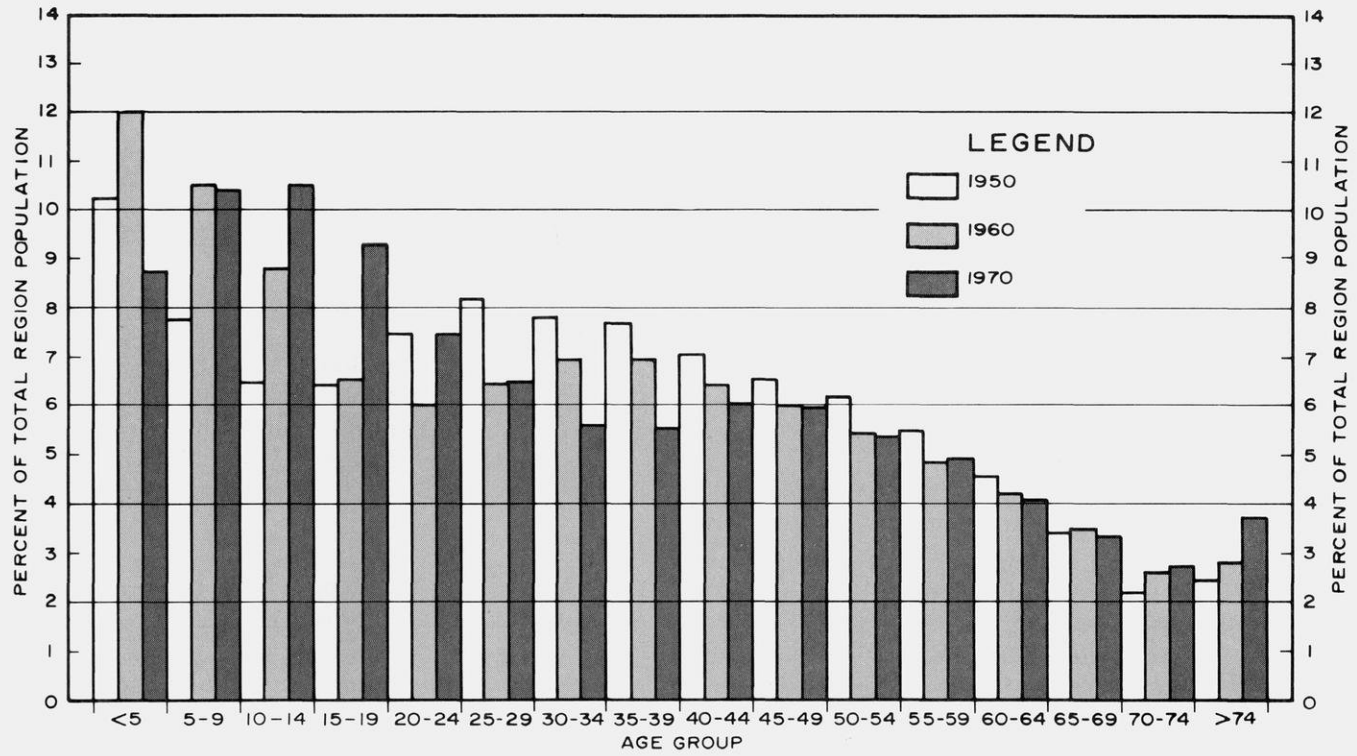
As stated above, the largest age group in 1950 consisted of those under 5 years of age, the first of the "baby boom" cohorts. This same age group was also the largest in 1960. In 1970, however, the age group under 5 years of age was exceeded in size by three other age groups—5 to 9 years of age, 10 to 14 years of age, and 15 to 19 years of age—indicating that the "baby boom" began to wane during the 1960's and was essentially over by 1970. The largest age group in 1970 was comprised of those individuals born in the second half of the 1950's.

During the 1950's, the 5 to 9 year age group experienced the greatest increase—more than 70,000 persons—while during the 1960's the 15 to 19 year age group increased the most—more than 59,000 persons. During the 1950's only one age group declined, and that by 2 percent. During the 1960's, three age groups experienced declines ranging from nearly 10 to 20 percent. The under 5 age group, which increased by nearly 50 percent from 1950 to 1960, experienced the greatest decline—19 percent—during the 1960's.

A single measure of the relative difference in age structure between areas or time periods can be obtained by use of a median age comparison. The median age is that age above and below which there are an equal number of persons. As indicated in Table 8, the Region in recent years has had a more youthful population than either the State or nation. The national median age level, which rose steadily from 1890 when it was 22 years to 1950 when it was just over 30 years, has declined the last two decades to nearly 30 years in 1960 and 28 years in 1970. In Wisconsin, the median age declined from 31 years in 1950 to 29 years in 1960 to 27 years in 1970. The decline of the median age in the Region was similar to that in the State. In 1950 the median age was 31 years, by 1960 it had declined to 28 years, and in 1970 it was below 28 years.

Figure 7

AGE COMPOSITION OF THE POPULATION IN THE REGION: 1950, 1960, AND 1970



Source: U. S. Bureau of the Census and SEWRPC.

Table 8

MEDIAN AGE OF THE POPULATION IN THE UNITED STATES, WISCONSIN, AND THE REGION: 1950, 1960, AND 1970

Geographic Area	Median Age		
	1950	1960	1970
United States	30.1	29.5	28.1
Wisconsin	31.0	29.4	27.2
Southeastern Wisconsin Region	31.4	28.5	27.6

Source: U. S. Bureau of the Census and SEWRPC.

Table 9

DEPENDENCY RATIOS OF THE POPULATION IN THE UNITED STATES, WISCONSIN, AND THE REGION: 1950, 1960, AND 1970

Geographic Area	Dependency Ratio Per 100 Persons		
	1950	1960	1970
United States	65.1	81.9	79.0
Wisconsin	67.3	88.5	87.1
Southeastern Wisconsin Region	56.7	80.4	82.7

Source: U. S. Bureau of the Census and SEWRPC.

One measure of the impact of age composition on the productive capacity of a population is the dependency ratio. It may be assumed that the age group 18 to 64 years comprises the "productive" segment of the population, while persons under 18 or over 65 years of age comprise the "dependent" segment. A rough measure of the dependency load that the productive population must bear is the ratio of the population 18 and under and 65 and older to the population 18 to 64 multiplied by 100. This ratio purports to measure how many dependents each 100 persons in the productive years must, on the average, support. Table 9 shows the dependency ratios for the Region, the State, and the nation in 1950, 1960, and 1970.

In 1950 every 100 "productive" persons supported 65 persons in the nation, 67 persons in the State, and 57 persons in the Region. By 1960 the dependency ratio had increased dramatically for all three areas. For the Region, however, this increase was greatest. In 1960 the dependency ratio was 82 persons for the nation, 88 persons for the State, and 80 persons for the Region. By 1970 the dependency load in the Region had increased to 83 persons, while in the nation and State it had declined to 79 and 87 persons, respectively.

One of the most important characteristics of the regional population with respect to land use and facilities planning is the number and size of the households.[3] Almost 70,600 households were added to the Region between 1960 and 1970, an increase of 15 percent, as shown in Table 10. This compares with an increase of 111,400 households, or 31 percent, from 1950 to 1960. Since the rate of household growth was greater than the total population increase during this period, the number of persons per household declined, from 3.36 in 1950 to 3.30 in 1960 to 3.20 in 1970. For the nation, the number of persons per household declined from 3.4 in 1950 to 3.3 in 1960 to 3.1 in 1970. The percentage of the total population living in households also fluctuated during this period, from 95.5 percent in 1950 to 97.7 percent in 1960 to 97.3 percent in 1970. All persons not living in households are classified as living in group quarters, such as hospitals for the chronically ill, homes for the aged, correctional institutions, college dormitories, and military barracks.

Within the Region, the greatest relative increase in the number of households from 1960 to 1970 occurred in suburban Waukesha, Ozaukee, and Washington Counties, with increases of 46, 42, and 39 percent, respectively, as shown in Table 11. Waukesha and Ozaukee Counties also had the largest increases in the 1950's, 80 and 58 percent, respectively. These increases are consistent with the previously discussed trends in population growth and distribution within the Region. The number of households in Milwaukee County increased by 8 percent from 1960 to 1970, the smallest relative increase in the Region, and by 26 percent in the 1950's, the second smallest rela-

[3] *A household is composed of all persons who occupy a group of rooms or a single room which constitutes a housing unit, i.e., separate living quarters. The household is a useful unit of analysis not only for comprehensive planning agencies but also for market analysts, public utility companies, and real estate firms.*

Table 10

HOUSEHOLD POPULATION TRENDS IN THE REGION: 1950-1970

Household Characteristics	1950	1960	1970	Change: 1950-1960		Change: 1960-1970	
				Absolute	Percent	Absolute	Percent
Total Number of Households	354,544	465,913	536,486	111,369	31.4	70,573	15.1
Household Population	1,190,193	1,537,235	1,714,200	347,042	29.1	176,965	11.5
Persons per Household	3.36	3.30	3.20	- 0.6	- 1.8	- 0.10	- 3.0

Source: U. S. Bureau of the Census and SEWRPC.

Table 11

NUMBER OF HOUSEHOLDS AND PERSONS PER HOUSEHOLD IN THE REGION BY COUNTY: 1950, 1960, AND 1970

County	Number of Households					Number of Persons per Household			Percent of Total Population Living in Households		
				Percent Change							
	1950	1960	1970	1950-1960	1960-1970	1950	1960	1970	1950	1960	1970
Kenosha	21,958	29,545	35,468	34.6	20.0	3.36	3.36	3.26	98.0	98.9	98.1
Milwaukee	249,232	314,875	338,605	26.3	7.5	3.34	3.21	3.04	95.4	97.5	97.6
Ozaukee	6,591	10,417	14,753	58.0	41.6	3.51	3.65	3.66	99.0	98.9	99.1
Racine	31,399	40,736	49,796	29.7	22.2	3.37	3.39	3.35	96.5	97.5	97.7
Walworth	12,369	15,414	18,544	24.6	20.3	3.25	3.28	3.16	96.6	96.5	92.3
Washington	9,396	12,532	17,385	33.4	38.7	3.55	3.64	3.63	98.5	98.8	98.9
Waukesha	23,599	42,394	61,935	79.6	46.1	3.51	3.66	3.66	96.3	98.0	98.0
Region	354,544	465,913	536,486	31.4	15.1	3.36	3.30	3.20	95.9	97.7	97.6

Source: U. S. Bureau of the Census and SEWRPC.

tive increase for that period. With the exception of Milwaukee County, the rates of increase in the number of households in the Region were nearly equal to the rates of population increase during the same period. The number of households in Milwaukee County has increased at a more rapid rate than the county population since 1960.

Although the proportion of persons living in households has declined within the Region as a whole since 1960, three counties—Milwaukee, Racine, and Washington—experienced increases in the proportion of the total population living in households. Three other counties—Kenosha, Ozaukee, and Walworth—experienced declines during this 10-year period. Waukesha County's proportion of household population remained at the 1960 level.

Kenosha, Milwaukee, Racine, Walworth, and Washington Counties experienced declines in the average number of persons per household from 1960 to 1970. The largest decline occurred in Milwaukee County, where the average number of persons per household declined from 3.21 in 1960 to 3.04 in 1970. Washington County experienced the smallest decline (only 0.01 person per household). Ozaukee County was the only county in which the average household size increased in 1970, while in Waukesha County the household size remained at the 1960 level.

Declining birthrates are undoubtedly a factor in the observed decreases in average household size in the Region; however, rapid increases in the number of one-person households have also been an important factor. In this regard, the increased incidence of divorce and its attendant propensity to create additional households, the desire of many elderly persons to remain in their own households, and the desire of many young, unmarried people to move out of their parents's household and form their own households are important contributors to decreasing average household size.

The racial composition of a population is significant because it is an index of cultural background as well as of differences in economic and social status. The classification of population according to race is important to comprehensive planning only insofar as there are differences in political, legal, or social status; in cultural traits; or in behavior between groups.

The census subdivides the population into three broad, currently recognized racial groups which represent significant cultural distinctions. Skin color is one of the easiest bases for such distinction, so the population can be enumerated as white, black, and other nonwhite. All persons of Spanish descent, including those of Mexican and Puerto Rican ancestry, are generally, although not exclusively, classified as white by the census.

As shown in Table 12, 7 percent of the Region's population was nonwhite in 1970 compared with nearly 5 percent in 1960 and 2 percent in 1950. The largest increase in the proportion of nonwhites since 1960 occurred in Milwaukee and Racine Counties. Blacks accounted for 95 percent of the nonwhite total in 1950 and 1960, but dropped to 92 percent of the total by 1970. Within the Region, the proportion of the nonwhite population total accounted for by blacks decreased from 1950 to 1970 in all counties except Washington County. The nonwhite population increased at a faster rate during the last two decades than the white population, with Milwaukee County registering a loss of white population in the last decade. The Region, however, remained overwhelmingly white in 1970, with 93 percent of its residents being white. In Ozaukee, Walworth, Washington, and Waukesha Counties, more than 99 percent of the population was white in 1970, although this proportion has decreased slightly in each of these counties since 1950. In Milwaukee County, which has the largest nonwhite population, 89 percent of the population was white in 1970, compared to 94 percent in 1960 and 97 percent in 1950.

SUMMARY

This chapter has described historic trends in the demographic base of the Southeastern Wisconsin Region. The more significant findings of this chapter can be summarized as follows:

In 1970 the resident population of the Region stood at 1,756,100 persons, or more than 14 times its 1850 level. Over the same 120-year period, the nation's population increased by slightly over 7 times, while Wisconsin's population increased by over 13 times. The sharp contrast between population growth trends during the two most recent decades reported in this chapter is more obvious in percentage than in absolute terms.

Between 1950 and 1960, the total regional population increased by 27 percent, from 1,240,600 persons to 1,573,600 persons. From 1960 to 1970, however, the total population in the Region increased by only 12 percent, from 1,573,600 persons to 1,756,100 persons. One interpretation of this reduced rate of regional population growth from 1960 to 1970 is that it signified a return to the more moderate rates that existed in the 1930's and 1940's, and that the unprecedented absolute population increase in the 1950's may be viewed as exceptional with a recurrence being unlikely.

Regional population increases since 1940 have been principally due to natural increase, one of the two major components of population change. Although the birthrates in the Region have declined steadily since 1960 after the high rates of the post World War II period, the importance of natural increase as a component of regional population growth is indicated by the fact that natural increase accounted for 67 percent of the total population increase from 1950 to 1960—224,000 persons—and all of the population increase from 1960 to 1970—203,000 persons.

Migration, the second major component of population change, accounted for an increase of 108,000 persons from 1950 to 1960, or about 33 percent of the total regional population increase. From 1960 to 1970 this migration pattern reversed itself and produced a net out-migration in the Region. As a component of population change, therefore, migration accounted for none of the total regional population increase from 1960 to 1970.

During the first three decades of the 1900's, the highest rates of population increase occurred in the now urban counties of Kenosha, Milwaukee, and Racine. Since 1930, however, the highest rates of increase have occurred in the suburban and rural areas of Ozaukee, Washington, and Waukesha Counties. This continuing trend of population decentralization from the older urban centers of the Region has important implications for both land use and physical facilities planning. The demands for new and additional public services

Table 12

RACIAL COMPOSITION OF THE POPULATION IN THE REGION BY COUNTY: 1950, 1960, AND 1970

1950

County	Black		White		Other Nonwhite		Total	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Region Population
Kenosha	253	0.33	74,954	99.63	31	0.04	75,238	6.0
Milwaukee	22,129	2.54	847,806	97.33	1,112	0.13	871,047	70.2
Ozaukee	7	0.03	23,352	99.96	2	0.01	23,361	1.9
Racine	1,844	1.68	107,705	98.29	36	0.03	109,585	8.8
Walworth	112	0.27	41,451	99.68	21	0.05	41,584	3.3
Washington	4	0.01	33,883	99.95	15	0.04	33,902	2.7
Waukesha	129	0.15	85,612	99.66	160	0.19	85,901	7.1
Region	24,478	1.97	1,214,763	97.92	1,377	0.11	1,240,618	100.0

1960

County	Black		White		Other Nonwhite		Total		Percent Change 1950-1960			
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Region Population	Black	White	Other Nonwhite	Region Population
Kenosha	957	0.95	99,525	98.92	133	0.13	100,615	6.4	278.3	31.4	329.0	33.7
Milwaukee	63,024	6.08	969,264	93.56	3,753	0.36	1,036,041	65.8	184.8	14.3	237.5	18.9
Ozaukee	9	0.02	38,395	99.89	37	0.09	38,441	2.5	28.6	64.4	1,750.0	64.6
Racine	5,289	3.73	136,322	96.15	170	0.12	141,781	9.0	186.8	26.6	372.2	29.4
Walworth	158	3.02	52,138	96.84	72	0.14	52,368	3.3	41.1	25.8	242.9	25.9
Washington	8	0.12	46,060	99.77	51	0.11	46,119	2.9	100.0	35.9	240.0	36.0
Waukesha	146	0.09	157,958	99.82	145	0.09	158,249	10.1	13.2	84.5	- 9.4	84.2
Region	69,591	4.42	1,499,662	95.31	4,361	0.27	1,573,614	100.0	184.3	23.5	216.7	26.8

1970

County	Black		White		Other Nonwhite		Total		Percent Change 1960-1970			
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Region Population	Black	White	Other Nonwhite	Region Population
Kenosha	1,930	1.63	115,623	98.06	364	0.31	117,917	6.7	101.7	16.7	173.7	17.2
Milwaukee	106,033	10.06	939,989	89.18	8,041	0.76	1,054,063	60.0	68.2	- 3.0	114.3	1.7
Ozaukee	92	0.17	54,197	99.59	132	0.24	54,421	3.1	922.2	41.2	256.8	41.6
Racine	10,572	6.19	159,511	93.37	755	0.44	170,838	9.7	99.9	17.1	344.1	20.5
Walworth	287	0.45	62,879	99.11	278	0.44	63,444	3.6	81.6	20.6	286.1	21.2
Washington	45	0.07	63,652	99.71	142	0.22	63,839	3.7	462.5	38.2	178.4	38.4
Waukesha	362	0.16	230,205	99.50	798	0.34	231,365	13.2	148.0	45.7	450.3	46.2
Region	119,321	6.80	1,626,056	92.60	10,510	0.60	1,755,887	100.0	71.5	8.4	141.0	11.6

Source: U. S. Bureau of the Census and SEWRPC.

and facilities by urban growth and development will affect both the older urban centers and the newer suburban and rural urban fringe areas of the Region.

Regional population increases over the last two decades have had a significant effect upon the age structure of the population. During the 1950's, rapidly rising birthrates and declining deathrates resulted in increases in the proportion of the regional population made up of persons under 20 years of age and 65 years of age and older, while the labor force age population—20 to 64—actually declined as a proportion of the total population by more than 8 percentage points. During the 1960's, however, declining birthrates resulted in a decrease in the proportion of the total regional population made up of persons under 10 years of age and an increasing proportion of the total population made up of persons 10 years of age and older. The result of this age composition change since 1950 has been a declining proportion of the productive labor force segment of the population and an increasing proportion of the dependent segment of the population made up of persons under 18 and 65 and older. It must be remembered, however, that not all of these changes are reflective of long-term trends in the age structure of the population. The identified trends may or may not continue over long periods of time depending upon the future course of birth and death rates and the incidence of both in- and out-migration.

From 1950 to 1970 the total number of households increased faster than the household population, resulting in declining persons per household rates of from 3.36 in 1950 to 3.30 in 1960 to 3.20 in 1970. The rapid decline in the average number of persons per households since 1950 is due in part to the dramatic increase in the number of one-person households. Declining fertility among married couples in households has also contributed to the decline. Presently, the average number of persons per household is generally larger in the suburban areas of the Region and smaller in the central cities and outlying rural areas.

The racial composition of the regional population has been changing also. In the 1970 census, nearly 93 percent of the regional population was reported as white compared to 95 percent reported as white in 1960 and almost 98 percent reported as white in 1950. The balance of the population was nonwhite, a category which includes persons reporting their race as black, American Indian, Japanese, Chinese, or another race. In all three years, 1950, 1960, and 1970, the overwhelming majority, or more than 90 percent, of the nonwhite population in the Region was comprised of persons who reported their race as black.

Chapter III

ANTICIPATED POPULATION GROWTH AND CHANGE: 1970-2000

INTRODUCTION

Change is one of the basic characteristics of the modern world, and urban growth, decay, and renewal are among the most important aspects of this change. No nation, state, or region which participates in modern life can escape the effects of urban change; and no part of daily life can avoid being influenced in some way by forces rooted in this complex process. Since change is inevitable, the question facing public officials and citizen leaders of a region, such as southeastern Wisconsin, is not whether urban growth, decay, and renewal will occur, but how much will occur and, correspondingly, when will it occur and how might it be shaped and guided in the public interest. Changes in population size, composition, and distribution are an important aspect of this complex process of change. Therefore, the analysis of past changes in population and the projection of probable future changes in population are important operations in any planning effort. The size, composition and distribution of population determine the level of demand for the various land uses and for facilities and services of all types. The preceding chapter of this report presented data which describe the changes in these factors that have occurred prior to 1970 within southeastern Wisconsin. This chapter presents the results of attempts to forecast changes in population size, composition, and distribution, and thereby to provide one important basis for the development of land use and supporting public facility plans to help guide urban change within the Region.

In any consideration of forecasts, it is important to understand the basic concepts underlying forecasting methodology in general, the particular methods used to prepare the forecasts under consideration, and the consequent limitations of those forecasts. Therefore, the methodologies and assumptions used in the preparation of the regional population forecasts are presented in summary form. It must be remembered, however, that the forecasts were prepared in the early part of the present decade. The discussion in this chapter, therefore, reflects the collective thinking of Commission staff and Commission advisory committees at that time, particularly with respect to the assumptions concerning births, deaths, and migration that were eventually chosen as the most reasonable. Since it is the purpose of this chapter to present and describe the forecasts that were selected to aid Commission staff in the development of long-range land use and physical facilities plans, the appropriateness of these assumptions in view of observed population change since 1970 will not be discussed here; however, this issue will be examined in later chapters.

Many methods have been developed for forecasting population change in a region, such as southeastern Wisconsin. Some of these methods are quite simple, some are highly complex, but all are ultimately based upon historical experience and, in general, rely on a combination of mathematical formulation and professional judgment to analyze this experience and project it into the future. The principal difference between or among any of the forecasting methods is generally reflected in the differing emphasis upon these two basic elements. At one extreme a method may involve little or no mathematical formulation and may depend almost entirely upon the exercise of professional judgment by a person or by a group of persons. Because the considerations entering into such forecasts are most often not clearly articulated, even in the minds of the persons making the forecasts, such forecasts are generally not capable of being replicated by others nor of being reduced to a precise procedure which can be expressed mathematically. At the other extreme, a method may depend almost entirely upon mathematical formulation and require little exercise of professional judgment. Such forecasts, founded as they are in a precise procedure, may be readily replicated once the rules of the procedure are established. These procedural rules may be called forecasting models; and if expressed in mathematical terms, may be designated as mathematical forecasting models.[1]

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[1] *A model is a replica or representation of some other object or thing. Models are often used to simulate the operation of complex, real world systems composed of a large number of interacting*

(footnote continued on following page)

It is important to understand that the forecasts based upon mathematical forecasting models are not necessarily more accurate than forecasts based largely upon experienced professional judgment. Forecasts based upon models, however, have two great advantages: they require that the underlying assumptions be explicitly stated, and they permit the effects of differing underlying assumptions to be quantitatively determined.

To date, no single mathematical or judgmental method of forecasting any of the basic components of regional population change has proven to be more accurate than any other. For this reason, it is generally unwise to rely on the results of a single method of forecasting, but to utilize, if possible, a number of methods; compare the results; and then, after careful consideration of any differences, select the "best" estimate utilizing the best professional judgment available. When and as estimates or measurements of the magnitude of actual change become available in the future, the forecasting methods used can be evaluated by comparing the deviation of the observed magnitude of change from the original "best" estimate of that change with the deviations from estimates obtained by alternative methods. This evaluation procedure permits assessment of the correctness of the assumptions incorporated into the different forecasting methods and results in refinement of these methods. This procedure has generally been followed in the preparation of forecasts by the Commission. In fact, one of the major purposes of this report is to assess the validity—at least for the period 1970 to 1977—of the assumptions used in the preparation of the regional population forecasts to the year 2000 as prepared in 1974.

Finally, it must be recognized that no one can "predict" the future, and that all forecasts, however made, involve uncertainty and, therefore, must always be used with great caution. Forecasts cannot take into account events which are unpredictable, but which may have a major effect upon future conditions. Such events include wars; epidemics; major social, political, and economic upheavals; and radical institutional changes. Moreover, both public and private decisions of a less radical nature than the foregoing can be made which may significantly affect the ultimate accuracy of any forecast. The very act of preparing forecasts which present a distasteful situation to society may lead to actions which will negate those forecasts. For these reasons, forecasting, like planning, must be a continuing process. As otherwise unforeseeable events unfold, forecast results must be revised; and, in turn, plans which are based on such forecasts must be reviewed and revised accordingly.

POPULATION FORECASTING METHODOLOGY

Although the preparation of forecasts is not planning, the preparation of all plans must begin with some kinds of forecasts. In any planning effort, forecasts are required of all future events and conditions which are outside the scope of the plan but which will affect plan design or implementation. For example, the future demand for land, transportation, water supply, and sewerage will depend primarily upon the size of the future population and the nature of future economic activity within the planning area. Control of changes in population and economic activity levels, however, lies largely outside the scope of governmental activity at the regional and local levels and outside the scope of the physical planning process. Future population levels, therefore, must be forecast. These levels in turn, determine the aggregate demand for land and supporting transportation and utility systems. This is not to say, however, that governmental policies at the regional and local levels cannot influence the course of economic development and consequently of population growth. Indeed, the provision of efficient regional transportation and utility systems and a sound regional economic development program can contribute to favorable industrial location decisions—and thereby economic and population growth—even though the provision of such systems and programs cannot directly generate economic or population growth.

Forecasts and Projections

Because demographers are seldom confident that a single most likely schedule of future population change can be specified, they are inclined to "bracket" the future course of population change by developing a group of alternative future population scenarios, using a variety of population projection techniques or a single projection tech-

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(footnote 1—continued)

elements. A mathematical model uses a set of mathematical relationships (equations) to operate on a set of typical real data. The model is then used to simulate the operation of the real system. The modeled system may be the flow of automobile traffic in a highway network, water flow in a river basin, change in the size and structure of a population, or some other real system.

nique utilizing a variety of assumptions concerning possible future changes in the components of population change. In general, it is presumed that the future course of change will not be greater than the highest projection produced nor lower than the lowest projection produced and that some intermediate projection is the most probable measure of the future population level. Once a consensus has been established as to which of the intermediate projections is judged to be the most realistic, it is referred to as a forecast.

The distinction between a population forecast and a population projection is important, particularly in view of the fact that either a forecast or a projection, or, in some cases, a current estimate, may be produced utilizing the same technique. There are a variety of techniques which use facts about a population at a particular time to reach conclusions about that population at some other time. If the time for which a projection is made is in the present or past, the result of the process is called an estimate; if in the future, the result is called a projection or forecast. The former term implies a conditional assertion about future population based upon a stated set of assumptions concerning the components of population change; the latter term implies an unconditional assertion about future population magnitudes and characteristics. As identified and used by the Commission, a population forecast is a population projection selected from a range of such population projections for use in plan preparation.

Methodology

There are two types of projection techniques: those which treat the population and changes in the population as a single aggregate and those which deal with disaggregate components of the population and of changes in the population. Aggregate approaches include graphical and mathematical extrapolation and ratio and analogue techniques. Disaggregate approaches include the Hamilton-Perry and the cohort survival techniques. The disaggregate approaches have two general advantages over the aggregate: 1) they permit explicit consideration of the components of population change—births, deaths, and migration—and 2) they provide more detailed projections by age and sex. Disaggregate techniques, while more complex, are not necessarily more accurate than the generally simpler aggregate techniques.

The procedure [2] selected by the Commission for making population projections is a disaggregate technique—known as the cohort survival technique—first developed for practical application by P. K. Whelpton over 40 years ago.[3] Over time, modifications in this procedure as originally proposed have been made. In concept, the methodology is not complicated. The following series of steps are involved: 1) establish a base population as of the date from which the projection is to be carried forward; 2) establish a schedule of vital rates—birth, death, and migration rates—estimated to be in effect at the base date; 3) establish an estimating cycle—for the Commission purposes, five years—and provide an estimated schedule of age-specific birth, death, and migration rates that will be assumed to apply during the next cycle period following the base date; 4) multiply the base population by the rates to obtain estimates of the number of births, deaths, and migrations that will occur during the next cycle period; and 5) add these estimated numbers to, or subtract them from the base population. The population ages as the cycle progresses, so that persons age x at the beginning of the cycle are age (x + 5) at the end of the cycle. This procedure yields in an orderly, methodical manner an estimate—or projection—of what the population may be expected to be at the end of the cycle, given the assumptions concerning the birth, death, and migration rates.

The validity of the projection, of course, depends entirely on how successfully the estimator is able to anticipate future mortality, fertility, and migration rates. In most instances, it is easier to forecast the future course of mortality rates than of fertility rates. In making forecasts for an entire nation, migration tends to be only a small component of growth. This means that the critical element in national forecasts is the fertility rate. In making forecasts for smaller areas such as states, regions, counties, or local communities, the migration component becomes as critical or more critical than the fertility rate. For this reason, it is much more difficult to make local forecasts than to make national ones. Moreover, no matter what the size of the geographic area, short-range projections are likely to have a smaller margin of error than long-range projections. That is, the projections for one decade are more likely to be accurate than those for two or three decades.

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[2] *For details of this method, see SEWRPC Technical Report No. 19, A Regional Population Projection Model.*

[3] *P. K. Whelpton, "An Empirical Method of Calculating Future Population," Journal of the American Statistical Association, 1936.*

The initial regional population and employment forecasts made by the Commission in 1964 for use in the preparation of the initial regional land use and transportation plans for the design year 1990 were made interdependently; that is, population forecasts were not derived solely from population projections prepared by purely demographic means, nor were the employment forecasts derived solely from employment projections prepared by purely economic means. Rather, both demographic and economic analyses were independently made, the resulting sets of population and employment projections compared, and the comparison used as an aid in the selection of the "best" set of projections as the required forecasts. In revising the initial regional population and employment forecasts for the new design year 2000 in 1972 and 1974, essentially the same procedure was followed. The following paragraphs briefly explain the overall framework in which the present Commission population forecasts were developed.

Using the cohort survival technique described above, a total of 15 population projections were prepared, each based upon different assumptions concerning trends in birth, death, and migration rates. Twelve of these projections were prepared in 1972, and an additional three were prepared in 1974 based upon additional information concerning changes in fertility and migration rates made apparent by more detailed analysis of data from the 1970 census. The separate population projections were converted to employment forecasts and independently prepared employment forecasts were converted to population forecasts based on an analysis of the relationship between total regional population and employment. A single "best" set of population projections was then selected from the complete array of projections. This selection was made on the basis of an analysis of the distribution of the array of projections supplemented by the judgment of the Commission staff and Commission advisory committees.

To further assure that the population forecast selected in this manner was both reasonable and realistic, the forecast was further checked against independent projections of the regional population to the year 2000 prepared using different demographic techniques. These included a ratio technique, which converted independently prepared national population projections to regional projections, the Hamilton-Perry censal ratio technique, and the independently prepared forecasts of the Wisconsin Department of Administration and the Bureau of Economic Analysis of the U. S. Department of Commerce. Since a disaggregate technique was used to produce a forecast of total resident population for the Region, estimates of the future age and sex characteristics of the regional population were available from the forecast.

Within the controlling framework of the chosen regional population forecast, individual population projections were developed for each of the seven counties comprising the Region. Specific assumptions about migration, fertility, and mortality were developed for each individual county based upon historic trends in that county and assumptions about future trends. For this reason, the assumptions vary between and among the individual counties. The resulting projections were carefully analyzed by the Commission staff. Of particular importance in this analysis were the different geographic distribution patterns of the regional population resulting from various sets of county projections.

The county forecasts finally selected from among the projections considered were normative ones, based upon the Commission's adopted land use development objectives. These forecasts assume that the continued diffusion of urban development into the outlying areas of the Region will be curtailed in the public interest through the exercise of land use controls and other public policy actions. They further assume that the present trends in population decentralization will be stabilized and in fact reversed in the mid to late 1980's and that the central areas of the Region will again experience population growth. While at variance with existing trends, this assumption is consistent with federal policies which seek to discourage urban sprawl and protect critical environmental areas and prime agricultural lands. The selected county population forecasts, therefore, support national urban policy.

Population projections based specifically on the trends perceived to be in effect in the early 1970's indicated a significant decline in the population in Milwaukee County and a redistribution of this population in surrounding counties. A continuation of these trends over the forecast period would result in a loss of approximately 150,000 residents in Milwaukee County by the year 2000, and any acceleration of those trends would result in population losses of an even larger magnitude. A population redistribution of such magnitude would result in the partial abandonment of a large and expensive urban infrastructure already in place in Milwaukee County and the re-creation of this infrastructure in the outlying counties. Selection of

projections based exclusively on accommodation of current trends for use in land use plan design would have had the consequence of encouraging urban sprawl.

Once county forecasts of total resident population were selected, forecasts of the future number of households and average household size for each county were developed using historic trend information. Implicit in these forecasts are the assumptions that the same proportion of the total population will reside in households as did in 1970 and that average household size will continue to decline from its 1970 level.

At the specific request of Commission advisory committees, the feasibility of developing a forecast for the resident black population of the Region was explored. As shown in Table 12 in Chapter II, only Milwaukee and Racine Counties had significant numbers of black residents in 1970. If all of the inputs to the forecasting process are held constant, the reliability of the particular forecast is generally a function of the size of the base population upon which the forecast is made—the smaller the base population, the less reliable the forecast. Additionally, research conducted by the U. S. Bureau of the Census suggested that the characteristics of black migration were undergoing significant changes. Since migration patterns represent significant input to population forecasting, any modification of historical migration trends would adversely affect the reliability of the forecasts, particularly in the absence of accurate information regarding the magnitude and direction of change in those trends. Finally, a review of literature on forecasting black population movements within small geographic areas indicated that the available techniques were developed for short-range forecasting and would not be suitable for developing a 30-year forecast. In view of these findings, the Commission staff determined that while a realistic forecast of total resident black population at the regional level could be prepared, individual county forecasts or forecasts of specific characteristics of blacks such as age would be unrealistic.

POPULATION FORECAST ASSUMPTIONS

Operation of the cohort survival population projection technique briefly described in the preceding section of this chapter requires the establishment of a schedule of age-specific birth, death, and migration rates that is expected to apply during the estimating cycle of the projection. These estimated rates are generally called "assumptions," and the ultimate reliability of any population forecast is contingent upon the degree to which these assumptions are anticipatory of actual future events. Since it was the intent of the Commission staff and the Commission advisory committees to investigate a number of alternative population projections, it was necessary then to structure a number of alternative sets of assumptions concerning the future course of these vital rates.

Given the continued stability of the age-sex mortality rates for a period of approximately two decades, the decision was made to use current mortality rates in all of the projection series.[4]

A second consideration in this decision was the nature of the mortality trends themselves. It is obviously impossible for deathrates to decline indefinitely. At some point, the mortality rate must level off as it reaches an irreducible minimum. Major causes of death presently are linked to the process of aging. There appears to be some common agreement among experts that progress to conquer the degenerative diseases involved in the aging process will be slow and that incremental additions to the life span of humans will be small. Furthermore, the age groups most affected are those over 55 years of age, where fertility is no longer a factor. A lowering of the deathrate, therefore, would not affect the projection significantly in any case.

Fertility rates fluctuate more than deathrates, and hence are more difficult to predict. Furthermore, fertility rates become crucial in long-range projections. As an example, by 1990 part of the female population—those cohorts with the highest fertility—to which age-specific fertility rates will be applied to generate a population for 2000 is the very population which has been produced through the modeling process by estimating fertility rates in effect since 1970. Three basic fertility assumptions were made as a basis for the projections: 1) a continuation of the current age-specific rates, with the rates prevailing in each county being used to allow for local differences; 2) a uniform replace-

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[4] *As used in describing assumptions about the future course of vital rates the term "current" refers to 1970 fertility, 1970 mortality, and 1960-1970 migration rates.*

ment rate for all counties;[5] and 3) a reduction of the current fertility rates to below replacement level from 1975 to 1985 followed by replacement level fertility to 2000.

Five assumptions concerning the migration rate, which is so crucial in local projections, were made: 1) a continuation of the then current—1960-1970—age-sex-specific migration rates; 2) zero net migration; 3) a return to the 1950-1960 age-specific migration rate; 4) a return to the 1950-1970 age- and sex-specific migration rate; and 5) a dynamic migration scenario under which the out-migration, in effect during the late 1960's, would gradually slow down, reaching a zero net migration condition by approximately 1985, with slight net in-migration occurring from 1985 to 2000.

The projected populations obtained by various combinations of the stated assumptions regarding fertility, mortality, and migration are shown in Table 13.

Within the framework of this regional population forecast, it was necessary to structure individual county schedules of vital rates such that the individual county forecasts would sum to the regional forecast. The necessary assumptions concerning fertility, mortality, and migration worked out for each county on the basis of both historic trends in these vital rates within each county and the vital rates chosen for the regional population forecast are shown in Table 14.

POPULATION FORECASTS

The various population projections prepared by application of the techniques described earlier in this chapter ranged from a high of 3.8 million persons to a low of 1.9 million persons for the Region in the year 2000. Based upon an analysis of these projections, and of the independently prepared employment forecasts, the probable range of the future regional population level was established at between 1.9 and 2.4 million persons by the year 2000. Within this range, a forecast level of 2.2 million persons was finally selected by the Commission staff and Commission advisory committees. This forecast population level is based on an assumed reduction in the age-specific fertility rates to below replacement level by 1985 and then a gradual increase to replacement level from 1985 to the year 2000, and on an assumed halt of regional out-migration by 1985, with only slight net in-migration occurring thereafter.

The assumptions contained in this forecast were judged to be reasonable in light of then evidenced national declines in birthrates and fertility expectations and the anticipation that even if then recent changes in the state tax laws did not result in increased industrial development, and thus population growth, in the Region, out-migration would reach a limit due to fundamental changes in migration components. In the recent past, migration was largely characterized by rural people moving into urban areas of the east, north-central, and midwest sections of the country. This rural pool of potential migration has effectively disappeared, however, and migration is presently characterized by a shift of population from the mature industrialized areas of the east, north-central, and midwest states to the South and West in response to the newly developing industrial economies there, with the attendant job opportunities. In time, that shift will diminish as per unit labor costs in the South and West approach those existing in the east, north-central, and midwest states. This should eventually stabilize much of the out-migration presently occurring from those states.

Population Size

As shown in Table 15 and Figure 8, the regional population is expected to increase by about 26 percent over the forecast period, from 1.76 million persons in 1970 to 2.22 million persons by the year 2000. The regional population growth rate will thus be somewhat higher than that expected for the nation—24 percent—and somewhat lower than that expected for the State—32 percent—over the same period. The slower rate of population growth expected in the Region compared to that of the State, which represents a departure from previous trends, in indicative of the faster rates of population growth expected in other parts of the State, particularly in the northern and western counties.

The anticipated population increase will be almost exclusively a function of natural increase, as shown in Table 16. Comparison of the anticipated rates of population change presented in this table with

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[5] *Replacement fertility may be defined as the total fertility rate at which parents are replacing themselves but are not contributing to population growth. Allowing for differential male and female birth ratios and for differential deathrates, each female of childbearing age in the United States would presently have to produce 2.1 children over her reproductive years to achieve replacement fertility.*

Table 13

PROJECTED REGIONAL POPULATION IN THE YEAR 2000 USING VARIOUS COMBINATIONS OF FERTILITY, MORTALITY, AND MIGRATION ASSUMPTIONS

Projection Number	Fertility and Migration Assumptions	2000 Population
1	Continuation of current fertility and mortality rates to 2000; migration rates at 1950-60 level	3,756,400
2	Reduction in fertility to replacement level from 1975 to 2000; migration rates at 1950-60 level; current mortality	3,532,000
3	Continuation of current fertility and mortality rates to 2000; migration rates at 1950-70 level	3,167,700
4	Reduction in fertility to replacement level from 1975 to 2000; migration rates at 1950-70 level; current mortality	2,968,400
5	Continuation of current fertility and migration rates through 1980, then replacement level fertility to 2000; migration rates between the current and the 1950-70 levels to 2000; current mortality	2,701,700
6	Continuation of current fertility, mortality, and migration rates to 2000	2,684,100
7	Continuation of current fertility rates to 1985 then replacement level fertility to 2000; continuation of current mortality and migration rates to 2000	2,590,100
8	Continuation of current fertility rates to 1980, then replacement level fertility to 2000; continuation of current mortality and migration rates to 2000	2,560,300
9	Reduction in fertility rates to replacement level from 1975 to 2000; continuation of current mortality and migration rates	2,506,800
10	Reduction in fertility rates to below replacement level from 1975 to 1985, then replacement level fertility to 2000; reversal of net out-migration of the 1960's to net in-migration from 1970 to 2000; current mortality	2,427,000[a]
11	Continuation of current fertility and migration rates to 1985, then replacement level fertility and no migration to 2000; current mortality	2,380,800
12	Continuation of current fertility and mortality rates to 2000; no migration	2,338,300
13	Reduction in fertility to below replacement level from 1975 to 1985, then replacement level fertility to 2000; slowdown in the out-migration of the 1960's to a slight net in-migration by 2000; current mortality	2,219,300[b]
14	Reduction in fertility rates to replacement level from 1975 to 2000; continuation of current mortality rates; no migration	2,175,200
15	Reduction in fertility to below replacement level from 1975 to 1985, then replacement fertility to 2000; continuation of current out-migration and current mortality	1,971,800[c]

[a] *Selected by the Commission staff and advisory committees as the probable upper limit of regional population in 2000.*

[b] *Selected by the Commission staff and advisory committees as the best forecast of regional population in 2000.*

[c] *Selected by the Commission staff and advisory committees as the probable lower limit of regional population in 2000.*

Source: SEWRPC.

Table 14

FERTILITY, MORTALITY, AND MIGRATION ASSUMPTIONS OF THE INDIVIDUAL COUNTY AND REGIONAL POPULATION FORECASTS

County	Assumptions
Kenosha	Reduction in fertility rates to below replacement level until 1995, then replacement level fertility until 2000; current mortality rates; continuation of current levels of net in-migration through 1980, then decreased levels of net in-migration until 2000
Milwaukee	Continued reduction in current fertility rates until 1985, gradually increasing after 1985, but remaining below replacement level through 2000; current mortality rates; continuation of current levels of net out-migration through 1980, continued net out-migration after 1980, but at decreasing levels through 2000
Ozaukee	Reduction in fertility rates to below replacement level between 1975 and 1990, increasing to slightly above replacement level by 2000; current mortality rates; continued net in-migration, but at declining levels through 2000
Racine	Continued reduction in current fertility rates until 1990, then slight increase, but remaining below replacement level through 2000; current mortality rates; continued modest net in-migration through 1980, decreasing in magnitude by 2000
Walworth	Reduction in fertility rates to below replacement level by 1975, increasing to replacement level about 1990, and remaining at replacement level through 2000; current mortality rates; continued net in-migration through 1980, decreasing slightly in magnitude through 2000
Washington	Reduction in fertility rates to slightly above replacement level by 1975, then slight increase through 2000; current mortality rates; continuation of current net in-migration through 1980, with reduced levels of net in-migration through 2000
Waukesha	Reduction in fertility rates to below replacement level by 1975, increasing to about replacement level by 1990, and remaining at replacement level through 2000; current mortality rates; continuation of current net in-migration, but at moderately reduced levels after 1980
Southeastern Wisconsin Region	Reduction in fertility to below replacement level from 1975 to 1990, then replacement level fertility to 2000; current mortality rates; reduction in current levels of net out-migration through 1980, then modest net in-migration from 1980 through 2000

Source: SEWRPC.

Table 15

POPULATION ESTIMATES AND FORECASTS FOR THE UNITED STATES, WISCONSIN, AND THE REGION: 1970-2000

	United States[a]			Wisconsin[b]			Region[c]			Regional Population as a Percent of:	
		Change From Previous Time Period			Change From Previous Time Period			Change From Previous Time Period			
Year	Population (in thousands)	Absolute (in thousands)	Percent	Population (in thousands)	Absolute (in thousands)	Percent	Population (in thousands)	Absolute (in thousands)	Percent	Wisconsin	United States
1970	204,800	--	--	4,418	--	--	1,756	--	--	39.7	0.86
1980	220,664	15,864	7.7	4,820	402	9.1	1,873	117	6.7	38.9	0.85
1990	237,678	17,014	7.7	5,384	564	11.7	2,044	171	9.1	38.0	0.86
2000	254,502	16,824	7.1	5,841	457	8.5	2,219	175	8.6	38.0	0.87
Total Change 1970-2000	--	49,702	24.3	--	1,423	32.2	--	463	26.4	--	--

[a] *Figures include armed forces abroad and are Series V projections with immigration, published by the U. S. Bureau of the Census in Current Population Report Series P-25, No. 480, April 1972.*

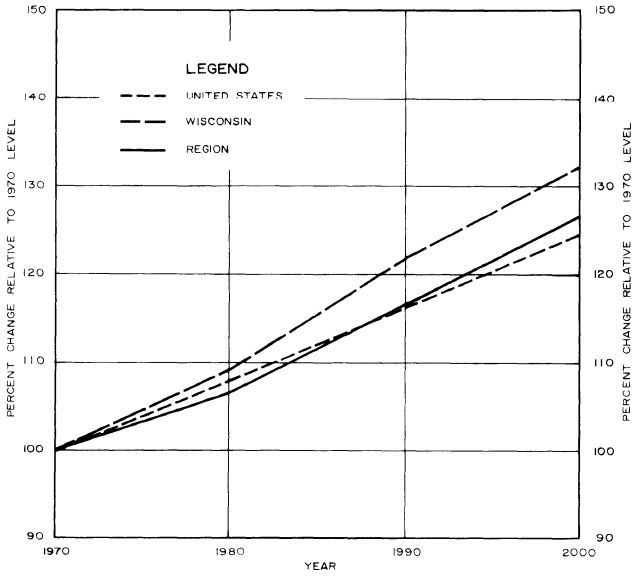
[b] *Wisconsin Department of Administration, Wisconsin Population Projections, Third Edition, June 1975.*

[c] *SEWRPC forecast.*

Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

Figure 8

ANTICIPATED RELATIVE INCREASE IN POPULATION IN THE UNITED STATES, WISCONSIN, AND THE REGION: 1970-2000



Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

the historic rates presented in Table 3 in Chapter II illustrates the conservative nature of the regional population forecast. The anticipated rates of population change for 10-year periods within the forecast period are intermediate between the rate of change in effect during the 1930's and the rate of change in effect during the 1960's. The rates of population change during these two decades were the lowest of the 50-year period prior to 1970. The lower rates of population growth and the lack of any significant contribution to population change by the net migration component are attributable to the fundamental changes in fertility and migration patterns and trends discussed in the previous chapter.

Population Distribution

As shown in Table 17 and Figure 9, the Region's forecast population for the year 2000 envisions an increase of about 463,200 persons, approximately 26 percent, over the 1970 enumerated regional population of 1,756,100 persons. Generally, the county population forecasts indicate continued rapid population growth in Ozaukee, Washington, and Waukesha Counties, with slower rates of population growth in Kenosha, Racine, and Walworth Counties. Milwaukee County, currently experiencing a population decline, is forecast to lose population until about 1980, when its population is expected to again begin increasing. The population increase forecast between 1980 and 2000 is not sufficient to offset the decrease forecast for 1970 to 1980, however, resulting in a small forecast absolute decline of 4,700 persons between 1970 and 2000. Washington and Ozaukee Counties are expected to show the largest relative population gain, increasing by 124 percent and 109 percent, respectively, from 1970 to 2000. The largest absolute population increase is forecast for Waukesha County, which is expected to increase by about 189,300 persons—a growth rate of about 82 percent over the forecast period.

Table 16

FORECAST RATES OF POPULATION CHANGE BASED ON NATURAL INCREASE AND NET MIGRATION IN THE REGION: 1970-2000

Decade	Total Change (percent)	Natural Increase (percent)	Net Migration (percent)
1970-1980	6.7	6.9	- 0.2
1980-1990	9.1	8.0	1.1
1990-2000	8.6	6.8	1.8
1970-2000	26.4	23.4	3.0

Source: SEWRPC.

The forecasts envision a continuation of the trend toward population decentralization that has been in operation within the Region since about the third decade of the present century. At that time, Milwaukee County contained more than 70 percent of the total regional population. By 1960 Milwaukee County's proportion of the total regional population was approximately 60 percent. Under the present forecasts that population decentralization would continue, as shown in Figure 10. By the year 2000 Milwaukee County's proportion of the total regional population would be about 47 percent, a drop of 13 percentage points over the forecast period. The proportions of the total regional population for the surrounding counties, particularly Ozaukee, Washington, and Waukesha, would continue to increase, with Waukesha County containing approximately 19 percent of the total regional population in 2000, an increase of approximately 6 percentage points over its 1970 proportion of about 13. Ozaukee County would gain approximately 2 percentage points in its proportion of the total regional population between 1970 and 2000, and Washington County would gain about 3 percentage points. Smaller increases—about 1 per-

Table 17

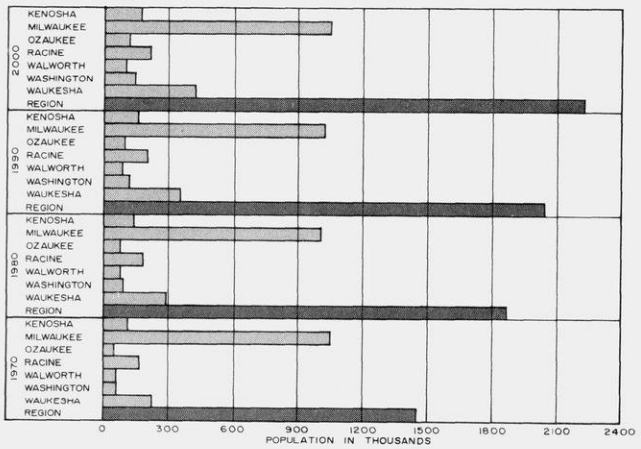
ESTIMATED AND FORECAST POPULATION DISTRIBUTION IN THE REGION BY COUNTY: 1970-2000

County	1970		1980		1990		2000		Change 1970-2000	
	Population	Percent of Region	Population	Percent of Region	Population	Percent of Region	Population	Percent of Region	Absolute	Percent
Kenosha	117,900	6.7	139,200	7.4	159,900	7.8	174,800	7.9	56,900	48.2
Milwaukee . . .	1,054,300	60.1	1,014,500	54.2	1,022,200	50.0	1,049,600	47.3	- 4,700	- 0.4
Ozaukee	54,500	3.1	76,200	4.1	97,400	4.8	114,000	5.1	59,500	109.3
Racine	170,800	9.7	185,600	9.9	203,600	10.0	217,700	9.8	46,900	27.4
Walworth. . . .	63,500	3.6	74,700	4.0	86,600	4.2	99,600	4.5	36,100	57.0
Washington . .	63,800	3.6	90,900	4.8	117,600	5.8	143,000	6.4	79,200	124.0
Waukesha . . .	231,300	13.2	292,300	15.6	356,600	17.4	420,600	19.0	189,300	81.8
Region	1,756,100	100.0	1,873,400	100.0	2,043,900	100.0	2,219,300	100.0	463,200	26.4

Source: SEWRPC.

Figure 9

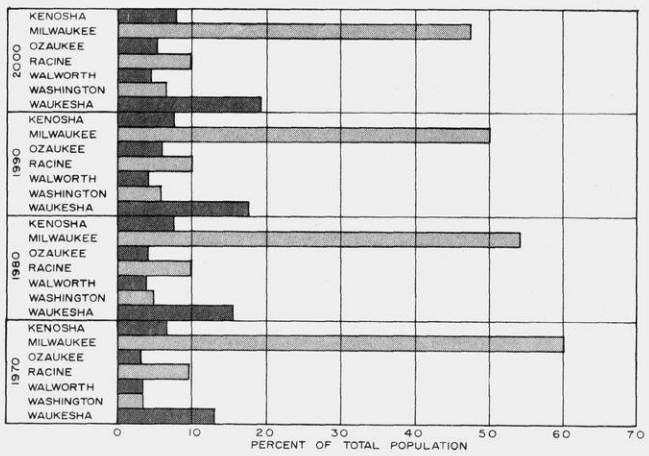
ANTICIPATED POPULATION DISTRIBUTION IN THE REGION BY COUNTY: 1970-2000



Source: SEWRPC.

Figure 10

ANTICIPATED PERCENTAGE DISTRIBUTION OF POPULATION IN THE REGION BY COUNTY: 1970-2000



Source: SEWRPC.

centage point—in the proportion of the total regional population are envisioned for Kenosha and Walworth Counties. Racine County would maintain its existing proportion of slightly less than 10 percent of the total regional population through the forecast period.

As shown in Table 18, the contribution of natural increase and net migration to the population change component of each individual county is anticipated to be quite variable. Generally, in those counties for which the largest population increases are forecast—Ozaukee, Washington, and Waukesha Counties—net in-migration is expected to comprise the majority of the increase. In those counties for which smaller increases are forecast—Kenosha, Racine, and Walworth Counties—natural increase is anticipated to contribute the majority of that change component or, as in the case of Walworth County, the contribution of natural increase and net in-migration will be approximately equal. In Milwaukee County, the only county for which net out-migration is presently being forecast, the component of population change attributable to natural increase will not be sufficient to accommodate the forecast net out-migration of approximately 186,000 Milwaukee County residents over the 30-year forecast period. The majority of this

Table 18

ESTIMATED AND FORECAST NATURAL INCREASE AND NET MIGRATION IN THE REGION BY COUNTY: 1970-2000

County	Natural Increase				Net Migration			
	1970-1980	1980-1990	1990-2000	1970-2000	1970-1980	1980-1990	1990-2000	1970-2000
Kenosha	9,300	15,200	12,400	36,900	12,000	5,500	2,500	20,000
Milwaukee . . .	61,400	67,700	52,400	181,500	- 101,200	- 60,000	- 25,000	- 186,200
Ozaukee	5,100	6,200	5,100	16,400	16,600	15,000	11,500	43,100
Racine	11,600	14,800	13,100	39,500	3,200	3,200	1,000	7,400
Walworth. . . .	4,200	5,600	6,700	16,500	7,000	6,300	6,300	19,600
Washington . .	8,100	11,700	15,400	35,200	19,000	15,000	10,000	44,000
Waukesha . . .	21,000	29,300	34,000	84,300	40,000	35,000	30,000	105,000
Region	120,700	150,500	139,100	410,300	- 3,400	20,000	36,300	52,900

Source: SEWRPC.

out-migration is anticipated to occur in the first decade of the 30-year forecast period, resulting in an initial population decline in Milwaukee County between 1970 and 1980 followed by a slight population growth in both the 1980's and 1990's. However, this small anticipated growth in Milwaukee County in the latter two decades of the forecast period will not be sufficient to recover the loss occurring during the first decade of the forecast period. The net result of this interchange is that the resident population in Milwaukee County in 2000 is expected to be slightly less than the resident population in Milwaukee County in 1970.

Population Characteristics

The population forecast envisions a significant decline in the overall rate of population growth within the Region over the next two to three decades. Additionally, the age composition of the regional population is expected to change in accordance with anticipated declines in birthrates and changes in migration patterns. Expected changes in the age composition of the population of the Region are presented in Table 19. As shown in Figure 11, these changes can be summarized as follows:

1. The age group from 0-4 years of age, representing the preschool population, is expected to increase only slightly—from about 153,200 persons in 1970 to nearly 161,000 persons in the year 2000, an increase of 7,700 persons, or 5 percent, over the forecast period.

2. The age group from 5-14 years of age, representing the elementary school-age population, is expected to decrease from about 370,000 persons in 1970 to about 275,700 in 1980 and then increase to about 337,300 persons in the year 2000, an overall decrease of about 32,600 persons, or 9 percent, over the forecast period.

3. The age group from 15-19 years of age, representing the high school-age population, is expected to fluctuate widely from about 163,000 persons in 1970 to about 182,700 persons in 1980 to about 128,400 persons in 1990 to about 151,700 persons in the year 2000, an overall decrease of about 11,300 persons, or 7 percent, over the forecast period.

4. The age group from 20-64 years of age, representing the working-age population of the Region, is expected to increase from about 900,000 persons in 1970 to about 1,296,400 persons in the year 2000, an increase of about 396,400 persons, or 44 percent, over the forecast period.

5. The age group 65 years of age and older, representing the elderly population of the Region, is expected to increase from about 169,400 persons in 1970 to about 272,900 persons in the year 2000, an increase of about 103,500 persons, or 61 percent, over the forecast period.

Table 19

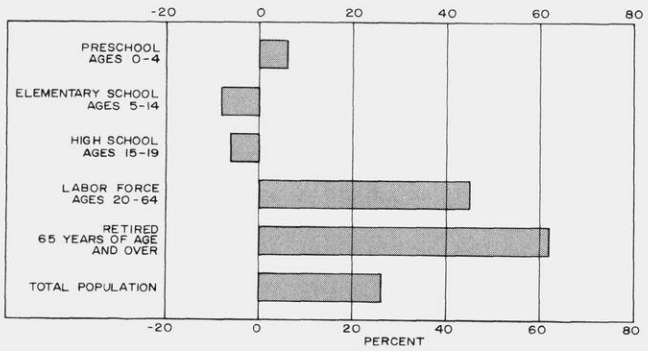
FORECAST AGE COMPOSITION OF THE POPULATION IN THE REGION: 1970-2000

Age Group	Population									
	1970		1980		1990		2000		Net Change: 1970-2000	
	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent of Total	Number	Percent
Under 5	153,243	8.7	139,009	7.4	164,930	8.1	160,934	7.2	7,691	5.0
5-9	183,283	10.4	125,832	6.7	147,823	7.2	170,180	7.7	- 13,103	- 7.1
10-14	186,685	10.6	149,895	8.0	139,952	6.8	167,140	7.5	- 19,545	- 10.5
15-19	163,033	9.3	182,735	9.8	128,404	6.3	151,685	6.8	- 11,348	- 7.0
20-24	132,672	7.5	186,217	9.9	150,526	7.4	140,979	6.4	8,307	6.3
25-29	114,042	6.5	167,854	9.0	185,717	9.1	129,997	5.9	15,955	14.0
30-34	98,001	5.6	139,222	7.4	191,731	9.4	154,704	7.0	56,703	57.8
35-39	95,857	5.5	114,626	6.1	170,347	8.3	188,760	8.5	92,903	96.9
40-44	104,631	6.0	95,325	5.1	138,832	6.8	191,741	8.6	87,110	83.2
45-49	103,140	5.9	92,035	4.9	112,628	5.5	167,888	7.6	64,748	62.8
50-54	93,714	5.3	98,570	5.3	91,448	4.5	134,187	6.0	40,473	43.2
55-59	85,424	4.9	94,454	5.0	85,583	4.2	105,876	4.8	20,452	23.9
60-64	72,567	4.1	81,443	4.3	87,543	4.3	82,322	3.7	9,755	13.4
65-69	57,494	3.3	68,445	3.7	78,408	3.8	72,328	3.3	14,834	25.8
70-74	46,711	2.7	52,169	2.8	61,399	3.0	67,719	3.0	21,008	45.0
75 and Older. .	65,210	3.7	85,538	4.6	108,546	5.3	132,915	6.0	67,705	103.8
All Ages	1,755,887	100.0	1,873,369	100.0	2,043,817	100.0	2,219,355	100.0	463,468	26.4

Source: SEWRPC.

Figure 11

PERCENT CHANGE IN POPULATION OF THE REGION BY SELECTED AGE GROUP: 1970-2000



Source: U. S. Bureau of the Census and SEWRPC.

These forecast changes in the age composition of the population have important implications for long-range land use and public facilities planning. Initially, these expected changes in population characteristics indicate a reduced need for new school facilities in the Region as a whole, although not necessarily in individual communities, at all levels of education, the reduced need reflecting the expected decline in fertility rates from 1970 to 1985 and the maintenance of replacement fertility rates thereafter. Forecast age changes indicate that the labor force may be expected to increase substantially, and will contain a larger percentage of persons between the ages of 30 and 54. Accordingly, the number of persons who will be seeking work within the Region may be expected to increase substantially, as will the need to provide jobs for these persons if the population forecast is indeed to come about. Finally, these changes indicate that the segment of the population 65 years of age and older, both in the next 30 years and later as the large working population grows older, may be expected to show the largest relative increase of all age groups, indicating a general aging of the population which will bear upon the demand for housing and special transportation services over at least the next 25 years.

Along with the forecast increases in population will come increases in the number of households in the Region. Forecasts of increases in the number of households have particularly important implications for long-range land use and transportation planning since it is the household population which creates nearly all the demand for land use and transportation facilities. As shown in Table 20, the

Table 20

ESTIMATED AND FORECAST HOUSEHOLDS IN THE REGION BY COUNTY: 1970-2000

County	1970			1980			1990			2000		
	Number of Households	Household Population	Persons Per Household	Number of Households	Household Population	Persons Per Household	Number of Households	Household Population	Persons Per Household	Number of Households	Household Population	Persons Per Household
Kenosha	35,468	115,712	3.26	42,800	136,574	3.19	50,400	156,860	3.11	56,800	171,466	3.02
Milwaukee	338,605	1,029,375	3.04	358,900	990,344	2.76	376,600	997,671	2.65	400,300	1,024,335	2.56
Ozaukee	14,753	53,999	3.66	21,200	75,546	3.56	27,500	96,558	3.51	32,500	113,012	3.48
Racine	49,796	167,016	3.35	55,100	181,406	3.29	61,800	198,963	3.22	67,800	212,727	3.14
Walworth	18,544	58,553	3.16	22,000	68,890	3.13	25,800	79,811	3.09	30,200	91,768	3.04
Washington	17,385	63,167	3.63	25,300	89,937	3.55	33,800	116,344	3.44	42,300	141,468	3.34
Waukesha	61,935	226,776	3.66	80,200	286,491	3.57	98,700	349,457	3.54	117,800	412,149	3.50
Region	536,486	1,714,598	3.20	605,500	1,829,188	3.02	674,600	1,995,664	2.95	747,700	2,166,925	2.90

Source: U. S. Bureau of the Census and SEWRPC.

number of households in the Region is expected to increase from about 536,500 in 1970 to about 747,700 by 2000, an increase of about 39 percent. Implicit in the forecast are the assumptions that the same proportion of the total population will reside in households in 2000 as did in 1970 and that average household size will continue to decline from its 1970 level. These assumptions are based on past trends in these population characteristics. The forecast decrease in average household size reflects the fact that forecasts of total population for the Region assume that birthrates in the forecast period will be substantially below the pre-1970 rates. This forecast increase in the number of households within the Region by the year 2000 will manifest itself as an increase in the amount of land devoted to residential use, particularly in view of the fact that a continuing decrease in the persons per household rates means that the number of households will increase at a rate greater than that of the total population.

The black population in the Region is expected to increase by 130 percent during the forecast period, almost doubling its proportion of the total regional population, from 6.8 percent in 1970 to 12.4 percent in 2000, as shown in Table 21. As noted earlier in this chapter, the preparation of individual county forecasts of future black population was deemed to be unrealistic in light of what may be significantly changing characteristics of black migration. It is likely, however, that significant numbers of blacks will continue to reside in Milwaukee, Racine, and Kenosha Counties.

Table 21

ESTIMATED AND FORECAST BLACK POPULATION IN THE REGION: 1970-2000

Year	Total Population	Black Population	
		Number	Percent of Total
1970	1,756,100	119,300	6.79
1980	1,873,400	172,000	9.18
1990	2,043,900	225,700	11.04
2000	2,219,300	275,000	12.39

Source: U. S. Bureau of the Census and SEWRPC.

SUMMARY

One of the very important steps necessary in the formulation of regional development plans is the preparation of forecasts. Forecasts are required of all future events and conditions which are outside the scope of the plan but which will affect plan design and implementation. This chapter has presented a description of both the process and results of the Commission's population forecasting effort for the design year 2000.

The procedure selected by the Commission for making population projections is a disaggregate technique known as the cohort survival technique. This procedure yields in an orderly and methodical

manner an estimate or projection of what the population may be expected to be at the end of the projecting cycle given specified assumptions concerning birth, death, and migration rates.

Using the cohort survival technique, a total of 15 population projections were prepared, each based upon different assumptions concerning trends in birth, death, and migration rates. From the array of these and other supplementary projections made using different techniques, a single projection was selected as the most realistic forecast of future population levels. This selection was made on the basis of analysis of the distribution of the array of projections, and comparisons to independently prepared economic projections, supplemented by the judgment of the Commission staff and Commission advisory committees. Since the procedure used to produce a forecast of total resident population for the Region was a disaggregate technique, forecasts of the probable future age and sex characteristics of the regional population were available from the procedure.

Utilizing the same projection technique used to develop the regional population forecast, and utilizing the regional forecast as a control total, individual population projections were developed for each of the seven counties comprising the Region. Selection of the county forecasts, however, included consideration of the relationship of the resulting distribution of the regional population to normative land use development objectives formulated by the Commission. Specific assumptions about fertility, mortality, and migration were developed for each county based upon historical trends in that county and assumptions about future trends. Once county forecasts of total resident population were obtained, forecasts of the future number of households and average household size for each county were developed on the basis of historic trend information. At the specific request of Commission advisory committees, the Commission staff also developed a forecast for the black population in the Region. This forecast was developed only at the regional level, however.

The various population projections prepared by application of the cohort survival technique ranged from a high of 3.8 million persons to a low of 1.9 million persons for the Region in the year 2000. Based upon an analysis of these projections and of the independently prepared employment forecasts, the probable range of future regional population levels was established at between 1.9 and 2.4 million persons by the year 2000. Within this range, a forecast level of 2.2 million persons was finally selected by the Commission staff and Commission advisory committees. This forecast population level was based on an assumed reduction in the age-specific fertility rates to below replacement level until 1985 and then a gradual increase to replacement level from 1985 to the year 2000, and on an assumed halt of regional outmigration by 1985 with only slight net in-migration occurring thereafter.

When compared to historical rates of population change, the population forecast envisions quite modest increases in the Region's population over the 30-year forecast period. The forecast increase from 1.8 million persons in 1970 to 2.2 million persons—26 percent—would be somewhat higher than that expected for the nation—24 percent—and somewhat lower than that expected for the State—32 percent—over the same period. The anticipated population increase is forecast to be almost exclusively a function of natural increase, with net in-migration accounting only for a very small portion of the forecast increase.

Generally, the county population forecast indicates continued rapid population growth in Ozaukee, Washington, and Waukesha Counties, with lower rates of population growth in Kenosha, Racine, and Walworth Counties. Milwaukee County, currently experiencing a population decline, is forecast to lose population until about 1980, when its population is expected to again begin increasing. The population increase forecast between 1980 and 2000 is not deemed sufficient to offset the decrease forecast for 1970 to 1980, however, resulting in a small forecast absolute decline of 4,700 persons between 1970 and 2000. Washington and Ozaukee Counties are expected to show the largest relative population gain, increasing by 124 percent and 109 percent, respectively, from 1970 to 2000. The largest absolute population increase is forecast for Waukesha County, which is expected to increase by about 189,300 persons—a growth rate of about 82 percent—over the forecast period. Based upon these changes, the forecasts envision a continuation of the trend toward population decentralization that has been in operation within the Region since about the third decade of the present century.

Some significant changes in the age composition of the regional population are also expected to occur over the forecast period. These changes will largely be a function of the anticipated declines

in birthrates and changes in migration patterns. The age group from 0 to 4 years of age—representing the preschool population—is expected to increase only slightly, by about 5 percent, over the forecast period. The age group from 5 to 14 years of age—representing the elementary school-age population—is expected to decrease by about 9 percent between 1970 and 2000. The age group from 15 to 19 years of age—representing the high school-age population—is also expected to decline, in this case by about 7 percent, between 1970 and 2000. The age group from 20 to 64 years of age—representing the working-age group population—is expected to increase by about 44 percent over the forecast period. Lastly, the age group 65 years of age and older—representing the elderly population of the Region—is expected to increase by about 61 percent between 1970 and 2000.

The number of households in the Region is forecast to increase from about 536,500 in 1970 to about 747,700 in 2000, an increase of about 39 percent. Since the forecast increase in the number of households is greater than the increase forecast for total population growth, it is anticipated that the average household size will continue to decline from its 1970 level.

The black population in the Region is expected to increase by 130 percent by the year 2000, almost doubling its proportion of the total regional population from 6.8 percent in 1970 to 12.4 percent in 2000. While this forecast was made for the Region as a whole, it is nevertheless anticipated that significant numbers of blacks will continue to reside in Milwaukee, Racine, and Kenosha Counties.

Chapter IV

RECENT POPULATION GROWTH AND CHANGE: 1970-1977

INTRODUCTION

The decennial census of population and housing conducted at the beginning of each decade in the United States represents the most voluminous and detailed source of information about this country's population—its size, its distribution, and its characteristics. This material is used by a wide variety of public and private organizations in their day-to-day work. It provides the basis for most statements about the current status and characteristics of the country's population and forms the basis for most population forecasting efforts undertaken by public and private organizations.

Although the federal census represents a very valuable reference, the fact that it has in the past been taken only at 10-year intervals presents a distinct disadvantage. During the intervening years between censuses, current information about the population is crucial to the proper conduct of many public and private programs. In these intervening time spans, then, it is necessary to rely on less detailed population information sources—oftentimes produced by estimating procedures as opposed to actual enumerations. Such is the case with respect to comprehensive public planning. As an input to the planning process, it is necessary to prepare forecasts for those variables lying outside of the scope of control of the units and agencies of government concerned. These forecasts constitute one important basis for long-range land use and supporting facilities planning. It is important that these forecasts be monitored on a continuing basis to determine the effect that changes in population levels, distribution, and characteristics may have on the adopted plans.

It is the purpose of this chapter to report, using available sources, changes in population size, distribution, and characteristics which have occurred in the Southeastern Wisconsin Region since the last federal census was taken in 1970. The available data sources used in this analysis will be described and, where appropriate, their limitations will be noted.

AVAILABLE DATA SOURCES

In the absence of the definitive data base that would be provided by a census of population, a review of available sources of data that could be used in the evaluation of intercensal year population change in the Southeastern Wisconsin Region was undertaken. It was determined that available data are such that reasonable inferences can be made about the direction and approximate magnitude of certain components of population change within the Region over the period 1970 to 1977. However, in some cases these data do not permit the detailed evaluation that would be desirable and that would be possible in the presence of a population census.

Four major data sources were utilized in the preparation of this report. First are the current population estimates prepared on a yearly basis by the Wisconsin Department of Administration. Second are the birth and death registrations as reported to the Wisconsin Department of Health and Social Services. Third are the data provided by special censuses conducted by the U. S. Bureau of the Census at the specific request of individual civil divisions in the Region. And fourth are data from special reports compiled by the U. S. Bureau of the Census during intercensal periods.

Current Population Estimates

On an annual basis, the Wisconsin Department of Administration prepares estimates of the total resident population[1] of each civil division in the State of Wisconsin for the purpose of distributing state shared taxes. The estimate procedure consists of three basic steps: preparation of a state population estimate, preparation of county population estimates, and preparation of individual civil division population estimates.

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[1] *The estimation procedure described involves only the noninstitutional population. The number of institutionalized persons is subtracted from the total population counted in 1970. This is done for all civil divisions having one or more resident care or domiciliary institutions. After the estimation procedure is completed, the institutionalized population in the estimate year is added to obtain the total resident population. Data for these adjustments are obtained annually from the Wisconsin Department of Health and Social Services and from churches operating institutional facilities in the State.*

The state population estimate for January 1 of the estimate year is based upon the U. S. Census Bureau final estimate of the state population for July 1 of the year prior to the estimate year. The Census Bureau estimate is updated to January 1 of the estimate year on the basis of birth and death registrations for the intervening six months and an estimate of the state net migration for the intervening six months based upon estimated net migration experienced by the state during recent years. The state proportion of the total United States population in recent years is also examined at this time, and a population estimate for the State—to be used as a control total for all subsequent steps of the estimating cycle—is established.

After estimating the state population, the population of each of the 72 counties is estimated. Four different estimates are derived at the county level and then averaged to obtain the final estimate—within the constraints of the state control total—for each county. Three of the four county estimates are derived by means of what is called the ratio difference method. Three symptomatic indicators of the population living in an area are used for this purpose: the number of motor vehicles—automobiles, trucks, and motorcycles—registered; the number of state income tax forms filed; and the dollar value of exemptions declared on state income tax forms filed. Counts of these indicators are available for 1970—the year of the most recent federal census and the base year for the estimating system—permitting the calculation of an indicator-to-population ratio for each indicator for the State and each individual county for the base year. The indicator-to-population ratio for each indicator is then calculated for the State as a whole for the estimate year. The difference between the state indicator-to-population ratio for each indicator in the base year and the estimate year is used to adjust the base year county indicator-to-population ratios for each indicator and thereby to derive the three county indicator-to-population ratios for the estimate year. Using the derived ratios and counts of registered motor vehicles, state income tax forms filed, and the dollar value of exemptions declared on the state income tax forms, three of the four individual population estimates for each county are obtained.

The fourth population estimate for each county is obtained by a "composite" method which utilizes data on births, deaths, and school enrollments in the State and in each county in the base year and the estimate year. As indicated previously, the final county estimate is an average of the four individual estimates and is controlled within the state population estimate. The county population estimates thus produced are used as control totals in the next step of the estimating cycle—the production of local civil division population estimates.

The ratio difference method previously described is also used to obtain civil division population estimates.[2] Three ratio difference estimates based on registered motor vehicles, state income tax forms filed, and the dollar value of exemptions claimed on state income tax forms are computed for each civil division. Whereas the data used to prepare the county estimates are for the counties and the State, the data used to prepare the civil division estimates are for the civil divisions[3] within each county and the county—otherwise the procedure is computationally the same. The final civil division estimate is an average of the three ratio difference estimates and is controlled within the county population estimate.

These estimates are useful in determining population change over time in particular civil divisions. They do have some disadvantages, however, in that their primary purpose is not as an indicator of population change but as a device for allocating tax monies to individual communities. Since their primary use is as an allocation device, it is not desirable that they be adjusted on the basis of new information. In other words, should the population of a particular civil division be determined to have been overestimated or underestimated for a period of years, the official estimates, since they are the basis for distributing the tax monies in each

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[2] *The composite method is not used at the civil division level since the data required for this method are not uniformly available for all local civil divisions in the State.*

[3] *Whenever a special census has been conducted by the U. S. Bureau of the Census in any civil division since 1970, the special census count has been used to introduce an adjustment factor into the estimation procedure. The adjustment is based on the difference between the actual and the estimated indicator-to-population ratios for the year in which the special census was conducted.*

particular year, are not revised. The only exception to this general rule is in the event of an official challenge to the estimate on the part of an individual civil division. State statutes provide that should an individual civil division believe that its resident population level has been incorrectly estimated, it may challenge the estimate. This is done by contracting with the U. S. Census Bureau to perform a special cencus for that particular civil division. The special census count, then, becomes the basis for an adjustment to the official estimate for that particular year, and is used to further adjust the population estimates of that civil division in succeeding years.

While using the official civil division current population estimates to assess the magnitude and direction of population change does present some difficulties, the Department of Administration—as part of its evaluation and monitoring activities with respect to the production of official population estimates—also produces a series of estimates by county for April 1 of each calendar year. Unlike the January 1 estimates, these estimates are revised on a yearly basis and take into account the most current and definitive data available to the Department of Administration for each community—including any special censuses that may have been conducted. Since the April 1 series is constantly being reevaluated and revised on the basis of more accurate or more current information, it offers more exact data than the January 1 series for evaluating demographic change over time. It is this series, then, that has been used by the Commission in its yearly monitoring activities and in the preparation of this report to provide general information on the approximate magnitude of the resident population of each county in the Region.

Birth and Death Registrations

The population forecasting model used by the Commission incorporates age-specific rates of population increase and decrease. In intercensal years, there is insufficient information[4] available at the county level to evaluate the validity of the age-specific fertility and mortality rates that have been incorporated into the model. However, the forecasting model does translate these age-specific mortality and fertility rates into numbers of births and numbers of deaths in the aggregate. Therefore, statistics on births and deaths by county can be used to indirectly assess the validity of assumptions concerning mortality and fertility incorporated into the population forecasting model.

In addition to providing data for the evaluation of fertility and mortality assumptions utilized in the Commission's population forecasts, birth and death registrations—used in conjunction with the current population estimates described above—allow for an indirect evaluation of the net migration assumptions utilized in the forecasts. In Chapter II of this report it was indicated that population change is comprised of four major components: fertility (births), mortality (deaths), in-migration (inflows), and out-migration (outflows). The balance between births and deaths is termed "natural increase" and the balance between in-migration and out-migration is termed "net migration." In theory, a current population estimate would be made by adjusting a base population for the effects of fertility, mortality, in-migration, and out-migration. In actuality, however, for geographic areas smaller than states, counts of migrants are seldom available and estimates of migrants are generally available only from the decennial census.

In the absence of definitive data on migration, the level of net migration is often estimated as the residual between a base population and a current population estimate after the effects of births and deaths have been accounted for. When calculated as a residual, the accuracy of the estimate of net migration is generally a function of the accuracy of the current population estimates used in the computation. In this regard, it should be noted that the current population estimates prepared by the Wisconsin Department of Administration have proven over time to be very good.

Special Censuses

As already noted, individual civil divisions may challenge the official population estimates as made by the Wisconsin Department of Administration by contracting for a special census with the U. S. Census Bureau. In addition, any civil division desiring more current information about its population may contract with the Census Bureau for a special census. A number of special censuses have been taken within the Region over the past few years, and the returns provide very good data

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[4] *A complete evaluation of age-specific rates of fertility and mortality would require that counts, or accurate estimates, of the age-sex subgroups of the population be available.*

for evaluating changes in total population, in the age and sex composition of the population within civil divisions, and in total and occupied housing units by civil division. These data, in turn, permit an evaluation of changes in the number of households and in average household size.

Prior to 1974, the U. S. Census Bureau released only total population figures obtained from special censuses of civil divisions of under 10,000 population, and tabulated total population; age, race, and sex distribution; and household counts for areas of 10,000 or more. Beginning in 1974, all civil divisions received age, race, and sex distribution tabulations, and, beginning in 1975, household and housing unit counts were also included for all civil divisions regardless of population size.

Since the 1970 census and as of December 31, 1978, 37 special censuses had been conducted in 33[5] of the Region's civil divisions (see Table 22 and Map 1). Of particular value for this analysis were those special census reports produced during or after 1975, when complete age, race, and sex distribution tabulations and household and housing unit counts became available for all civil divisions conducting special censuses. Data from special census reports for 17 civil divisions[6] —those which had special censuses conducted during the period January 1, 1975, to April 30, 1978—were utilized in this analysis.

The civil divisions for which special census reports were available cannot be assumed to be representative of all communities in the Region, nor to characterize all types of local population change currently taking place in the Region. They do, however, represent both areas of rapid growth and areas in stasis or decline. While data for the City of Milwaukee and a few suburbs are available, it would be desirable to have information on the rapidly growing suburbs such as the Cities of Mequon, New Berlin, and Waukesha, to which the City of Milwaukee is presumably losing population, and on the mature Milwaukee County suburbs such as the Cities of Wauwatosa and West Allis. This sample of 17 civil divisions in the Region was determined not by choice, however, but by the availability of the data. It is interesting to note that the enumerated populations of these 17 civil divisions represent about 45 percent of the estimated total resident population of the Region.

[5] *The Town of Somers, the Village of Germantown, the Village of West Milwaukee, and the Village of Wales have each contracted for two special censuses since the 1970 federal census. In addition, as of December 31, 1978, the Town of Somers had contracted for a third special census to be conducted during the first quarter of 1979.*

[6] *Special census reports for the City of Greenfield and the Town of Grafton, whose special censuses were conducted during the second half of 1978, were not available when the analysis was conducted.*

Table 22

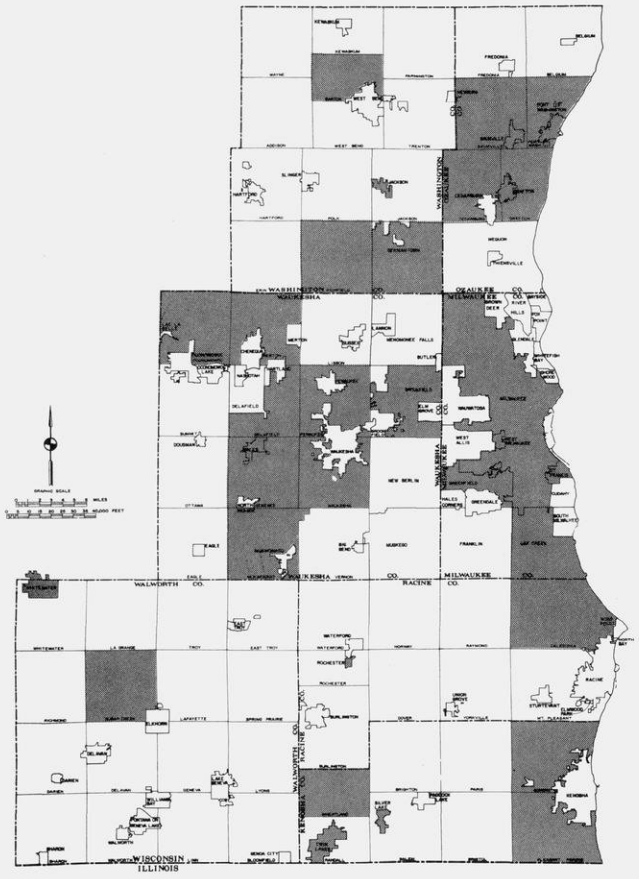
SPECIAL CENSUSES CONDUCTED IN THE SOUTHEASTERN WISCONSIN REGION: 1970-1978

Civil Division	Date of Special Census
Village of Saukville	August 7, 1972
Village of Jackson	November 15, 1972
Village of Rochester	February 7, 1973
Town of Somers	February 7, 1973
Village of Twin Lakes	February 14, 1973
Town of Sugar Creek	May 1, 1973
Village of Wales	May 7, 1973
Town of Caledonia	May 8, 1973
Village of Grafton	June 7, 1973
Town of Mukwonago	August 8, 1973
Town of Wheatland	August 14, 1973
Village of Germantown	January 3, 1974
City of St. Francis	May 6, 1974
Town of Delafield	May 20, 1974
City of Brookfield	June 4, 1974
Town of Pewaukee	June 20, 1974
Village of Silver Lake	September 5, 1974
Village of West Milwaukee	December 2, 1974
City of Milwaukee	March 3, 1975
Town of Pleasant Prairie	February 23, 1976
Town of Somers	February 27, 1976
Town of Barton	December 9, 1976
City of Oak Creek	December 14, 1976
City of Whitewater	January 19, 1977
Town of Cedarburg	February 8, 1977
Town of Waukesha	March 1, 1977
Town of Merton	August 1, 1977
Town of Richfield	September 8, 1977
City of Port Washington	December 6, 1977
Town of Oconomowoc	January 17, 1978
Village of Germantown	January 18, 1978
Town of Genesee	January 19, 1978
Town of Saukville	February 13, 1978
Village of West Milwaukee	April 6, 1978
Village of Wales	April 17, 1978
City of Greenfield	July 19, 1978
Town of Grafton	September 19, 1978

Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

Map 1

SPECIAL CENSUSES CONDUCTED IN THE SOUTHEASTERN WISCONSIN REGION: 1970-1978



Source: U. S. Bureau of the Census and SEWRPC.

While these civil divisions may not constitute a totally representative sample of the Region's civil divisions, they nevertheless represent a very large sample of the Region's residents.

Special Reports

During intercensal periods, the Census Bureau conducts a program of special studies and reports designed to provide current information on population and housing trends. The special reports issued as part of this program are of two general types—those that provide essentially national data, and those that provide local (substate) data. National data are valuable as comparisons against local data to illuminate differential rates of change in population composition and population size and have been incorporated into the analysis of population change in the Region.

Reports containing local data—although not as common—are of even greater value in analyzing change. During the period 1974-1977, the U. S. Bureau of the Census, in conjunction with the U. S. Department of Housing and Urban Development, conducted housing surveys in each of 60 U. S. Standard Metropolitan Statistical Areas (SMSA's). One-third of the SMSA's were surveyed in each of the three 12-month periods. The program is expected to continue, with each set of SMSA's being resurveyed every third year. A sample of 5,000 housing units in the Milwaukee SMSA was surveyed during the period from April 1975 through March 1976.

The annual housing survey is designed to provide current information on the size and composition of the housing inventory, the characteristics of occupants, the changes in the inventory resulting from new construction and from losses, the indicators of housing and neighborhood quality, and the characteristics of recent movers. While the primary emphasis on the data collected as part of this survey is on housing, several data items pertaining to population are available from this survey, particularly in the area of household size and household composition. While the data are the result of a sample survey and are reported only at the SMSA level, they do provide a means of comparison against certain data items available from special census returns and also provide some large area estimates for the Milwaukee SMSA, about which inferences can be drawn concerning the magnitude and direction of change in certain population characteristics since 1970. The annual housing survey and the special censuses analyzed for this report were conducted at approximately the same time, thus providing a high degree of comparability between these two data sources.

CHANGES IN THE DEMOGRAPHIC BASE OF THE REGION

Significant changes have occurred in the population dynamics of the Region since 1970. The most apparent indicator of these changes has been a virtual halt in regional population growth—the dislocation of a pattern of continuous population increase that has characterized the Region for more than a century. Less apparent but nonetheless important changes in the number of households, household size, family composition, and age structure have also occurred.

Since comprehensive planning is intended to improve the environment in which people work and live, and since the primary purpose of all public facilities and services is to meet the needs of the resident population, an understanding of changes in the size, composition, and spatial distribution of the population is essential to the planning process. This section presents a description and analysis of recent demographic trends in the Region, particularly as they relate to long-range physical facilities planning. This presentation of recent change in the demographic base includes descriptions of the changes in population size, spatial distribution, and characteristics, with emphasis on such factors as age composition, racial composition, household size, number of households, and levels of net migration and natural increase.

Population Size

As indicated in Table 23, the estimated 1977 resident population of the Region was approximately 1,776,000 persons—only 20,000 persons, or slightly more than 1 percent, larger than in 1970. More importantly, the available data indicate that the Region has actually lost population since 1975. Between 1970 and 1975 the Region's resident population is estimated to have increased by approximately 32,000 persons to a level of 1,788,000 persons—an increase of about 2 percent over the 1970 level of 1,756,000 persons. Between 1975 and 1977 the resident population of the Region is estimated to have decreased from 1,788,000 persons to 1,776,000 persons—a decrease of about 1 percent.

As further indicated in Table 23, the State and the nation were both experiencing population increases at much reduced rates by 1977 in comparison to the early years of the current decade. Neither the State nor the nation, however, is currently experiencing a decline in resident population as apparently is the Region. As a result of the disparate rates of population change between 1970 and 1977 for the Region, the State, and the nation (see Figure 12), the proportion of the state and national populations represented by the resident population of the Region has also declined since 1970. Whereas in 1970 the regional population accounted for 39.7 percent of the state population and 0.86 percent of the national population, in 1977 the percentages were 38.3 and 0.82, respectively.

General fertility declines partially account for the reduced rates of population growth noted. Within the Region, State, and nation, fertility levels are among the lowest on record. A comparison of Table 24 and Table 3 in Chapter II is particularly informative with respect to the fundamental and potentially far-reaching changes in population dynamics currently taking place in the Region. Despite the fact that the rates displayed in the tables are not for uniform time periods and the rates, therefore, are not directly comparable, some general observations may be made. Given that the estimated rate of natural increase for the period 1970 to 1977 was 4.4 percent, it is apparent that—barring any significant change in current regional fertility and mortality

Table 23

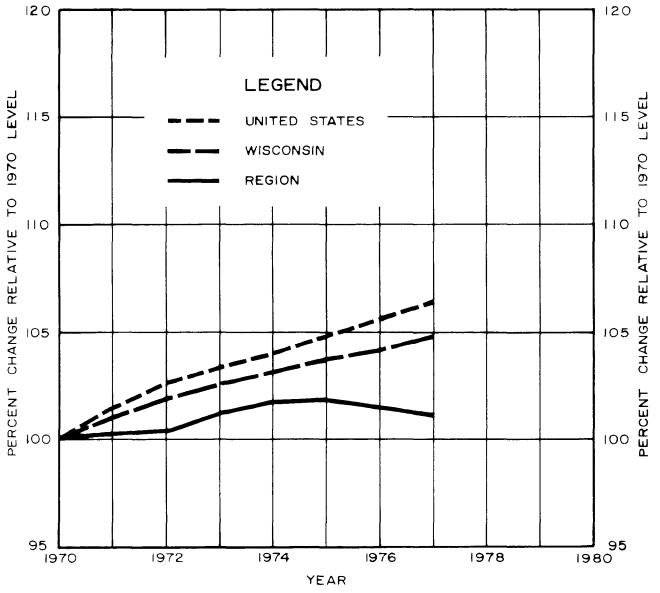
POPULATION TRENDS IN THE REGION, WISCONSIN, AND THE UNITED STATES: 1970-1977

Year	Region			Wisconsin			United States			Regional Population as a Percent of:	
	Population (in thousands)	Change From Previous Year		Population (in thousands)	Change From Previous Year		Population (in thousands)	Change From Previous Year			
		Absolute (in thousands)	Percent		Absolute (in thousands)	Percent		Absolute (in thousands)	Percent	Wisconsin	United States
1970	1,756	--	--	4,418	--	--	203,235	--	--	39.7	0.86
1971	1,764	8	0.4	4,462	44	1.0	206,219	2,984	1.5	39.5	0.86
1972	1,772	8	0.4	4,501	39	0.9	208,234	2,015	1.0	39.4	0.85
1973	1,778	6	0.3	4,532	31	0.7	209,859	1,625	0.8	39.2	0.85
1974	1,785	7	0.4	4,561	29	0.6	211,389	1,530	0.7	39.1	0.84
1975	1,788	3	0.2	4,583	22	0.5	213,051	1,662	0.8	39.0	0.84
1976	1,782	-6	-0.3	4,604	21	0.5	214,669	1,618	0.8	38.7	0.83
1977	1,776	-6	-0.3	4,632	28	0.6	216,332	1,663	0.8	38.3	0.82
Total Change 1970-1977	--	20	1.2	--	214	4.8	--	13,097	6.4	--	--

Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

Figure 12

RELATIVE INCREASE IN POPULATION IN THE UNITED STATES, WISCONSIN, AND THE REGION 1970-1977



Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

rates between 1977 and 1980—the rate of natural increase in the Region for the 1970's will be approximately equal to the 6.2 percent rate of natural increase that occurred during the 1930's, which was the lowest 10-year rate for the period 1920 to 1970—the period for which reasonably reliable data on migration and natural increase are available.

Changes in resident population levels within the Region since 1970 are only partially explained by declining fertility. The rate of net out-migration for the period 1970 to 1977—estimated at - 3.3 percent—is of greater magnitude than for any single decade for the period of record, 1920 to 1970. Prior to 1970, net out-migration occurred only during the 1930's—at a rate of - 0.1 percent—and the 1960's—at a rate of 1.3 percent—and was substantially offset in each of these decades by natural increase. However, since 1970, and particularly since 1975, net out-migration has become a significant component of population change in the Region. Between 1970 and 1977, net out-migration offset approximately 75 percent of the population change that is attributable to natural increase. The increased rates of net out-migration and the reduced rates of natural increase noted have combined to produce for the 1970 to 1977 period the smallest rate of total population change in the Region's history.

Table 24

ESTIMATED RATES OF POPULATION CHANGE BASED ON NATURAL INCREASE AND NET MIGRATION IN THE REGION: 1970-1977

Time Period	Total Change (percent)	Natural Increase (percent)	Net Migration (percent)
1970-1975	1.8	3.3	- 1.5
1976-1977	- 0.7	1.1	- 1.8
1970-1977	1.2	4.4	- 3.3

Source: U. S. Bureau of the Census, Wisconsin Department of Administration, Wisconsin Department of Health and Social Services, and SEWRPC.

Although the Region experienced a slight population loss—less than 1 percent—between 1975 and 1977, its rate of population increase between 1970 and 1975 compared favorably with rates of population change in other large metropolitan areas in the United States between 1970 and 1975—the most recent period for which comparable national statistics are available (see Figure 13). During this period, 6 of the 15 largest SMSA's in the nation experienced higher rates of population growth than did the Region. Of the remaining 9 metropolitan areas, 3 experienced rates of population growth less than that of the Region and 6 experienced a population loss. The City of Milwaukee was the thirteenth largest city in the United States in 1975, a decline from its 1970 rank as the twelfth largest city. The Milwaukee SMSA was the twenty-fourth largest in the United States in 1975, a decline from its 1970 rank as the nineteenth largest.

Population Distribution

Population change since 1970 has not been uniform throughout the Region. Estimated population levels for each of the Region's seven counties by individual year—1970 through 1977—are shown in Table 25. Changes in population distribution by county are shown in Table 26. Four distinct patterns of population change at the county level in the Region can be identified.

1. Milwaukee County has probably experienced population losses in each successive year since 1970. It is estimated that by 1977, Milwaukee County had approximately 71,600 fewer residents than in 1970—a decrease of almost 7 percent.

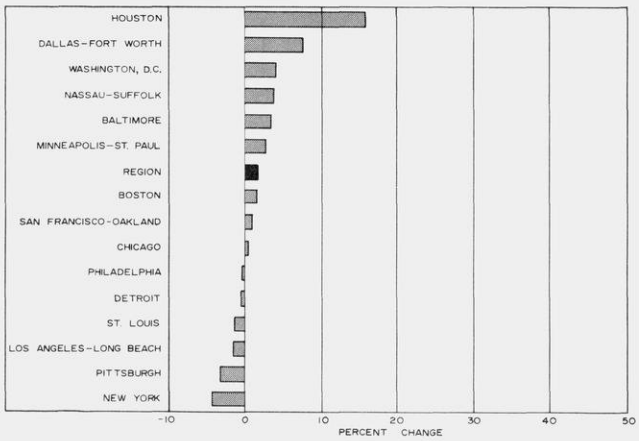
2. Kenosha and Racine Counties, after experiencing modest population growth between 1970 and 1975, have experienced slight population losses in 1976 and 1977—the same years in which the Region as a whole experienced slight population declines. In spite of these recent losses, both Kenosha and Racine Counties had larger resident populations in 1977 than in 1970—6,700 persons, or about 6 percent, and 6,400 persons, or about 4 percent, respectively.

3. Walworth County has experienced modest population increases in each successive year since 1970—a total of 5,300 persons, or about 8 percent, between 1970 and 1977.

4. Ozaukee, Washington, and Waukesha Counties have experienced rapid population growth between 1970 and 1977, a continuation of trends in existence prior to 1970. The largest absolute population increase has occurred in Waukesha County, which increased by an estimated 42,500 persons, or by about 19 percent, between 1970 and 1977. During the same period, the populations of Ozaukee and Washington Counties were estimated to have increased by 13,900 persons, or by 26 percent, and 17,100 persons, or by 27 percent, respectively.

Figure 13

PERCENT INCREASE OF POPULATION IN THE 15 LARGEST STANDARD METROPOLITAN STATISTICAL AREAS IN THE UNITED STATES AND IN THE REGION: 1970-1975



Source: U. S. Bureau of the Census and SEWRPC.

These patterns indicate that the dispersion of urban population into the outlying areas of the Region—a trend which began early in the present century—is continuing even though the resident population level of the Region has been virtually stable between 1970 and 1977 (see Figures 14 and 15). As shown in Table 26, the most dramatic changes in population distribution continue to occur—as they have since 1930—in Milwaukee and Waukesha Counties. The Milwaukee County proportion of the total regional population decreased by about 5 percentage points—from 60.1 percent to 55.3 percent—between 1970 and 1977. In contrast, the Waukesha County proportion of the total regional population increased by about 2 per-

Table 25

ESTIMATED POPULATION LEVELS IN THE REGION BY COUNTY: 1970-1977

County	1970	1971	1972	1973	1974	1975	1976	1977
Kenosha	117,900	120,100	120,900	123,100	124,600	125,900	125,600	124,600
Milwaukee . . .	1,054,300	1,049,600	1,044,300	1,033,200	1,024,200	1,014,400	999,600	982,700
Ozaukee	54,500	56,100	58,500	60,900	63,400	64,900	66,100	68,400
Racine	170,800	172,000	172,200	174,200	176,500	178,600	177,800	177,200
Walworth. . . .	63,500	64,800	65,800	66,500	66,600	67,200	68,000	68,800
Washington . .	63,800	65,400	67,800	72,200	74,600	76,200	78,000	80,900
Waukesha . . .	231,300	235,800	242,100	248,300	254,700	261,100	267,100	273,800
Region	1,756,100	1,763,800	1,771,600	1,778,400	1,784,600	1,788,300	1,782,200	1,776,400

Source: Wisconsin Department of Administration and SEWRPC.

Table 26

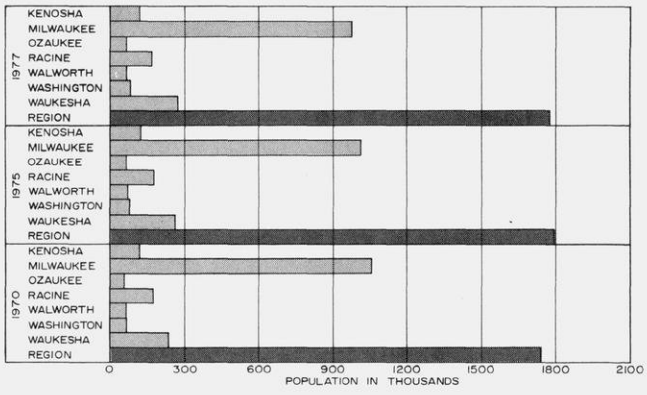
POPULATION DISTRIBUTION IN THE REGION BY COUNTY: 1970, 1975, AND 1977

County	1970		1975		1977		Estimated Change: 1970-1977	
	Population	Percent of Region	Population	Percent of Region	Population	Percent of Region	Absolute	Percent
Kenosha	117,900	6.7	125,900	7.0	124,600	7.0	6,700	5.68
Milwaukee . . .	1,054,300	60.1	1,014,400	56.7	982,700	55.3	- 71,600	- 6.79
Ozaukee	54,500	3.1	64,900	3.6	68,400	3.8	13,900	25.50
Racine	170,800	9.7	178,600	10.0	177,200	10.0	6,400	3.75
Walworth. . . .	63,500	3.6	67,200	3.8	68,800	3.9	5,300	8.35
Washington . .	63,800	3.6	76,200	4.3	80,900	4.6	17,100	26.80
Waukesha . . .	231,300	13.2	261,100	14.6	273,800	15.4	42,500	18.37
Region	1,756,100	100.0	1,788,300	100.0	1,776,400	100.0	20,300	1.16

Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

Figure 14

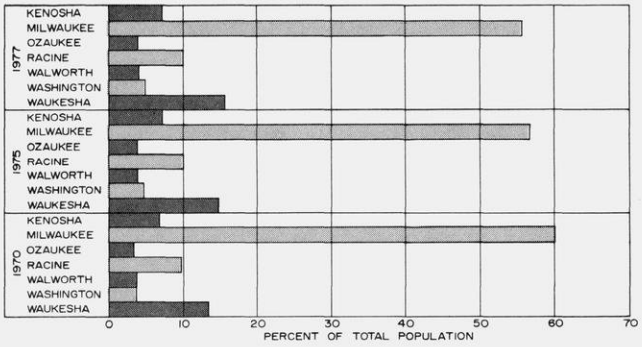
POPULATION DISTRIBUTION IN THE REGION BY COUNTY: 1970, 1975 AND 1977



Source: SEWRPC.

Figure 15

PERCENTAGE DISTRIBUTION OF POPULATION IN THE REGION BY COUNTY: 1970, 1975, AND 1977



Source: SEWRPC.

centage points—from 13.2 percent to 15.4 percent—during the same period. The remaining five counties showed increases of from 0.3 to 1.0 percentage point in their proportions of the total regional population.

An examination of estimated levels of natural increase and net migration by county (see Table 27) provides important insights into the differential patterns of population change by county. Those counties which have experienced the largest rates of population growth in the Region since 1970—Ozaukee, Washington, and Waukesha Counties—are also the counties experiencing the largest levels of net in-migration. Milwaukee County has lost more than twice as many residents as a result of net out-migration as it has gained from natural increase. During the 1960's and the first half of the 1970's, only Milwaukee County of the Region's seven counties experienced net out-migration. By 1977, both Kenosha and Racine Counties were also experiencing net out-migration.

Population Characteristics

Perhaps the most difficult population information to obtain during the periods between decennial

Table 27

ESTIMATED NATURAL INCREASE AND NET MIGRATION IN THE REGION BY COUNTY: 1970-1977

County	Natural Increase			Net Migration		
	1970-1975	1976-1977	1970-1977	1970-1975	1976-1977	1970-1977
Kenosha	4,100	1,400	5,500	3,900	- 2,700	1,200
Milwaukee	32,300	10,400	42,700	- 72,200	- 42,100	- 114,300
Ozaukee	2,300	900	3,200	8,100	2,600	10,700
Racine	6,400	2,400	8,800	1,400	- 3,800	- 2,400
Walworth	1,000	300	1,300	2,700	1,300	4,000
Washington	3,300	1,400	4,700	9,100	3,300	12,400
Waukesha	8,500	3,400	11,900	21,300	9,300	30,600
Region	57,800	20,300	78,100	- 25,600	- 32,200	- 57,800

Source: U. S. Bureau of the Census, Wisconsin Department of Administration, Wisconsin Department of Health and Social Services, and SEWRPC.

censuses are data concerning the composition and characteristics of the resident population of small geographic areas such as the Region. Differential and ever-changing age-specific rates of fertility, mortality, and migration make estimates of the characteristics of the population of small areas especially error-prone. The special censuses conducted in certain civil divisions in southeastern Wisconsin between January 1, 1975, and April 30, 1978 (see Table 22), and analyzed for this report, therefore provide valuable data on changes in population characteristics, especially given the fact that these special censuses enumerated approximately 45 percent of the Region's resident population. Previously published Commission population studies have generally examined population characteristics at the county level. While data from the special censuses cannot be compared with the county data previously presented in this report, they nevertheless provide important indicators of change over time in characteristics of the population.

Population change since 1970 in those 17 civil divisions for which special census results were analyzed for this report is summarized in Table 28. Thirteen of these civil divisions have experienced population increases since 1970; four civil divisions—the Cities of Milwaukee, Port Washington, and Whitewater and the Village of West Milwaukee—have experienced population losses. Direct comparison of either absolute or relative population changes among these civil divisions is difficult given the varying amounts of elapsed time between the 1970 federal census and individual special censuses. For comparison between individual civil divisions, average annual rates of change have been included in the table.

Analysis of the results of the special censuses indicate that the population of the Region is aging. A comparison of median ages computed for 1970 and for the date of the special censuses (see Table 29) indicates that the median age has increased in 14 of the civil divisions examined. In six of these civil divisions, an increase of three or more years in the median age was observed. Only the Cities of Whitewater and Milwaukee and the Village of Wales have experienced a decrease in median age since 1970. The largest of the three observed decreases was - 0.3 years. General fertility declines account for some of the observed increases in median age, as evidenced by the fact that all 17 civil divisions experienced a decrease in the proportion of their total population in the under five years of age category between 1970 and the date of their respective special censuses.

Special census results also indicate that the number of households in the Region is increasing (see Table 30), even in areas which are experiencing a population decline such as the City of Milwaukee. Perhaps more importantly, as can be seen by comparing rates of change in Tables 28 and 30, the rate of household increase is greater than the rate of population increase for those civil divisions experiencing population growth. Of the civil divisions examined, only the Village of West Milwaukee has experienced a decrease in the number of households since 1970. As might be

Table 28

POPULATION CHANGE IN SELECTED CIVIL DIVISIONS IN SOUTHEASTERN WISCONSIN SINCE 1970

Civil Division	Date of Special Census	Population		Change		Annual Rate of Change (percent)
		1970 Census	Special Census	Number	Percent	
City of Milwaukee	March 3, 1975	717,372	669,022	- 48,350	- 6.74	- 1.43
City of Oak Creek	December 14, 1976	13,928	15,510	1,582	11.36	1.62
City of Port Washington	December 6, 1977	8,752	8,500	- 252	- 2.88	- 0.38
City of Whitewater	January 19, 1977	12,038	10,942	- 1,096	- 9.10	- 1.41
Village of Germantown	January 18, 1978	6,974	9,729	2,755	39.50	4.36
Village of Wales	April 17, 1978	691	1,750	1,059	153.26	12.25
Village of West Milwaukee	April 6, 1978	4,405	3,506	- 899	- 20.41	- 2.81
Town of Barton	December 9, 1976	1,624	2,125	501	30.85	4.10
Town of Cedarburg	February 8, 1977	3,774	5,152	1,378	36.51	4.64
Town of Genesee	January 19, 1978	3,172	4,701	1,529	48.20	5.17
Town of Merton	August 1, 1977	4,424	5,566	1,142	25.81	3.18
Town of Oconomowoc	January 17, 1978	6,010	6,668	658	10.95	1.34
Town of Pleasant Prairie	February 23, 1976	12,019	12,043	24	0.20	0.03
Town of Richfield	September 8, 1977	5,923	7,883	1,960	33.09	3.92
Town of Saukville	February 13, 1978	1,516	1,610	94	6.20	0.77
Town of Somers	February 27, 1976	7,270	7,677	407	5.60	0.93
Town of Waukesha	March 1, 1977	4,408	6,268	1,860	42.20	5.22

Source: U. S. Bureau of the Census and SEWRPC.

Table 29

CHANGE IN MEDIAN AGE IN SELECTED CIVIL DIVISIONS IN SOUTHEASTERN WISCONSIN SINCE 1970

Civil Division	Median Age		Change in Years
	1970 Census	Special Census	
City of Milwaukee	28.2	28.1	- 0.1
City of Oak Creek	22.9	25.9	3.0
City of Port Washington	24.8	28.3	3.5
City of Whitewater	21.4	21.2	- 0.2
Village of Germantown	22.4	26.8	4.4
Village of Wales	24.8	24.5	- 0.3
Village of West Milwaukee	38.9	40.4	1.5
Town of Barton	23.2	24.3	1.1
Town of Cedarburg	24.1	27.3	3.2
Town of Genesee	24.1	26.7	2.6
Town of Merton	28.0	29.5	1.5
Town of Oconomowoc	29.0	29.9	0.9
Town of Pleasant Prairie	25.5	28.5	3.0
Town of Richfield	23.1	26.4	3.3
Town of Saukville	25.6	27.6	2.0
Town of Somers	26.0	27.5	1.5
Town of Waukesha	27.3	28.3	1.0

Source: U. S. Bureau of the Census and SEWRPC.

Table 30

CHANGE IN NUMBER OF HOUSEHOLDS IN SELECTED CIVIL DIVISIONS IN SOUTHEASTERN WISCONSIN SINCE 1970

Civil Division	Households		Change	
	1970 Census	Special Census	Number	Percent
City of Milwaukee	236,981	240,608	3,627	1.53
City of Oak Creek	3,585	4,569	984	27.45
City of Port Washington	2,459	2,778	319	12.97
City of Whitewater	2,257	2,805	548	24.28
Village of Germantown	1,744	2,974	1,230	70.53
Village of Wales	185	489	304	164.32
Village of West Milwaukee	1,845	1,809	- 36	- 1.95
Town of Barton	419	575	156	37.23
Town of Cedarburg	956	1,384	428	44.77
Town of Genesee	846	1,310	464	54.85
Town of Merton	1,274	1,635	361	28.34
Town of Oconomowoc	1,794	2,075	281	15.66
Town of Pleasant Prairie	3,303	3,658	355	10.75
Town of Richfield	1,502	2,149	647	43.08
Town of Saukville	409	472	63	15.40
Town of Somers	2,115	2,560	445	21.04
Town of Waukesha	1,206	1,756	559	46.35

Source: U. S. Bureau of the Census and SEWRPC.

expected in view of the observed differential rates of change in population and households in these civil divisions, average household size has continued to decline (see Table 31). Special census results for those civil divisions analyzed indicate, in all cases, a decrease in household size since 1970.

It is also apparent that the racial composition of the Region's population has continued to change since 1970. Of all civil divisions for which special censuses have been taken, only the City of Milwaukee has a significant black population component. As shown in Table 32, the black population in the City of Milwaukee increased by almost 18 percent between 1970 and 1975. During this same time period, the total population of the City of Milwaukee declined by approximately 7 percent. Additionally it is noted that the 1975 enumerated black population in the City of Milwaukee was approximately 4,300 persons more than the 1970 enumerated black population in the entire Regon. Since the black population residing in the City of Milwaukee represented approximately 88 percent of the black population residing in the Region in 1970, the increase noted here is significant and indicates that the black component of the regional population has increased since 1970.

Table 31

CHANGE IN HOUSEHOLD SIZE IN SELECTED CIVIL DIVISIONS IN SOUTHEASTERN WISCONSIN SINCE 1970

Civil Division	Household Size		Change	
	1970 Census	Special Census	Number	Percent
City of Milwaukee	2.96	2.72	- 0.24	- 8.14
City of Oak Creek	3.88	3.39	- 0.49	- 12.63
City of Port Washington	3.52	3.02	- 0.50	- 14.20
City of Whitewater	2.99	2.11	- 0.88	- 29.43
Village of Germantown	4.00	3.27	- 0.73	- 18.25
Village of Wales	3.74	3.58	- 0.16	- 4.28
Village of West Milwaukee	2.35	1.91	- 0.44	- 18.72
Town of Barton	3.88	3.70	- 0.18	- 4.64
Town of Cedarburg	3.95	3.72	- 0.23	- 5.82
Town of Genesee	3.75	3.59	- 0.16	- 4.27
Town of Merton	3.47	3.40	- 0.07	- 2.02
Town of Oconomowoc	3.32	3.18	- 0.14	- 4.22
Town of Pleasant Prairie	3.61	3.26	- 0.35	- 9.70
Town of Richfield	3.94	3.67	- 0.27	- 6.85
Town of Saukville	3.71	3.41	- 0.30	- 8.09
Town of Somers	3.44	3.00	- 0.44	- 12.79
Town of Waukesha	3.66	3.55	- 0.11	- 3.01

Source: U. S. Bureau of the Census and SEWRPC.

SUMMARY

This chapter has described changes in the demographic base of the Southeastern Wisconsin Region since 1970. In the absence of the definitive data base that would be provided by a census of population, a detailed evaluation of recent population change in the Region is not possible; however, the data available to examine these changes are such that reasonable inferences can be drawn concerning the direction and approximate magnitude of population change within the Region between 1970 and 1977.

Between 1970 and 1975 the population of the Region increased from a level of about 1,756,000 persons to a level of about 1,788,000 persons—an increase of about 32,000 persons, or approximately 2 percent. After 1975, however, the Region began to experience a decline in its resident population. In 1977 the estimated population of the Region was 1,776,000 persons—about 12,000 persons less than in 1975 and only about 20,000 persons, or slightly more than 1 percent, greater than the 1970 level. During this same period, the State and the nation continued to register yearly population increases, but at rates substantially less than those of the preceding three decades.

Rates of natural increase within the Region have reached their lowest level since the 1930's. In the absence of any significant change in current regional fertility and mortality rates, the rate of natural increase in the Region for the 1970's will be approximately equal to the 6.2 percent rate that occurred during the 1930's—presently the lowest 10-year rate for the period of record.

Table 32

CHANGE IN BLACK POPULATION IN THE CITY OF MILWAUKEE: 1970-1975

Black Population		Change	
1970	1975	Number	Percent
105,088	123,689	18,601	17.70

Source: U. S. Bureau of the Census, and SEWRPC.

Net out-migration has—for the first time in the history of the Region—become a significant factor in the population dynamics of the Region. The net migration rate of -3.3 observed for the period of 1970 to 1977 is greater than the rate of -0.1 observed in the 1930's and the rate of -1.3 observed in the 1960's—the only other time periods for which net out-migration was recorded. For the period 1970 to 1977, net out-migration offset approximately 75 percent of the growth in population that would have accrued to the Region through natural increase.

In spite of a virtually stable regional population level since 1970, the long-established trend toward regional population decentralization continues. Between 1970 and 1977 the proportion of the regional population residing in Milwaukee County, which experienced a decrease of approximately 71,600 residents, or about 7 percent, over this period, decreased from 60.1 percent to 55.3 percent—a decrease of about 5 percentage points. During the same period, the Waukesha County proportion of the total regional population increased by about 2 percentage points—from 13.2 percent to 15.4 percent—while the proportion of the total regional population shared by the remaining five counties increased by a total of about 3 percentage points.

Special censuses taken within the Region since the 1970 decennial census of population indicate a general aging of the population. Of 17 civil divisions for which special census reports were analyzed, 14 experienced an increase in median age. Six of these civil divisions experienced an increase in median age of three years or more. Of the three civil divisions experiencing decreases in the median age, the largest decrease observed was -0.3 years.

Special censuses also indicate that the number of households in the Region has increased, and that the rate of increase in the number of households is greater than the rate of population increase in all civil divisions examined. With the exception of the Village of West Milwaukee, an increase in the number of households was observed even in civil divisions experiencing population declines. In the Village of West Milwaukee, the rate of decrease in the number of households was less than the rate of decrease in population. As a result of the differential rates of change in population and households, the average household size within the Region has declined since 1970. All 17 civil divisions examined recorded decreases in household size.

The racial composition of the regional population has also changed since 1970. On the basis of the special census taken in the City of Milwaukee in 1975, it is noted that more blacks were enumerated in that special census than were enumerated in the whole Region in 1970. The observed rate of increase between 1970 and 1975 of black residents in the City of Milwaukee was approximately 18 percent, in contrast to an estimated rate of total regional population increase of 2 percent for the same period.

The data presented in this chapter relate to very recent changes in the resident population of the Region. These data are important considerations in the physical facilities planning process, since the existing and anticipated future size, distribution, and characteristics of the resident population together represent one of the principal bases for determining the general scale and geographic distribution of the demand for land use and supporting physical facilities and public services. The next chapter will discuss the implications and possible impacts of the recent changes in previously prepared demographic analyses and forecasts which serve as important bases for the long-range land use and supporting facilities plans prepared by the Commission.

Chapter V

EVALUATION OF THE POPULATION FORECASTS

INTRODUCTION

Preceding chapters of this report have discussed the changes in the demographic base of the Region occurring prior to 1970; the population forecasts for the design year 2000 chosen by Commission staff and advisory committees in 1974 to aid in the development of long-range land use and supporting facilities plans for the Region; and changes in the demographic base of the Region that have taken place since 1970. The purpose of this chapter is to compare actual changes in the population size, distribution, and characteristics of the Region as observed since 1970 with anticipated changes in the population size, distribution, and characteristics of the Region as they were forecast to occur, and to provide an evaluation of the population forecasts as a basis for the development of long-range land use and supporting facilities plans in light of this comparison.

FORECASTING AS A COMPONENT OF THE PLANNING PROCESS

Throughout this report, the relationship between population studies and forecasts and the planning process utilized by the Commission has been emphasized. While the study of population change over time and the preparation of forecasts of future population change are interesting and worthwhile pursuits in their own right, the Commission's interest in these areas is founded in the importance of these studies and forecasts to the planning process (see Figure 16). Particularly germane to the subject of this report are those steps of the planning process referred to as "inventories" and "analyses and forecasts" which together aid in the determination of the probable future need for the various land use categories and for supporting public facilities and services.

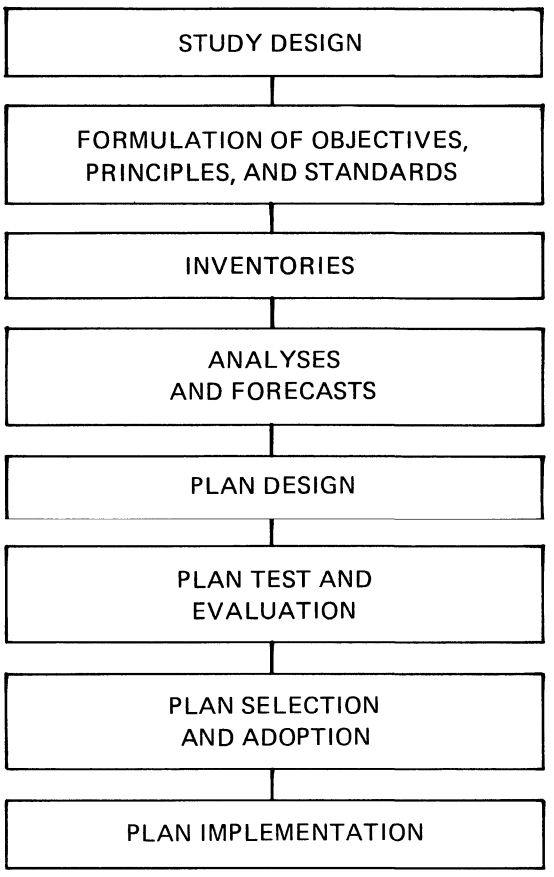
Determination of Future Needs

Inventories provide factual information about the present situation. Reliable basic planning and engineering data—including information about population size, distribution, and composition—collected on a uniform, areawide basis are essential to the formulation of workable development plans. Consequently, inventory becomes the first operational step in any planning effort. The crucial nature of factual information in the planning process should be evident, since no intelligent forecasts can be made, or alternative courses of action evaluated, without knowledge of the current state of the system being planned.

Analyses and forecasts are necessary to provide estimates of future needs for resources, land, and public facilities and services. Analyses of the information provided by the inventories are

Figure 16

THE PLANNING PROCESS AS DEFINED BY THE SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION



Source: SEWRPC.

required to provide an understanding of the existing situation, the possible future trends of change in that situation, and the factors influencing those trends. Particularly important among the analytical relationships established are those which link population and economic activity levels to the demand for land and public facilities and services.

Future needs must be estimated from a sequence of interlocking forecasts founded on the results of the planning analyses. Economic activity and population forecasts set the general scale of future growth, which is, in turn, translated into future natural resource, land use, and facility and service demand. These anticipated future demands can then be scaled against the existing supply, and plans can be formulated to meet deficiencies.

Great care is taken by the Commission in the preparation of forecasts, but it must ultimately be recognized that no one can "predict" the future and that all forecasts, however made, involve uncertainty, and, therefore, must always be used with great caution. Forecasts cannot take into account events that are unpredictable but that may have a major effect upon future conditions. Such events include wars, epidemics, major social, political, and economic upheavals, and radical institutional changes. Moreover, both public and private decisions of a less radical nature than the foregoing can be made which may significantly affect the ultimate accuracy of any forecasts. The very act of preparing forecasts that present a distasteful situation to society may lead to collective social and political actions, the express purpose of which is to prevent the forecast situation from ever materializing.

Forecast Target Date

An important consideration in the preparation of necessary forecasts is the forecast target date. Both the land use pattern and the physical facilities systems must be planned in consideration of, although not necessarily to meet, anticipated demand at some future time. In the planning of physical facility systems, this "design year" is usually established by the expectant life of the first facilities to be constructed in the implementation of the plan. Depending on the particular facilities involved, this design year can be from 20 to more than 50 years in the future. Although it may be argued that the design year for land use development should be extended farther into the future than that for physical facilities because of the basic irreversibility of many land use development decisions, practical considerations—including limitations on the ability to make the necessary economic and demographic forecasts—dictate that the land use planning design year be scaled to the facility design year requirement.

Because of the need to designate a design year based upon the expectant life of the first facilities constructed in the implementation of the plan under development, a forecast period of at least 20 to 30 years is normally required for comprehensive planning purposes. This situation places some severe requirements upon population forecasts produced as part of the planning process. Research has indicated that the "error" rate of a forecast tends to vary directly with the length of the forecast period and that this is especially the case for subnational forecasts. For this reason it is generally recommended that the long-term forecasts required in comprehensive planning be produced by the more elaborate and computationally complex procedures such as the cohort survival procedure utilized by the Commission. While no evidence exists that these more elaborate procedures produce more accurate long-term forecasts, they do have a greater analytic capability in that they permit—and indeed require—explicit consideration of the individual components of population change. They are generally preferred for this reason.

Forecast Accuracy Requirements

While demographers have long been concerned about the accuracy of population projections and have attempted to develop procedures whereby the accuracy of a projection could be evaluated by a quantitative measure, it is not currently possible to establish levels of reliability for projections in either statistical or probabilistic terms. Projections can only be evaluated qualitatively, with the results interpreted in light of the uses to which the projections will be put. Once a particular projection has been designated as a forecast, it is perfectly appropriate to assess its accuracy by a subsequent comparison with a census count or current estimate. Attention may profitably be focused on the accuracy of the forecast of net change and its components—births, deaths, and net migration—rather than on the forecast itself since it is these components that are actually forecast from the base population. While the comparison of forecast change to observed change can be revealing, it provides no standard by which to judge the overall accuracy of the forecast. In actuality, the possibilities of evaluating a forecast are limited because census counts for many years subsequent to the

base year are needed. In a particular situation, this may permit evaluation of a forecast only after a long period of time has elapsed. The question of accuracy is further complicated by the observed relationship between the "error rate," or difference, of a forecast and the base population size, the character and magnitude of the population growth rate, the length of the forecast period, and the relative incidence of external migration into or out of the area for which the forecast is prepared.

While the absence of objective tests or measures—similar in function to statistical tests for significance—for determining the quality of a forecast render the concept of "accuracy" less meaningful, there is a broader issue to be considered. The normative nature—at the county level—of the Commission's population forecasts poses a further constraint on evaluating the accuracy of these forecasts. As discussed in Chapter III of this report, the county forecasts finally selected from among the alternative projections considered were based in part upon the Commission's adopted land use development objectives. These forecasts assume that the continued diffusion of urban development into the outlying areas of the Region will be curtailed in the public interest through the exercise of land use controls and other public policy actions. Failure of units of government, private developers, and the public to actively pursue necessary public policy actions to ensure implementation of the various adopted regional development plans will adversely affect the ultimate accuracy of the forecasts.

Lacking objective tests for determining forecast reliability and given the normative nature of the county level population forecasts, forecast accuracy requirements are largely a function of the use to be made of the forecasts. As applied to land use and physical facilities planning, the critical question involves the effect of any forecast inaccuracies on the basic structure of the plans to be produced. It is important to keep the forecast tolerances within that range wherein only the timing and not the basic structure of the plans will be affected. It is the opinion of professional demographers that forecast accuracies on the order of plus or minus 10 percent would be very good over a 20-year period and that certainly no greater level of accuracy should be anticipated. It is similarly the opinion of the professional planners and engineers concerned that even somewhat greater forecast variances would not significantly affect the structure of the plans. Experience has indicated that if the basic forecasts—including population forecasts—required for the preparation of land use and physical facilities plans can be made to within plus or minus 10 percent per decade, it is likely that only the timing, and not the structure, of the plans will be affected.[1]

ASSESSMENT OF THE COMMISSION POPULATION FORECASTS

A complete and detailed assessment of the existing Commission population forecasts cannot be undertaken until data from the 1980 census are available. As noted previously in this report, these forecasts have been prepared through the use of a disaggregate technique wherein anticipated rates of change in fertility, mortality, and migration operate differentially through time over age-sex specific subsets of the regional population to produce an anticipated future population. A thorough assessment of the population forecasts would require a comparison of the anticipated rates of change in these variables with observed rates of change for each age-sex specific subset. Data from a complete population census are necessary to compute the necessary observed rates of change.

Despite the absence of the detailed data necessary for a thorough assessment, a more general assessment of the population forecasts is presently possible, and this assessment can be made with a reasonable degree of certainty. Sufficient time has elapsed since the base year of the population forecasts to allow the "aggregate result" of the operation of the various age-sex specific population change component rates to be estimated. On the basis of these estimates a tentative assessment of the degree to which the population forecasts correctly anticipated population change—at least in the aggregate—can be made. The assessment must remain tentative, however, until detailed age-sex specific data from the 1980 census permit a more rigorous assessment to be made.

Components of Population Change

A comparison of estimated and forecast total population change in the Region by county for the period 1970 through 1977 is presented in Table 33. Of the Region's seven counties, only Milwaukee County was anticipated to experience a population loss over this period. While the forecast population loss has occurred in Milwaukee County, the loss has been about 40,000 per-

[1] *For a discussion of the accuracy requirements of forecasts used in the preparation of long-range land use and physical facilities plans, see SEWRPC Planning Report No. 25, A Regional Land Use Plan and a Regional Transportation Plan for Southeastern Wisconsin: 2000.*

Table 33

ESTIMATED POPULATION CHANGE AND FORECAST POPULATION CHANGE IN THE REGION BY COUNTY: 1970-1977

County	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Kenosha	6,700	5.68	14,400	12.21	- 7,700	- 6.53
Milwaukee	- 71,600	- 6.79	- 31,500	- 2.99	- 40,100	- 3.80
Ozaukee	13,900	25.50	15,200	27.89	- 1,300	- 2.38
Racine	6,400	3.75	9,900	5.80	- 3,500	- 2.05
Walworth	5,300	8.35	7,800	12.28	- 2,500	- 3.94
Washington	17,100	26.80	18,900	29.62	- 1,800	- 2.82
Waukesha	42,500	18.37	42,900	18.55	- 400	- 0.17
Region	20,300	1.16	77,600	4.42	- 57,300	- 3.26

Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

sons, or about 4 percentage points, greater than anticipated. In the remaining six counties, population increases were anticipated. While population increases have been observed in these six counties, only in Waukesha County have the observed increases closely approached the forecast increases. Of those counties experiencing population increases, the largest differences from the forecasts in both a relative and an absolute sense have been observed in Kenosha County—7,700 persons, or about 7 percentage points, less than forecast. In all seven counties, the difference between the estimated population change and the forecast population change is—with the possible exception of Kenosha County, where the difference is roughly equivalent to 1 percentage point per year—within the range of plus or minus 10 percent per decade, previously cited as the allowable range of accuracy for forecasts used in long-range land use and supporting facilities and services planning. For the past several years, Kenosha County—and particularly the City of Kenosha—has suffered a depressed economy relative to the rest of the Region which may, in part, explain its less than anticipated population growth.

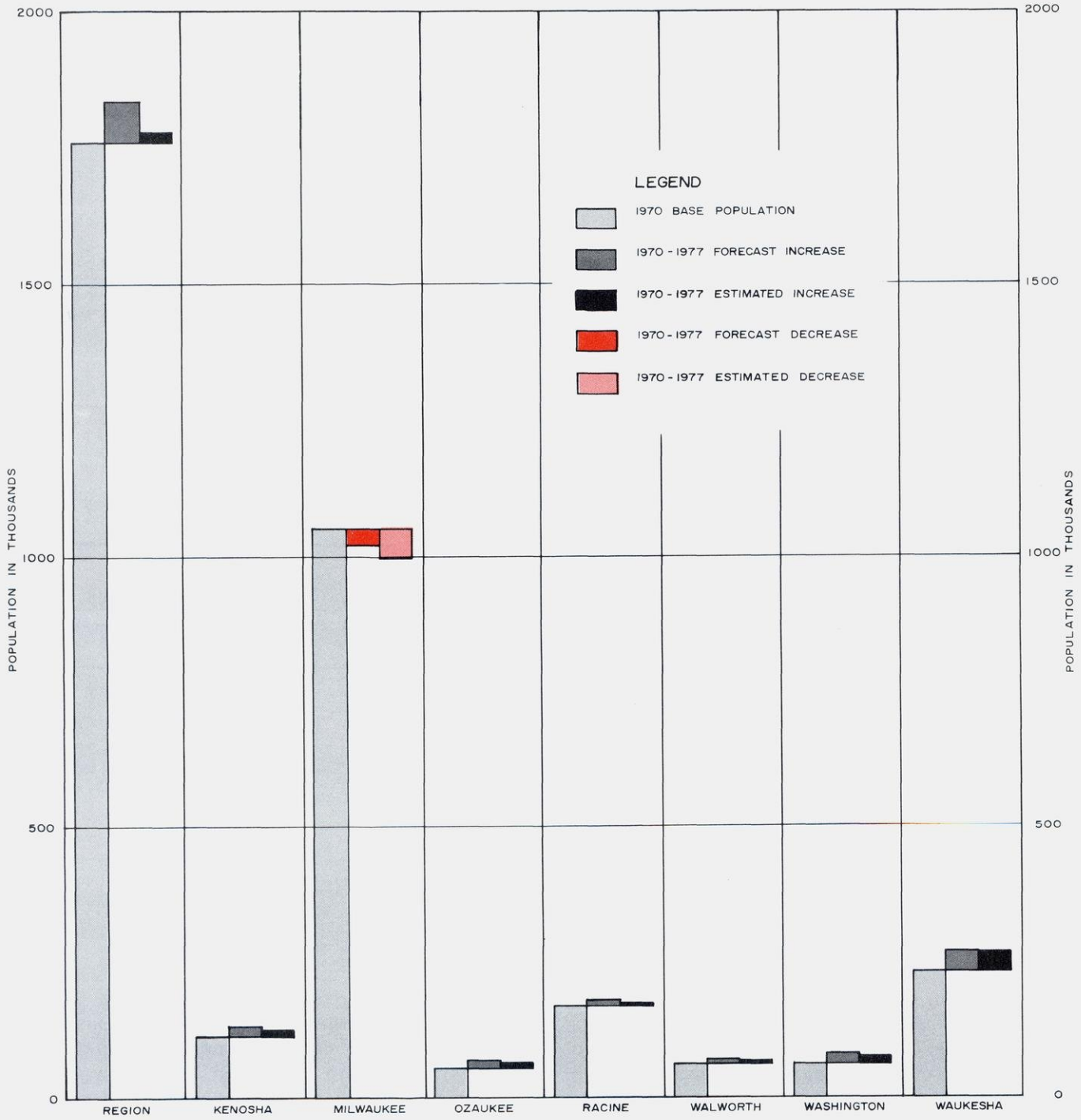
Figure 17 presents a graphic comparison of the 1970 base population of the Region and each of the seven counties with the estimated and forecast 1970 through 1977 total population change information presented in Table 33. This comparison illustrates that the existing differences between forecast and estimated population change for the period 1970 through 1977 are relatively small in relation to the base populations from which the forecasts were made and as a practical matter should not affect the form and structure of physical development plans.

A comparison of estimated and forecast natural increase in the Region by county for the period 1970 through 1977 is presented in Table 34. Two of the Region's seven counties—Milwaukee and Racine—have experienced larger natural increase components than anticipated in the population forecasts, although the difference in both counties is less than a single percentage point. The remaining five counties have experienced a natural increase smaller than forecast. The largest relative difference occurred in Walworth County, where the increase was 2.5 percentage points less than forecast. The largest absolute difference occurred in Waukesha County, where the increase was 3,000 persons less than forecast. In general, however, the observed amounts and rates of natural increase occurred largely as forecast.

Table 35 presents a comparison of the estimated and forecast net migration in the Region by county for the period 1970 through 1977. Only Milwaukee County was forecast to experience net out-migration during this period. This net out-migration has, in fact, occurred, but at a greater rate than anticipated in the forecasts. During this seven-year period, Milwaukee County experienced an estimated net out-migration of 114,300 persons—43,500 persons more than anticipated in the forecasts and a rate of net out-migration 4 percentage points greater than anticipated in the forecasts. Racine County—forecast to experience a very modest net in-migration of about 2,200 persons—experienced a net out-migration

Figure 17

ESTIMATED POPULATION CHANGE AND FORECAST
POPULATION CHANGE IN THE REGION BY COUNTY: 1970-1977



Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

Table 34

ESTIMATED NATURAL INCREASE AND FORECAST
NATURAL INCREASE IN THE REGION BY COUNTY: 1970-1977

County	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Kenosha	5,500	4.66	6,000	5.09	- 500	- 0.43
Milwaukee	42,700	4.05	39,300	3.73	3,400	0.32
Ozaukee	3,200	5.87	3,600	6.60	- 400	- 0.73
Racine	8,800	5.15	7,700	4.51	1,100	0.64
Walworth	1,300	2.05	2,900	4.57	- 1,600	- 2.52
Washington	4,700	7.37	5,600	8.78	- 900	- 1.41
Waukesha	11,900	5.14	14,900	6.44	- 3,000	- 1.30
Region	78,100	4.44	80,000	4.55	- 1,900	- 0.11

Source: SEWRPC.

Table 35

ESTIMATED NET MIGRATION AND FORECAST
NET MIGRATION IN THE REGION BY COUNTY: 1970-1977

County	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Kenosha	1,200	1.02	8,400	7.12	- 7,200	- 6.10
Milwaukee	- 114,300	- 10.84	- 70,800	- 6.72	- 43,500	- 4.12
Ozaukee	10,700	19.63	11,600	21.28	- 900	- 1.65
Racine	- 2,400	- 1.40	2,200	1.29	- 4,600	- 2.69
Walworth	4,000	6.30	4,900	7.72	- 900	- 1.42
Washington	12,400	19.44	13,300	20.84	- 900	- 1.40
Waukesha	30,600	13.23	28,000	12.10	2,600	1.13
Region	- 57,800	- 3.29	- 2,400	- 0.14	- 55,400	- 3.15

Source: SEWRPC.

of about 2,400 persons. Kenosha County experienced net in-migration at a rate much less than anticipated—an observed rate of 1 percent in comparison with a forecast rate of 6 percent. Ozaukee, Walworth, and Washington Counties have experienced net in-migration close to—although in all cases slightly less than—forecast amounts. Of those regional counties experiencing net in-migration, only Waukesha County is experiencing net in-migration in greater amounts than forecast. In general, the net migration estimates show greater differences from the forecasts than do the natural increase estimates.

Geographic Areas

For the Region as a whole it can be seen that the major difference in the population forecast has occurred in the net migration component (see Table 36). The estimated net out-migration of 57,800 persons for the period 1970 through 1977 is substantially in excess of the forecast net out-migration of 2,400 persons. The estimated rate of population change attributable to net out-migration, - 3.3 percent, is 3.2 percentage points greater than the forecast rate of - 0.1 percent. This difference between the estimated and forecast rates of net out-migration accounts for virtually

the entire difference of - 3.3 percentage points that exists at the regional level between the estimated rate of total population change—1.2 percent—and the forecast rate of total population change—4.4 percent. It has been noted previously in this report that the level of net out-migration has increased significantly since 1975. This is a situation that was not foreseen when the present forecasts were prepared in 1974. In contrast, the natural increase component of regional population change is estimated to have operated virtually as anticipated.

The largest relative difference between the estimated 1970 through 1977 total population change and the forecast 1970 through 1977 total population change has occurred in Kenosha County (see Table 37). The difference of - 6.5 percentage points between the estimated rate of total population change—5.7 percent—and the forecast rate of total population change—12.2 percent—is almost totally accounted for by the difference of - 6.1 percentage points between the estimated and forecast rates of net migration. For Kenosha County, a net in-migration of 8,400 persons was forecast for the period 1970 to 1977—a rate of increase of 7.1 percent. Estimated in-migration for this period, however, occurred at a level of only 1,200 persons—a rate of 1.0 percent—or about 7,200 persons fewer than forecast. Natural increase, on the other hand, occurred approximately as forecast, with a difference of less than one-half of a percentage point between the estimated and forecast rates of change.

In Milwaukee County, the forecast envisioned a loss in total population for the period 1970 through 1977 of about 31,500 persons—a rate of decrease of 3.0 percent (see Table 38). The estimated loss in total population in Milwaukee County for this period is 71,600 persons—a rate of decrease of 6.8 percent. The difference from the forecast of total population change is therefore - 40,100 persons, or - 3.8 percentage points. This difference is attributable entirely to greater than

Table 36

COMPARISON OF ESTIMATED POPULATION CHANGE AND FORECAST POPULATION CHANGE BY COMPONENT IN THE REGION: 1970-1977

Component	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Natural Increase. . .	78,100	4.44	80,000	4.55	- 1,900	- 0.11
Net Migration	- 57,800	- 3.29	- 2,400	- 0.14	- 55,400	- 3.15
Total Change	20,300	1.16	77,600	4.42	- 57,300	- 3.26

Source: SEWRPC.

Table 37

COMPARISON OF ESTIMATED POPULATION CHANGE AND FORECAST POPULATION CHANGE BY COMPONENT IN KENOSHA COUNTY: 1970-1977

Component	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Natural Increase. . .	5,500	4.66	6,000	5.09	- 500	- 0.43
Net Migration	1,200	1.02	8,400	7.12	- 7,200	- 6.10
Total Change	6,700	5.68	14,400	12.21	- 7,700	- 6.53

Source: SEWRPC.

forecast net out-migration in the County. The forecast anticipated a loss of about 70,800 persons to net out-migration—a forecast net migration rate of - 6.7 percent. Estimated net out-migration for this period was - 114,300 persons—a rate of - 10.8 percent. The difference between the estimated and forecast net migration for the period is - 43,500 persons, or - 4.1 percentage points. Natural increase is estimated to have occurred at a level slightly greater than forecast and has partially compensated for the greater than anticipated net out-migration. The difference between the estimated and forecast levels of natural increase—about 3,400 persons—resulted in an estimated rate of natural increase of less than one-half of a percentage point greater than the forecast rate.

The estimated change in total population in Ozaukee County for the period 1970 through 1977 was 13,900 persons—a rate of increase of 25.5 percent (see Table 39). This is about 1,300 persons, or 2.4 percentage points, less than the forecast change of 15,200 persons—a forecast rate of increase of 27.9 percent. The larger portion of the total difference occurred in the net migration component, where the estimated rate of population change due to net in-migration—19.6 percent—is about 1.7 percentage points less than the foreast change of 21.3 percent. Natural increase is estimated to have occurred at a rate of 5.9 percent—about 0.7 percentage point less than the forecast rate of 6.6 percent.

The estimated total population change in Racine County for 1970 through 1977 was about 6,400 persons, or 3.8 percent, in comparison with the forecast change of 9,900 persons, or 5.8 percent—a difference of - 3.500 persons, or - 2.0 percentage points (see Table 40). The primary component accounting for this difference is net migration. A modest net in-migration of 2,200 persons, or 1.3 percent, was foreseen for this period for Racine County. However, it is estimated that rather than experiencing net in-migration, Racine County has in fact experienced a net out-migration during this period of about 2,400 persons, or a rate

Table 38

COMPARISON OF ESTIMATED POPULATION CHANGE AND FORECAST POPULATION CHANGE BY COMPONENT IN MILWAUKEE COUNTY: 1970-1977

Component	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Natural Increase. . .	42,700	4.05	39,300	3.73	3,400	0.32
Net Migration	- 114,300	- 10.84	- 70,800	- 6.72	- 43,500	- 4.12
Total Change	- 71,600	- 6.79	- 31,500	- 2.99	- 40,100	- 3.80

Source: SEWRPC.

Table 39

COMPARISON OF ESTIMATED POPULATION CHANGE AND FORECAST POPULATION CHANGE BY COMPONENT IN OZAUKEE COUNTY: 1970-1977

Component	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Natural Increase. . .	3,200	5.87	3,600	6.60	- 400	- 0.73
Net Migration	10,700	19.63	11,600	21.28	- 900	- 1.65
Total Change	13,900	25.50	15,200	27.89	- 1,300	- 2.38

Source: SEWRPC.

of - 1.4 percent, for a difference of - 4.600 persons, or - 2.7 percentage points from the forecast. Natural increase in Racine County—as in Milwaukee County—was slightly higher than forecast—approximately 1,100 persons, or 0.6 percentage point, more than forecast.

In Walworth County an increase of 7,800 persons, or 12.3 percent, was forecast for the period 1970 through 1977 (see Table 41). The estimated change was 5,300 persons, or 8.4 percent. The difference between the estimated and forecast change was - 2,500 persons, or - 3.9 percentage points. In Walworth County the primary component of population change contributing to the difference in total population change is natural increase. Walworth County is the only county in the Region where the difference between the estimated and forecast natural increase accounted for a larger proportion of the total difference than the difference between the estimated and forecast net migration. In Walworth County, a natural increase of 2,900 persons, or a rate of increase of 4.6 percent, was forecast for the 1970 through 1977 period. The estimated natural increase for this period was 1,300 persons, or a rate of increase of 2.0 percent. The difference between the estimated and forecast natural increase was - 1,600 persons, or - 2.5 percentage points. The forecast net in-migration for Walworth County was 4,900 persons—a rate of 7.7 percent—in comparison to an estimated net in-migration of 4,000 persons—a rate of 6.3 percent—representing a difference of - 900 persons, or - 1.4 percentage points.

In Washington County, the population is estimated to have increased by 17,100 persons over the period 1970 through 1977, or by 26.8 percent, in comparison to the forecast change of 18,900 persons, or 29.6 percent (see Table 42). The difference between the estimated and forecast change was - 1,800 persons, or - 2.8 percentage points. The difference in total population change in Washington County is equally attributable to the difference in the natural increase and net migration components, each of these components being about 900 persons, or 1.4 percentage points, less than forecast.

Table 40

COMPARISON OF ESTIMATED POPULATION CHANGE AND FORECAST POPULATION CHANGE BY COMPONENT IN RACINE COUNTY: 1970-1977

Component	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Natural Increase. . .	8,800	5.15	7,700	4.51	1,100	0.64
Net Migration	- 2,400	- 1.40	2,200	1.29	- 4,600	- 2.69
Total Change	6,400	3.75	9,900	5.80	- 3,500	- 2.05

Source: SEWRPC.

Table 41

COMPARISON OF ESTIMATED POPULATION CHANGE AND FORECAST POPULATION CHANGE BY COMPONENT IN WALWORTH COUNTY: 1970-1977

Component	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Natural Increase. . .	1,300	2.05	2,900	4.57	- 1,600	- 2.52
Net Migration	4,000	6.30	4,900	7.72	- 900	- 1.42
Total Change	5,300	8.35	7,800	12.28	- 2,500	- 3.94

Source: SEWRPC.

The smallest difference between the estimated change and forecast change in total population occurred in Waukesha County (see Table 43), which had been forecast to increase by 42,900 persons, or 18.6 percent, for the period 1970 through 1977. The estimated change in total population for that period of 42,500 persons, or 18.4 percent, represents a difference of only - 400 persons, or - 0.2 percentage point. In examining the differences by component, however, it becomes clear that the small difference in total population change is actually the result of an under-forecast for the natural increase component that almost totally compensates for an over-forecast for the net migration component. Natural increase was forecast to account for an additional 14,900 persons—a rate of increase of 6.4 percent. The estimated change attributable to natural increase was 11,900 persons—a rate of increase of 5.1 percent—or about 3,000 persons, or 1.3 percentage points, less than forecast. Net in-migration, forecast to account for an increase of 28,000 persons, or 12.1 percent, is estimated to have occurred at the level of 30,600 persons, or 13.2 percent, representing an increase of 2,600 persons, or 1.1 percentage points, more than forecast. Waukesha County is the only county in the Region that has experienced net in-migration at greater than forecast rates.

COMPARISON OF ACTUAL AND ANTICIPATED POPULATION CHANGE

The preceding section of this chapter provided an assessment of the Commission population forecasts, focusing on the mechanical aspects of the forecasts; that is, the degree to which the forecasts have been anticipatory of actual change in the components of population change for specific units of geography—at least through approximately the first quarter of the forecast period. As previously stated, the population forecasts are prepared as one of the external inputs to the design of long-range land use and supporting facilities and services plans. This section will discuss the manner in which the previously noted differences from the forecasts might potentially affect existing plans prepared

Table 42

COMPARISON OF ESTIMATED POPULATION CHANGE AND FORECAST POPULATION CHANGE BY COMPONENT IN WASHINGTON COUNTY: 1970-1977

Component	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Natural Increase. . .	4,700	7.37	5,600	8.78	- 900	- 1.41
Net Migration	12,400	19.44	13,300	20.84	- 900	- 1.40
Total Change	17,100	26.81	18,900	29.62	- 1,800	- 2.81

Source: SEWRPC.

Table 43

COMPARISON OF ESTIMATED POPULATION CHANGE AND FORECAST POPULATION CHANGE BY COMPONENT IN WAUKESHA COUNTY: 1970-1977

Component	Estimated Change		Forecast Change		Difference (estimate-forecast)	
	Number	Rate (percent)	Number	Rate (percent)	Number	Percentage Points
Natural Increase. . .	11,900	5.14	14,900	6.44	- 3,000	- 1.30
Net Migration	30,600	13.23	28,000	12.10	2,600	1.13
Total Change	42,500	18.37	42,900	18.55	- 400	- 0.17

Source: SEWRPC.

utilizing these forecasts. Since the Commission's physical facility plans are designed for the land use pattern anticipated in the Commission's adopted land use plan for the design year 2000, the comparison will focus on the land use plan.

Population Size

The aggregate demand for the various land uses and facilities and services of all types is a function of the size of the resident population of an area. Economic activity and population levels—both existing and anticipated—translate into natural resource, land use, and supporting facility and service demand. Plans can be formulated in consideration of, although not necessarily to meet, existing or anticipated deficiencies. For this reason, changes in the population size of a planning area are important in the planning process.

A comparison of estimated rates of population change and forecast rates of population change for the Region over the period 1970 through 1977 is presented in Table 44. Between 1970 and 1977, the size of the Region's resident population is estimated to have increased by about 1 percent. The anticipated increase for this period was about 4 percent. The difference between the estimated change and the forecast change is an aggregate measure of the degree to which the assumptions made in preparing the regional population forecast correctly anticipated the direction and magnitude of population change. It is apparent, then, that the estimated rate of total population change was approximately 3 percentage points less than the forecast rate of total population change.

Further examination indicates that the difference between the estimated rate of total population change and the forecast rate of total population change is almost entirely a function of the unanticipated acceleration of regional net out-migration since 1970 and particularly since 1975. As shown in Table 44, the difference of about 3 percentage points between the estimated rate of net migration and the forecast rate of net migration accounts for virtually the entire difference between the estimated and forecast rates of total population change.

Table 44

ESTIMATED AND FORECAST RATES OF POPULATION CHANGE IN THE REGION 1970-1977

Component	Estimated Change (percent)	Forecast Change (percent)	Difference (estimate-forecast)
Natural Increase. .	4.4	4.4	- 0.1
Net Migration . . .	- 3.3	- 0.1	- 3.2
Total Change	1.2	4.4	- 3.3

Source: U. S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

The estimated rate of natural increase for the period 1970 through 1977 is, for all practical purposes, equal to the forecast rate of natural increase. The measured difference between the estimated and forecast rates is approximately one-tenth of a percentage point.

It has been previously noted in this chapter that population forecast accuracy requirements as they relate to the preparation of long-range land use and physical facilities plans are such that differences from the forecast should not affect the basic structure of the plans. In this regard, it has been noted that professional planners and engineers generally agree that differences on the order of plus or minus 10 percent per decade are unlikely to affect the basic structure of the plans. The observed difference of about 3 percentage points from the regional population forecast for the period 1970 through 1977 is well within the range of plus or minus 10 percent per decade.

While it may be concluded that the present regional population forecast continues to be adequate for use as a guide in the long-range land use and supporting facilities and services planning process, the observed changes in regional migration are cause for some concern. It has been previously noted in this report that the present regional migration experience differs significantly from both the historic migration experience and the anticipated migration experience. This issue will require careful analysis after the detailed data collected as part of the 1980 census of population and housing become available.

Population Distribution

Whereas the aggregate demand for the various land uses and for certain facilities and services is a function of the total resident population size of a planning area, the demand that exists in—and in the case of certain facilities and services between—various subareas of the planning area is a function of the distribution of the resident population throughout the planning area. Knowledge of the present and anticipated future distri-

bution of population throughout the planning area is, therefore, an important consideration in areawide planning.

A discussion of the Commission population forecasts with respect to the issue of population size consists merely of a comparison of the regional population forecast stage for a particular year with a current estimate of the size of the regional resident population for the same year. A discussion of the population forecasts with respect to the issue of population distribution is more complex, given the normative nature—as previously discussed—of the county forecasts. Achievement of the population distribution envisioned in the forecasts is dependent not only upon correctly anticipating the future size of the Region's resident population and upon correctly anticipating the differential operation of natality, mortality, in-migration, and out-migration in each of the Region's seven counties, but also upon successful implementation of the Commission's land use plan for the design year 2000.

The land use plan provides a framework for the rational, orderly conversion of land from rural to urban uses. This conversion is necessary both to accommodate the residential, industrial, and commercial needs of the existing and anticipated future population of the Region and to accommodate, to the extent possible, the collectively expressed preferences of society with respect to lifestyles. It seeks to provide for this transition in a manner that will avoid deleterious and sometimes irreversible effects on the environment, thereby providing for this transition at the least cost to society as a whole. It further seeks to provide that this transition of land occur only when necessary, only in amounts sufficient to accommodate demand, and only in locations adjudged to be both suitable and desirable for urban uses. Under a successful land use plan implementation scenario, shifts in the base year population distribution are partially guided in the public interest both by the chosen land use development objectives and by the physical structure of the land use plan. The land use plan was not designed to accommodate projected changes in population distribution, but rather to counteract projected changes in population distribution collectively judged to be not in the public interest.

The existing relative population distribution of the Region by county in 1977 is compared to the planned relative population distribution by county for the same year in Table 45. It has been previously noted that in 1977 the current estimates of total population in each of the Region's seven counties were less than the 1977 stage of the population forecast. In spite of this population shortfall, the information in Table 45 indicates that a population distribution at variance with the tenets of the adopted land use plan may be evolving. The greater than anticipated population loss in Milwaukee County during the period 1970 through 1977 has been previously noted and is apparent in Table 45, which indicates that the proportion of the total regional population actually residing in Milwaukee County in 1977 was about one-half of a percentage point less than originally anticipated by the land use plan for that year. With the exception of Waukesha County, the remaining counties show relative proportions of the 1977 total regional population that are reasonably close to the proportions anticipated by the land use plan. Waukesha County, however, had about one-half of a percentage point more of the total regional population in 1977 than anticipated and had virtually achieved the relative proportion of the total regional population anticipated by the land use plan for 1980.

As noted previously, estimated population growth in Waukesha County since 1970—while slightly less than forecast—is much closer to the forecast population change than are the remaining six counties. Thus, the proportion of the total regional population in Waukesha County relative to the other six counties has increased much faster than

Table 45

EXISTING AND PLANNED POPULATION DISTRIBUTION IN THE REGION BY COUNTY 1970, 1977, AND 1980

County	Existing (percent)		Planned (percent)		Difference: 1977 (existing-planned)
	1970	1977	1977	1980	Percentage Points
Kenosha	6.7	7.0	7.2	7.4	- 0.2
Milwaukee . . .	60.1	55.3	55.8	54.2	- 0.5
Ozaukee	3.1	3.8	3.8	4.1	0.0
Racine	9.7	10.0	9.9	9.9	0.1
Walworth. . . .	3.6	3.9	3.9	4.0	0.0
Washington . .	3.6	4.6	4.5	4.8	0.1
Waukesha . . .	13.2	15.4	14.9	15.6	0.5
Region	100.0	100.0	100.0	100.0	- -

Source: SEWRPC.

originally anticipated. This is especially important in view of the manner in which the components of population change have operated in Waukesha County. As already noted, since 1970 natural increase in Waukesha County has been somewhat less than forecast, while net migration has been somewhat greater than forecast. Natural increase—which represents the relative balance between births and deaths—can be assumed to accrue in the form of infants added to existing family units. This tends to create a latent, rather than an immediate, demand for the conversion of land and the provision of facilities and services. However, since net migration accrues in the form of single adults or already existent family units, it tends to create an immediate demand. Given the manner in which the components of population change have operated in Waukehsa County since 1970, it could be hypothesized that a greater amount of land has been converted from rural to urban residential use than was called for under the land use plan despite the fact that Waukesha County's total resident population has not grown at a faster than anticipated rate. Records of land subdivision activity and residential building activity in Waukesha County since 1970 generally support such a hypothesis.

Population Characteristics

The demand for the various land uses and facilities and services is also a function of the characteristics of the resident population. Different subgroups of the population place different demands upon society for public facilities and services. Different household and living arrangements likewise produce differential demands for land uses and facilities and services.

Sufficient data to provide a quantitative assessment of the Commission's population forecasts with respect to specific population characteristics will not be available until after the next federal population census is taken in 1980. As noted previously in this report, however, special census results—where available—provide enough data to enable qualitative assessments to be made.

The Commission's population forecasts anticipated the following major qualitative changes in the characteristics of the Region's resident population over the 30-year forecast period:

1. A general aging of the population, with a decrease in the proportion of the total population represented by school-age children and increases in the proportion of the total population represented by working-age persons and elderly persons.

2. A decrease in the average regional household size in conjunction with a rate of increase in the number of households greater than the rate of increase in the total population. As a corollary, a greater proportion of all households were anticipated to be one-person and two-person households.

3. A change in the racial composition of the resident population expected to result from a rate of population increase for the Region's black population that is greater than the anticipated rate of population increase for the total population.

Special census results as reported in the previous chapter indicate that these anticipated changes are, in fact, occurring, although—as previously stated—a quantitative assessment of the rates at which these changes are occurring in the Region or in the seven individual counties cannot be made at this time.

SUMMARY

This chapter has presented an evaluation for the period 1970 through 1977 of changes in the observed population size, distribution, and characteristics of the Region in comparison to such changes as they were forecast to occur by the Commission for the design year 2000. A discussion of the continued validity of these forecasts as a guide in the development of long-range land use and physical facilities plans has also been presented.

Population forecasts provide one basis for the determination of future needs. Economic activity and population forecasts set the general scale of future growth, which is, in turn, translated into future natural resource, land use, and facility and service demand. These anticipated future demands can then be considered in the formulation of land use and supporting facilities and services plans.

Both the future land use pattern and the supporting facilities and services must be planned so as to consider the potential demand at some future time—the "design year"—which is usually established by the expectant life of the first facilities

to be constructed in the implementation of the plan. Consequently, a forecast period of at least 20 to 30 years is normally required for comprehensive planning purposes.

Since objective tests of forecast accuracy are nonexistent, forecast accuracy requirements are a function of the use to which the forecasts are put. With respect to land use and physical facilities planning, it is important to keep the forecast tolerances within that range wherein only the timing and not the basic structure of the plans will be affected. It is the opinion of professional planners and engineers concerned that deviations of up to plus or minus 10 percent per decade are not likely to affect the structure of land use or physical facility plans prepared utilizing the forecasts.

For the period 1970 through 1977 the population forecasts prepared by the Commission for the Region and for each of the Region's seven counties have remained within the range of plus or minus 10 percent per decade. Current population estimates for the year 1977 indicate that the Region's total resident population has increased about 3 percentage points less than anticipated since 1970. Differences in individual counties ranged from a rate of growth of about 7 percentage points less than forecast in Kenosha County to 1 percentage point less than forecast in Waukesha County. Milwaukee County—the only county which experienced a population loss for this period—experienced a rate of population decline about 4 percentage points greater than forecast.

In general, differences between the estimated and forecast rates of natural increase were smaller than the differences between the estimated and forecast rates of net migration for the Region and the individual counties. Only in Walworth County was the difference between the estimated and forecast rates of natural increase greater than the difference between the estimated and forecast rates of net migration. The changing character of net migration as a component of population change in the Region since 1970 will require careful scrutiny when detailed data from the 1980 census become available.

On the basis of information presently available, it appears that the size of the Region's resident population in 1980 will be somewhat less than that forecast by the Commission. The major deficiency of the forecasts was the failure to correctly anticipate the changing character of net migration in the Region's population dynamics. Although the Region's 1980 resident population will be less than forecast, the difference probably will not be sufficient to adversely affect the basic structure of the land use and physical facility plans into which the forecasts have been incorporated.

Specific trends in the Region's changing population distribution which the adopted regional land use plan sought to counteract are continuing to occur, as manifested in the continued decline in Milwaukee County's proportion of total regional population and the more rapid than planned increase in Waukesha County's proportion of the total regional population. Curtailment of the fiscally and environmentally debilitating effects of urban sprawl will require vigorous plan implementation efforts on the part of both the public and private sectors.

Changes in population characteristics are occurring generally as forecast. Although the available data are such that change in characteristics cannot be measured in quantitative terms for the Region or the individual counties, they do suggest that the regional population—as a single entity—is becoming older, that the average household size is decreasing and the number of one-person and two-person households is increasing, and that the nonwhite component of the population is increasing in both absolute and relative terms. All of these changes are consistent with forecast changes in population characteristics.

Chapter VI

SUMMARY AND CONCLUSIONS

INTRODUCTION

Rapid change is one of the basic characteristics of the modern world. Urban growth, decay, and renewal are among the most important aspects of this change. An important and necessary step in the regional planning process is the attempt at forecasting the probable nature and approximate magnitude of these changes. Although such forecasting is beyond the scope of a comprehensive plan for the physical development of a region, it must be considered in the preparation of such a plan. Among the more important of such changes are those relating to population size, distribution, and composition. No one, of course, can "predict" the future, and all forecasts involve uncertainties. Nevertheless, forecasts are essential if a plan is to be prepared which can serve as a point of departure for sound decision-making with respect to regional development. Given the uncertainties underlying any forecasts, it must be recognized that planning must be a continuous process involving the periodic reassessment of the supporting forecasts and attendant revision of the plans.

It is the purpose of this report to provide such an assessment of the Commission's design year 2000 population forecasts in view of estimated changes in the size, distribution, and composition of the Region's resident population since 1970. The report is organized around four major topics. The first topic is the historical change in the size, distribution, and composition of the regional population through 1970. The second topic is the anticipated growth and change in the size, distribution, and composition of the regional population over the period 1970 to 2000 as envisioned in the current regional population forecasts selected by the Commission staff and the Commission advisory committees concerned in 1974. The third topic is the estimated growth and change in the size, distribution, and composition of the regional population over the period 1970 through 1977. The fourth topic is the degree to which the regional population forecasts have correctly anticipated changes to date in the size, distribution, and composition of the regional population and the potential impacts that existing deviations between forecast and estimated population change may have on the various physical development plans prepared by the Commission. The discussions of each of these topics are summarized in the following sections.

POPULATION CHANGE THROUGH 1970

The historical nature of population change in the Region has been one of continuous growth. By 1970 the population of the Region had increased by more than 14 times its 1850 level. Over the same 120-year period, the nation's population increased by slightly more than 7 times its 1850 level while Wisconsin's population increased by more than 13 times its 1850 level. Between 1950 and 1960 the total regional population increased by 27 percent—from 1,240,600 persons to 1,573,600 persons. From 1960 to 1970, however, the total population in the Region increased by about 12 percent—from 1,573,600 persons to 1,756,100 persons.

Regional population increases since 1940 have been principally due to natural increase, one of the two major components of population change. Although the birthrates in the Region have declined steadily since 1960 after the high rates of the post World War II period, the historical importance of natural increase as a component of regional population growth is indicated by the fact that natural increase accounted for 67 percent of the total population increase from 1950 to 1960—224,000 persons—and all of the population increase from 1960 to 1970—203,000 persons.

Migration, the second major component of population change, accounted for an increase of 108,000 persons from 1950 to 1960, or about 33 percent of the total regional population increase. From 1960 to 1970 this migration pattern reversed itself and produced a net out-migration in the Region. As a component of population change, therefore, migration accounted for none of the total regional population increase from 1960 to 1970.

During the first three decades of the 1900's, the highest rate of population increase occurred in the now urban Counties of Kenosha, Milwaukee, and Racine. Since 1930, however, the highest

rates of increase have occurred in the suburban and rural areas of Ozaukee, Washington, and Waukesha Counties.

Regional population increases over the two decades between 1950 and 1970 were accompanied by significant shifts in the age structure of the population. During the 1950s, rapidly rising birthrates and declining deathrates resulted in increases in the proportion of the regional population made up of persons under 20 and 65 and over while the labor force-age population, 20 to 64, actually declined as a proportion of the total population by more than 8 percentage points. During the 1960's, however, declining birthrates resulted in a decrease in the proportion of the total regional population made up of persons under 10 years of age and an increase in the proportion of the total population made up of persons 10 years of age and over. This change in the age composition between 1950 and 1970 reduced the proportion of the productive labor force segment of the population and increased the proportion of the dependent segment of the population, made up of persons under 18 and 65 and over.

From 1950 to 1970 the total number of households in the Region increased faster than the household population, resulting in declining persons-per-household rates of from 3.36 in 1950 to 3.30 in 1960 to 3.20 in 1970. The rapid decline in the average number of persons per household after 1950 was due in part to the dramatic increase in the number of one-person households. Declining fertility among married couples in households also contributed to the decline. The average number of persons per household was generally larger in the suburban areas of the Region and smaller in the central cities and outlying rural areas.

The racial composition of the regional population also changed between 1950 and 1970. In the 1970 census, nearly 93 percent of the regional population was reported as white compared to 95 percent reported as white in 1960 and almost 98 percent reported as white in 1950. In all three years, 1950, 1960, and 1970, the overwhelming majority, over 90 percent, of the nonwhite population in the Region was comprised of persons who reported their race as black.

ANTICIPATED POPULATION CHANGE: 1970 TO 2000

The population projections prepared by Commission staff utilizing various assumptions concerning fertility, mortality, and migration rates ranged from a low of 1.9 million residents to a high of 3.8 million residents in the Region by the year 2000. Based upon an analysis of these projections and of independently prepared employment forecasts, the probable range of the future regional population level was established at between 1.9 and 2.4 million persons by the year 2000. Within this range a forecast level of 2.2 million persons was finally selected in 1974 by the Commission staff and Commission advisory committees. This forecast population level was based on an assumed reduction in the age-specific fertility rates to below replacement level until 1985 and then a gradual increase to replacement level from 1985 to the year 2000, and on an assumed halt of regional out-migration by 1985, with only slight net in-migration occurring thereafter.

When compared to historical rates of population growth, the selected population forecast envisions quite modest increases in the Region's population over the 30-year forecast period. The forecast increase from 1.8 million persons in 1970 to 2.2 million persons—26 percent—would be somewhat higher than that expected for the nation—24 percent—and somewhat lower than that expected for the State—32 percent—over the same period. The anticipated population increase was forecast to be almost exclusively a function of natural increase, with net in-migration accounting only for a very small portion of the forecast increase.

Utilizing the regional forecast as a control total, individual population projections were developed for each of the Region's seven counties. Specific assumptions about fertility, mortality, and migration were developed for each county based upon historical trends in that county and assumptions about future trends. Selection of the county forecasts, however, included the consideration of the relationship of the different distribution patterns of the regional population indicated by various sets of county projections.

The county forecasts finally selected from among the projections considered were normative ones based upon the Commission's adopted land use development objectives. These forecasts assume that the continued diffusion of urban development into the outlying areas of the Region will be curtailed in the public interest through the exercise of land use controls and other public policy actions. They further assume that the present trends in population decentralization will be stabilized and reversed in the mid to late 1980's,

and that the central areas of the Region will again experience population growth. While at variance with existing trends, these assumptions are consistent with recent federal objectives which seek to discourage urban sprawl and protect critical environmental areas and prime agricultural lands, as well as with similar long-standing Commission objectives. The selected county population forecasts, therefore, support national urban policy as well as adopted regional development objectives.

Population projections based specifically on the trends in evidence over the late 1960's and early 1970's indicated a significant decline in the population in Milwaukee County and a redistribution of this population in surrounding counties. A continuation of these trends over the forecast period would result in a loss of approximately 150,000 residents in Milwaukee County by the year 2000. Any acceleration of those trends would, of course, result in population losses of even larger magnitude. A population redistribution of such scope would result in the partial abandonment of a large and expensive urban infrastructure already in place in Milwaukee County and the re-creation of this infrastructure in the outlying counties. Selection of projections based exclusively on accommodation of current trends for use in land use plan design would have had the consequence of producing plans encouraging urban sprawl.

Generally, the selected county population forecasts indicated continued rapid population growth in Ozaukee, Washington, and Waukesha Counties and lower rates of population growth in Kenosha, Racine, and Walworth Counties. Milwaukee County was forecast to lose population until about 1980, when its population was expected to begin increasing again. The population increase forecast between 1980 and 2000 was not deemed sufficient to offset the decrease forecast for 1970 to 1980, however, resulting in a small forecast absolute decline of 4,700 persons between 1970 and 2000. Washington and Ozaukee Counties were expected to show the largest relative population gain, increasing by 124 percent and 109 percent, respectively, from 1970 to 2000. The largest absolute population increase was forecast for Waukesha County, in which population was expected to increase by about 189,300 persons—about 82 percent—over the forecast period. Even given their normative nature, the forecasts envisioned a continuation—albeit at a rate more moderate than would be the case for trend projections—of the population decentralization that has been in operation within the Region since about the third decade of the present century.

Significant changes in the age composition of the regional population were also expected to occur over the forecast period as a result of anticipated declines in birthrates and changes in migration patterns. The age group from 0 to 4 years of age—representing the preschool population—was expected to increase only slightly—by about 5 percent—over the forecast period. The age group from 5 to 14 years of age—representing the elementary school-age population—was expected to decrease by about 9 percent between 1970 and 2000. The age group from 15 to 19 years of age—representing the high school-age population—was also expected to decline, in this case by about 7 percent, between 1970 and 2000. The age group from 20 to 64 years of age—representing the working-age group population of the Region—was expected to increase by about 44 percent over the forecast period. Lastly, the age group 65 years of age and older—representing the elderly population of the Region—was expected to increase by about 61 percent between 1970 and 2000. As a result of these forecast changes in the age composition of the Region, the median age of the regional population was anticipated to increase by about eight years over the forecast period—from 27.6 years in 1970 to 29.6 years in 1980 to 32.7 years in 1990 and to 35.9 years in 2000.

The number of households in the Region was forecast to increase from about 536,500 in 1970 to about 747,700 in 2000, an increase of about 39 percent. Since the forecast increase in the number of households is greater than the increase forecast for total population growth, it was anticipated that the average household size would continue to decline from its 1970 level.

By 2000, it was anticipated that the black population in the Region would increase by 130 percent, almost doubling its proportion of the total regional population—from 6.8 percent in 1970 to 12.4 percent in 2000. While this forecast was made for the Region as a whole, it was nevertheless anticipated that significant numbers of blacks would continue to reside in Milwaukee, Racine, and Kenosha Counties.

POPULATION CHANGE SINCE 1970

Between 1970 and 1975 the population of the Region increased from a level of about 1,756,000 persons to a level of about 1,788,000 persons—an increase of about 32,000 persons, or approximately 2 percent. After 1975, however, the Region began to experience a decline in its resident popu-

lation. In 1977 the estimated population of the Region was 1,776,000 persons—about 12,000 persons less than in 1975 and only about 20,000 persons, or slightly more than 1 percent, greater than the 1970 level. During this same period, the State and the nation continued to register yearly population increases, but at rates substantially less than those of the preceding three decades.

Rates of natural increase within the Region have reached their lowest level since the 1930's. In the absence of any significant change in current regional fertility and mortality rates, the rate of natural increases in the Region for the 1970's will be approximately equal to the 6.2 percent rate that occurred during the 1930's—presently the lowest 10-year rate for the 50-year period of record.

Net out-migration has—for the first time in the history of the Region—become a significant factor in the population dynamics of the Region. The net migration rate of - 3.3 observed for the period 1970 through 1977 is significantly greater than the rate of - 0.1 observed in the 1930's and the rate of - 1.3 observed in the 1960's—the only other time periods for which net out-migration was recorded. For the period 1970 through 1977, net out-migration offset approximately 75 percent of the growth in population that would normally have accrued to the Region through natural increase.

In spite of a virtually stable regional population level since 1970, the long-established trend toward regional population decentralization continues. Between 1970 and 1977 the proportion of the regional population residing in Milwaukee County—which experienced a decrease of approximately 71,600 residents, or about 7 percent, over this period—decreased from 60.1 percent to 55.3 percent—a decrease of about 5 percentage points. During the same period, the proportion of the total regional population in Waukesha County increased by about 2 percentage points—from 13.2 percent to 15.4 percent. The proportion of the total regional population in the remaining five counties together increased by a total of about 3 percentage points.

Special censuses taken within the Region since the 1970 decennial census of population indicate a general aging of the population. Of 17 civil divisions for which special census reports were analyzed, 14 experienced an increase in median age. Six of these civil divisions experienced an increase in median age of three years or more. Of the three civil divisions experiencing decreases in the median age, the largest decrease observed was - 0.3 year.

Special censuses also indicate that the number of households in the Region has increased, and that the rate of increase in the number of households is greater than the rate of population increase in all civil divisions examined. With the exception of the Village of West Milwaukee, an increase in the number of households was observed even in civil divisions experiencing population declines. In the Village of West Milwaukee, the rate of decrease in the number of households was less than the rate of decrease in population. As a result of the differential rates of change in population and households, the average household size within the Region has probably declined since 1970. All 17 civil divisions examined recorded decreases in household size.

The racial composition of the regional population has changed since 1970 also. In the special census taken in the City of Milwaukee in 1975, more blacks were enumerated than were enumerated in the whole Region in 1970. The increase of black residents in the City of Milwaukee between 1970 and 1975 was approximately 18 percent in contrast to an estimated total regional population increase of 2 percent for the same period.

EVALUATION OF THE FORECASTS

Population forecasts provide one basis for the determination of probable future needs for various kinds of public facilities and services. Economic activity and population forecasts set the general scale of future growth, which may, in turn, be translated into probable future natural resource, land use, and facility and service demand. These anticipated future demands can then be considered in the formulation of land use and supporting facilities plans.

Both the future land use pattern and the physical facilities must be planned so as to consider the potential demand at some future time—the "design year"—which is usually established by the expectant life of the first facilities to be constructed in the implementation of the plan. Consequently, a forecast period of at least 20 to 30 years is normally required for comprehensive planning purposes.

Since objective tests of forecast accuracy are nonexistent, forecast accuracy requirements are a function of the use to which the forecasts are put. With

respect to land use and physical facilities planning, it is important to keep the forecast tolerances within that range wherein only the timing and not the basic structure of the plans will be affected. It is the opinion of professional planners and engineers concerned that deviations of up to plus or minus 10 percent per decade are not likely to affect the structure of land use or physical facility plans prepared utilizing the forecasts.

For the period 1970 through 1977 the population forecasts prepared by the Commission for the Region and for each of the Region's seven counties have remained within the range of plus or minus 10 percent per decade. Current population estimates for the year 1977 indicate that the Region's total resident population has increased about 3 percentage points less than anticipated since 1970. Differences in individual counties ranged from a growth about 7 percentage points less than forecast in Kenosha County to a growth of less than 1 percentage point less than forecast in Waukesha County. Milwaukee County—the only county which experienced a population loss for this period—experienced a population decline about 4 percentage points greater than forecast.

In general, differences between the estimated and forecast rates of natural increase were smaller than the differences between the estimated and forecast rates of net migration for the Region and the individual counties. Only in Walworth County was the difference between the estimated and forecast rates of natural increase greater than the difference between the estimated and forecast rates of net migration.

Changes in population characteristics are occurring generally as forecast. Although the available data are such that change in characteristics cannot be measured in quantitative terms for the Region or the individual counties, they do suggest that the regional population—as a single entity—is becoming older, that the average household size is decreasing and the number of one-person and two-person households is increasing, and that the nonwhite component of the population is increasing in both absolute and relative terms. All of these changes are consistent with forecast changes in population characteristics.

CONCLUSIONS

On the basis of the information presented in this report, as summarized above, certain conclusions can be drawn concerning the current situation with respect to population change in the Southeastern Wisconsin Region. Of particular interest are the following aspects of population change, which bear significantly on the long-range planning programs of the Commission.

1. Population growth within the Region as a whole has not occurred at the rates anticipated in the forecasts prepared in 1974. Although the forecast population growth was anticipated to be modest in comparison to the historical growth that occurred during the 1950's and 1960's, it is now apparent that the actual growth for the present decade will be less than forecast. It is even conceivable that no growth or possibly even a decrease in the resident population of the Region could occur.

2. Rates of natural increase have declined. For the Region and for each of the seven counties, the rates of natural increase are significantly below those recorded during the 1950's and 1960's. However, the reduced levels of natural increase were correctly anticipated by the Commission's population forecasts. For the Region and the seven individual counties, the levels of natural increase are currently very close to the forecast levels.

3. Net out-migration for the Region and for Milwaukee County has increased over the rates anticipated in the forecasts. While there was slight net out-migration from both the Region and Milwaukee County during the 1960's, the levels of net out-migration have been of greater magnitude during the first seven years of the 1970's than at any other time in the Region's history. While some net out-migration from both the Region and Milwaukee County was forecast to occur during the 1970's, the present levels of net out-migration are greater than anticipated.

   It is not readily apparent to where these out-migrants are being redistributed. One hypothesis is that the Milwaukee metropolitan area is expanding to include areas external to the Region's existing boundaries. Analyses indicate, however, that growth rates for counties immediately adjacent to the Region are not sufficient to account for the estimated net out-migration that has occurred from Milwaukee County. Conse-

quently, the question of where the out-migrants are going will have to await the results of the decennial census in 1980, as the federal census represents the most definitive set of migration information presently available for substate areas.

4. Milwaukee County is losing population more rapidly than anticipated in the Commission forecasts. This is exclusively a function of net out-migration, as the level of natural increase for Milwaukee County has occurred approximately as forecast.

5. Ozaukee, Washington, and Waukesha Counties are continuing to grow at rapid rates. The growth in these Counties has occurred generally as forecast.

6. Kenosha, Racine, and Walworth Counties are growing at modest rates. These rates are somewhat less than forecast. Between 1975 and 1977, Kenosha and Racine Counties experienced some small, short-term, population losses attributable to local economic fluctuations. However, available data indicate that by 1978 the population of these counties was again increasing.

7. The changing characteristics and composition of the Region's resident population may be expected to create a continuing demand for land and public facilities and services in excess of what might be expected given the absence of any significant growth in the Region's total population during the 1970's. The existing trend in the age structure of the population toward fewer very young persons and more working-age and elderly persons can be expected to affect the need for school facilities, employment opportunities, and various types of housing. It may also be expected to affect the collective travel habits and patterns of the Region. Continued growth in the number of households, along with their changing composition and their decreasing average size, will similarly have an impact since the household represents the basic consumption unit for various types of land uses and public facilities and services.

8. On the basis of information presently available, it appears that the size of the Region's resident population as enumerated in the 1980 census may be somewhat less than that forecast by the Commission. Analyses indicate that the major deficiency of the forecast was the failure to correctly anticipate the changing character of net migration in the Region's population dynamics. Although the 1980 resident population of the Region will be less than forecast, the difference probably will not be sufficient to adversely affect the basic structure of the land use and physical facility plans into which such forecasts have been incorporated. This is particularly important in view of the fact that it appears unlikely that a significantly "better" forecast could be prepared prior to 1981 or 1982, when detailed data from the 1980 census will become available. The 1980 census is needed to confirm much of the information presented in this report—which is in actuality based on estimates rather than counts—and to provide new baseline information on important aspects of the population including, but not limited to, age-specific fertility rates, age-specific migration rates, household composition and size information, and labor force participation information.

9. The diffusion of urban development continues in the Region even in the absence of regional population growth. Specific trends in the Region's changing population distribution which the adopted regional land use plan sought to counteract are continuing to occur. This is manifested in the continued decline in Milwaukee County's proportion of the total regional population and the more rapid than planned increase in Waukesha County's proportion of the total regional population.

The land use plan provides the framework for the rational, orderly conversion of land from rural to urban uses. This conversion is necessary both to accommodate the residential, industrial, and commercial needs of the existing and future resident populations of the Region and to accommodate, to the extent possible, the collectively expressed

preferences of society with respect to lifestyles. It seeks to provide for this transition in a manner that will avoid deleterious and sometimes irreversible effects on the environment, thereby providing for this transition at the least cost to society as a whole. It further seeks to provide that this conversion of land occur only when necessary, only in amounts sufficient to accommodate demand, and only in locations adjudged to be both suitable and desirable for urban uses. Under a successful land use plan implementation scenario, shifts in the base year population distribution are partially guided in the public interest both by the chosen land use development objectives and by the physical structure of the land use plan. The land use plan was not designed to accommodate projected changes in population distribution but rather to counteract projected changes in population distribution judged to be not in the long-term public interest. Curtailment of the fiscally and environmentally debilitating effects of urban sprawl will require vigorous regional land use plan implementation efforts on the part of both the public and private sectors.

10. Population growth may no longer be a useful singular measure of regional development. This is perhaps the most intriguing conclusion—and one which is only partially perceived at this point—to emerge from the present analysis. It may well be that population growth, which has for so long been a useful surrogate for assessing the socioeconomic vitality and well-being of an area, may no longer be an adequate measure in and of itself for such assessment. The present pattern of population decline within the central county and of little or no regional population growth is hardly unique to the Southeastern Wisconsin Region. To a greater or lesser extent this pattern is being repeated in all older, mature metropolitan areas of the United States. Nationally, rates of natural increase are greatly reduced from their previous amounts. The effective disappearance from the rural areas of the nation of a potential pool of urban migrants has resulted in fundamental changes in the character of migration, with migration between metropolitan areas becoming of far greater significance than in the past. Viewed within a national context, the lack of population growth in the Region may be part of a redistribution and equalization of economic activity, per capita income, and population throughout the nation rather than the beginning of a long-term, slow, absolute decline in the Region. If this scenario is a correct one, then measures of socioeconomic well-being in addition to—or in lieu of—population growth will be necessary in order to obtain a realistic perception of the "health" of the Southeastern Wisconsin Region.

CONCLUDING NOTE

It might be reasonably asked whether or not the present Commission forecast of 2.2 million persons for the Region in the year 2000 still represents a reasonable forecast, and if not, what a more reasonable alternative forecast of regional population in that year might be. Because demographers are seldom confident that a single most likely schedule of future fertility, mortality, and migration rates can be specified, they are inclined to "bracket" the future course of population change by making at least three projections: a high, a low, and an intermediate projection. In general, it is presumed that the future course of population change will not be greater than the high projection nor lower than the low projection and that the intermediate projection is in all likelihood the best with respect to what will actually happen; that is, the intermediate projection is the most probable measure of the future population level and, as such, becomes the forecast level to be used in plan preparation. The present Commission population forecast was, in fact, chosen in just such a manner.

Ideally, the range of projections prepared by the demographer would be used as such by the planner in plan preparation. However, the quantitative analyses required, for example, in determining the area which should be allotted to the various kinds of land uses; in deriving probable future traffic flows, water demand, and sewage flows from the future land use patterns; and in locating and sizing physical facilities to serve these needs and demands all dictate as a practical matter that a single forecast number be agreed upon as the population level for which the physical plans will be designed. Moreover, consistency in the economic analyses

involved in consideration of alternative plan designs requires that each alternative be designed to serve substantially the same forecast population and economic activity levels.

It would be desirable to prepare plans for alternative future levels of population and economic activity in order to allow public officials and citizen leaders to evaluate the desirability of various growth and no-growth policies. Reality, however, has usually made such a course impractical for two reasons. First, as already noted, regional growth within the United States is presently dictated by forces that operate largely outside the control of local public policy determination, and history indicates that any local public plans that run substantially counter to the trends set by these economic forces are doomed to failure. Second, the cost and time constraints imposed upon the planning process dictate that the alternatives to be explored within the available resources be practical, with some reasonable probability of implementation.

For the reasons noted above, therefore, it has been necessary to select a single most likely forecast as the basis for land use and supporting facility plan design even though it is recognized that a degree of uncertainty is involved in the selection of any forecast. In past Commission planning efforts, the uncertainty surrounding the selection of a regional population forecast has been recognized and implicity, if not explicity, addressed.

In carrying out the Milwaukee area primary transit system alternatives analysis, a planning study initiated by Commission staff in the spring of 1979, it was determined that it would be necessary to explicitly recognize and deal with uncertainty. This study, therefore, proposes to develop two alternative regional population and economic activity forecasts and to design a primary transit system plan for each of these alternatives. This, therefore, represents a departure from previous Commission planning practice. Several alternative regional population projections developed for staff review and discussion in support of the Milwaukee area transit system alternative analysis are shown in Table 46. For purposes of comparison, two population projections prepared in 1974 are also included in the table—the projections selected by Commission staff and Commission advisory committees as the best forecast of regional population in 2000 and as the probable lower limit of regional population in 2000. It should be stressed that the alternative projections shown in this table do not necessarily represent projections that will be used in the alternatives analysis, nor should they be interpreted as possible replacements for the existing regional population forecast. These projections have been developed to assist the Commission staff in assessing some reasonable statements about alternative future population levels. It should be further noted that, in the absence of a complete population census since 1970, it has been necessary in producing these projections to rely on estimates of change in age-specific rates of both fertility and migration. In spite of this limitation, however, the projections shown in Table 46 provide some interesting insight into an evaluation of the current forecast.

An analysis of these alternative projections reveals a number of interesting considerations. Perhaps foremost among these is that if there is no net in-migration or out-migration to the year 2000, the regional population may be expected to increase by approximately 300,000 to 400,000 persons over the 1970 level and thus would range between 2.0 and 2.1 million residents in 2000. While the present rates of natural increase are quite low, they are nevertheless sufficient to result in population growth. On the other hand, a continuation of existing—1970 through 1977—levels of net out-migration over the 30-year forecast period would result in a resident population in the Region in the year 2000 of about 1.9 million—or about 150,000 persons greater than the 1970 level. These projections would indicate that even the reduced fertility levels currently in effect and anticipated through the remainder of this century would result in overall population growth, even with modest net out-migration.

The three low projections provide some indication of the increase over the estimated current levels of net out-migration necessary to completely offset any growth that might accrue to the Region through natural increase, and to result in absolute population decline over the 30-year forecast period. In order for any of these three projections to be realized, it would be necessary for a net out-migration of between 400,000 and 600,000 residents to occur over the 30-year forecast period, a rate of from 13,350 to 20,000 persons per year. As a comparison, it is estimated on the basis of 1970 through 1977 data that the total net out-migration for the Region between 1970 and 1980 will be somewhere between 75,000 and 100,000 persons, a rate of from 7,500 to 10,000 persons per year.

Table 46

ALTERNATIVE PROJECTED REGIONAL POPULATION IN THE YEAR 2000 USING VARIOUS COMBINATIONS OF FERTILITY, MORTALITY, AND MIGRATION ASSUMPTIONS

Projection Number	Assumptions[a]	2000 Population
1	Reduction in fertility to below replacement level from 1975 to 1985, then replacement level fertility to 2000; current mortality; slight net out-migration between 1970 and 1980, then moderate net in-migration between 1980 and 2000	2,219,300[b]
2	Reduction in fertility to below replacement level from 1975 to 1985, then replacement fertility to 2000; current mortality; moderate net out-migration	1,971,800[c]
3	Reduction in fertility to below replacement level from 1975 to 1985, then replacement level fertility to 2000; current mortality; zero net migration	2,142,000
4	Reduction in fertility to below replacement level from 1975 to 1985, reaching its low point in 1985 and continuing at that level to 2000; current mortality; zero net migration	2,079,400
5	Reduction in fertility to below replacement level from 1975 to 1985, then replacement level fertility to 2000; convergence of white and nonwhite fertility; current mortality; current net out-migration	1,925,300
6	Reduction in fertility to below replacement level from 1975 to 1985, then replacement level fertility to 2000; convergence of white and nonwhite fertility; current mortality; current net out-migration between 1970 and 1980, then a doubling of the current level between 1980 and 1990, and a tripling of the current level between 1990 and 2000	1,713,300
7	Reduction in fertility to below replacement level from 1975 to 1985, then replacement level fertility to 2000; convergence of white and nonwhite fertility; current mortality; slight acceleration in current net out-migration between 1975 and 1980, then a doubling of the current level between 1980 and 1990, and a quadrupling of the current level between 1990 and 2000	1,596,900
8	Reduction in fertility to below replacement level from 1975 to 1985, then replacement level fertility to 2000; convergence of white and nonwhite fertility; current mortality; slight acceleration in current net out-migration between 1975 and 1980, then a quadrupling of the current level between 1980 and 1990, and a doubling of the current level between 1990 and 2000	1,615,800

[a] *The term "current" implies 1970 mortality rates and 1970-1977 estimated net migration rates.*

[b] *Selected by the Commission staff and advisory committees in 1974 as the best forecast of regional population in 2000.*

[c] *Selected by the Commission staff and advisory committees in 1974 as the probable lower limit of regional population in 2000.*

Source: SEWRPC.

In summary, it may be stated that levels of net out-migration significantly greater than those presently occurring in the Region and operating over decades of time will be necessary to produce any long-term decrease in the resident population of the Region. A continuation of 1970 through 1977 trends in population would still result in the addition of approximately 150,000 residents to the Region between 1970 and 2000.