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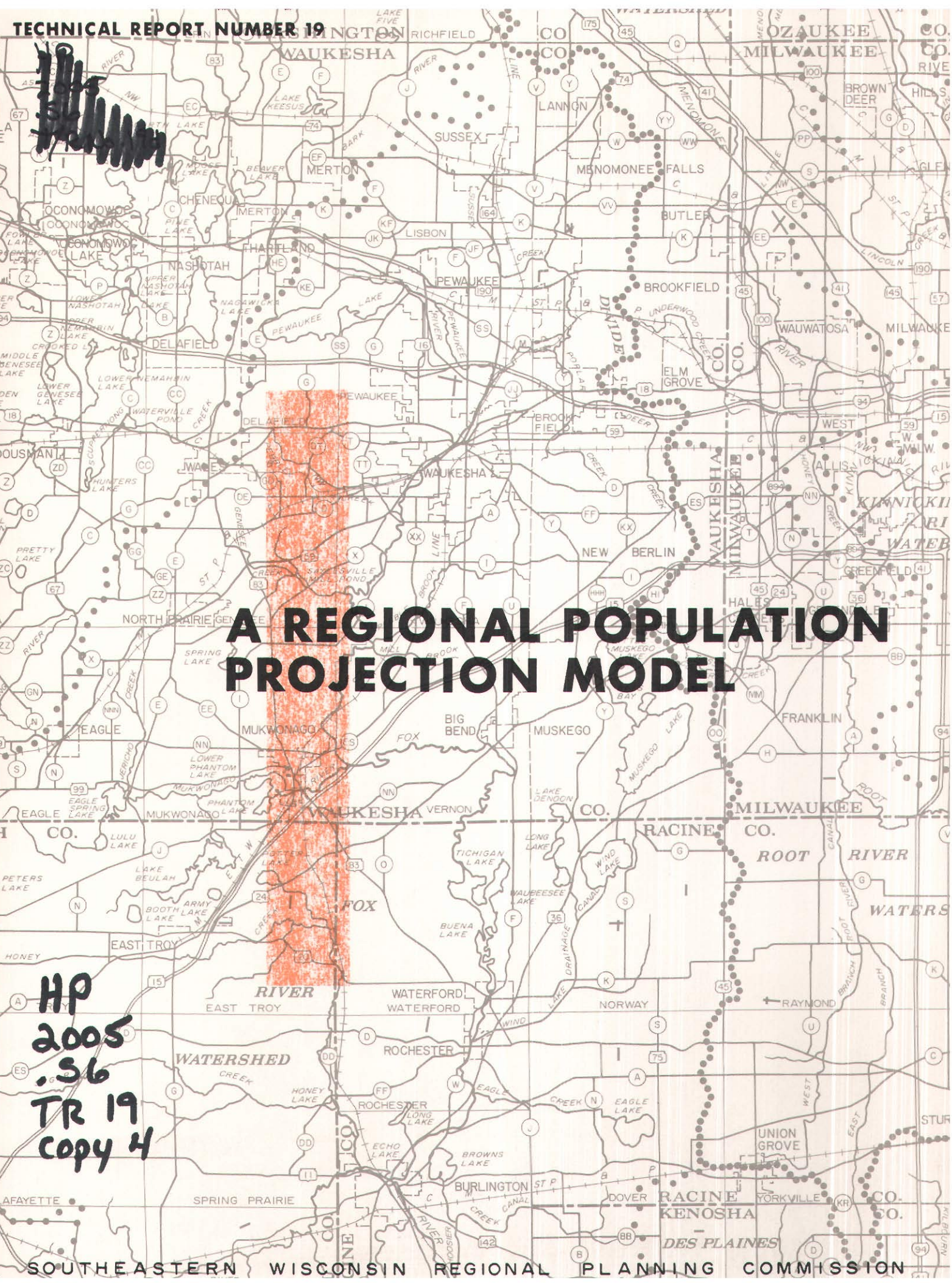

A REGIONAL POPULATION PROJECTION MODEL

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NUMBER 19

A REGIONAL POPULATION PROJECTION MODEL

Prepared by the
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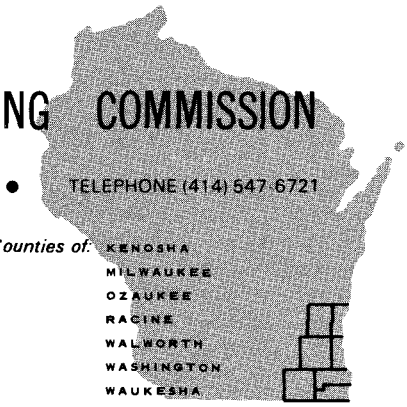

October 12, 1980

STATEMENT OF THE EXECUTIVE DIRECTOR

A 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 the comprehensive plan for the physical development of the 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 of preparing and maintaining an advisory plan for the physical development of the Region.

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. 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.

This report presents a description of the model used by the Commission in preparing forecasts of population change in the Region. The model used is a cohort-component model which projects population levels by age, sex, and race for five-year intervals on the basis of separate assumptions about fertility, mortality, and migration. While the conceptual structure of the model has remained essentially unchanged in more than a decade of use, several significant changes in the procedures by which assumptions about demographic change are incorporated into the operation of the model have been made during this time and are also documented herein.

It is important to understand that 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.

As a final note, 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 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, forecasts must be revised and, in turn, plans which are based on such forecasts must be reviewed and revised accordingly.

Respectfully submitted,

Kurt W. Bauer
Executive Director

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INTRODUCTION

FORECASTS IN PLANNING

Because planning is intended to improve the environment in which people live and because the primary purpose of all facilities and services in any community is to meet the needs of the resident population, an understanding of the probable future size, composition, and spatial distribution of the population is a basic prerequisite to any planning for the future development of an area. Such understanding aids in shaping the development objectives of the planning area and is essential to the determination of the demand for, and allocation of, resources for housing, education, recreation, transportation, and sewerage systems.

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. In the land use and transportation planning process, forecasts of population, economic activity, and automobile and truck availability are necessary to provide a basis for plan preparation. The future demand for land, transportation, and natural resources will depend primarily upon the size of the future population and the nature of future economic activity within the Region. Control of changes in population and economic activity levels lies largely outside the scope of governmental activity at the regional and local levels and the scope of the physical planning process. Probable future population and economic activity levels must, therefore, be forecast. These levels, in turn, determine the aggregate future demand for the various land uses, for transportation, and for other public facilities and services. This is not to say, however, that governmental policies at the regional and local level cannot influence the course of economic development and, consequently, of population growth. For example, the provision of efficient regional transportation and utility systems can contribute to favorable industrial location decisions even though the provision of such systems cannot directly generate economic growth and consequent population growth.

An important consideration involved in the preparation of population and other forecasts for planning purposes is the forecast target date. Both the land use pattern and the supporting transportation and utility systems must be planned for anticipated demand at some future time. This "design year" is usually established by the expected life of the first facilities to be constructed in the implementation of the plan. It may indeed be argued that because of the basic irreversibility of many land development decisions, the design year for a land use plan should be extended beyond the life of the supporting transportation and utility system plans; nevertheless, practical considerations dictate that the land use plan design year be scaled to these design year requirements. Consequently, a population forecast period of 20 to 25 years is normally required for comprehensive planning purposes.

Forecast accuracy requirements depend on the use to be made of the forecasts. As applied to land use and transportation planning, the critical question relates to 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. Experience has indicated that if the basic population, as well as employment, personal income, and automobile and truck availability, forecasts 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. When and as estimates or measurements of the actual magnitude of change become available in the future, forecasting methods 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 to be incorporated into the different forecasting methods and results in a refinement of these methods.

In any consideration of forecasts, it is important to stress that no one can "predict" the future, and 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.

Many methods have been developed for forecasting 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—albeit based on either some theoretical formulation stated on an a-priori basis, or the results of some empirical tests—to analyze this experience and project it into the future. The principal difference between 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 group of persons. Because the variables entering into these forecasts are most often not clearly defined, sometimes not even in the minds of their authors, such forecasts are generally not capable of reduction to a precise procedure which can be expressed mathematically. At the other extreme, a method may depend almost entirely upon mathematical formulation. 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.

MODELS

A model is a representation of something that exists in reality. The encompassing definition of a model signifies that models can vary in their structure and complexity. Models which represent situations or phenomena at one point are considered static models; in contrast, dynamic models allow for changes in the parameters of model elements over time. Models can be expressed in either quantitative or nonquantitative terms. Quantitative or mathematical models represent phenomena symbolically, using mathematical equations to describe relationships between elements of the system under study. For instance, a formulation of the statistical probability of migration by age and sex category is a mathematical model. When a mathematical model represents the functioning of a system of relationships over a period of time, with a structural similarity to the real life system and with real data used as input to the model, it is considered to be a simulation model. Thus, for example, mathematical models of the basic demographic processes of fertility, mortality, and migration can be combined into a comprehensive model simulating growth in a population over time.

Simulation model development has several advantages over less precise procedures of model formation. The determination of a unified set of mathematical equations requires the model developer to examine in detail the connectives and causal links between variables, for an understanding of the order and interaction between elements of the model must be achieved before the relationships can be systematized. After the relationships have been quantified, the assemblage of the necessary input data and the computational procedure can be directly accomplished. Most important of its advantages is that the mathematical simulation model permits experimentation with alternative hypotheses about relationships between variables and the parameters of the equations in the model. The different model outputs produced by varying these assumptions can then be compared and analyzed to determine the sensitivity of the model to changes in variables and to make an assessment of the validity of the model in reproducing the system of relationships being modeled. Based upon the results of the experimentation, the model can be modified or extended to improve its soundness and make it more representative of the real world system. Such adjustments are integral to the process of model development. After the completion of this process and the utilization of the model, it may later become evident that, because of new data or revised perceptions of the relationships between variables, it is advisable to modify the originally developed or first generation model while

preserving its basic structural form. The revised version of the model can be considered a second-generation model; further modifications of the model would result in a third-generation model, and so on.

POPULATION MODELS

A population growth model can be used to quickly develop a relatively large number of projections which can vary in their assumptions about the future levels of population variables, in their input data, or in their temporal application. When a projection is made of the population in the past or the present, using available current census, vital statistics, or population indicator data, the resulting population level is called an estimate, whereas future population levels which are developed and which lack the indicator data available in the production of estimates are considered projections or forecasts. A population projection is conditional, for it is defined as the future level of population which would occur if a specified set of assumptions about population change were in effect during the projection period. If one set of assumptions is believed to represent the most likely future course of population change, then the population projection resulting from these assumptions is termed a population forecast.

Population projection models generally are of a form which expresses the population at a future time as a function of the existing population and the three basic demographic processes of fertility, mortality, and migration. Population projection models of this form attempt to describe the growth of the population and changes in population characteristics and distribution using a set of equations quantifying demographic relationships and using known data about the population as input to the projection model, and therefore are considered to be simulation models. The projection of population is usually a macrosimulation rather than a microsimulation procedure, because the focus is on the behavior of the population as a group and thus aggregated data are used, while microsimulation models are concerned with the fertility, mortality, and migration decisions of individuals within the population.

However, not all population projection models are mathematical simulation models. These other models are mathematical in nature, but they do not represent the real-world functioning of a system of demographic relationships in determining population growth and, therefore, cannot be considered simulation models. Mathematical extrapolations and ratio methods, which belong in this category, derive future population levels mechanistically, using straightforward mathematical relationships or equations. The ratio method can be employed when future population levels of a relatively large geographic area have previously been projected, and projections are desired for some or all of its constituent subareas. The projected population of the total area is distributed according to the existing or projected percentage distribution of the total population by subarea. State population projections, for example, may be derived by the application of state proportions to the population of the United States as a whole. Another mathematical method in this category extrapolates population levels into the future using equations designed to fit historical population growth trends. This method can result in unrealistically high levels of population over a long projection period. One of the well-known extrapolation procedures is the logistic curve, which places an upper limit on future population growth, but which cannot be used to project a decline in population size. The mathematical extrapolation and ratio methods are relatively uncomplicated in their form and computation; however, they are oversimplifications of population change and distribution and currently are not widely used.

More complex than mathematical extrapolation and ratio methods, the component method projects the fertility, mortality, and migration components of population change separately. Since it attempts to symbolically reproduce the actual process of population growth, the component method is considered a population growth simulation model. When the components of population change are projected by age, race, and sex and then applied to a population base distributed by age, race, and sex, the method is termed a cohort-component model. The cohort-component method is the most widely used projection procedure because it allows for manipulation and analysis of the separate fertility, mortality, and migration components and yields population projection levels by age and sex. Therefore, each component can be evaluated against available current data on trends in fertility, mortality, and migration, and adjustments made to those parts of the model judged to be the least accurate. The migration component of population growth is sometimes projected by using regression analysis or the ratio method to

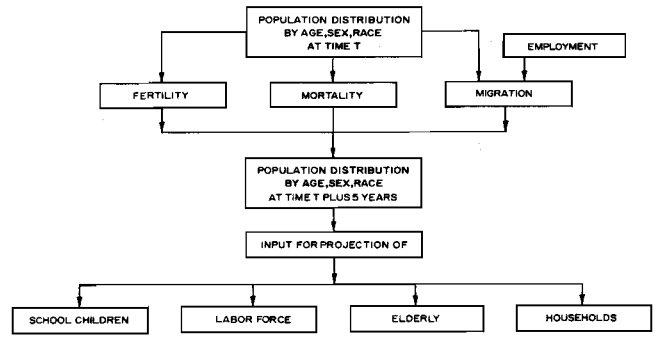
relate migration to expected changes in economic variables such as employment, industrial composition, and per capita income, since employment and population are interrelated variables.

Fertility, mortality, and migration are considered to be subsystems of the cohort-component population projection model. A schematic diagram of the subsystems and the structure of the cohort-component model is presented in Figure 1. Besides varying with the basic demographic compositional factors—age, sex, and race—fertility, mortality, and migration are also influenced by factors not directly accounted for in the standard cohort-component model. Fertility rates are related to variables such as educational attainment, female labor force participation, and age at marriage, while mortality rates vary by socioeconomic level and occupation. Shifts in locations of businesses and attitudes of the population concerning urban or suburban residence are two of the factors influencing population migration. Many of these variables cannot be easily quantified and incorporated into the projection model, and future changes in these variables, as well as changes in the relationships of these variables to fertility, mortality, and migration, are difficult to predict. The expected influence of these variables on population growth or decline must be considered when the fertility, mortality, and migration assumptions are selected for the model.

The cohort-component population projection model is a dynamic model, since it permits the parameters of the fertility, mortality, and migration components to vary over time. For instance, fertility may be projected to decline and then return to its current level. Another advantage of this model, shared by other mathematical simulation models, is its flexibility. The basic cohort-component structure is retained, but procedures used in projecting the individual components may be revised experimentally, or to reflect changes in the relationships between variables. Different fertility, mortality, and migration assumptions may be substituted, enabling the comparison of projected population levels under different sets of assumptions. The model may also use different base data, as long as they are classified by age, sex, and race. The flexibility of the model permits the calculation of projections for various geographic areas and different time periods and the updating of projections using the most current population data. The development of a population projection model is an unending process. Assumptions and procedures should be continually reviewed and new, or modifications of existing, assumptions and procedures considered. Such revisions are easily implemented given the flexibility of the model.

Figure 1

SCHEMATIC DIAGRAM OF THE SUBSYSTEMS OF THE COHORT-COMPONENT POPULATION PROJECTION MODEL



Source: SEWRPC.

The Commission's population projection model is a cohort-component model, projecting population levels by age, sex, and race for five-year intervals using separate assumptions about fertility, mortality, and migration. This report presents two versions of the Commission's model for projecting population in the Region, developed over approximately a 10-year period. The first and second versions will hereafter be referred to in this report as Model I and Model II. It is important to note that these labels are established merely as a convenience for reference purposes, since both Model I and Model II are operational forms of the same "model" of population change. The two models are physically distinct, however, in that they are represented by two distinct computer programs. Indeed, one of the reasons for the production of Model II was to improve upon the computer language code contained in Model I to increase its flexibility and manageability with respect to handling the base data and various sets of assumptions. During the modifications to the program, the mathematical relationships of population change based upon 1960 census data contained in the computer language code were replaced, where necessary, to account for change in relationships observed in the 1970 census data.

During the development of Model I and the modification process resulting in Model II, varying sets of assumptions were considered, different projections incorporating these alternative assumptions were prepared, and the resulting population levels were studied and compared. The projected population levels and the values of the parameters of the model components selected for both versions of the model presented in this report are those that were determined to be the most likely when the two models were developed. The projected population assumptions and levels presented in this report for the purpose of discussing the two models may therefore be referred to as forecasts.

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Chapter II

DEVELOPMENT OF MODEL I

The initial version—Model I—of the Commission demographic model was developed prior to the release of 1970 census data; hence, the base data used in the development of this model were from the 1960 census. As input to the model, the base data are divided into four major components—white male, nonwhite male, white female, and nonwhite female—and each component is again divided into 16 five-year age groups (0-4, 5-9 . . . 70-74 and 75 and over). Since it uses a cohort component procedure, Model I provides for separate projections of fertility, mortality, and migration by age, sex, and race. The particular assumptions concerning the expected changes in fertility, mortality, and migration in this and in any model are affected by the trends observable at the time the assumptions were chosen.

FERTILITY

Examination of the historical birthrates in each county, presented in Table 1, indicated that age-specific fertility rates tended to increase over 1940-1960, although the rate of increase during 1950-1960 was not as rapid as that during 1940-1950. Post-1960 vital statistics data for the State of Wisconsin, however, indicated that this trend reversed and that the age-specific fertility rates in the State were declining after 1960.[1] The same trend was experienced nationwide, as evidenced by the estimates presented in a report by the U. S. Bureau of the Census.[2]

The method used to project fertility rates in Model I relates fertility rates of women ages 15-19 and 25-44, by five-year interval, to the fertility of the central childbearing female age group of 20-24 years. The fertility of the 20-24 year old group was projected to continue to decline, and the 1960 fertility rates for this age group in each county were reduced on the basis of nationwide projections of fertility rates prepared by the U. S. Bureau of the Census.[3] The geographic variation in fertility rates among the counties was assumed to follow the same pattern that existed in 1960. The age-specific fertility rates for each county and the Region for the year 1960 are presented in Table 2. Rates are shown for whites in all counties and for nonwhites in Milwaukee and Racine Counties. Because the nonwhite populations of Kenosha, Ozaukee, Walworth, Washington, and Waukesha Counties are too small to calculate reliable fertility rates, Milwaukee and Racine nonwhite age-specific fertility rates were averaged, and these averaged rates were used as the 1960 base rates for the other five counties.

Age-race-specific fertility rates for a particular county were projected on the basis of the following formula:

$$ {}_iF_j^{\,m} = \alpha_j^{\,m} \left({}_iF_j^{\,1} * {}_iN_j^{\,m} \right) / {}_iN_j^{\,1} \qquad (1) $$

where: F = birthrate per 1,000 women per year in a given county;
α = factor representing the reduction in fertility rate of the central age group, 20-24 years;
N = ratio of age-specific fertility rate to the fertility rate of the central age group, 20-24 years;
i = age group of childbearing females;
j = race (white, nonwhite); and
m = year of projection (1960 = 1).

---

[1] *Zahava Fuchs and Douglas G. Marshall, Fertility Trends in Wisconsin, 1900-1964, Department of Rural Sociology, University of Wisconsin, Madison, Wisconsin, June 1966, p. 20; and Wisconsin Division of Health, Public Health Statistics, Wisconsin - 1969, Madison, Wisconsin, circa 1971, Table 15.*

[2] *U. S. Bureau of the Census, "Projections of the Population of the United States by Age and Sex: 1970 to 2020," Population Estimates and Projections, Current Population Reports, Series P-25, No. 448, August 1970, p. 48.*

[3] *Ibid.*

Table 1

AGE-SPECIFIC FERTILITY RATES IN THE SOUTHEASTERN WISCONSIN REGION
BY COUNTY: 1940, 1950, AND 1960
(BIRTHS PER 1,000 WOMEN)

1940

County	Age Group					
	15-19	20-24	25-29	30-34	35-39	40-44
Kenosha	27	115	117	83	38	16
Milwaukee	18	100	113	70	35	9
Ozaukee	16	100	131	118	35	11
Racine	18	108	113	67	41	12
Walworth	29	139	135	74	55	15
Washington	20	108	119	105	58	15
Waukesha	23	135	126	91	52	18

1950

County	Age Group					
	15-19	20-24	25-29	30-34	35-39	40-44
Kenosha	45	210	169	118	49	17
Milwaukee	42	177	179	105	48	12
Ozaukee	55	235	192	126	61	25
Racine	54	210	191	114	55	16
Walworth	58	227	186	113	65	14
Washington	60	229	221	142	74	24
Waukesha	48	197	200	124	62	18

1960

County	Age Group					
	15-19	20-24	25-29	30-34	35-39	40-44
Kenosha	80	254	232	144	70	19
Milwaukee	69	260	228	128	65	15
Ozaukee	46	295	278	152	78	26
Racine	75	303	247	140	71	23
Walworth	64	266	242	121	67	22
Washington	66	329	276	150	97	27
Waukesha	52	307	248	151	78	24

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

Table 2

AGE-SPECIFIC FERTILITY RATES IN THE SOUTHEASTERN WISCONSIN REGION BY RACE AND COUNTY: 1960 (BIRTHS PER 1,000 WOMEN)

County	Age Group (white)					
	15-19	20-24	25-29	30-34	35-39	40-44
Kenosha	75	247	232	144	70	19
Milwaukee	58	253	228	126	63	15
Ozaukee	46	295	279	152	78	27
Racine	69	297	245	139	70	24
Walworth	64	266	242	121	67	22
Washington	66	329	276	151	97	29
Waukesha	52	306	247	151	78	25
Region	62	269	235	133	68	17

County	Age Group (nonwhite)					
	15-19	20-24	25-29	30-34	35-39	40-44
Milwaukee	236	336	234	147	85	28
Racine	196	411	277	174	98	20
Remaining Counties	216	374	255	160	91	24
Region	228	345	237	148	88	26

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

Both the reduction factor α and the ratio N in equation (1) were developed at the regional level using national projections of fertility and were applied uniformly to all counties. The reduction factor α, as mentioned previously, was based on Census Bureau projections of the fertility rates of 20-24 year olds in the U. S. The value of α was set at 0.8 for whites and 0.75 for nonwhites for the year 1965. For the year 1970, the corresponding values were 0.7 and 0.65 for white and nonwhite groups, respectively. For the rest of the projection years, the values of this reduction factor were held at the 1970 values. Furthermore, no projected fertility rate was allowed to fall below 50 percent of the corresponding base year rate; and in no case was the fertility rate of a nonwhite group permitted to fall below the corresponding white fertility rate. The projection of fertility differential values, or N ratios—that is, the ratios of age-specific fertility rates to the fertility rate of the 20-24 age group—was made by adjusting national projection values[4] in accordance with the magnitude of regional fertility differentials relative to the corresponding national values. The 1960 adjusted national and 1965-1990 projected regional fertility differential values used in Model I are presented in Table 3.

The projected county and regional fertility rates by age of mother for selected years 1965-1990 are presented in Tables 4 through 9. The projected

[4]*Ira S. Lowry, Metropolitan Populations to 1985: Trial Projections, Rand Corporation, Santa Monica, California, 1964.*

Table 3

1960 ADJUSTED NATIONAL AND 1965-1990 PROJECTED REGIONAL FERTILITY DIFFERENTIAL VALUE (N RATIOS) BY AGE AND SEX

Year	Age-Specific Birthrates Expressed As Ratios to 20-24 Age Group—White					
	15-19	20-24	25-29	30-34	35-39	40-44
1960	0.219	1.0	0.778	0.457	0.213	0.051
1965	0.218	1.0	0.774	0.439	0.199	0.046
1970	0.215	1.0	0.745	0.407	0.175	0.037
1975	0.213	1.0	0.717	0.376	0.154	0.030
1980	0.211	1.0	0.691	0.348	0.135	0.024
1985	0.209	1.0	0.665	0.323	0.118	0.020
1990	0.209	1.0	0.665	0.323	0.118	0.020

Year	Age-Specific Birthrates Expressed As Ratios to 20-24 Age Group—Nonwhite					
	15-19	20-24	25-29	30-34	35-39	40-44
1960	0.579	1.0	0.684	0.429	0.244	0.048
1965	0.567	1.0	0.686	0.420	0.234	0.044
1970	0.544	1.0	0.689	0.405	0.216	0.037
1975	0.522	1.0	0.693	0.392	0.199	0.031
1980	0.500	1.0	0.696	0.376	0.184	0.027
1985	0.480	1.0	0.700	0.362	0.169	0.023
1990	0.480	1.0	0.700	0.362	0.169	0.023

Source: A. Chevan, Penn-Jersey Transportation Study; Ira S. Lowry, Metropolitan Populations to 1985 - Trial Projections; and SEWRPC.

age-specific fertility rates were applied to the corresponding projected numbers of women to yield the total number of births in each race-age group. These projected numbers of births were summed and then split by sex according to observed white and nonwhite male to female ratios at birth.

MORTALITY

At the national level, the crude deathrate remained more or less stable during the decade of 1950-1960. Age-specific deathrates, however, continued to experience reduction. When Model I was developed, it was assumed that in the future decades, due to improved health care and a rising standard of living, this trend was likely to continue. It was therefore assumed that the regional deathrate would decline in all age-sex-race groups over the projection period 1960-1990. This assumption was in part based upon subjective judgment, and in part upon historical trends in deathrates at both the national and state levels. The rates of decline in white deathrates were established at about three-fourths of the average yearly rate of decrease in age-sex-race-specific deathrates between 1940-1960, while for nonwhites the projected rates of decline were about one-half of the corresponding average yearly rate of decrease in deathrates during 1940-1960. For the computation of the average yearly rate of decrease in age-sex-race-specific deathrates, available data at the state level were used. It was further assumed that the projected age-sex-race-specific deathrates represented regional average values. In other words, no local differences between counties were considered, and the projected deathrates were applied uniformly throughout the Region.

The deathrates were projected according to the following formula:

$$ {}_iD_j^m = {}_iD_j^1 - f * {}_ir_j * (m-1) * {}_iD_j^1 \qquad (2) $$

or

$$ {}_iD_j^m = \left[1 - f * {}_ir_j * (m-1)\right] * {}_iD_j^1 \qquad (3) $$

where: D = average deaths per 1,000 residents per year in the Region;
i = five-year age group;
j = sex-race group (white male, nonwhite male, white female, nonwhite female);
m = year of projection (1960 = 1);
r = average yearly rate of decrease in the deathrate, 1940-1960; and
f = constant (0.25 for white, 0.50 for nonwhites).

Several additional conditions were established to make the projected rates consistent and reasonable. The conditions include the following:

1. In no case were the projected deathrates allowed to fall below 90 percent of the base year rates.
2. For age groups below 75, nonwhite deathrates were not permitted to fall below the corresponding white deathrates.
3. The deathrate of the nonwhite age group of 75 and over was diminished at a rate of one-tenth of its base year value.

Estimated 1960 deathrate base data, which were developed using state and county deathrates, are shown in Table 10. The survival rates for the years 1970-1990 generated from the procedure discussed above are presented in Tables 11 through 13.

Table 4

MODEL I PROJECTED AGE-SPECIFIC FERTILITY RATES
BY COUNTY AND RACE: 1965
(BIRTHS PER 1,000 WOMEN)

County	Age Group (white)					
	15-19	20-24	25-29	30-34	35-39	40-44
Kenosha	59	197	184	110	52	13
Milwaukee	46	202	181	96	47	10
Ozaukee	36	236	222	116	58	19
Racine	54	237	194	106	52	17
Walworth	50	212	192	92	50	15
Washington	52	263	219	116	72	20
Waukesha	41	244	196	116	58	18
Region	49	215	187	102	51	12

County	Age Group (nonwhite)					
	15-19	20-24	25-29	30-34	35-39	40-44
Milwaukee	173	252	176	107	61	19
Racine	143	308	208	127	70	13
Remaining Counties	158	280	191	117	65	16
Region	167	259	187	109	63	18

Source: SEWRPC.

Table 5

MODEL I PROJECTED AGE-SPECIFIC FERTILITY RATES
BY COUNTY AND RACE: 1970
(BIRTHS PER 1,000 WOMEN)

County	Age Group (white)					
	15-19	20-24	25-29	30-34	35-39	40-44
Kenosha	51	172	155	89	40	9
Milwaukee	39	177	152	78	36	7
Ozaukee	31	206	187	94	44	13
Racine	47	207	164	86	40	12
Walworth	43	186	162	75	38	11
Washington	45	230	185	94	55	14
Waukesha	35	214	165	94	44	12
Region	43	188	158	83	39	9

County	Age Group (nonwhite)					
	15-19	20-24	25-29	30-34	35-39	40-44
Milwaukee	144	218	153	90	48	14
Racine	119	267	181	106	56	10
Remaining Counties	131	243	166	98	52	12
Region	139	224	158	91	51	13

Source: SEWRPC.

Table 6

MODEL I PROJECTED AGE-SPECIFIC FERTILITY RATES
BY COUNTY AND RACE: 1975
(BIRTHS PER 1,000 WOMEN)

County	Age Group (white)					
	15-19	20-24	25-29	30-34	35-39	40-44
Kenosha	51	172	149	82	35	9
Milwaukee	39	177	147	72	31	7
Ozaukee	31	206	179	87	39	13
Racine	46	207	158	80	35	12
Walworth	43	186	156	69	33	11
Washington	44	230	178	86	49	14
Waukesha	35	214	159	86	39	12
Region	42	188	152	77	34	8

County	Age Group (nonwhite)					
	15-19	20-24	25-29	30-34	35-39	40-44
Milwaukee	138	218	154	87	45	14
Racine	114	267	182	103	51	10
Remaining Counties	126	243	167	95	48	12
Region	134	224	156	88	47	13

Source: SEWRPC.

Table 7

MODEL I PROJECTED AGE-SPECIFIC FERTILITY RATES
BY COUNTY AND RACE: 1980
(BIRTHS PER 1,000 WOMEN)

County	Age Group (white)					
	15-19	20-24	25-29	30-34	35-39	40-44
Kenosha	50	172	144	76	35	9
Milwaukee	39	177	141	67	31	7
Ozaukee	31	206	173	81	39	13
Racine	46	207	152	74	35	12
Walworth	43	186	150	64	33	11
Washington	44	230	171	80	48	14
Waukesha	35	214	153	80	39	12
Region	42	188	146	71	34	8

County	Age Group (nonwhite)					
	15-19	20-24	25-29	30-34	35-39	40-44
Milwaukee	132	218	154	83	42	14
Racine	110	267	183	99	49	10
Remaining Counties	121	243	168	91	45	12
Region	128	224	157	84	44	13

Source: SEWRPC.

Table 8

MODEL I PROJECTED AGE-SPECIFIC FERTILITY RATES
BY COUNTY AND RACE: 1985
(BIRTHS PER 1,000 WOMEN)

County	Age Group (white)					
	15-19	20-24	25-29	30-34	35-39	40-44
Kenosha	50	172	138	72	35	9
Milwaukee	38	177	136	63	31	7
Ozaukee	30	206	166	76	39	13
Racine	46	207	146	69	35	12
Walworth	42	186	144	60	33	11
Washington	44	230	165	75	48	14
Waukesha	34	214	147	75	39	12
Region	41	188	141	66	34	8

County	Age Group (nonwhite)					
	15-19	20-24	25-29	30-34	35-39	40-44
Milwaukee	127	218	155	80	42	14
Racine	105	267	184	95	49	10
Remaining Counties	116	243	169	87	45	12
Region	123	224	158	81	44	13

Source: SEWRPC.

Table 9

MODEL I PROJECTED AGE-SPECIFIC FERTILITY RATES
BY COUNTY AND RACE: 1990
(BIRTHS PER 1,000 WOMEN)

County	Age Group (white)					
	15-19	20-24	25-29	30-34	35-39	40-44
Kenosha	50	172	138	72	35	9
Milwaukee	38	177	136	63	31	7
Ozaukee	30	206	166	76	39	13
Racine	46	207	146	69	35	12
Walworth	42	186	144	60	33	11
Washington	44	230	165	75	48	14
Waukesha	34	214	147	75	39	12
Region	41	188	141	66	34	8

County	Age Group (nonwhite)					
	15-19	20-24	25-29	30-34	35-39	40-44
Milwaukee	127	218	155	80	42	14
Racine	105	267	184	95	49	10
Remaining Counties	116	243	169	87	45	12
Region	123	224	158	81	44	13

Source: SEWRPC.

Table 10

AGE-SPECIFIC DEATHRATES IN THE SOUTHEASTERN WISCONSIN REGION BY SEX AND RACE: 1960
(DEATHS PER 1,000 RESIDENTS)

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	6.48	10.6	4.61	8.5
5-9	0.51	0.7	0.45	0.7
10-14	0.47	0.7	0.43	0.7
15-19	1.96	1.9	0.55	1.0
20-24	2.41	1.9	0.85	1.0
25-29	1.43	2.4	0.68	1.9
30-34	1.20	2.4	0.90	1.9
35-39	2.20	4.5	1.22	4.8
40-44	3.45	4.5	2.43	4.8
45-49	5.60	12.9	3.37	8.6
50-54	10.09	12.9	5.08	8.6
55-59	16.06	25.2	8.11	17.7
60-64	23.71	25.2	12.31	17.7
65-69	36.78	51.3	21.44	37.5
70-74	52.91	51.3	32.73	37.5
75+	113.23	95.0	89.62	87.7

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

MIGRATION

Reliable forecasts of net migration in an "open" area, such as a region or a county, are difficult to make, because unlike the migration into or out of a nation—a "closed" area—the migration of population into open areas is essentially unrestricted. Net migration is a critical component in the forecasts of regions and counties, for net migration can constitute a large percentage of total population change. Before future migration can be forecast, past migration must be estimated for use as base data in the model.

Estimation of Past Migration

Unlike birth and death data, past migration data are not directly available because, in the United States, there is no system for accurately and reliably reporting the movement of individuals into or out of small geographical areas. Therefore, the residual method is employed to estimate past migration. Total net migration can be determined by subtracting natural increase from total population change. Since

$$P^{t+p} = P^t - D^p + B^p + M^p , \quad (4)$$

then

$$M^p = P^{t+p} - P^t + D^p - B^p \quad (5)$$

where P^t = total population at time t ;

P^{t+p} = total population at time (t + a period of time, p);

D^p = total deaths during period p;

B^p = total births during period p; and

M^p = net migration during period p.

The cohort-component projection model requires age-sex-race-specific migration data. If mortality statistics for the area of study are not available, it is possible to estimate the theoretical survivors by applying the mortality rates of a different area, such as the State or nation. Net migration is then obtained by subtracting the theoretical survivors from the population estimate for each sex and race component. In the census survival method, the theoretical survivors are computed on the basis of

Table 11

MODEL I PROJECTED SURVIVAL RATES PER 1,000 POPULATION BY AGE, SEX, AND RACE: 1970

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	967.6000	947.0000	976.9500	957.3000
5-9	997.5400	996.5000	997.7500	996.5000
10-14	997.6500	996.5000	997.8500	996.5000
15-19	990.2000	990.2000	997.2500	995.0000
20-24	987.9500	987.9500	995.7500	995.0000
25-29	992.8500	988.0000	996.6000	990.5000
30-34	994.0000	988.0000	995.5000	990.5000
35-39	989.0000	977.5000	993.9000	976.0000
40-44	982.7500	977.5000	987.5000	976.0000
45-49	972.0000	935.5000	983.1500	957.0000
50-54	949.5500	935.5000	974.6000	957.0000
55-59	919.7000	874.0000	959.4500	911.5000
60-64	881.4500	874.0000	938.4500	911.5000
65-69	816.1000	743.5000	892.8000	812.5000
70-74	735.4500	735.4500	836.3500	812.5000
75+	433.8500	524.8500	551.9000	561.5000

Source: SEWRPC.

Table 12

MODEL I PROJECTED SURVIVAL RATES PER 1,000 POPULATION BY AGE, SEX, AND RACE: 1980

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	970.8400	952.3000	979.2550	961.5700
5-9	997.6093	996.8500	997.8906	996.8500
10-14	997.7968	996.8500	997.9843	996.8500
15-19	990.3225	990.3225	997.4906	995.5000
20-24	988.1006	988.1006	996.1218	995.5000
25-29	993.4756	989.2000	996.9400	991.4500
30-34	994.5250	989.2000	995.9500	991.4500
35-39	990.1000	979.7500	994.5100	978.4000
40-44	984.4750	979.7500	989.0650	978.4000
45-49	974.8000	941.9500	984.8350	961.3000
50-54	954.5950	941.9500	977.1400	961.3000
55-59	927.7300	886.6000	963.5050	920.3500
60-64	893.3050	886.6000	944.6050	920.3500
65-69	834.4900	769.1500	903.5200	831.2500
70-74	761.9050	761.9050	852.7150	831.2500
75+	490.4650	572.3650	596.7100	605.3500

Source: SEWRPC.

Table 13

MODEL I PROJECTED SURVIVAL RATES PER 1,000 POPULATION BY AGE, SEX, AND RACE: 1990

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	972.4600	954.9500	980.4075	963.7050
5-9	997.7687	997.0250	998.0312	997.0250
10-14	997.9437	997.0250	998.1187	997.0250
15-19	990.4450	990.4450	997.6625	995.7500
20-24	988.2512	988.2512	996.3875	995.7500
25-29	993.9225	989.8000	997.1100	991.9250
30-34	994.9000	989.8000	996.1750	991.9250
35-39	990.6500	980.8750	994.8150	979.6000
40-44	985.3375	980.8750	989.6725	979.6000
45-49	976.2000	945.1750	985.6775	963.4500
50-54	957.1175	945.1750	978.4100	963.4500
55-59	931.7450	892.9000	965.5325	924.7750
60-64	899.2325	892.9000	947.6825	924.7750
65-69	843.6850	781.9750	908.8800	840.6250
70-74	775.1325	775.1325	860.8975	840.6250
75+	518.7725	596.1225	619.1150	627.2750

Source: SEWRPC.

national census survival ratios, which are the ratios of population cohorts at census year (y plus a period of time p) to the same cohorts at census year y.

Consistent data about the number of deaths by age, sex, and race for each county in the Region during the period 1950-1960 were neither available nor computable from the available information with a reasonable degree of accuracy. National census survival rates were used, therefore, to compute the respective survival of each cohort. Although local variations in mortality rates were not taken into consideration, it was believed that the adoption of this method would result in less error than would adjustments of available data.

The census survival rates for native whites and nonwhites by five-year age group were obtained from U. S. Bureau of the Census material.[5] The survival rates were applied to the 1950 age-sex-race-specific population for each county and the Region to obtain the respective population components aged by 10 years. These theoretical survivors were subtracted from the 1960 census-enumerated population by age, sex, and race. Net out-migration in any age-sex-race group is indicated by a negative remainder, while net in-migration is indicated by a positive remainder.

Adjustments to the procedure were necessary for three age groups. Migration computations for the two youngest age groups (persons under 10 years of age in 1960) were made by applying the appropriate census survival rates to births reported during the period 1950-1960. Births from mid-1950 to mid-1955 were "survived" to obtain the expected population in the 5-9 age group, and children born during mid-1955 to mid-1960 were survived to obtain the expected population in the 0-4 age group in 1960. The expected population in the oldest age group (75 and over) was computed by summing the survived persons from the age groups 65-69, 70-74, and 75 and over in 1950.

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[5] *U. S. Bureau of the Census, "National Census Survival Rates by Color and Sex, for 1950 to 1960," Technical Studies, Current Population Reports, Series P-23, No. 15, July 12, 1965, pp. 9 - 10.*

The migration computations for each sex-race group can then be expressed as follows:

$$ {}_{0\text{-}4}M^{1950\text{-}60} = {}_{0\text{-}4}P^{1960} - B^{1955\text{-}60} * {}_{0\text{-}4}S^{1950\text{-}60} \quad (6) $$

$$ {}_{5\text{-}9}M^{1950\text{-}60} = {}_{5\text{-}9}P^{1960} - B^{1950\text{-}55} * {}_{5\text{-}9}S^{1950\text{-}60} \quad (7) $$

$$ {}_{10\text{-}14}M^{1950\text{-}60} = {}_{10\text{-}14}P^{1960} - {}_{0\text{-}4}P^{1950} * {}_{10\text{-}14}S^{1950\text{-}60} \quad (8) $$

$$ \vdots \qquad \vdots \qquad \vdots \qquad \vdots $$

$$ {}_{70\text{-}74}M^{1950\text{-}60} = {}_{70\text{-}74}P^{1960} - {}_{60\text{-}64}P^{1950} * {}_{70\text{-}74}S^{1950\text{-}60} \quad (9) $$

$$ {}_{75+}M^{1950\text{-}60} = {}_{75+}P^{1960} - \left[{}_{65\text{-}69}P^{1950} + {}_{70\text{-}74}P^{1950} + {}_{75+}P^{1950} \right] * {}_{75+}S^{1950\text{-}60} \quad (10) $$

where: B = total midyear to midyear births in a particular sex-race group for a five-year period, and

S = census survival rates.

The total net migration for a particular county during the period 1950-60 can be obtained by summing net migration in each age, sex, and race group:

$$ \text{total net migration} = \sum_{i=1}^{16} \sum_{k=1}^{4} {}_{i}M_{k}^{1950\text{-}60} \quad (11) $$

where: i = age group; and

k = sex-race group (white males, nonwhite males, white females, nonwhite females).

The net migration for sex-race groups can be found in a similar manner, summing over age groups.

The age-sex-race specific migration totals for each county were then subjected to an adjustment based on an independently computed total net migration for each county, using vital statistics data.

Age-specific migration ratios can be obtained for each sex-race group by dividing the age, sex, and race-specific net migration estimates by the total net migration estimated for the sex-race group. These migration ratios for the Region are presented in Table 14. The corresponding values for Kenosha, Milwaukee, and Racine Counties are given in Tables 15, 16, and 18. Because of the small nonwhite population in the remaining counties, migration ratios for whites only are presented in Tables 17, 19, 20, and 21 for Ozaukee, Walworth, Washington, and Waukesha Counties.

Forecasting Net Migration

Young adults are the most mobile component of the population, and the most important variable affecting their mobility is job opportunity. It can be assumed that children 14 years and younger follow their migrating parents. Older age groups (65 and over) in most cases move for reasons other than job opportunity. In some cases, however, migration of people 65 and over may follow the movement of the working-age group. On the basis of these assumptions, it is reasonable to hypothesize that migration is initiated by working age group mobility and that movements in other age groups are generated simultaneously. The general form of the basic model is:

$$ M^{P} = f(X_1, X_2 \ \ldots \ X_N) \quad (12) $$

where: M^{P} = net migration in working-age group per 1,000 of total base year population during the time period, p; and

Table 14

1950-1960 MIGRATION RATIOS USED IN MODEL I: REGION

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.0683	0.0619	0.0653	0.0587
5-9	0.1108	0.1235	0.1006	0.1135
10-14	0.0672	0.1234	0.0677	0.1159
15-19	0.0240	0.0813	0.1373	0.0870
20-24	0.0775	0.1137	0.2675	0.1429
25-29	0.2584	0.1557	0.1985	0.1653
30-34	0.2076	0.1214	0.0964	0.1148
35-39	0.0784	0.0745	0.0574	0.0668
40-44	0.0653	0.0483	0.0412	0.0363
45-49	0.0597	0.0352	0.0436	0.0300
50-54	0.0472	0.0270	0.0313	0.0251
55-59	0.0255	0.0137	-0.0097	0.0175
60-64	0.0068	0.0104	-0.0197	0.0095
65-69	-0.0402	0.0035	-0.0431	0.0059
70-74	-0.0388	0.0003	-0.0307	0.0048
75 +	-0.0177	0.0062	-0.0036	0.0060

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

Table 15

1950-1960 MIGRATION RATIOS USED IN MODEL I: KENOSHA COUNTY

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.0935	0.0796	0.1062	0.0341
5-9	0.1027	0.1146	0.1030	0.1399
10-14	0.0841	0.1146	0.0986	0.1160
15-19	0.0861	0.0860	0.0752	0.0785
20-24	0.1251	0.1274	0.1057	0.1331
25-29	0.1095	0.1242	0.1150	0.1399
30-34	0.1043	0.0828	0.1006	0.1229
35-39	0.0667	0.1146	0.0758	0.0649
40-44	0.0649	0.0605	0.0603	0.0580
45-49	0.0649	0.0287	0.0709	0.0341
50-54	0.0559	0.0223	0.0614	0.0307
55-59	0.0224	0.0287	0.0230	0.0239
60-64	0.0146	0.0064	0.0034	0.0068
65-69	0.0033	-0.0064	-0.0019	-0.0034
70-74	-0.0030	0.0064	-0.0054	0.0103
75 +	0.0050	0.0096	0.0082	0.0103

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

Table 16

1950-1960 MIGRATION RATIOS USED IN MODEL I: MILWAUKEE COUNTY

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.2255	0.0591	0.1625	0.0561
5-9	0.4758	0.1206	0.3522	0.1112
10-14	0.4583	0.1228	0.2540	0.1168
15-19	0.2438	0.0745	-0.2577	0.0859
20-24	-0.3572	0.1135	-0.8615	0.1437
25-29	-1.1131	0.1584	-0.3156	0.1679
30-34	-0.3912	0.1258	0.2364	0.1163
35-39	0.2639	0.0767	0.2911	0.0689
40-44	0.1832	0.0495	0.1832	0.0356
45-49	0.0662	0.0353	0.1051	0.0290
50-54	0.0232	0.0284	0.0743	0.0252
55-59	0.0420	0.0137	0.1587	0.0177
60-64	0.0936	0.0101	0.1706	0.0090
65-69	0.3330	0.0034	0.2130	0.0062
70-74	0.3079	0.0007	0.1493	0.0049
75 +	0.1451	0.0075	0.0844	0.0056

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

Table 17

1950-1960 MIGRATION RATIOS USED IN MODEL I: OZAUKEE COUNTY

Age Group	Male		Female	
	White	Nonwhite[a]	White	Nonwhite[a]
0-4	0.0680	–	0.0486	–
5-9	0.1733	–	0.1664	–
10-14	0.1206	–	0.1004	–
15-19	0.0302	–	0.0484	–
20-24	0.0023	–	0.0302	–
25-29	0.0615	–	0.0892	–
30-34	0.1273	–	0.1523	–
35-39	0.1284	–	0.1113	–
40-44	0.0933	–	0.0670	–
45-49	0.0597	–	0.0586	–
50-54	0.0502	–	0.0458	–
55-59	0.0376	–	0.0271	–
60-64	0.0212	–	0.0321	–
65-69	0.0171	–	0.0039	–
70-74	0.0059	–	0.0100	–
75 +	0.0034	–	0.0087	–

[a]*Migration values in nonwhite group are insignificant. See accompanying text.*

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

Table 18

1950-1960 MIGRATION RATIOS USED IN MODEL I: RACINE COUNTY

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.1314	0.0962	0.1146	0.0980
5-9	0.1902	0.1556	0.1297	0.1306
10-14	0.1443	0.1101	0.1106	0.1078
15-19	-0.0083	0.0848	0.1036	0.0971
20-24	-0.0488	0.1163	0.1046	0.1510
25-29	0.1463	0.1582	0.1260	0.1478
30-34	0.2127	0.0883	0.1270	0.1004
35-39	0.1077	0.0481	0.0994	0.0490
40-44	0.0681	0.0411	0.0522	0.0408
45-49	0.0579	0.0411	0.0435	0.0376
50-54	0.0305	0.0236	0.0256	0.0171
55-59	0.0171	0.0122	-0.0055	0.0122
60-64	-0.0027	0.0149	-0.0045	0.0090
65-69	-0.0335	0.0052	-0.0246	0.0024
70-74	-0.0083	0.0017	-0.0191	-0.0041
75 +	-0.0046	0.0026	0.0169	0.0033

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

Table 19

1950-1960 MIGRATION RATIOS USED IN MODEL I: WALWORTH COUNTY

Age Group	Male		Female	
	White	Nonwhite[a]	White	Nonwhite[a]
0-4	0.0093	–	0.0368	–
5-9	0.0993	–	0.0926	–
10-14	0.1508	–	0.0918	–
15-19	0.1310	–	0.1654	–
20-24	0.0381	–	0.0623	–
25-29	-0.0057	–	-0.0137	–
30-34	0.0426	–	0.0489	–
35-39	0.0766	–	0.1039	–
40-44	0.0799	–	0.0797	–
45-49	0.0718	–	0.0906	–
50-54	0.0637	–	0.0481	–
55-59	0.0426	–	0.0606	–
60-64	0.0576	–	0.0716	–
65-69	0.0657	–	0.0412	–
70-74	0.0803	–	0.0162	–
75 +	-0.0036	–	0.0040	–

[a]*Migration values in nonwhite group are insignificant. See accompanying text.*

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

Table 20

1950-1960 MIGRATION RATIOS USED IN MODEL I: WASHINGTON COUNTY

Age Group	Male		Female	
	White	Nonwhite[a]	White	Nonwhite[a]
0-4	0.0978	–	0.1076	–
5-9	0.1545	–	0.1694	–
10-14	0.1335	–	0.0847	–
15-19	0.0164	–	0.0073	–
20-24	0.0339	–	0.0270	–
25-29	0.0609	–	0.1337	–
30-34	0.1389	–	0.1429	–
35-39	0.0791	–	0.0847	–
40-44	0.0715	–	0.0609	–
45-49	0.0582	–	0.0485	–
50-54	0.0400	–	0.0536	–
55-59	0.0400	–	0.0444	–
60-64	0.0342	–	0.0165	–
65-69	0.0255	–	0.0060	–
70-74	0.0076	–	-0.0041	–
75 +	0.0080	–	0.0169	–

[a]*Migration values in nonwhite group are insignificant. See accompanying text.*

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

Table 21

1950-1960 MIGRATION RATIOS USED IN MODEL I: WAUKESHA COUNTY

Age Group	Male		Female	
	White	Nonwhite[a]	White	Nonwhite[a]
0-4	0.0910	–	0.0845	–
5-9	0.1715	–	0.1605	–
10-14	0.1215	–	0.1085	–
15-19	0.0609	–	0.0470	–
20-24	0.0122	–	0.0302	–
25-29	0.0635	–	0.0967	–
30-34	0.1211	–	0.1273	–
35-39	0.1104	–	0.1097	–
40-44	0.0847	–	0.0739	–
45-49	0.0579	–	0.0518	–
50-54	0.0395	–	0.0351	–
55-59	0.0258	–	0.0227	–
60-64	0.0175	–	0.0169	–
65-69	0.0103	–	0.0109	–
70-74	0.0058	–	0.0089	–
75 +	0.0064	–	0.0154	–

[a]*Migration values in nonwhite group are insignificant. See accompanying text.*

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

$X_1 \ldots X_N$ = the independent variables explaining the variations in the observed net migration rates of the working age group.

It was initially assumed that the relationship is linear and a series of multiple linear regression analyses was conducted to arrive at the most likely relationship. Accordingly, the initial relationship that was investigated took the following form:

$$Y = A_o + \sum_{i=1}^{6} A_i X_i \qquad (13)$$

where: A_o = intercept;

$A_1 \ldots A_6$ = regression coefficients;

Y = net migration in working-age group (15-64) per 1,000 of total base year population in a 10-year census period;

X_1 = change in median income for families and related individuals during the same 10-year period, expressed as a percentage of base year median income;

X_2 = change in school enrollment (5-24) per 1,000 of total base year population during the same time period;

X_3 = change in civilian employment per 1,000 of total base year population during the same time period;

X_4 = natural increase in the working-age group (15-64) per 1,000 of total base year population during the same time period;

X_5 = change in property tax rate during the same time period, expressed as a percentage of base year rate; and

X_6 = change in armed forces personnel per 1,000 of total base year population during the same time period.

It was expected that inclusion of variable X_5, the change in the property tax rate, might partially explain the high out-migration observed in areas with comparatively high property tax rates. The values of the independent variables X_1, X_2, X_3, X_4, and X_6 were obtained from 1950 and 1960 census reports, whereas the value of X_5 was collected from State of Wisconsin documents.[6]

Synchronous data were considered for 17 counties[7] in Wisconsin, including the seven counties comprising the Region. Multiple regression analysis was conducted to identify the variables which significantly explain the observed variations in the dependent variable. The procedure used for this analysis was an iterative search process in which a series of regression runs was made to arrive at a final "best" functional relationship for working-age group migration. This functional relationship was achieved by the successive exclusion of independent variables which do not show a significant correlation or do not contribute any explanatory power to the functional relationship.

Initially, the model was run with all six independent variables. The regression statistics of this run, presented in Appendix Table A-1, indicated that the most important variable in the functional relationship of the working-age group migration rate is change in employment. Several regression runs were conducted with different combinations of variables and the same process of elimination was performed. In each run, the employment change variable, X_3, emerged as the only significant variable.

Since the initial analysis of data from the counties in southeastern Wisconsin established the fact that change in employment is the most important variable causing mobility of the working-age group population, it was decided to include the change of employment as the only independent variable in the final form of the functional relationship. The regression statistics for this equation are given in Appendix Table A-2. The 17-county area includes many counties with large rural areas, where the pulling effect of employment on the

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[6] *Wisconsin Department of Taxation, Property Tax 1950, Bulletin No. 159, July 1951, and Property Tax 1960, Bulletin No. 460, July 1961, p. 1.*

[7] *The counties are Kenosha, Milwaukee, Ozaukee, Racine, Walworth, Washington, and Waukesha within the Southeastern Wisconsin Planning Region, and Columbia, Dane, Dodge, Fond du Lac, Green, Green Lake, Jefferson, Manitowoc, Rock, and Sheboygan.*

working-age group occurs less regularly than in urbanized areas. It was thus hypothesized that the employment-migration relationship within the Region would be different from the relationship within the 17-county area. Data from the seven counties were used to fit a regression equation for the Region (see Appendix Table A-3). As expected, the correlation between the change in employment and the migration rate in the working-age group is higher for the Region than for the 17-county area. This equation, which was used to forecast future migration of the working-age population in the Region in Model I, has the following form:

$$XLFMIG = 1.42361 * CEMP - 29.28972 \quad (14)$$

where: XLFMIG = net migration in working-age group (15-64) per 1,000 of total base year population during a 10-year period, and

CEMP = change in civilian nonagricultural employment per 1,000 of total base year population during the same time period.

Table 22 presents the actual 1960 and forecast levels of civilian nonagricultural employment in each county. The 1960 employment levels were taken from 1960 census data and the 1970-1990 employment levels were obtained by adjusting forecasts of county employment by place of work[8] on the basis of the trend of the ratio of employment by place of residence to employment by place of work for each county.

As previously noted, it was hypothesized that the migration in the child-age group follows the migration in the working-age group. Accordingly, a regression analysis was performed to find the relationship between the migration rates of the child-age group, comprised of age groups 0-4, 5-9, and 10-14, and the working-age group. The resulting equation is:

$$CHLDMG = 0.67776 * XLFMIG - 20.44056 \quad (15)$$

where: CHLDMG = net migration in child-age group (0-14) per 1,000 of total base year population.

The migration in the older-age group was also estimated on the basis of the migration in the working-age group. The validity of this assumption may be questioned. It would be better to estimate old-age group migration independently, on the basis of causal variables which influence such migration, but no such significant causal variables could be identified and measured. Therefore, in the absence of any better method, a correlation was established between migration in the older-age group and in the working-age group. The resulting equation is:

$$OLDMIG = 0.05364 * XLFMIG - 5.12491 \quad (16)$$

where: OLDMIG = net migration in older-age group (65 and over) per 1,000 of total base year population.

The total net migration in each county for a 10-year period can then be obtained by the following summation:

Total net migration per 1,000 of base year population = XLFMIG + CHLDMG + OLDMIG (17)

The projected total net migration values obtained with this method are shown in Table 23 by county.

Distribution of Future Net Migration Into Age, Sex, And Race Groups

The total forecast net migration levels of each county were distributed among the four sex-race components according to the pattern of differential migration that existed during 1950-60 in each county (see Table 24) with some adjustments. Since Ozaukee, Walworth, Washington, and Waukesha Counties all had nonwhite populations of less than 300 in 1960, no nonwhite entries are shown for these counties in Table 24. Under the assumptions that nonwhite migration into Milwaukee County would decline and nonwhite migration into the other counties in the Region would be stable or increase slightly, the following adjustments were made to obtain the proportion of net migration in each sex-race group:

1. For the period of the projections, the proportion of white out-migration in Milwaukee County was maintained at the

[8]*The employment forecasts by place of work for each county were obtained from SEWRPC Planning Report No. 7, Volume Two, Forecasts and Alternative Plans: 1990, June 1966. These forecasts were adjusted to take into account more recent trends in regional employment levels since the original forecasts were prepared in 1964.*

Table 22

MODEL I ESTIMATED AND PROJECTED CIVILIAN NONAGRICULTURAL EMPLOYMENT IN THE SOUTHEASTERN WISCONSIN REGION BY COUNTY: 1960, 1970, 1980, AND 1990

County	Nonagricultural Employment (in thousands)			
	1960	1970	1980	1990
Kenosha	38.50	41.00	46.00	53.00
Milwaukee	414.00	401.00	405.00	413.00
Ozaukee	9.40	13.10	17.10	23.00
Racine	52.56	58.06	65.53	94.60
Walworth	19.73	24.00	27.00	33.50
Washington	16.97	23.00	30.00	40.00
Waukesha	56.59	79.60	105.00	132.00
Region	607.75	639.76	695.63	789.10

Source: SEWRPC.

1950-60 level, while the proportion of nonwhite in-migration was reduced to 15 percent of the total.

2. The proportion of nonwhite migration in Kenosha County was set at 10 percent of the total migration.

3. A nonwhite migration proportion of 1 percent was assigned to the counties of Ozaukee, Walworth, and Washington.

4. A nonwhite migration proportion of 2 percent was assigned to Waukesha County. Racine was the only county which had no adjustments made to the sex-race group proportions.

After obtaining the total net migration in each of the four sex-race groups, these values were distributed among the respective age groups according to the age-specific migration ratios of Tables 14 through 21. The same ratios were used throughout the projection period, because the age-specific composition of net migration in a particular sex-race group is likely to remain essentially the same.

The forecast total net migrations by age, sex, and race for each county obtained with this method are for 10-year periods. Because the projection interval was a five-year period, the total net migrations expected in each age, sex, and race group by decade were halved. The assumption is that migration occurs uniformly during a 10-year period. In reality, there is every possibility of a non-uniform flow of migrating population; however, this assumption involves only the mid-census period projections.

COMPUTATIONAL PROCEDURE

The computational procedure is iterative, the computation being carried forward to the forecast year by five-year period beginning with 1960 to the year 1990. The state of the system at the end of a particular computation period is determined on the basis of the information available at the end of the preceding computation period. The change in the state of the system indicates the change in population figures.

Each component of population (white male, nonwhite male, white female, nonwhite female) is quantified into 16 discrete age groups (0-4, 5-9, 10-14 . . . 70-74, 75 and over). The simulation period 1970-1990 is quantified into six discrete units of five-year periods. As the system is processed during a particular computation period, each cohort group is updated or aged according to its survival rate. Subsequently, new population figures are generated for the 0-4 age group on the

Table 23

MODEL I ESTIMATED AND PROJECTED NET MIGRATION OF POPULATION IN THE SOUTHEASTERN WISCONSIN REGION BY COUNTY AND RACE: 1950-1990

County	White Net Migration (in hundreds)			
	1950-1960	1960-1970	1970-1980	1980-1990
Kenosha	106	14	10	46
Milwaukee	-145	-1,277	-834	-754
Ozaukee	90	99	128	161
Racine	81	65	51	53
Walworth	49	46	50	85
Washington	48	99	123	180
Waukesha	521	436	442	424
Region	750	-518	-30	195

County	Nonwhite Net Migration			
	1950-1960	1960-1970	1970-1980	1980-1990
Kenosha	6	2	1	5
Milwaukee	281	167	109	98
Ozaukee	–	2	3	3
Racine	24	19	15	16
Walworth	–	–	1	1
Washington	–	1	1	2
Waukesha	–	10	10	10
Region	311	201	140	135

County	Total Net Migration			
	1950-1960	1960-1970	1970-1980	1980-1990
Kenosha	112	16	11	51
Milwaukee	136	-1,110	-725	-656
Ozaukee	90	101	131	164
Racine	105	84	66	69
Walworth	49	46	51	86
Washington	48	100	124	182
Waukesha	521	446	452	434
Region	1,061	-315	110	330

Source: SEWRPC.

Table 24

MODEL I COUNTY PROPORTIONS OF REGIONAL NET MIGRATION BY RACE AND SEX: 1950-1960

County	Proportion of Net Migration			
	Male		Female	
	White	Nonwhite	White	Nonwhite
Kenosha	0.5325	0.0280	0.4134	0.0261
Milwaukee	-0.4508	0.9822	-0.6209	1.0895
Ozaukee	0.4905	—[a]	0.5095	—[a]
Racine	0.3904	0.1091	0.3837	0.1168
Walworth	0.4993	—[a]	0.5007	—[a]
Washington	0.5461	—[a]	0.4539	—[a]
Waukesha	0.5075	—[a]	0.4925	—[a]
Region	0.3749	0.1399	0.3294	0.1558

[a] *Migration of nonwhite group was insignificant. See accompanying text.*

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

basis of the fertility rates of childbearing female age groups (15-44) by race. The total births in each racial group are split by sex according to the respective observed sex ratios at birth.

After the computation for natural increase is completed, the migrating population for each cohort is determined according to the migration assumptions. The migration figures for each cohort are then added or subtracted from the natural increase values to give the updated population at the beginning of the next computation period for the respective cohort. The same chain of computations continues for the next computation period on the basis of the updated population figures.

MODEL RESULTS

For comparative purposes, the model was run with three different sets of migration assumptions. Only the results of the model chosen as the forecast and discussed in this report are presented in Table 25, which sets forth the total population levels by county projected under Model I for the period 1970-1990. Detailed projections by age, sex, and race for 1970, 1980, and 1990 are shown in Appendix Tables B-1 through B-24. Table 25 shows that large population increases were forecast for all seven counties over the projection period, with an increase of approximately 723,000, or 46 percent, over the 1960 base for the Region as a whole. The populations of Ozaukee, Washington, and Waukesha Counties were all forecast to more than double during the 30-year period. While Milwaukee County had the smallest forecast percentage increase, it still had a forecast level in 1990 which was 172,000 more than the 1960 level.

Table 26 compares the 1970 forecast levels of Model I with the actual 1970 census levels. The forecast for the Region is less than 1 percentage point above the census figure. Six of the seven counties' forecasts vary less than 2 percent from the census levels. Kenosha County had the largest relative variance from its census level with a difference of almost 3 percent. Two of the counties, Milwaukee and Racine, were overforecast by the model, Milwaukee by over 9,000 persons, or 1 percent. The census estimates for the other counties are above the forecast levels. The net effect is that much of the deviation at the regional level is canceled out.

Table 25

ACTUAL 1960 AND FORECAST 1970-1990 POPULATION LEVELS UNDER MODEL I BY COUNTY

County	Population (in hundreds)				Population Change			
					1960-1990		1970-1990	
	1960	1970	1980	1990	Number	Percent	Number	Percent
Kenosha	1,006	1,148	1,274	1,472	466	46.3	324	28.2
Milwaukee	10,360	10,635	11,178	12,076	1,716	16.6	1,441	13.6
Ozaukee	384	544	750	1,030	646	168.2	486	89.3
Racine	1,418	1,716	2,006	2,383	965	68.0	667	38.9
Walworth	524	626	736	898	374	71.4	272	43.4
Washington	461	638	853	1,173	712	154.4	535	83.9
Waukesha	1,583	2,280	3,041	3,931	2,348	148.3	1,651	72.4
Region	15,736	17,587	19,838	22,963	7,227	45.9	5,376	30.6

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

Table 26

COMPARISON OF 1970 CENSUS AND 1970 MODEL I FORECAST POPULATION LEVELS BY COUNTY

County	Population		Difference	
	1970 Census	Model I Forecast	Number	Percent
Kenosha	117,917	114,800	-3,117	-2.6
Milwaukee	1,054,249	1,063,500	9,251	0.9
Ozaukee	54,461	54,400	-61	-0.1
Racine	170,838	171,600	762	0.4
Walworth	63,444	62,600	-844	-1.3
Washington	63,839	63,800	-39	-0.1
Waukesha	231,335	228,000	-3,335	-1.4
Region	1,756,083	1,758,700	2,617	0.2

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

Tables 27 and 28 compare estimated and forecast 1960-1970 migration levels and 1970 total fertility rates. Kenosha, Milwaukee, and Waukesha Counties had the greatest absolute differences between the 1970 actual and forecast population levels. An examination of these two tables and of the age-specific fertility rates making up these total fertility rates suggests that the Kenosha County difference results from both a slight underforecast of in-migration and an underforecast of the child-bearing activity of younger women in Kenosha County. The estimated 1970 fertility rates in Milwaukee County were considerably lower than the forecast rates, which resulted in an overforecast of the population in Model I even though net out-migration was overforecast. Waukesha County's forecast is more than 3,000 persons lower than the actual level, and this difference seems to be accounted for by the underforecast of migration into Waukesha County. In general, in-migration was underforecast. In Milwaukee County the net out-migration was overforecast. Fertility appears to have been overforecast for the period 1960-1970.

Table 27

COMPARISON OF ESTIMATED AND MODEL I FORECAST NET MIGRATION LEVELS: 1960-1970

County	Net Migration Level		Difference	
	Estimated	Model I Forecast	Number	Percent
Kenosha	2,100	1,600	-500	-23.8
Milwaukee	-104,300	-111,000	-6,700	-6.4
Ozaukee	10,000	10,100	100	1.0
Racine	8,600	8,400	-200	-2.3
Walworth	6,400	4,600	-1,800	-28.1
Washington	9,600	10,000	400	4.2
Waukesha	47,300	44,600	-2,700	-5.7
Region	-20,300	-31,700	-11,400	-56.2

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

Table 28

COMPARISON OF ESTIMATED AND MODEL I FORECAST TOTAL FERTILITY RATES PER WOMAN BY RACE AND COUNTY: 1970

County	White		Nonwhite	
	Estimate	Model I Forecast	Estimate	Model I Forecast[a]
Kenosha	2.6	2.6	3.3	3.5
Milwaukee	2.3	2.4	3.8	3.3
Ozaukee	2.6	2.9	3.6	3.5
Racine	2.5	2.8	3.7	3.7
Walworth	2.3	2.6	3.3	3.5
Washington	2.9	3.1	3.6	3.5
Waukesha	2.5	2.8	3.3	3.5
Region	2.4	2.6	3.7	3.4

[a] *Nonwhite rate for Kenosha, Ozaukee, Walworth, Washington, and Waukesha Counties is the average of the Milwaukee and Racine rates.*

Source: Wisconsin Department of Health and Social Services and SEWRPC.

Chapter III

DEVELOPMENT OF MODEL II

The revised version—Model II—of the Commission demographic model was developed several years after the 1970 census. It has the same cohort component structure as Model I. It too integrates economic analysis into the population projection process, albeit subjectively, by relating employment to net migration. Since it was developed after Model I, more recent fertility, mortality, and migration trends could be taken into account. In addition, several modifications were made to the projection methodology in order to simplify and improve the procedure.

FERTILITY

The decline in fertility which apparently began around 1960 has continued at both the state[1] and national[2] levels, with a rapid drop in fertility since 1970. Tables 29 through 36 present age- and race-specific fertility rates for the seven counties and the Region in 1970. These rates are in every case except one lower than the corresponding rates for 1960 shown in Table 2. In the one exception, the rates are almost equal. Tables 29 through 36 also display the total fertility rate (TFR) for each county in 1970. The TFR is calculated by summing the age-specific rates and multiplying by five, the age group interval.

The TFR represents the children a hypothetical cohort of 1,000 women would produce if they experienced the set of age-specific fertility rates in effect at a specific point in time. A TFR of 2,115, or 2.11 per woman, means the women are producing enough children to replace their cohort, given the existing sex ratio and survival rates, and

[1] *Wisconsin Division of Health, Wisconsin Public Health Statistics, 1973, Madison, Wisconsin, pp. 29-31.*

[2] *U. S. Bureau of the Census, "Fertility History and Prospects of American Women: June, 1975," Population Characteristics, Current Population Reports, Series P-20, No. 288, January 1976. pp. 1-2.*

Table 29

AGE-SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATES BY RACE FOR KENOSHA COUNTY: 1970

Female Age Group	White	Nonwhite
15-19	65.8	157.7
20-24	179.7	216.7
25-29	146.1	164.8
30-34	80.9	87.0
35-39	31.1	30.3
40-44	9.0	11.7
Total Births/ 1,000 Females Age 15-44	512.6	668.2
Total Fertility Rate	2,563	3,341

Source: Wisconsin Department of Health and Social Services and SEWRPC.

Table 30

AGE-SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATES BY RACE FOR MILWAUKEE COUNTY: 1970

Female Age Group	White	Nonwhite
15-19	45.0	227.0
20-24	147.6	241.1
25-29	148.3	157.2
30-34	78.7	87.9
35-39	34.3	41.8
40-44	8.0	14.1
Total Births/ 1,000 Females Age 15-44	461.9	769.1
Total Fertility Rate	2,310	3,846

Source: Wisconsin Department of Health and Social Services and SEWRPC.

Table 31

AGE-SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATES BY RACE FOR OZAUKEE COUNTY: 1970

Female Age Group	White	Nonwhite
15-19	38.3	155.8
20-24	170.2	226.0
25-29	173.2	177.8
30-34	82.1	95.8
35-39	38.4	51.9
40-44	10.0	18.7
Total Births/ 1,000 Females Age 15-44	512.2	725.9
Total Fertility Rate	2,561	3,630

Source: Wisconsin Department of Health and Social Services and SEWRPC.

Table 32

AGE-SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATES BY RACE FOR RACINE COUNTY: 1970

Female Age Group	White	Nonwhite
15-19	52.4	198.0
20-24	174.8	204.9
25-29	148.0	154.9
30-34	79.4	124.3
35-39	34.9	43.5
40-44	9.3	11.2
Total Births/ 1,000 Females Age 15-44	498.8	736.8
Total Fertility Rate	2,494	3,684

Source: Wisconsin Department of Health and Social Services and SEWRPC.

Table 33

AGE-SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATES BY RACE FOR WALWORTH COUNTY: 1970

Female Age Group	White	Nonwhite
15-19	36.0	121.5
20-24	123.5	173.6
25-29	169.2	178.3
30-34	88.1	116.5
35-39	38.3	52.0
40-44	10.6	11.6
Total Births/ 1,000 Females Age 15-44	465.7	653.5
Total Fertility Rate	2,329	3,268

Source: Wisconsin Department of Health and Social Services and SEWRPC.

Table 34

AGE-SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATES BY RACE FOR WASHINGTON COUNTY: 1970

Female Age Group	White	Nonwhite
15-19	49.2	161.0
20-24	206.0	234.2
25-29	174.8	174.8
30-34	85.3	90.4
35-39	53.8	53.8
40-44	13.6	13.6
Total Births/ 1,000 Females Age 15-44	582.7	727.8
Total Fertility Rate	2,914	3,639

Source: Wisconsin Department of Health and Social Services and SEWRPC.

Table 35

AGE-SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATES BY RACE FOR WAUKESHA COUNTY: 1970

Female Age Group	White	Nonwhite
15-19	35.1	145.8
20-24	164.2	200.7
25-29	168.6	174.0
30-34	82.6	87.5
35-39	38.1	44.4
40-44	9.5	9.5
Total Births/ 1,000 Females Age 15-44	498.1	661.9
Total Fertility Rate	2,491	3,310

Source: Wisconsin Department of Health and Social Services and SEWRPC.

Table 36

AGE-SPECIFIC FERTILITY RATES AND TOTAL FERTILITY RATES BY RACE FOR THE SOUTHEASTERN WISCONSIN REGION: 1970

Female Age Group	White	Nonwhite
15-19	36.3	208.0
20-24	155.2	235.9
25-29	153.5	156.9
30-34	80.4	90.4
35-39	35.9	41.9
40-44	8.7	13.8
Total Births/ 1,000 Females Age 15-44	470.0	746.9
Total Fertility Rate	2,350	3,735

Source: Wisconsin Department of Health and Social Services and SEWRPC.

is therefore termed "replacement level fertility." All seven counties' TFR's in 1970 are above replacement level. The TFR for the State of Wisconsin (2,540) was also above replacement level in 1970, but fell to below replacement level by 1972.[3] Nationally, the TFR also fell below the replacement level in 1972. Given that fertility declines cannot continue indefinitely, and considering national data on birth expectations, the most reasonable future course for fertility, according to the U. S. Bureau of the Census, is a gradual rise to around replacement level in the 1990's and a continuation of rates around that level until after 2000.[4]

The projected fertility rates in Model II, in accordance with these recent fertility changes, assume current and expected levels of fertility which are lower than those of Model I. In addition to changes in the fertility levels, the procedure to project fertility in Model II has also been simplified. Rather than using a fairly complex system relating age-specific fertility to the fertility of women 20-24, as was done in Model I, the method employed in Model II bases all fertility projections on 1970 data and projections of TFR's, which were developed according to a national projection of the TFR and adjusted to reflect county and regional fertility rate differentials. The TFR's were projected according to the assumption that fertility will decline to below replacement level by 1980 and then gradually return to around replacement level or slightly higher by the end of the projection period. This assumption is patterned after a national fertility projection, prepared by the U. S. Bureau of the Census, which assumes that the TFR will decline to 1,600 in 1980 and increase to 2,110 by 2000.[5] The projected national fertility

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[3] *Wisconsin Division of Health, loc. cit.*

[4] *U. S. Bureau of the Census, "Projections of the Population of the United States: 1975 to 2050," Population Estimates and Projections, Current Population Reports, Series P-25, No. 601, October 1975, p. 2.*

[5] *U. S. Bureau of the Census, "Illustrative Population Projections for the United States: The Demographic Effects of Alternate Paths to Zero Growth," Population Estimates and Projections, Current Population Reports, Series P-25, No. 480, April 1972, p. 12.*

rates for 1970-2000, as well as recent national TFR's, are displayed in Table 37. The relationship of these TFR's to replacement level fertility is shown in Figure 2.

Nonwhites in the United States have historically had higher fertility rates than whites. That this is also true on the regional level is evident in Tables 29 through 36, which show higher fertility for nonwhites in almost every case. Model II assumes that there will be no reduction in the racial differential in fertility. Both racial groups' fertility rates are expected to follow the pattern of the national projection, but nonwhite fertility is expected to remain at a higher level.

These projected TFR's are displayed in Table 38, and in Figures 3 through 10 the relationships between the projected total fertility rates and replacement level fertility are graphed for the counties and the Region. As to be expected, the curves of the graphs of TFR's in these figures parallel the curve of the projected national fertility level, shown in Figure 2, on which the county TFR's were based.

From Table 38, a series of factors α^{m}_{j}, relating projected to current fertility, were derived for each county and the Region, where:

$$\alpha^{m}_{j} = \frac{TFR^{m}_{j}}{TFR_{j}^{1970}} \qquad (17)$$

j = race (white, nonwhite); and

m = year of projection.

When α equals one, projected fertility is equal to the 1970 level; when α is below or above one, projected fertility is below the 1970 fertility level or above the 1970 fertility level, respectively. Table 39 presents the α's which were derived from the county and regional TFR projections.

Forecast age-specific fertility rates were determined by applying the forecast α's to 1970 race- and age-specific fertility rates:

$${}_{i}F^{m}_{j} = \alpha^{m}_{j} * {}_{i}F_{j}^{1970} \qquad (18)$$

Table 37

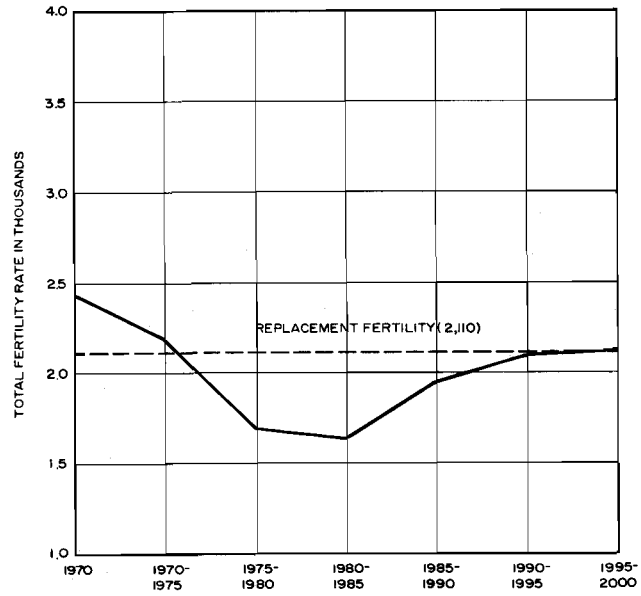
HISTORICAL AND PROJECTED TOTAL FERTILITY RATES FOR THE UNITED STATES

Time Period	Total Fertility Rate
1950-1955	3,285
1955-1960	3,640
1960-1965	3,456
1965-1970	2,616
1970-1975	2,194
1975-1980	1,696
1980-1985	1,647
1985-1990	1,952
1990-1995	2,091
1995-2000	2,119

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

Figure 2

1970 AND PROJECTED SERIES V TOTAL FERTILITY RATES IN THE UNITED STATES



Source: SEWRPC.

where: F = birthrate per 1,000 women,

i = age group of childbearing females,

j = race (white, nonwhite), and

m = year of projection.

Table 38

MODEL II PROJECTED TOTAL FERTILITY RATES PER WOMAN BY RACE: 1970-2000

County	Projection Period					
	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
Kenosha						
White	2.00	1.89	1.89	2.00	2.00	2.20
Nonwhite	2.61	2.47	2.47	2.61	2.61	2.87
Milwaukee						
White	1.80	1.71	1.46	1.71	1.80	1.80
Nonwhite	3.30	3.00	2.84	2.84	3.00	3.00
Ozaukee						
White	2.56	2.00	1.89	2.00	2.20	2.20
Nonwhite	3.63	2.83	2.69	2.83	3.12	3.12
Racine						
White	1.94	1.84	1.84	1.57	1.84	1.94
Nonwhite	2.87	2.72	2.72	2.72	2.87	2.87
Walworth						
White	2.33	1.82	1.72	1.72	2.00	2.00
Nonwhite	3.27	2.55	2.42	2.42	2.81	2.81
Washington						
White	2.91	2.27	2.27	2.15	2.27	2.50
Nonwhite	3.64	2.84	2.84	2.69	2.84	3.13
Waukesha						
White	2.49	1.94	1.84	1.94	2.14	2.14
Nonwhite	3.31	2.58	2.45	2.58	2.85	2.85
Region						
White	2.02	1.82	1.74	1.82	2.02	2.02
Nonwhite	3.36	2.91	2.76	2.76	3.21	3.21

Source: SEWRPC.

The generated ${}_iF_j^m$'s are presented in Tables 40 through 47. These age-specific rates were multiplied by the projected female population in the respective age groups to obtain the projected number of births. The births were assumed to be equally divided by sex.

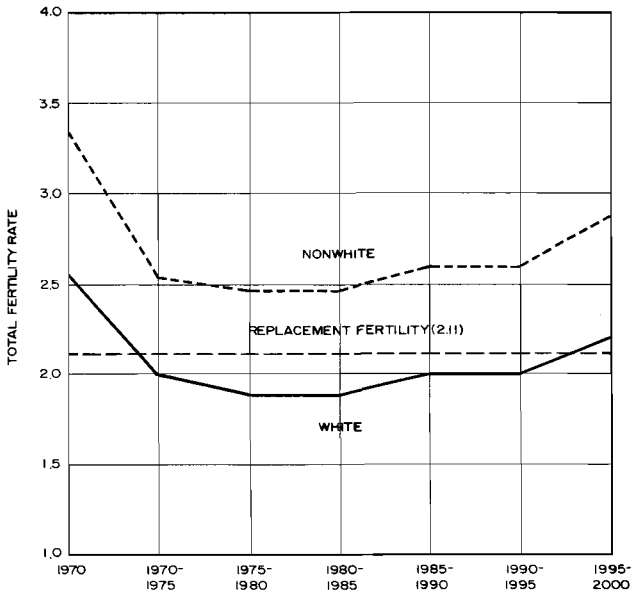
MORTALITY

All four sex-race groups have continued to experience reductions in mortality rates. However, rates for males continue to be higher than for females and for nonwhites higher than for whites.[6] The 1969 survival rates for five-year age groups by race and sex which are presented in Table 48 show lower mortality rates than the 1960 survival rate base data of Model I for almost every sex-race-age group.

[6]*National Center for Health Statistics, "Final Mortality Statistics, 1974, Advance Report," Monthly Vital Statistics Report, 24:1, February 3, 1976, pp. 2-3.*

Figure 3

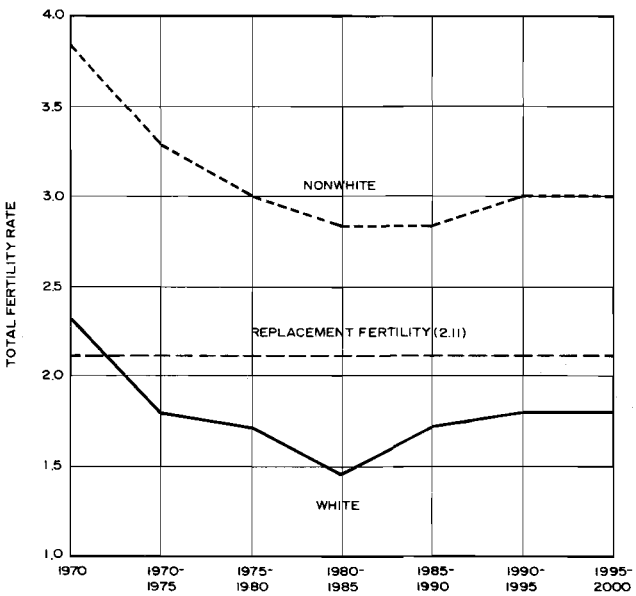
1970 AND PROJECTED TOTAL FERTILITY RATES PER WOMAN IN KENOSHA COUNTY



Source: SEWRPC.

Figure 4

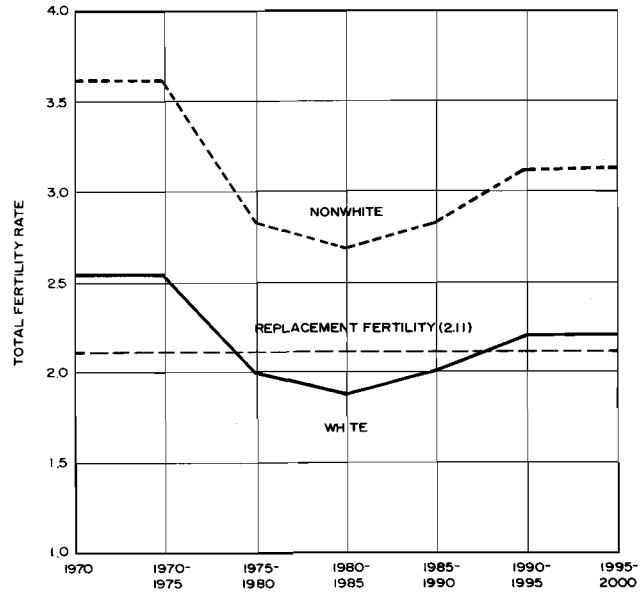
1970 AND PROJECTED TOTAL FERTILITY RATES PER WOMAN IN MILWAUKEE COUNTY



Source: SEWRPC.

Figure 5

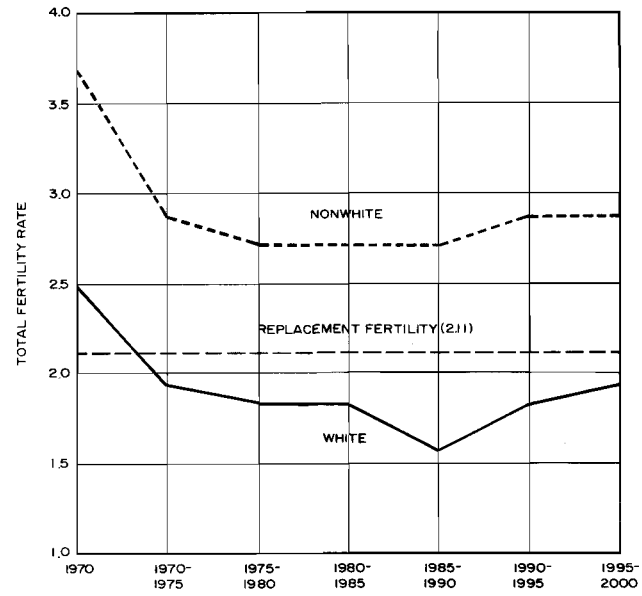
1970 AND PROJECTED TOTAL FERTILITY RATES PER WOMAN IN OZAUKEE COUNTY



Source: SEWRPC.

Figure 6

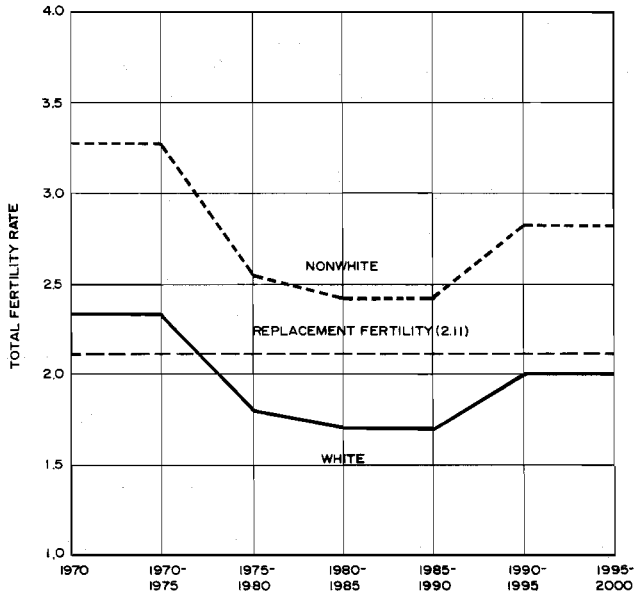
1970 AND PROJECTED TOTAL FERTILITY RATES PER WOMAN IN RACINE COUNTY



Source: SEWRPC.

Figure 7

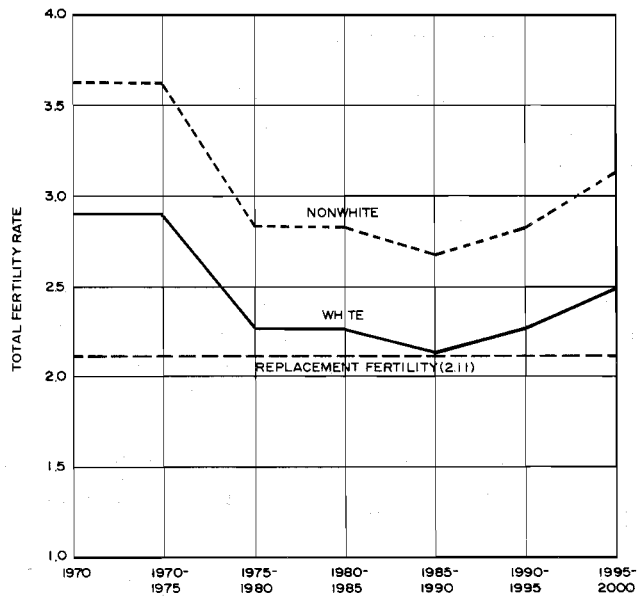
1970 AND PROJECTED TOTAL FERTILITY RATES PER WOMAN IN WALWORTH COUNTY



Source: SEWRPC.

Figure 8

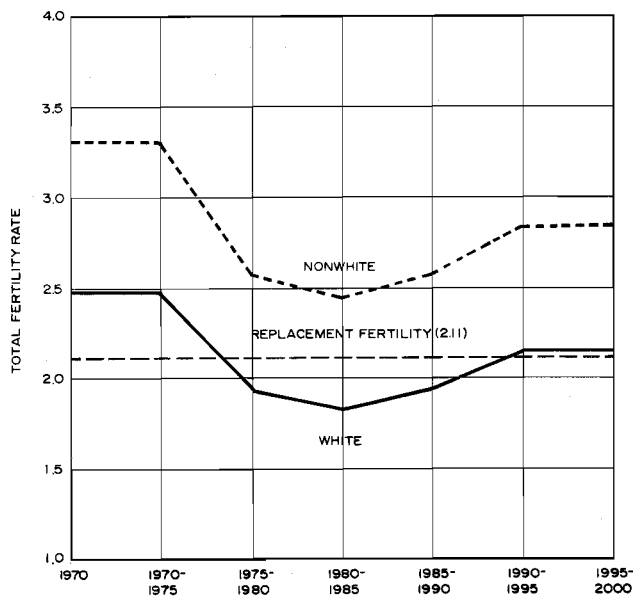
1970 AND PROJECTED TOTAL FERTILITY RATES PER WOMAN IN WASHINGTON COUNTY



Source: SEWRPC.

Figure 9

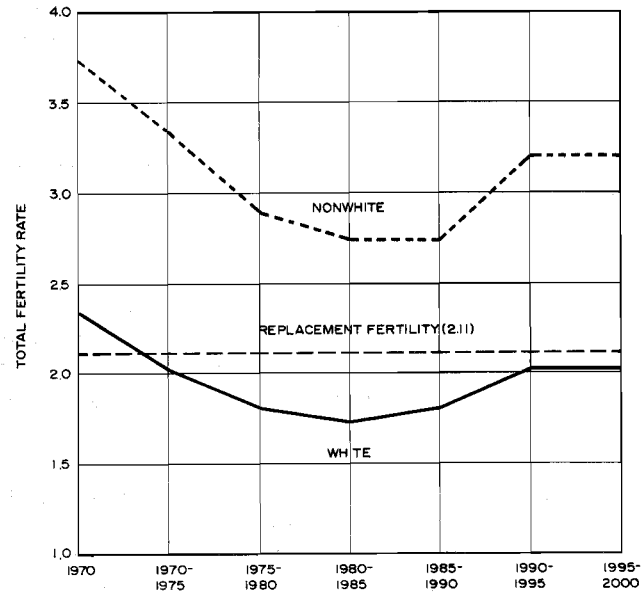
1970 AND PROJECTED TOTAL FERTILITY RATES PER WOMAN IN WAUKESHA COUNTY



Source: SEWRPC.

Figure 10

1970 AND PROJECTED TOTAL FERTILITY RATES PER WOMAN IN THE REGION



Source: SEWRPC.

Table 39

MODEL II PROJECTED FERTILITY FACTORS BY RACE: 1970-2000

County	Projection Period					
	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
Kenosha						
White	0.78	0.74	0.74	0.78	0.78	0.86
Nonwhite	0.78	0.74	0.74	0.78	0.78	0.86
Milwaukee						
White	0.78	0.74	0.63	0.74	0.78	0.78
Nonwhite	0.86	0.78	0.74	0.74	0.78	0.78
Ozaukee						
White	1.00	0.78	0.74	0.78	0.86	0.86
Nonwhite	1.00	0.78	0.74	0.78	0.86	0.86
Racine						
White	0.78	0.74	0.74	0.63	0.74	0.78
Nonwhite	0.78	0.74	0.74	0.74	0.78	0.78
Walworth						
White	1.00	0.78	0.74	0.74	0.86	0.86
Nonwhite	1.00	0.78	0.74	0.74	0.86	0.86
Washington						
White	1.00	0.78	0.78	0.74	0.78	0.86
Nonwhite	1.00	0.78	0.78	0.74	0.78	0.86
Waukesha						
White	1.00	0.78	0.74	0.78	0.86	0.86
Nonwhite	1.00	0.78	0.74	0.78	0.86	0.86
Region						
White	0.86	0.78	0.74	0.78	0.86	0.86
Nonwhite	0.90	0.78	0.74	0.74	0.86	0.86

Source: SEWRPC.

The rates for white males and females in Table 48 are the survival rates for all Wisconsin males and females in effect during 1967-1969.[7] Rates for nonwhite males and females in the table are 1969 U. S. rates for nonwhite males and females.[8]

Like Model I, Model II assumes no variations in mortality rates among counties. Unlike Model I, Model II makes no projections of further reductions in mortality. With better health care, education, and services and with the control of infectious diseases, mortality in the U. S. and Wisconsin has reached such low levels that it was assumed at the time that Model II was developed that mortality was unlikely to significantly decline

[7] *Wisconsin Division of Health, Public Health Statistics, Wisconsin—1969, Madison, Wisconsin, p. 9.*

[8] *National Center for Health Statistics, "Life Tables," Vital Statistics of the United States, 1969, Vol. II, Section 5, p. 8.*

Table 40

MODEL II PROJECTED AGE-SPECIFIC FERTILITY RATES BY RACE—KENOSHA COUNTY: 1970-2000
(NUMBER OF BIRTHS PER 1,000 WOMEN)

Age of Women	Projection Period					
	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
White						
15-19	51.3	48.7	48.7	51.3	51.3	56.6
20-24	140.2	133.0	133.0	140.2	140.2	154.5
25-29	114.0	108.1	108.1	114.0	114.0	125.6
30-34	63.1	59.9	59.9	63.1	63.1	69.6
35-39	24.3	23.0	23.0	24.3	24.3	26.8
40-44	7.0	6.7	6.7	7.0	7.0	7.7
Nonwhite						
15-19	123.0	116.7	116.7	123.0	123.0	135.6
20-24	169.0	160.4	160.4	169.0	169.0	186.4
25-29	128.5	122.0	122.0	128.5	128.5	141.7
30-34	67.9	64.4	64.4	67.9	67.9	74.8
35-39	23.6	22.4	22.4	23.6	23.6	26.1
40-44	9.1	8.7	8.7	9.1	9.1	10.1

Source: SEWRPC.

Table 41

MODEL II PROJECTED AGE-SPECIFIC FERTILITY RATES BY RACE—MILWAUKEE COUNTY: 1970-2000
(NUMBER OF BIRTHS PER 1,000 WOMEN)

Age of Women	Projection Period					
	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
White						
15-19	35.1	33.3	28.4	33.3	35.1	35.1
20-24	115.1	109.2	93.0	109.2	115.1	115.1
25-29	115.7	109.7	93.4	109.7	115.7	115.7
30-34	61.4	58.2	49.6	58.2	61.4	61.4
35-39	26.8	25.4	21.6	25.4	26.8	26.8
40-44	6.2	5.9	5.0	5.9	6.2	6.2
Nonwhite						
15-19	195.2	177.1	168.0	168.0	177.1	177.1
20-24	207.4	188.1	178.4	178.4	188.1	188.1
25-29	135.2	122.6	116.3	116.3	122.6	122.6
30-34	75.6	68.6	65.1	65.1	68.6	68.6
35-39	36.0	32.6	30.9	30.9	32.6	32.6
40-44	12.1	11.0	10.4	10.4	11.0	11.0

Source: SEWRPC.

Table 42

MODEL II PROJECTED AGE-SPECIFIC FERTILITY RATES BY RACE—OZAUKEE COUNTY: 1970-2000
(NUMBER OF BIRTHS PER 1,000 WOMEN)

Age of Women	Projection Period					
	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
White						
15-19	38.3	29.9	28.3	29.9	32.9	32.9
20-24	170.2	132.8	126.0	132.8	146.4	146.4
25-29	173.2	135.1	128.2	135.1	149.0	149.0
30-34	82.1	64.0	60.8	64.0	70.6	70.6
35-39	38.4	30.0	28.4	30.0	33.0	33.0
40-44	10.0	7.8	7.4	7.8	8.6	8.6
Nonwhite						
15-19	155.8	121.5	115.3	121.5	134.0	134.0
20-24	226.0	176.3	167.2	176.3	194.4	194.4
25-29	177.8	138.7	131.6	138.7	152.9	152.9
30-34	95.8	74.7	70.9	74.7	82.4	82.4
35-39	51.8	40.4	38.3	40.4	44.6	44.6
40-44	18.7	14.6	13.8	14.6	16.1	16.1

Source: SEWRPC.

Table 43

MODEL II PROJECTED AGE-SPECIFIC FERTILITY RATES BY RACE—RACINE COUNTY: 1970-2000
(NUMBER OF BIRTHS PER 1,000 WOMEN)

Age of Women	Projection Period					
	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
White						
15-19	40.9	38.8	38.8	33.0	38.8	40.9
20-24	136.3	129.4	129.4	110.1	129.4	136.3
25-29	115.4	109.5	109.5	93.2	109.5	115.4
30-34	61.9	58.8	58.8	50.0	58.8	61.9
35-39	27.2	25.8	25.8	22.0	25.8	27.2
40-44	7.2	6.9	6.9	5.9	6.9	7.2
Nonwhite						
15-19	154.4	146.5	146.5	146.5	154.4	154.4
20-24	159.8	151.6	151.6	151.6	159.8	159.8
25-29	120.8	114.6	114.6	114.6	120.8	120.8
30-34	97.0	92.0	92.0	92.0	97.0	97.0
35-39	33.9	32.2	32.2	32.2	33.9	33.9
40-44	8.7	8.3	8.3	8.3	8.7	8.7

Source: SEWRPC.

Table 44

MODEL II PROJECTED AGE-SPECIFIC FERTILITY RATES BY RACE–WALWORTH COUNTY: 1970-2000
(NUMBER OF BIRTHS PER 1,000 WOMEN)

Age of Women	Projection Period					
	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
White						
15-19	36.0	28.1	26.6	26.6	31.0	31.0
20-24	123.5	96.3	91.4	91.4	106.2	106.2
25-29	169.2	132.0	125.2	125.2	145.5	145.5
30-34	88.1	68.7	65.2	65.2	75.8	75.8
35-39	38.3	29.9	28.3	28.3	32.9	32.9
40-44	10.6	8.3	7.8	7.8	9.1	9.1
Nonwhite						
15-19	121.5	94.8	89.9	89.9	104.5	104.5
20-24	173.6	135.4	128.5	128.5	149.3	149.3
25-29	178.3	139.1	131.9	131.9	153.3	153.3
30-34	116.5	90.9	86.2	86.2	100.2	100.2
35-39	52.0	40.6	38.5	38.5	44.7	44.7
40-44	11.6	9.1	8.6	8.6	10.0	10.0

Source: SEWRPC.

Table 45

MODEL II PROJECTED AGE-SPECIFIC FERTILITY RATES BY RACE–WASHINGTON COUNTY: 1970-2000
(NUMBER OF BIRTHS PER 1,000 WOMEN)

Age of Women	Projection Period					
	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
White						
15-19	49.2	38.4	38.4	36.4	38.4	42.3
20-24	206.0	160.7	160.7	152.4	160.7	177.2
25-29	174.8	136.3	136.3	129.4	136.3	150.3
30-34	85.3	66.5	66.5	63.1	66.5	73.4
35-39	53.8	42.0	42.0	39.8	42.0	46.3
40-44	13.6	10.6	10.6	10.1	10.6	11.7
Nonwhite						
15-19	161.0	125.6	125.6	119.1	125.6	138.5
20-24	234.2	182.7	182.7	173.3	182.7	201.4
25-29	174.8	136.3	136.3	129.4	136.3	150.3
30-34	90.4	70.5	70.5	66.9	70.5	77.7
35-39	53.8	42.0	42.0	39.8	42.0	46.3
40-44	13.6	10.6	10.6	10.1	10.6	11.7

Source: SEWRPC.

Table 46

MODEL II PROJECTED AGE-SPECIFIC FERTILITY RATES BY RACE–WAUKESHA COUNTY: 1970-2000
(NUMBER OF BIRTHS PER 1,000 WOMEN)

Age of Women	Projection Period					
	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
White						
15-19	35.1	27.4	26.0	27.4	30.2	30.2
20-24	164.2	128.1	121.5	128.1	141.2	141.2
25-29	168.6	131.5	124.8	131.5	145.0	145.0
30-34	82.6	64.4	61.1	64.4	71.0	71.0
35-39	38.1	29.7	28.2	29.7	32.8	32.8
40-44	9.5	7.4	7.0	7.4	8.2	8.2
Nonwhite						
15-19	145.8	113.7	107.9	113.7	125.4	125.4
20-24	200.7	156.6	148.5	156.6	172.6	172.6
25-29	174.0	135.7	128.8	135.7	149.6	149.6
30-34	87.5	68.2	64.8	68.2	75.2	75.2
35-39	44.4	34.6	32.9	34.6	38.2	38.2
40-44	9.5	7.4	7.0	7.4	8.2	8.2

Source: SEWRPC.

Table 47

MODEL II PROJECTED AGE-SPECIFIC FERTILITY RATES BY RACE–REGION: 1970-2000
(NUMBER OF BIRTHS PER 1,000 WOMEN)

Age of Women	Projection Period					
	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
White						
15-19	31.2	28.3	26.9	28.3	31.2	31.2
20-24	133.5	121.1	114.8	121.1	133.5	133.5
25-29	132.0	119.7	113.6	119.7	132.0	132.0
30-34	69.1	62.7	59.5	62.7	69.1	69.1
35-39	30.9	28.0	26.6	28.0	30.9	30.9
40-44	7.5	6.8	6.4	6.8	7.5	7.5
Nonwhite						
15-19	187.2	162.2	153.9	153.9	178.9	178.9
20-24	212.3	184.0	174.6	174.6	202.9	202.9
25-29	141.2	122.4	116.1	116.1	134.9	134.9
30-34	81.4	70.5	66.9	66.9	77.7	77.7
35-39	37.7	32.7	31.0	31.0	36.0	36.0
40-44	12.4	10.8	10.2	10.2	11.9	11.9

Source: SEWRPC.

Table 48

1969 SURVIVAL RATES PER 1,000 POPULATION USED IN MODEL II

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	977.4	963.5	981.8	969.4
5-9	997.9	996.8	998.3	997.7
10-14	997.9	996.3	998.6	997.9
15-19	991.7	988.3	996.7	995.3
20-24	990.4	980.5	996.4	993.2
25-29	992.7	977.5	996.9	990.4
30-34	992.2	970.9	995.4	985.4
35-39	989.6	961.3	992.4	978.5
40-44	982.9	947.3	988.9	969.8
45-49	971.0	931.3	983.5	958.4
50-54	953.2	904.4	974.6	942.9
55-59	925.2	869.3	961.5	918.6
60-64	884.7	824.2	942.7	881.1
65-69	830.1	754.5	900.7	812.0
70-74	743.4	650.6	847.0	765.3
75 +	596.4	649.8	696.0	735.6

Source: National Center for Health Statistics, Division of Vital Statistics; Wisconsin Department of Health and Social Services, Division of Health; and SEWRPC.

in the near future. Under the assumptions of no variations in mortality over the next 30 years and of no variation by county, the 1969 survival rates presented in Table 48 were used in all projections.

The survival rates used in Model II are generally higher for whites and lower for nonwhites, except at the younger ages, than the rates projected for 1960-1970 in Model I. Model I's 1970-1980 and 1980-1990 survival rates are generally somewhat higher for both racial groups, although the Model II rates are higher for the youngest age groups.

MIGRATION

For the period 1960-1970, net migration estimates by age, sex, and race were estimated using a procedure, similar to that of Model I, involving census data. Race-sex group proportions of net migration during 1960-1970 are presented in Table 49 by county, and migration ratios by age, sex, and race for each county and the Region are shown in Tables 50 through 57. Unlike Model I, Model II made no adjustments to nonwhite group proportions of total net migration.

The Commission's employment projections are made according to county of employment rather than county of residence and thus represent the number of jobs projected for each county and the Region as a whole. The methodology used in these forecasts, together with the resultant employment levels, is presented in Appendix C. Because many people commute to jobs outside their county of residence, a projection of county migration levels based on the number of jobs projected for each county may result in an incorrect distribution of migration between counties. While the same situation may exist on the regional level, it is not likely to occur as frequently. Therefore, various methods of projecting net migration by relating it to employment forecasts were tested at the regional level only. One of the methods tested applied Model I's regression equations to current regional employment forecasts; the method produced large net in-migration figures, which were intuitively rejected as being too high. After consideration of the various projection methods, the forecast regional net migration levels were selected on the basis of perceptions of historical and expected trends in employment and other economic

Table 49

MODEL II COUNTY PROPORTIONS OF REGIONAL NET MIGRATION BY RACE AND SEX: 1960-1970

County	Proportion of Net Migration			
	Male		Female	
	White	Nonwhite	White	Nonwhite
Kenosha	0.1170	0.3511	0.1371	0.3948
Milwaukee	-0.5998	0.0414	-0.5146	0.0730
Ozaukee	0.6184	0.0034	0.3782	-0.0001
Racine	0.1893	0.2775	0.2094	0.3238
Walworth	0.4787	0.0108	0.5107	-0.0003
Washington	0.4914	-0.0017	0.5114	-0.0011
Waukesha	0.5351	–	0.4652	-0.0003
Region	-0.8500	0.3000	-0.7700	0.3200

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

variables. Employment in the Region was forecast to increase by 274,000 jobs between 1970 and 2000, with increases in jobs forecast for every major industry group in the Region except agriculture. After taking into account the natural increase forecast for the Region, the forecast changes in the age distribution of the population, and forecast labor force participation and unemployment rates—which were expected to continue at about their 1970 levels—the forecast growth in the labor force was smaller than the forecast increase in jobs. Since these unfilled jobs should attract migrants to the Region, a slight in-migration of population was forecast to occur in the Region between 1970 and 2000. These migration totals were then distributed among the seven counties with reference to historical migration trends and anticipated economic development.

The projected net migration figures by county are shown in Table 58. Each decade's total net migration was split in half to obtain net migration by five-year period. The total net migration allocated to each county was distributed among the four sex-race components according to the 1960-1970 sex-race proportions of migration in each county (Table 49). Unlike Model I, no further adjustments were made to the proportions. The sex-race totals were distributed among the age groups according to the migration ratios of Tables 50-57. As in Model I, these ratios were assumed to be in effect throughout the projection period.

COMPUTATIONAL PROCEDURE

The computational procedure of Model II follows the same iterative form as that of Model I, with the projections by five-year interval for the period 1970 to the year 2000. Births are computed by applying projected age-specific fertility rates to the female childbearing age groups and are split equally by sex. All age groups are "survived" over each five-year projection period. Forecast migration by age group is determined by applying race-sex proportions and age ratios to the total migration forecasts. Summing the natural increase and migration levels yields the forecast population, which becomes the base population for the next five-year projection period.

MODEL RESULTS

The model was initially run in 15 different sets, with varying fertility and migration assumptions. Upon examining the range of projections produced, one set, the set whose assumptions are detailed in this report, was chosen as the most reasonable.

Table 50

1960-1970 MIGRATION RATIOS USED IN MODEL II: KENOSHA COUNTY

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.2084	-0.0113	0.0113	0.0904
5-9	0.1571	0.1977	-0.1054	-0.1206
10-14	-0.2050	0.2711	0.2784	0.1658
15-19	-0.0495	0.1695	0.1122	0.1508
20-24	0.7100	0.0847	-0.0204	0.2161
25-29	-0.0134	0.1017	0.4097	0.1960
30-34	-0.2537	-0.0113	0.3277	0.1356
35-39	-0.0420	0.0452	0.0918	-0.0100
40-44	-0.0352	0.0678	0.0515	0.0804
45-49	-0.0176	0.0006	0.0682	0.0352
50-54	-0.0126	0.0508	0.0675	0.0302
55-59	0.0285	0.0056	-0.0288	-0.0050
60-64	0.0369	0.0113	0.0364	0.0006
65-69	0.1201	0.0169	-0.0880	0.0151
70-74	0.1462	-0.0056	-0.0773	0.0050
75+	0.2218	0.0056	-0.1350	0.0151

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

Table 51

1960-1970 MIGRATION RATIOS USED IN MODEL II: MILWAUKEE COUNTY

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.0702	-0.0608	0.0680	0.0009
5-9	0.1499	0.1326	0.1607	0.1092
10-14	0.1131	0.2377	0.1293	0.1405
15-19	0.0866	0.1124	0.0617	0.1010
20-24	0.0671	0.1566	0.0489	0.2147
25-29	0.0260	0.2632	0.0232	0.2118
30-34	0.0396	0.1362	0.1225	0.1012
35-39	0.0979	0.0202	0.0932	0.0319
40-44	0.0673	0.0004	0.0647	0.0173
45-49	0.0488	-0.0093	0.0465	0.0009
50-54	0.0381	-0.0038	0.0385	0.0174
55-59	0.0357	0.0052	0.0407	0.0116
60-64	0.0404	-0.0027	0.0463	0.0152
65-69	0.0631	0.0017	0.0507	0.0102
70-74	0.0565	0.0076	0.0351	0.0114
75+	0.0518	0.0029	0.0675	0.0048

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

Table 52

1960-1970 MIGRATION RATIOS USED IN MODEL II: OZAUKEE COUNTY

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.0933	-0.0741	0.1179	0.9000
5-9	0.2107	-0.2963	0.3167	0.1000
10-14	0.1928	0.2963	-0.2966	-0.8000
15-19	0.0220	0.1481	0.0506	-0.6000
20-24	-0.1006	0.0370	-0.1091	-0.4000
25-29	0.0800	0.0370	0.1814	0.3000
30-34	0.1667	0.1852	0.2722	0.5000
35-39	0.1326	0.2222	0.1852	-0.4000
40-44	0.1008	0.0370	0.1142	-0.2000
45-49	0.0542	0.1481	0.0656	-0.4000
50-54	0.0301	0.0741	0.0503	-0.2000
55-59	0.0249	0.0741	0.0346	0.1000
60-64	0.0054	0.0001	0.0030	0.1000
65-69	-0.0083	0.0001	0.0034	-0.2000
70-74	-0.0031	0.0001	0.0041	0.1000
75+	-0.0017	0.1111	0.0064	0.1000

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

Table 53

1960-1970 MIGRATION RATIOS USED IN MODEL II: RACINE COUNTY

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	-0.0517	0.0122	0.0620	0.0262
5-9	-0.1737	0.1983	0.3215	0.1608
10-14	-0.2739	0.2335	0.3378	0.1673
15-19	0.1458	0.1018	-0.0270	0.1070
20-24	0.8704	0.1202	-0.1267	0.1293
25-29	0.3483	0.1263	0.3350	0.1450
30-34	-0.5212	0.0880	0.2931	0.0741
35-39	-0.1792	0.0398	0.0932	0.0610
40-44	-0.0396	0.0291	0.0601	0.0230
45-49	0.0224	0.0222	-0.0037	0.0092
50-54	0.0123	0.0076	0.0009	0.0216
55-59	0.0712	0.0107	-0.0135	0.0322
60-64	-0.0029	0.0076	-0.0517	0.0105
65-69	0.2923	0.0054	-0.0727	0.0105
70-74	0.2158	0.0015	-0.0722	0.0118
75+	0.2634	-0.0046	-0.1361	0.0105

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

Table 54

1960-1970 MIGRATION RATIOS USED IN MODEL II: WALWORTH COUNTY

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.0400	0.0339	-0.0032	0.2500
5-9	0.0935	-0.0678	0.0610	0.1500
10-14	0.1809	-0.0847	0.1244	0.1500
15-19	0.2771	0.1356	0.3463	-0.2500
20-24	0.2317	0.2542	0.2435	-0.2500
25-29	-0.0508	0.2542	-0.1104	0.9000
30-34	0.0408	0.0847	0.0112	0.0001
35-39	0.0462	0.1017	0.0660	0.3000
40-44	0.0504	-0.0339	0.0552	0.1500
45-49	0.0250	0.0678	0.0274	0.1500
50-54	0.0177	0.0678	0.0357	-0.0001
55-59	-0.0100	0.0339	0.0292	-0.1500
60-64	0.0300	0.0678	0.0379	-0.1000
65-69	0.0366	0.0001	0.0346	0.1500
70-74	0.0169	0.0169	0.0119	-0.2000
75+	-0.0262	0.0678	0.0292	-0.2500

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

Table 55

1960-1970 MIGRATION RATIOS USED IN MODEL II: WASHINGTON COUNTY

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.1078	0.6875	0.0723	0.9500
5-9	0.1962	0.1875	0.1779	-0.1000
10-14	0.1987	0.0001	0.1473	0.2000
15-19	0.0115	-0.0625	0.0369	0.2000
20-24	-0.1363	0.3125	-0.0011	0.1000
25-29	0.1296	0.1250	0.1584	-0.1000
30-34	0.1972	-0.0001	0.1490	-0.1000
35-39	0.1241	-0.1875	0.0908	-0.3000
40-44	0.0714	-0.1250	0.0595	0.2000
45-49	0.0457	-0.0625	0.0306	-0.1000
50-54	0.0242	0.0001	0.0341	-0.2000
55-59	0.0312	-0.0001	0.0215	0.1000
60-64	0.0052	0.1250	0.0174	0.2500
65-69	0.0038	–	-0.0026	–
70-74	-0.0068	–	0.0085	–
75+	-0.0036	–	-0.0006	-0.1000

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

Table 56

1960-1970 MIGRATION RATIOS USED IN MODEL II: WAUKESHA COUNTY

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.0609	–	0.0622	1.0588
5-9	0.1658	–	0.1843	1.0588
10-14	0.1779	–	0.1824	0.0588
15-19	0.0593	–	0.0625	-1.0588
20-24	0.0894	–	-0.0458	-0.7647
25-29	0.0247	–	0.0936	-0.0588
30-34	0.1371	–	0.1759	-0.4118
35-39	0.1206	–	0.1186	0.5294
40-44	0.0886	–	0.0782	0.1176
45-49	0.0492	–	0.0457	-0.0588
50-54	0.0252	–	0.0227	0.4118
55-59	0.0109	–	0.0096	0.0588
60-64	0.0020	–	0.0024	-0.1765
65-69	-0.0063	–	-0.0012	–
70-74	-0.0052	–	-0.0002	0.0588
75+	-0.0002	–	0.0088	0.1765

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

Table 57

1960-1970 MIGRATION RATIOS USED IN MODEL II: REGION

Age Group	Male		Female	
	White	Nonwhite	White	Nonwhite
0-4	0.0701	0.0275	0.0770	0.0363
5-9	0.1112	0.1308	0.1324	0.1170
10-14	0.0078	0.1782	0.1053	0.1288
15-19	0.1146	0.1089	0.0427	0.0984
20-24	0.1497	0.1242	-0.0770	0.1729
25-29	-0.0698	0.1638	-0.1010	0.1643
30-34	-0.0984	0.1052	0.0477	0.0904
35-39	0.0639	0.0443	0.0661	0.0471
40-44	0.0436	0.0269	0.0514	0.0312
45-49	0.0487	0.0160	0.0524	0.0163
50-54	0.0496	0.0153	0.0526	0.0223
55-59	0.0598	0.0144	0.0782	0.0190
60-64	0.0749	0.0092	0.0999	0.0169
65-69	0.1367	0.0099	0.1238	0.0131
70-74	0.1227	0.0121	0.0870	0.0135
75+	0.1168	0.0133	0.1613	0.0125

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

Table 58

FORECAST NET MIGRATION LEVELS UNDER MODEL II: 1970-2000

County	Forecast Net Migration Levels		
	1970-1980	1980-1990	1990-2000
Kenosha	12,000	5,500	2,500
Milwaukee	-101,200	-60,000	-25,000
Ozaukee	16,600	15,000	11,500
Racine	3,200	3,200	1,000
Walworth	7,000	6,300	6,300
Washington	19,000	15,000	10,000
Waukesha	40,000	35,000	30,000
Region	-3,400	20,000	36,300

Source: SEWRPC.

A summary of these forecasts of the regional population by county for 1975-2000 is presented in Table 59. Age-sex-race-specific forecasts of the regional and county populations by decade are given in Tables D-1 through D-24 in Appendix D.[9] Table 59 shows that the Region as a whole is forecast to increase by 460,000 people, or about 26 percent, by the year 2000. Ozaukee and Washington Counties are forecast to more than double in population. Milwaukee County is the only county which is expected to decline in population, although by less than 1 percent.

Model II 1975 forecast population levels are compared with 1975 Wisconsin Department of Administration population estimates in Table 60. The forecast for the Region is 1 percent, or about 17,000 persons, above the estimate. Most of the county forecasts are within 1 percent of the estimates. Milwaukee and Walworth are the only counties which are not; these two counties have variances of approximately 2 percent. Only two county forecasts, those of Racine and Waukesha, are below the estimates. Milwaukee County was overforecast by almost 16,000 people, or 2 percent. When Milwaukee County is removed from the regional total, the sum of the forecasts is much closer to the sum of the actual estimates of the other six counties, varying by less than 2,000 people, or 0.2 percent. Conversely, in Model I's 1970 forecast comparison with the 1970 census estimate, over- and underforecasts of counties compensated for one another at the regional level.

In Tables 61 and 62, forecast net migration and natural increase levels by county are compared with 1970-1975 estimates of these components.[10] Natural increase at the regional level was under-

[9]*County nonwhite population forecasts are considered unreliable because of the small nonwhite population base and changing nonwhite migration trends. They are presented as part of the model output for historical and academic purposes only.*

[10]*Reliable data on the 1975 age distribution of women, necessary for calculating estimated 1975 TFR's, were not available. For an approximate estimate of the TFR in 1975, Model II age, sex, and race distribution percentages were applied to a 1975 estimate of the regional population to obtain estimated numbers of white and nonwhite women in the childbearing years. To minimize error, this was not done on the county level. The TFR's calculated for the Region in 1975 were 1.61 and 2.60 for whites and nonwhites, respectively. These two values are lower than the TFR's forecast for 1970-1975; they are also lower than, although much closer to, the forecast 1975-1980 TFR's.*

Table 59

ACTUAL 1970 AND FORECAST 1980-2000 POPULATION LEVELS UNDER MODEL II BY COUNTY

County	Population (in hundreds)				Population Change			
					1970-1990		1970-2000	
	1970	1980	1990	2000	Number	Percent	Number	Percent
Kenosha	1,179	1,392	1,600	1,749	421	35.7	570	48.4
Milwaukee	10,543	10,145	10,222	10,496	-321	-3.0	-47	-0.4
Ozaukee	545	762	974	1,140	429	78.7	595	109.2
Racine	1,708	1,856	2,035	2,177	327	19.2	469	27.5
Walworth	635	747	866	996	231	36.4	361	56.9
Washington	638	909	1,176	1,430	538	84.3	792	124.1
Waukesha	2,313	2,923	3,566	4,206	1,253	54.2	1,893	81.8
Region	17,561	18,734	20,439	22,194	2,878	16.4	4,633	26.4

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

Table 60

COMPARISON OF 1975 WISCONSIN DEPARTMENT OF ADMINISTRATION ESTIMATES AND 1975 MODEL II FORECAST POPULATION LEVELS BY COUNTY

County	Population		Difference	
	Estimate January 1, 1975	Model II Forecast	Number	Percent
Kenosha	126,651	127,800	1,149	0.9
Milwaukee	1,012,536	1,028,300	15,764	1.6
Ozaukee	64,932	65,300	368	0.6
Racine	178,916	177,400	-1,516	-0.8
Walworth	67,511	69,000	1,489	2.2
Washington	76,579	77,300	721	0.9
Waukesha	262,746	262,200	-546	-0.2
Region Less Milwaukee County	777,335	779,000	1,665	0.2
Region	1,789,871	1,807,300	17,429	1.0

Source: Wisconsin Department of Administration and SEWRPC.

forecast by only about 500 people; the slight overforecast of the population of the Region is the result of an underforecast of out-migration by 18,000 people. Milwaukee County follows the same pattern as the Region. Its natural increase was underforecast, but total population was overforecast because of an underforecast of net out-migration. Racine is the only other county with an underforecast of natural increase. In Walworth County, which has the highest percentage difference between the forecasts and the 1975 estimates, the net migration forecast is on target, but the natural increase component was overforecast. Although in absolute numbers four of the seven counties have larger variances in natural increase than in net migration, it is the underforecast of net out-migration by 21,100 people in Milwaukee County which principally explains the difference between the Model II regional 1975 population forecast and the 1975 estimate.

Table 61

COMPARISON OF ESTIMATED AND MODEL II FORECAST
NET MIGRATION LEVELS: 1970-1975

County	Net Migration Level		Difference	
	Estimated[a]	Model II Forecast[b]	Number	Percent
Kenosha	4,905	6,000	1,095	22.3
Milwaukee	-71,656	-50,600	21,056	29.4
Ozaukee	8,308	8,300	-8	-0.1
Racine	2,108	1,600	-508	-24.1
Walworth	3,162	3,500	338	10.7
Washington	9,767	9,500	-267	-2.7
Waukesha	23,674	20,000	-3,674	-15.5
Region Less Milwaukee County	51,924	48,900	-3,024	-5.8
Region	-19,732	-1,700	18,032	91.4

[a] *Net migration estimated from April 1, 1970 to January 1, 1975.*

[b] *Forecast net migration from April 1, 1970 to April 1, 1975.*

Source: Wisconsin Department of Administration and SEWRPC.

Table 62

COMPARISON OF ESTIMATED AND MODEL II FORECAST
NATURAL INCREASE: 1970-1975

County	Natural Increase		Difference	
	Estimated[a]	Forecast[b]	Number	Percent
Kenosha	3,829	3,867	38	1.0
Milwaukee	29,943	24,694	-5,249	-17.5
Ozaukee	2,163	2,532	369	17.1
Racine	5,970	4,965	-1,005	-16.8
Walworth	905	2,070	1,165	128.7
Washington	2,973	3,978	1,005	33.8
Waukesha	7,737	10,868	3,131	40.5
Region Less Milwaukee County	23,577	28,280	4,703	20.0
Region	53,520	52,974	-546	-1.0

[a] *Natural increase from April 1, 1970 to January 1, 1975.*

[b] *Forecast natural increase from April 1, 1970 to April 1, 1975.*

Source: Wisconsin Department of Administration and SEWRPC.

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Chapter IV

SUMMARY

Chapter II described the initial version of the Commission demographic model—referred to as Model I—utilized to project population to the year 1990 based on 1960 census data. A refined version of this model—referred to as Model II—later used to project population to the year 2000 based on 1970 census data was described in Chapter III. Both versions of the model are based upon the component method of population projection, with separate projection assumptions covering the fertility, migration, and mortality components of population growth in the Southeastern Wisconsin Region. The component method uses input data by, and produces projections according to, sex, race, and five-year age classifications of the population. The second version was developed on the basis of experience gained in using the initial version and incorporates structural changes which make the model more tractable and permit the testing of alternative assumptions more quickly and with less difficulty.

In evaluating the product of any population projection model, the most immediate concern is how well the particular fertility, mortality, and migration assumptions and the population forecast itself compare with the most recent data on demographic trends and population estimates. Changes in the assumptions can then be made in accordance with the available data, and the model can be rerun. But the main focus of model development is the refinement of the structural form of the model to improve its efficiency, manageability, and validity.

If only the first approach to model evaluation had been undertaken, i.e., particular assumptions reviewed and revised to take into account lower fertility rates and continued out-migration, then Model I could have been rerun with revised assumptions and 1970 census base data. However, the structure of Model I is such that changes in assumptions are difficult to make without rewriting the computer language code that represents the operational form of the model. Therefore, the second version of the model was developed to provide a model framework which can accommodate alternative assumptions more easily.

In brief, the structures of the two versions differ in the following ways. Model I fertility was projected using a fairly complex procedure which related the fertility rates of women 20-24 years old to the fertility rates of the other childbearing age groups. County differences in fertility rates were assumed to remain constant. In Model II, total fertility rates were projected and the relationships of individual county fertility rates to the regional totals were permitted to vary over time. Schedules of mortality rates were projected in Model I by systematically reducing them on the basis of extrapolations of historical trends. Model II used the same schedule of rates throughout the projection period. Model I projected net migration for each county by relating the migration of the working-age population to projected county employment levels and then relating child and older adult migration to the migration of the working-age population. Regression analysis of 1950 and 1960 census data was used to determine the parameters of these relationships. In Model II, regional net migration forecasts were based on expected economic trends at the regional level, and the regional net migration levels were then allocated to the county level according to the historical and expected future economic development trends of each county.

Model I's framework is such that the fertility, mortality, and migration forecast assumptions are intrinsic to the model, and the parameters of the model—fertility differential values (N ratios), death reduction rates (r), and net migration factors, (CHLDMG, OLDMIG, and XLFMIG)—are heavily weighted by historical trends. This disadvantage does not reflect upon Model I's usefulness during the period it was developed, but limits its adaptability for other projection efforts. Fertility, migration, and, to a lesser extent, mortality are dynamic demographic processes; trends in these variables respond to economic and lifestyle changes and medical advances, which are sometimes unpredictable and inconsistent with historical patterns. A recession or an economic upswing, an increase in the desire for children, or a surge in the price of energy can immediately and significantly affect fertility and migration decisions. The

rapidity with which these demographic variables can change makes it advantageous to have a population projection model which can accept varying levels of projected rates without changing the structure of the model—refitting the formulas projecting the fertility, mortality, and migration rates which are intrinsic to the model—each time a new set of alternatives is to be tested.

Because of adjustments made to the second version, Model II is a more flexible version of the projection model; it allows for more and better experimentation with and testing of alternative levels of the fertility, mortality, and migration assumptions. The capacity of the second version to formulate alternative forecasts was substantiated when the population projection model was used in connection with the Commission's Milwaukee area primary transit system alternatives analysis planning study during 1979. Alternative population projections for the Region were developed by revising fertility rates and, principally, migration levels and rates; this process was accomplished in a relatively straightforward manner, without changing the equations and interrelationships within the model.

Two other changes in assumptions were made to the model which will be retained in future applications of the model. The first set of projections produced by Model II and described in Chapter III assumed an equal distribution of births by sex. This sex ratio assumption was changed to reflect the actual ratio of male to female births. The other modification which will be retained changed Model II's original assumption that migration occurs uniformly throughout a decade and that the net migration projected to occur during a decade can be halved to obtain the projection of net migration for a five-year period. To promote greater flexibility in examining alternative migration assumptions, the computer program was modified to allow the model to operate with six distinct projected net migration levels, one for each five-year projection period.

CONCLUSION

When detailed tabulations from the 1980 census become available in 1981 and 1982, the revised version—Model II—of the Commission's cohort component population projection model, as described herein, is proposed to be utilized by Commission staff to prepare new forecasts of population change within the Region. This model includes the modifications to the sex ratio and net migration level assumptions which were incorporated into the model during the preparation of population projections for the alternatives analysis planning study, as noted in the preceding section. Census data on the distribution of the population by age, sex, and race in 1980 will be used as the base data for the projections, while census and updated vital statistics data will be used to review and, where necessary, revise the values of the fertility, mortality, and migration parameters. These refinements in assumptions will not change the operational structure of the model and are readily implemented, given the flexibility of the model in handling alternative sets of assumptions concerning the direction and magnitude of changes in fertility, mortality, and migration.

APPENDICES

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Appendix A

MODEL I MIGRATION COMPONENT REGRESSION STATISTICS

Table A-1

LINEAR REGRESSION OF WORKING AGE GROUP MIGRATION ON 1950-1960 SOCIOECONOMIC CHARACTERISTIC CHANGE DATA FROM 17 COUNTIES IN SOUTHEASTERN WISCONSIN

Variable	Mean	Standard Deviation	Correlation X vs Y	Regression Coefficient	Standard Error of Regression Coefficient	T Value
Independent						
X1	81.12353	12.94587	0.47193	-0.26838	0.61926	-0.43338
X2	24.72529	17.01965	0.91029	0.29128	1.22175	0.23841
X3	67.58117	72.33627	0.97927	1.65369[a]	0.26667	6.20117
X4	31.01941	12.38368	0.39039	-0.79438	0.65057	-1.22105
X5	3.61000	1.79750	0.47912	-0.24143	5.09437	-0.04739
X6	1.14353	2.96990	0.22358	-2.04651	2.70837	-0.75562
Dependent						
Y	44.00117	118.57930				
Intercept	—	-25.33405	Multiple Correlation	0.98311	Standard Error of Estimate	27.45114

Analysis of Variance

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	6	217,441.17578	36,240.19580	48.09168
Deviation from Regression	10	7,535.64844	753.56484	
Total	16	224,976.82422		

[a] *Significantly different from zero at 95 percent level of confidence.*

Source: SEWRPC.

Table A-2

LINEAR REGRESSION OF WORKING AGE GROUP MIGRATION ON 1950-1960 CHANGE OF EMPLOYMENT DATA FROM 17 COUNTIES IN SOUTHEASTERN WISCONSIN

Mean of Independent Variable 67.58117	Mean of Dependent Variable 44.0017
Standard Deviation of Independent Variable 72.33627	Standard Deviation of Dependent Variable 118.57930
Regression Coefficient . . . . . 1.60529[a]	Correlation 0.97927
T Value 18.7230	Intercept . . . . . -64.48643
Standard Error of Regression Coefficient 0.08574	Standard Error of Estimate 24.80819

Analysis of Variance

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	1	215,745.96503	215,745.96503	350.58378
Deviation from Regression	15	9,230.85919	615.39061	
Total	16	224,976.82422		

[a] *Significantly different from zero at 95 percent level of confidence.*

Source: SEWRPC.

Table A-3

LINEAR REGRESSION OF WORKING AGE GROUP MIGRATION ON 1950-1960 CHANGE OF EMPLOYMENT DATA FROM THE SEVEN-COUNTY SOUTHEASTERN WISCONSIN REGION

Mean of Independent Variable 121.05285	Mean of Dependent Variable 143.04286
Standard Deviation of Independent Variable 82.63330	Standard Deviation of Dependent Variable 118.79058
Regression Coefficient . . . . . 1.42361[a]	Correlation 0.99030
T Value 15.93450	Intercept . . . . . -29.28972
Standard Error of Regression Coefficient 0.08934	Standard Error of Estimate 18.08359

Analysis of Variance

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	F Value
Attributable to Regression	1	83,032.63382	83,032.63382	253.98805
Deviation from Regression	5	1,634.57756	326.91551	
Total	6	84,667.21138		

[a] *Significantly different from zero at 95 percent level of confidence.*

Source: SEWRPC.

Appendix B

MODEL I DETAILED POPULATION FORECASTS BY AGE, SEX, AND RACE

Table B-1

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN KENOSHA COUNTY: 1970

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	4,886	90	4,926	87	9,989
5-9	5,663	116	5,756	120	11,655
10-14	6,041	103	5,825	114	12,083
15-19	5,518	75	5,264	75	10,932
20-24	4,787	57	4,548	61	9,453
25-29	3,696	45	3,464	42	7,247
30-34	3,152	54	2,841	53	6,100
35-39	2,944	54	2,916	53	5,967
40-44	3,281	49	3,204	56	6,590
45-49	3,345	57	3,471	28	6,901
50-54	3,152	25	3,160	24	6,361
55-59	2,705	17	2,822	15	5,559
60-64	2,179	14	2,395	14	4,602
65-69	1,807	11	2,069	11	3,898
70-74	1,462	6	1,723	5	3,196
75+	1,805	5	2,475	10	4,295
Total	56,423	778	56,859	768	114,828

Source: SEWRPC.

Table B-2

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN KENOSHA COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	5,626	123	5,670	122	11,541
5-9	4,769	98	4,839	101	9,807
10-14	4,779	91	4,858	90	9,818
15-19	5,684	120	5,765	124	11,693
20-24	6,038	108	5,845	121	12,112
25-29	5,460	80	5,281	82	10,903
30-34	4,756	60	4,561	67	9,444
35-39	3,689	51	3,473	45	7,258
40-44	3,140	55	2,840	55	6,090
45-49	2,906	54	2,899	53	5,912
50-54	3,179	47	3,148	54	6,428
55-59	3,125	52	3,350	27	6,554
60-64	2,799	21	2,977	22	5,819
65-69	2,244	13	2,567	12	4,836
70-74	1,623	10	2,042	11	3,686
75+	2,132	11	3,356	15	5,514
Total	61,949	994	63,471	1,001	127,415

Source: SEWRPC.

Table B-3

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN KENOSHA COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	6,599	191	6,629	181	13,600
5-9	6,319	182	6,366	191	13,058
10-14	5,672	147	5,748	147	11,714
15-19	4,967	120	4,973	120	10,180
20-24	5,041	123	5,051	123	10,338
25-29	5,842	150	5,964	158	12,114
30-34	6,196	127	6,011	150	12,484
35-39	5,568	108	5,399	97	11,172
40-44	4,852	73	4,642	79	9,646
45-49	3,765	56	3,563	51	7,435
50-54	3,161	57	2,895	59	6,172
55-59	2,772	55	2,842	55	5,724
60-64	2,872	41	2,981	50	5,944
65-69	2,627	40	3,062	22	5,751
70-74	2,116	16	2,553	19	4,704
75+	2,706	17	4,400	23	7,146
Total	71,075	1,503	73,079	1,525	147,182

Source: SEWRPC.

Table B-4

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN MILWAUKEE COUNTY: 1970

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	42,734	5,551	43,823	5,523	97,631
5-9	48,989	7,485	50,077	7,541	114,092
10-14	43,877	7,043	43,162	7,057	101,139
15-19	37,262	5,447	47,022	5,551	95,282
20-24	43,129	4,003	41,441	4,316	92,889
25-29	33,022	3,105	34,112	3,542	73,781
30-34	30,372	3,117	28,639	3,742	65,870
35-39	25,310	3,245	26,626	3,693	58,874
40-44	26,539	3,115	29,282	3,064	62,000
45-49	24,391	2,536	29,805	2,477	59,209
50-54	25,076	1,866	27,413	1,673	56,028
55-59	24,093	1,419	23,965	1,343	50,820
60-64	20,300	975	21,074	948	43,297
65-69	14,280	691	17,263	756	32,990
70-74	11,942	395	12,954	402	25,693
75+	12,665	446	20,303	482	33,896
Total	463,981	50,439	496,961	52,110	1,063,491

Source: SEWRPC.

Table B-5

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN MILWAUKEE COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	45,204	8,340	46,034	8,364	107,942
5-9	37,508	7,160	38,241	7,232	90,141
10-14	35,139	5,922	36,990	5,946	83,997
15-19	42,098	7,818	50,708	7,929	108,553
20-24	45,444	7,552	44,636	7,764	105,396
25-29	38,966	6,201	47,558	6,425	99,150
30-34	44,426	4,565	38,653	4,912	92,556
35-39	28,878	3,473	31,368	3,862	67,581
40-44	26,155	3,293	26,282	3,793	59,523
45-49	20,085	3,278	24,106	3,698	51,167
50-54	22,968	3,038	26,022	2,990	55,018
55-59	20,613	2,359	24,514	2,397	49,883
60-64	19,706	1,613	21,640	1,534	44,493
65-69	15,798	1,132	17,643	1,192	35,765
70-74	12,631	670	13,818	752	27,871
75+	14,088	756	22,952	928	38,724
Total	469,707	67,170	511,165	69,718	1,117,760

Source: SEWRPC.

Table B-6

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN MILWAUKEE COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	48,529	10,932	49,321	10,981	119,763
5-9	44,111	10,600	44,903	10,734	110,348
10-14	38,211	8,531	39,770	8,626	95,138
15-19	31,320	7,462	38,850	7,583	85,215
20-24	36,619	6,389	38,342	6,592	87,942
25-29	43,471	8,440	51,160	8,697	111,768
30-34	46,522	7,977	42,085	8,258	104,842
35-39	35,140	6,468	44,978	6,666	93,252
40-44	40,395	4,678	36,421	4,920	86,414
45-49	24,043	3,489	28,999	3,854	60,385
50-54	22,897	3,200	23,377	3,678	53,152
55-59	16,882	3,027	19,478	3,531	42,918
60-64	18,221	2,613	20,814	2,713	44,361
65-69	13,502	1,895	18,662	2,099	36,158
70-74	12,689	1,131	14,871	1,217	29,908
75+	16,941	1,294	26,199	1,629	46,063
Total	489,493	88,126	538,230	91,778	1,207,627

Source: SEWRPC.

Table B-7

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN OZAUKEE COUNTY: 1970

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	2,286	17	2,219	16	4,538
5-9	3,227	30	3,273	28	6,558
10-14	3,142	13	2,972	12	6,139
15-19	2,656	7	2,680	11	5,354
20-24	1,927	12	2,012	14	3,965
25-29	1,481	17	1,653	20	3,171
30-34	1,459	15	1,702	24	3,200
35-39	1,661	8	1,687	11	3,367
40-44	1,772	7	1,816	6	3,601
45-49	1,650	4	1,689	5	3,348
50-54	1,504	2	1,415	2	2,923
55-59	1,223	1	1,143	2	2,369
60-64	915	1	987	1	1,904
65-69	758	–	699	–	1,457
70-74	504	–	658	1	1,163
75+	554	–	805	1	1,360
Total	26,719	134	27,410	154	54,417

Source: SEWRPC.

Table B-8

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN OZAUKEE COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	3,442	31	3,357	31	6,861
5-9	3,617	42	3,661	40	7,360
10-14	2,969	32	2,830	30	5,861
15-19	3,399	40	3,573	39	7,051
20-24	3,120	29	3,140	30	6,319
25-29	2,985	29	3,243	32	6,289
30-34	2,691	29	2,998	29	5,747
35-39	2,270	27	2,371	28	4,696
40-44	2,022	21	2,128	27	4,198
45-49	1,994	12	2,045	14	4,065
50-54	2,016	10	2,069	9	4,104
55-59	1,771	6	1,804	7	3,588
60-64	1,464	3	1,541	3	3,011
65-69	1,120	1	1,065	3	2,189
70-74	718	–	907	1	1,626
75+	825	1	1,217	2	2,045
Total	36,423	313	37,949	325	75,010

Source: SEWRPC.

Table B-9

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN OZAUKEE COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	4,773	64	4,668	63	9,568
5-9	5,359	70	5,425	68	10,922
10-14	4,288	51	4,115	48	8,502
15-19	3,837	55	4,041	54	7,987
20-24	2,954	51	3,046	52	6,103
25-29	3,812	66	4,281	65	8,224
30-34	4,068	50	4,376	48	8,542
35-39	3,965	41	4,139	42	8,187
40-44	3,387	37	3,526	34	6,984
45-49	2,688	32	2,819	32	5,571
50-54	2,340	24	2,453	30	4,847
55-59	2,159	13	2,198	16	4,386
60-64	1,963	10	2,217	9	4,199
65-69	1,618	5	1,682	7	3,312
70-74	1,156	2	1,409	3	2,570
75+	1,270	3	1,855	5	3,133
Total	49,637	574	52,250	576	103,037

Source: SEWRPC.

Table B-10

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN RACINE COUNTY: 1970

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	7,621	559	7,628	572	16,380
5-9	9,049	738	9,006	736	19,529
10-14	8,705	597	8,578	618	18,498
15-19	7,838	510	7,801	497	16,646
20-24	6,417	345	6,616	411	13,789
25-29	4,688	333	4,957	342	10,320
30-34	4,047	262	4,386	335	9,030
35-39	4,323	274	4,422	299	9,318
40-44	4,789	252	4,689	251	9,981
45-49	4,665	216	4,937	192	10,010
50-54	4,146	161	4,239	141	8,687
55-59	3,714	111	3,765	116	7,706
60-64	2,968	75	3,220	61	6,324
65-69	2,344	43	2,710	41	5,138
70-74	1,881	32	2,359	19	4,291
75+	2,295	27	3,620	31	5,973
Total	79,490	4,535	82,933	4,662	171,620

Source: SEWRPC.

Table B-11

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN RACINE COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	9,235	862	9,263	876	20,236
5-9	7,973	762	7,941	763	17,439
10-14	7,754	610	7,736	631	16,731
15-19	8,987	794	9,233	807	19,821
20-24	8,476	673	8,805	730	18,684
25-29	8,049	613	8,072	607	17,341
30-34	6,850	401	6,893	483	14,627
35-39	4,911	361	5,175	374	10,821
40-44	4,161	283	4,477	357	9,278
45-49	4,363	293	4,460	315	9,431
50-54	4,674	250	4,632	249	9,805
55-59	4,384	197	4,738	190	9,509
60-64	3,665	145	3,979	132	7,921
65-69	2,991	91	3,364	100	6,546
70-74	2,191	52	2,700	44	4,987
75+	2,734	49	4,620	52	7,455
Total	91,398	6,436	96,088	6,710	200,632

Source: SEWRPC.

Table B-12

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN RACINE COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	11,095	1,265	11,132	1,283	24,775
5-9	10,524	1,177	10,520	1,184	23,405
10-14	9,348	904	9,356	928	20,536
15-19	7,917	821	8,184	837	17,759
20-24	7,534	690	7,979	748	16,951
25-29	9,189	896	9,511	918	20,514
30-34	8,896	725	9,083	802	19,506
35-39	8,248	637	8,280	636	17,801
40-44	6,934	419	6,968	502	14,823
45-49	4,949	378	5,209	389	10,925
50-54	4,084	280	4,435	351	9,150
55-59	4,122	268	4,287	306	8,983
60-64	4,161	222	4,364	229	8,976
65-69	3,584	161	4,270	164	8,179
70-74	2,758	102	3,377	99	6,336
75+	3,561	99	5,887	117	9,664
Total	106,904	9,044	112,842	9,493	238,283

Source: SEWRPC.

Table B-13

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WALWORTH COUNTY: 1970

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	2,647	23	2,730	23	5,423
5-9	3,026	22	3,128	22	6,198
10-14	3,112	11	2,897	11	6,031
15-19	3,122	10	2,969	16	6,117
20-24	2,551	15	2,538	17	5,121
25-29	2,000	8	2,019	21	4,048
30-34	1,583	6	1,669	7	3,265
35-39	1,534	1	1,569	6	3,110
40-44	1,645	8	1,644	7	3,304
45-49	1,688	2	1,791	6	3,487
50-54	1,608	4	1,652	7	3,271
55-59	1,511	5	1,626	7	3,149
60-64	1,355	5	1,430	6	2,796
65-69	1,145	8	1,225	9	2,387
70-74	976	7	1,056	6	2,045
75+	1,124	5	1,677	5	2,811
Total	30,627	140	31,620	176	62,563

Source: SEWRPC.

Table B-14

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WALWORTH COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	3,143	27	3,233	27	6,430
5-9	2,923	28	3,021	28	6,000
10-14	2,933	25	2,889	25	5,872
15-19	3,336	24	3,523	24	6,907
20-24	3,174	14	3,043	14	6,245
25-29	3,049	14	2,911	20	5,994
30-34	2,605	18	2,642	19	5,284
35-39	2,170	10	2,266	23	4,469
40-44	1,761	7	1,854	8	3,630
45-49	1,671	2	1,768	6	3,447
50-54	1,735	8	1,720	7	3,470
55-59	1,671	2	1,874	6	3,553
60-64	1,561	3	1,731	6	3,301
65-69	1,413	4	1,583	6	3,006
70-74	1,209	3	1,263	4	2,479
75+	1,372	9	2,088	11	3,480
Total	35,726	198	37,409	234	73,567

Source: SEWRPC.

Table B-15

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WALWORTH COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	3,697	37	3,834	37	7,605
5-9	3,785	35	3,927	35	7,782
10-14	3,675	31	3,539	31	7,276
15-19	3,458	31	3,700	32	7,221
20-24	3,065	29	3,146	31	6,271
25-29	3,255	30	3,435	31	6,751
30-34	3,289	19	3,230	19	6,557
35-39	3,342	17	3,334	23	6,716
40-44	2,910	19	2,959	20	5,908
45-49	2,415	11	2,611	23	5,060
50-54	1,958	8	2,008	8	3,982
55-59	1,731	2	1,960	7	3,700
60-64	1,780	7	1,923	7	3,717
65-69	1,671	2	1,889	5	3,567
70-74	1,522	2	1,564	5	3,093
75+	1,795	8	2,727	12	4,542
Total	43,348	288	45,786	326	89,748

Source: SEWRPC.

Table B-16

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WASHINGTON COUNTY: 1970

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	3,209	7	3,178	7	6,401
5-9	3,981	11	3,964	10	7,966
10-14	3,817	9	3,378	11	7,215
15-19	2,941	5	2,709	8	5,663
20-24	2,192	11	2,292	10	4,505
25-29	1,835	13	2,126	10	3,984
30-34	1,955	7	1,971	7	3,940
35-39	1,766	5	1,762	4	3,537
40-44	1,905	3	1,778	5	3,691
45-49	1,791	2	1,704	2	3,499
50-54	1,584	2	1,570	3	3,159
55-59	1,422	–	1,368	2	2,792
60-64	1,155	2	1,075	3	2,235
65-69	957	–	883	–	1,840
70-74	692	–	672	–	1,364
75+	823	–	1,186	–	2,009
Total	32,025	77	31,616	82	63,800

Source: SEWRPC.

Table B-17

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WASHINGTON COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	4,297	19	4,258	19	8,593
5-9	4,279	21	4,238	21	8,559
10-14	4,035	14	3,598	14	7,661
15-19	4,061	15	3,985	15	8,076
20-24	3,541	16	3,527	20	7,104
25-29	3,301	15	3,474	18	6,808
30-34	3,131	19	3,101	17	6,268
35-39	2,367	18	2,603	14	5,002
40-44	2,428	10	2,304	9	4,751
45-49	2,131	7	2,014	6	4,158
50-54	2,101	4	2,038	6	4,149
55-59	1,948	3	1,898	3	3,852
60-64	1,645	2	1,572	3	3,222
65-69	1,357	–	1,280	2	2,639
70-74	913	2	895	2	1,812
75+	1,120	1	1,543	1	2,665
Total	42,655	166	42,328	170	85,319

Source: SEWRPC.

Table B-18

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WASHINGTON COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	6,116	32	6,056	32	12,236
5-9	6,300	39	6,237	38	12,614
10-14	5,519	29	4,883	29	10,460
15-19	4,404	28	4,276	29	8,737
20-24	3,652	24	3,822	27	7,525
25-29	4,591	29	5,100	31	9,751
30-34	4,903	27	4,704	30	9,664
35-39	4,071	22	4,166	24	8,283
40-44	3,819	23	3,585	20	7,447
45-49	2,906	20	2,972	16	5,914
50-54	2,733	11	2,692	11	5,447
55-59	2,401	8	2,318	7	4,734
60-64	2,226	5	2,061	6	4,298
65-69	1,893	2	1,787	3	3,685
70-74	1,324	1	1,321	3	2,649
75+	1,636	2	2,213	4	3,855
Total	58,494	302	58,193	310	117,299

Source: SEWRPC.

Table B-19

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WAUKESHA COUNTY: 1970

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	10,155	47	10,080	39	20,321
5-9	13,641	85	13,570	67	27,363
10-14	13,127	81	12,375	62	25,645
15-19	11,513	52	10,655	54	22,274
20-24	8,412	89	8,255	74	16,830
25-29	6,945	166	7,194	80	14,385
30-34	6,061	82	6,583	54	12,780
35-39	7,016	49	7,501	43	14,609
40-44	7,707	37	7,568	26	15,338
45-49	7,069	26	7,081	15	14,191
50-54	5,986	18	5,808	20	11,832
55-59	4,882	12	4,733	11	9,638
60-64	3,826	6	3,806	4	7,642
65-69	2,749	4	2,831	4	5,588
70-74	1,907	–	2,251	4	4,162
75+	2,064	7	3,313	6	5,390
Total	113,060	761	113,604	563	227,988

Source: SEWRPC.

Table B-20

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WAUKESHA COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	14,155	138	14,104	131	28,528
5-9	14,145	173	14,059	158	28,535
10-14	12,518	114	12,244	90	24,966
15-19	14,867	126	14,552	106	29,651
20-24	13,241	144	12,990	127	26,502
25-29	12,695	140	12,716	129	25,680
30-34	10,952	158	11,006	125	22,241
35-39	9,316	206	9,566	110	19,198
40-44	7,850	108	8,148	69	16,175
45-49	8,129	67	8,519	54	16,769
50-54	8,281	50	8,144	36	16,511
55-59	7,152	31	7,317	22	14,522
60-64	5,691	21	5,839	22	11,573
65-69	4,275	12	4,545	12	8,844
70-74	2,981	4	3,442	5	6,432
75+	3,101	9	4,846	10	7,966
Total	149,349	1,501	152,037	1,206	304,093

Source: SEWRPC.

Table B-21

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WAUKESHA COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	18,834	213	18,823	207	38,077
5-9	19,256	254	19,257	240	39,007
10-14	16,306	198	16,095	176	32,775
15-19	15,320	213	14,999	194	30,726
20-24	12,631	174	12,835	152	25,792
25-29	15,921	209	16,505	178	32,813
30-34	15,587	209	15,596	175	31,567
35-39	14,905	179	14,954	157	30,195
40-44	12,597	181	12,466	137	25,381
45-49	10,330	217	10,511	118	21,176
50-54	8,398	115	8,688	76	17,277
55-59	8,145	67	8,697	58	16,967
60-64	7,758	47	8,048	36	15,889
65-69	6,211	26	6,923	21	13,181
70-74	4,441	15	5,215	19	9,690
75+	4,967	17	7,575	18	12,577
Total	191,607	2,334	197,187	1,962	393,090

Source: SEWRPC.

Table B-22

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN THE REGION: 1970

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	73,538	6,294	74,584	6,267	160,683
5-9	87,576	8,487	88,774	8,524	193,361
10-14	81,821	7,857	79,187	7,885	176,750
15-19	70,850	6,106	79,100	6,212	162,268
20-24	69,415	4,532	67,702	4,903	146,552
25-29	53,667	3,687	55,525	4,057	116,936
30-34	48,629	3,543	47,791	4,222	104,185
35-39	44,554	3,636	46,483	4,109	98,782
40-44	47,638	3,471	49,981	3,415	104,505
45-49	44,599	2,843	50,478	2,725	100,645
50-54	43,056	2,078	45,257	1,870	92,261
55-59	39,550	1,565	39,422	1,496	82,033
60-64	32,698	1,078	33,987	1,037	68,800
65-69	24,040	757	27,680	821	53,298
70-74	19,364	440	21,673	437	41,914
75+	21,330	490	33,379	535	55,734
Total	802,325	56,864	841,003	58,515	1,758,707

Source: SEWRPC.

Table B-23

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN THE REGION: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	85,102	9,540	85,919	9,570	190,131
5-9	75,214	8,284	76,000	8,343	167,841
10-14	70,127	6,808	71,145	6,826	154,906
15-19	82,432	8,937	91,339	9,044	191,752
20-24	83,034	8,536	81,986	8,806	182,362
25-29	74,505	7,092	83,255	7,313	172,165
30-34	75,411	5,250	69,854	5,652	156,167
35-39	53,601	4,146	56,822	4,456	119,025
40-44	47,517	3,777	48,033	4,318	103,645
45-49	41,279	3,713	45,811	4,146	94,949
50-54	44,954	3,407	47,773	3,351	99,485
55-59	40,664	2,650	45,495	2,652	91,461
60-64	36,531	1,808	39,279	1,722	79,340
65-69	29,198	1,253	32,047	1,327	63,825
70-74	22,266	741	25,067	819	48,893
75+	25,372	836	40,622	1,019	67,849
Total	887,207	76,778	940,447	79,364	1,983,796

Source: SEWRPC.

Table B-24

MODEL I FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN THE REGION: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	99,643	12,734	100,463	12,784	225,624
5-9	95,654	12,357	96,635	12,490	217,136
10-14	83,019	9,891	83,506	9,985	186,401
15-19	71,223	8,730	79,023	8,849	167,825
20-24	71,496	7,480	74,221	7,725	160,922
25-29	86,081	9,820	95,956	10,078	201,935
30-34	89,461	9,134	85,085	9,482	193,162
35-39	75,239	7,472	85,250	7,645	175,606
40-44	74,894	5,430	70,567	5,712	156,603
45-49	51,096	4,203	56,684	4,483	116,466
50-54	45,571	3,695	46,548	4,213	100,027
55-59	38,212	3,440	41,780	3,980	87,412
60-64	38,981	2,945	42,408	3,050	87,384
65-69	31,106	2,131	38,275	2,321	73,833
70-74	26,006	1,269	30,310	1,365	58,950
75+	32,876	1,440	50,856	1,808	86,980
Total	1,010,558	102,171	1,077,567	105,970	2,296,266

Source: SEWRPC.

Appendix C

EMPLOYMENT FORECAST METHODOLOGY

Table C-1 presents the Commission's employment forecasts by county for the years 1980, 1990, and 2000. These forecasts of total employment were based on analyses of each of the dominant and subdominant industry groups within the Region. Employment projections were made for each dominant and subdominant industry group and then summed, together with the projections of the remaining employment, to arrive at a total employment projection for the Region in the year 2000.

For each dominant and subdominant industry group, a range of employment was projected for the year 2000 from a series of inputs which included:

1. An analysis of historic trends of selected characteristics for each industry group, including employment, value added by manufacture, average hourly earnings, and indices of industrial production.

2. An extrapolation of the employment trends in each industry group in the Region from 1950 to 1970.

3. A multiple regression analysis of national, east-north-central states, Wisconsin, and regional employment in each industry group from 1950 to 1970.

4. A questionnaire survey of 165 manufacturing firms in the Region.

5. Industry outlooks to 1980 as published by the U. S. Department of Commerce.

6. Unpublished forecasts to the year 2000 of national and east-north-central states employment by industry group prepared by the National Planning Association.[1]

7. Recent studies of regional business attitudes published by the Bureau of Business Research of the University of Wisconsin.

From the range of projections, a final regional employment forecast was selected by the Commission staff and Commission advisory committees. The forecast jobs at the regional level were then allocated to each of the seven counties comprising the Region on the basis of county employment trends over the period 1955 through 1974. It should be emphasized that the forecast employment levels are intended to reflect long-term trends and do not presume to account for variations caused by short-term changes in the business cycle.

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[1] *The National Planning Association is a private, nonprofit, research organization made up of various standing committees composed of leaders from different specialties and fields. The association issues policy statements on matters of public concern and disseminates a variety of data, including demographic and economic forecasts on both a national and regional basis.*

Table C-1

ESTIMATED EMPLOYMENT AND REGIONAL EMPLOYMENT FORECAST
BY COUNTY: 1970, 1980, 1990, AND 2000

County	Employment					
	Estimated 1970	Forecast			Difference 1970-2000	
		1980	1990	2000	Number	Percent
Kenosha	39,200	44,200	49,300	54,300	15,100	38.5
Milwaukee	510,900	538,400	566,000	593,600	82,700	16.2
Ozaukee	17,900	24,600	31,300	38,000	20,100	112.3
Racine	61,900	73,100	84,300	95,500	33,600	54.3
Walworth	24,200	29,900	35,500	41,200	17,000	70.2
Washington	20,300	25,500	30,800	36,000	15,700	77.3
Waukesha	67,200	97,300	127,300	157,400	90,200	134.2
Region	741,600	833,000	924,500	1,016,000	274,400	37.0

Source: SEWRPC.

Appendix D

MODEL II DETAILED POPULATION FORECASTS BY AGE, SEX, AND RACE

Table D-1

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN KENOSHA COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	4,728	583	4,611	825	10,747
5-9	4,186	495	3,891	24	8,596
10-14	4,922	1,122	5,145	507	11,696
15-19	6,379	1,086	6,652	893	15,010
20-24	6,621	671	6,179	1,004	14,475
25-29	5,898	484	5,650	1,071	13,103
30-34	3,595	245	5,034	874	9,748
35-39	3,368	123	4,249	361	8,101
40-44	3,262	276	3,291	236	7,065
45-49	2,828	186	3,034	313	6,361
50-54	3,107	158	3,260	215	6,740
55-59	3,086	155	3,406	85	6,732
60-64	2,805	60	3,025	15	5,905
65-69	2,287	67	2,477	47	4,878
70-74	1,741	25	1,966	51	3,783
75+	2,614	32	3,514	90	6,250
Total	61,427	5,768	65,384	6,611	139,190

Source: SEWRPC.

Table D-2

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN KENOSHA COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	6,002	1,275	5,966	1,392	14,635
5-9	5,317	1,253	5,212	1,050	12,832
10-14	4,595	1,012	4,585	847	11,039
15-19	4,087	916	4,026	368	9,397
20-24	5,083	1,348	5,155	901	12,487
25-29	6,487	1,231	6,753	1,328	15,799
30-34	6,424	728	6,416	1,346	14,914
35-39	5,715	493	5,764	1,179	13,151
40-44	3,505	335	5,026	919	9,786
45-49	3,259	175	4,214	466	8,114
50-54	3,104	293	3,252	289	6,938
55-59	2,623	206	2,922	308	6,059
60-64	2,760	140	3,058	182	6,140
65-69	2,575	136	3,067	85	5,863
70-74	2,139	44	2,509	29	4,721
75+	3,262	62	4,639	139	8,102
Total	66,937	9,648	72,564	10,828	159,977

Source: SEWRPC.

Table D-3

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN KENOSHA COUNTY: 2000

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	5,460	1,207	5,456	1,264	13,387
5-9	5,495	1,233	5,475	1,149	13,352
10-14	5,847	1,430	5,877	1,369	14,523
15-19	5,257	1,437	5,263	1,201	13,158
20-24	4,644	1,107	4,579	1,022	11,352
25-29	4,115	969	4,065	566	9,715
30-34	4,959	1,331	5,247	1,049	12,586
35-39	6,347	1,183	6,773	1,357	15,660
40-44	6,296	729	6,362	1,333	14,720
45-49	5,551	477	5,678	1,175	12,881
50-54	3,341	319	4,911	886	9,457
55-59	3,019	170	4,046	432	7,667
60-64	2,746	238	3,049	248	6,281
65-69	2,169	159	2,640	257	5,225
70-74	2,063	90	2,570	138	4,861
75+	3,765	114	6,016	160	10,055
Total	71,074	12,193	78,007	13,606	174,880

Source: SEWRPC.

Table D-4

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN MILWAUKEE COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	29,488	9,000	29,990	9,187	77,665
5-9	22,663	7,561	23,636	7,903	61,763
10-14	28,479	7,781	28,124	7,989	72,373
15-19	36,846	8,213	36,636	8,453	90,148
20-24	39,780	7,742	43,159	8,474	99,155
25-29	38,959	6,160	42,109	7,324	94,552
30-34	33,847	4,570	37,999	6,202	82,618
35-39	26,532	3,311	25,485	4,472	59,800
40-44	18,762	2,690	20,115	3,731	45,298
45-49	19,509	2,433	21,071	3,303	46,316
50-54	23,378	2,373	25,315	2,847	53,913
55-59	23,502	1,899	26,732	2,135	54,268
60-64	20,763	1,281	24,785	1,554	48,383
65-69	17,193	931	22,766	1,137	42,027
70-74	12,265	584	18,901	807	32,557
75+	16,996	748	34,793	1,113	53,650
Total	408,962	67,277	461,616	76,631	1,014,486

Source: SEWRPC.

Table D-5

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN MILWAUKEE COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	30,640	11,288	30,997	11,435	84,360
5-9	23,586	10,221	24,255	10,495	68,557
10-14	24,034	9,103	24,921	9,431	67,489
15-19	18,978	7,943	20,617	8,397	55,935
20-24	25,431	7,994	27,797	8,625	69,847
25-29	35,461	8,476	36,778	9,286	90,001
30-34	38,862	7,909	40,622	9,017	96,410
35-39	35,904	6,036	38,464	7,436	87,840
40-44	30,279	4,290	35,110	6,086	75,765
45-49	23,739	3,004	23,305	4,282	54,330
50-54	16,368	2,358	18,263	3,508	40,497
55-59	16,761	2,051	18,989	3,046	40,847
60-64	19,296	1,868	22,403	2,523	46,090
65-69	17,459	1,360	22,774	1,780	43,373
70-74	13,289	807	19,798	1,155	35,049
75+	19,849	1,032	43,138	1,800	65,819
Total	389,936	85,740	448,231	98,302	1,022,209

Source: SEWRPC.

Table D-6

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN MILWAUKEE COUNTY: 2000

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	23,791	12,911	23,989	13,022	73,713
5-9	26,830	12,048	27,262	12,258	78,398
10-14	27,915	11,033	28,517	11,287	78,752
15-19	21,992	10,331	22,952	10,669	65,944
20-24	22,637	9,102	24,723	9,655	66,117
25-29	18,337	7,912	20,639	8,688	55,576
30-34	24,899	7,865	26,675	8,767	68,206
35-39	33,899	8,123	35,111	9,183	86,316
40-44	36,927	7,392	39,117	8,739	92,175
45-49	34,061	5,492	37,037	7,073	83,663
50-54	28,258	3,778	33,605	5,673	71,314
55-59	21,432	2,531	21,835	3,895	49,693
60-64	13,884	1,855	16,564	3,062	35,365
65-69	12,978	1,469	16,605	2,487	33,539
70-74	13,355	1,166	18,503	1,823	34,847
75+	22,791	1,450	49,014	2,746	76,001
Total	383,986	104,458	442,148	119,027	1,049,619

Source: SEWRPC.

Table D-7

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN OZAUKEE COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	2,769	3	2,670	4	5,446
5-9	3,671	3	3,498	5	7,177
10-14	4,628	16	2,440	1	7,085
15-19	4,499	16	2,449	8	6,972
20-24	3,045	13	3,134	5	6,197
25-29	2,470	6	2,797	5	5,278
30-34	2,670	7	2,963	1	5,641
35-39	3,074	12	3,157	–	6,243
40-44	2,804	13	2,644	7	5,468
45-49	2,416	11	2,197	6	4,630
50-54	2,148	8	2,122	3	4,281
55-59	1,776	7	1,782	4	3,569
60-64	1,388	3	1,355	1	2,747
65-69	935	1	1,027	–	1,963
70-74	568	–	738	–	1,306
75+	805	6	1,379	1	3,191
Total	39,666	125	36,352	51	76,194

Source: SEWRPC.

Table D-8

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN OZAUKEE COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	3,391	5	3,306	6	6,708
5-9	4,056	4	3,906	5	7,871
10-14	4,570	10	2,673	5	7,258
15-19	4,650	15	2,791	6	7,462
20-24	4,215	20	2,262	1	6,498
25-29	4,328	18	2,638	8	6,992
30-34	4,136	18	4,398	4	8,556
35-39	3,815	16	4,070	5	7,906
40-44	3,698	13	3,772	2	7,485
45-49	3,701	16	3,604	1	7,322
50-54	3,060	17	2,898	7	5,982
55-59	2,485	13	2,343	6	4,847
60-64	2,026	8	2,091	3	4,128
65-69	1,438	5	1,633	3	3,079
70-74	973	2	1,170	1	2,146
75+	1,092	8	1,927	–	3,027
Total	51,634	188	45,482	63	97,367

Source: SEWRPC.

Table D-9

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN OZAUKEE COUNTY: 2000

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	3,461	6	3,400	6	6,873
5-9	4,163	5	4,057	6	8,231
10-14	4,740	10	3,282	6	8,038
15-19	4,801	13	3,360	6	8,180
20-24	4,242	14	2,533	5	6,794
25-29	4,497	16	2,930	6	7,449
30-34	5,019	24	3,232	1	8,276
35-39	5,322	25	3,610	8	8,965
40-44	4,886	22	4,993	4	9,905
45-49	4,255	18	4,382	5	8,660
50-54	3,823	16	3,918	2	7,759
55-59	3,616	16	3,637	1	7,270
60-64	2,800	14	2,794	6	5,614
65-69	2,021	9	2,138	5	4,173
70-74	1,453	5	1,791	2	3,251
75+	1,689	10	2,900	2	4,601
Total	60,788	223	52,957	71	114,039

Source: SEWRPC.

Table D-10

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN RACINE COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	5,914	809	5,977	822	13,522
5-9	5,106	695	5,349	706	11,856
10-14	7,076	894	7,116	871	15,957
15-19	9,003	992	8,797	952	19,744
20-24	9,484	887	8,854	885	20,110
25-29	7,690	657	7,428	700	16,475
30-34	4,724	472	6,177	566	11,939
35-39	4,669	391	5,358	477	10,895
40-44	4,337	307	4,602	381	9,627
45-49	4,229	280	4,241	343	9,093
50-54	4,451	237	4,524	246	9,458
55-59	4,130	183	4,592	181	9,086
60-64	3,574	127	3,885	158	7,744
65-69	3,008	90	3,376	132	6,606
70-74	2,340	48	2,636	60	5,084
75+	3,182	44	5,116	98	8,440
Total	82,917	7,113	88,028	7,578	185,636

Source: SEWRPC.

Table D-11

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN RACINE COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	6,266	1,183	6,330	1,199	14,978
5-9	6,698	1,079	6,955	1,094	15,826
10-14	5,633	968	6,079	965	13,645
15-19	5,046	839	5,436	844	12,165
20-24	7,310	979	7,031	987	16,307
25-29	9,209	1,069	8,806	1,083	20,167
30-34	9,271	944	9,004	983	20,202
35-39	7,363	679	7,500	753	16,295
40-44	4,573	471	6,153	589	11,786
45-49	4,536	378	5,277	469	10,660
50-54	4,150	283	4,475	370	9,278
55-59	3,939	243	4,060	337	8,579
60-64	3,945	194	4,217	234	8,590
65-69	3,468	136	4,121	157	7,882
70-74	2,764	81	3,253	123	6,221
75+	4,202	80	6,510	183	10,975
Total	88,373	9,606	95,207	10,370	203,556

Source: SEWRPC.

Table D-12

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN RACINE COUNTY: 2000

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	6,450	1,339	6,490	1,350	15,629
5-9	6,785	1,294	6,908	1,311	16,298
10-14	6,069	1,196	6,274	1,212	14,751
15-19	6,657	1,118	6,966	1,134	15,875
20-24	5,671	984	6,035	996	13,686
25-29	5,071	847	5,421	879	12,218
30-34	7,171	967	7,050	1,006	16,194
35-39	9,005	1,032	8,779	1,079	19,895
40-44	9,083	890	8,911	961	19,845
45-49	7,160	625	7,366	719	15,870
50-54	4,367	419	5,984	552	11,322
55-59	4,206	321	5,057	433	10,017
60-64	3,665	225	4,187	327	8,404
65-69	3,252	176	3,668	276	7,372
70-74	2,940	121	3,566	171	6,798
75+	4,915	134	8,184	270	13,503
Total	92,467	11,688	100,846	12,676	217,677

Source: SEWRPC.

Table D-13

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WALWORTH COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	2,630	15	2,569	14	5,228
5-9	2,653	13	2,557	14	5,237
10-14	2,926	10	2,592	7	5,535
15-19	3,883	8	3,766	8	7,665
20-24	4,061	18	4,079	6	8,164
25-29	3,784	35	3,770	18	7,607
30-34	2,995	38	2,871	17	5,921
35-39	1,991	25	1,873	1	3,890
40-44	1,729	10	1,785	3	3,527
45-49	1,563	7	1,632	–	3,202
50-54	1,592	9	1,683	6	3,290
55-59	1,488	8	1,709	6	3,211
60-64	1,370	9	1,662	5	3,045
65-69	1,251	7	1,554	8	2,820
70-74	1,045	7	1,256	6	2,314
75+	1,464	16	2,562	16	4,058
Total	36,425	235	37,920	135	74,715

Source: SEWRPC.

Table D-14

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WALWORTH COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	3,224	12	3,173	11	6,420
5-9	3,064	11	2,983	12	6,070
10-14	2,978	9	2,816	13	5,816
15-19	3,332	15	3,306	14	6,667
20-24	3,659	23	3,527	8	7,217
25-29	4,083	25	3,953	7	8,068
30-34	3,978	28	3,893	6	7,905
35-39	3,858	39	3,865	17	7,779
40-44	3,086	38	3,030	16	6,170
45-49	2,049	24	1,970	–	4,043
50-54	1,714	13	1,837	3	3,567
55-59	1,457	9	1,668	–	3,134
60-64	1,435	11	1,683	6	3,135
65-69	1,313	8	1,663	4	2,988
70-74	1,077	6	1,481	4	2,568
75+	1,712	17	3,263	17	5,009
Total	42,019	288	44,111	138	86,556

Source: SEWRPC.

Table D-15

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WALWORTH COUNTY: 2000

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	3,599	15	3,549	14	7,177
5-9	3,787	11	3,713	12	7,523
10-14	3,558	7	3,408	10	6,983
15-19	3,742	13	3,731	12	7,498
20-24	3,711	22	3,749	13	7,495
25-29	3,542	31	3,496	13	7,082
30-34	3,583	33	3,345	7	6,968
35-39	4,152	30	4,046	7	8,235
40-44	4,051	29	4,039	5	8,124
45-49	3,865	37	3,925	16	7,843
50-54	3,009	38	3,048	15	6,110
55-59	1,907	23	1,992	–	3,922
60-64	1,542	14	1,828	3	3,387
65-69	1,288	8	1,625	–	2,921
70-74	1,125	77	1,498	4	2,634
75+	1,853	18	3,818	15	5,704
Total	48,314	336	50,810	146	99,606

Source: SEWRPC.

Table D-16

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WASHINGTON COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	3,728	2	3,590	2	7,322
5-9	4,424	3	4,253	4	8,684
10-14	5,200	1	4,684	2	9,887
15-19	5,064	6	4,804	1	9,875
20-24	3,326	4	3,815	1	7,146
25-29	2,836	2	3,594	2	6,434
30-34	3,266	–	3,632	3	6,901
35-39	3,529	6	3,370	6	6,911
40-44	2,908	5	2,696	3	5,612
45-49	2,359	7	2,185	2	4,553
50-54	2,053	3	2,032	4	4,092
55-59	1,794	1	1,819	2	3,616
60-64	1,459	–	1,577	2	3,038
65-69	1,134	–	1,213	–	2,347
70-74	709	–	956	–	1,665
75+	1,073	–	1,727	2	2,802
Total	44,862	40	45,947	36	90,885

Source: SEWRPC.

Table D-17

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WASHINGTON COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	5,115	2	5,017	2	10,136
5-9	5,169	–	5,049	3	10,221
10-14	5,090	2	4,765	2	9,859
15-19	5,179	3	4,945	–	10,127
20-24	4,685	2	4,798	–	9,485
25-29	4,954	–	5,374	2	10,330
30-34	4,471	2	4,967	3	9,443
35-39	3,972	4	4,483	5	8,464
40-44	3,923	4	4,161	4	8,092
45-49	3,850	8	3,650	5	7,522
50-54	3,028	5	2,868	5	5,906
55-59	2,383	6	2,305	2	4,696
60-64	1,936	1	2,051	1	3,989
65-69	1,500	1	1,701	1	3,203
70-74	1,058	–	1,362	1	2,421
75+	1,356	–	2,349	3	3,708
Total	57,678	40	59,845	39	117,602

Source: SEWRPC.

Table D-18

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WASHINGTON COUNTY: 2000

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	6,549	2	6,498	2	13,051
5-9	6,129	–	6,073	2	12,204
10-14	5,959	–	5,748	1	11,708
15-19	5,663	1	5,504	1	11,169
20-24	4,730	–	4,834	–	9,564
25-29	5,073	1	5,314	1	10,389
30-34	5,407	1	5,551	1	10,960
35-39	5,665	2	5,944	4	11,615
40-44	4,867	5	5,289	3	10,164
45-49	4,148	5	4,628	4	8,785
50-54	3,912	4	4,211	5	8,132
55-59	3,705	6	3,638	5	7,354
60-64	2,754	3	2,785	3	5,545
65-69	1,971	3	2,124	1	4,099
70-74	1,413	–	1,757	–	3,170
75+	1,850	–	3,255	4	5,109
Total	69,795	33	73,153	37	143,018

Source: SEWRPC.

Table D-19

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WAUKESHA COUNTY: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	9,532	27	9,499	21	19,079
5-9	11,264	26	11,215	14	22,519
10-14	14,063	9	13,280	10	27,362
15-19	17,056	5	16,248	12	33,321
20-24	16,617	36	14,297	20	30,970
25-29	12,813	112	11,442	38	24,405
30-34	7,414	13	9,003	24	16,454
35-39	8,844	11	9,926	5	18,786
40-44	9,129	8	9,586	5	18,728
45-49	9,033	5	8,839	3	17,880
50-54	8,606	4	8,181	5	16,796
55-59	6,951	2	7,019	–	13,972
60-64	5,235	4	5,339	2	10,580
65-69	3,732	3	4,066	3	7,804
70-74	2,468	2	2,988	2	5,460
75+	2,986	4	5,156	1	8,147
Total	145,743	271	146,084	165	292,263

Source: SEWRPC.

Table D-20

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WAUKESHA COUNTY: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	14,197	25	14,195	20	28,437
5-9	12,820	25	12,804	15	25,664
10-14	12,512	26	12,293	15	24,846
15-19	13,434	26	13,172	19	26,651
20-24	15,305	9	13,352	19	28,685
25-29	17,813	5	16,526	16	34,360
30-34	17,851	35	16,393	22	34,301
35-39	15,024	107	13,745	36	28,912
40-44	9,227	13	10,488	20	19,748
45-49	9,879	10	10,743	5	20,637
50-54	9,396	7	9,874	3	19,280
55-59	8,687	4	8,730	–	17,421
60-64	7,703	3	7,760	5	15,471
65-69	5,647	1	6,371	1	12,020
70-74	3,747	2	4,523	1	8,273
75+	4,420	4	7,481	1	11,906
Total	177,662	302	178,450	198	356,612

Source: SEWRPC.

Table D-21

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN WAUKESHA COUNTY: 2000

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	15,520	28	15,533	23	31,104
5-9	17,045	26	17,086	17	34,174
10-14	16,603	24	16,469	14	33,110
15-19	14,667	25	14,471	19	29,182
20-24	13,572	26	12,350	23	25,971
25-29	14,104	25	13,416	23	27,568
30-34	16,344	8	15,141	21	31,514
35-39	19,605	5	18,449	15	38,074
40-44	19,197	33	17,560	18	36,808
45-49	15,707	97	14,348	34	30,186
50-54	9,392	11	10,673	17	20,093
55-59	9,424	9	10,518	2	19,953
60-64	8,383	6	9,334	3	17,726
65-69	7,074	3	7,921	1	14,999
70-74	5,573	2	6,580	3	12,158
75+	6,685	3	11,254	–	17,942
Total	208,895	331	211,103	233	420,562

Source: SEWRPC.

Table D-22

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN THE REGION: 1980

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	58,789	10,439	58,906	10,875	139,009
5-9	58,967	8,796	54,399	8,670	125,832
10-14	67,294	9,833	63,381	9,387	149,895
15-19	82,730	10,326	79,352	10,327	182,735
20-24	82,934	9,371	83,517	10,395	186,217
25-29	74,450	7,456	76,790	9,158	167,854
30-34	58,511	5,345	67,679	7,687	139,222
35-39	52,007	3,879	53,418	5,322	114,626
40-44	42,931	3,309	44,719	4,366	95,325
45-49	41,937	2,929	43,199	3,970	92,035
50-54	45,335	2,792	47,117	3,326	98,570
55-59	42,727	2,259	47,059	2,413	94,454
60-64	36,594	1,484	41,628	1,737	81,443
65-69	29,540	1,099	36,479	1,327	68,445
70-74	21,136	666	29,441	926	52,169
75+	29,120	850	54,247	1,321	85,538
Total	820,002	80,829	881,331	91,207	1,673,369

Source: SEWRPC.

Table D-23

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN THE REGION: 1990

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	68,530	13,724	68,678	13,998	164,930
5-9	60,991	12,651	61,448	12,733	147,823
10-14	59,412	11,130	58,132	11,278	139,952
15-19	54,706	9,757	54,293	9,648	128,404
20-24	65,688	10,375	63,922	10,541	150,526
25-29	82,335	10,824	80,828	11,730	185,717
30-34	84,993	9,664	85,693	11,381	191,731
35-39	75,651	7,374	77,891	9,431	170,347
40-44	58,291	5,165	67,740	7,636	138,832
45-49	51,022	3,615	52,763	5,228	112,628
50-54	40,820	2,976	43,467	4,185	91,448
55-59	38,335	2,532	41,017	3,699	85,583
60-64	39,101	2,225	43,263	2,954	87,543
65-69	33,400	1,647	41,330	2,031	78,408
70-74	25,047	942	34,096	1,314	61,399
75+	35,893	1,203	69,307	2,143	108,546
Total	874,215	105,804	943,868	119,930	2,043,817

Source: SEWRPC.

Table D-24

MODEL II FORECAST POPULATION LEVELS BY AGE, SEX, AND RACE IN THE REGION: 2000

Age Group	Male		Female		Total Population
	White	Nonwhite	White	Nonwhite	
0-4	64,830	15,508	64,915	15,681	160,934
5-9	70,234	14,617	70,574	14,755	170,180
10-14	70,394	13,637	69,275	13,834	167,140
15-19	63,059	12,996	62,529	13,101	151,685
20-24	59,207	11,255	58,803	11,714	140,979
25-29	54,739	9,801	55,281	10,176	129,997
30-34	67,382	10,229	66,241	10,852	154,704
35-39	83,995	10,400	82,712	11,653	188,760
40-44	85,307	9,100	86,271	11,063	191,741
45-49	74,747	6,751	77,364	9,026	167,888
50-54	56,102	4,585	66,350	7,150	134,187
55-59	47,309	3,076	50,723	4,768	105,876
60-64	35,774	2,355	40,541	3,652	82,322
65-69	30,753	1,827	36,721	3,027	72,328
70-74	27,922	1,391	36,265	2,141	67,719
75+	43,548	1,729	84,441	3,197	132,915
Total	935,302	129,257	1,009,006	145,790	2,219,355

Source: SEWRPC.