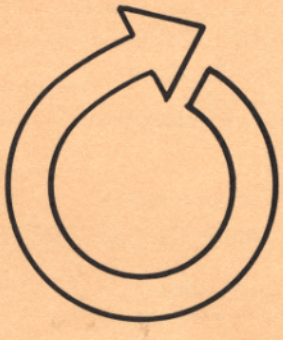
DEMOGRAPHIC SCENARIOS TO THE YEAR 2000 FOR THE CITY OF CHICAGO AND SUBURBAN COUNTIES IN NORTHEASTERN ILLINOIS

information base



STAFF PAPER

northeastern illinois planning commission

NIPC staff papers are summaries of important research applicable to planning projects being conducted by the Commission, or outlines of processes and procedures being applied by the Commission in fulfilment of its regional planning objectives Staff Papers are prepared by Commission staff members or by consultants working with the Commission.

Staff Papers are prepared primarily to meet research and organizational requirements of specific Commission planning activities. They are made available to citizens and agencies of northeastern Illinois in the interest of sharing important information and increasing knowledge of regional planning issues and programs.

Staff Papers are not official policy statements of the Commission, nor are their contents intended to serve as Commission recommendations for specific planning actions.

Northeastern Illinois is a diverse in its land use and complex in its political structure. It has some of the most productive farms on earth - also one of the world's greatest cities. It contains 3,714 square miles of land and 38 square miles of water. It is home to 7 million people, organized in more than 1,250 units of government.

In 1957, following a decade of rapid urbanization in the Chicago suburban area, the Illinois General Assembly created the Northeastern Illinois Planning Commission (NIPC) to conduct comprehensive planning for the six-county greater Chicago region.

The Commission is expressly directed to meet the problems of metropolitan growth head on. It has three statutory charges: conduct research and collect data for planning; assist local government; and prepare comprehensive plans and policies to guide the development of the counties of Cook, DuPage, Kane, Lake, McHenry and Will.

By necessity, regional planning deals with general development policies not local land use detail. NIPC supports and coordinates county and municipal planning. The Commission has advisory powers only and relies upon voluntary compliance with its plans and policies.

northeastern illinois planning commission

400 West Madison Street, Chicago, Illinois 60606 (312) 454-0400

DEMOGRAPHIC SCENARIOS TO THE YEAR 2000 FOR THE CITY OF CHICAGO AND SUBURBAN COUNTIES IN NORTHEASTERN ILLINOIS

Max Dieber
September 1979

The preparation of this report was financed in part through a grant from the Illinois Department of Transportation and in part through a grant from the U.S. Dept. of Transportation, Urban Mass Transit Administration, under the Mass Administration Act of 1964 as amended.

NORTHEASTERN ILLINOIS PLANNING COMMISSION
400 West Madison
Chicago, Illinois
(312) 454-0400

LIST OF TABLES

LIST OF DIAGRAMS

TABLE OF CONTENTS

INTRODUCTION

On June 15, 1978, the Northeastern Illinois Planning Commission adopted a statement concerning a regional conservation and development strategy:

> "The Commission recommends that the governments of this region cooperate in a basic regional strategy to begin to stabilize the mature, fully developed communities throughout the region and to encourage their maintenance and revitalization. The second part of this strategy is to accommodate new urban expansion in locations and in a manner which is supportive of regional goals and objectives."

This shifting policy emphasis plus the need to recognize the outlook for lower overall regional growth means that the Commission's 1976 forecasts of regional and sub-regional population change must be revised. On the one hand, totals must be adjusted to account for continuing decline in fertility, rapid decreases in household size, increases in female labor force participation and net out-migration of the region's population. On the other hand, the Commission statement of policy must be clarified by, first, exploring the implications of alternative distributions of population, households and employment, and, second, submitting these findings and the alternatives to public review and discussion. Once this review is complete and the Commission acts upon a single set of forecast results, these figures will provide the means in which to introduce the urban conservation strategy in a practical, comprehensive way into the regional planning process.

An important initial step in this effort is an examination of the demographic possibilities and the determination of maximum and minimum totals for each suburban county and the city of Chicago within which the discussion of urban conservation strategies and implications can take place. The purpose of this paper is the presentation of these maximum and minimum totals, a description of the methods used and a discussion of the assumptions that were constructed. Note that it is expected that adjustments will be made in response to comments, observations and suggestions received concerning the information contained in this document.

POPULATION AND HOUSEHOLD FORECAST SCENARIOS TO YEAR 2000

The ranges of county population and household forecasts summarized in Tables 1, 2 and 3 are derived from an evaluation of ninety-six different alternatives. These alternatives are summarized in Appendix A. The objective of the evaluation was to determine results that would:

(1) provide a realistic range of potential final results within which negotiated totals were feasible;

(2) provide one set of numbers that could be interpreted as a continuation of current conditions; these results are labeled as Scenario 1;

(3) provide a set of numbers that could be interpreted as one intra-regional distribution consistent with an unspecified effort to implement the urban conservation strategy; these results are labeled as Scenario 2.

In Scenario 1 the five counties other than Cook receive nearly 1.2 million new people or more than 230 percent of the growth available for the whole region for the 1970 to 2000 period. McHenry and Will counties show rapid rates of growth consistent with their experience during the 1970s. DuPage County's growth is moderated somewhat as the county nears its ultimate capacity. Kane and Lake counties show increases of "only" 51 percent and 61 percent, respectively. Within Cook County, the suburban area grows by 7 percent while the city of Chicago loses 24 percent of its 1970 population. Much of this loss is due to reductions in household size since the corresponding reduction in the number of households is only 5 percent.

The regional total for Scenario 1 was determined by adding the independently derived county totals. The resulting population figure of 7,495,000 for the region in the year 2000 is over 1.4 million less than the forecast endorsed by the Commission in August 1976 and 485,000 less than the Illinois Bureau of the Budget's (BOB) 1977 result. It represents, however, an average annual growth rate which is three times that actually experienced in the 1970-1977 period.

In Scenario 2, the five counties other than Cook gain by slightly less than 1 million new people in the 1970 to 2000 period, an amount of growth equal to 89 percent of that for the region as a whole. For each of the five, growth is less than in Scenario 1. Within Cook County, the suburban area gains 400,000 new residents

DIAGRAM 1 NORTHEASTERN ILLINOIS POPULATION

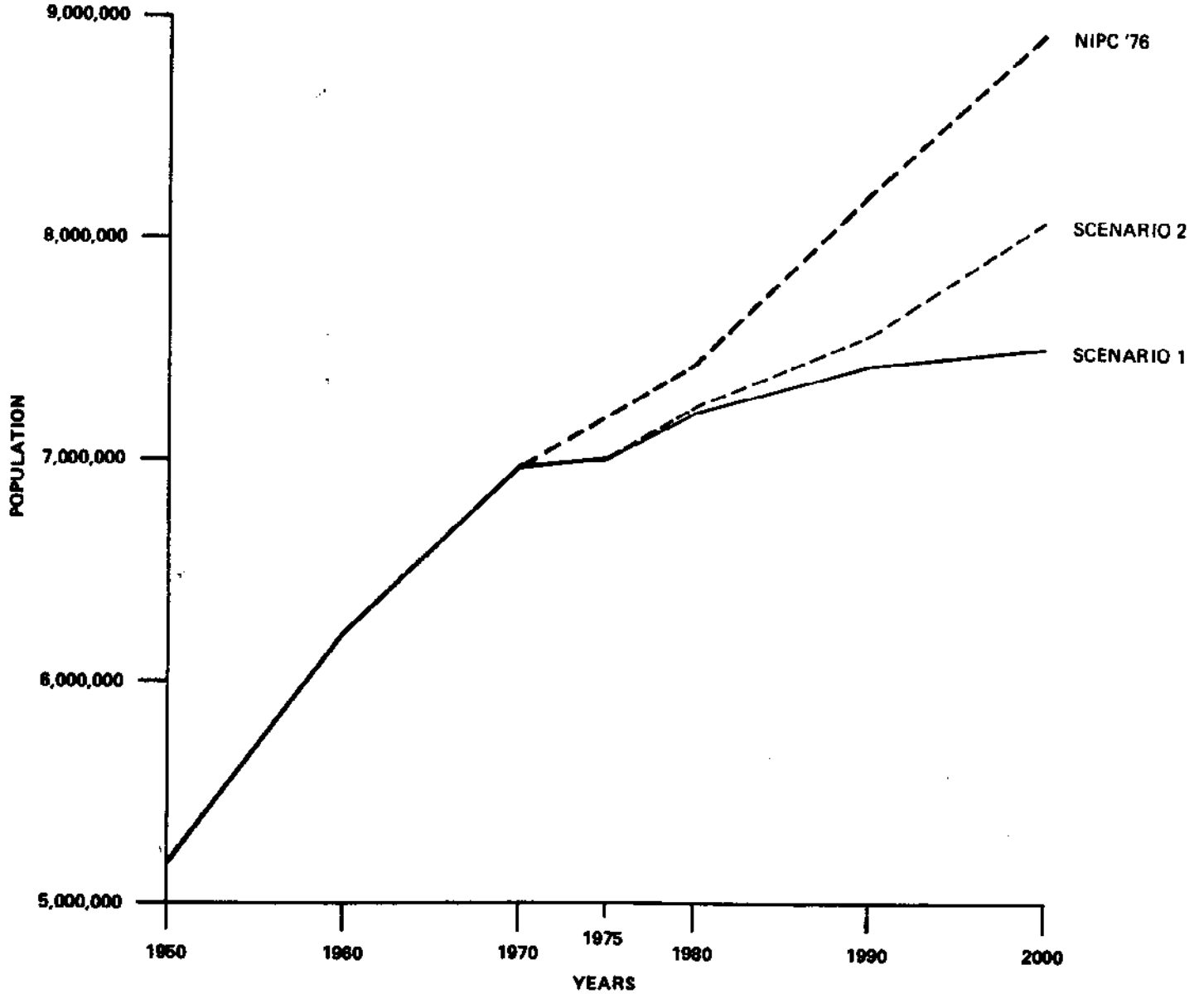


TABLE 1

FORECAST SCENARIOS
POPULATION AND HOUSEHOLDS
(in thousands)

				2000			
		1970	1975	NIPC'76	BOB'77	Scenario 1	Scenario 2
Cook	POP	5492	5371	6011	5278	4818	5616
	HH	1766	1818	2097	2257	2052	2398
Chicago	POP	3367	3099	3011	NA	2554	3083
	HH	1138	1070	1180	NA	1084	1313
Suburban	POP	2125	2272	3000	NA	2264	2533
	HH	628	748	927	NA	968	1085
DuPage	POP	492	551	987	861	922	868
	HH	136	154	327	287	309	291
Kane	POP	251	268	426	449	380	368
	HH	75	82	138	167	143	138
Lake	POP	383	404	700	612	618	580
	HH	103	117	222	220	228	214
McHenry	POP	112	126	241	228	240	199
	HH	33	38	78	83	88	73
Will	POP	249	290	553	553	517	451
	HH	71	84	181	203	192	167
N.E.Illinois	POP	6979	7010	8918	7980	7495	8082
	HH	2184	2293	3043	3217	3012	3281

1970 data source is the 1970 Census report, General Population Characteristics: Illinois, PC(1)-B 15, U.S. Bureau of the Census. 1975 data source is Current Population Reports, Population Estimates and Projections, Series P-25, No.661, U.S. Bureau of the Census, May 1977.

while the city of Chicago loses only 8 percent of its 1970 population. Because of the decreases in household size, that loss actually is associated with an increase of 176,000 households.

Scenario 2's regional total for the year 2000 is 8,082,000, a result which is 800,000 less than NIPC's 1976 forecast and 100,000 more than IBOB's 1977 result. Generally, this scenario reflects a situation where the northeastern Illinois area as a whole becomes a more attractive place to live and work than is currently perceived.

Diagram 1 shows the possible paths of regional growth to the year 2000. NIPC's 1976 forecast is shown for reference purposes. Table 1 presents county level figures for 1970 and 1975 and year 2000 population and households. In this table NIPC's 1976 and BOB's 1977 totals are shown. Note that NIPC's 1976 regional population total for the year 2000 is nearly 1 million more than the result determined by BOB in 1977. Because of differences in household size assumptions, however, BOB's result for households is actually higher.

Tables 2 and 3 present the population and household scenarios in five year increments to the year 2000. The 1975 figure shown in these tables is not an estimate but is the output of the cohort-survival procedures. Comparison to independent Census Bureau estimates of 1975 population shows that either the process generally overestimates population in the short run or the Census estimates

TABLE 2

POPULATION FORECAST SCENARIOS
(in thousands, including group quarters)

	1970	1975*	1980	1985	1990	1995	2000
Cook							
Scenario 1	5492	5496	5340	5217	5105	4974	4818
Scenario 2	5492	5496	5362	5332	5382	5479	5616
Chicago							
Scenario 1	3367	3143	3021	2921	2812	2687	2554
Scenario 2	3367	3143	3036	2997	2996	3023	3083
Suburban Cook							
Scenario 1	2125	2353	2319	2296	2293	2287	2264
Scenario 2	2125	2353	2326	2335	2386	2456	2533
DuPage							
Scenario 1	492	579	662	740	814	877	922
Scenario 2	492	579	660	728	782	827	868
Kane							
Scenario 1	251	274	294	316	338	360	379
Scenario 2	251	274	293	314	334	353	368
Lake							
Scenario 1	383	421	457	498	541	582	617
Scenario 2	383	421	456	494	529	558	580
McHenry							
Scenario 1	112	128	150	173	197	219	240
Scenario 2	112	128	149	168	183	194	199
Will							
Scenario 1	250	284	328	376	425	472	517
Scenario 2	250	284	327	367	403	432	451
N.E.Illinois							
Scenario 1	6979	7182	7231	7320	7420	7484	7493
Scenario 2	6979	7182	7247	7403	7613	7843	8082

*as generated by the cohort-survival model; this is not an estimate

TABLE 3

HOUSEHOLD FORECAST SCENARIOS
(in thousands)

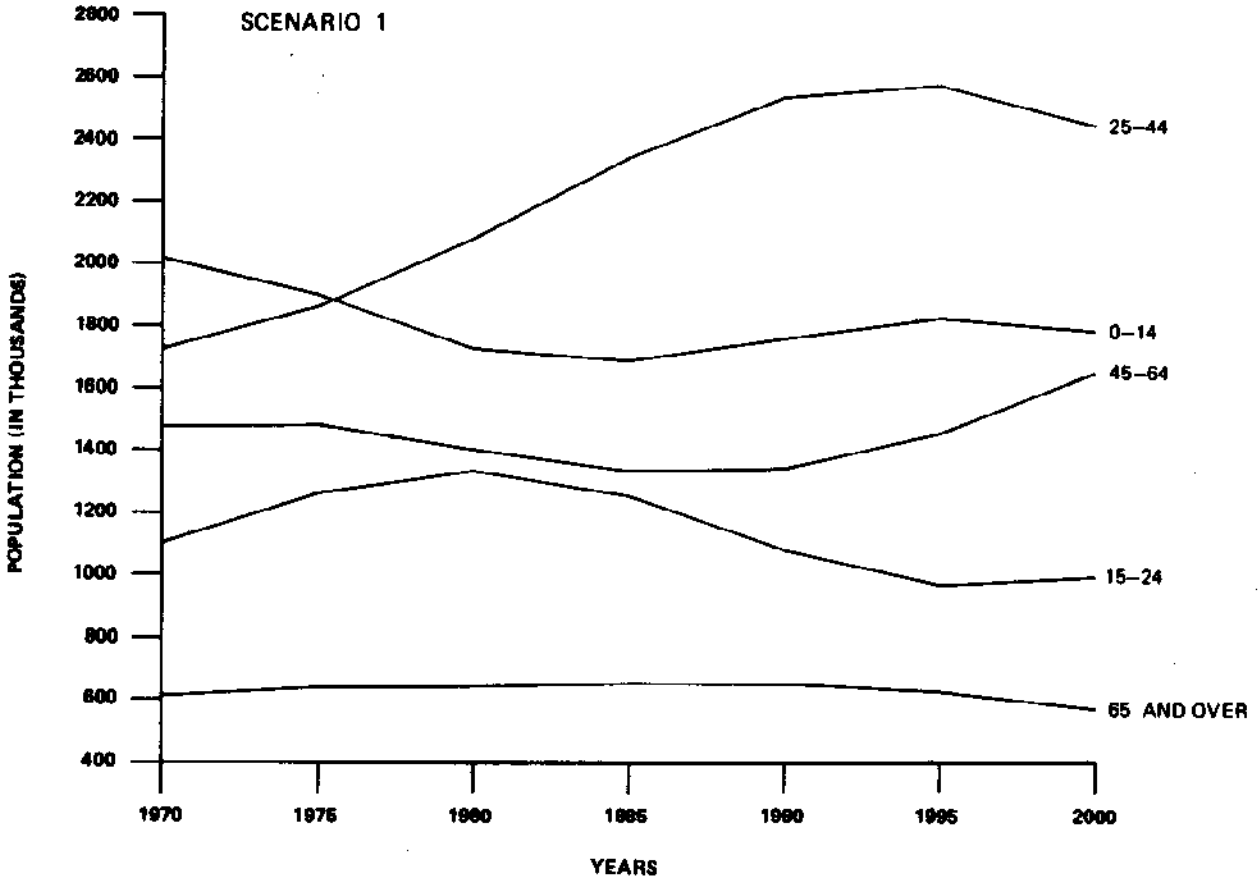
	1970	1975*	1980	1990	2000
Cook					
Scenario 1	1763	1862	1928	2077	2052
Scenario 2	1766	1862	1935	2192	2398
Chicago					
Scenario 1	1080	1063	1088	1141	1084
Scenario 2	1080	1063	1093	1217	1313
Suburban Cook					
Scenario 1	683	799	840	936	968
Scenario 2	683	799	842	975	1085
DuPage					
Scenario 1	136	162	196	268	309
Scenario 2	136	162	196	257	291
Kane					
Scenario 1	75	84	98	123	142
Scenario 2	75	84	98	121	138
Lake					
Scenario 1	103	123	146	188	228
Scenario 2	103	123	146	184	214
McHnery					
Scenario 1	33	39	48	69	88
Scenario 2	33	39	47	64	73
Will					
Scenario 1	71	83	103	146	192
Scenario 2	71	83	103	138	167
N.E.Illinois					
Scenario 1	2181	2353	2519	2871	3011
Scenario 2	2181	2353	2525	2956	3281

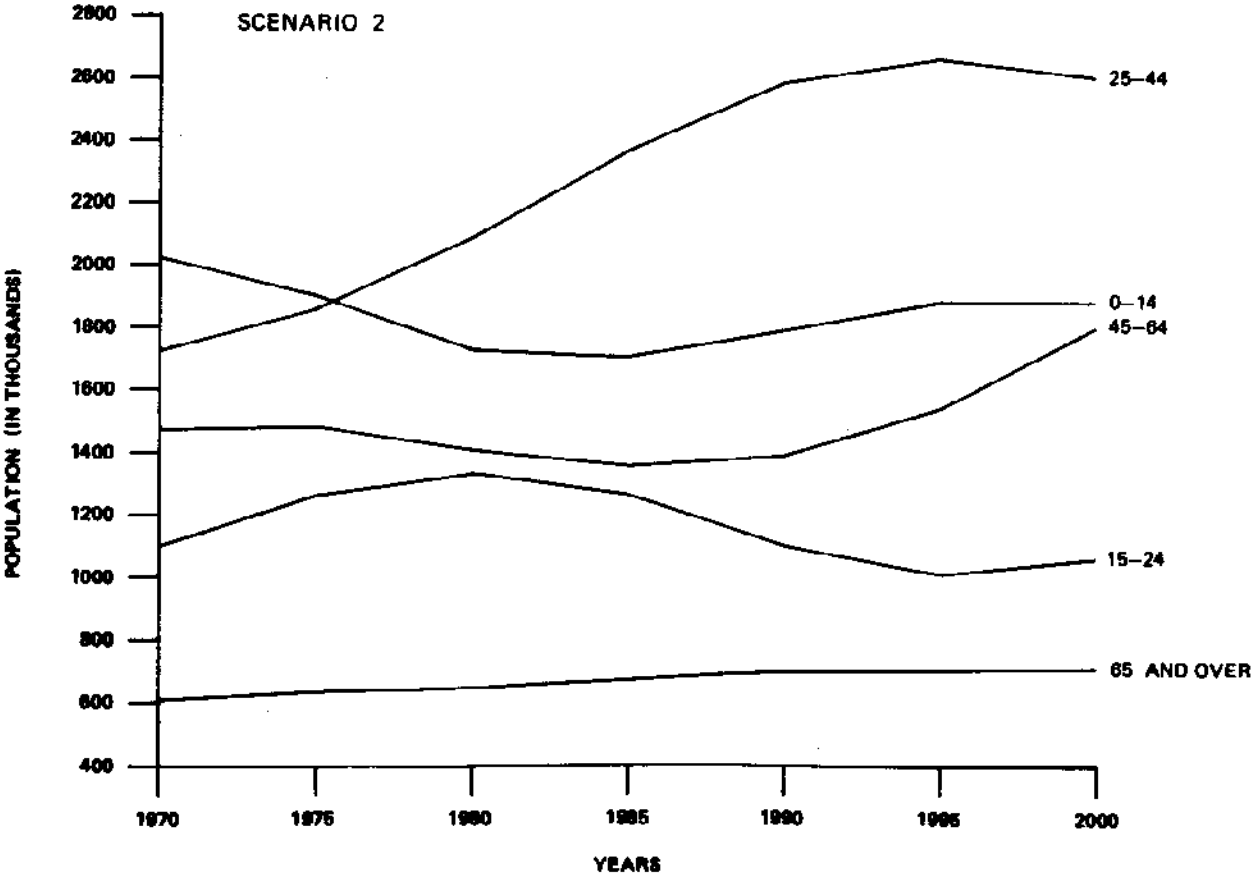
*as generated by the cohort-survival model; this is not an estimate

are consistently low. The one exception is in Will County. These differences will be evaluated when adjustments are made in response to comments and observations received from each of the counties.

Assuming that there are not dramatic changes in the factors that influence numbers of births, deaths and migrants, the age distribution is one of the easiest demographic results to generate. Diagram 2 summarizes the two scenarios by broad age category. In both scenarios the greatest growth of population is in the 25 to 44 year old age group. By the year 2000 this group of consumers/homeowners/workers will have become 32 to 33 percent of the population. The recent declines in the 0-14 year old population, manifested in the many recent school closings will continue through the middle of the 1980s. After 1980, there will be a decline in the number of people first entering the labor force. The population aged 65 and older does not change by very much in either scenario. Note that the baby boom population (born in the 1954 to 1964 period) will not begin to reach retirement age until 2019. By the year 2000 this group will be 36 to 46. Significantly, most of their offspring will be born during the 1980s.

DIAGRAM 2 AGE DISTRIBUTION IN NORTHEASTERN ILLINOIS 1970 - 2000





METHOD

The scenarios were generated using a cohort-survival, or cohort-component, method.[1] Many handbooks and guides to demographic techniques discuss this method in detail.[2] In simple terms the process recognizes that change in the population is the result of births, aging (survival), deaths, migration, and the initial, or base year, age structure. The overall population total is determined by summing separate forecasts that have been generated for each age group by sex. For the results discussed in this document, the process begins with the age and sex distribution as recorded in the 1970 Census. Expected future births are added to this base population, expected future deaths are subtracted from each age and sex group, and an allowance is made for expected net migration. The number of survivors from one date to another is calculated separately for each age and sex group by applying projected survival rates to the base population. The number of births is determined by multiplying age specific birth rates by number of women in the childbearing

---

[1] The method used here is POPROJ, a computer model that is outlined in Techniques for Making Population Projections: How to Make Age-Sex Projections by Electronic Computer, Donald J. Bogue and Louise Rehling, Community and Family Study Center, University of Chicago, 1974.

[2] For example, see Projecting State and Local Populations, Donald B. Pittenger, Ballinger Publishing, Cambridge, Mass. 1976; or Guide for Local Area Population Projections, Richard Irwin, U.S. Bureau of the Census, Technical Paper 39, 1977. In addition to descriptions of the cohort-component approach, both of these manuals contain useful bibliographies.

ages. Estimated net migrants are added to the survived population at the end of each time period (one year in the process used here). The resulting population becomes the base population for the next projection interval. The number of households was generated by dividing the population living in households by assumed household sizes.

ASSUMPTIONS

The basic inputs to the model used to provide the results described in this document include the age and sex composition of the base population, age specific birth rates for selected years, the proportion of births that are male, age and sex specific mortality based on the stationary population values of a life table, and the annual number of migrants by age and sex for selected years.

Base Population

Base population data, including age, race, sex detail as well as the number of individuals living in group quarters, came from the 1970 Census, Report PC(1)-B15, General Population Characteristics: Illinois. This information is summarized in Table 4. Each of the seven areas, i.e., the city of Chicago and six suburban counties, was evaluated to determine the need, first, to disaggregate the base population by race, and second, to deal only with population living in households. It was assumed that unless the proportion of the population that was minority or in group quarters was particularly large, the increased detail would not substantially alter the quality of the projections. As a result of this analysis, the base population was disaggregated to white and non-white only for the city of Chicago. In addition, population living in group quarters was excluded from the base totals in Kane, Lake and Will counties. In these counties, final results were generated by adding the group quarters population to the output of the cohort-component model. For lack of a better assumption, this group quarters population level was held constant throughout the forecast period (see discussion on determination of household size).

Fertility

The model requires that current and expected fertility be expressed by age specific birth rates (ASBR), i.e., the number of live births per 1000 women in each five year cohort between 15 and 49 years

TABLE 4

1970 Age Distribution Of Males
by
Subregions In Northeastern Illinois

Age	Chicago White	Chicago Non-White	Sub.Cook	DuPage	Kane	Lake	McHenry	Will
0-4	80,384	62,706	93,478	23,466	11,982	16,963	5,091	11,934
5-9	83,516	72,214	114,005	29,567	13,854	20,740	6,337	14,568
10-14	86,642	72,058	118,900	30,200	13,532	21,284	6,697	14,516
15-19	83,008	53,345	92,688	22,917	10,622	15,847	5,131	10,758
20-24	86,566	38,048	63,329	13,659	8,417	10,610	2,841	7,402
25-29	79,122	37,829	70,325	16,295	8,947	11,320	3,576	8,621
30-34	59,484	34,041	62,543	16,210	7,621	10,876	3,285	7,524
35-39	54,396	32,251	62,699	16,032	6,914	10,742	3,171	7,298
40-44	61,316	30,789	70,126	16,838	6,998	11,730	3,241	7,298
45-49	67,183	28,103	69,973	15,851	6,827	11,015	3,223	7,179
50-54	69,749	22,583	61,940	13,035	5,886	9,384	2,922	6,189
55-59	68,802	18,266	51,734	10,200	4,925	7,512	2,593	5,218
60-64	58,902	14,867	38,319	7,141	4,298	5,643	2,268	3,969
65-69	43,882	12,186	25,434	4,592	3,221	3,842	1,708	2,727
70-74	32,910	7,654	17,147	3,125	2,276	2,714	1,272	2,057
75-79	23,359	4,059	11,270	1,828	1,502	1,671	838	1,328
80-84	12,443	1,945	6,092	1,080	857	895	429	743
85 +	6,579	1,485	3,735	653	485	552	262	398
Total	1,058,243	544,429	1,034,737	242,689	119,164	173,340	54,885	119,727

TABLE 4 (cont'd)

1970 Age Distribution of Females
by
Subregions In Northeastern Illinois

Age	Chicago White	Chicago Non-White	Sub.Cook	DuPage	Kane	Lake	McHenry	Will
0-4	76,476	63,535	89,123	22,518	11,466	16,198	4,987	11,462
5-9	80,958	71,717	108,827	28,481	12,928	19,900	6,090	14,093
10-14	84,162	73,075	114,806	28,829	12,951	20,641	6,346	13,941
15-19	85,385	58,651	92,997	22,222	10,866	15,913	4,808	10,709
20-24	98,566	52,223	78,776	16,243	10,200	12,452	3,714	9,120
25-29	76,269	47,969	75,713	18,537	9,141	12,433	3,831	8,861
30-34	55,855	42,575	66,024	16,868	7,240	11,476	3,357	7,795
35-39	52,216	38,877	64,518	15,877	6,707	11,103	3,139	7,171
40-44	62,589	36,237	72,499	16,575	7,208	11,838	3,272	7,316
45-49	73,266	31,211	71,710	15,849	6,937	11,048	3,242	7,116
50-54	80,106	25,428	64,741	12,819	6,226	9,260	3,140	6,061
55-59	80,358	20,499	54,085	10,246	5,507	7,837	2,679	5,206
60-64	69,790	17,496	41,566	7,565	4,883	6,009	2,325	4,158
65-69	57,960	14,460	31,924	5,541	3,862	4,489	1,938	3,337
70-74	48,184	9,558	25,214	4,358	3,277	3,400	1,524	2,763
75-79	35,733	5,616	18,834	3,212	2,291	2,360	1,173	1,796
80-84	20,298	3,103	11,541	2,087	1,422	1,441	683	1,082
85 +	11,353	2,531	7,777	1,366	976	927	422	681
Total	1,149,524	614,761	1,090,675	249,193	124,088	178,725	56,670	122,668

SOURCE: U.S. Bureau of the Census, General Population Characteristics: Illinois 1970, PC(1)-B 15

of age. For all seven sub-regions, age specific rates were calculated for 1970, 1975 and 2000. Rates for intermediate years were calculated by the computer model using linear interpolation. Table 5 summarizes the rates determined for the three input years. Another common measure of fertility, the total fertility rate (TFR), also is shown in Table 5. The TFR is the sum of all the single year ASBR's. The value for the TFR of a specific year equals the number of live births 1000 women would generate in their child-bearing career if they experienced the fertility level implied by the age specific rates of that year.

The ASBR's for 1970 were determined by using the vital statistics records of the Illinois Department of Public Health (IDPH) and population data from the 1970 Census. Outside of Cook County, 1975 rates were calculated from IDPH records and BOB's estimates of the midyear population by age and sex. For the city of Chicago and suburban Cook County, 1975 fertility was determined by a two-step process necessitated by the lack of direct age, race, sex estimates for the city of Chicago. In the first step, the cohort-component model was run with the mortality and migration components described later in this report plus fertility assumptions that maintained the relationship between 1970 Chicago and suburban Cook rates and 1970 U.S. rates. The resulting 1975 age distribution for females aged 15-49 then became the input to the second step. In this second step, this estimated age distribution was combined with IDPH records for births in 1975 to

TABLE 5

ASSUMED BIRTH RATES
SCENARIOS 1 and 2
(rates express number of births per 1000 women)

	Age of Women							
1970	15-19	20-24	25-29	30-34	35-39	40-44	45-49	TFR
Chicago-White	57.8	140.1	140.6	87.4	41.4	10.1	0.3	2393.5
Non-White	171.3	203.1	130.0	80.8	40.5	12.2	0.7	3193.0
Suburban Cook	35.5	152.9	168.0	85.3	34.3	8.0	0.5	2422.5
DuPage	29.7	149.2	181.0	88.6	34.4	8.6	0.4	2459.5
Kane	75.6	201.1	164.1	84.1	35.3	8.2	0.1	2842.5
Lake	65.7	195.1	170.3	81.8	34.0	8.8	0.4	2780.5
McHenry	46.8	204.4	164.7	76.9	30.3	8.3	0.3	2658.5
Will	65.6	200.7	156.2	71.5	28.0	8.9	0.4	2656.5
1975								
Chicago-White	57.5	98.7	97.7	57.7	32.0	7.7	0.3	1708.0
Non-White	126.5	151.1	98.3	53.7	27.7	8.7	0.7	2333.5
Suburban Cook	23.7	83.4	120.1	58.8	18.2	4.3	0.2	1543.5
DuPage	18.0	82.1	177.6	74.4	23.3	4.0	0.3	1898.5
Kane	65.3	132.0	133.4	55.0	19.9	4.3	0.4	2051.5
Lake	44.8	105.6	123.1	79.4	19.8	3.4	0.3	1882.0
McHenry	37.2	128.0	142.3	63.1	17.3	3.4	0.3	1958.0
Will	47.1	132.5	156.9	62.9	20.1	4.3	0.5	2121.5
2000								
Chicago-White	46.1	144.4	145.5	62.3	18.4	4.2	0.3	2105.6
Non-White	46.1	141.4	131.8	56.8	20.0	5.1	0.4	2007.5
Suburban Counties	46.1	143.9	143.4	61.9	18.9	4.3	0.3	2095.0

calculate the age-specific birth rates. Year 2000 rates in all seven sub-regions were assumed to equal the U.S. Series II birth rates for the year 2000 as shown in Projections of the Population of the United States: 1977 to 2050, Current Population Reports, P-25, No.704, Bureau of the Census, 1977.

The Series II fertility rate for the year 2000 is approximately consistent with the replacement level of fertility (also known as the zero population growth, ZPG, rate). The year 2000 fertility under this assumption, will be substantially lower than 1970 rates. In general, the conditions which result in this reduced fertility are assumed to continue. These include increasing participation of women in the labor force, fewer and later marriages, delayed first births, and improving technology in fertility control.[1] It must be noted, of course, that as shown in Table 5 and Diagram 3b, this year 2000 fertility assumption does imply an increase from current fertility. The Series II assumption was selected because, first, it is the series that is currently recommended by BOB, and second, it is consistent with the fertility expectations of American women as determined in a recent U.S. Census Bureau survey.[2]

---

[1]There are several theories about conditions that will influence future fertility. For recent examples see Richard Easterlin, Michael Wachter and Susan Wachter, "The Coming Upswing in Fertility" and Charles Westoff, "The Decline of Fertility", American Demographics, Vol.1, No.2 (Feb.1979) and William Butz and Michael Ward, "The Emergence of Countercyclical U.S. Fertility", American Economic Review, Vol.69, No.3 (June 1979)

[2]Fertility of American Women: June 1978 (Advance Report), Current Population Reports, P-20, No.330, U.S. Bureau of the Census, 1978.

For the sake of comparison, the year 2000 Series III assumption was tested. This fertility level would imply that fertility remain at its current level through the forecast period. Table 6 shows the relationship between the two fertility assumptions with both scenarios. In general, the lower fertility results in a population total that is 3.5 to 4.0 percent lower.

The birth rate is not the only determinant of the number of births. The age structure of women in the child-bearing years must also be examined. Diagrams 3a, 3b, and 3c summarize the relationship between the number of births, the age-specific birth rates and the age structure of women in the child-bearing years for the region as a whole. Note in Diagram 3a that regardless of the migration scenario that is selected, the number of women aged 15-29 declines after 1980 while the number of women aged 30-49 grows substantially through the forecast period. This is significant because as suggested in Diagram 3b the large majority of births occur to women in their twenties. As a result, even though birth rates are assumed to generally increase over the forecast period, the number of births declines after the last portion of the 1980s. If the fertility rates which are being observed remain low into the early part of the 1980s, the eventual increase in the fertility rates will have little impact on the number of births because of this change in the age structure.

TABLE 6

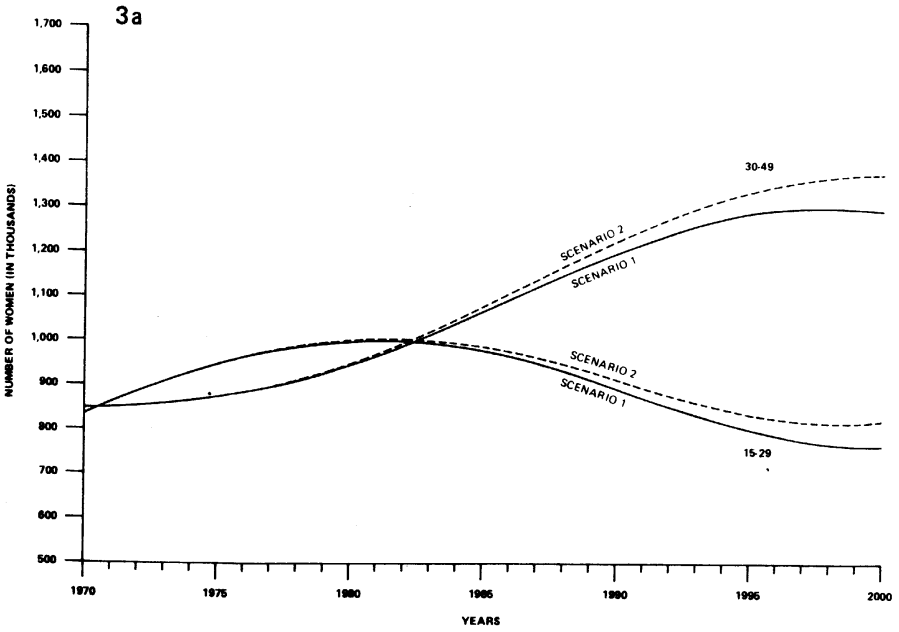
YEAR 2000 POPULATION WITH DIFFERENT FERTILITY ASSUMPTIONS
(in thousands)

	Scenario 1		Scenario 2	
	Series II	Series III	Series II	Series III
Cook	4818	4611	5616	5396
Chicago	2554	2439	3083	2960
Suburban	2264	2172	2533	2436
DuPage	922	888	868	835
Kane	380	364	368	352
Lake	618	593	580	556
McHenry	240	233	199	192
Will	517	497	451	432
N.E.Illinois	7495	7186	8082	7763

Total fertility rate for the year 2000 under Series II assumptions is 2095.0. Under Series III assumptions it is 1693.5.

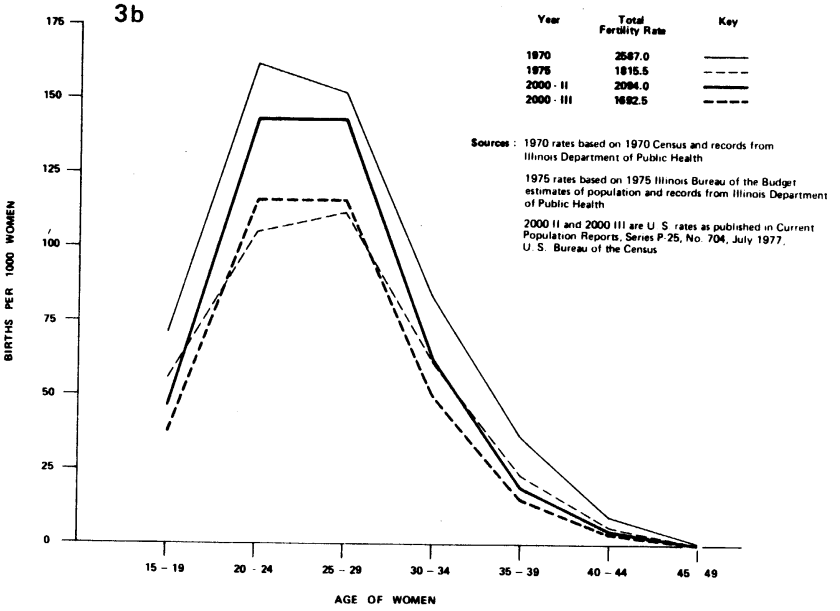
DIAGRAM 3 BIRTHS IN NORTHEASTERN ILLINOIS 1970 – 2000

Number of Women in Childbearing Years in Northeastern Illinois



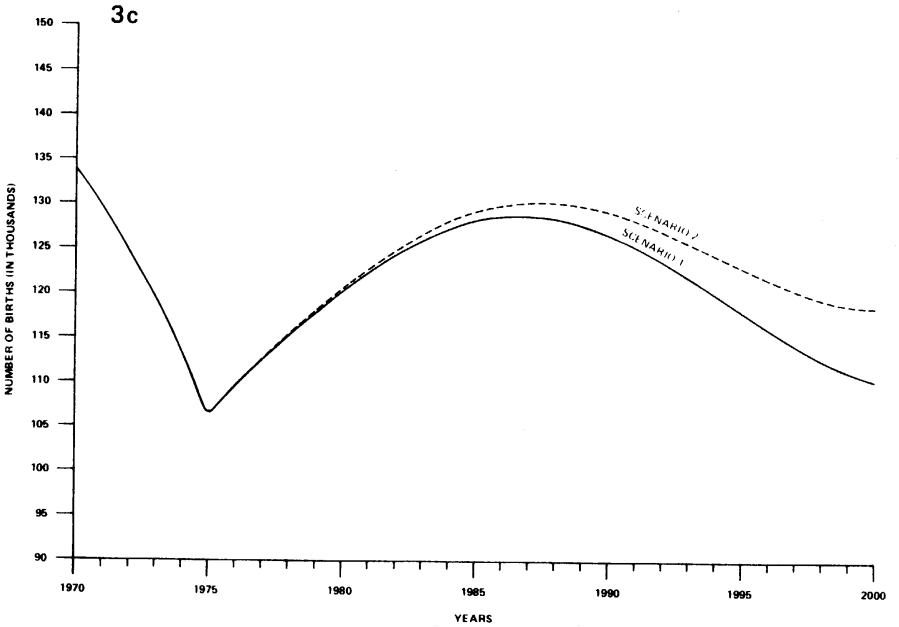
with

Age-specific Birth Rates in Northeastern Illinois



results in

Number of Births in Northeastern Illinois



Proportion of Births That Are Male

It was assumed that throughout the forecast period the proportion of births that are male is 51.32 percent. This is the figure recommended in the Bogue/Rehling document referenced earlier. An examination of the actual number of male births by county for various years shows, first, that this is not an unreasonable assumption, and, second, there is no reason to expect that inter-county differences are stable.

Mortality

The cohort-component procedure requires assumptions concerning the survival of the population in each single year age and sex group. The computer model calculates these survival rates on the basis of stationary population values for five year age cohorts by sex and race. These values were derived from "Life Tables", Vital Statistics of the United States, 1976, Vol.II, Sec.5, National Center for Health Statistics, Public Health Service, U.S. Dept. of Health, Education and Welfare, Hyattsville, Maryland, 1978. The stationary population is that population and age distribution where there is no migration and 100,000 annual births distributed evenly throughout the year. The resulting population values imply rates of survival.

Although it is possible to construct different mortality assumptions for various forecast years and geographic areas, the population totals documented in this report are based on nationwide rates applicable to all years. Different assumptions would not substantially alter the final results.

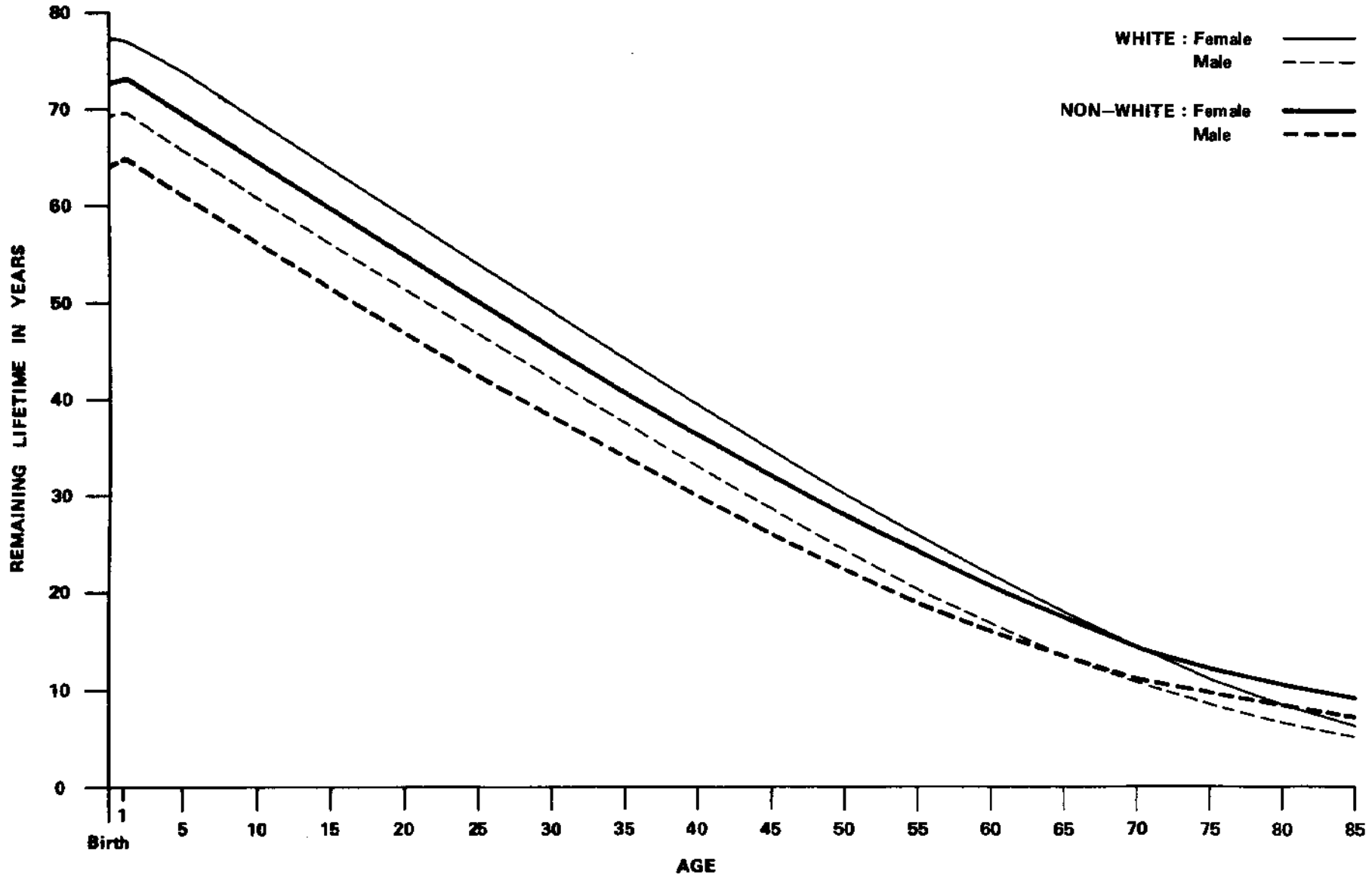
TABLE 7

LIFE TABLE VALUES
FOR THE STATIONARY POPULATION

Age	TOTAL		WHITE		NON-WHITE	
	Female	Male	Female	Male	Female	Male
0-1	98681	98398	98873	98614	97870	97454
1-4	393962	392523	394778	392298	390508	388694
5-9	491581	489475	492656	490646	487006	484312
10-14	490983	488571	492080	489781	486304	483212
15-19	490037	486394	491151	487627	485286	480917
20-24	488561	482137	489769	483567	483284	475442
25-29	486899	477447	488327	479396	480317	467136
30-34	484907	473003	486624	475642	476538	457706
35-39	482131	467727	484248	471221	471343	446342
40-44	477838	460132	480553	464689	463387	431191
45-49	471029	448363	474526	454112	451447	410843
50-54	460741	430368	465167	437393	434355	383121
55-59	445656	403602	451137	411825	410851	346536
60-64	423811	364905	430437	373920	379311	300709
65-69	394059	313726	401677	322583	341840	250281
70-74	352288	251047	360915	258996	290218	193953
75-79	291519	179032	300597	185293	222615	133650
80-84	213866	109447	220767	112721	162259	85971
85 +	226823	83490	227258	82530	249215	97335
Life Expectancy (yrs)	76.7	69.0	77.3	69.7	72.6	64.1

SOURCE: Life Tables
Vol.II, Section 5
Vital Statistics of The Unites States, 1976
Department of Health, Education and Welfare
Hyattsville, Md., 1978

DIAGRAM 4 AVERAGE REMAINING LIFETIME



Source : National Center for Health Statistics, U.S. Department of Health, Education and Welfare.
Life Tables, Vol. II, Section 5 Vital Statistics of the United States, 1976.

Table 7 shows the stationary population values that were used in the model. To assist in understanding the meaning of these values, Diagram 4 translates Table 7 into remaining life expectancy for each age, race and sex.

Migration

There are three dimensions to the selection of migration assumptions. The first is the determination of the total number of net migrants. The model required that inputs be provided for 1970, 2000 and no more than two intermediate years. Given the available sources of information different approaches to the calculation of these inputs were necessary for Cook County than for the five other counties. In the counties outside Cook, net migration for 1970 was based on NIPC estimates prepared in 1973. These estimates were generated by applying the age specific rates of migration to the 1970 population. Net migration in 1976-1977 was estimated by comparing the Census Bureau's federal-state cooperative program estimates of natural increase and migration for the two years.[1] In suburban Cook County and the city of Chicago, the number of net migrants in the periods 1970 to 1973, 1973 to 1975, and 1975 to 1976 was determined by using Census

[1] Federal State Cooperative Program for Population Estimates, Current Population Reports, Series P-26, U.S. Bureau of the Census.

Bureau estimates of population[1] and IDPH records for natural increase. Estimates of annual net migration were prepared for 1970, 1975 and 1976 that would imply the migration observed during the period. For the city of Chicago, it was also necessary to determine the proportion of the net migrants that were white and non-white. This was accomplished by, first, using IDPH estimates of natural increase and the total population by race, and, second, applying the resulting migration proportions to the 1970, 1975 and 1976 estimates of migrants described above. This procedure resulted in the conclusion that the average annual net out-migration of whites and non-whites from the city of Chicago from 1970 to 1976 was 54,000 and 21,200, respectively. For all subregions, the net migration assumptions for the year 2000 were selected in order to create population totals that would provide a reasonable range as a basis for discussion of the region's urban conservation strategy. In Scenario 1, the number of net migrants is held constant at the level measured in 1976 for Cook County and 1977 for the remaining counties excluding DuPage. In DuPage County, net migration is assumed to reach zero in the year 2000. Scenario 2 is intended to reflect a situation where the rate of population decentralization and movement away from the region's mature urban

---

[1] Population Estimates and Per Capita Income Estimates for Counties, Incorporated Places, and Selected Minor Civil Divisions in Illinois, Current Population Reports, Series P-25, No.661 (May 1977) and No.752 (Jan. 1979), U.S. Bureau of the Census.

area is reduced. In this scenario, net migration becomes zero in the year 2000 for all areas except DuPage which reaches zero in 1990. Because of the existence of large mature urban communities in Kane, Lake and Will counties, it is possible that the migration assumptions selected overstate the reduction in growth consistent with the implementation of urban conservation strategies. Further analysis is certainly suggested in these counties.

Table 8 summarizes the migration assumptions by forecast decade. Diagram 5 graphically portrays the migration differences between the two scenarios.

The second dimension in the selection of migration assumptions is the proportion of migrants by sex. In all subregions, the proportions observed in the 1960s was held constant throughout the forecast period.

The third dimension is the age structure of the migrants. The relationship among the age groups observed in the 1960s was held constant through the forecast period. This meant that the number of net migrants in each age moved up or down as did the total number of migrants. One effect of this assumption is that even when net migration is zero for a subregion, some age groups will be migrating out while others will be migrating in.

TABLE 8

MIGRATION IN NORTHEASTERN ILLINOIS, 1950 to 2000
-net migrants in thousands-

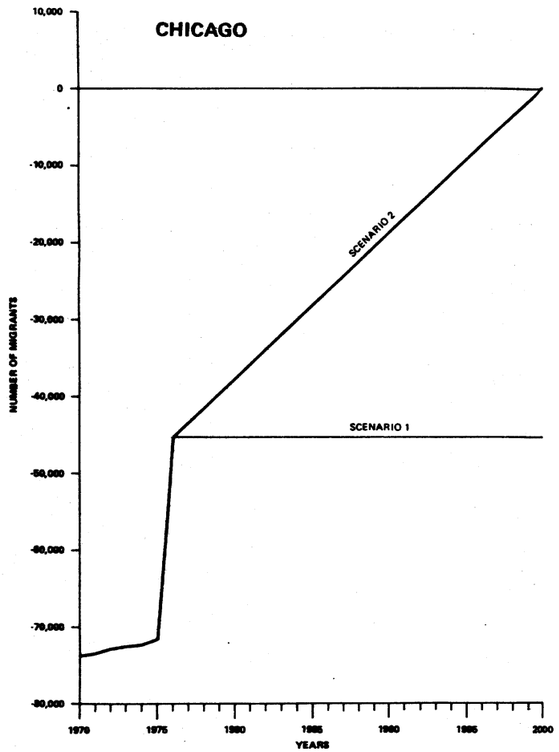
	Chicago	Suburban Cook	DuPage	Kane*	Lake*	McHenry	Will*	Total
ACTUAL								
1950-60	-517.7	488.4	120.6	32.3	70.8	23.9	32.9	251.1
1960-70	-527.8	318.9	126.4	13.5	43.8	16.5	28.9	20.2
SCENARIO 1								
1970-80	-617.9	80.9	117.9	12.9	35.8	28.8	46.8	-294.8
1980-90	-452.9	-231.6	77.1	10.1	35.1	37.1	58.6	-466.5
1990-00	-452.9	-231.6	27.5	10.1	35.1	37.1	58.6	-516.2
SCENARIO 2								
1970-80	-606.4	86.7	116.8	12.8	35.4	28.2	46.0	-280.5
1980-90	-291.5	-149.8	48.5	6.6	24.4	24.8	39.2	-297.7
1990-00	-103.3	- 54.1	0	2.6	9.9	8.8	13.8	-122.2

*Migration for 1970-2000 excludes population living in group quarters

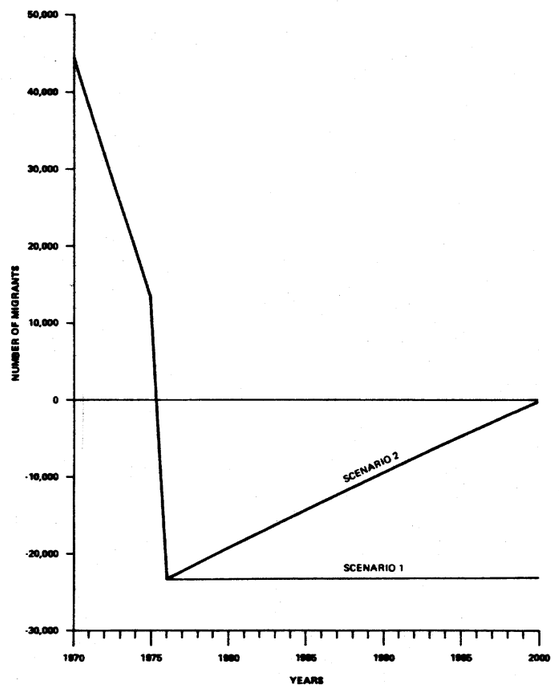
DIAGRAM 5

NET MIGRATION IN NORTHEASTERN ILLINOIS 1970 - 2000

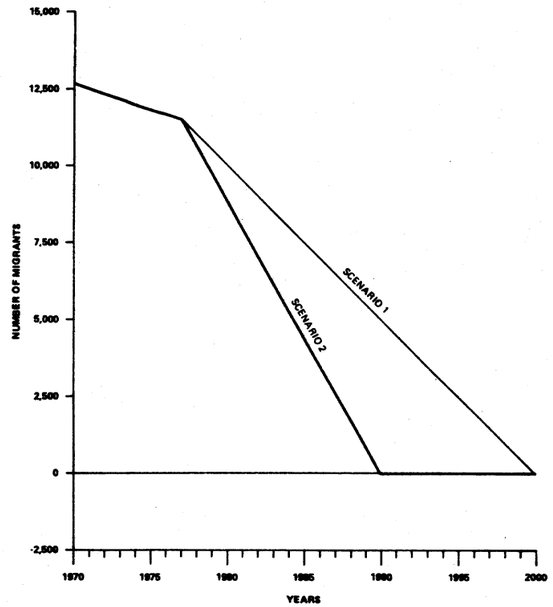
CHICAGO



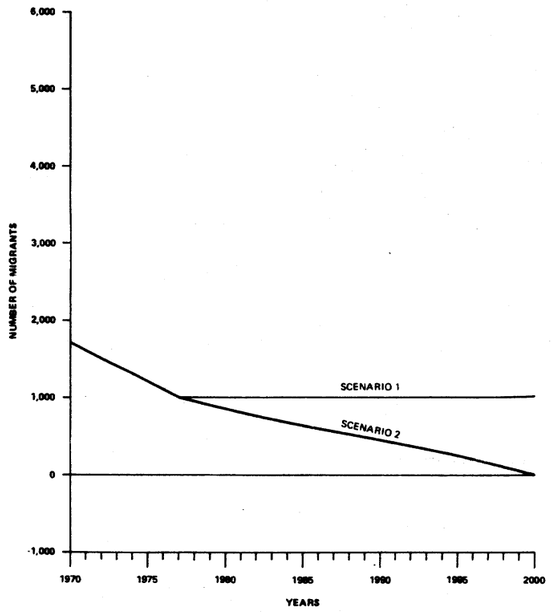
SUBURBAN COOK COUNTY



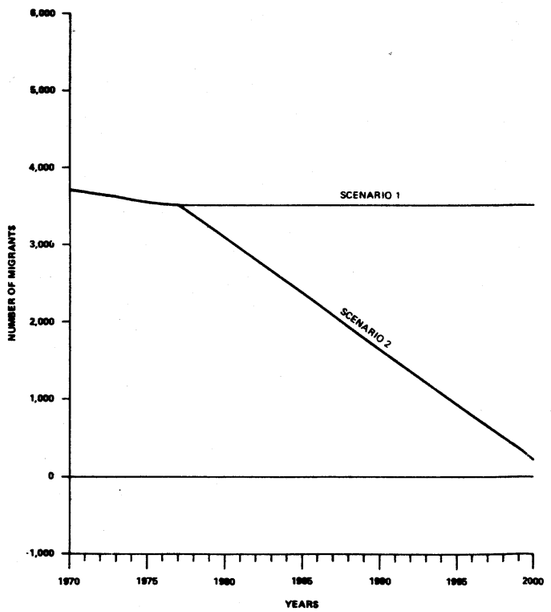
DU PAGE COUNTY



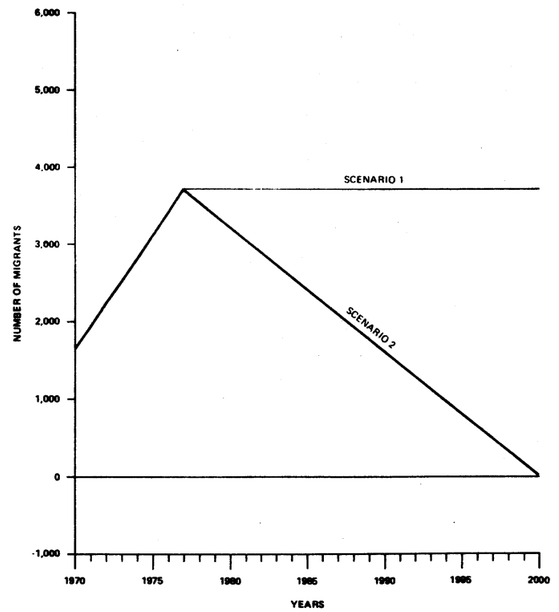
KANE COUNTY
(Excludes Population in Group Quarters)



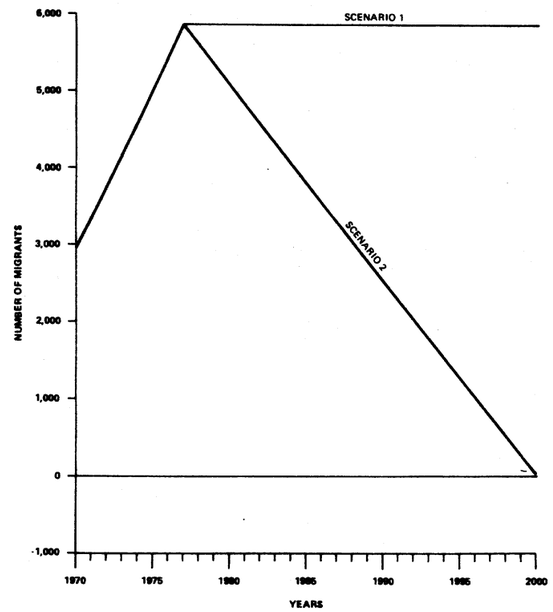
LAKE COUNTY
(Excludes Population in Group Quarters)



MC HENRY COUNTY



WILL COUNTY
(Excludes Population in Group Quarters)



Household Size

The number of households was determined by dividing the population assumed to be living in households by the average household size. Population living in households for Kane, Lake and Will counties is the direct output of the computer model. In the other areas household population in all forecast years was determined by subtracting the 1970 population in group quarters from the total population projected for each year. The household size assumptions were derived from data supplied by BOB and are consistent with the Census Bureau's fertility Series II and household formation Series B assumptions.[1] Table 9 shows the household size assumptions and group quarters assumptions used in the calculation of the number of households.

The household size figures are substantially lower than the ones used in 1974 and 1976. The continuing and dramatic reduction in the number of people per unit is the result of several factors.[2] First, the baby boom generation of the 1950s and early 1960s are becoming adults and setting up their own households. These generally smaller households help explain why the number of house-

[1] Projections of the Number of Households and Families, 1975 to 1990, Current Population Reports, Series P-25, No.607, U.S. Bureau of the Census, August 1975.

[2] For a detailed discussion of household sizes, see Arthur Norton, Paul Glick, "What's Happening to Households?", American Demographics, Vol. 1, No.3 (March 1979)

TABLE 9

ASSUMED HOUSEHOLD SIZE AND POPULATION
IN GROUP QUARTERS

	Household Size				Pop. in Group Qtrs.
	1970 Census	1980	1990	2000	All Years
Cook	3.07	2.73	2.42	2.31	78,131
Chicago	2.91	2.73	2.42	2.31	51,087
Suburban	3.18	2.73	2.42	2.31	27,044
DuPage	3.56	3.34	3.01	2.96	6,701
Kane	3.26	2.92	2.69	2.61	7,753
Lake	3.42	2.92	2.71	2.57	30,573
McHenry	3.35	3.13	2.84	2.72	706
Will	3.43	3.12	2.87	2.66	7,103
N.E.Illinois	3.14	2.82	2.54	2.43	130,967

holds can grow faster than the population. Second, families are smaller because of lower birth rates. Fewer couples living with their families and an increase in the number of one parent families. Third, there are more singles as marriages are delayed and the number of divorces increase. Fourth, people are living longer and maintaining their own home.

OTHER PROJECTIONS

Other projections to the year 2000 have also been prepared by the Bureau of the Budget, State of Illinois, by the Community and Family Study Center, University of Chicago, and by the planning commission staffs in DuPage and McHenry counties. Table 10 summarizes those results; the methods that were used are discussed below.

Bureau of the Budget, State of Illinois (BOB)

The BOB projections were completed in September 1977 by the staff of the Office of Planning, BOB.[1] The results are important for at least three reasons. First, because of the authority given to BOB by the Governor, these projections must be used by all state agencies for investment decisions and planning purposes. Second, a federally-proposed process may soon result in circumstances where all federal agencies must use the state's figures for sub-state areas.[2] Third, NIPC and BOB have signed an agree-

[1] Illinois Population Projections, 1970-2025, State of Illinois, Bureau of the Budget, September 1977.

[2] NARC Water Quality Report, National Association of Regional Councils, Washington, D.C., April 1979.

TABLE 10

OTHER RECENT PROJECTIONS

	1970	1980	1990	2000
Illinois Bureau of the Budget:				
N.E.Illinois	6,995,355	7,091,496	7,394,086	7,980,299
Cook	5,504,586	5,261,031	5,105,728	5,277,647
DuPage	493,292	612,287	756,231	860,969
Kane	251,788	287,486	356,443	448,899
Lake	383,748	437,042	543,550	611,725
McHenry	111,760	145,493	182,168	227,703
Will	250,181	348,157	449,966	553,356
Bogue, Hinze, DeVise Study:				
N.E.Illinois	6,979,000	7,114,700	7,607,600	7,978,500
Chicago	3,367,000	2,918,100	2,828,800	2,791,300
Suburban	3,612,000	4,196,600	4,778,800	5,187,200
DuPage County Regional Plan Commission Staff	491,883	644,549	795,090	903,092
McHenry County Land Use Plan	111,555	NA	NA	234,000

SOURCES: IBOB, Illinois Population Projections, 1970-2025, September 1977.

Hinze, Bogue, DeVise, Population and Social Projections for the Chicago Area, 1970-2000, Community and Family Study Center, University of Chicago, October 1978.

Discussions with and technical memos from DCRPC staff during spring and summer of 1979.

1979 discussion draft of McHenry County's Land Use Plan.

ment whereby NIPC will use BOB's result as a controlling total for the region and BOB will use NIPC's sub-regional results. The county figures shown in Table 10 were prepared by BOB. Once completed, BOB will substitute county figures endorsed by NIPC assuming the regional total is consistent. As a result, given the federal-state-local relationship, participation in the forecast process becomes an important tool to influence state and federal decisions.

BOB's results are generated by a cohort-component method that is similar to that used by NIPC. There are three significant differences. First, in the BOB process migration is not an assumption but is the result of independent projections of the demand for labor. Second, rather than assuming convergence to U.S. rates by 2000 as in the NIPC approach, county to county differences in fertility, household formation and labor force participation are maintained throughout the forecast period. Both BOB and NIPC are using Series II fertility assumptions but NIPC's source provides a more recent version. Finally, BOB's county results are disaggregates of a controlling regional total. NIPC's regional totals contained in this document are the sum of the uncontrolled county figures. It is expected that after discussion of the scenarios, final results will approximate a yet-to-be-announced revised regional total from BOB.

In theory, the explicit synthesis of population and employment projections reflected in the BOB results is a superior approach to the conventional cohort-component method. In this conventional approach, which is used by NIPC, the University of Chicago, and DuPage County, the demand for labor is assumed to match whatever result is generated for the supply of labor. Unfortunately, inadequate baseline information for employment raises serious questions about the actual superiority of the BOB process and, hence, the final results.

Community and Family Study Center, University of Chicago

In the fall of 1978, a study prepared by Kenneth Hinze, Donald Bogue and Pierre DeVise, contained projections to the year 2000 for the city of Chicago, the suburban area and the total northeastern Illinois region.[1] These projections were generated for Black, Spanish and "Majority Whites". Although regional population totals for the year 2000 are within 3000 of BOB's results, totals for intermediate years are substantially higher.

The method used is the same computer model, POPROJ, that was used by NIPC and DuPage County. Constant 1970 U.S. mortality rates were used throughout the forecast period for both Chicago

[1]Kenneth Hinze, Donald Bogue, Pierre DeVise, Population and Social Projections for the Chicago Area, 1970-2000, Community and Family Study Center, University of Chicago, October 1978.

and the suburban ring. For year 2000 fertility it was assumed that Black and Spanish fertility would fall to replacement levels and that White fertility would rise slightly to a level equal to 90 percent of replacement level fertility. For the region as a whole, Black out-migration in 2000 would be only slightly reduced from its current level. Spanish in-migration would be halved and White out-migration would become zero by the end of the forecast period. For the city of Chicago, Black out-migration would increase, Spanish in-migration would become zero, and White out-migration would become zero. These migration assumptions were in turn constructed upon the assumptions that:

(1) job opportunities in the central city would expand;

(2) central city crime rates would diminish;

(3) progress would be made in the racial integration of community areas and suburbs;

(4) the education system in the central city would improve;

(5) place of work would become more important in residential location decisions; and,

(6) the relative cost of living with an automobile in the suburbs would increase.

While the authors insist that results reflect a most likely future, clearly these are important policy-related assumptions. Nevertheless, the study's major conclusions are of importance, i.e., the Black and Spanish populations will be the only source of growth for the region through the year 2000.

DuPage County Regional Planning Commission (DCRPC)

In the spring and summer of 1979, DCRPC staff had prepared and discussed with NIPC staff several outcomes of POPROJ under different assumptions. As of this writing, county staff had settled on a county total using assumptions very similar to those used by NIPC staff. There were three major differences. First, DCRPC staff used fertility and mortality rates applicable to the White population only. Second, the baseline estimates of migration were based on DCRPC's estimates of current population rather than the estimates prepared by the U.S. Census Bureau. Finally, the county assumed that net migration approached zero at a slightly slower pace than did NIPC staff. In spite of these difference, the DCRPC result falls within the range implied by the NIPC result. Notably, both DCRPC staff and NIPC staff foresee a continuing rapid rate of growth of DuPage County.

McHenry County Regional Planning Commission (MCRPC)

The 1979 discussion draft of the McHenry County Land Use Plan contains a year 2000 population total which appears to be the arithmetic mean of NIPC's 1976 forecast and BOB's 1977 projection. The result for the year 2000 does fall within the range implied by the NIPC scenarios. No results are available for the interim years, however.

CONCLUSIONS

Armed with the results described in this memo--plus consistent alternatives being prepared for municipalities--regional, county and local planning policy makers and technicians must now consider the implications of the scenarios for equal opportunity, environmental protection, economic health, fiscal stability and the general quality of life in northeastern Illinois. The single set of figures that flow from this discussion will serve as an important tool for the implementation of urban conservation strategies determined to be appropriate to the needs and desires of the local governments in the region.

APPENDIX A: FORECAST ALTERNATIVE DATA SETS

The following table of 96 forecast alternative data sets shows the data set name and the year 2000 population figure (in thousands) generated by the cohort-survival model. All data sets begin with 'FA' (forecast alternative) followed by an abbreviation for Chicago, suburban Cook County, or one of the five outer counties. Information regarding the 96 forecast alternative data sets such as interim year population figures, assumptions, etc., is available in the Research Services and Economic Development Department.

DATA SET NAME	YR. 2000 POP (in thousands)	DATA SET NAME	YR. 2000 POP (in thousands)
FA.CHIW1.DATA	2,336	FA.CHINW3.DATA	1,581
FA.CHIW1A.DATA	1,420	FA.CHINW3A.DATA	1,410
FA.CHIW1AA.DATA	865	FA.CHINW3B.DATA	1,626
FA.CHINW1.DATA	1,669	FA.CHIW4A.DATA	1,183
FA.CHINW1A.DATA	1,458	FA.CHIW4B.DATA	1,561
FA.CHINW1AA.DATA	1,232	FA.CHINW4A.DATA	1,442
FA.CHINW1B.DATA	1,437	FA.CHINW4B.DATA	1,595
FA.CHINW1BB.DATA	1,290	FA.CHIW5A.DATA	1,151
FA.CHI1.DATA	4,005	FA.CHIW5B.DATA	1,528
FA.CHI2.DATA	2,875	FA.CHINW5A.DATA	1,464
FA.CHI2A.DATA	2,856	FA.CHINWSB.DATA	1,589
FA.CHIW3.DATA	1,399	FA.CHIW6A.DATA	1,141
FA.CHIW3A.DATA	840	FA.CHIW6B.DATA	1,517
FA.CHIW3B.DATA	1,377	FA.CHINW6A.DATA	1,414

APPENDIX A: (cont'd)

DATA SET NAME	YR. 2000 POP (in thousands)	DATA SET NAME	YR. 2000 POP (in thousands)
FA.CHINW6B.DATA	1,566	FA.DPG1AA.DATA	901
FA.CHIWS3.DATA	1,141	FA.DPG1AAA.DATA	837
FA.CHIWS3B.DATA	1,462	FA.DPG2B.DATA	1,047
FA.CHINWS3.DATA	1,348	FA.DPG3.DATA	903
FA.CHINWS3B.DATA	1,498	FA.DPG3A.DATA	838
FA.SUBCOOK1.DATA	2,581	FA.DPG3B.DATA	1,051
FA.SUBCOOK2.DATA	2,920	FA.DPG3C.DATA	922
FA.SUBCOK2A.DATA	2,853	FA.DPG3E.DATA	868
FA.SUBCOK2B.DATA	3,079	FA.DPGS3.DATA	888
FA.SUBCOK3DATA	2,986	FA.DPGS3B.DATA	835
FA.SUBCOK3A.DATA	3,132	FA.KANE1.DATA	318*
FA.SUBCOK3B.DATA	3,028	FA.KANE2.DATA	349*
FA.SUBCOK3C.DATA	2,905	FA.KANE2A.DATA	364*
FA.SUBCOK3D.DATA	2,972	FA.KANE3.DATA	355*
FA.SUBCOK4A.DATA	2,370	FA.KANE3A.DATA	372*
FA.SUBCOK4B.DATA	2,640	FA.KANE3B.DATA	360*
FA.SUBCOK5A.DATA	2,264	FA.KANES3.DATA	356*
FA.SUBCOK5B.DATA	2,533	FA.KANES3B.DATA	344*
FA.SUBCOKS3.DATA	2,172	FA.LAK1.DATA	454*
FA.SUBCKS3B.DATA	2,436	FA.LAK2.DATA	540*
FA.DPG1DATA	637	FA.LAK2A.DATA	586*
FA.DPG2.DATA	914	FA.LAK3.DATA	541*
FA.DPG2A.DATA	1,060	FA.LAK3A.DATA	587*
FA.DPG2AA.DATA	849	FA.LAK3B.DATA	549*

APPENDIX A: (cont'd)

DATA SET NAME	YR. 2000 POP (in thousands)	DATA SET NAME	YR. 2000 POP (in thousands)
FA.LAKS3.DATA	562*	FA.MCHS3.DATA	233
FA.LAKS3B.DATA	525*	FA.MCHS3B.DATA	192
FA.MCH1.DATA	140	FA.WIL1.DATA	324*
FA.MCH2.DATA	206	FA.WIL2.DATA	459*
FA.MCH2A.DATA	250	FA.WIL2A.DATA	538*
FA.MCH1AA.DATA	230	FA.WIL3.DATA	437*
FA.MCH1AAA.DATA	247	FA.WIL3A.DATA	510*
FA.MCH3.DATA	197	FA.WIL3B.DATA	444*
FA.MCH3A.DATA	240	FA.WILS3.DATA	490*
FA.MCH3B.DATA	199	FA.WILS3B.DATA	425*

*group quarters not included