

**DULUTH**  
**INDEPENDENT SCHOOL DISTRICT # 709**

**ENROLLMENT PROJECTIONS**

***FULL REPORT***

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## Introduction

The Duluth School District serves students in the city of Duluth and several surrounding townships and unorganized territories; however, 92 percent of the district's households are in the city of Duluth, where 64 percent of housing units are owner occupied. In the townships, 95 percent or more of households are owner occupied.

This report contains public school K-12 enrollment projections and the assumptions used for the projections. The first part of the report examines data that guided decisions about the assumptions. These data include: a) selected population characteristics of the component parts of the district; b) past and present enrollment choices and current enrollment dynamics; and c) the history of resident births. The second part of the report contains the projections and a discussion of those projections.

### 2000 Census Results

The 2000 census contains information that provides clues about future enrollment, although some of the indicators are at the end of their usefulness. The census showed fewer 0-4 year-olds than 5-9 year-olds in the district. St. Louis County showed a similar pattern. These data suggested that kindergarten would be smaller early this decade and it has been. However, the past two years show larger kindergarten classes, pointing to an expected upward trend in kindergarten size.

### DULUTH SCHOOL DISTRICT YOUTH POPULATION 2000

	0-4	5-9	10-14	15-19*
Duluth C	4,695	4,924	5,505	7,886
Gnesen T	67	106	109	102
Lakewood T	128	165	207	163
Normanna T	47	54	55	54
North Star T	12	22	12	8
Rice Lake T	256	326	353	306
Marion Lake UT	1	1	10	9
Whiteface Reservoir UT	7	7	15	8
St. Louis County	10,455	11,912	13,550	16,762

Note: Data are for entire minor civil division  
\*Many of these persons are in college

Source: U.S. Bureau of the Census

Another indicator of future kindergarten class size is the age of childbearing-age women. Because several colleges/universities are located in Duluth, the district has an unusually large number of women 18-24 years old. Looking at women 25-44 years of age shows that these women are more likely to be 35-44 than 25-34. This is typical because the Baby Bust generation, called Gen X, made up the 25-34 year-olds in 2000 while the 35-44 year-olds were part of the larger Baby Boom generation. Those 23 and younger in 2000 are part of the Echo Boom or Gen Y, which is also a large generation. The size of these various generations points to more births after 2000.

**DULUTH SCHOOL DISTRICT  
WOMEN OF CHILDBEARING AGE  
2000**

	<b>15-19*</b>	<b>20-24**</b>	<b>25-29</b>	<b>30-34</b>	<b>35-39</b>	<b>40-44</b>
Duluth C	4,037	4,675	2,521	2,591	3,000	3,160
Gnesen T	49	26	30	39	68	70
Lakewood T	82	30	35	57	98	115
Normanna T	26	9	12	26	32	34
North Star T	2	3	5	5	10	7
Rice Lake T	141	96	83	132	210	115
Marion Lake UT	2	1	1	1	3	4
Whiteface Reservoir UT	6	6	4	4	4	12
St. Louis County	8,141	7,227	5,073	5,557	7,154	8,160

Note: Data are for entire minor civil division

Source: U.S. Bureau of the Census

\*The majority of these women are in high school or college

\*\*Many of these women are in college

Measured by median age, the district's population was slightly older than Minnesota's population (35.4 years) but younger than St. Louis County (39.0 years). Duluth City's median age is identical to that of Minnesota. The townships have higher median ages. However, the large college/university population artificially lowers median age. If Duluth City had the same percentage of 18-24 year-olds as Minnesota, Duluth City's median age would be about 40 years not 35.4 years. In addition to median age, looking at the percentages of youth and elderly is also instructive. Duluth City had 21.3 percent of its population under 18 years (youth) compared to 26.2 percent for Minnesota. With a smaller percentage of youth, it is no surprise that the percentage of elderly (65+ years) is higher than in Minnesota. In Duluth City, 15.1 percent of the population was 65+ years, while in Minnesota the elderly accounted for 12.1 percent of the population. The age profile shows that Duluth City and the Duluth School District are older populations on which a college-aged population is overlaid, which lowers the median age.

**DULUTH SCHOOL DISTRICT  
AGE CHARACTERISTICS  
2000**

	<b>Median Age</b>	<b>% Under 18 years</b>	<b>% 65+ years</b>	<b>% College Grads</b>
Duluth C	35.4	21.3%	15.1%	28.2%
Gnesen T	40.7	24.5%	10.3%	29.2%
Lakewood T	38.6	30.6%	7.4%	28.5%
Normanna T	36.4	30.1%	6.4%	26.1%
North Star T	40.8	25.6%	9.4%	31.7%
Rice Lake T	37.8	27.5%	9.4%	18.0%
Marion Lake UT	41.0	30.9%	5.9%	11.8%
Whiteface Reservoir UT	50.4	12.7%	15.8%	21.3%
St. Louis County	39.0	22.4%	16.1%	21.9%
Minnesota	35.4	26.2%	12.1%	27.4%

Note: Data are for entire minor civil division

Source: U.S. Bureau of the Census

The percentage of adults age 25 and older with at least a bachelor's degree is 28.2 percent in Duluth City. Most of the townships also have higher percentages of college graduates than St. Louis County (21.9 percent). Educational attainment in the Duluth School District is similar to that of Minnesota. The educational attainment of parents affects expectations of schools and student achievement is usually correlated with the educational attainment of parents.

While household characteristics are not as directly related to school enrollment, they play an important role in helping assess the future size of households and the number of children per household in the future. Household size was very low in Duluth City (2.26 persons) but higher in the townships and unorganized territories. Household size is below the Minnesota average (2.52 persons) in Duluth City (2.26 persons), but the township averages are typical of many Twin Cities suburbs and rural townships elsewhere in the state.

In 2000, Duluth City's percentage of households with at least one person under 18 years of age (28.1 percent) was below the state percentage of 34.8 percent. In the townships, about 40 percent of households had at least one person under the age of 18. Duluth City had 35.4 percent of its households with at least one person 65 or more years of age while Minnesota had 21.3 percent of its households with at least one person age 65 or more. The percentage of households with youth or seniors correlates with the age profile.

**DULUTH SCHOOL DISTRICT  
HOUSEHOLD CHARACTERISTICS  
2000**

	<b>Persons per Household</b>	<b>% Households with Persons Under 18 yrs</b>	<b>% Households with Persons 65+ yrs</b>
Duluth C	2.26	28.1%	25.4%
Gnesen T	2.52	32.0%	18.0%
Lakewood T	2.84	40.8%	15.2%
Normanna T	2.91	43.8%	12.8%
North Star T	2.74	36.5%	16.2%
Rice Lake T	2.77	39.6%	18.2%
Marion Lake UT	2.83	50.0%	8.3%
Whiteface Reservoir UT	2.25	15.4%	26.2%
St. Louis County	2.32	29.3%	26.8%
Minnesota	2.52	34.8%	21.3%

Note: Data are for entire minor civil division

Source: U.S. Bureau of the Census

Finally, census data provide a glimpse at movement prior to the census. In Duluth City, 46.7 percent of householders moved during the five years prior to the census. In Minnesota, 46 percent moved during those five years. Other areas in the district had less movement.

**DULUTH SCHOOL DISTRICT  
MOVEMENT AND OWNERSHIP**

**2000**

	% Householders Who Moved to Unit		Owner-Occupied
	In 1999-2000	In 1995-1998	
Duluth C	20.8%	25.9%	64.1%
Gnesen T	10.1%	31.9%	95.2%
Lakewood T	8.9%	20.3%	96.2%
Normanna T	12.3%	25.6%	94.1%
North Star T	9.5%	33.8%	95.9%
Rice Lake T	8.4%	24.5%	94.0%
Marion Lake UT	14.3%	14.3%	95.8%
Whiteface Reservoir UT	8.5%	40.3%	96.2%
St. Louis County	15.8%	23.8%	74.7%
Minnesota	17.6%	28.4%	74.6%

Note: Data are for entire minor civil division

Source: U.S. Bureau of the Census

## **Enrollment Dynamics**

School enrollment increases or decreases as a school district's population changes. For example, the number of childbearing-age women living in a school district directly affects future kindergarten class size. A larger number of women of childbearing-age results in more births. Kindergarten class size is also affected by the number of preschool children who move into or move out of a school district.

The migration of families with children less than 18 years of age also affects enrollment. Population "turnover" is ongoing in a mobile society and enrollment changes throughout the school year as families and children move. In this study, enrollment projections are made for a single point in a year—Fall (October).

While population changes affect the total number of school-age children within a district, students and their families also have choices. Therefore, when public school enrollment is analyzed, choice must be considered as well as population dynamics. Choice includes traditional nonpublic schools, home schools, open enrollment, charter schools and alternative schools or Area Learning Centers (ALCs). Other forms of choice include dropping out of high school and selecting an alternative to kindergarten.

## **Duluth Public Schools: Current Enrollment/Past Trends**

The Duluth Public Schools enrolled 10,144 K-12 students in Fall 2006 compared to 13,517 students in Fall 1997. Enrollment decreased 3,373 students or 25 percent. As the table below shows, enrollment decreases were never less than 2.1 percent per year and a decrease of 3 percent per year was more typical.

School enrollment decreased in Minnesota and the nation during this time period and most Minnesota districts experienced enrollment decline. Many rural districts experienced decreases of 25 percent or more. Some Twin Cities suburban districts have also experienced enrollment decline, although the percentage decreases are less than 25 percent. While the majority of Minnesota school districts are declining, the school districts in third ring suburbs in the Twin Cities are experiencing growth, often very rapid growth.

ENROLLMENT CHANGE		
Year	#	%
1997/1998	-628	-4.6
1998/1999	-277	-2.1
1999/2000	-328	-2.6
2000/2001	-290	-2.4
2001/2002	-521	-4.3
2002/2003	-322	-2.8
2003/2004	-379	-3.4
2004/2005	-341	-3.2
2005/2006	-287	-2.8

Like all population changes, school enrollment change is the result of two different phenomena. In the total population, the difference between the number of births and the number of deaths is called natural increase/decrease. Natural increase/decrease also affects school enrollment. If Fall kindergarten classes are smaller than the previous year's Grade 12, natural decrease occurs. If Fall kindergarten classes are larger than the previous year's Grade 12, natural increase occurs. The Duluth Public Schools, like most public schools in Minnesota, experienced natural decrease every year since 1997.

The other phenomenon affecting school enrollment is migration. Migration is the term used for the movement of people across a boundary or border, in this case, the boundary is that of the school district. Migration is usually an estimate and the estimate is derived indirectly, which it is in this report as well. In this report, net migration is determined by the progression from grade-to-grade of public school students. With this method, the physical movement across the district's boundaries cannot be distinguished from choice, such as transferring from a nonpublic school to a public school, transferring to a charter school or deciding to open enroll in another public school. Further, students who move into or out of a school district but never enroll in the district's public schools are not reflected in the migration numbers as calculated in this report.

Net migration is calculated by progressing public school Kindergarten students to Grade 1 in the following year, Grade 1 students to Grade 2, etc. Because the probability of death is very low among children, the same number of children should be in the next higher grade the following year. Therefore, if the number of students changes, migration is assumed to have occurred. A positive number indicates a net flow into the public schools and a negative number implies a net flow out of the public schools.

COMPONENTS OF CHANGE			
Year	Total	Natural Increase/Decrease	Net Migration
1997/1998	-628	-249	-379
1998/1999	-277	-339	62
1999/2000	-328	-313	-15
2000/2001	-290	-342	52
2001/2002	-521	-367	-154
2002/2003	-322	-343	21
2003/2004	-379	-377	-2
2004/2005	-341	-298	-43
2005/2006	-287	-293	6

As the table above shows, natural decrease, that is, smaller Fall kindergarten classes compared to the previous year's Grade 12, was the major cause of enrollment decline in the Duluth Public Schools. Since 1997, the Duluth Public Schools experienced net out migration five times and net in migration four times. Compared to natural decrease, migration is very erratic from year-to-year. The net migration column shows two years with large net out migrations, Fall 1997 to Fall 1998 and again from Fall 2001 to Fall 2002. Both these years coincide with the opening or growth of charter schools. The net migration numbers suggest that actual physical movement is modest on an annual basis.

Net migration, which is measured from Fall to Fall, is different from another mobility measure called student mobility. Student mobility measures the number of students moving between schools, whether across district boundaries or not, during the school year. High student mobility is correlated with lower student achievement.

A summary of net migration appears below. Since 1997, net migration has been negative every year in the elementary grades (K-5). For the middle school grades (Grades 6-8), some years are positive and others are negative; however, net migration has been negative every year since 2003. In the high school grades (Grades 9-12), net migration is usually positive every year and the numbers of students coming to the Duluth Public Schools are relatively large. Because the Duluth Public Schools offer many special programs, including an ALC, the Duluth Public Schools educate many nonresident students in Grades 9-12 through tuition agreements with other school districts.

**SUMMARY OF NET MIGRATION**

**FALL TO FALL**

	<b>97/98</b>	<b>98/99</b>	<b>99/00</b>	<b>00/01</b>	<b>01/02</b>	<b>02/03</b>	<b>03/04</b>	<b>04/05</b>	<b>05/06</b>
K-5	-248	-64	-41	-51	-39	-66	-44	-71	-43
6-8	-35	39	27	73	-22	6	-5	-59	-8
9-12	-96	87	-1	30	-93	81	47	87	57
Total	-379	62	-15	52	-154	21	-2	-43	6

Migration by grade shows a net inflow at Grade 9, which most likely reflects nonpublic students entering the public schools. Between Grade 10 and Grade 11, there is a net outflow of students, which probably represents students who are dropping out of high school and are not transferring to an ALC. These patterns are present throughout the period being analyzed.

**NET MIGRATION**

**FALL TO FALL**

	<b>97/98</b>	<b>98/99</b>	<b>99/00</b>	<b>00/01</b>	<b>01/02</b>	<b>02/03</b>	<b>03/04</b>	<b>04/05</b>	<b>05/06</b>
<b>K to 1</b>	-41	16	-23	-26	1	-7	-18	-24	-11
<b>1 to 2</b>	-54	-29	5	-5	-19	-11	-5	-19	-3
<b>2 to 3</b>	-48	-6	-11	-18	-10	4	-26	5	-22
<b>3 to 4</b>	-3	-16	19	-3	-6	-6	-3	-2	1
<b>4 to 5</b>	-60	-45	-38	-17	-8	-27	-8	-14	-8
<b>5 to 6</b>	-42	16	7	18	3	-19	16	-17	-31
<b>6 to 7</b>	-10	4	11	55	-1	6	9	-31	-1
<b>7 to 8</b>	-25	35	16	18	-21	0	-14	-28	24
<b>8 to 9</b>	26	124	92	92	-7	74	45	61	88
<b>9 to 10</b>	-44	13	-25	-34	-28	36	-3	5	9
<b>10 to 11</b>	-72	-61	-76	-61	-47	-41	-26	-30	-14
<b>11 to 12</b>	-6	11	8	33	-11	12	31	51	-26
<b>Total</b>	-379	62	-15	52	-154	21	-2	-43	6
<b>Percent</b>	-2.8	0.5	-0.1	0.4	-1.3	0.2	0.0	-0.4	0.1

The history of public school enrollment contains several patterns with implications for the future. In 2006, the largest grade was Grade 12 with 1,000 students. In Grades 9, 10 and 11, the number of students range from 923 to 933. By Grade 7, the number of students has dropped to 744 and by Grade 2, there are only 647 students. The size of the grades in relation to each other points to a period of continued enrollment decline. Enrollment will not stabilize until the size of the high school grades is the same as the elementary grades.

#### FALL ENROLLMENT HISTORY

Grade	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
<b>K</b>	965	837	814	796	729	684	742	674	711	704
<b>1</b>	919	924	853	791	770	730	677	724	650	700
<b>2</b>	982	865	895	858	786	751	719	672	705	647
<b>3</b>	992	934	859	884	840	776	755	693	677	683
<b>4</b>	958	989	918	878	881	834	770	752	691	678
<b>5</b>	977	898	944	880	861	873	807	762	738	683
<b>6</b>	1,003	935	914	951	898	864	854	823	745	707
<b>7</b>	1,083	993	939	925	1,006	897	870	863	792	744
<b>8</b>	1,055	1,058	1,028	955	943	985	897	856	835	816
<b>9</b>	1,168	1,081	1,182	1,120	1,047	936	1,059	942	917	923
<b>10</b>	1,170	1,124	1,094	1,157	1,086	1,019	972	1,056	947	926
<b>11</b>	1,159	1,098	1,063	1,018	1,096	1,039	978	946	1,026	933
<b>12</b>	1,086	1,153	1,109	1,071	1,051	1,085	1,051	1,009	997	1,000
<b>Total</b>	13,517	12,889	12,612	12,284	11,994	11,473	11,151	10,772	10,431	10,144

Excludes Early Childhood or Pre-K; includes ALC students and students in other special programs

Source: Duluth School District

In the state and nation, Grade 11 is the largest grade in 2006 because the largest recent kindergarten class entered school in 1995. This class will graduate from high school in the spring of 2008. Duluth Public Schools is one year in advance of the state and nation.

Kindergarten classes were almost 200 students smaller in 2000 (796) compared to 1997 (965). The size of the kindergarten class has varied from year to year since 2000, but in Fall 2005 and again in Fall 2006, kindergarten classes were above 700. In Minnesota, kindergarten classes have been smaller since 1995, although they are beginning to get larger again.

## Student Choices in the Duluth School District

Students and their families have more choices today than ever before in Minnesota. Traditional nonpublic schools provided an option for many years. More recently, home schools have provided another option. In addition, public school options are attracting more students. Open enrollment allows residents of one district to attend public schools in another district, the number of charter schools is increasing and more students are transferring to alternative high schools. Competition for students is increasing.

### Nonpublic Enrollment and Home Schools

Today, nonpublic enrollment falls into two categories—traditional nonpublic schools and home schools. Traditional nonpublic schools, usually associated with religious institutions, have been present for many years. Home schools are a more recent and rapidly growing option.

In 2005, 1,383 district residents enrolled in traditional nonpublic schools. In 1998, traditional nonpublic schools served 1,495 students. Between these years enrollment decreased 7.5 percent; however, the decline came after enrollment peaked in 2001 at 1,626 students. As of 2005, 10.5 percent of the school-age population in the Duluth School District enrolled in traditional nonpublic schools. In Minnesota, enrollment in traditional nonpublic schools declined 9 percent from 1998 to 2005. As of 2005, 83,909 students, that is, 9 percent of Minnesota’s school-age population were enrolled in traditional nonpublic schools.

### RESIDENTS ENROLLED IN NONPUBLIC SCHOOLS

Fall	Traditional Schools	Home Schools*	Total
1997			
1998	1,495	153	1,648
1999	1,552	152	1,704
2000	1,590	190	1,780
2001	1,626	208	1,834
2002	1,600	221	1,821
2003	1,500	254	1,787
2004	1,433	543	1,976
2005	1,383	266	1,649
2006			

\*709 School Operations

Source: Duluth School District

Because traditional nonpublic schools have physical plants, their enrollment can be constrained by the size of their buildings or the number of classroom “seats” available, although all evidence indicates this is not an issue in Duluth.

Home school enrollment is not affected by building capacity. In 2005, 266 district residents were home-schooled. This represents 2 percent of district school-age residents. In Minnesota, 1.9 percent were home schooled in 2005. The number of home schooled students increased 73.9 percent in the Duluth School District and 27.1 percent in Minnesota, where 17,334 students were home schooled in 2005. The number of home schooled children is likely to continue to increase.

Based on estimated school-age population in 2005, 12.5 percent of all school-age district residents, that is, 1,649 students were enrolled in nonpublic settings. In Minnesota 10.9 percent are enrolled in nonpublic settings.

### Open Enrollment

Open enrollment allows Minnesota’s public school students to attend school outside the district where they live. The application to open enroll is made by the student and his/her parents and families generally provide their own school transportation. No tuition is charged. Through open enrollment, students flow into or out of a district’s public schools and appear as migration in the year they first transfer. Students open enroll to other districts for many reasons; however, convenience and proximity often play important roles in the decision.

Open enrollment should not be confused with tuition agreements. Tuition agreements are between school districts, where one district pays another district to accept its students, usually for specialized programs. The Duluth Public Schools serve many tuition agreement students, although some are served for short periods of time. Tuition agreement students are not included in the open enrollment numbers.

In the 1990s and in this decade, the flow of open enrollment students, both in and out, increased in the Duluth School District as well as in Minnesota. As of 2005, 35,731 Minnesota students “open enrolled” to another district. Students who open enroll into the Duluth School District accounted for 1.2 percent of Duluth’s enrollment in 2005. Students leaving the district to attend public schools in other districts represent 2.9 percent of district school-age residents. In Minnesota, 3.8 percent of the school-age population open enrolls to other districts. These two percentages show that open enrollment is less of a factor in the Duluth School District than in some other districts in Minnesota.

**OPEN ENROLLMENT HISTORY\***  
**K-12**

<b>Year</b>	<b>In</b>	<b>Out</b>	<b>Net</b>
<b>1997-98</b>	123	204	-81
<b>1998-99</b>	127	246	-119
<b>1999-00</b>	136	269	-133
<b>2000-01</b>	132	283	-151
<b>2001-02</b>	172	320	-148
<b>2002-03</b>	164	280	-116
<b>2003-04</b>	147	325	-178
<b>2004-05</b>	157	364	-207
<b>2005-06</b>	129	376	-247
<b>2006-07</b>			

\*Note: Based on state aid category 01

Source: Duluth School District and the Minnesota Department of Education

Charter Schools

Charter schools are independent public schools that are part of the public education system in Minnesota. Three charter schools are located in Duluth—Duluth Public Schools Academy (DPSA) Edison Charter School, Lake Superior High School and Harbor City International School. The DPSA Edison (Grades K-8) opened in 1997. Lake Superior High School (Grades 9-12) opened in 1999 and Harbor City International School (Grades 9-12) opened in 2002. The three charter schools served 1,064 students in 2005 compared to 507 students in 1997. In 2005, charter schools served 8.1 percent of the school-age population in the district. In Minnesota, 20,608 students were enrolled in charter schools. These students represent 2.2 percent of Minnesota’s school-age population. These percentages show that charter schools are a competitive factor in the Duluth School District.

**ESTIMATED SCHOOL-AGE POPULATION  
(ENROLLED STUDENTS)**

	<b>Duluth Public Schools*</b>	<b>Nonpublic Schools</b>	<b>Net Open Enrollment</b>	<b>Charter Schools</b>	<b>Other Non-residents</b>	<b>Total</b>
<b>1997</b>	13,517		-81	507	+208	
<b>1998</b>	12,889	1,648	-119	737	+240	15,153
<b>1999</b>	12,612	1,704	-133	797	+287	14,959
<b>2000</b>	12,284	1,780	-151	887	+310	14,792
<b>2001</b>	11,994	1,834	-148	826	+287	14,515
<b>2002</b>	11,473	1,821	-116	973	+272	14,111
<b>2003</b>	11,151	1,787	-178	1,037	+285	13,868
<b>2004</b>	10,772	1,976	-207	1,061	+274	13,742
<b>2005</b>	10,431	1,649	-247	1,064	+240	13,151
<b>2006</b>	10,144					

\*Excludes Early Childhood but includes ALC students and all other special programs

Note: Positive numbers for Open Enrollment and Other Non-residents must be subtracted and negative numbers must be added to estimate resident school-age population

Source: Duluth School District

**Summary of District School-Age Residents**

Examining enrollment in 1998 and again in 2005, the school-age population in the district decreased by 2,002 students or -13.2 percent. During that same time, enrollment in the Duluth Public Schools decreased by 2,458 students of -19.1 percent. Based on a school-age population estimate of 13,151 in 2005, the Duluth Public Schools captured 76.5 percent of the district's school-age population. In 2000, the Duluth Public Schools captured 80.1 percent of the district's school-age population. From 2000 to 2005, the capture rate decreased 4.5 percent. Charter schools are the largest contributor to the Duluth Public Schools loss of share. In Minnesota, a district's public schools captured 83 percent of the school-age population.

## Enrollment Projections

There are two methodologies for projecting school enrollment. One method is called the cohort survival method and the other is the housing unit method. Both methods are modifications of methods used to project population.

### Cohort Survival Method

The first step in the cohort survival method is aging the population. In a standard cohort survival model, advancing the population by age involves estimating the number of deaths expected in that age group before it reaches the next older age group. When the cohort survival method is applied to school enrollment, the first step is to move a grade to the next highest grade. However, because mortality is so low in the school-age population, the entire grade is assumed to “survive” to the next higher grade in the following year.

(The low level of mortality among school-age children is illustrated by the following data. In a kindergarten class of 1,000 students, only 1 has the probability of dying before reaching Grade 5.)

Once a grade or cohort has been “survived” to the next grade, net migration is added to or subtracted from that grade. Therefore, over time, the size of a cohort will increase or decrease as a result of migration as it moves through the grades. For example, the kindergarten class of 1997 had 965 members. This same cohort had 864 members when it reached Grade 6 in 2003. By 2006, when this cohort reached Grade 9, it has 923 members. Therefore, this cohort decreased by 42 students from 1997 to 2006. However, the cohort had only 835 students in Grade 8 in 2005, which represents a decrease of 130 students. The increase of 88 students between Grade 8 and Grade 9 most likely is the result of nonpublic students entering the public high schools. Loss from migration is observable in more recent cohorts as well. The kindergarten class of 2004 had 674 students but by Grade 2 in 2006, it had 647 students, a loss of 27 students. Other cohorts are more stable. For example, the kindergarten class of 2002 had 684 members. When this cohort reached Grade 4 in 2006, it had 678 members, a decrease of only 6 members.

Different versions of the cohort survival method express migration trends differently, but the basic methodology is the same. Migration can be expressed as weighted averages, as percentages or as numbers each year. In school districts undergoing rapid residential development, net migration assumptions are very important. In more stable districts, net migration rates are less critical for projection accuracy.

Kindergarten class size is always a key variable in long-term school enrollment projections because this class will be with the school system for many years. If a school census exists, it is a resource for short-term kindergarten projections, i.e., a couple of years. However, school censuses are notoriously inaccurate for children less than four years of age.

For long-term projections, i.e., six years or more, several options exist. The best theoretical approach, but the least practical, is to project births based on the age of the female population. These births projections then must be survived to age five and then adjusted for migration to yield a kindergarten projection. Determining the age of females in a school district is the first challenge and then, many assumptions must be made, making this approach impractical.

A simpler approach is to use resident births as a proxy for kindergarten five years later. However, this approach only yields kindergarten for a few years into the future. To project kindergarten into a more distant future, population projections of 5-year-olds can be used as a guide for future kindergarten classes.

Projection Assumptions

Statewide trends affecting school enrollment will affect Duluth Public Schools. Current trends important to school enrollment are as follows:

§ The population in the U.S. and Minnesota is aging. By 2020, 16-17 percent of the population will be 65 years old or older. There is no historical precedent for this high proportion of older population; therefore, society is entering uncharted waters as to the effects of this change. We do know that women of childbearing age will be a smaller proportion of the population, although the number will be large. Also, an older population will reduce geographic mobility because older people move less often. Further, the number of school-age children per household will decrease for the foreseeable future.

This decade (2000-2010) we will see large decreases in the school-age population per household as Baby Boom households empty nest. Households with children will be primarily headed by Generation X parents who belong to a much smaller generation. (Gen X is only 60 percent the size of the Baby Boom.) Therefore, while the total number of households will increase, the percentage of households with 5-17 year-olds will decrease. After 2015, most parents will belong to Gen Y, the children of the Boomers. Gen Y, born 1977 to 1995, is also large. This generation’s peak birth year was 1990.

§ Births have fallen since 1990 in the U.S. and in Minnesota, although since 1998 births appear to be trending upward. Minnesota resident births are as follows:

Year	Resident Births
1998	65,207
1999	65,953
2000	67,451
2001	66,617
2002	68,037
2003	70,053
2004	70,617

Source: Minnesota Dept. of Health

An up tick in births was expected in the late 1990s and early in this decade because births were higher in 1968. (Today, the median age for women giving birth is about 30 years of age.)

§ Fertility is low. Fertility refers to the number of children born per woman throughout her childbearing years. In the U.S., White non-Hispanic and Black women have below replacement fertility. (Replacement is 2.11 children per female at the end of childbearing.) Hispanic women have much higher fertility, but the number of Hispanic women in the Duluth School District is small.

§ As the history of resident births shows, 2004 resident births in St. Louis County were 5.2 percent lower than in 1991. Resident births in Duluth City are 51 percent of the St. Louis County resident births. Births decreased 5.1 percent in Duluth from 1991 to 2004.

**ST. LOUIS COUNTY AND DULUTH CITY  
RESIDENT LIVE BIRTHS**

	<b>St. Louis County</b>	<b>Duluth City Total</b>
<b>1991</b>	2,219	1,128
<b>1992</b>	2,332	1,171
<b>1993</b>	2,135	1,044
<b>1994</b>	2,118	1,028
<b>1995</b>	1,997	1,004
<b>1996</b>	1,960	935
<b>1997</b>	2,003	961
<b>1998</b>	2,076	1,021
<b>1999</b>	2,008	1,012
<b>2000</b>	2,039	1,019
<b>2001</b>	1,930	954
<b>2002</b>	2,004	1,022
<b>2003</b>	2,139	1,054
<b>2004</b>	2,104	1,071
<b>2005</b>	n.a.	n.a.

Source: Minnesota Department of Health

§ Minnesota's largest high school class since 1978 will graduate in the spring of 2008. (This class represents the largest Gen Y birth year of 1990.) A comparable number of graduates will not occur again until the 2030s. This means Minnesota is near the end of a second enrollment cycle resulting from the Baby Boom and Baby Bust. These cycles are marked by rising and falling elementary enrollments followed by rising and falling secondary enrollments. The third cycle, marked by increasing elementary enrollment, is likely to begin later this decade with secondary enrollment at a high again in the 2030s.

- § Minority enrollment is rising. In Minnesota, minority students are now 22 percent of total public school enrollment. Minority students comprise 14 percent of Duluth’s enrollment.
- § Competition for K-12 students is likely to increase. Public schools must compete for students. Open enrollment, charter schools and nonpublic enrollment are growing. More students are attracted to alternatives to traditional high school.

Kindergarten Assumptions

Trends are more stable in large populations than in small populations; therefore, projections for large populations tend to be more accurate than projections for small populations. Tying a school district projection to the county in which it is located takes advantage of this principle. Births five years earlier are a good proxy for a kindergarten class. However, because kindergarten students must be 5 years old by September 1, about one-third of the kindergarten class is born six years earlier not five years earlier. For example, one-third of the 2006 kindergarten class was born in 2000 and two-thirds were born in 2001. The result of adjusting the births to fit the age requirements of kindergarten will be called the kindergarten pool.

DULUTH CITY KINDERGARTEN POOL	
2007	1,000
2008	1,043
2009	1,066

Duluth Public Schools’ kindergarten as a percent of Duluth City’s kindergarten pool varies from year-to-year but decreased during the past ten years. From 1997 to 2001, kindergarten averaged 78.8 percent of the pool. From 2002 to 2006, the average was 70.9 percent. The decrease in Duluth Public Schools’ share of the kindergarten pool also reflects the effect of competition.

<b>DULUTH CITY KINDERGARTEN POOL</b>			
<b>AND</b>			
<b>PERCENT OF POOL IN DULUTH PUBLIC SCHOOLS' KINDERGARTEN</b>			
<b>Birth Years</b>	<b>Pool</b>	<b>Percentage</b>	<b>Kindergarten Year</b>
1991; 1992	1,157	83.4%	1997
1992; 1993	1,085	77.1%	1998
1993; 1994	1,034	78.7%	1999
1994; 1995	1,012	78.7%	2000
1995; 1996	957	76.2%	2001
1996; 1997	953	71.8%	2002
1997; 1998	1,001	74.1%	2003
1998; 1999	1,015	66.4%	2004
1999; 2000	1,017	69.9%	2005
2000; 2001	975	72.2%	2006
2001; 2002	1,000		2007
2002; 2003	1,043		2008
2003; 2004	1,066		2009

Applying a ratio of Duluth's kindergarten to Duluth's kindergarten pool takes advantage of actual births during the past several years. With births through 2004, the kindergarten classes through 2009 can be calculated on known births.

Calculating the average of the kindergarten to kindergarten pool ratios for the past three years yields a ratio of 69.5 percent, which will be used for one kindergarten assumption. If the future ratio of kindergarten to the kindergarten pool averages 69.5 percent, kindergarten in 2007, 2008 and 2009 would be 695, 725 and 741 respectively. In 2006, kindergarten had 704 students. For projection purposes, the 69.5 percent ratio will be called the low kindergarten assumption.

**PUBLIC SCHOOL KINDERGARTEN PROJECTIONS  
BASED ON KINDERGARTEN POOL AND 5-YEAR-OLDS**

Kindergarten	Based on Births (Kindergarten Pool)		Based on 5-Year-Olds	
	@69.5%*	@71.1%**	@34.0%*	@34.9%**
2007	695	711		
2008	725	742		
2009	741	758		
2010			749	768
2015			771	792

\*Projections based on the kindergarten pool result from the average of the past three years of Duluth's kindergarten classes to Duluth's kindergarten pool. Projections based on 5-year-olds assume that Duluth's kindergarten will decrease to 34.0 percent of St. Louis County's 5-year-olds in 2015

\*\*Projections based on the kindergarten pool result from the average of the past two years of Duluth's kindergarten to the Duluth kindergarten pool. Projections based on 5-year-olds assume that Duluth's kindergarten will remain at 34.9 percent of St. Louis County's 5-year-olds

Kindergarten was 34.9 percent of St. Louis County 5-year-olds in 2000. For 2000, the decennial census is shown. For 2010 and 2015, the number of 5-year-olds is taken from projections made by the Minnesota State Demographer.

ST. LOUIS COUNTY 5-YEAR-OLDS	
2000	2,282
2010	2,202
2015	2,268

Source: 2000 Census; Minnesota State Demographer

The Minnesota State Demographer's projection for St. Louis County 5-year-olds can be used as a guide to extend kindergarten projections beyond the current birth data. These projections show a slight decrease in 5-year-olds between 2000 and 2010 and a slight increase in 5 year-olds between 2010 and 2015. The State Demographer's projection may or may not be accurate, but it has the advantage of being based on the female childbearing-age population, which will increase in size after 2010. In 2000, Duluth's kindergarten was 34.9 percent of St. Louis County 5-year-olds. This percentage will be reduced slightly to 34 percent in 2010 and 2015 to project Duluth kindergarten students in 2010 and 2015.

The low kindergarten assumption results in average kindergarten classes of 728 students between 2007 and 2010 and 763 students between 2011 and 2015. Between 2002 and 2006, the average kindergarten class size was 703 students. An increase in kindergarten class size is supported by the size of the kindergarten pool as well as the projected increase of women of childbearing age.

The average of Duluth’s kindergarten to the Duluth kindergarten pool for the past two years is 71.1 percent because Duluth Public Schools’ share was up slightly in the past two years. The 71.1 percent ratio is called the high kindergarten assumption. Using this assumption, Duluth’s kindergarten in 2007, 2008 and 2009 will be 711, 742 and 748 respectively. To extend the kindergarten projections, the projection of St. Louis County 5-year-olds will be used; however, for the high assumption, Duluth’s 2000 percentage of 34.9 percent will be used in 2010 and 2015. The high kindergarten assumption results in average kindergarten classes of 745 students between 2007 and 2010 and 783 students between 2011 and 2015.

**PUBLIC SCHOOL KINDERGARTEN PROJECTIONS  
2007 to 2017**

<b>Fall</b>	<b>Low</b>	<b>High</b>
<b>2007</b>	695	711
<b>2008</b>	725	742
<b>2009</b>	741	758
<b>2010</b>	749	768
<b>2011</b>	753	773
<b>2012</b>	758	778
<b>2013</b>	763	783
<b>2014</b>	768	788
<b>2015</b>	771	792
<b>2016</b>	775	795
<b>2017</b>	775	795

If Duluth Public Schools provided all day kindergarten at all schools, the ratio of kindergarten to the kindergarten pool would have to be increased somewhat.

### Net Migration Assumptions

One of the advantages of the cohort survival method is that it produces projections for each grade. However, this requires migration assumptions for each grade. With the exception of years when charter schools opened or increased enrollment, net migration has moved between a + 21 students to a -43 students since 2002. (See p. 8)

Two migration assumptions were developed. A net in migration assumption is based on the experience of the past year (Fall 2005 to Fall 2006). The most recent experience is a net migration of +6 students per year. This assumption adds six students each year as the result of migration. However, the grade-specific assumptions result in net losses in many grades. The summary of the net in migration assumptions by grade are: K-5 -43; Grades 6-8 -8; and Grades 9-12 +57.

A net out migration assumption is based on an approximate average by grade of the past three years. This assumption subtracts 13 students each year. The summary of the net out migration assumptions by grade are: K-5 -53; Grade 6-8 -25; and Grades 9-12 +65.

#### **PUBLIC SCHOOL NET MIGRATION PROJECTIONS**

<b>Grade</b>	<b>Net In Migration</b>	<b>Net Out Migration</b>
<b>1</b>	-11	-18
<b>2</b>	-3	-9
<b>3</b>	-22	-15
<b>4</b>	1	-1
<b>5</b>	-8	-10
<b>6</b>	-31	-11
<b>7</b>	-1	-8
<b>8</b>	24	-6
<b>9</b>	88	65
<b>10</b>	9	4
<b>11</b>	-14	-23
<b>12</b>	-26	19
<b>Total</b>	6	-13

The difference between the two net migration assumptions is 19 students per year. The most important difference is in K-5 where the difference is 10 students per year.

The kindergarten and net migration assumptions are smoothed trend lines. The future, like the past, most likely will be characterized by annual variation, sometimes substantial, around the trend lines. Because there is no reasonable way to forecast when variations around trend lines will occur, it is arbitrary to project them. Furthermore, long-term projections are designed to approximate a point in the future, not each intervening year between the present and the projection date. For this reason, long-term projections should not be used for annual budgeting purposes. The district should continue to use its version of the cohort survival methodology for annual enrollment projections.

Projection Results

Four cohort projections were made based on the two kindergarten assumptions and the two migration assumptions. For all four projections, enrollment continues to decline through Fall 2012 or Fall 2013. After that, enrollment begins to increase. Enrollment decline through 2012 is the result of the larger middle school and high schools grades graduating and being replaced by smaller kindergarten classes. Once the size of the kindergarten class and the previous year’s Grade 12 are about equal, enrollment will stabilize and then begin to increase due to the larger projected kindergarten classes.

**COMPARISON OF ENROLLMENT PROJECTIONS  
2007-2017**

<b>Fall</b>	<b>Low K Net Out Migration</b>	<b>High K Net Out Migration</b>	<b>Low K Net In Migration</b>	<b>High K Net In Migration</b>
<b>2006</b>	<b>10,144</b>	<b>10,144</b>	<b>10,144</b>	<b>10,144</b>
<b>2007</b>	9,826	9,842	9,845	9,861
<b>2008</b>	9,586	9,619	9,669	9,702
<b>2009</b>	9,392	9,442	9,530	9,580
<b>2010</b>	9,205	9,274	9,393	9,462
<b>2011</b>	9,064	9,153	9,279	9,368
<b>2012</b>	9,006	9,115	9,218	9,327
<b>2013</b>	8,998	9,127	9,200	9,329
<b>2014</b>	9,030	9,179	9,242	9,391
<b>2015</b>	9,080	9,250	9,300	9,470
<b>2016</b>	9,130	9,320	9,356	9,543
<b>2017</b>	9,231	9,441	9,470	9,674

Note: Projections do not include Early Childhood

The lowest projection results from the low kindergarten and the net out migration assumptions. This projection shows enrollment decreasing 939 students or -9.3 percent from 2006 to 2010. Enrollment decreases 1,064 students or -10.5 percent from 2006 to 2015. Enrollment is at its lowest in 2013 with 8,998 students. Total enrollment is 9,080 in 2015, but increases to 9,231 by 2017.

The high kindergarten and net in migration assumptions result in a decrease of 682 students or -6.7 percent from 2006 to 2010 and a decrease of 674 students or -6.6 percent from 2006 to 2015. Total enrollment is 9,470 in 2015, but 9,674 in 2017. Enrollment is at its lowest in 2012 with 9,327 students.

Between the high and low projections are two other projections. The second lowest projection results from the combination of the high kindergarten and the net out migration assumptions. In this projection, enrollment drops to 9,250 in 2015. The second highest projection results from the combination of the low kindergarten and net in migration assumptions. These assumptions result in 9,300 Duluth Public School students in 2015.

**COMPARISON OF ENROLLMENT PROJECTIONS  
BY GRADE CONFIGURATION  
2006, 2010, 2015**

	<b>K-5</b>	<b>6-8</b>	<b>9-12</b>	<b>Total</b>
<b>2006</b>	4,095	2,267	3,782	10,144
<b>2010</b>				
Low K/Out M	4,149	1,906	3,150	9,205
High K/Out M	4,218	1,906	3,150	9,274
Low K/In M	4,186	1,893	3,314	9,393
High K/In M	4,255	1,893	3,314	9,462
<b>2015</b>				
Low K/Out M	4,379	1,947	2,754	9,080
High K/Out M	4,499	1,997	2,754	9,250
Low K/In M	4,423	1,961	2,916	9,300
High K/In M	4,543	2,011	2,916	9,470

As the table above shows, the high school grades will be much smaller over the projection period, while enrollment in the elementary grades will increase. The middle school grades will also decrease, but the decrease will be smaller than in the high school grades.

In 2015, the 2006 kindergarten will be in Grade 9, which means that all the grades below Grade 9 are a product of the projection assumptions.

Detailed grade by year projections are in the appendix of this report.

## Housing Unit Method

Another method to project population and school enrollment is the housing unit method. This method is based on the number of existing and projected housing units and then applying a child per household estimate to the housing unit count. In areas that are developing or growing rapidly, this method is attractive. Even in more stable environments, the housing unit method illustrates the number of housing units needed to accommodate a school enrollment of a specific size. While the number of housing units is related to population size, housing units alone do not determine population size. The number of persons per household is also important. Housing units are relatively easy to count or to estimate, estimating persons per household and the child per household ratios is more difficult.

The type of housing unit affects the child per household ratio. Detached single-family housing units have the highest child per household ratio. Attached single-family, such as townhouses, have fewer children per unit and apartment units tend to have the lowest school-age child per household ratio. With the aging of the population, more units are being built for seniors. These units will have zero school-age children per household.

Housing costs affect the number of children per household. For example, expensive housing units usually contain fewer children per unit. However, some modestly priced units also can have a low child per household ratio. Perhaps as important, the value of housing nearly always affects the age of children present. Units valued up to \$250,000 are more likely to have younger children, especially preschool children. Units valued at \$250,000 or more are more likely to contain middle school or high school students.

The child per household ratio is also affected by larger societal trends. For example, the aging of the Baby Boom generation in the next ten years will result in a large number of “empty nests.” Because the Baby Boom generation represents 30 percent of the population and 40 percent of householders, the child per household ratio will decrease dramatically in this decade.

In 2000, Baby Boomers were 36 to 54 years of age. In 2010, they will be 46-64 years-old and in 2020, they will be 56-74 years-old. The numerically small Generation X, the parents of most school-age children this decade, will further fuel the decrease in the child per household ratio. Gen X was 24-35 years-old in 2000. That means they will be 34-45 in 2010 and 44-55 in 2020. The different size of these two generations, reflected in the table below, will result in significant changes in the age of the adult population, which is likely to affect the type of new housing units built in the future.

AGE MINNESOTA					
	2000	2010	2020	CHANGE 2000-2010	CHANGE 2010-2020
20-34 yrs	995,621	1,153,100	1,174,800	157,479	21,700
35-54 yrs	1,489,878	1,539,800	1,499,600	49,922	-40,200
55-64 yrs	404,869	633,900	776,300	229,031	142,400
65+ yrs	594,266	680,000	951,700	85,734	271,700

Source: Minnesota State Demographer

These trends are projected to decrease Minnesota's school-age population (5-17 year-olds) per household 15.7 percent between 2000 and 2010 and another 4.7 percent from 2010 to 2015. In St. Louis County, the school-age population per household ratio is projected to decrease 19.0 percent from 2000 to 2010 and then 2.9 percent from 2010 to 2015. In 2000, the Duluth School District's school-age population per household (0.39) was lower than in St. Louis County (0.42) and Minnesota (0.51). (See p. 43)

When an estimate of district households is available, the housing unit method is calculated as follows:

$$\text{Occupied housing units} \times \text{School-age population per HH} = \text{School-age population}$$

$$\text{School-age population} \times \text{Public school capture rate} = \text{Public school enrollment}$$

(Then make adjustments for nonresident students)

### Household Growth

Based on data from the Minnesota State Demographer and district maps, the Duluth School District is estimated to have 38,615 occupied households in 2005. In 2000, there were 37,897. From 2000 to 2005, 718 additional units were added and occupied. The growth in the past five years translates into an annual average of 144 households. The housing market has weakened in the past year, which suggests that the number of households will increase more slowly for a couple of years, but the number of units is likely to increase at a faster rate again in the future.

#### **HOUSEHOLDS IN THE SCHOOL DISTRICT**

	<b>Total HH 2000</b>	<b>Total HH 2005</b>	<b>Est. of % in District</b>	<b>HH 2005 in District</b>
Duluth C	35,500	36,039	98%	35,318
Gnesen T	582	619	100%	619
Lakewood T	710	760	100%	760
Normanna T	219	232	100%	232
North Star T	74	86	100%	86
Rice Lake T	1,494	1,572	100%	1,572
Marion Lake UT	24		100%	
Whiteface Reservoir UT	130		3%	
<b>District Total</b>	<b>37,897</b>			<b>38,615</b>

A household is an occupied housing unit. (Apartments, townhouses and single-family homes)  
Source: 2000 Census; Minnesota State Demographer

Projection Results

Projecting enrollment via the housing unit method does not yield projections for each grade, but it provides an estimate of the total number of students that residential growth is likely to yield.

Based on projections from Duluth City and current trends, the district is likely to have 39,340 households in 2010 and 40,065 in 2015. This represents an increase of 725 households between 2005 and 2010 and an increase of 725 households from 2010 to 2015.

Housing unit projections are very sensitive to the school-age child per household ratio and the capture rate. In 2000, the Duluth School District had a school-age child per household ratio of 0.39. Assuming that the school-age child per household ratio will decrease at a rate similar to St. Louis County, the ratio will be reduced to 0.31 in 2010 and 0.30 in 2015. (The ratio was 0.34 in 2005.)

**PROJECTION OF PERSONS 5-17 YEARS  
PER HOUSEHOLD**

	<b>2000</b>	<b>2010</b>	<b>2015</b>
<b>Minnesota</b>	0.51	0.43	0.41
<b>St. Louis County</b>	0.42	0.34	0.33
<b>Duluth City</b>	0.39	n.a.	n.a.
<b>Duluth School District</b>	0.39	0.31	0.30

Source: 2000 Census; Minnesota State Demographer

	Change 2000-2010	Change 2010-2015
Minnesota	-15.7%	-4.7%
St. Louis County	-19.0%	-2.9%
School District	-20.5%	-3.2%

The Duluth Public Schools’ capture rate was 76.5 percent in 2005. Given the increasingly competitive environment, the capture rate is likely to decline further. For these projections, a capture rate of 74 percent will be used, a decrease of 3.3 percent.

Based on these assumptions, the housing unit method produces the following results for 2010 and 2015. If the school-age child per household ratio is 0.31 in 2010, 39,340 households would yield 12,195 school-age children in the district. If the public school capture rate is 74 percent, 9,025 of these district residents would be enrolled in Duluth Public Schools in 2010. Nonresidents who attend Duluth Public Schools must be added. In 2005, there were 369 nonresidents attending Duluth Public Schools. For these projections, it is assumed that this number will remain constant (rounded to 370). Of course, the district may accept more or less than this number. (Open enrollment out of the District is included in the capture rate.) Based on these assumptions, K-12 enrollment in the Duluth Public Schools would be 9,395 students in 2010.

Using the same procedure but adding 1,450 households from 2005 to 2015 and reducing the school-age population per household to 0.30 yields 12,020 school-age children in the district. Assuming that the Duluth Public Schools capture 74 percent, 8,895 district residents would be enrolled in the Duluth Public Schools. When 370 nonresident students are added, total enrollment is 9,265 in 2015.

Of course, other assumptions could be used with the housing method and different assumptions would result in different enrollment projections.

**Comparison of Housing Unit and Cohort Survival Results**

By solving the equation in reverse, the housing unit methodology can be used to estimate the number of households that are implied by the cohort survival method projections. The table below shows the results of four cohort projections and the housing unit projections for 2010 and 2015. The housing unit method projection, with 725 additional households from 2005 to 2010, is very similar to the low kindergarten/net in migration cohort projection. However, by 2015, the housing unit method projection is more similar to the high kindergarten/net out migration cohort projection, although the low kindergarten/net in migration projection is also similar to the housing unit method projection. The cohort method and the housing unit method produce very similar projections. Baring unforeseen changes, enrollment in the Duluth Public Schools should fall within the range shown in the table below.

2010

	Residents		Open Enrollment	Total Enrollment	Housing Units
		In Duluth P.S.			
Housing Unit Method (+725) @0.31; 74%	12,195	9,025	370	9,395	39,340
Low K/Out M	11,939	8,835	370	9,205	38,513
High K/Out M	12,032	8,904	370	9,274	38,813
Low K/In M	12,193	9,023	370	9,393	39,332
High K/In M	12,286	9,092	370	9,462	39,632

2015

Housing Unit Method (+1,450) @0.30; 74%	12,020	8,895	370	9,265	40,065
Low K/Out M	11,770	8,710	370	9,080	39,233
High K/Out M	12,000	8,880	370	9,250	40,000
Low K/In M	12,068	8,930	370	9,300	40,227
High K/In M	12,297	9,100	370	9,470	40,990

# **APPENDIX**

Low Kindergarten-Net Out Migration

Duluth	K (+Hdcp)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	K-5	6-8	9-12	K-12 total
2006 Actual	704	700	647	683	678	683	707	744	816	923	926	933	1000	4095	2267	3782	10144
06-07 Cohort	695	704	700	647	683	678	683	707	744	816	923	926	933	4107	2134	3598	9839
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07-08 Proj	695	686	691	632	682	668	672	699	738	881	927	903	952	4054	2109	3663	9826
07-08 Cohort	725	695	686	691	632	682	668	672	699	738	881	927	903	4111	2039	3449	9599
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08-09 Proj	725	677	677	676	631	672	657	664	693	803	885	904	922	4058	2014	3514	9586
08-09 Cohort	741	725	677	677	676	631	672	657	664	693	803	885	904	4127	1993	3285	9405
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09-10 Proj	741	707	668	662	675	621	661	649	658	758	807	862	923	4074	1968	3350	9392
09-10 Cohort	749	741	707	668	662	675	621	661	649	658	758	807	862	4202	1931	3085	9218
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-11 Proj	749	723	698	653	661	665	610	653	643	723	762	784	881	4149	1906	3150	9205
10-11 Cohort	753	749	723	698	653	661	665	610	653	643	723	762	784	4237	1928	2912	9077
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-12 Proj	753	731	714	683	652	651	654	602	647	708	727	739	803	4184	1903	2977	9064
11-12 Cohort	758	753	731	714	683	652	651	654	602	647	708	727	739	4291	1907	2821	9019
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-13 Proj	758	735	722	699	682	642	640	646	596	712	712	704	758	4238	1882	2886	9006

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Low Kindergarten-Net Out Migration

	K (+Hdcp)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	K-5	6-8	9-12	K-12 total
12-13 Cohort	763	758	735	722	699	682	642	640	646	596	712	712	704	4359	1928	2724	9011
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-14 Proj	763	740	726	707	698	672	631	632	640	661	716	689	723	4306	1903	2789	8998
13-14 Cohort	768	763	740	726	707	698	672	631	632	640	661	716	689	4402	1935	2706	9043
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-15 Proj	768	745	731	711	706	688	661	623	626	705	665	693	708	4349	1910	2771	9030
14-15 Cohort	771	768	745	731	711	706	688	661	623	626	705	665	693	4432	1972	2689	9093
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-16 Proj	771	750	736	716	710	696	677	653	617	691	709	642	712	4379	1947	2754	9080
15-16 Cohort	775	771	750	736	716	710	696	677	653	617	691	709	642	4458	2026	2659	9143
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-17 Proj	775	753	741	721	715	700	685	669	647	682	695	686	661	4405	2001	2724	9130
16-17 Cohort	775	775	753	741	721	715	700	685	669	647	682	695	686	4480	2054	2710	9244
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-18 Proj	775	757	744	726	720	705	689	677	663	712	686	672	705	4427	2029	2775	9231



Low Kindergarten-Net In Migration

	K (+Hdcp)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	K-5	6-8	9-12	K-12 total
12-13 Cohort	763	758	742	735	705	690	652	630	636	610	756	759	758	4393	1918	2883	9194
Historical		-11	-3	-22	1	-8	-31	-1	24	88	9	-14	-26	-43	-8	57	6
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-14 Proj	763	747	739	713	706	682	621	629	660	698	765	745	732	4350	1910	2940	9200
13-14 Cohort	768	763	747	739	713	706	682	621	629	660	698	765	745	4436	1932	2868	9236
Historical		-11	-3	-22	1	-8	-31	-1	24	88	9	-14	-26	-43	-8	57	6
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-15 Proj	768	752	744	717	714	698	651	620	653	748	707	751	719	4393	1924	2925	9242
14-15 Cohort	771	768	752	744	717	714	698	651	620	653	748	707	751	4466	1969	2859	9294
Historical		-11	-3	-22	1	-8	-31	-1	24	88	9	-14	-26	-43	-8	57	6
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-16 Proj	771	757	749	722	718	706	667	650	644	741	757	693	725	4423	1961	2916	9300
15-16 Cohort	775	771	757	749	722	718	706	667	650	644	741	757	693	4492	2023	2835	9350
Historical		-11	-3	-22	1	-8	-31	-1	24	88	9	-14	-26	-43	-8	57	6
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-17 Proj	775	760	754	727	723	710	675	666	674	732	750	743	667	4449	2015	2892	9356
16-17 Cohort	775	775	760	754	727	723	710	675	666	674	732	750	743	4514	2051	2899	9464
Historical		-11	-3	-22	1	-8	-31	-1	24	88	9	-14	-26	-43	-8	57	6
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-18 Proj	775	764	757	732	728	715	679	674	690	762	741	736	717	4471	2043	2956	9470



High Kindergarten-Net In Migration

	K (+Hdcp)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	K-5	6-8	9-12	K-12 total
12-13 Cohort	783	778	762	754	722	707	668	630	636	610	756	759	758	4506	1934	2883	9323
Historical		-11	-3	-22	1	-8	-31	-1	24	88	9	-14	-26	-43	-8	57	6
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-14 Proj	783	767	759	732	723	699	637	629	660	698	765	745	732	4463	1926	2940	9329
13-14 Cohort	788	783	767	759	732	723	699	637	629	660	698	765	745	4552	1965	2868	9385
Historical		-11	-3	-22	1	-8	-31	-1	24	88	9	-14	-26	-43	-8	57	6
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-15 Proj	788	772	764	737	733	715	668	636	653	748	707	751	719	4509	1957	2925	9391
14-15 Cohort	792	788	772	764	737	733	715	668	636	653	748	707	751	4586	2019	2859	9464
Historical		-11	-3	-22	1	-8	-31	-1	24	88	9	-14	-26	-43	-8	57	6
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-16 Proj	792	777	769	742	738	725	684	667	660	741	757	693	725	4543	2011	2916	9470
15-16 Cohort	792	792	777	769	742	738	725	684	667	660	741	757	693	4610	2076	2851	9537
Historical		-11	-3	-22	1	-8	-31	-1	24	88	9	-14	-26	-43	-8	57	6
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-17 Proj	792	781	774	747	743	730	694	683	691	748	750	743	667	4567	2068	2908	9543
16-17 Cohort	792	792	781	774	747	743	730	694	683	691	748	750	743	4629	2107	2932	9668
Historical		-11	-3	-22	1	-8	-31	-1	24	88	9	-14	-26	-43	-8	57	6
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-18 Proj	792	781	778	752	748	735	699	693	707	779	757	736	717	4586	2099	2989	9674

High Kindergarten- Net Out Migration

Duluth	K (+Hdcp)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	K-5	6-8	9-12	K-12 total
2006 Actual	704	700	647	683	678	683	707	744	816	923	926	933	1000	4095	2267	3782	10144
06-07 Cohort	711	704	700	647	683	678	683	707	744	816	923	926	933	4123	2134	3598	9855
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07-08 Proj	711	686	691	632	682	668	672	699	738	881	927	903	952	4070	2109	3663	9842
07-08 Cohort	742	711	686	691	632	682	668	672	699	738	881	927	903	4144	2039	3449	9632
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08-09 Proj	742	693	677	676	631	672	657	664	693	803	885	904	922	4091	2014	3514	9619
08-09 Cohort	758	742	693	677	676	631	672	657	664	693	803	885	904	4177	1993	3285	9455
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09-10 Proj	758	724	684	662	675	621	661	649	658	758	807	862	923	4124	1968	3350	9442
09-10 Cohort	768	758	724	684	662	675	621	661	649	658	758	807	862	4271	1931	3085	9287
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10-11 Proj	768	740	715	669	661	665	610	653	643	723	762	784	881	4218	1906	3150	9274
10-11 Cohort	773	768	740	715	669	661	665	610	653	643	723	762	784	4326	1928	2912	9166
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11-12 Proj	773	750	731	700	668	651	654	602	647	708	727	739	803	4273	1903	2977	9153
11-12 Cohort	778	773	750	731	700	668	651	654	602	647	708	727	739	4400	1907	2821	9128
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12-13 Proj	778	755	741	716	699	658	640	646	596	712	712	704	758	4347	1882	2886	9115

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High Kindergarten- Net Out Migration

	K (+Hdcp)	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	K-5	6-8	9-12	K-12 total
12-13 Cohort	783	778	755	741	716	699	658	640	646	596	712	712	704	4472	1944	2724	9140
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13-14 Proj	783	760	746	726	715	689	647	632	640	661	716	689	723	4419	1919	2789	9127
13-14 Cohort	788	783	760	746	726	715	689	647	632	640	661	716	689	4518	1968	2706	9192
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14-15 Proj	788	765	751	731	725	705	678	639	626	705	665	693	708	4465	1943	2771	9179
14-15 Cohort	792	788	765	751	731	725	705	678	639	626	705	665	693	4552	2022	2689	9263
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15-16 Proj	792	770	756	736	730	715	694	670	633	691	709	642	712	4499	1997	2754	9250
15-16 Cohort	795	792	770	756	736	730	715	694	670	633	691	709	642	4579	2079	2675	9333
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16-17 Proj	795	774	761	741	735	720	704	686	664	698	695	686	661	4526	2054	2740	9320
16-17 Cohort	795	795	774	761	741	735	720	704	686	664	698	695	686	4601	2110	2743	9454
Historical		-18	-9	-15	-1	-10	-11	-8	-6	65	4	-23	19	-53	-25	65	-13
Economic														0	0	0	0
Stu Choice		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17-18 Proj	795	777	765	746	740	725	709	696	680	729	702	672	705	4548	2085	2808	9441

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Hazel Reinhardt, a consultant based in Minneapolis, Minnesota, specializes in market analysis and strategic direction. Her work also includes demographic analysis of all types.

Reinhardt consults with public and private K-12 schools providing demographic studies and enrollment projections. Since 1991, she has made enrollment projections for 65 school districts in Minnesota, Wisconsin, South Dakota and Illinois.

Reinhardt teaches in the executive education programs at the Media Management Center, a joint program of the Kellogg School of Management and the Medill School of Journalism, Northwestern University, Evanston, Illinois. She also heads the Media Management Center's market research team.

As part of her media practice, Reinhardt consults with newspapers, magazines, television and cable television in the United States, Canada and Latin America.

Before establishing her firm in 1991, Reinhardt spent more than 12 years with Cowles Media Company, a diversified media company in Minneapolis, Minnesota. She spent seven years as Vice President of Market Development and also served as its Vice President of Human Resources and as Director of Research.

Her five years as Minnesota State Demographer in the 1970s followed similar work with the State of Wisconsin. She taught at the University of Wisconsin-Madison early in her career.

Reinhardt holds Ph.D., M.A. and B.A. degrees in history from the University of Wisconsin-Madison.

## **Analyzing Duluth School District with a Geographic Information System**

A very important tool in the analysis of the district's facility needs will be something called a geographic information system (GIS). A GIS is a powerful computerized mapping tool. In a way, it is a word processor for maps. Just as a word processor can create, modify and print a document, GIS can do the same with maps.

GIS makes it easier and less costly to create highly detailed, up-to-date school district maps for a variety of purposes.

Geographic information systems can use all kinds of data, including census and demographic information, to make maps of the Duluth District. These maps can show streets, school locations, attendance area boundaries, land use, public and community facilities, and most importantly the distribution and density of K-12 students throughout the district. These maps will give the district the ability to analyze the student population with a high degree of detail.

These maps will also be very effective communication tools. They convert data, patterns, trends and difficult issues into graphic images that bring into sharp focus new understanding about how school district services and policies are connected to the homes and neighborhoods in the community. These high-quality maps can be displayed on the district's web site. They can be used in presentations before school boards and community groups and published in district newsletters, and newspaper articles.

In the facility study the GIS could be used to

- Analyze the geographic distribution of students by grade level
- Determine the student density in individual attendance areas
- Visualize how these factors impact school and facility utilization

Attached is an example of how the Geographic Information System can be used. This map shows the geographic distribution of kindergarten children throughout the central portion of the district. Each red dot represents an enrolled kindergarten student. The individual school attendance areas are portrayed in different colors. Notice that there are definite areas of low and high density.