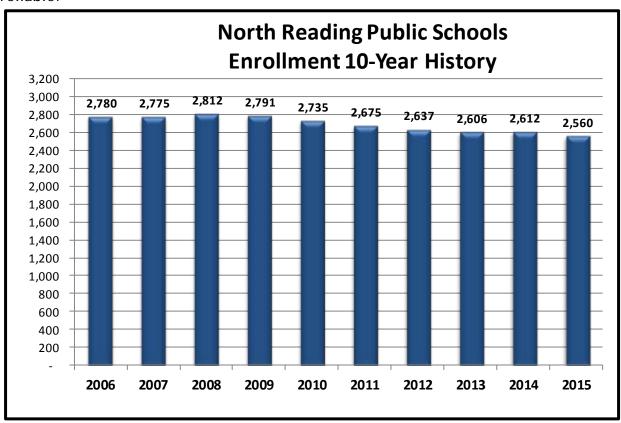## THE COHORT SURVIVAL METHOD

The basic assumption of the Cohort Survival Method for predicting school enrollments is that what has happened in the past, will continue to happen in the future; that is, given the number of births, the net effect of all other influences on enrollment will remain proportionately the same. The basic technique requires calculating the ratio of the number of children in one grade in one year compared to the number of children who "survive" the year and enroll in the next grade the following year. Fluctuations in such data from year to year create a pattern from which an average survival rate can be calculated to project an enrollment. Basically, percentages are calculated from the historical enrollment data to determine a reliable percentage of increase or decrease in enrollment between any two grades. For example, if 100 students enrolled in Grade 1 in 2013-14, increased to 104 students in Grade 2 in 2014-15, the percentage of survival would have been 104% or a ratio of 1.04. Such ratios are calculated between each pair of grades or years in school over several recent years.

A Cohort Survival Method was employed using a 3-year, 5-year, and 10-year historical database. Because North Reading's inward and outward migration has remained relatively stagnant over the past ten years, the ten-year data base is considered more reliable.

North Reading Public Schools Enrollment 10-Year History

Year	Enrollment
2006	2,780
2007	2,775
2008	2,812
2009	2,791
2010	2,735
2011	2,675
2012	2,637
2013	2,606
2014	2,612
2015	2,560

Enrollment projections and analysis contained presented in this reports were conducted by the New England School Development Council (NESDEC) in December 2013.

Historical enrollment over the last ten years has remained relatively stable as the above chart indicates. Enrollment did peak in fiscal year 2008 and has slowly declined over the last several fiscal years until the district experienced a small increase in fiscal year 2014.

Proposed or planned residential development and/or turn over of homes in North Reading can impact the cohort numbers. It must be noted that the projected kindergarten enrollments have been adjusted to reflect typical incoming enrollments. Relying solely on birth rate data from prior three years is not always accurate – this is due to the impact from the full-day kindergarten option now being available.

The two factors now at work which will have the greatest effect upon future enrollments are: a continuing decline in the number of births to North Reading residents and, to a greater degree, the possibility of a resumption of in-migration (which had slowed due to the real estate slowdown). In the decade from 1999-2008, North Reading averaged 164 births per year; more recently (and expected over the next 6-7 years) are about 120-150 births annually...averaging about 24 fewer per year than previously.
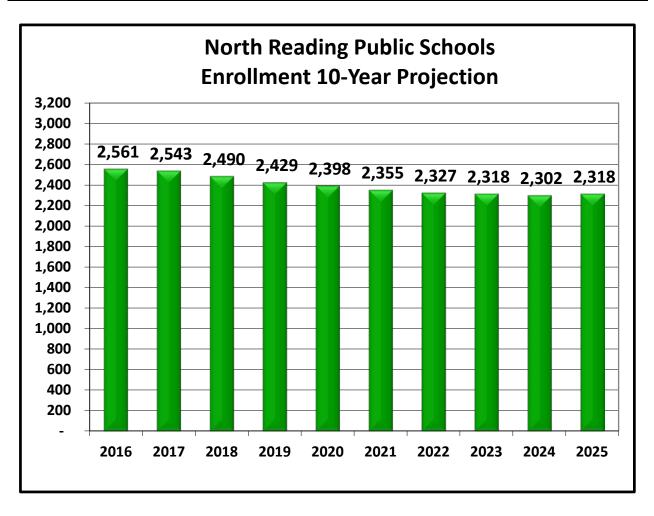
North Reading, over the past seven years, has registered about 117 Kindergarteners for every 100 births (five years previous), a relationship which has been generally steady. In the fall of 2014 there were only 109 Kindergarteners for every 100 births five-years-previous. However, in 2011 there were only 106 Kindergarteners for every 100 births-five-years-previous, yet a robust 128 Kindergarteners for every 100 births in 2010. Grade 1 is expected to remain about 8% larger than the previous year's Kindergarten class.

Like many nearby communities, North Reading continues to experience enrollment fluctuations of in/out-migration in Grades 1- 8. The high school had experienced a consistent loss between 12-14% of students enrolling in grade 9 at the end of Grade 8. However, this trend has decreased in recent years to 7-8%, for reasons unrelated to the number of families moving into-/out-of town). Over the next three years, K-5 enrollments are forecasted to decrease by a total of 9 students which is primarily due to fewer births and incoming kindergartens. Grade 6-8 is expected to decrease by 100 students, and the high school level is expected to increase by 29 students all within the next three years. After that point these projections show fairly flat or slightly declining enrollment in grade K-5, with further decreases in grades 6-12 as the smaller classes work their way up through the grades. However, it is very possible that as the real estate market increases, it will bring additional new families to North Reading.

Enrollment projections and analysis contained presented in this reports were conducted by the New England School Development Council (NESDEC) in October 2014.

History of Enrollment Projections vs. Actuals

You may wonder how enrollments projections have compared to our actual enrollment over the last several years. The chart below indicates that our historical projections using this method have been within 1% of actual enrollment. The last few years indicate that our actual enrollment have come in slightly higher than projected but are still very close to projected amounts.
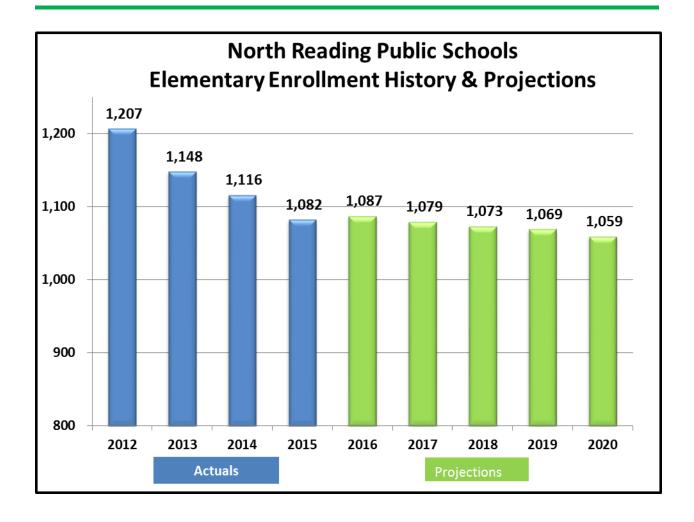
FISCAL YEAR	2010	2011	2012	2013	2014	2015
PROJECTION	2,791	2,682	2,633	2,591	2,587	2,549
ACTUAL	2,735	2,675	2,636	2,606	2,612	2,560
CHANGE	-56	-7	3	15	25	11

**North Reading Public Schools
Enrollment 10-Year Projection**

Year	Enrollment
2016	2,561
2017	2,543
2018	2,490
2019	2,429
2020	2,398
2021	2,355
2022	2,327
2023	2,318
2024	2,302
2025	2,318

Enrollment projections and analysis contained presented in this reports were conducted by the New England School Development Council (NESDEC) in October 2014.
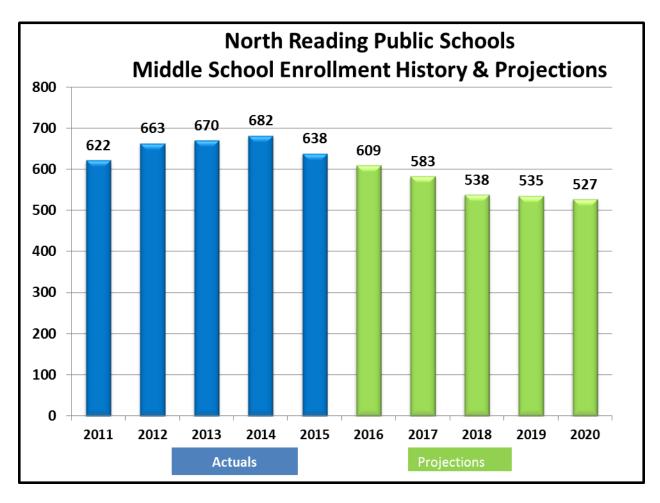
Districtwide enrollment is expected to decline over the next decade. However, one should realize that it is very likely these patterns will not last as long as ten years. All projections are most reliable in year's #1-5; and less reliable in year's #6-10. As soon as the economy and real estate situations improve in the region, additional in-migration may return to North Reading. During 2008-2013, many communities in the region sold only about 60-80% as many homes as in 2003-2007. In the case of North Reading, on average 161 single-family homes were sold between 2003 and 2007 – compared to only 100 homes in 2009. However, the pace quickened with 181 homes sold in 2013 the most since 2004. The pace in 2014 seems to be on the same trend through August, North Reading has sold 170 homes. If this trend continues it will have an impact on these projections. Also, in 2013, 28 new homes were built in North Reading which is an incredible 39% increase over 2012 when just 17 new homes were built. As additional families move in, any forecasted declines will change and the projected decline will moderate.

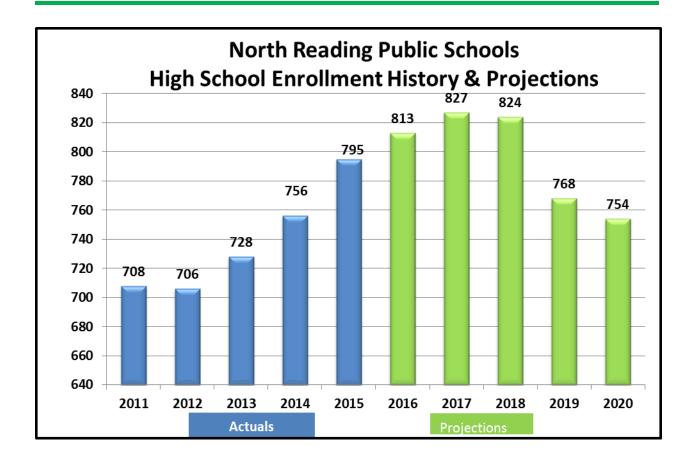| Projected Enrollment in Grade Combinations						
Year	PK-5	K-5	6-8	9-12	K-12	PK -12
2013-14 Actual	1,174	1,116	682	756	2,554	2,612
2014-15 Actual	1,127	1,082	638	795	2,515	2,560
2015-16 Projection	1,139	1,087	609	813	2,509	2,561
2016-17 Projection	1,133	1,079	583	827	2,489	2,543
2017-18 Projection	1,128	1,073	538	824	2,435	2,490
2018-19 Projection	1,126	1,069	535	768	2,372	2,429
2019-20 Projection	1,117	1,059	527	754	2,340	2,398
2020-21 Projection	1,118	1,060	541	696	2,297	2,355
2021-22 Projection	1,106	1,046	550	671	2,267	2,327
2022-23 Projection	1,091	1,030	550	677	2,257	2,318
2023-24 Projection	1,119	1,056	526	657	2,239	2,302
2024-25 Projection	1,119	1,054	515	684	2,253	2,318

The above chart shows projected in grade combinations over the next ten years. All projections are most reliable in the first five years and less reliable in years six through ten. Over the next three years, K-5 enrollments are forecasted to remain relatively stable, Grades 6-8 is expected to decrease by 100 students; and the high school level to increase by about 29 students all within the next three years. After that point these projections show fairly flat, or slightly decreasing, enrollment in Grades K-5, with further decreases in Grades 6-12 – as smaller classes work their way up through the grades. However it is important to note that it is possible that real estate turnover will have increased, bringing in additional new families to North Reading, which will impact the projections.

Enrollment projections and analysis contained presented in this reports were conducted by the New England School Development Council (NESDEC) in October 2014.

North Reading Public Schools
Elementary Enrollment History & Projections

Chart: Enrollment values by year — 2012: 1,207; 2013: 1,148; 2014: 1,116; 2015: 1,082 (Actuals); 2016: 1,087; 2017: 1,079; 2018: 1,073; 2019: 1,069; 2020: 1,059 (Projections).

Elementary enrollment (K-5), next school year is projected to be 1,087 system-wide. This is a slight increase of 5 students. As evidenced by the chart above, long term enrollment projections at the elementary level are anticipated to remain relatively stable. Over the next three years, K-5 enrollments are forecast to decline by only a total of 9 students. After that point these projections show enrollment decreasing slightly in FY19 and FY 20.

Enrollment projections and analysis contained presented in this reports were conducted by the New England School Development Council (NESDEC) in October 2014.

North Reading Public Schools
Middle School Enrollment History & Projections

Year	Enrollment
2011	622
2012	663
2013	670
2014	682
2015	638
2016	609
2017	583
2018	538
2019	535
2020	527

Actuals: 2011–2015 (blue)
Projections: 2016–2020 (green)

Middle School enrollment is also expected to decline by 29 students next school year; as a result, no additional staff will be necessary. Over the next three years, it is anticipated that grades 6-8 will decline by a total of 100 students. As you can see by the above chart, long term enrollment projections indicate the middle school enrollment, which reached a 10 year peak in 2014, will continue to decline each year. The opposite is true at the high school level over the next three years, as enrollment is expected to rise through fiscal year 2018.

North Reading Public Schools
High School Enrollment History & Projections

High School enrollment is expected to rise steadily over the next three fiscal years, reaching a peak in fiscal year 2017/2018. Enrollment at the high school level is anticipated to increase by about 32 students all within the next three years as the high middle school classes move into the high school. The opening of the new building has also resulted in a higher survival ratio of 8th grade students moving into ninth grade as well. Next year it is anticipated the high school will have an additional 18 students. After fiscal year 2018, it is expected that the high school will experience a decline in enrollment.