

**Projections:  
Student Enrollment Figures**

# ENROLLMENT PROJECTIONS

Enrollment membership projections are made using a technique called the grade-progression method. Student membership, tabulated separately for each grade, is the basis for predicting next year's enrollment, which then becomes the basis for forecasting enrollment the year after, and so on.<sup>1</sup>

Student enrollment counts were obtained from both the McAllen Independent School District and the Texas Education Agency. The counts used are fall enrollment figures – the count of students taken usually toward the beginning of each school year. The enrollment count is tabulated by grade, beginning with the youngest students in pre-Kindergarten classes, and extending through the oldest students in high school. Excluded from this study are students that do not fall within the “standard” public school system (those that attend Options or alternative education centers, for example). It is the K—12 students that form the basis for the projections.<sup>2</sup>

## HOW THE PROJECTIONS ARE MADE

In order to make a set of membership projections, it is helpful to have a minimum of five years' worth of fall enrollment data. Since the heart of this projection technique is the grade-progression ratio, an in-depth examination of how these ratios are calculated and how they are interpreted comes next.

A grade-progression ratio is simply the ratio (or fraction) of the number of students in a particular grade, divided by the number of students in the previous grade in the previous school year. For example, if the current number of 12<sup>th</sup> grade students is divided by last year's 11<sup>th</sup> grade students, the grade-progression from 11<sup>th</sup> to 12<sup>th</sup> grade in successive years is calculated. Demographers refer to this process as one of being “promoted” from grade to grade; however, either term does a similar job of catching the meaning.

In this sense, a grade-progression ratio for every pair of consecutive grades can be calculated, from Kindergarten to 1st, 1<sup>st</sup> to 2<sup>nd</sup>, 2<sup>nd</sup> to 3<sup>rd</sup>, and so on through 11<sup>th</sup> to 12<sup>th</sup>. Instead of focusing on the mathematics of constructing the grade-progression ratio, note why this ratio can take on a value either greater or less than one (1.0). Or rather, the following may be posited: why is it that the grade-progression ratio is not exactly one each year?

We must start with the obvious reason that between one school year and the next a certain number of families and their school-age children move into the area, while other families leave. For many families these moves will be job related (that is to say, families moving because of a job change), although some families move for other reasons. If more families with school-age children move into the area than leave – that is, if the balance between those coming and going is positive – this will tend to yield grade-progression ratios greater than one.

But there are other factors beyond in and out-migration that affect the size of the grade-progression ratio. Every public school zone, from the elementary zones through the secondary zones in the school district is in competition with other educational institutions to attract and retain pupils – *both inter-district and intra-district*. There are always some alternatives to public education available to the parents of school-age students. Each year some parents decide to send their children to private school, or decide that home schooling is an appropriate choice for their children. Simultaneously, other parents make just the opposite decision – taking their children out of private school to send them to public school, or sending them back to public school after a period of home schooling. Once again, the balance between those removing their

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<sup>1</sup> In a strict technical sense, “membership” and “enrollment” are different concepts. Membership refers to the number of students actually attending a school (even if they are temporarily absent due to illness or being on vacation). Enrollment, on the other hand, is a count of all the students who register to attend school, even if some of them withdraw or transfer during the semester. In the discussion of the projection methodology the two terms are used interchangeably, with the meaning usually given to “membership.”

<sup>2</sup> Enrollment figures for SY 1997-1998 through SY 2003-2004, courtesy of Texas Education Agency (TEA), Information Analysis Division. This data is from PEIMS, a state-wide data management system for public education information in the State of Texas. School districts submit their data using standardized computer files. The enrollment student counts include the total number of public students who were reported enrolled on October 31, 2003 in any grade, from early childhood education through grade 12.

children from the public school system and those sending their children to public schools will have an affect on the grade-progression ratios.

There are also factors operating within the school district that influence its grade-promotion ratios. Whether class size is increasing or decreasing depends on many factors. Some of these are external to the school division while others are not. Some depend on the availability of jobs and housing, others on the perceived quality of the public schools, and yet others on changes in school administrative policies. A grade-progression ratio shows, in one deceptively simple number, the net effect of all the different factors affecting student enrollment, retention, and promotion.

In order to make membership projections, grade-progression ratios between every pair of consecutive grades are thus calculated. In other words, there is a Kindergarten to 1<sup>st</sup> grade ratio, another ratio calculated from the 1<sup>st</sup> to the 2<sup>nd</sup> grade, another calculated from the 2<sup>nd</sup> to the 3<sup>rd</sup> grade, and so forth, all the way up the line to the 11<sup>th</sup> / 12<sup>th</sup> grade ratio.

Since there are at least ten years of fall membership data for each grade, a number of grade-progression ratios can be calculated for each pair of grades. For example, the 1st to 2nd grade ratio can be computed between school years 2002-03 and 2003-04, and between 2001-02 and 2002-03, and between 2000-01 and 2001-02, and so on.

In our study of enrollment numbers for secondary campuses, one will note that the grade-progression ratios fluctuate around the value of 1.0, although none are exactly one (which simply means that it is rare for class size to remain exactly the same in consecutive years).

The lack of a consistent set of grade-progression ratios creates a problem. In order to make accurate projections a “dependable” set of grade-progression ratios are needed. This set of required ratios (one for each pair of grades) is used to promote the current fall enrollment count of students into next years count, and then that set of students are promoted another year into the future, and so on. But since grade-progression ratios tend to jump around, which is the appropriate ratio to use for the projection? Would it be correct to use the most recent ratio? Or an average of several ratios? And if an average is selected, should it be based on all ten of the available grade-progression ratios, or a sub-set of the ten?

There is no hard, fast method to answer these questions or a preferred way of selecting an appropriate grade-progression ratio. Most statisticians reviewed in the literature suggest a combination of such methods as a way to produce reliable projections. In the enrollment projections, a series of different averages are calculated for review purposes.

The averages are:

1. An average based on all of the available grade-progression ratios.
2. The second average is nearly the same as the first. The difference is that the largest and the smallest values are omitted from the average. This is done on the basis of the largely untested assumption that both the highest and the lowest value are likely not to be representative of the series.
3. The final average is based on the notion that while the simple average method often produces a useful number, it still gives equal weight to grade-progression values that are somewhat out-of-date. A grade-progression ratio that let the most recent data have more impact than the oldest might produce a better number. A “front-loaded” average can be calculated.

In our case projections, we employed an exponentially smoothed average is used as the preferred weighted average based on the most recent five year’s worth of figures, provided by the school district. For SY 2009-2010 through 2013-2014, the weighted averages are based on district projections for SY 2004-2005 through 2008-2009 The general formula for the exponentially smoothed average is:

$$aX_t + a(1-a)X_{t-1} + a(1-a)^2X_{t-2} + a(1-a)^3X_{t-3} + a(1-a)^4X_{t-4}$$

Where:

a = the smoothing constant (for our calculations a value of 0.8 is used.)

X = a grade-progression ratio

t = time, such that  $X_t$  is the most recent historical grade-progression ratio,  $X_{t-1}$  is one year older, and so on

Substituting the value 0.8 for “a” in the equation produces the following equivalent formula:

$$0.80X_t + 0.16X_{t-1} + 0.032X_{t-2} + 0.0064X_{t-3} + 0.00128X_{t-4}$$

This equation produces a weighted average where 80% of the final value depends on the first (most recent) grade-progression ratio, 16% of the value depends on the second ratio, 3.2% on the third, 0.64% on the fourth, and only 0.128% on the oldest ratio.

In order to see how the exponentially smoothed equation differs from a standard average, note that the equation for an average can be written this way:

$$0.20X_t + 0.20X_{t-1} + 0.20X_{t-2} + 0.20X_{t-3} + 0.20X_{t-4}$$

From this it is easy to see that the average is merely one type of weighted average—one in which all the weights are the same.

4. A weighted average similar in formula to the previous average, but based on the previous actual enrollment figures.

Each of the averages is then selected and used to project that particular grade forward in time.

## ACCURACY OF PROJECTIONS

The accuracy of enrollment projections is tempered by different factors. There are several general “rules of thumb” that help in thinking about the accuracy of enrollment projections. First, projections for larger geographic areas tend to be more accurate than those for smaller areas. A corollary of this is that the projection of total student enrollment will likely be more accurate than the projections for any one individual grade level. Second, short-term projections – those for one or two years into the future – tend to be more accurate than those that extend for three to five years into the future. Finally, school districts with populations that are changing at a constant rate (either growing, or declining), will tend to have more accurate projections than those districts where growth (or decline) is erratic.

Our particular enrollment projections are tempered by the inclusion of the district’s own projections through SY 2008-2009, which form a “conservative” base for our measurements. We feel that the inclusion of these district figures for the calculation of enrollment projections through SY 2013-2014 offer a reasonable and reliable base for future planning and preparation.

It is clear that projection accuracy is associated with at least two factors: the size of the area for which projections are being made, and the length of time of the forecasts. Short-range projections for large aggregates tend to be the most accurate, while long-range projections for smaller areas are the least accurate. However, even though these latter projections are considered “least accurate,” one must keep in mind that projection errors of around 5 percent or less are considered quite well in the demographic literature. Even these forecasts should be sufficiently accurate for most planning and analytical applications.

## Secondary Enrollment Projections Through School Year 2013-2014

<b>Brown</b>	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
6th	297	237	263	275	245	270	309	300	306	312	319	325	334	342	351	360	369
7th	278	297	239	241	274	273	276	309	302	308	314	320	328	337	346	355	363
8th	281	273	308	229	236	277	268	227	296	290	295	301	306	312	317	323	328
<b>TOTAL</b>	<b>856</b>	<b>807</b>	<b>810</b>	<b>745</b>	<b>755</b>	<b>820</b>	<b>853</b>	<b>836</b>	<b>904</b>	<b>910</b>	<b>928</b>	<b>946</b>	<b>968</b>	<b>991</b>	<b>1,014</b>	<b>1,037</b>	<b>1,061</b>

<b>Cathey</b>	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
6th	229	201	205	310	271	289	318	320	321	322	323	324	333	341	350	359	368
7th	237	221	224	302	323	279	278	318	314	314	315	309	317	325	334	342	351
8th	257	229	211	238	300	305	268	269	302	298	299	300	305	311	316	321	327
<b>TOTAL</b>	<b>723</b>	<b>651</b>	<b>640</b>	<b>850</b>	<b>894</b>	<b>873</b>	<b>864</b>	<b>907</b>	<b>937</b>	<b>934</b>	<b>937</b>	<b>933</b>	<b>955</b>	<b>977</b>	<b>1,000</b>	<b>1,023</b>	<b>1,046</b>

<b>De Leon</b>	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
6th	294	297	316	294	322	359	332	321	327	334	340	347	356	365	375	385	394
7th	289	316	326	295	312	344	383	318	330	337	344	350	359	369	378	388	398
8th	266	274	316	295	306	343	329	351	318	330	337	344	350	356	363	369	375
<b>TOTAL</b>	<b>849</b>	<b>887</b>	<b>958</b>	<b>884</b>	<b>940</b>	<b>1,046</b>	<b>1,044</b>	<b>990</b>	<b>975</b>	<b>1,001</b>	<b>1,021</b>	<b>1,041</b>	<b>1,065</b>	<b>1,090</b>	<b>1,116</b>	<b>1,141</b>	<b>1,166</b>

<b>Lincoln</b>	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
6th	256	245	247	241	254	275	278	312	317	322	326	331	340	349	358	367	376
7th	252	240	231	255	242	271	257	306	314	318	323	328	337	345	354	363	373
8th	233	243	231	272	252	222	256	310	303	311	315	320	326	332	337	343	349
<b>TOTAL</b>	<b>741</b>	<b>728</b>	<b>709</b>	<b>768</b>	<b>748</b>	<b>768</b>	<b>791</b>	<b>928</b>	<b>934</b>	<b>951</b>	<b>964</b>	<b>979</b>	<b>1,002</b>	<b>1,025</b>	<b>1,049</b>	<b>1,073</b>	<b>1,097</b>

<b>Morris</b>	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
6th	321	318	305	232	241	282	269	282	279	277	274	271	278	285	293	300	308
7th	318	324	322	190	249	258	265	260	284	281	278	275	282	290	297	305	312
8th	317	314	331	291	199	263	254	263	255	278	275	290	298	305	313	321	329
<b>TOTAL</b>	<b>956</b>	<b>956</b>	<b>958</b>	<b>713</b>	<b>689</b>	<b>803</b>	<b>788</b>	<b>805</b>	<b>818</b>	<b>836</b>	<b>827</b>	<b>836</b>	<b>858</b>	<b>880</b>	<b>903</b>	<b>926</b>	<b>950</b>

<b>Travis</b>	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
6th	218	201	201	254	282	275	278	272	275	277	280	283	290	298	306	314	321
7th	234	222	213	238	249	251	284	271	269	272	274	277	284	292	299	307	315
8th	238	221	219	202	253	258	240	267	266	264	266	290	298	305	313	321	329
<b>TOTAL</b>	<b>690</b>	<b>644</b>	<b>633</b>	<b>694</b>	<b>784</b>	<b>784</b>	<b>802</b>	<b>810</b>	<b>810</b>	<b>813</b>	<b>820</b>	<b>850</b>	<b>872</b>	<b>895</b>	<b>918</b>	<b>942</b>	<b>966</b>

## Secondary Enrollment Projections Through SY 2013-2014

McAllen	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
9th	664	678	677	648	715	695	805	735	742	750	757	765					
10th	413	467	430	454	482	441	456	528	485	490	495	500					
11th	378	336	385	357	373	385	394	361	438	403	407	411					
12th	309	319	280	298	297	306	319	313	303	351	322	325					
<b>TOTAL</b>	<b>1,764</b>	<b>1,800</b>	<b>1,772</b>	<b>1,757</b>	<b>1,867</b>	<b>1,827</b>	<b>1,974</b>	<b>1,937</b>	<b>1,968</b>	<b>1,994</b>	<b>1,981</b>	<b>2,001</b>	-	-	-	-	-
9th (A)	1.394215											765	809	830	852	874	896
10th (A)	0.665592											500	509	538	552	567	582
11th (A)	0.82682											411	413	421	445	457	469
12th (A)	0.814983											325	335	337	343	363	372
<b>TOTAL</b>												<b>2,001</b>	<b>2,066</b>	<b>2,126</b>	<b>2,192</b>	<b>2,260</b>	<b>2,318</b>
9th (B)	1.401453											765	813	834	856	878	901
10th (B)	0.662322											500	507	538	552	567	582
11th (B)	0.822538											411	411	417	443	454	466
12th (B)	0.816319											325	336	336	340	361	371
<b>TOTAL</b>												<b>2,001</b>	<b>2,066</b>	<b>2,125</b>	<b>2,191</b>	<b>2,261</b>	<b>2,320</b>
9th (C)	1.411637											765	819	840	862	885	907
10th (C)	0.660196											500	505	541	555	569	584
11th (C)	0.830052											411	415	419	449	460	472
12th (C)	0.798694											325	328	328	335	358	368
<b>TOTAL</b>												<b>2,001</b>	<b>2,067</b>	<b>2,128</b>	<b>2,200</b>	<b>2,273</b>	<b>2,332</b>
9th (D)	1.537672											765	892	915	939	964	988
10th (D)	0.652484											500	499	582	597	613	629
11th (D)	0.8752											411	438	437	509	523	536
12th (D)	0.826759											325	340	340	361	421	432
<b>TOTAL</b>												<b>2,001</b>	<b>2,168</b>	<b>2,274</b>	<b>2,407</b>	<b>2,520</b>	<b>2,586</b>

McAllen	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
9th		1.221622	1.265421	1.178182	1.450304	1.537611	1.545106	1.487854	1.4	1.439539	1.396679	1.414048					
10th		0.703313	0.634218	0.670606	0.743827	0.616783	0.656115	0.655901	0.659864	0.660377	0.66	0.660502					
11th		0.813559	0.824411	0.830233	0.821586	0.798755	0.893424	0.791667	0.829545	0.830928	0.830612	0.830303					
12th		0.843915	0.833333	0.774026	0.831933	0.820375	0.828571	0.794416	0.839335	0.80137	0.799007	0.798526					

McAllen feeders: Morris and Travis

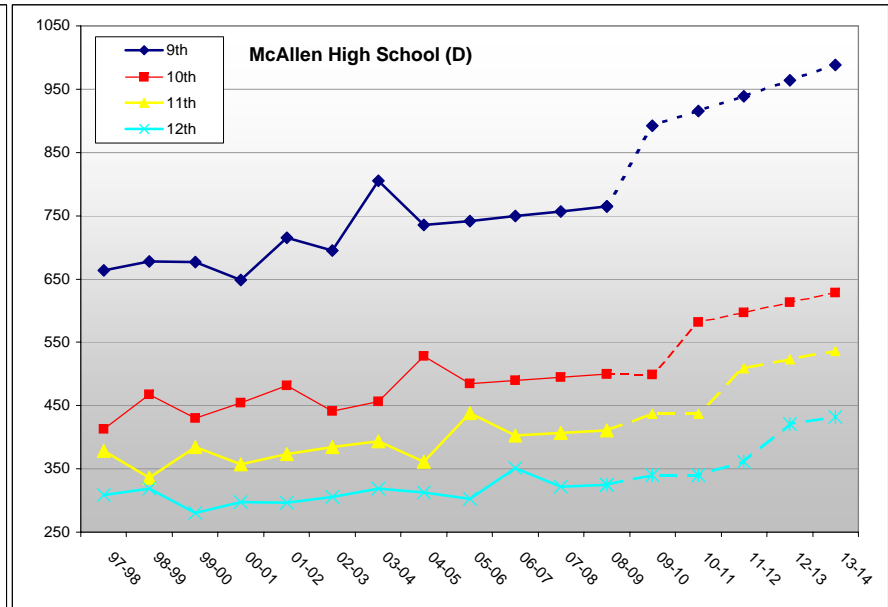
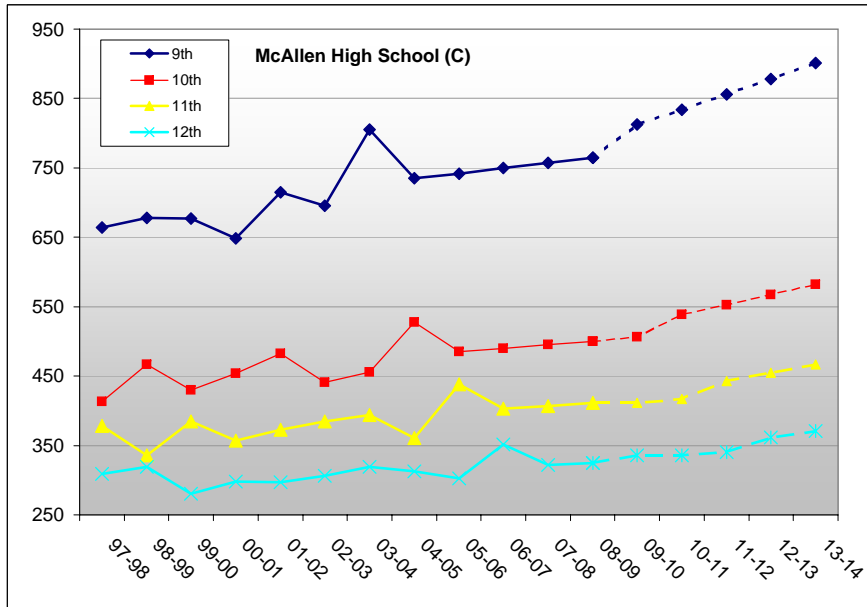
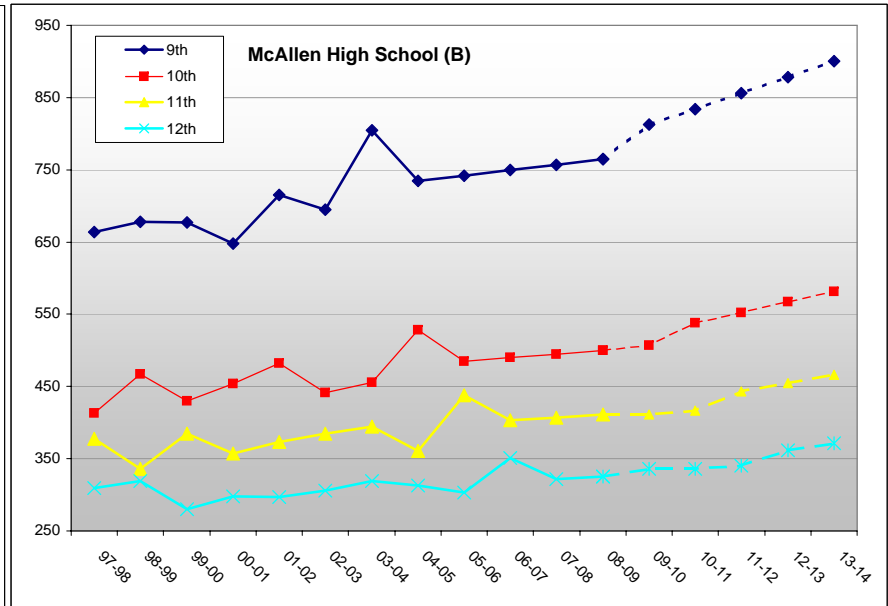
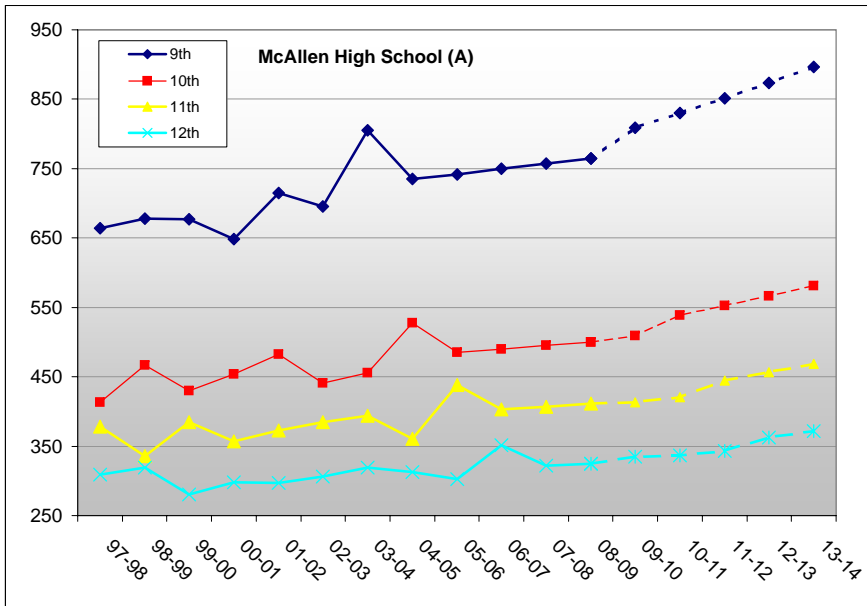
(A) = Average

(B) = Average, excluding highest and lowest

(C) = Weighted average of last five projected years

(D) = Weighted average of last five actual years

## Secondary Enrollment Projections Through SY 2013-2014



## Secondary Enrollment Projections Through SY 2013-2014

Memorial	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
9th	649	715	711	743	682	728	716	712	719	726	734	741					
10th	493	475	483	519	525	495	499	498	506	511	516	521					
11th	500	430	390	404	408	459	405	401	409	415	419	423					
12th	389	417	369	316	386	362	394	349	349	356	361	364					
<b>TOTAL</b>	<b>2,031</b>	<b>2,037</b>	<b>1,953</b>	<b>1,982</b>	<b>2,001</b>	<b>2,044</b>	<b>2,014</b>	<b>1,960</b>	<b>1,983</b>	<b>2,008</b>	<b>2,030</b>	<b>2,049</b>	-	-	-	-	-
9th (A)	1.386522											741	833	825	847	869	891
10th (A)	0.708426											521	525	590	585	600	616
11th (A)	0.826643											423	431	434	488	483	496
12th (A)	0.867688											364	367	374	377	423	419
<b>TOTAL</b>												<b>2,049</b>	<b>2,156</b>	<b>2,223</b>	<b>2,296</b>	<b>2,376</b>	<b>2,422</b>
9th (B)	1.372537											741	796	817	838	860	882
10th (B)	0.709474											521	526	565	580	595	610
11th (B)	0.825851											423	430	434	466	479	491
12th (B)	0.864318											364	366	372	375	403	414
<b>TOTAL</b>												<b>2,049</b>	<b>2,118</b>	<b>2,188</b>	<b>2,260</b>	<b>2,337</b>	<b>2,397</b>
9th (C)	1.367546											741	793	814	835	857	879
10th (C)	0.709748											521	526	563	578	593	608
11th (C)	0.819538											423	427	431	461	473	486
12th (C)	0.868695											364	367	367	374	401	411
<b>TOTAL</b>												<b>2,049</b>	<b>2,114</b>	<b>2,175</b>	<b>2,249</b>	<b>2,324</b>	<b>2,384</b>
9th (D)	1.411738											741	819	840	862	885	907
10th (D)	0.692628											521	513	567	582	597	613
11th (D)	0.825991											423	430	424	468	481	493
12th (D)	0.865529											364	366	366	367	405	416
<b>TOTAL</b>												<b>2,049</b>	<b>2,129</b>	<b>2,197</b>	<b>2,280</b>	<b>2,368</b>	<b>2,430</b>

Memorial	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
9th		1.288288	1.328972	1.350909	1.383367	1.610619	1.37428	1.441296	1.356604	1.393474	1.354244	1.369686					
10th		0.731895	0.675524	0.729958	0.706595	0.725806	0.68544	0.695531	0.710674	0.710709	0.710744	0.709809					
11th		0.872211	0.821053	0.836439	0.786127	0.874286	0.818182	0.803607	0.821285	0.820158	0.819961	0.819767					
12th		0.834	0.85814	0.810256	0.955446	0.887255	0.858388	0.861728	0.870324	0.870416	0.86988	0.868735					

McAllen Memorial feeders: Brown and Cathey

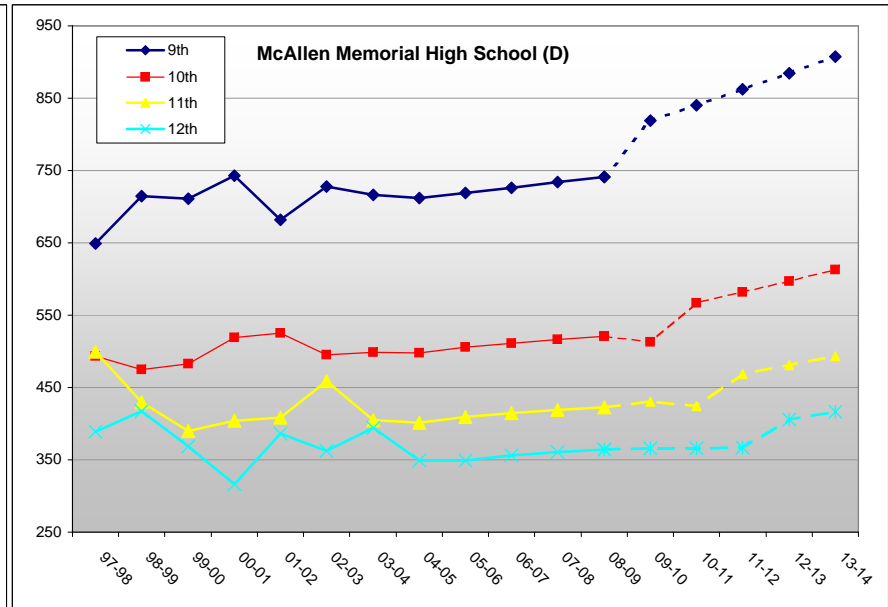
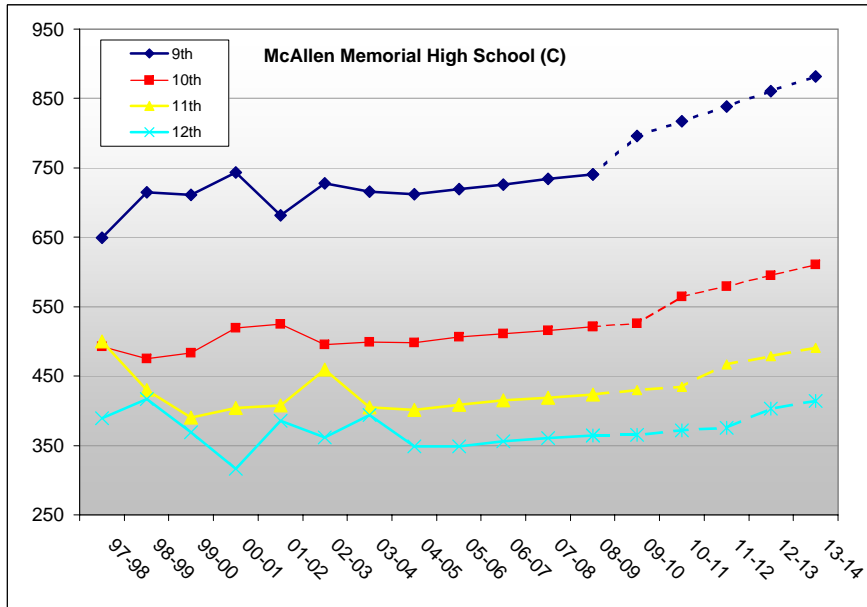
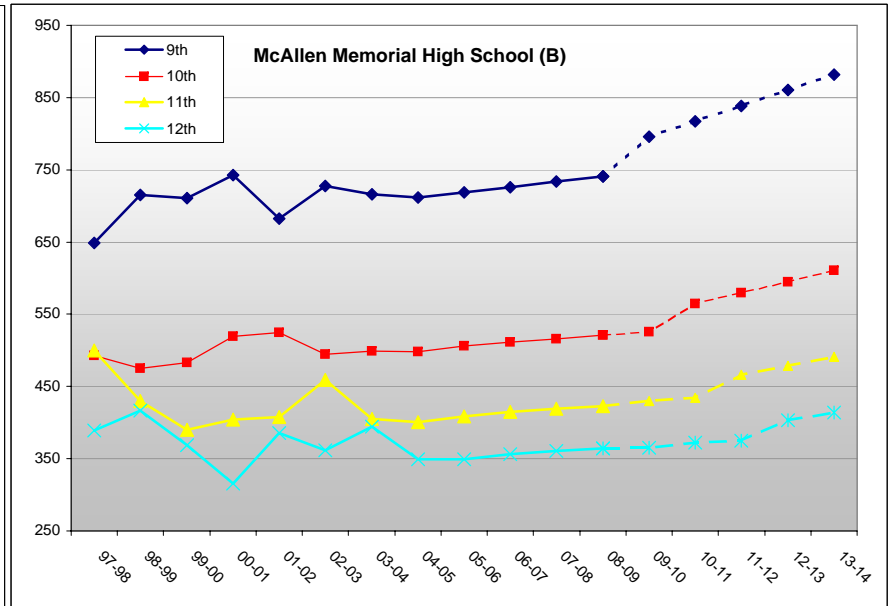
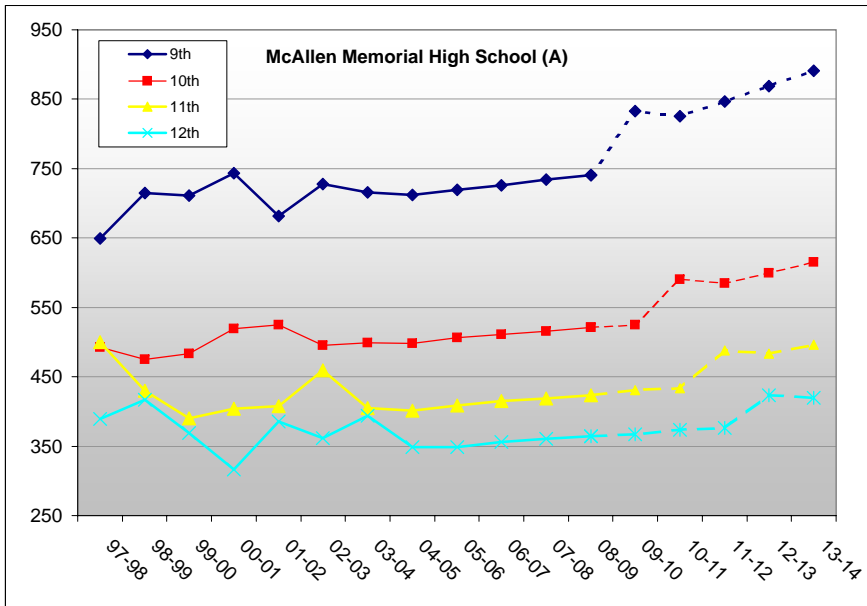
(A) = Average

(B) = Average, excluding highest and lowest

(C) = Weighted average of last five projected years

(D) = Weighted average of last five actual years

## Secondary Enrollment Projections Through SY 2013-2014



## Secondary Enrollment Projections Through SY 2013-2014

Memorial	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
9th	806	790	808	735	715	758	618	695	713	731	749	768					
10th	480	480	522	514	510	503	530	448	508	520	533	547					
11th	495	416	421	409	433	437	384	450	372	421	432	443					
12th	441	403	375	318	333	332	361	310	364	301	341	350					
<b>TOTAL</b>	<b>2,222</b>	<b>2,089</b>	<b>2,126</b>	<b>1,976</b>	<b>1,991</b>	<b>2,030</b>	<b>1,893</b>	<b>1,903</b>	<b>1,957</b>	<b>1,973</b>	<b>2,055</b>	<b>2,108</b>	-	-	-	-	-
9th (A)	1.262754											768	838	854	869	884	898
10th (A)	0.693966											547	533	582	592	603	613
11th (A)	0.832731											443	456	444	485	493	502
12th (A)	0.81122											350	359	370	360	393	400
<b>TOTAL</b>												<b>2,108</b>	<b>2,186</b>	<b>2,249</b>	<b>2,305</b>	<b>2,373</b>	<b>2,414</b>
9th (B)	1.269065											768	843	858	873	888	903
10th (B)	0.700795											547	538	591	601	612	622
11th (B)	0.835504											443	457	450	493	502	511
12th (B)	0.807404											350	358	369	363	398	406
<b>TOTAL</b>												<b>2,108</b>	<b>2,196</b>	<b>2,267</b>	<b>2,331</b>	<b>2,400</b>	<b>2,442</b>
9th (C)	1.26214											768	838	853	868	883	898
10th (C)	0.72985											547	561	612	623	634	645
11th (C)	0.83076											443	454	466	508	517	526
12th (C)	0.80985											350	359	359	377	412	419
<b>TOTAL</b>												<b>2,108</b>	<b>2,212</b>	<b>2,289</b>	<b>2,376</b>	<b>2,446</b>	<b>2,488</b>
9th (D)	1.124207											768	746	760	773	787	800
10th (D)	0.699047											547	537	522	531	541	550
11th (D)	0.780928											443	427	419	408	415	422
12th (D)	0.81559											350	361	361	342	332	338
<b>TOTAL</b>												<b>2,108</b>	<b>2,072</b>	<b>2,062</b>	<b>2,054</b>	<b>2,074</b>	<b>2,110</b>

Rowe	97-98	98-99	99-00	00-01	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14
9th		1.273423	1.36028	1.186364	1.300304	1.526991	1.03618	1.256883	1.195283	1.253071	1.231919	1.269593					
10th		0.595533	0.660759	0.636139	0.693878	0.703497	0.699208	0.724919	0.730935	0.729313	0.729138	0.730307					
11th		0.866667	0.877083	0.783525	0.842412	0.856863	0.763419	0.849057	0.830357	0.82874	0.830769	0.831144					
12th		0.814141	0.901442	0.755344	0.814181	0.766744	0.826087	0.807292	0.808889	0.80914	0.809976	0.810185					

Nikki Rowe feeders: De Leon and Lincoln

(A) = Average

(B) = Average, excluding highest and lowest

(C) = Weighted average of last five projected years

(D) = Weighted average of last five actual years

## Secondary Enrollment Projections Through SY 2013-2014

