

Enrollment Projections for ORCSD, 2022-2031

Long Range Planning Committee

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March 2022

LRPC Goals

- Provide the School Board with enrollment projections for each of the next 10 years.
- Make every effort to provide projections for the following school year in the fall when they can be used in the budgeting process.
- Continually improve and refine the model used to make enrollment projections.

Methodology

Kindergarten

- Linear regression as a function of historical births and enrollments
- Historical MW/MOH Splits

Grade 1

- Linear regression as a function of historical births and enrollments
- Grade Progression Ratio (GPR)
- Historical MW/MOH Splits

Grades 2-12

- Grade Progression Ratio (GPR)
- High School enrollment calculated with and without tuition students

Methodology - Regression

- Linear regression model is updated annually for both kindergarten and first grade.

- Current regression – Kindergarten

$$K(i) = 0.153*B(i-6)+0.075*B(i-5)+0.095*K(i-1)+0.694*K(i-2)$$

- $K(i)$ = kindergarten enrollment in year i
- $B(i)$ = births in year i

- Current regression – First Grade

$$F(i) = 0.157*B(i-7)+0.160*B(i-6)+0.181*F(i-1)+0.571*F(i-2)$$

- $F(i)$ = first grade enrollment in year i

- The most dominant variable in both regressions is the enrollment 2 years ago (enrollment is autocorrelated).

Methodology - Regression

- Enrollment of kindergarteners and first graders per school is then calculated based on 4-year averages of enrollment at each school

Year	K	1
MW	52.2%	54.9%
MOH	47.8%	45.1%

- When projecting past 5-years, the births per academic year also need to be estimated. This year's birth regression

$$B(i) = 0.563*B(i-1)+0.244*B(i-2)$$

Methodology - GPR

- Grade progression ratio is calculated as

$$GPR(i) = \frac{Grade(i)}{Grade-1(i-1)}$$

- Example:

Year	4	5	GPR, 4 to 5
2020	147		
2021		153	=153/147 = 1.04

- Each grade is calculated separately.
- The GPR is typically averaged over a 5-year time span to reduce individual year and cohort changes.
- Incorporates the net migration (in- and out-) over time and by grade.

Methodology - GPR

- GPRs are broken out separately for MOH and MW for 2-4.
- This year's GPRs

School	K - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8	8 - 9	9 - 10	10 - 11	11 - 12
MW	1.11	1.09	1.03	1.02								
MOH	1.12	1.06	1.03	1.03								
ORMS					1.04	1.03	1.01	1.00				
ORHS									0.99	0.99	0.99	1.02

- $GPR > 1.0$ except for grades 9-11, where we lose some native students. However, the overall enrollment increases due to tuition students (not included in calculation).

Model Skill

- Consider the predictions made in 2019 for the current year

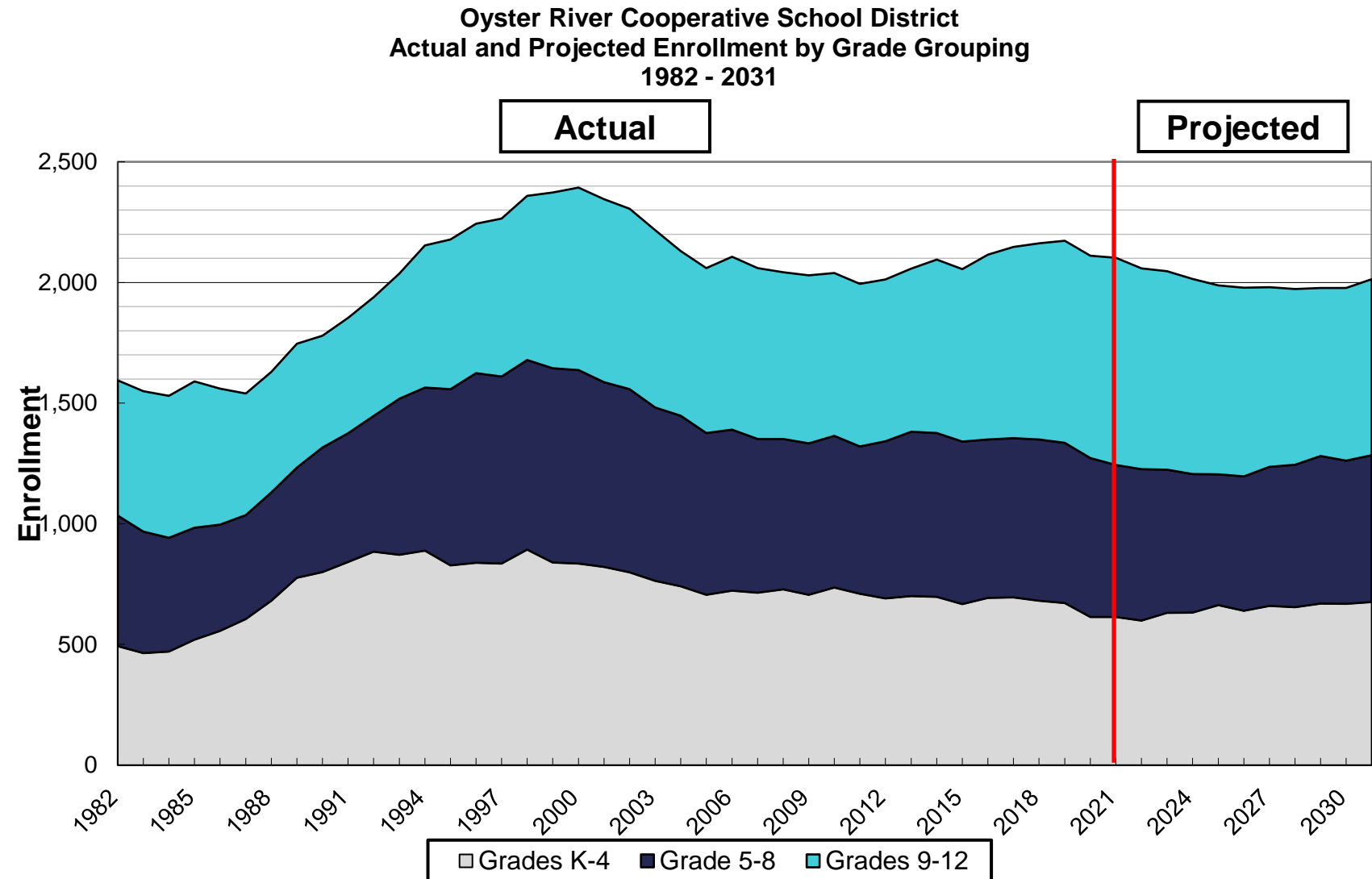
School	K	1	2	3	4	5	6	7	8	9	10	11	12
MW													
Predict.	62	58	75	60	96								
Actual	62	55	66	63	77								
Error (%)	0.0	5.5	13.6	-4.8	24.7								
MOH													
Predict.	49	48	60	53	66								
Actual	66	49	59	49	68								
Error (%)	-25.8	-2.0	1.7	8.3	-2.9								
ORMS & ORHS (including tuition)													
Predict.						162	162	168	160	222	198	201	216
Actual						153	160	159	158	223	211	202	223
Error (%)						5.9	1.3	5.7	1.3	-0.4	-6.2	-0.5	-3.1

Model Skill

- For this data comparison, the most discrepancy occurs at the elementary levels.
 - Kindergarten:
 - 110 total kindergarteners were predicted and 128 enrolled as of 10/01/2021.
 - Of the 128 enrolled
 - 12 students turned 6 prior to 09/30/21 (should have been kindergarteners last year)
 - 4 students are repeating kindergarten
 - This is consistent with a lower-than-expected enrollment in Kindergarten last year.
 - Fourth grade
 - Estimated to be largely pandemic related. The GPRs from Grades 3 to 4 at MW over the last 2 years were <0.95 . Historically, they are closer to 1.05. MOH's GPRs were more stable.
- ORMS & ORHS predictions are fairly good, which is consistent with very stable GPRs.

Predictions – District Wide

- Predicted decline in the total enrollment, driven by declines in ORMS & ORHS.
- MOH & MW populations may be overpredicted, given this year's larger Kindergarten enrollment.



Predictions – District Wide

- Differences from current:
 - Elementary: Maximum gain of 62 students (2031) from current
 - ORMS: Maximum loss of 88 students (2025) from current
 - ORHS: Maximum loss of 163 students (2029) from current

Year	K	1-4	5-8	9-12 w/ Tuition	Total w/ Tuition	9-12 w/o Tuition	Total w/o Tuition
2021-22	128	486	630	859	2,103	679	1,923
2022-23	103	496	628	832	2,059	667	1,894
2023-24	119	512	593	823	2,047	654	1,878
2024-25	105	527	574	809	2,015	651	1,857
2025-26	116	547	542	783	1,988	625	1,830
2026-27	108	531	558	781	1,978	623	1,820
2027-28	116	544	576	745	1,981	587	1,823
2028-29	110	544	591	728	1,973	570	1,815
2029-30	115	554	612	696	1,977	538	1,819
2030-31	111	557	594	715	1,977	557	1,819
2031-32	114	562	608	730	2,014	572	1,856

Predictions – District Wide

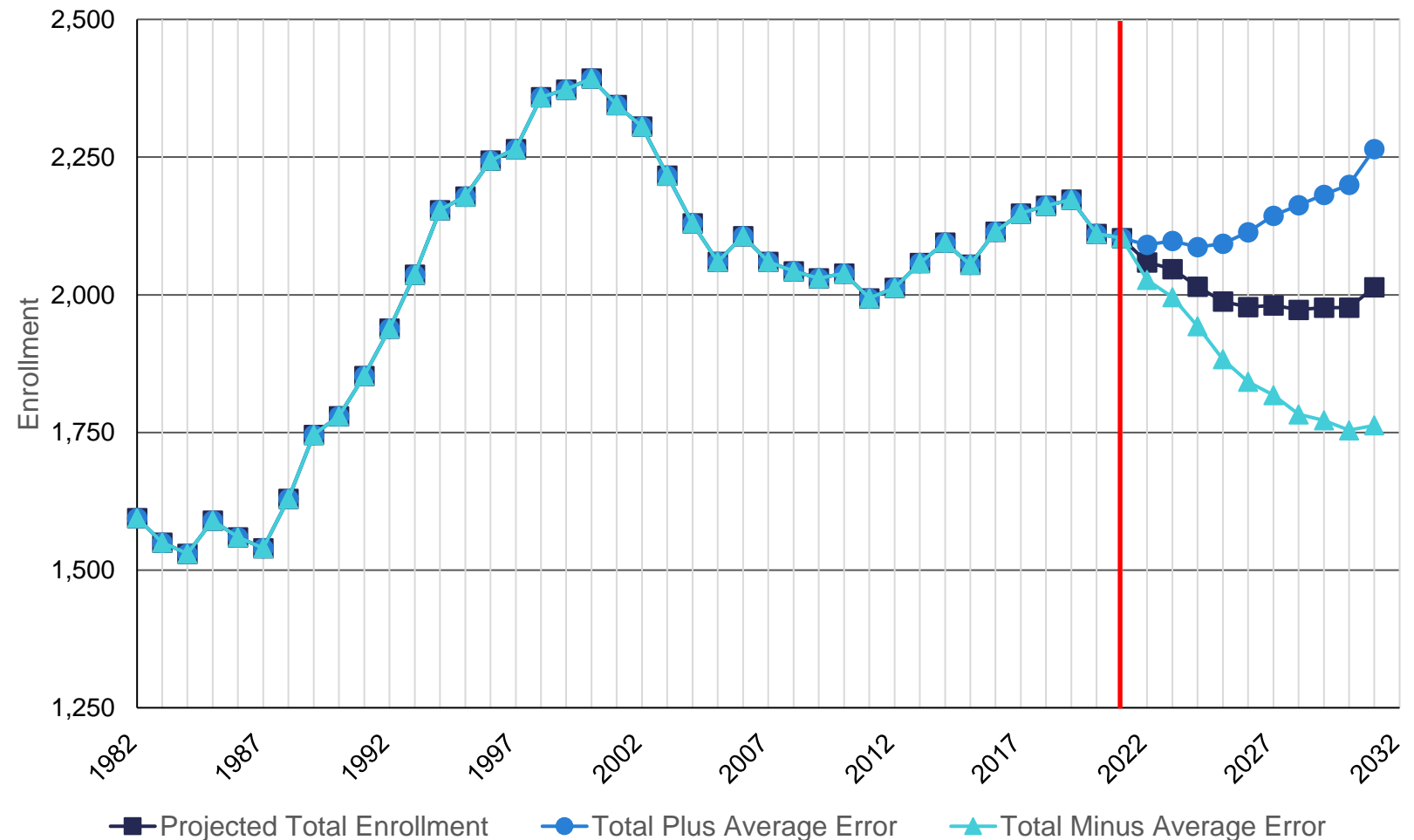
- MOH & MW populations may be overpredicted, given this year's larger Kindergarten enrollment.
- Due to the autocorrelation in the regression, we see estimates of our kindergarten population are higher every 2 years.
- Similar trend is observable in the 1st grade predictions, but it's slightly less pronounced.
- However, the predictions are within the scatter of recent enrollment data

Year	K	1-4	5-8	9-12 w/ Tuition	Total w/ Tuition	9-12 w/o Tuition	Total w/o Tuition
2021-22	128	486	630	859	2,103	679	1,923
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Predictions – District Wide

- Average error varies from 1.6% at Predicted Year 1 to 12.5% at Predicted Year 10.
- Total variation in Predicted Year 10 is 502 students.

Oyster River Cooperative School District
Actual and Projected Total Enrollment including Average Prediction Error
1982-2031



Predictions – MW & MOH

Year	Mast Way						Moharimet						Total
	K	1	2	3	4	Total	K	1	2	3	4	Total	
2021-22	62	55	66	63	77	323	66	49	59	49	68	291	614
2022-23	54	78	60	68	64	324	49	64	52	61	50	276	600
2023-24	62	63	85	62	69	341	57	51	68	53	63	292	633
2024-25	55	72	68	88	63	346	50	59	54	70	54	287	633
2025-26	60	66	78	70	90	364	56	54	63	56	72	301	665
2026-27	56	71	72	81	71	351	52	58	57	65	58	290	641
2027-28	60	69	77	74	82	362	56	57	61	59	67	300	662
2028-29	57	72	75	80	75	359	53	59	60	63	61	296	655
2029-30	60	71	78	77	81	367	55	59	63	62	65	304	671
2030-31	58	73	77	81	78	367	53	59	63	65	64	304	671
2031-32	59	72	79	80	82	372	55	59	63	65	67	309	681

Predictions – ORMS

Year	ORMS				
	5	6	7	8	Total
2021-22	153	160	159	158	630
2022-23	150	158	161	159	628
2023-24	118	155	159	161	593
2024-25	137	122	156	159	574
2025-26	121	142	123	156	542
2026-27	167	125	143	123	558
2027-28	134	173	126	143	576
2028-29	153	138	174	126	591
2029-30	141	158	139	174	612
2030-31	150	146	159	139	594
2031-32	147	155	147	159	608

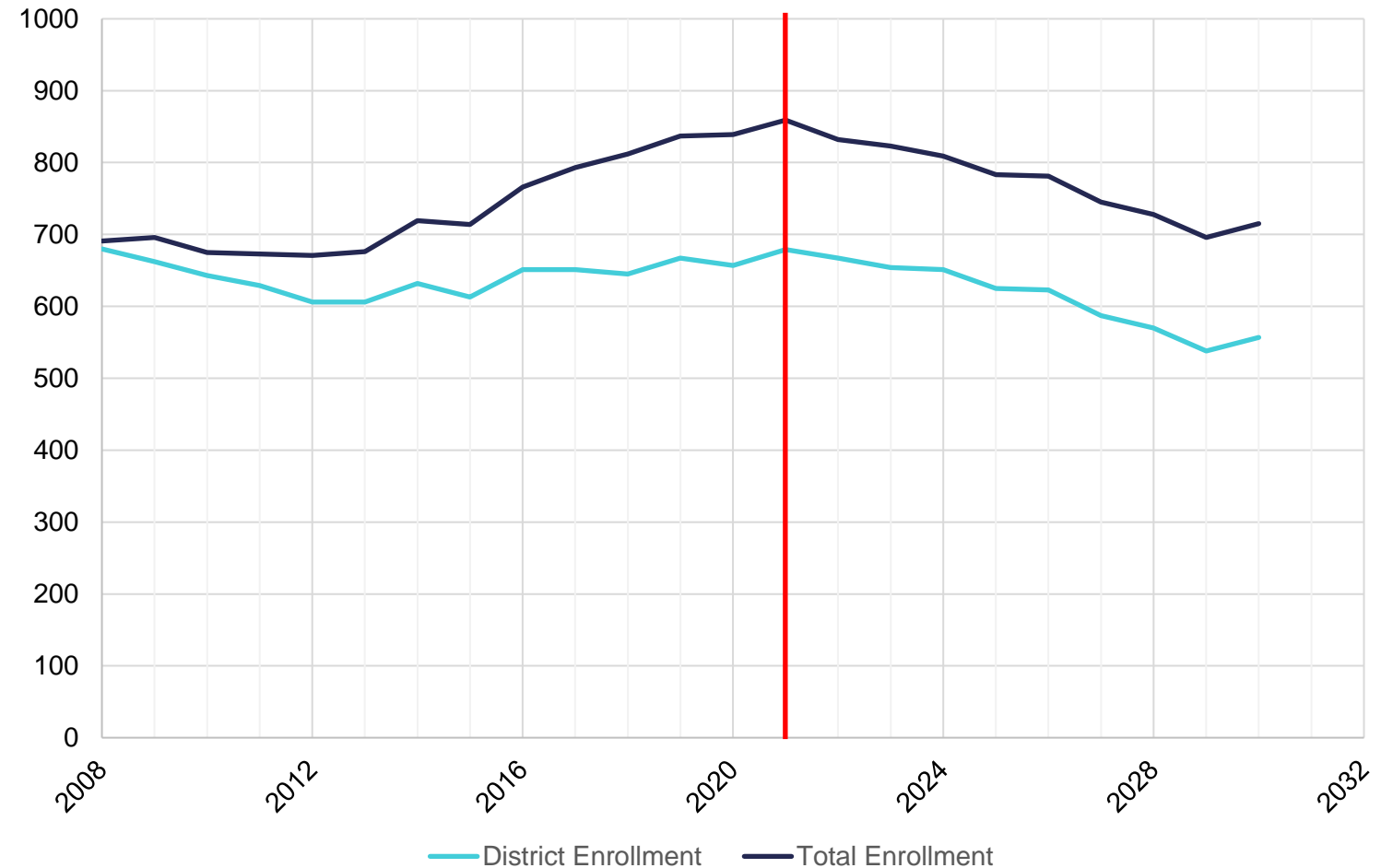
Predictions – ORHS

Year	With Tuition					Without Tuition					Tuition				
	9	10	11	12	Total	9	10	11	12	Total	9	10	11	12	Total
2021-22	223	211	202	223	859	183	160	167	169	679	40	51	35	54	180
2022-23	197	220	209	206	832	157	181	159	170	667	40	39	50	36	165
2023-24	198	194	218	213	823	158	155	179	162	654	40	39	39	51	169
2024-25	200	195	192	222	809	160	156	153	182	651	40	39	39	40	158
2025-26	198	197	193	195	783	158	158	154	155	625	40	39	39	40	158
2026-27	195	195	195	196	781	155	156	156	156	623	40	39	39	40	158
2027-28	162	192	193	198	745	122	153	154	158	587	40	39	39	40	158
2028-29	182	160	190	196	728	142	121	151	156	570	40	39	39	40	158
2029-30	165	180	158	193	696	125	141	119	153	538	40	39	39	40	158
2030-31	213	163	178	161	715	173	124	139	121	557	40	39	39	40	158
2031-32	178	210	161	181	730	138	171	122	141	572	40	39	39	40	158

Predictions – District Wide

- Predictions of tuition students assume 40 students entering in grade 9.
- Grades 10-12 tuition students are calculated with the HS GRPs.
- As those GPRs are very close to 1, the total number of tuition students predicted is the same year over year.

Oyster River Cooperative School District
High School Enrollment Breakdown
2008-2031



Summary

- Total ORCSD enrollment is predicted to decrease by 130 students (2029) as compared to current enrollment.
 - MW & MOH have a maximum gain of 62 students (2031) from current.
 - ORMS has a maximum loss of 88 students (2025) from current.
 - ORHS has a maximum loss of 163 students (2029) from current.
- MW & MOH enrollment increases may be an artifact of the prediction method and the current large Kindergarten cohort.
- However, more recent birth data is increasing for the district compared to when the current kindergarteners were born (by 20 births in 2021). The potential overprediction may be matched by increased births.

Notes

- With the opening of the new ORMS, we may see additional students choosing to come back to ORCSD from private schools.
- The continuing effect of the pandemic is unknown. Students that were lost as a result of the pandemic may filter back over the next few years, increasing the enrollment.
- The effect of the voucher bill is unknown.