

Operations Research and Education Laboratory

2017-18 IPSAC Update

DRAFT Report

Onslow County Schools



OREd, ITRE @ NCSU Centennial Campus

www.itre.ncsu.edu

March 2018

Overview

This document serves as a summary of findings from the 2017-18 Integrated Planning for School and Community (IPSAC) Update conducted by the Operations Research and Education Laboratory (OREd) for Onslow County Schools (OCS). Please refer to the accompanying Out-of-Capacity table [see page 7, OOC final draft date: March 1, 2018].

Data Summary:

2017-18 OCS Month-2 Membership (NC-DPI)

2008 – 2016 Resident Live Births (Onslow County)

Building Capacities: supplied by OCS and Smith-Sinnett Architects, updated March 29th, 2018

Membership History

The 2017-18 Month-2 K-12 Average Daily Membership (ADM) for OCS is 26,486, representing an increase of 352 students over 2016-17. In the last five years OCS has seen significant growth – paralleling the growth experienced in the pre-recession years. Since 2012-13, Month-2 K-12 ADM has increased by 1,532 students representing an average annual growth rate of about 1.2% or about 300 students per year. (See Figure 1.)

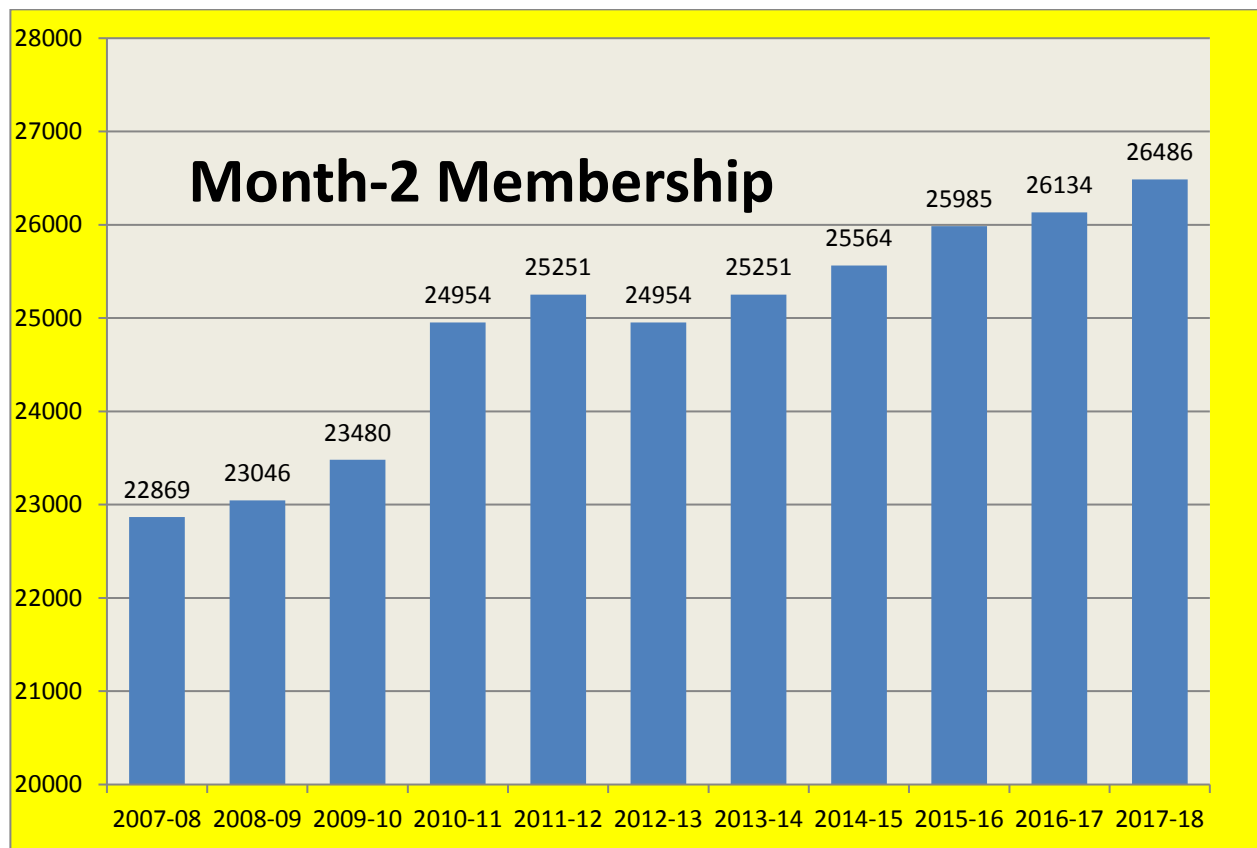


Figure 1 – Onslow County Schools Month-2 Membership

County resident live births (RLB) reported for 2016 was 3,959 – a decrease of 214 from 2015. (See Figure 2.) In the last five years (2012-2016) the average number of RLB is about 4,247 live births per year. Many counties in NC experienced a decline in RLB between these years. Onslow County has experienced stable RLB since 2010 with moderate declines starting in 2015. The enrollment forecast presented in this report projects RLB to increase gradually. Figure 2 shows historic county resident live births over the 10-year period 2007 – 2016.

The number of RLB is a primary indicator of the number of kindergarten students five years later. The historical RLB to kindergarten cohort survival ratio was basically flat, averaging about 0.640 for the 2007-08 to 2014-15 period (excluding school year 2009-10). However, the ratio dropped to 0.585 for 2015-16 and to 0.519 this year; meaning that only 51.9% of the 4408 RLBs in 2012 appeared in K in 2017-18¹. ORED considered this decrease in the RLB-K cohort a trend and modified the model appropriately.

This ratio is low compared to other districts of similar size and is likely due to military-related births; many babies born in the county have parents in the military and thus are likely more transient. It also suggests that student in-migration has remained fairly constant over recent years. These unique factors are not the case for many other school districts in North Carolina.

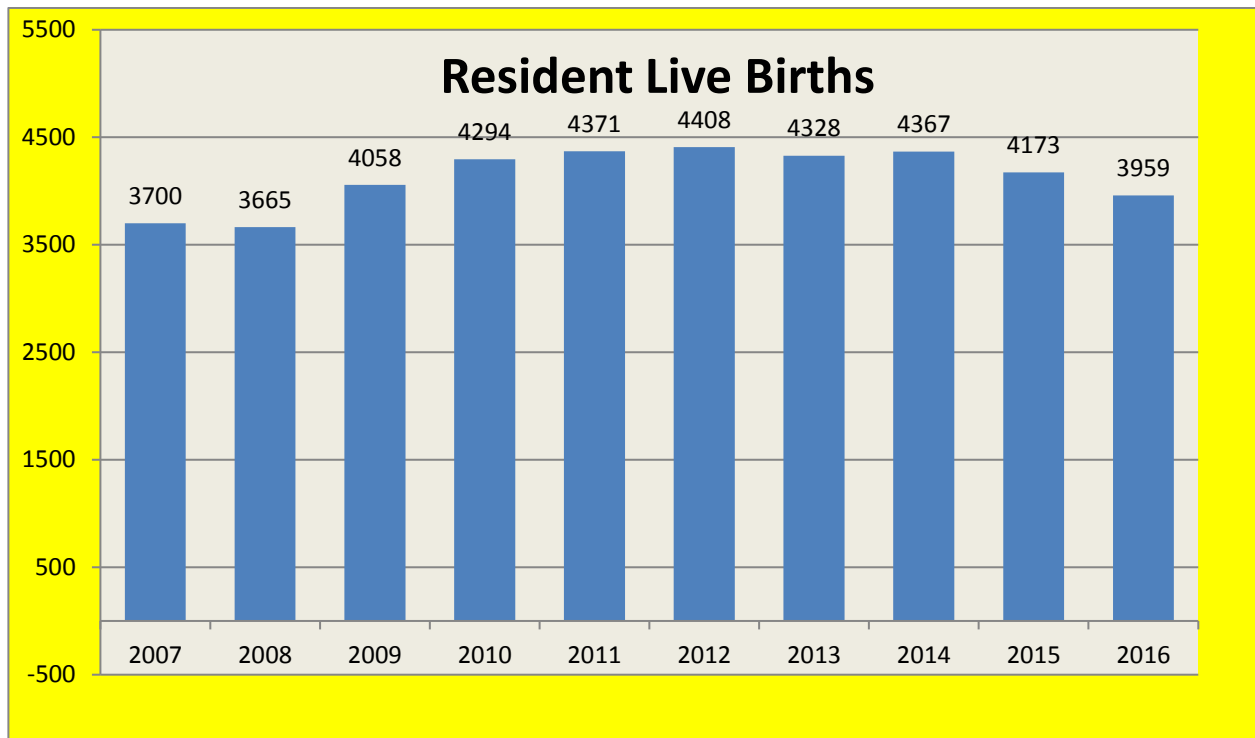


Figure 2 – Onslow County Resident Live Births (actual)

¹ We do not mean to imply that the 51.9% of K-students were the same persons who were born 5 years earlier. Many born five years ago left the county and others moved in; however, the ratio is meaning because it is used to predict future kindergarten populations.

The number of kindergarten students who will enroll in 2018-19 is, in part, a factor of the number of RLB in 2013. That year saw a decrease of almost 80 RLB over the previous year. The predicted increase in the number K-students in 2018-19 is higher than that since the RLB to kindergarten CSR is projected to increase. The projected increase for the number kindergarten students is 178. The increase declines in subsequent years with a drop in the expected number of kindergarten students in 2019-20 and again in 2021-22.

Forecasted 2027-28 K-12 totals are 29,298 students and represent an average gain of about 300 students per year over the next ten years.

The 2016-17 IPSAC forecast (version: February 1st, 2017) predicted a 2017-18 Day-40 K-12 total of 26,455, an over-projection of 22 students (less than one-tenth of one percent relative error). The magnitude of error is greater for each level. In grades K-5, the projection exceeded the actual by 180. The projection for the middle grades was under by 282, and the projection for high school was over by 123. (See Table 1) This information was used to modify the assumptions relied on as part of the current forecast.

Contrary to declining growth trends in many other districts, overall growth in Onslow County Schools has remained fairly strong since the loss in 2010-11. Because of the significant increase in the number of kindergarten students expected in 2018-19, models indicate a significant increase in K-12 students in the near-term: annual increases in the near future similar to what has occurred the past two years. Those increases are mitigated to some extent by two negative cohorts that are now moving through the system. The various models investigated for this forecast are very similar. The ten-year average growth for the six models investigated ranged from 0.72 % to 0.99%.

Level	2017 Prediction	2017 Actual	Error
Elem	13,530	13,350	-180
Mid	5,527	5,809	282
High	7,397	7,274	-123

Table 1: 2016-17 Forecast Predictions

System Forecast

Several factors can influence the membership forecast for OCS; most notably, military-related decisions about base population as well as school assignments (on-base or off-base) and, of course, the economy will also impact actual student numbers in the future.

This forecast includes only a moderate increase in RLB for 2017 and years after. All six forecast models produce fairly similar trajectories. (See Figure 3.)

It should be noted that the elementary share, as compared to the total K-12 population, remains high. For the past several years, the average percent of all K-12 OCS students who are in grades K-5 is 51%. For most districts, K-5 represents about 46% of the total K-12 population. The growth seen by OCS over the past 5-7 years has been dominated by elementary students. Clearly, the connection to younger military families can account for some of this but that is likely not the complete story.

The proportion of elementary students in the system in Onslow County (51%) is high, compared to other counties: Craven is 48%, Chatham is 45%, Harnett is 47%, Pender is 44%, and Wake is 46%.

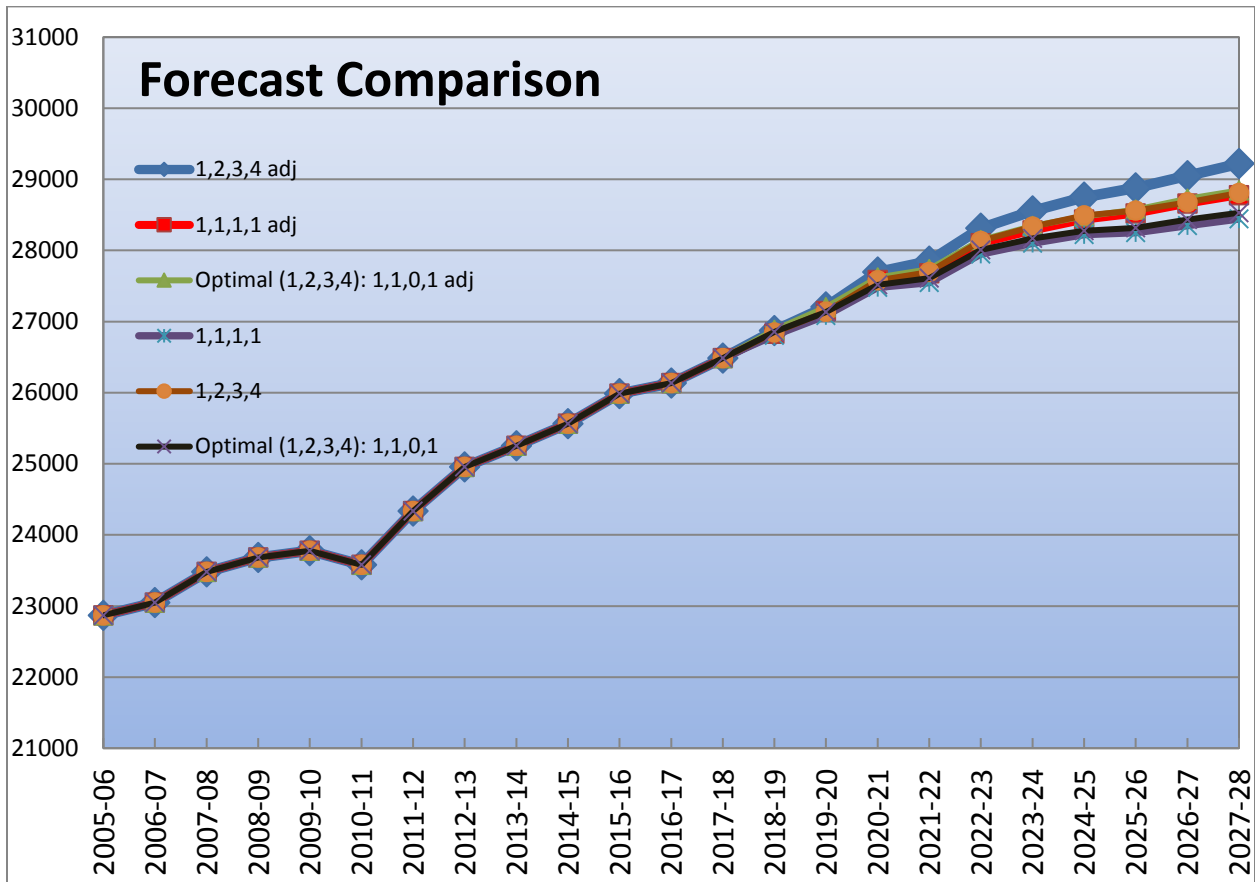


Figure 3 – Comparison of Ten-Year K-12 Forecast Models

The 2017-18 IPSAC forecast for OCS uses a weighted 1-2-3-4 model that has slight adjustments to the CSRs for middle grades (less) and for high school grades (more) in some years. It also includes an adjustment to the RLB to K CSR (higher). The forecast predicts a growth of around 2,700 K-12 students over the next ten years, an average annual growth rate of 0.99% over the next ten years – compared to a historical growth rate of 1.20%. Figure 3 shows a comparison of forecast models.

Figure 4 shows the current ten-year K-12 forecast split into K-5, 6-8, and 9-12 cohorts.

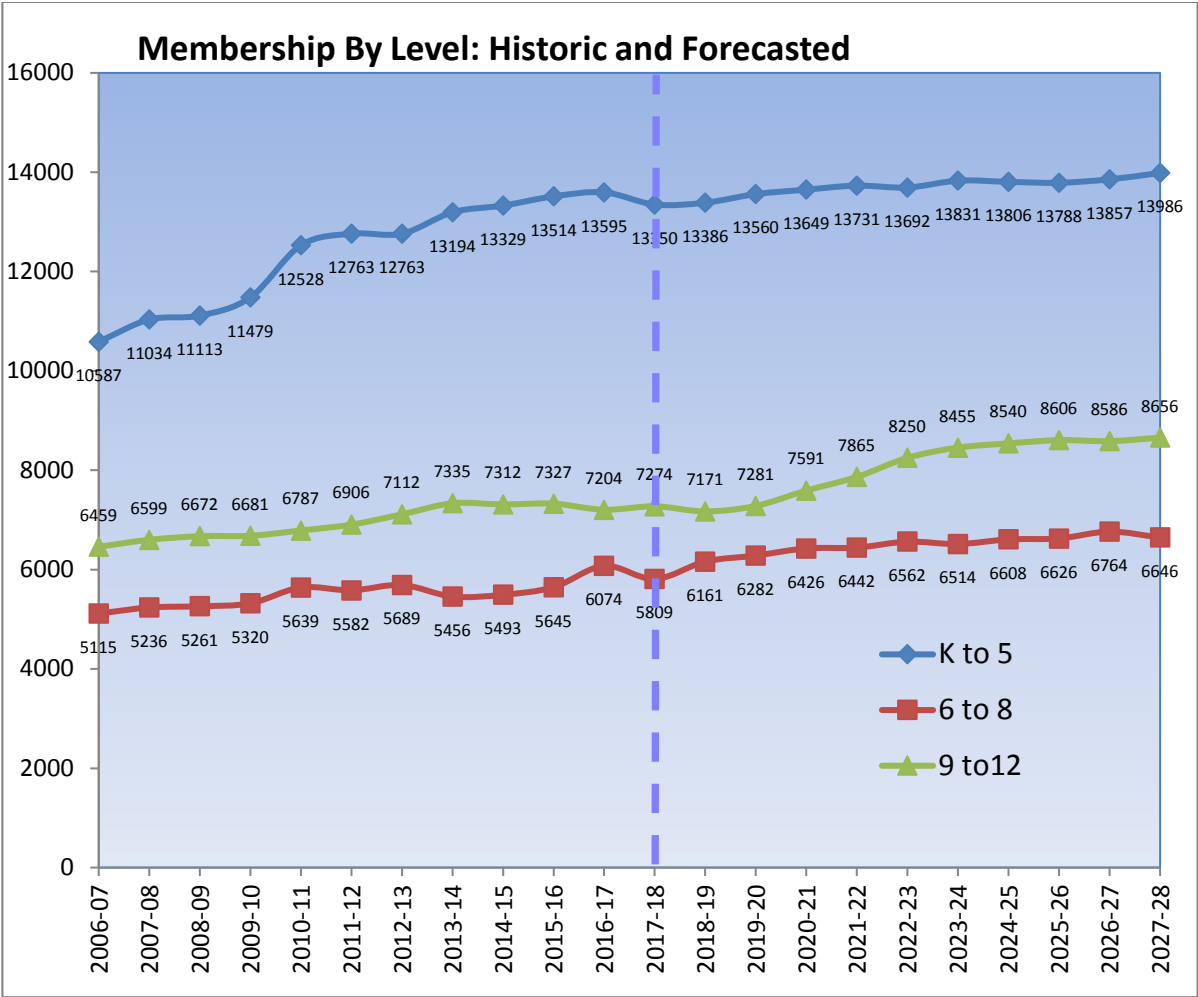


Figure 4 - Ten-Year Forecast by Level (1-2-3-4 Adjusted Forecast Model)

System Forecast - Qualifications

The military bases in and around Onslow County have a significant impact on the number of students in OCS. Although the number and percentage of students whose parents are either in the military or who work on-base has grown slightly over the past five years, more recent trends suggest a downtrend trend. Recent statistics show that 2 out of 5 K-12 students are Federally Connected. However, the impact at the three grade levels is significantly different.

Table 2 shows the percentage of students at each level whose parents either are military living off-base or civilians who work on-base. Obviously, the high percentages support the first sentence in this section. However, it is also obvious that the impact is felt more in grades K-5 than in high school.

2017-18 School Data	Military Dependent Living On or Off Base
Elementary	38.1%
Middle	32.6%
High	30.4%

Table 2: Federally Connected Students

2017-18 Out-of-Capacity Table

Annual IPSAC Updates build on a history of land use and student growth data. Data originally collected in the 2015-16 IPSAC Land Use Study has been supplemented by annual growth in student population and recent residential construction data. These data are combined to provide information on the location of growth within the district.

See Tables 4 and 5 for the 2017-18 OOC [final draft date: March 1, 2018]. Note that this Out-of-Capacity Table (OOO) is generated using the weighted 1-2-3-4 forecast model and does not include Pre-Kindergarten children that may impact a school's K-12 capacity. This table is color-coded by building utilization, allowing easy identification of disparities in utilization between schools. The capacity of each school, updated spring 2018, is used to calculate percent utilization. For the 2017-18 IPSAC Update all included building capacities reflect K-3 class size reductions implemented by the adoption of North Carolina HB90.

Month-2 data from NC-DPI indicates that 13 of the elementary schools, three middle schools, and zero high schools are over capacity (>100% utilization). The short-term forecast indicates this situation will continue. In fact, several elementary schools have a 2017-18 month-2 ADM that is more than 35% above the capacity: Carolina Forest ES, Dixon ES, Heritage ES of Richlands, ~~Richlands ES~~, and Southwest ES.

The County has projects planned that will impact the capacities of several schools. Tables 4 and 5 are OOCs showing the color-coded utilization projections based on current and planned capacity changes through the 2023-24 school year. OCS is working in conjunction with Onslow County to continue the joint education funding agreement to build additional schools over the foreseeable future.

At the elementary level, two new schools are planned to open in the next decade. Those two schools should decrease the stress in the west central area and in the southern area.

Three middle schools have planned increases in capacity. As population trends change, it may be beneficial to look at the attendance zones in order to balance utilization.

Note: Table 4 and Table 5 are included herein but have also been provided as separate Excel documents so that they can be shared as well as read more easily.

Respectfully Submitted,

OREd @ ITRE, NCSU Centennial Campus

Onslow County Schools

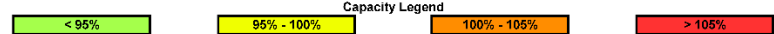
Out-of-Capacity Table (Campus Capacity with Mobile Classrooms)

W/ Passage of HB90

1. 2017-18 Month-2 ADM from NC-DPI.
2. CSR projection uses 1-2-3-4 weighting with adjustments. Mean annual growth: 1.03%
3. 2017-18 Planning Segment level AOG based on 2015 Land Use Study.
4. Elementary School Capacity based on SS classroom projection tables and existing mobile classroom utilization

Best Practices Using 95%, 97%, and 100% @ E, M, H

	Capacities								Month-2 2017-18	Month-2 Membership Forecast									
	2018-19	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28		2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Elementary																			
Bell Fork ES	673	605	605	605	605	605	605	605	652	673	694	704	710	703	696	687	677	680	675
Blue Creek ES	760	669	669	669	669	669	669	669	461	456	454	458	457	456	464	466	468	469	471
Carolina Forest ES	886	783	783	783	783	783	783	783	893	899	899	900	897	895	897	894	896	900	920
Clyde Erwin (magnet)	563	506	506	506	506	506	506	506	438	426	421	424	428	437	439	441	441	442	440
Dixon ES (K-4)	1034	922	922	922	922	922	922	922	992	1041	1157	1142	1139	1131	1117	1100	1091	1101	1120
Hunters Creek ES	817	734	734	734	734	734	734	734	619	623	622	630	625	624	631	629	629	633	638
Jacksonville Commons ES	817	734	734	734	734	734	734	734	695	699	700	704	706	699	704	705	706	706	701
Meadow View ES	798	719	719	719	719	719	719	719	704	693	680	688	692	692	706	710	714	716	720
Morton ES	886	783	783	783	783	783	783	783	667	694	722	746	759	744	747	737	727	731	730
Northwoods ES	807	556	556	556	556	556	556	556	461	464	454	457	455	460	460	462	463	464	462
Parkwood ES	698	920	920	920	920	920	920	920	536	525	530	531	529	531	532	536	537	539	537
Queens Creek ES	836	750	750	750	750	750	750	750	627	629	634	642	648	652	663	658	657	662	677
Richlands Primary/Heritage Elementary	1009	850	850	850	850	850	850	850	855	862	863	865	875	872	874	877	875	877	880
Richlands Elem	971	874	874	874	874	874	874	874	862	843	869	841	838	825	849	860	868	871	877
Sand Ridge ES	873	605	605	605	605	605	605	605	618	624	644	659	666	658	670	671	654	654	641
Silverdale ES	635	563	563	563	563	563	563	563	454	493	496	496	531	524	563	548	539	547	571
Southwest ES	943	825	825	825	825	825	825	825	829	833	830	850	860	859	857	854	853	859	873
Stateside ES	741	652	652	652	652	652	652	652	754	719	708	713	717	726	741	746	756	761	786
Summersill ES	861	766	766	766	766	766	766	766	598	596	588	596	599	600	604	605	605	607	604
Swansboro ES	698	620	620	620	620	620	620	620	635	644	645	646	648	645	649	650	654	658	673
Stump Sound Area ES (2021-22)		800	800	800	800	800	800	800											
Catherine Lake Area ES (2023-24)			800	800	800	800	800	800											
Totals	15906	15236	16036	16036	16036	16036	16036	16036	13350	13434	13608	13691	13779	13732	13863	13836	13808	13877	13996
Middle																			
Dixon MS (5-8)	1003	1003	1003	1003	1003	1003	1003	1003	855	828	825	851	883	910	932	971	991	1013	1047
Hunters Creek MS	827	827	827	827	827	827	827	827	698	761	816	886	910	958	948	975	967	1018	1027
Jacksonville Commons MS	827	827	827	827	827	827	827	827	986	1058	1060	1071	1060	1065	1062	1052	1048	1063	1029
New Bridge (magnet)	504	504	504	504	504	504	504	504	483	503	502	504	493	488	487	484	485	487	435
Northwoods Park MS	695	695	695	695	900	900	900	900	631	675	680	636	630	635	639	650	662	672	650
Southwest MS	618	618	618	618	618	618	618	618	563	583	578	555	563	582	585	602	614	625	610
Swansboro MS	912	912	912	912	912	912	912	912	835	900	935	975	984	992	969	976	967	981	975
Trexler MS	926	926	926	926	926	926	926	926	758	853	885	948	918	933	902	900	891	905	873
Totals	6310	6310	6310	6310	6310	6310	6310	6310	5809	6161	6282	6426	6442	6562	6514	6608	6626	6764	6546
High																			
Dixon HS	1146	1146	1146	1146	1146	1146	1146	1146	914	904	928	996	1022	1099	1151	1158	1177	1182	1198
Jacksonville HS	1510	1510	1510	1510	1510	1510	1510	1510	1281	1278	1296	1347	1389	1411	1401	1382	1370	1365	1369
Northside HS	1259	1259	1259	1259	1259	1259	1259	1259	1184	1211	1328	1431	1539	1564	1538	1515	1482	1476	1449
Richlands HS	1064	1064	1064	1064	1064	1064	1064	1064	912	887	869	875	964	1008	1038	1059	1059	1053	1054
Southwest HS	1032	1032	1032	1032	1032	1032	1032	1032	776	738	743	764	750	772	774	773	790	782	801
Swansboro HS	1322	1322	1322	1322	1322	1322	1322	1322	1126	1095	1097	1155	1158	1231	1278	1285	1298	1298	1295
White Oak HS	1427	1427	1427	1427	1427	1427	1427	1427	1081	1057	1019	1024	1043	1166	1275	1368	1430	1431	1490
Totals	8760	8760	8760	8760	8760	8760	8760	8760	7274	7171	7281	7591	7865	8250	8455	8540	8606	8586	8656
Midwest School (2025-26)																			
Central School (2027-28)																			
System Totals	30877	30007	30607	30607	30607	30607	30607	30607	26433	26766	27170	27708	28085	28544	28831	28985	29041	29227	29298



Operations Research and Education Laboratory
Institute for Transportation Research and Education
North Carolina State University

March 22, 2018

Table 4 – 2017-18 OOC

Onslow County Schools

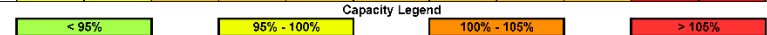
Out-of-Capacity Table (Operational Capacity with no Mobile Classrooms)

W/ Passage of HB90

1. 2017-18 Month-2 ADM from NC-DPI.
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3. 2017-18 Planning Segment level AOG based on 2015 Land Use Study.
4. Elementary School Capacity based on SS classroom projection tables

Best Practices Using 95%, 97%, and 100% @ E, M, H

	Capacities										Month-2 Membership Forecast											
	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	
Elementary																						
Bell Fork ES	607	587	567	546	546	546	546	546	546	546	652	673	694	704	710	703	696	687	677	680	675	
Blue Creek ES	607	587	567	546	546	546	546	546	546	546	461	456	454	458	457	456	464	466	468	469	471	
Carolina Forest ES	654	632	610	589	589	589	589	589	589	589	893	899	899	900	897	895	897	894	896	900	920	
Clyde Erwin (magnet)	443	429	415	392	392	392	392	392	392	392	438	426	421	424	428	437	439	441	441	442	440	
Dixon ES (K-4)	760	736	711	669	669	669	669	669	669	669	992	1041	1157	1142	1139	1131	1117	1100	1091	1101	1120	
Hunters Creek ES	673	650	627	605	605	605	605	605	605	605	619	623	622	630	625	624	631	629	629	633	638	
Jacksonville Commons ES	673	650	627	605	605	605	605	605	605	605	695	699	700	704	706	699	704	705	705	706	701	
Meadow View ES	741	718	694	652	652	652	652	652	652	652	704	693	680	688	688	692	706	710	714	716	720	
Morton ES	698	668	645	620	620	620	620	620	620	620	667	694	722	746	759	744	747	737	727	731	730	
Northwoods ES	462	447	432	417	417	417	417	417	417	417	461	464	454	457	455	460	460	462	463	464	462	
Parkwood ES	500	483	466	448	448	448	448	448	448	448	536	525	530	531	529	531	532	536	537	539	537	
Queens Creek ES	722	693	669	636	636	636	636	636	636	636	627	629	634	642	648	652	663	658	657	662	677	
Richlands Primary/Heritage Elementary	654	632	610	589	589	589	589	589	589	589	855	862	863	865	875	872	874	877	875	877	880	
Richlands Elem	971	939	907	874	874	874	874	874	874	874	862	843	869	841	838	825	849	860	868	871	877	
Sand Ridge ES	654	632	610	589	589	589	589	589	589	589	618	624	644	659	666	658	670	671	654	654	641	
Silverdale ES	538	519	500	481	481	481	481	481	481	481	454	493	496	496	531	524	563	548	539	547	571	
Southwest ES	673	640	627	605	605	605	605	605	605	605	829	833	830	850	860	859	857	854	853	859	873	
Stateside ES	698	668	645	620	620	620	620	620	620	620	754	719	708	713	717	726	741	746	756	761	786	
Summersill ES	673	650	627	605	605	605	605	605	605	605	598	596	588	596	599	600	604	605	605	607	604	
Swansboro ES	607	587	567	546	546	546	546	546	546	546	635	644	645	646	648	645	649	650	654	658	673	
West Central Area ES (2021-22)				800	800	800	800	800	800	800												
Southern Area ES (2023-24)					800	800	800	800	800	800												
Totals	13008	12547	12393	12393	13193	13193	13193	13193	13193	13193	13350	13434	13608	13691	13779	13732	13863	13836	13808	13877	13996	
Middle																						
Dixon MS (5-8)	1003	1003	1003	1003	1003	1003	1003	1003	1003	1003	855	828	825	851	883	910	932	971	991	1013	1047	
Hunters Creek MS	827	827	827	827	827	827	827	827	827	827	698	761	816	885	910	958	948	975	967	1018	1027	
Jacksonville Commons MS	827	827	827	827	827	827	827	827	827	827	986	1058	1060	1071	1060	1065	1052	1062	1048	1063	1029	
New Bridge (magnet)	504	504	504	504	504	504	504	504	504	504	483	503	502	504	493	488	487	484	485	487	435	
Northwoods Park MS	695	695	695	695	695	900	900	900	900	900	631	675	680	636	630	635	639	650	662	672	650	
Southwest MS	518	518	518	518	518	518	518	518	518	518	563	583	578	555	563	582	585	602	614	625	610	
Swansboro MS	912	912	912	912	912	912	912	912	912	912	835	900	935	975	984	992	969	976	967	981	975	
Trexter MS	866	866	866	866	866	866	866	866	866	866	758	853	885	948	918	933	902	900	891	905	873	
Totals	6152	6152	6152	6152	6152	6152	6357	6357	6357	6357	5809	6161	6282	6426	6442	6562	6514	6608	6626	6764	6646	
High																						
Dixon HS	1046	1046	1046	1046	1046	1046	1046	1046	1046	1046	914	904	928	996	1022	1099	1151	1158	1177	1182	1198	
Jacksonville HS	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	1281	1278	1296	1347	1389	1411	1401	1382	1370	1365	1369	
Northside HS	1195	1195	1195	1195	1195	1195	1195	1195	1195	1195	1184	1211	1328	1431	1539	1564	1538	1515	1482	1476	1449	
Richlands HS	944	944	944	944	944	944	944	944	944	944	912	887	869	875	964	1008	1038	1059	1053	1053	1054	
Southwest HS	1032	1032	1032	1032	1032	1032	1032	1032	1032	1032	776	738	743	764	750	772	774	773	790	782	801	
Swansboro HS	1262	1262	1262	1262	1262	1262	1262	1262	1262	1262	1126	1095	1097	1155	1158	1231	1278	1285	1298	1298	1295	
White Oak HS	1327	1327	1327	1327	1327	1327	1327	1327	1327	1327	1081	1057	1019	1024	1043	1166	1275	1368	1430	1431	1490	
Totals	8256	8256	8256	8256	8256	8256	8256	8256	8256	8256	7274	7171	7281	7591	7865	8250	8455	8540	8606	8586	8656	
Midwest School (2025-26)																						
Central School (2027-28)																						
System Totals	27416	26955	26801	26801	27601	27601	27806	27806	27806	27806	26433	26766	27170	27708	28085	28544	28831	28985	29041	29227	29298	



March 22, 2018

Table 5 – 2017-18 OOC

Operations Research and Education Laboratory
 Institute for Transportation Research and Education
 North Carolina State University