

Operations Research and Education Laboratory

2015-16 IPSAC Update Report

Onslow County Schools



OREd, ITRE @ NCSU Centennial Campus
www.itre.ncsu.edu
February 11, 2016

Overview

This document serves as a summary of findings from the 2015-16 Integrated Planning for School and Community (IPSAC) Update conducted by the Operations Research and Education Laboratory (OREd) for the Onslow County Schools (OCS). Please refer to the accompanying Out-of-Capacity table [see page 7, OOC final draft date: February 11, 2016].

Data Summary:

2015-16 OCS Month-2 Membership (preliminary)

2004 – 2014 Resident Live Births (Onslow County)

DPI Month-2 ADM Data

Building Capacities: supplied by OCS and Smith-Sinnett Architects, updated March 2015

Membership History

The 2015-16 Month-2 K-12 Average Daily Membership (ADM) for OCS is 25,985, representing an increase of 421 students over 2014-15. In the last five years, since the decrease in 2010-11, OCS has seen significant growth – paralleling the growth experienced in the pre-recession years. Since 2010-11, Month-2 K-12 ADM has increased by 2407 students representing an average annual growth rate of about 2% or about 500 students per year. Growth the past two years has averaged 367 students per year. (See Figure 1.)

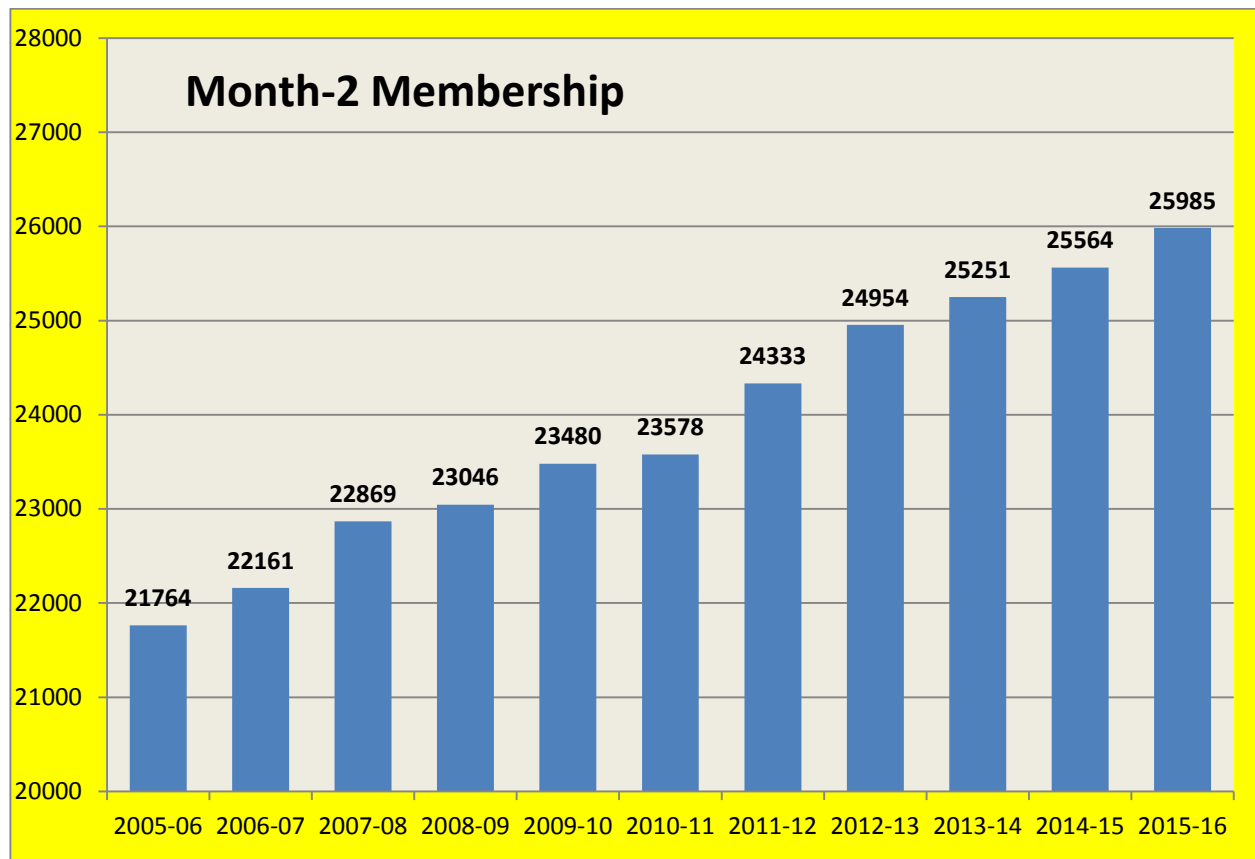


Figure 1 – Onslow County Schools Month-2 Membership

County resident live births (RLB) reported for 2014 was 4367 – an increase from 2013 – after a slight dip in 2013. (See Figure 2.) In the last five years, 2010-2014, the average number of RLB is about 4350 live births per year. Many counties in NC experienced a decline in RLB between the years 2010 and 2013. Onslow County had not seen an actual decrease in RLB since 2005, until 2013. This forecast projects RLB to continue to increase gradually. Figure 2 shows historic county resident live births over the 16-year period 1999 – 2014 and projected RLB for six additional years.

The number of RLB is a primary indicator of the number of K-students five years later¹. The historical RLB to kindergarten cohort survival ratio was basically flat, averaging about 0.640 for the 2007-08 to 2013-14 period (excluding school year 2009-10). However, the ratio dropped to 0.585 for 2014-15 and to 0.551 this year; meaning that only 55.1% of the 4294 RLB in 2010 appeared in K in 2015-16². OREd considered this decrease in the RLB-K cohort a trend and modified the model appropriately.

That ratio is somewhat low (compared to other districts of like size) and is probably 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. This is not the case for many other school districts in NC.

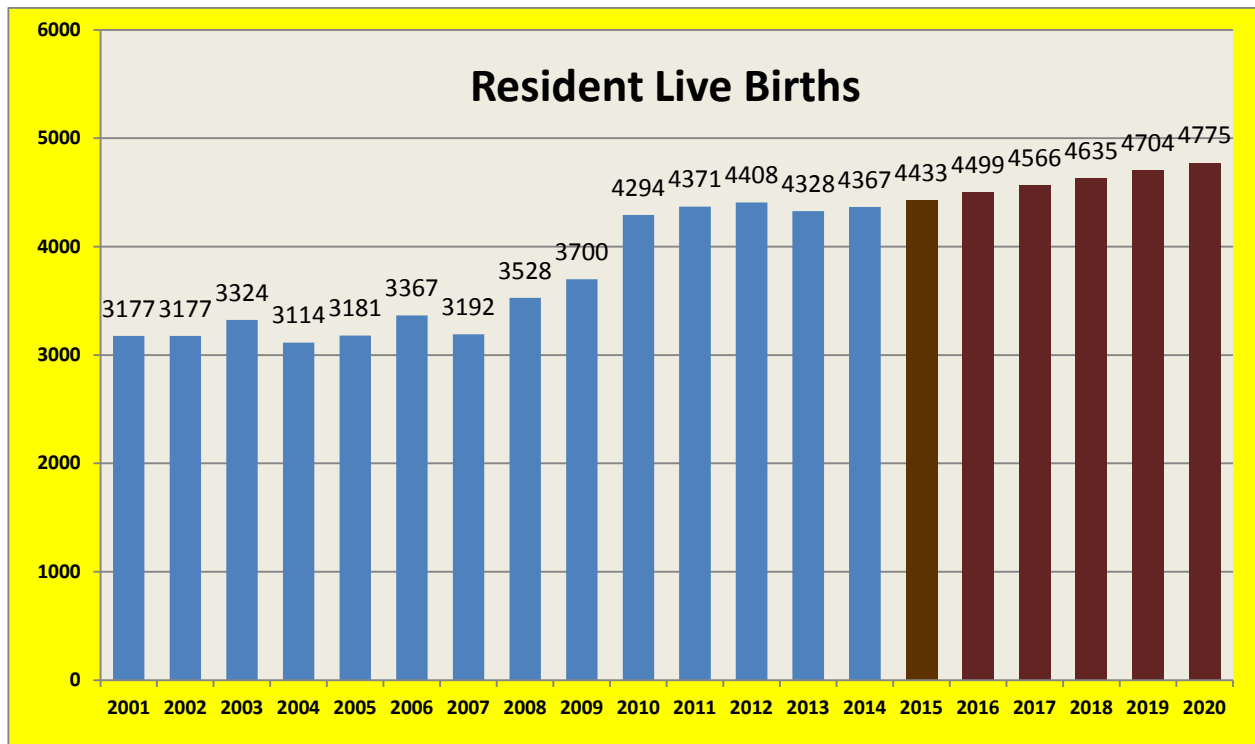


Figure 2 – Onslow County Resident Live Births (actual and predicted)

¹ The degree of linear association between RLB-5 and the number of K-students in Onslow County was historically high. However, in the past two years, this association has not been as strong.

² We do not mean to imply that the 58.5% 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. The ratio is what is important and is used to predict future K-numbers. See the Appendix for additional information.

The number of K-students who will enroll in 2016-17 is, in part, a factor of the number of RLB in 2011. That year saw an increase of almost 80 RLB over the previous year. The predicted increase in the number K-students in 2016-17 is higher than that since the RLB to K CSR is projected to increase. The projected increase for the number K-students is 125. The increase declines in subsequent years until there is a drop in the expected number of K-students in 2018-19 and again in 2019-20.

Forecasted 2025-26 K-12 totals are 30,068 students and represent an average gain of about 400 students per year over the next ten years.

The 2014-15 IPSAC forecast (version: 20150408) predicted a 2015-16 Day-40 K-12 total of 25,926, an under-projection of 41 students (less than one-quarter of one percent relative error). The magnitude of error is greater for each level. In grades K-5, the projection came up 123 short. The projection for the middle grades was over by 66, and the projection for high school was short by 13. (See Table 1) This information was used to modify 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 K-students expected in 2016-17 and in 2017-18, 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 1.43% to 1.55%.

Level	2015 Prediction	2015 Actual	Delta
Elem	13,071	13,194	-123
Mid	5532	5456	66
High	7322	7335	-13

Table 1: 2014-15 Forecast Predictions

System Forecast

Several factors can influence the membership forecast for OCS; most notably, the negative growth cohort appearing in the elementary level in 2010-11 and now moving through the middle level. This cohort is the major factor that caused such a significant decline in grades 6-8 for 2015-16. This cohort will reach grade 9 in two years. 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 2015 and years after. All six forecast models produce 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 50%. For most districts, K-5 represents about 46% of the total K-12 population. The growth seen by OCS over the past 5 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 (50%) is high, compared to other counties: Craven is 48.5%, Chatham is 47%, Harnett is 47%, Pender is 44%, and Wake is 48%.

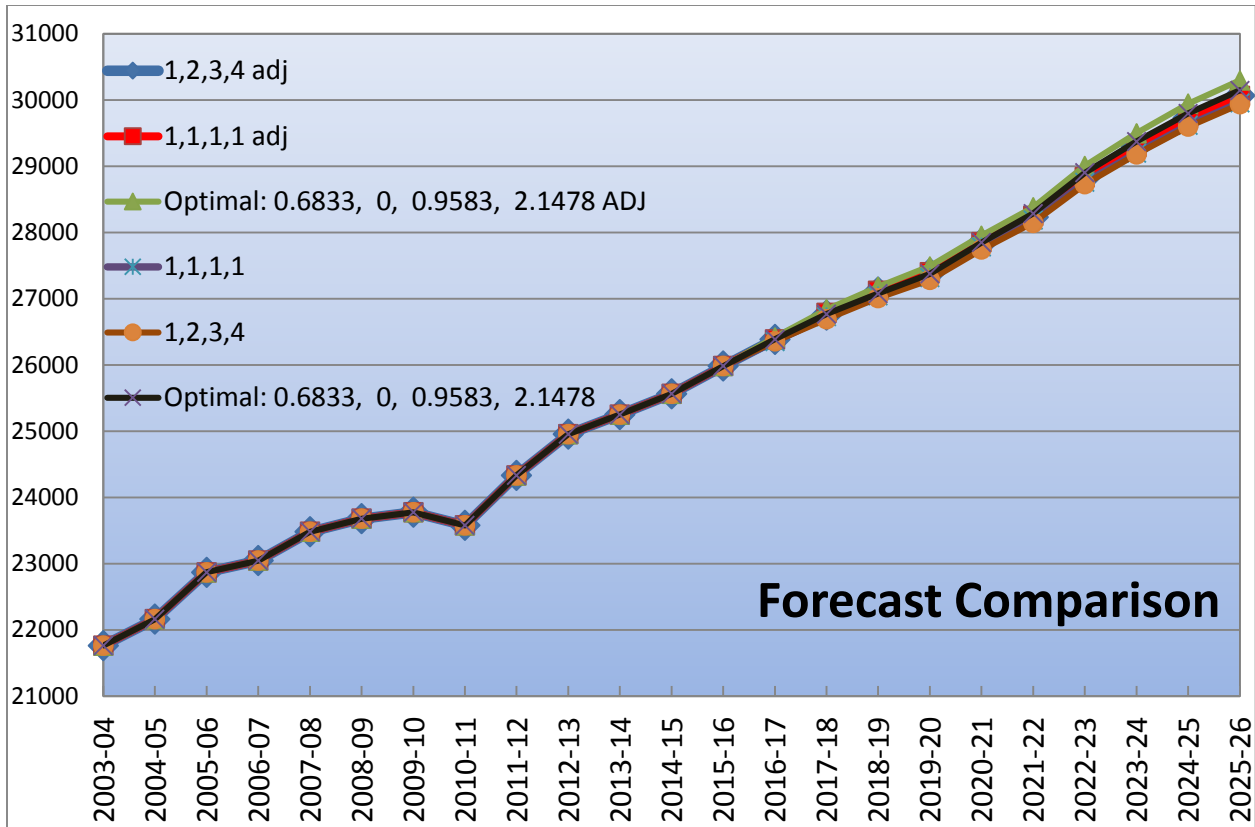


Figure 3 – Comparison of Ten-Year K-12 Forecast Models

The 2015-16 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 (lower). The forecast predicts a growth of around 4,100 K-12 students over the next ten years, an average annual growth rate of 1.47% over the next ten years – compared to a historical growth rate of 1.97%. 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.

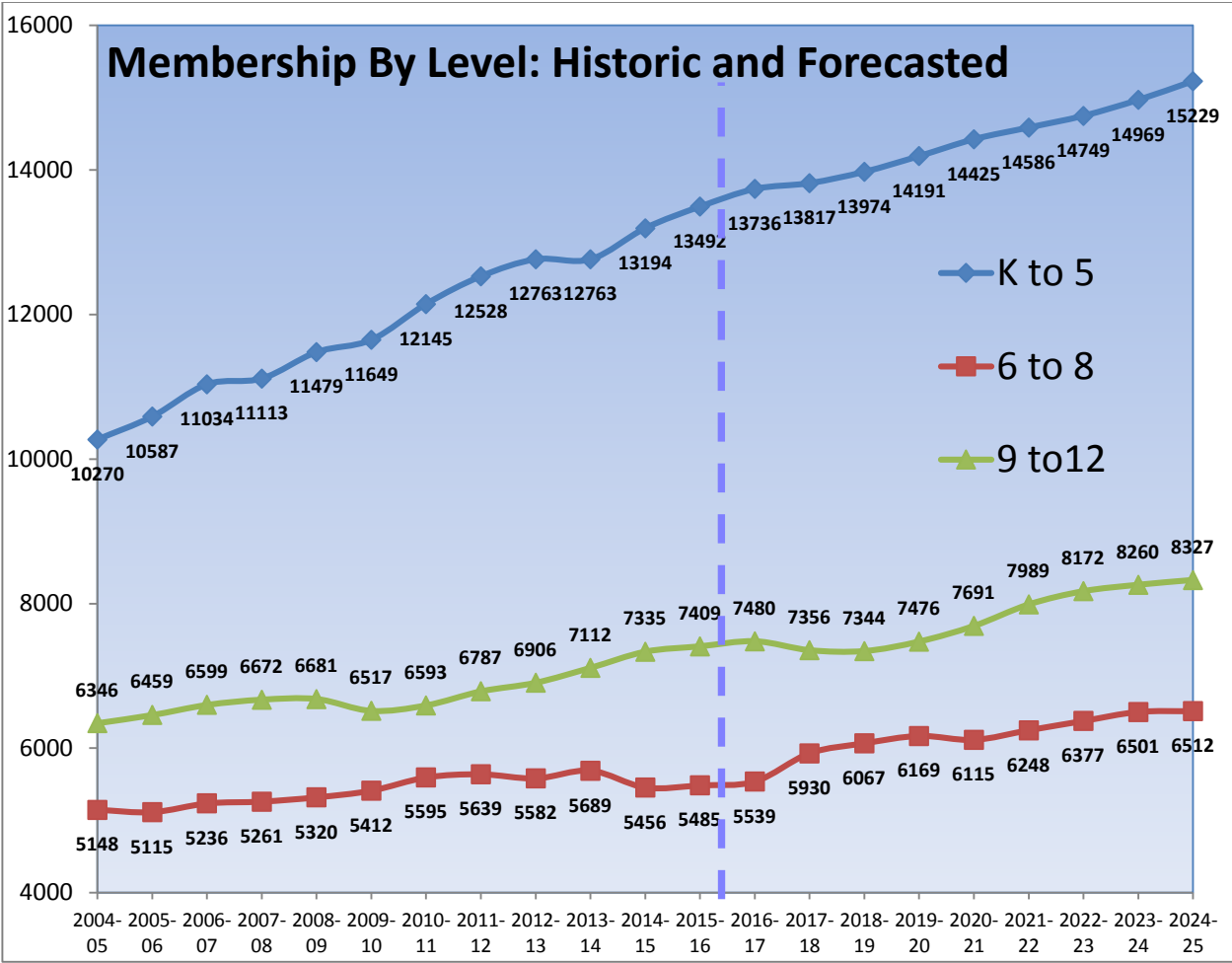


Figure 4 - Ten-Year Forecast by Level (1-2-3-4 Adjusted Forecast Model)

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-8 than in high school.

2013-14 School Data	Military Dependent Living Off-Base	Civilian Dependent Working On-Base
Elementary	36%	10%
Middle	27%	14%
High	20%	17%

Table 2: Off-base

This fact may help to explain the high proportion of students in OCS who are in grades K-5 (about 50%). Typically, this percentage is around 45-46% for most systems and this percentage was 46% for OCS in 2008-09. With this in mind, any conversation about changes to the status quo at military bases should be of concern to Onslow County Schools and will be problematic to forecasters. In particular, any changes in the size of the military bases around Onslow County would likely affect the membership of elementary schools the most. The uncertainty around military impact is the reason the conservative model was chosen for the current membership forecast.

It should be noted that military impact is not the only factor contributing to growth in Onslow County. As a case in point, OCS experienced a net decrease of 260 in the number of Federally Connected students in 2013-14 – from a total of 11,015 in 2012-13 to 10,755 in 2013-14. But as mentioned above, OCS saw an overall rise of 307 K-12 students according to Month-2 ADM data. (See Figure 5.)

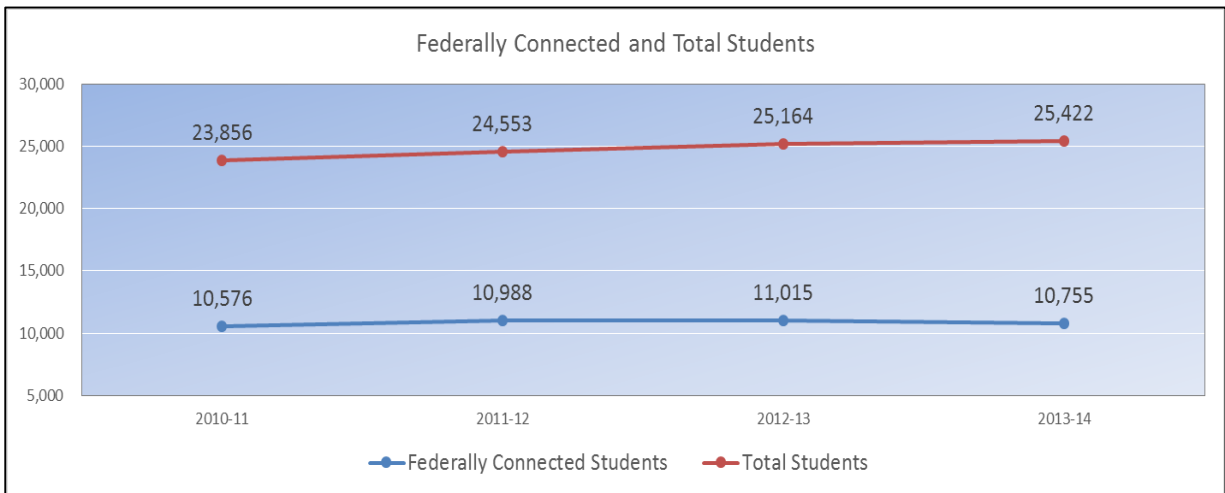


Figure 5 - Tracking Federally Connected Students

2015-16 Out-of-Capacity Table

Annual IPSAC Updates build on a history of land use and student growth data. Data originally collected in the 2011-12 IPSAC Land Use Study has been supplemented by annual growth in student population and recent residential construction data and a full IPSAC Update was conducted in the spring of 2015. These data are combined to provide information on the location of growth within the district.

See Tables 4 and 5 for the 2015-16 OOC [final draft date: February 11, 2016]. Note that this Out-of-Capacity Table (OOC) 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 2015, is used to calculate percent utilization.

Month-2 data from OCS indicates that 13 of the elementary schools, five middle schools, and three high schools are over capacity (>100% utilization). The short-term forecast indicates this situation will continue. In fact, several schools have a 2015-16 M-2 ADM that is more than 24% above the capacity: Carolina Forest ES, Dixon ES, Richlands Prim, and Dixon HS.

The County has projects planned that will impact the capacity of several schools. Table 5 is an OOC showing the color-coded projections, as in Table 4. However, Table 5 includes updates to planned capacities through 2025-26.

At the elementary level, Table 5 shows 3 schools will have larger capacity. 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.

Only at Dixon HS are there plans now for more capacity at the high school level.

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.

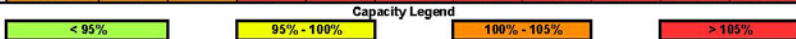
Respectfully Submitted,

Michael Miller, Program Manager
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Onslow County Schools Out-of-Capacity Table (Campus Capacity including Mobile Classrooms)

1. 2015-16 Month-2 ADM from OCS data.
2. CSR projection uses 1-2-3-4 weighting with adjustments. Mean annual growth: 1.47%
3. 2015-16 Planning Segment level AOG based on 2015 Land Use Study.
4. Campus capacities provided by S-S/OCS (Updated February 2016).

	Capacities	Month-2 Membership Forecast										
	2015-16	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
Elementary												
Bell Fork ES	717	639	660	668	671	674	661	647	650	653	657	664
Blue Creek ES	746	463	464	479	480	486	495	502	507	510	514	519
Carolina Forest ES	900	853	896	936	937	944	953	964	973	982	997	1016
Clyde Erwin (magnet)	500	527	504	512	511	512	506	508	508	509	509	510
Dixon ES	980	1005	1096	1105	1121	1147	1184	1223	1250	1277	1314	1357
Hunters Creek ES	716	571	577	588	596	602	611	621	628	635	646	659
Jacksonville Commons ES	836	690	691	692	691	687	689	692	692	693	694	695
Meadow View ES	825	785	799	797	800	809	819	829	835	840	847	854
Morton ES	820	624	618	618	623	639	665	694	712	729	747	766
Northwoods ES	500	471	473	470	469	470	472	474	474	475	475	476
Parkwood ES	662	546	544	532	529	532	534	536	537	538	539	539
Queens Creek ES	776	709	745	766	782	797	818	840	853	867	885	906
Richlands Prim (K-2)	717	876	901	907	917	938	963	984	996	1001	1008	1015
Richlands Elem (3-5)	754	783	844	875	873	874	875	877	877	883	890	897
Sand Ridge ES	665	478	501	527	535	537	540	542	542	543	544	545
Silverdale ES	562	446	445	448	457	481	513	548	573	598	634	675
Southwest ES	896	777	818	820	832	848	859	870	879	888	902	921
Stateside ES	746	749	746	764	758	745	761	779	792	807	827	852
Summersill ES	880	602	609	623	622	625	627	630	631	632	634	635
Swansboro ES	646	600	594	607	612	626	645	664	678	691	708	728
<i>West Central Area ES (2021-22)</i>												
<i>Southern Area ES (2023-24)</i>												
Totals	14844	13194	13492	13736	13817	13974	14191	14425	14586	14750	14970	15230
Middle												
Dixon MS	619	657	632	639	715	742	762	755	781	807	833	836
Hunters Creek MS	926	771	776	779	876	918	952	946	997	1049	1099	1104
Jacksonville Commons MS	828	880	887	885	912	921	928	921	932	943	954	955
New Bridge (magnet)	500	503	513	508	508	508	508	502	502	502	502	502
Northwoods Park MS	715	589	598	608	629	637	643	636	644	652	661	661
Southwest MS	618	531	533	559	598	610	618	611	620	627	635	635
Swansboro MS	912	795	806	814	879	900	915	909	926	941	955	956
Trexler MS	810	730	741	747	812	831	843	837	847	856	863	863
<i>Midwest School (2025-26)</i>												
Totals	5926	5456	5485	5539	5930	6067	6169	6115	6248	6377	6501	6512
High												
Dixon HS	790	856	875	885	860	859	867	909	968	1005	1024	1038
Jacksonville HS	1470	1375	1387	1396	1408	1405	1442	1455	1473	1485	1491	1496
Northside HS	1105	1166	1189	1188	1145	1141	1183	1198	1220	1236	1244	1250
Richlands HS	1030	1026	1029	1037	1024	1023	1044	1062	1084	1095	1099	1103
Southwest HS	950	745	777	801	814	812	827	844	865	877	883	887
Swansboro HS	1230	1112	1105	1113	1082	1081	1088	1118	1156	1178	1188	1195
White Oak HS	1345	1055	1049	1060	1023	1023	1025	1106	1222	1296	1331	1359
Totals	7920	7335	7409	7480	7356	7344	7476	7691	7989	8172	8260	8327
System Totals	28690	25985	26387	26755	27102	27385	27836	28231	28824	29299	29731	30069



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North Carolina State University

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Table 4 – 2015-16 OOC

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

1. 2015-16 Month-2 ADM from OCS data.
2. CSR projection uses 1-2-3-4 weighting with adjustments. Mean annual growth: 1.47%
3. 2015-16 Planning Segment level AOG based on 2015 Land Use Study.
4. Operational capacities provided by S-S/OCS (Updated February 2016).

	Capacities						Month-2	Month-2 Membership Forecast									
	2015-16	2017-18	2019-20	2021-22	2023-24	2024-25	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26
Elementary																	
Bell Fork ES	637	637	637	637	637	637	639	660	668	671	674	661	647	650	653	657	664
Blue Creek ES	626	626	626	626	626	626	463	464	479	480	486	495	502	507	510	514	519
Carolina Forest ES	680	680	680	680	680	680	853	896	936	937	944	953	964	973	982	997	1016
Clyde Erwin (magnet)	500	500	500	500	500	500	527	504	512	511	512	506	508	508	509	509	510
Dixon ES	720	720	720	720	720	720	1005	1066	1105	1121	1147	1184	1223	1250	1277	1314	1357
Hunters Creek ES	656	656	656	656	656	656	571	577	588	596	602	611	621	628	635	646	659
Jacksonville Commons ES	656	656	656	656	656	656	690	691	692	691	687	689	692	692	693	694	695
Meadow View ES	765	765	765	765	765	765	785	799	797	800	809	819	829	835	840	847	854
Morton ES	680	680	680	680	680	680	624	618	618	623	639	665	694	712	729	747	766
Northwoods ES	500	500	500	500	500	500	471	473	470	469	470	472	474	474	475	475	476
Parkwood ES	522	522	522	522	522	522	546	544	532	529	532	534	536	537	538	539	539
Queens Creek ES	656	656	656	656	656	656	709	745	766	782	797	818	840	853	867	885	908
Richlands Prim (K-2)	637	637	680	680	680	680	876	901	907	917	938	963	984	996	1001	1008	1015
Richlands Elem (3-5)	654	654	760	760	760	760	783	844	875	873	874	875	877	877	883	890	897
Sand Ridge ES	665	665	665	665	665	665	478	501	527	535	537	540	542	542	543	544	545
Silverdale ES	522	522	522	522	522	522	446	445	448	457	481	513	546	573	598	634	675
Southwest ES	636	636	636	636	636	636	777	818	820	832	848	859	870	879	888	902	921
Stateside ES	746	746	746	746	746	746	749	746	764	758	745	761	779	792	807	827	852
Summersill ES	720	720	720	720	720	720	602	609	623	622	625	627	630	631	632	634	635
Swansboro ES	586	586	586	586	586	586	600	584	607	612	626	645	664	678	691	708	728
West Central Area ES (2021-22)				600	600	600											
Southern Area ES (2023-24)				600	600	600											
Totals	12764	12764	12913	13513	14113	14113	13194	13492	13736	13817	13974	14191	14425	14586	14750	14970	15230
Middle																	
Dixon MS	599	1003	1003	1003	1003	1003	857	832	639	715	742	762	755	781	807	833	836
Hunters Creek MS	826	826	826	826	826	826	771	776	779	876	918	952	946	997	1049	1099	1104
Jacksonville Commons MS	826	826	826	826	826	826	880	887	885	912	921	926	921	932	943	954	955
New Bridge (magnet)	500	500	500	500	500	500	503	513	508	508	508	508	502	502	502	502	502
Northwoods Park MS	695	695	695	695	695	900	589	598	608	629	637	643	636	644	652	661	661
Southwest MS	518	518	518	518	518	518	531	533	559	598	610	618	611	620	627	635	635
Swansboro MS	912	912	912	912	912	912	795	806	814	879	900	915	909	926	941	955	956
Trexler MS	710	710	866	866	866	866	730	741	747	812	831	843	837	847	856	863	863
<i>Midwest School (2025-26)</i>																	
Totals	5586	5990	6146	6146	6146	6351	5456	5485	5539	5930	6067	6169	6115	6248	6377	6501	6512
High																	
Dixon HS	690	1030	1030	1030	1030	1030	856	875	885	860	859	867	909	968	1005	1024	1038
Jacksonville HS	1390	1390	1390	1390	1390	1390	1375	1387	1396	1408	1405	1442	1455	1473	1485	1491	1496
Northside HS	1105	1105	1105	1105	1105	1105	1166	1189	1188	1145	1141	1183	1198	1220	1236	1244	1250
Richlands HS	870	870	870	870	870	870	1026	1029	1037	1024	1023	1044	1062	1084	1095	1099	1103
Southwest HS	950	950	950	950	950	950	745	777	801	814	812	827	844	865	877	883	887
Swansboro HS	1170	1170	1170	1170	1170	1170	1112	1105	1113	1082	1081	1088	1118	1156	1178	1188	1195
White Oak HS	1225	1225	1225	1225	1225	1225	1055	1049	1060	1023	1023	1025	1106	1222	1296	1331	1359
Totals	7400	7740	7740	7740	7740	7740	7335	7409	7480	7356	7344	7476	7691	7989	8172	8260	8327
System Totals	25750	26494	26799	27399	27999	28204	25985	26387	26755	27102	27385	27836	28231	28824	29299	29731	30069



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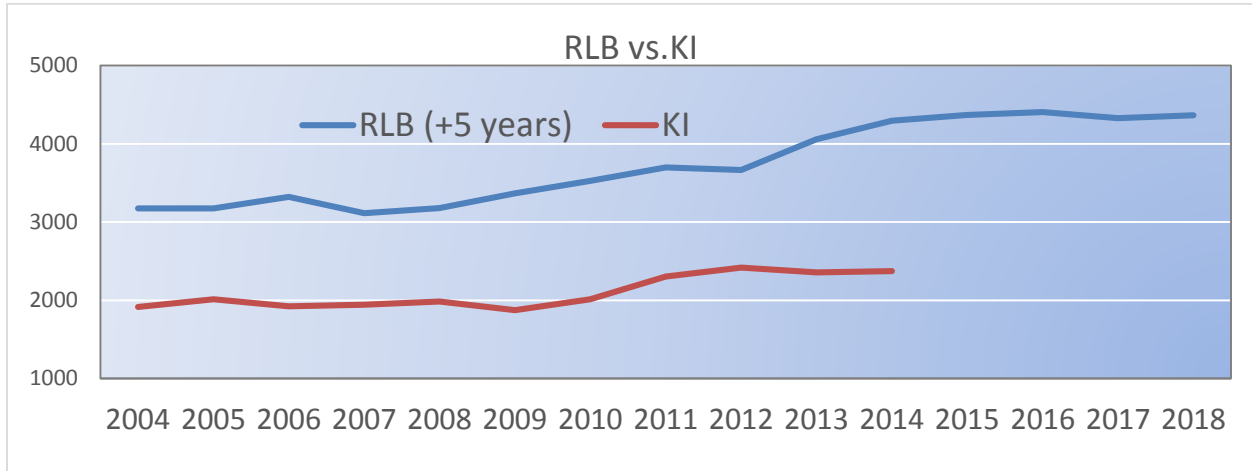
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Table 5 – 2015-16 OOC

Appendix

The County’s RLB from five years previous are normally a good predictor of the number of K-students in a County’s school system. Increases and decreases in the RLB normally appear in K-numbers. For the past several years, this correlation in Onslow County has not been as strong. The prediction in the 2014-15 IPSAC Update for the number of K-students in 2015-16 was too high – because it was primarily based on historical data. The 2015-16 forecast includes a modification to the RLB-to-K CSR, decreasing the number of K-students.

RLB vs K Data



The Cohort Survival Ratio (CSR) for RLB to K has been much lower than past ratios as shown here.

School Year	CSR: RLB to K
2015-16	0.551
2014-15	0.585
2013-14	0.643
2012-13	0.653
2011-12	0.653
2010-11	0.654
2009-10	*
2008-09	0.624
2007-08	0.653

* K- eligibility age changed