Suffolk County Department of Economic Development and Planning

Division of Water Quality Improvement

STEVEN BELLONE
COUNTY EXECUTIVE

LOCAL LAW NO. 41-2007 TO REDUCE NITROGEN POLLUTION BY REDUCING USE OF FERTILIZER IN SUFFOLK COUNTY

2011-2012 ANNUAL REPORTS

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1. Introduction

This report serves as a tool, in part, to judge the effectiveness of LL 41-2007, "to reduce nitrogen pollution by reducing use of fertilizer in Suffolk County." The data contained in this report solely represents the amount of fertilizer sold, not necessarily that of which was applied in the county. In addition to the law, the fertilizer program as a whole teaches the public proper lawn care maintenance which may positively affect many areas of the environment in addition to a reduction in nitrogen loadings.

A better representation of nitrogen reduction in Suffolk County may be water quality monitoring data. However, it should be mentioned that there will be a significant time lag between the reduction in fertilizer applications and measured benefits to both ground and surface waters with respect to a decrease in the amount of nitrogen. Therefore, actual measured decreases in the amount of nitrogen in surface and ground waters might not be verified by water quality monitoring data immediately because it may take many years to see a reduction.

Furthermore, it would be extremely difficult to accurately relate changes in water quality to the effectiveness of the fertilizer law since there are many additional sources of nitrogen loading other than turf fertilizers. A lack of quantifiable decreases in nitrogen levels observed in ground or surface waters does not necessarily indicate that the fertilizer law has not been effective.

2. Sales Data

The State of New York, Department of Agriculture and Markets reported the total fertilizer sales in Suffolk County. Data from 2007 are being used as a baseline to compare data collected from the years 2008, 2009, 2010, and 2011. Data is provided in tons and broken down by primary nutrient.

Total fertilizer includes single nutrient fertilizer, multi nutrient fertilizer, and all other fertilizer. Single nutrient fertilizer is fertilizer that only contains one nutrient; multi nutrient fertilizer

contains two or more nutrients. The three primary nutrients in fertilizer sold in Suffolk County are potassium (K_2O - potassium oxide), phosphorus (P_2O_5 - phosphorus pentoxide), and nitrogen (N), and are broken down by tons. These are the nutrients that contribute to excessive nutrient loadings that are environmentally damaging to surface waters and groundwater.

2010 Fertilizer Sales

Figure 1 provides data for total fertilizer sold in Suffolk County in 2010 separated into single and multi nutrient fertilizer sold. There was approximately 36,000 tons of fertilizer sold in Suffolk County in 2010, approximately 82% of which was multiple nutrient fertilizer.

Figure 1. Total fertilizer sold in 2010

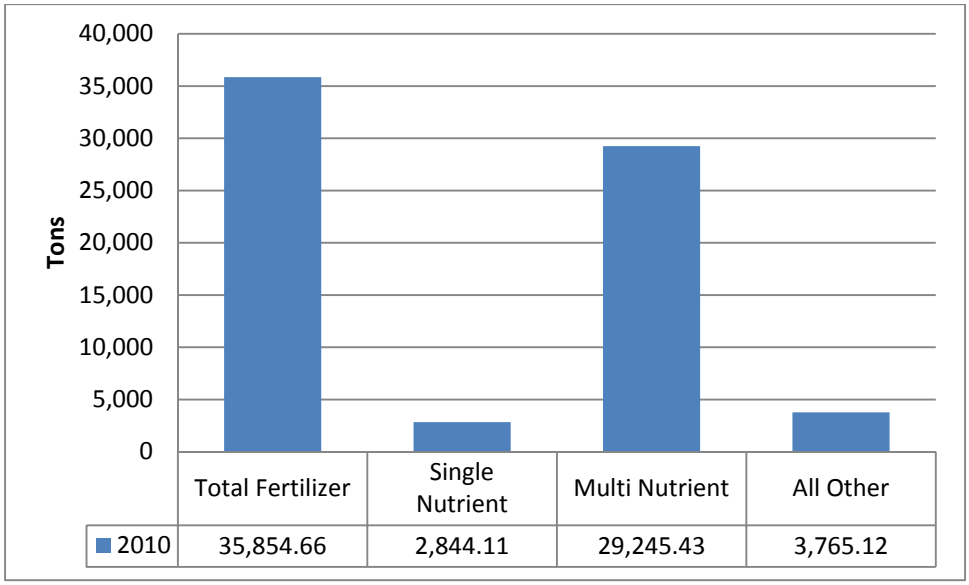
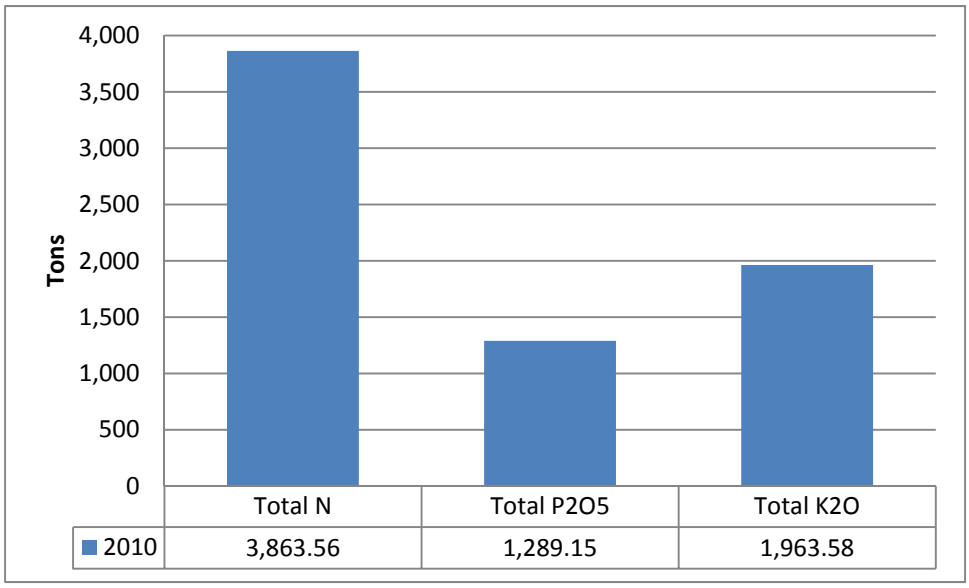


Figure 2 provides specific nutrient data for all fertilizer sold in Suffolk County in 2010 in tons of primary nutrient. A breakdown of the total amount of primary nutrients sold during 2010 indicates that 54.3% was of nitrogen (N), 27.6% of potassium (K_2O - potassium oxide), and of 18.1% phosphorus (P_2O_5 - phosphorus pentoxide).

Figure 2. Tons of primary nutrient sold in all fertilizer in 2010



2011 Fertilizer Sales

Figure 3 provides data for total fertilizer sold in Suffolk County in 2011 separated into single and multi nutrient fertilizer sold. There was approximately 35,000 tons of fertilizer sold in Suffolk County in 2011, approximately 61.5% of which was multiple nutrient fertilizer.

Figure 3. Total fertilizer sold in 2011

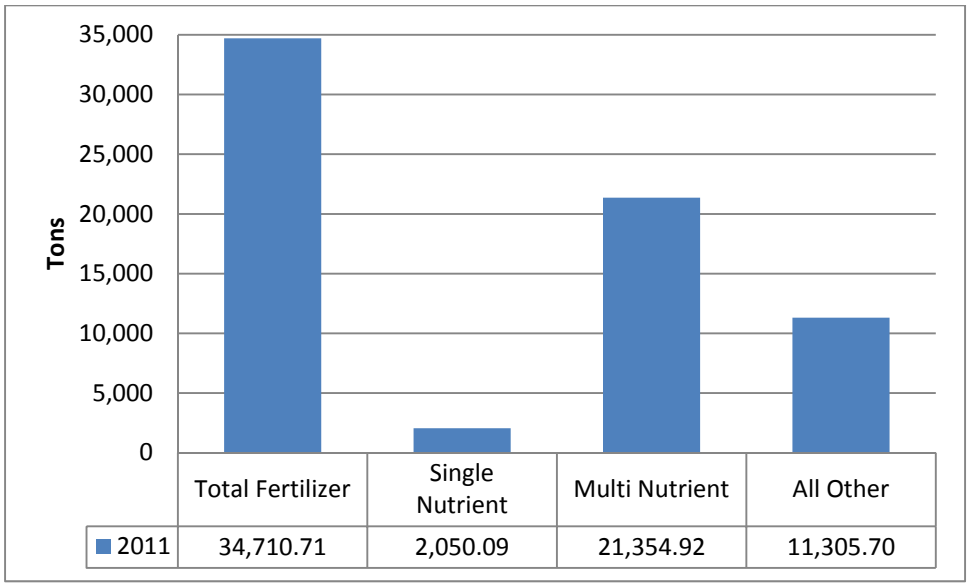
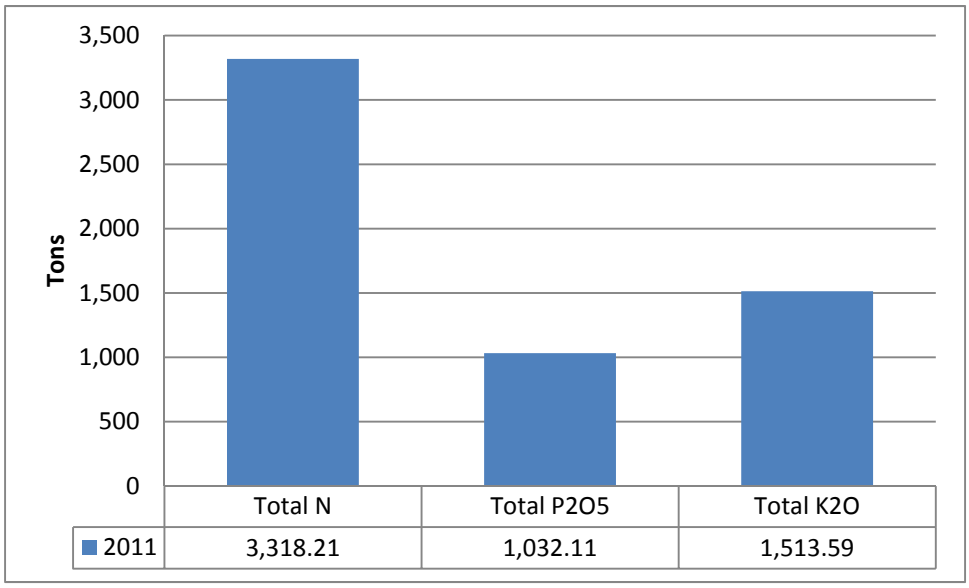


Figure 4 provides specific nutrient data for all fertilizer sold in Suffolk County in 2011 in tons of primary nutrient. A breakdown of the total amount of primary nutrients sold during 2011 indicates that 56.6% was of nitrogen (N), 25.8% of potassium (K_2O - potassium oxide), and of 17.6% phosphorus (P_2O_5 - phosphorus pentoxide).

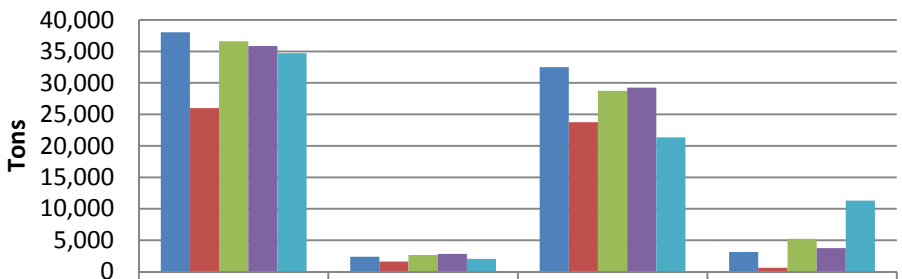
Figure 4. Tons of primary nutrient sold in all fertilizer in 2011



Annual Fertilizer Sales Comparisons 2007-2011

Figure 5 compares data for total fertilizer, single nutrient fertilizer, multi nutrient fertilizer, and all other fertilizers sold in Suffolk County for the years 2007, 2008, 2009, 2010, and 2011. The greatest tonnage of total fertilizer and multi nutrient fertilizers were sold in 2007 while the greatest amount of single nutrient fertilizer was sold in 2010 and the greatest amount of all other fertilizers was sold in 2011.

Figure 5. Comparison of total fertilizer sold between 2007-2011

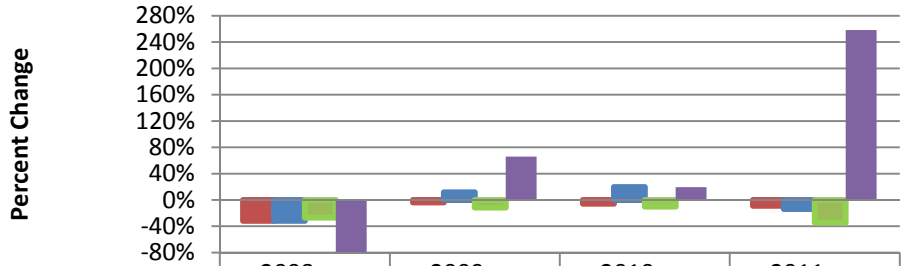


	Total Fertilizer	Single Nutrient	Multi Nutrient	All Other
2007	38,042.67	2,377.69	32,510.42	3,154.56
2008	26,005.69	1,625.09	23,746.87	633.73
2009	36,621.37	2,651.06	28,734.58	5,235.73
2010	35,854.66	2,844.11	29,245.43	3,765.12
2011	34,710.71	2,050.09	21,354.92	11,305.70

Figure 6 shows the percent change for total fertilizer, single nutrient fertilizer, multi nutrient fertilizer, and all other fertilizers sold in Suffolk County for the years 2008, 2009, 2010, and 2011 as compared to 2007. 2008 displayed a decrease in fertilizer sales across the board when compared to 2007 sales data. The greatest decrease was in the all other fertilizer category with a change of approximately -80%. A decrease of approximately 30% was seen in 2008 for the three remaining types of fertilizer. 2009 exhibited sales data similar to 2007 with percent changes up to approximately +/- 12%, with the exception of the all other fertilizer category, which showed an increase of more than 65%. Sales data for the year 2010 was similar to 2007 sales data for total fertilizer and multi nutrient fertilizer with decreases up to approximately 10%. Single nutrient and all other fertilizer increased by about 20% in 2010 as compared to 2007. For 2011,

fertilizer sales decreased for three of the four fertilizer categories by between approximately 9 and 34 percent. There was a dramatic increase in amount of all other fertilizer sold in 2011 as compared to 2007 of approximately 258%.

Figure 6. Percent change of total fertilizer sold in years 2008, 2009, 2010, and 2011 as compared to 2007



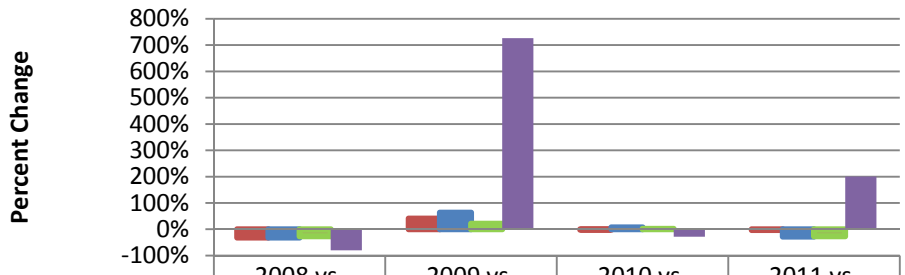
	2008 vs. 2007	2009 vs. 2007	2010 vs. 2007	2011 vs. 2007
Total Fertilizer	-31.64%	-3.74%	-5.75%	-8.76%
Single Nutrient	-31.65%	11.50%	19.62%	-13.78%
Multi Nutrient	-26.96%	-11.61%	-10.04%	-34.31%
All Other	-79.91%	65.97%	19.35%	258.39%

Year

Figure 7 shows the percent change for total fertilizer, single nutrient fertilizer, multi nutrient fertilizer, and all other fertilizers sold in Suffolk County for the years 2007-2011 as a year to year comparison. 2008 displayed a decrease in fertilizer sales across the board when compared to 2007 sales data. The greatest decrease was in the all other fertilizer category with a change of approximately -80%. A decrease of approximately 30% was seen in 2008 for the three remaining types of fertilizer. For 2009, fertilizer sales increased when compared to 2008 sales for all fertilizer types sold. The largest increase was in the all other fertilizer category with a dramatic increase of over 700%. 2010 remained similar to 2009 sales data with three of four types of fertilizer sold having a percent change of less than +/- 10%. The greatest change in fertilizer sales between 2009 and 2010 was seen in all other fertilizer with a decrease of approximately 28%. The comparison of fertilizer sales in 2011 versus sales in 2010 was not dissimilar to the comparison of fertilizer sales between 2011 and 2007. Like the 2011 vs. 2007 comparison,

fertilizer sales decreased for three of the four fertilizer categories and dramatically increased for the all other fertilizer category. The decrease in total fertilizer, single nutrient, and multi nutrient fertilizer categories ranged from approximately 3 to 28 percent. The amount of all other fertilizer sold in 2011 increased when compared to sales in 2010, by approximately 200%.

Figure 7. Percent change of total fertilizer sold in years 2007-2011, a year to year comparison

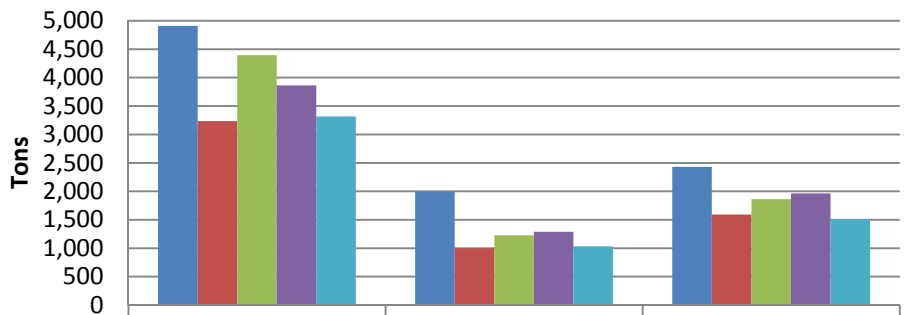


	2008 vs. 2007	2009 vs. 2008	2010 vs. 2009	2011 vs. 2010
Total Fertilizer	-31.64%	40.82%	-2.09%	-3.19%
Single Nutrient	-31.65%	63.13%	7.28%	-27.92%
Multi Nutrient	-26.96%	21.00%	1.78%	-26.98%
All Other	-79.91%	726.18%	-28.09%	200.27%

Year

Figure 8 compares the total tons of primary nutrient sold in all fertilizers for the years 2007, 2008, 2009, 2010, and 2011. The amount of total primary nutrient sold in all fertilizer was greatest in 2007 for all primary nutrients and lowest in 2008 for nitrogen and phosphorus. The amount of potassium sold was lowest in 2011.

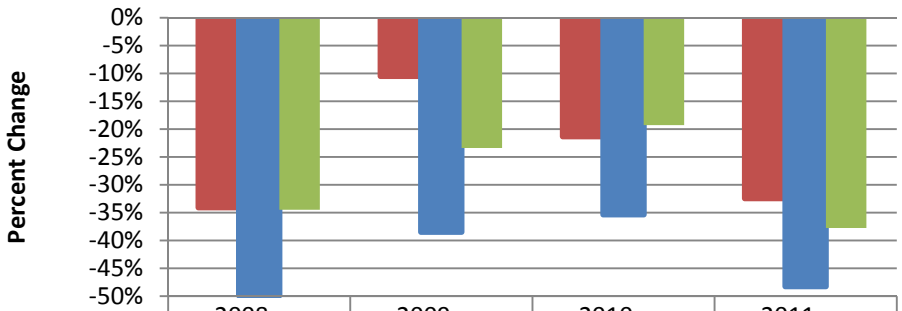
Figure 8. A comparison of total primary nutrient breakdown for all fertilizer sold between 2007-2011



	Total N	Total P2O5	Total K2O
2007	4,910.68	1,993.89	2,432.56
2008	3,237.30	999.36	1,593.83
2009	4,395.67	1,226.75	1,863.09
2010	3,863.56	1,289.15	1,963.58
2011	3,318.21	1,032.11	1,513.59

Figure 9 indicates the percentage change of tons of primary nutrient for all fertilizer sold in Suffolk County for the years 2008, 2009, 2010, and 2011 as compared to 2007. All four years exhibited decreases in tons of primary nutrient sold as compared to 2007. Phosphorus displayed the greatest decrease amongst all of the primary nutrients with a reduction of approximately 35% or greater. Nitrogen and potassium decreased at about the same rate in 2008 (about 35%) and in 2010 (about 20%). For 2009, the decrease in potassium was more than twice as much as the decrease in nitrogen. The decrease for nitrogen in 2011 was over triple, and for 2010 over double the decrease seen in 2009. The greatest decrease in potassium was in 2011, by approximately 38%.

Figure 9. Percent change of total primary nutrient sold in years 2008, 2009, 2010, and 2011 as compared to 2007

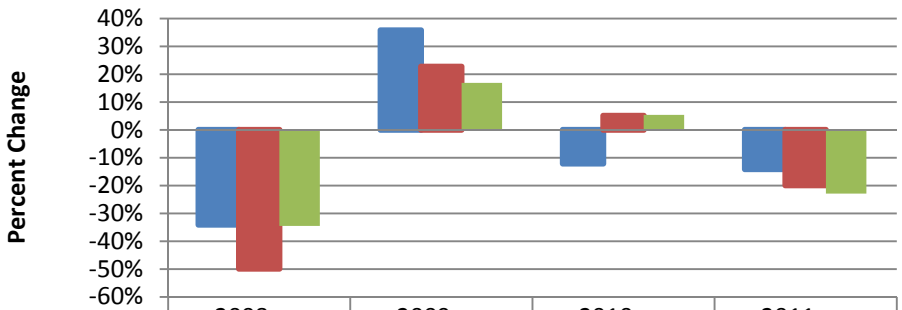


	2008 vs. 2007	2009 vs. 2007	2010 vs. 2007	2011 vs. 2007
Total N	-34.08%	-10.49%	-21.32%	-32.43%
Total P2O5	-49.88%	-38.47%	-35.34%	-48.24%
Total K2O	-34.48%	-23.41%	-19.28%	-37.78%

Year

Figure 10 indicates the percent change of tons of primary nutrient in all fertilizers sold in Suffolk County for the years 2007-2011 as a year to year comparison. 2008 displayed a decrease in tons of primary nutrients sold in all fertilizer across the board when compared to 2007 sales data. Nitrogen and potassium decreased similarly in 2008, by around 35%. Phosphorus displayed the greatest decrease (50%) when compared to 2007. For 2009, tons of primary nutrients in all fertilizers sold increased when compared to 2008 for all primary nutrients. The largest increase was in nitrogen with an increase of around 35%. Tons of phosphorus and potassium sold in 2009 increased by about 20% when compared with the previous year. For 2010, tons of nitrogen in all fertilizers sold decreased when compared to 2009, by over 10%. Phosphorus and potassium increased only slightly in 2010 when compared to 2009, by about 5%. For 2011, tons of primary nutrient sold decreased across the board when compared with 2010 sales. The amount of nitrogen sold decreased by 14% and the amount of phosphorus and potassium decreased by approximately 20% or more.

Figure 10. Percent change of total primary nutrient sold between years 2007-2011, a year to year comparison



	2008 vs. 2007	2009 vs. 2008	2010 vs. 2009	2011 vs. 2010
Total N	-34.08%	35.78%	-12.11%	-14.12%
Total P2O5	-49.88%	22.75%	5.09%	-19.94%
Total K2O	-34.48%	16.89%	5.39%	-22.92%

Year

3. Summary

- Total fertilizer sales were highest in 2007.
- Total fertilizer sales were lowest in 2008.
- The amount of nutrient sold in 2007 was the highest of all the years reviewed for all primary nutrients.
- There was an increase in total fertilizer sales between 2008 and 2009, but not to 2007 levels.
- 2010 total fertilizer sales were similar to 2009 sales data. However, for 2010, there was a decrease in the amount of tons of nitrogen sold when compared to 2009.
- The amount of total fertilizer sold in 2011 was the lowest since 2008.
- The amount of potassium sold in 2011 was the lowest for all years reviewed.
- The amount of nitrogen and phosphorus sold was second lowest in 2011, next to 2008.

4. Conclusions

Although LL 41-2007 was signed into law in 2007, it did not go into effect until January 1, 2009. Therefore, 2007 and 2008 sales data should be looked at separately from 2009 – 2011 sales data as pre- and post- fertilizer law respectively. Overall, for years 2007-2011 the total amount of fertilizer sold in Suffolk County was the greatest in 2007. The same holds true for the amount of primary nutrient sold; it was greatest in 2007. Although we did see a decrease in fertilizer sales and in amount of primary nutrient sold in 2008, those numbers increased again in 2009, however not to 2007 levels.

The amount of fertilizer sold in 2010 was similar to, although slightly lower than the amount sold in 2009. The amount of nitrogen sold in 2010 was also lower than in 2009. Total fertilizer sales decreased in 2011; this was the second lowest year of total sales, next to 2008. 2011 was also the lowest year of all of the years reviewed in the amount of potassium sold. Also, the amount of nutrient sold in 2011 decreased for all primary nutrients when compared to 2010 sales.

There was a slight increase in fertilizer sales the first year the law went into effect. However, it should be stated that there was a delay in the public education and outreach section of this law. The required retail location signage was not sent out until mid-2009. Also, it has taken fertilizer retail locations one year or more to get acquainted with the new law and to adhere to the requirements of the law. Perhaps the decrease in total fertilizer sold and in the amount of primary nutrients sold in 2011 is a good indication that the public is responding favorably to this initiative.