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

2013-2014 ANNUAL REPORT
RELEASED 2016*

THERESA WARD, COMMISSIONER

*Suffolk County relies on data provided by New York State Department of Agriculture & Markets and reports the data as it becomes available.

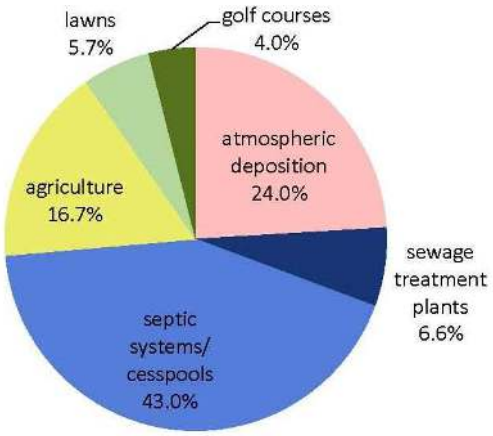
1. Suffolk County's Comprehensive Approach to Reducing Nitrogen in Our Waters

Nitrogen is one of the primary nutrients critical for the survival of all living organisms. However, much of the nitrogen applied to agricultural and urban areas ultimately enters our rivers and coastal systems. Nitrogen contamination from unsewered housing and fertilizer use poses a threat to both drinking water supplies and coastal marine habitat and resources. Nitrogen contamination of surface waters leads to hypoxia, harmful algal blooms, and degradation of the wetlands and seagrass beds. Nitrogen enters our groundwater affecting our drinking water supply. Control of nitrogen sources will improve groundwater quality, surface water quality, potable supply, and coastal resiliency.

There are three basic sources of nitrogen that enter our waterways: atmospheric deposition, wastewater (which includes sewage treatment plants and septic systems/cesspools), and fertilizer (which includes fertilizer to lawns, golf courses, and farmland). The amount of nitrogen entering the waterway differs depending on the estuary.

Figure 1 illustrates the percentage of nitrogen entering the Peconic Estuary by source. Wastewater represents the largest source of nitrogen entering the Peconic Estuary, with about 49.6%. Total fertilizers represent the second highest amount of nitrogen entering the Peconic Estuary with 26.4%. Of that 26.4%, 16.7% of that is from agriculture (representative of the number of farms on the East End of Long Island), 5.7% from lawn fertilizers, and 4.0% from golf courses. Atmospheric deposition makes up the final piece of the pie with 24.0%.

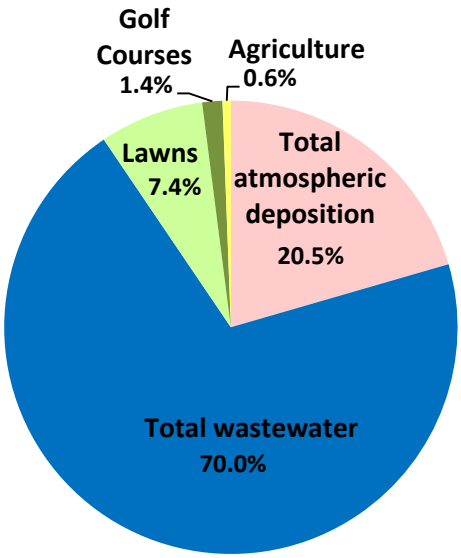
Figure 1. Nitrogen loading to the Peconic Estuary broken down by source of Nitrogen



Taken from "Nitrogen load modeling to forty-three subwatersheds of the Peconic Estuary" prepared by Stephen Lloyd, The Nature Conservancy in partnership with the Peconic Estuary Program, May 2014

Figure 2 illustrates the percentage of nitrogen entering the Great South Bay by source. Wastewater represents the largest source of nitrogen entering the Great South Bay, with 70.0%. Atmospheric deposition represents the second highest amount of nitrogen entering the Great South Bay with 20.5%. Fertilizers make up the final piece of the pie with 9.4%. Of that 9.4%, 7.4% is from lawn fertilizers, 1.4% from golf courses, and 0.6% of that is from agriculture.

Figure 2. Nitrogen loading to the Great South Bay broken down by source of Nitrogen



As illustrated above, the amount of each source of nitrogen differs for each estuary. While wastewater is the largest source of nitrogen entering our waterways in both the Peconic Estuary and the Great South Bay, it remains a larger problem for the Great South Bay. Atmospheric deposition is around the same percentage for both estuaries. While nitrogen fertilizers from agriculture play a large role in the amount of nitrogen entering the Peconic Estuary, that source is practically non-existent for the Great South Bay. Fertilizer from golf courses plays a small part in both estuaries, with 4% or less. Finally, the percentage of fertilizers entering each estuary from residential lawns is fairly similar, between 5.7% and 7.4%.

Suffolk County is working to address all sources of nitrogen entering our waters using the comprehensive approach of the Reclaim Our Water Initiative by adopting the 2015 Comprehensive Water Resources Management Plan and advancing the Nitrogen Fertilizer Reduction Initiative. The amount of nitrogen entering our waterways from fertilizers is a smaller piece of the puzzle compared to wastewater; however, it is still a source that needs to be addressed. The Nitrogen Fertilizer Reduction Initiative is an integral part of the County's comprehensive approach to removing nitrogen from our waters.

Suffolk County's Reclaim Our Water Initiative

In 2014 Suffolk County Executive Steve Bellone announced the County was going to "Reclaim Our Water" to improve the quality of groundwater and surface water and restore wetland health through the reduction of nitrogen pollution.

The implementation of the Reclaim Our Water initiative is guided by the goals and objectives of Suffolk County's Comprehensive Water Resources Management Plan. The categories of recommendations of the Comprehensive Water Resources Management Plan are organized into seven separate, but inter-related and overlapping categories: Nitrogen, Volatile Organic Compounds, Pesticides, Pharmaceuticals and Personal Care Products, Potable Supply, Project

Management and Data Collection, and Coastal Resiliency and Surface Water Quality. The need to develop location-specific wastewater management approaches, together with the implementation of the above seven recommendations will also support achievement of the County's goals to provide a safe potable water supply to all residents, as well as improving coastal resiliency and surface water quality.

Responsibilities for many of the management activities identified are currently shared by collaborators and partners on the federal, state, county, town and local levels. While Suffolk County may have the ability to implement a number of the actions shown, it will be critical to share data, information and resources with other stakeholders who share water resource protection missions, in order to most effectively accomplish the water quality protection goals articulated in this Plan.

Nitrogen discharged to the ground in unsewered areas has been identified as a priority in the previous 1987 and draft 2010 Comprehensive Water Resources Management Plans. The groundwater resource management recommendations laid out by the Suffolk County Comprehensive Water Resources Management Plan are intended to provide the framework to guide water resource protection and management in Suffolk County through the years ahead, within the context of adaptive management.

Full implementation of Plan goals is a long-term process that will require coordination and collaboration with agencies and organizations on the federal, state, county and local level, a careful reevaluation of resource allocation issues, and will also necessitate exploring grant opportunities and other innovative and alternative funding mechanisms. Suffolk County continues to work with state and federal agencies and stakeholders to explore implementation options to cost-effectively execute Plan recommendations.

For a complete copy of the Suffolk County Comprehensive Water Resources Management Plan please visit: http://suffolkcountyny.gov/Departments/HealthServices/EnvironmentalQuality/WaterResources/ComprehensiveWaterResourcesManagementPlan.aspx

Introduction to Suffolk County Local Law 41-2007 and the Suffolk County Nitrogen Fertilizer Reduction Initiative

Suffolk County Local Law 41-2007, "to reduce nitrogen pollution by reducing use of fertilizer in Suffolk County" was signed into law in 2007 but went into effect January 1, 2009. This law is a multi-faceted piece of legislation with a few prohibitions and many legislative requirements:

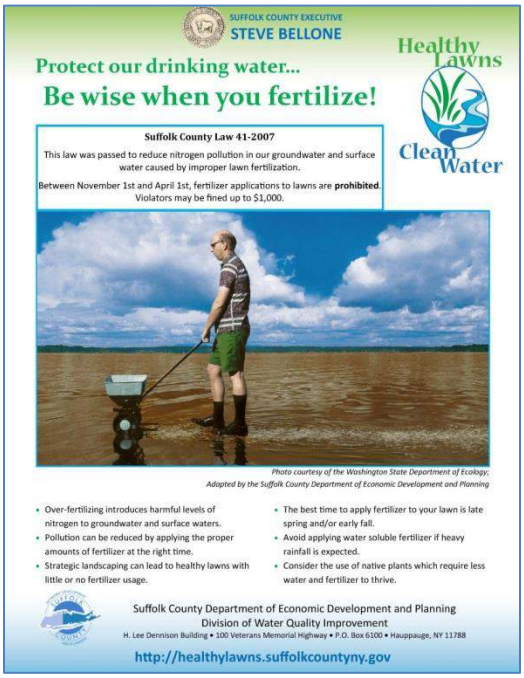


Figure 3. Informational signs required to be posted in any retail fertilizer establishment in the County

LL 41-2007 Prohibitions

As part of LL 41-2007, fertilizer shall not be applied to any turf within Suffolk County between November 1st and April 1st of every year except for golf courses, farm operations, athletic fields, or newly-seeded or newly-sodded areas. Additionally, no fertilizer shall be applied to any County-owned real property, except for golf courses, the Suffolk County farm, athletic fields, or newly-seeded or newly-sodded areas at any time throughout the year. Any violation of these prohibitions may result in a civil penalty in the amount of $1,000 per violation. Violations are complaint driven and any enforcement of this prohibition is to be administered by Suffolk County Department of Health Services.

LL 41-2007 Requirements

LL 41-2007 requires the Suffolk County Department of Economic Development and Planning prepare an annual report which presents information on fertilizers sold in Suffolk County during the preceding year. This report satisfies that requirement of LL 41-2007.

Under LL 41-2007, the Department of Economic Development and Planning is also charged with working with the Suffolk County Department of Health Services to develop Best management practices (BMPs) to support healthy vegetation, while posing the least harm to the environment. Additionally, the Department of Economic Development and Planning is responsible to develop an interactive website concerning turf and fertilizer-related issues.

The law also requires any retail fertilizer establishment in the County to conspicuously post informational signs (see Figure 3) and brochures about fertilizers and turf management within ten feet of the establishment's fertilizer display area. Any failure to comply with LL 41-2007 by any retail fertilizer establishment may result in a civil penalty in the amount of $1,000 per violation. Violations are complaint driven and any enforcement of this prohibition is administered by Suffolk County Department of Health Services.

Also under LL 41-2007, any person applying for or renewing a home improvement contractor's license that applies fertilizer as part of their business must take a Suffolk County approved turf management course. During this three to five hour course, landscape professionals learn about: the requirements and prohibitions of LL 41-2007, alternative plantings, proper use and application of fertilizers, health and environmental issues related to nitrate contamination of groundwater, Best Management Practices, irrigation, soils, soil amendments, and soil chemistry.

Nitrogen Fertilizer Reduction Initiative

In order to comply with the requirements of LL 41-2007, the Suffolk County Department of Economic Development and Planning created the nitrogen Fertilizer Reduction Initiative (FRI) program. This important initiative was designed to elevate public awareness about proper lawn care maintenance, thereby reducing the amount of nitrogen that enters our waterways.

Under the FRI program, Suffolk County contracted with Cornell Cooperative Extension of Suffolk County (CCE) between 2009 and 2010. Under their original contract, CCE reviewed and expanded existing educational programs, offered consumers a free soil pH test, developed and provided turf management courses for landscape professionals, and developed and provided a self-teaching educational program on CD to retail establishments prior to installation of signs and brochures developed as part of this program.

Because LL 41-2007 requires landscape professionals take a turf management class before renewing or applying for their home improvement contractor's license, Suffolk County decided to contract with CCE to continue providing quarterly turf management classes for landscapers. From the expiration of the original contract through the end of 2014, CCE provided 19 turf management classes for landscapers. Fifteen hundred landscapers have been certified through this turf management course through the end of 2014.

Also under the FRI program, Suffolk County contracted with Cornell University as well, between 2009 and 2011. Under their original contract, Cornell University developed a technical evaluation and literature review for the County, developed BMPs to promote healthy vegetation that poses the least harm and risk to the environment, developed educational signs and brochures to be posted near fertilizer displays in retail locations throughout the County, developed separate best management practices for nitrogen fertilizer management for each of the East End Suffolk County golf courses which agreed to participate in the golf course nitrogen management challenge, and developed an interactive website to provide information on turf management for Suffolk County residents.

Currently, as part of the FRI program, the Department of Economic Development and Planning, Division of Water Quality Improvement is charged with scheduling the landscaper education classes and also prepares and administers the contract with CCE for landscaper education classes. The Division also furnishes and distributes the educational signs and brochures to fertilizer retail locations throughout the County on an as-needed basis. The County also maintains and updates the interactive website healthylawns.suffolkcountyny.gov.

The Suffolk County nitrogen FRI program provides information to elevate public awareness about proper lawn care maintenance which may positively affect many areas of the environment, in addition to a reduction in nitrogen loadings.

2. Data and Methodology

Pursuant to Local Law 41-2007, the Department of Economic Development and Planning is tasked with reporting fertilizer sales trends in Suffolk County.

The State of New York, Department of Agriculture and Markets reports the total annual fertilizer sales in Suffolk County. 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 – 2013 sales data. In certain analyses, data from 2007 are being used as a baseline for sales trends pre-fertilizer law, and in others, data from 2009 are being used as a baseline for sales trends post-fertilizer law. Data is provided in tons and broken down by primary nutrient. The data contained in this report solely represents the amount of fertilizer sold, not necessarily that which was applied in the county.

The New York State Department of Agriculture and Markets provides data based on "total fertilizer," which is comprised of "single nutrient fertilizer," "multi nutrient fertilizer," and "all other fertilizer." "Single nutrient fertilizer" is fertilizer that contains only one primary nutrient (see Figure 4); "multi nutrient fertilizer" contains two or more primary nutrients (see Figure 5).

Figure 4. An example of "single nutrient fertilizer" (nitrogen in this case)

Figure 5. An example of "multi nutrient fertilizer"

The three primary nutrients in fertilizer sold in Suffolk County are nitrogen (N), phosphorus (P_2O_5 - phosphorus pentoxide), and potassium (K_2O - potassium oxide). These are the nutrients that contribute to excessive nutrient loadings that could be potentially environmentally damaging to surface waters and groundwater. Excess nitrogen in the environment can contaminate groundwater and the County's drinking water supplies. Due to the fact that groundwater discharges to surface waters, high nitrogen levels can negatively impact marine and freshwater ecological resources by contributing to algal blooms that can reduce dissolved oxygen levels and result in fish kills. Nitrogen or phosphorus may be the limiting nutrient in a particular surface

water body. A limiting nutrient is the hardest nutrient for a plant to acquire, and therefore is the only nutrient that is limiting the plant's growth. In general, phosphorus is typically the limiting nutrient for algal growth and productivity in freshwater systems, and nitrogen is usually the limiting nutrient in marine waterbodies. Nutrients and sediments in stormwater run-off threaten fishing, fish propagation, and fish survival in tributaries and coves. Sediment and excessive nutrients in stormwater run-off have affected fish survival in tributaries and organic nutrients play a role in brown tide outbreaks. (Suffolk County Department of Health Services [SCDHS], et al. 2015. *Suffolk County Comprehensive Water Resources Management Plan*. pp. 3-4, 5-65, 6-37, and 6-38)

Beginning January 1, 2012, the New York State Department of Environmental Conservation (NYSDEC) enacted the New York State (NYS) Dishwasher Detergent and Nutrient Runoff Law which restricts the use of phosphorus fertilizer on lawns or non-agricultural turf. Under the law, use of fertilizer that contains up to 0.67% phosphorus is not restricted. Fertilizer containing more than 0.67% phosphorus can only be used if a new lawn is being established or if a soil test indicates that it is necessary. Therefore, generally, we can now expect to see a zero for the middle number on a bag of fertilizer sold in New York State.

"All other fertilizer" is any fertilizer predominantly consisting of secondary nutrients (like calcium, magnesium, or sulfur) and/or micronutrients (see Figure 6). Secondary nutrients are second in importance to nitrogen, phosphorus, and potassium, not because they are less essential, but because smaller amounts of those elements are typically needed for most crops. The third category of essential crop nutrients is called micronutrients. Plants don't need as much of them as they do primary and secondary fertilizers, but they still can't do without them. Scientists classify boron (B), chlorine (Cl), copper (Cu), iron (Fe), manganese (Mn), molybdenum (Mo), nickel (Ni), and zinc (Zn) as essential micronutrients.

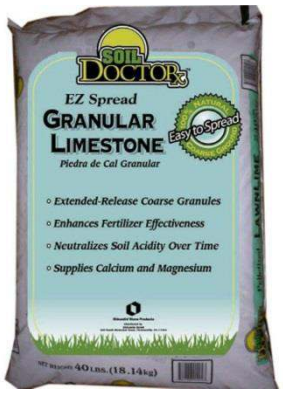


Figure 6. An example of "all other fertilizer" (lime in this case, which is comprised primarily of calcium and magnesium)

The New York State Department of Agriculture and Markets also provides a fertilizer sales data breakdown for farm sales and non-farm sales (such as residential). This Annual Report includes a farm vs. non-farm section in which data will be analyzed based on its purpose. Suffolk County farm and non-farm fertilizer sales will be analyzed by year, and also compared against New York State farm and non-farm fertilizer sales. Total fertilizer sales trends of Suffolk County will also be compared against total fertilizer sales trends of New York State as a whole.

2012 Fertilizer Sales

Figure 7 provides data for total fertilizer sold in Suffolk County in 2012 separated into single and multi-nutrient fertilizer. There was approximately 32,500 tons of fertilizer sold in Suffolk County in 2012, approximately two-thirds of which was multiple nutrient fertilizer.

Figure 7. Total fertilizer sold in 2012

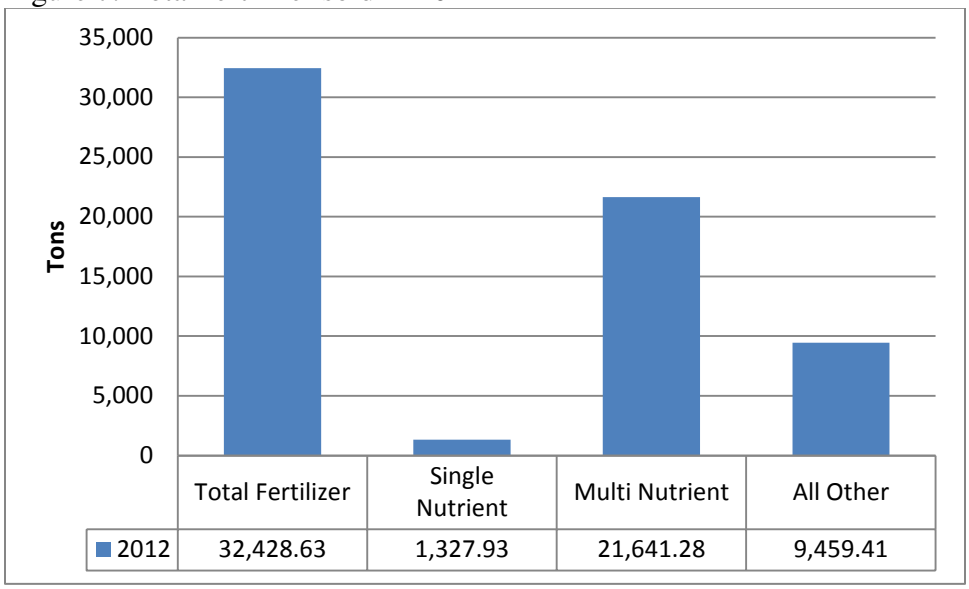
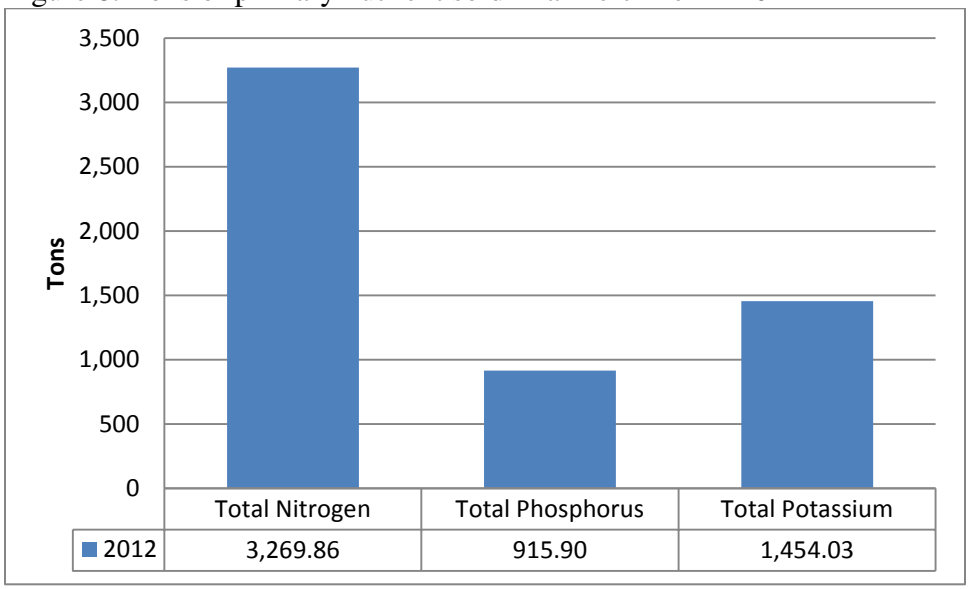


Figure 8 provides specific nutrient data for all fertilizer sold in Suffolk County in 2012 in tons of primary nutrient. A breakdown of the total amount of primary nutrients sold during 2012 indicates that 58.0% was of nitrogen (N), 16.2% of phosphorus (P_2O_5 - phosphorus pentoxide) and 25.8% of potassium (K_2O - potassium oxide).

Figure 8. Tons of primary nutrient sold in all fertilizer in 2012



2013 Fertilizer Sales

Figure 9 provides data for total fertilizer sold in Suffolk County in 2013 separated into single and multi-nutrient fertilizer sold. There was approximately 31,000 tons of fertilizer sold in Suffolk County in 2013, approximately 68.2% of which was multiple nutrient fertilizer.

Figure 9. Total fertilizer sold in 2013

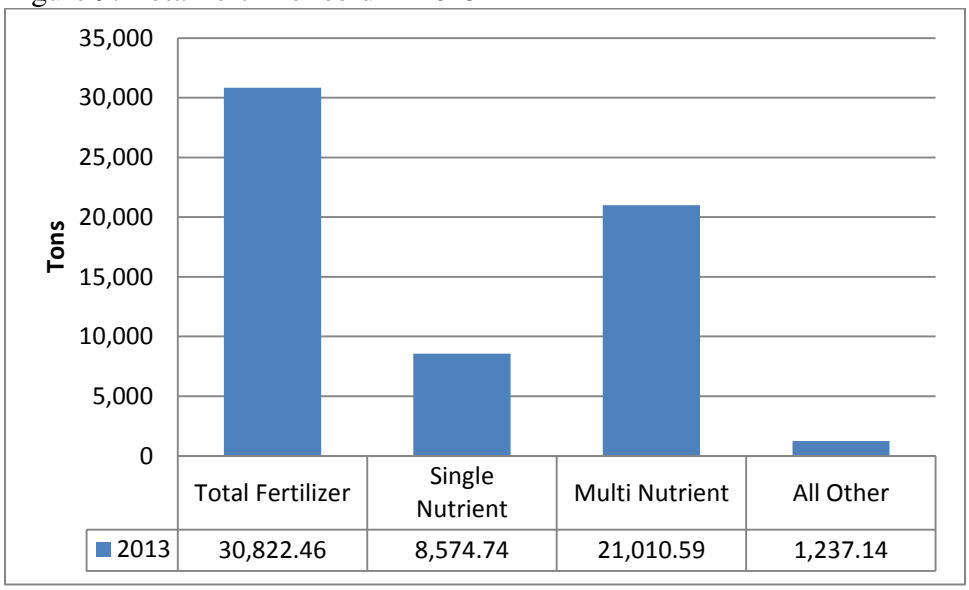
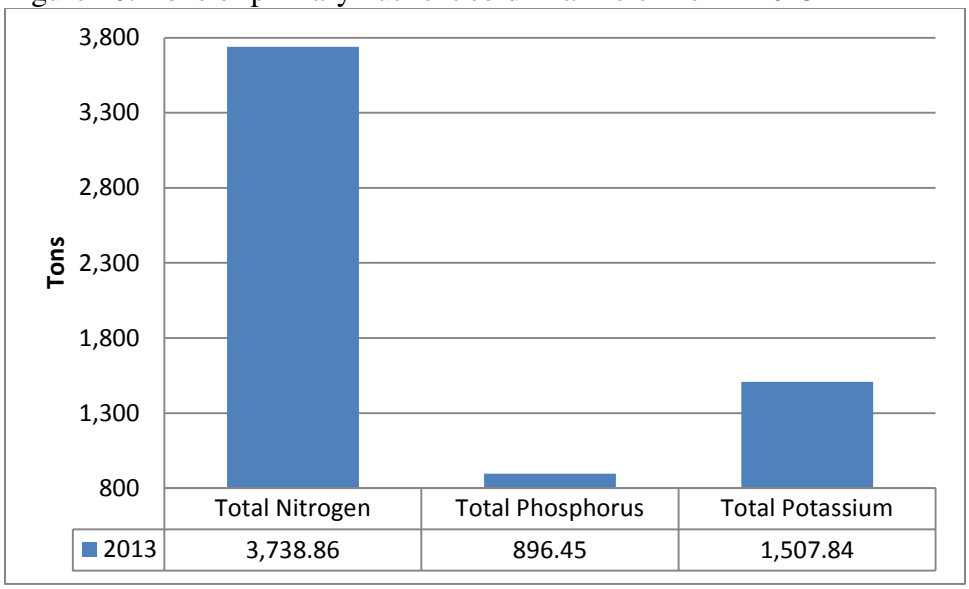


Figure 10 provides specific nutrient data for all fertilizer sold in Suffolk County in 2013 in tons of primary nutrient. A breakdown of the total amount of primary nutrients sold during 2013 indicates that that 60.9% was of nitrogen (N), 14.6% of phosphorus (P_2O_5 - phosphorus pentoxide) and 24.5% of potassium (K_2O - potassium oxide).

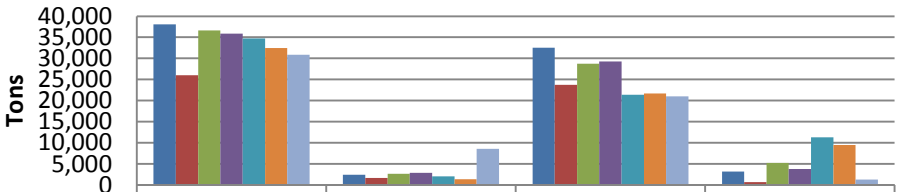
Figure 10. Tons of primary nutrient sold in all fertilizer in 2013



Total Fertilizer Sales Comparisons 2007-2013

Figure 11 compares data for total fertilizer, single nutrient fertilizer, multi nutrient fertilizer, and all other fertilizers sold in Suffolk County for the years 2007 through 2013. 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 2013, and the greatest amount of all other fertilizers was sold in 2011. 2008 fertilizer sales are the lowest for any year analyzed. The Department of Economic Development and Planning attributes this reduction in fertilizer sales in 2008 (a pre-fertilizer law implementation year) to the 2008 financial crisis.

Figure 11. Comparison of total fertilizer sold between 2007-2013



	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
2012	32,428.63	1,327.93	21,641.28	9,459.41
2013	30,822.46	8,574.74	21,010.59	1,237.14

Figure 12 compares data for total fertilizer sold in Suffolk County for the years 2009 through 2013. Total fertilizer sales have decreased steadily since the fertilizer law was implemented in 2009.

Figure 12. Total fertilizer sold in Suffolk County since 2009

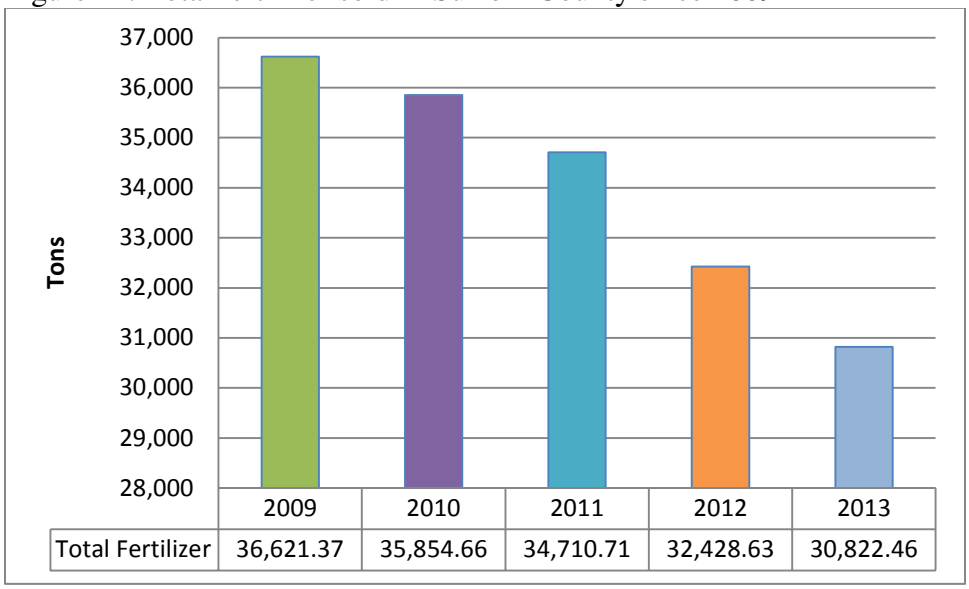


Figure 13 shows the percent change for total fertilizer sold in Suffolk County for the years 2008 through 2013 as compared to 2007. This analysis is important because it compares pre-fertilizer law implementation sales data to post-fertilizer law implementation sales data. Fertilizer sales decreased for all years analyzed when compared to 2007. The greatest decrease since 2007 was seen in 2008; a decrease of approximately 30%. However, since 2009, fertilizer sales have progressively decreased in comparison to 2007 sales. A reduction of almost 4% was seen in 2009 whilst a decrease of almost 19% was seen in 2013.

Figure 13. Percent change of total fertilizer sold in years 2008 through 2013 as compared to 2007

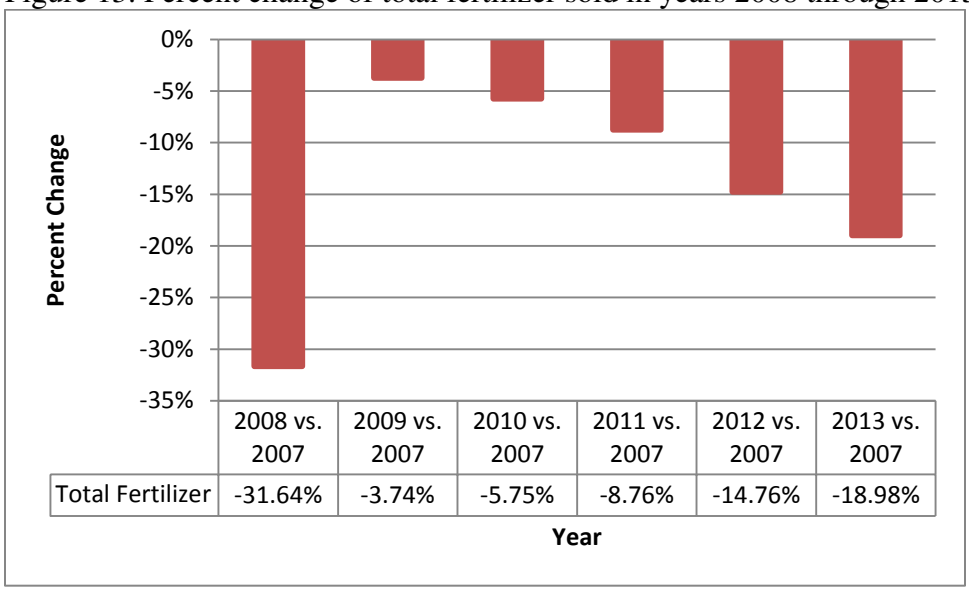


Figure 14 shows the percent change for total fertilizer sold in Suffolk County for the years 2009 through 2013 as a year to year comparison. The smallest reduction in total fertilizer sales was

seen from 2009 to 2010 when sales decreased approximately 2%. The largest decrease of approximately 6.5% was seen in 2012 when compared to 2011.

Figure 14. Percent change of total fertilizer sold between years 2009-2013, a year to year comparison

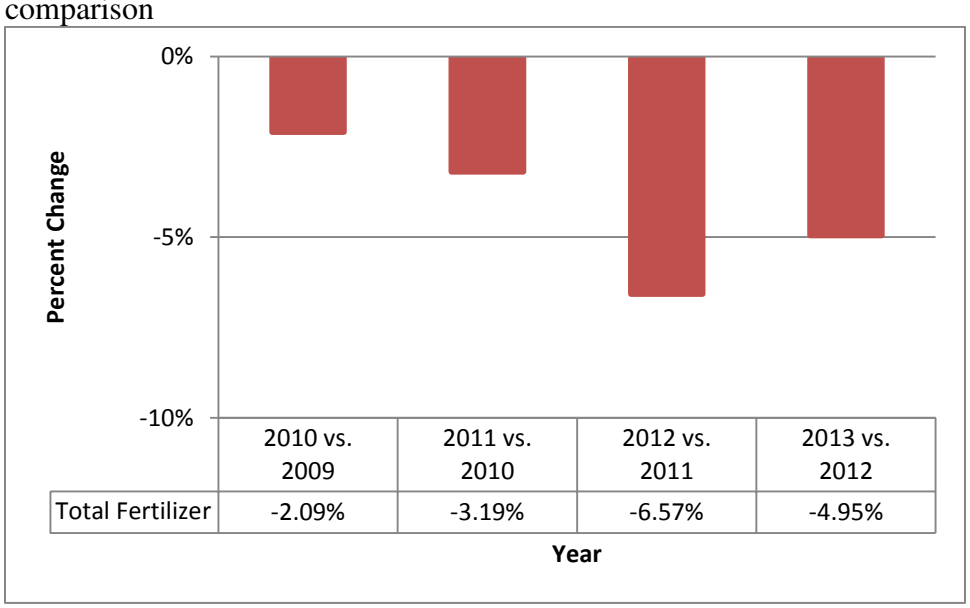
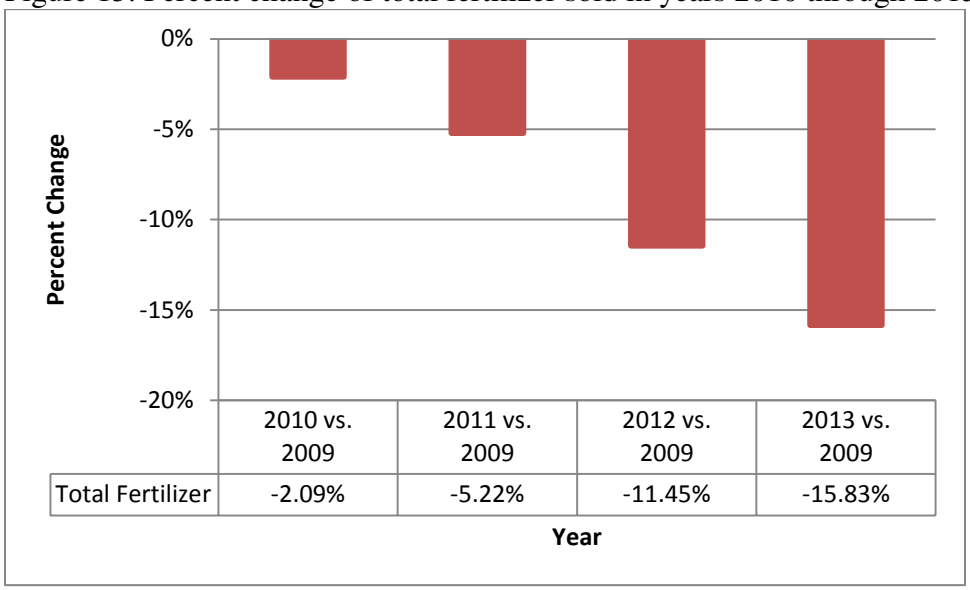


Figure 15 shows the percent change for total fertilizer sold in Suffolk County for the years 2010 through 2013 as compared to 2009. This analysis is important because it shows data trends since the fertilizer law was implemented in 2009. Since 2009 fertilizer sales have progressively decreased. A reduction of approximately 2% was seen in 2010 whilst a decrease of almost 16% was seen in 2013.

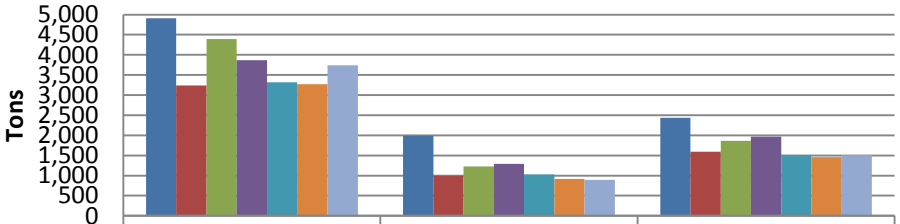
Figure 15. Percent change of total fertilizer sold in years 2010 through 2013 as compared to 2009



Total Primary Nutrient Sales Comparisons 2007-2013

Figure 16 compares the total tons of primary nutrient sold in all fertilizers for the years 2007 through 2013. The amount of total primary nutrient sold in all fertilizer was greatest in 2007 for all primary nutrients. The least amount of nitrogen sold was in 2008, the least amount of phosphorus sold was in 2013, and the least amount of potassium sold was in 2012.

Figure 16. A comparison of total primary nutrient breakdown for all fertilizer sold between 2007-2013



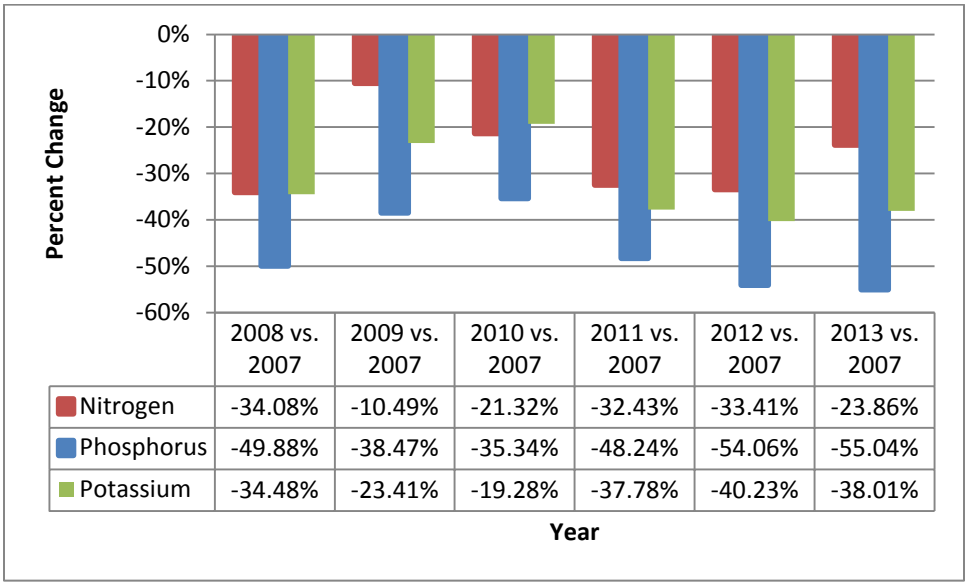
	Total Nitrogen	Total Phosphorus	Total Potassium
2007	4,910.68	1,993.89	2,432.56
2008	3,237.30	999.36	1,593.83
2009	4,395.67	1,226.75	1,863.09
2010	3,863.56	1,289.15	1,963.58
2011	3,318.21	1,032.11	1,513.59
2012	3,269.86	915.90	1,454.03
2013	3,738.86	896.45	1,507.84

Figure 17 indicates the percent change of tons of primary nutrient for all fertilizer sold in Suffolk County for the years 2008 through 2013 as compared to 2007. All six years exhibited decreases in all primary nutrients sold as compared to 2007. Phosphorus displayed the greatest decrease amongst all of the primary nutrients with a reduction of up to approximately 55%.

Due to the NYS Dishwasher Detergent and Nutrient Runoff Law (enacted January 1, 2012), we would expect to see a decrease in the sale of phosphorus in Suffolk County for the years 2012 and 2013. Since the NYS Dishwasher Detergent and Nutrient Runoff Law was enacted, the sale of phosphorus decreased by 13% for all fertilizer sold in Suffolk County.

Nitrogen decreased by between approximately 10.5% and 34% when compared to 2007 sales. 2012 was the second lowest year (next to 2008) for nitrogen fertilizer sales. Potassium decreased by approximately 19% to 40% when compared to 2007 sales data. 2012 and 2013 were the years with the highest decreases in potassium and phosphorus sales.

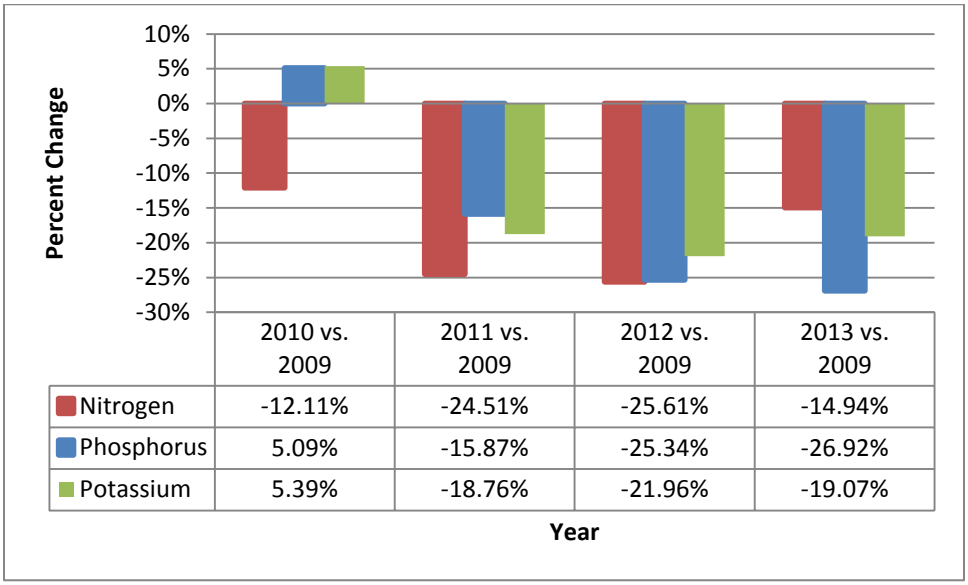
Figure 17. Percent change of total primary nutrient sold in years 2008 through 2013 as compared to 2007



	2008 vs. 2007	2009 vs. 2007	2010 vs. 2007	2011 vs. 2007	2012 vs. 2007	2013 vs. 2007
Nitrogen	-34.08%	-10.49%	-21.32%	-32.43%	-33.41%	-23.86%
Phosphorus	-49.88%	-38.47%	-35.34%	-48.24%	-54.06%	-55.04%
Potassium	-34.48%	-23.41%	-19.28%	-37.78%	-40.23%	-38.01%

Figure 18 indicates the percent change of tons of primary nutrient in all fertilizers sold in Suffolk County for the years 2010-2013 as compared to 2009. For years 2011 through 2013 there was a reduction in all primary nutrients sold when compared to 2009. While sales of nitrogen decreased in 2010, the sale of phosphorus and potassium increased slightly (by approximately 5% for each primary nutrient). The greatest reduction in the sales of nitrogen and potassium was seen in 2012 as compared to 2009. Whilst the greatest reduction in the amount of phosphorus sold occurred in 2013.

Figure 18. Percent change of total primary nutrient sold in years 2010 through 2013 as compared to 2009



	2010 vs. 2009	2011 vs. 2009	2012 vs. 2009	2013 vs. 2009
Nitrogen	-12.11%	-24.51%	-25.61%	-14.94%
Phosphorus	5.09%	-15.87%	-25.34%	-26.92%
Potassium	5.39%	-18.76%	-21.96%	-19.07%

Farm vs. Non-Farm Sales

Figure 19 shows the percentage of farm fertilizer sales vs. non-farm fertilizer sales for Suffolk County vs. New York State for the years 2008-2013. For Suffolk County the amount of farm fertilizer sold vs. non-farm fertilizer sold has been consistently approximately 20% to 80% respectively for the years 2008-2012. For New York State during this time period, farm fertilizer sold vs. non-farm fertilizer sold was almost the complete opposite of Suffolk County. For 2008-2012 the amount of farm fertilizer sold to non-farm fertilizer sold has been consistently approximately 70-75% and 25-30% respectively (except for 2009 when sales were approximately 60% farm fertilizer sold vs. 40% non-farm fertilizer sold).

Between 2012 and 2013, the amount of farm fertilizer sold in Suffolk County increased by almost 95% to approximately 40% of total fertilizer sales. During the same time period, non-farm fertilizer sales in Suffolk County decreased by 30%, to less than 60% of total fertilizer sold. New York State also saw an increase in farm fertilizer sales, however, not to the extent that Suffolk County did. Farm fertilizer sales in New York State increased by around 20% to approximately 83% of the total fertilizer sold in the State. Non-farm fertilizer sales for New York State decreased similarly to Suffolk County non-farm fertilizer sales for 2013; they decreased by just over 30%. For 2013 a total of 17% of total fertilizer sold in the State was for non-farm usage.

Figure 19. Percentage of Farm Fertilizer Sales vs. Non-Farm Fertilizer Sales, Suffolk County vs. New York State for the years 2008-2013

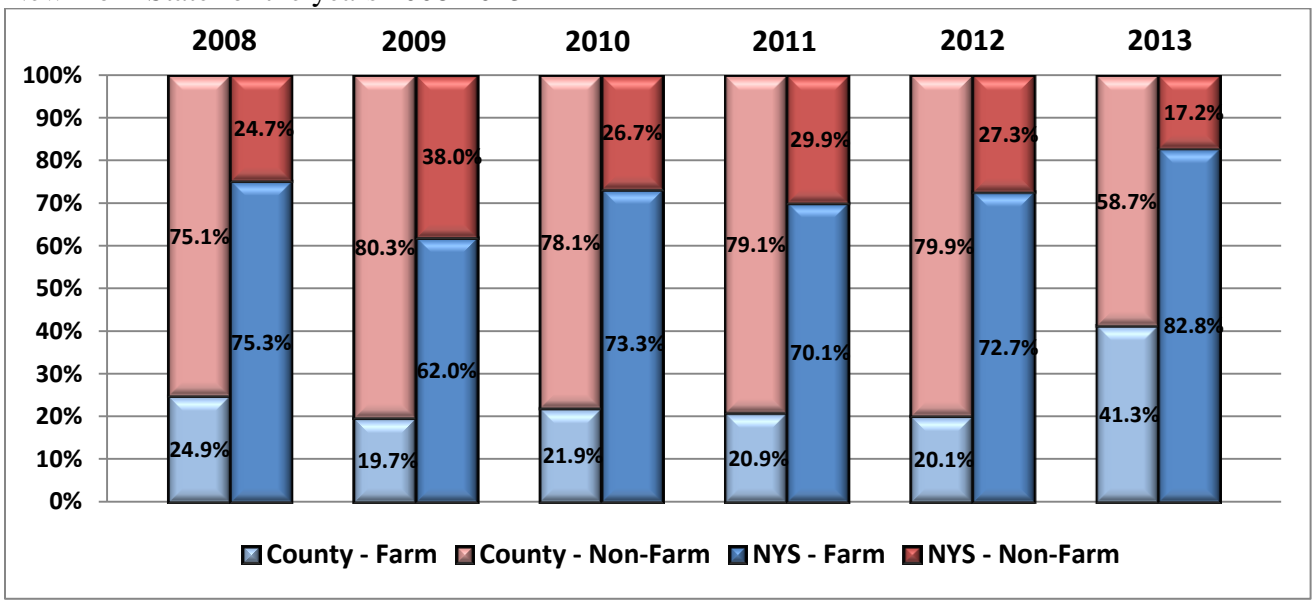


Figure 20 depicts the percent change for the years 2009 vs. 2013 for farm fertilizer sold in Suffolk County as compared to non-farm fertilizer sold in Suffolk County. While farm fertilizer sold in Suffolk County saw an increase by more than 76%, there was a decrease of approximately 38% in non-farm fertilizer sold in Suffolk County for the same time period.

Figure 20. Percent Change of Farm Fertilizer Sales vs. Non-Farm Fertilizer Sales in Suffolk County, 2009 vs. 2013

Year	Farm - Suffolk County (tons)	Non-Farm - Suffolk County (tons)
2009	7,230.56	29,396.21
2013	12,726.57	18,095.89
Percent Change	**76.01%**	**-38.44%**

Suffolk County vs. New York State Sales

Figure 21 depicts the percentage of total fertilizer sold in Suffolk County as a portion of New York State. The amount of total fertilizer sold in Suffolk County in 2009 (the year the fertilizer legislation was enacted) was approximately 9% of all fertilizer sold in New York State. Since that time, total fertilizer sales in Suffolk County have decreased to approximately 5% of all fertilizer sold in New York State. Total fertilizer sold in Suffolk County as a portion of total fertilizer sold in New York State decreased by approximately 46% in 2013 as compared to 2009.

Figure 21. Fertilizer Sold in Suffolk County as a portion of New York State, 2009-2013

Year	Total Fertilizer
2009	8.9%
2010	6.6%
2011	5.8%
2012	5.5%
2013	4.8%
Percent Change 2009-2013	**-45.77%**

Figure 22 depicts the six year average (2008-2013) of non-farm fertilizer sold in Suffolk County as a portion of New York State in comparison to Suffolk County's 2010 population as a portion of New York State's 2010 population. From the figure below, it seems as though while only 7.7% of New York State's population resides in Suffolk County, Suffolk County uses 17.3% of the state's fertilizer for non-farm purposes (124.3% more non-farm fertilizer than it should be using based on population). Whilst this statement is certainly true, it should be noted that New York State has a vast metropolis which comprises 42.2% of the state's population, an area that uses very minimal fertilizer. New York City is an anomaly in this situation. Suffolk County's population-based fertilizer usage is skewed, based on the large population of New York City. In order to look at Suffolk County fairly, New York City should be excluded from the analysis.

Figure 22. Non-Farm Fertilizer Sold in Suffolk County as a portion of New York State (a six year average) in comparison to Suffolk County's 2010 population as a portion of New York State's 2010 population

	2010 Population	Six Year Non-Farm Fertilizer Average (Tons)
Suffolk County	1,493,350	24,881.87
New York State	19,378,102	143,946.58
Suffolk County as a Percentage of New York State	**7.71%**	**17.29%**

Figure 23 depicts the six year average of non-farm fertilizer sold in Suffolk County as a portion of New York State excluding New York City, in comparison to Suffolk County's 2010 population as a portion of New York State's 2010 population excluding New York City. When New York City is excluded from the analysis, Suffolk County comprises 13.3% of the state's population. Also excluding New York City's six year non-farm average usage, Suffolk County uses 18.6% of the state's fertilizer for non-farm purposes. Whilst this still indicates that Suffolk County is using a greater percentage of its fertilizer for non-farm purposes than the rest of the state based on its population (39.8% more), the discrepancy shrinks by 84.4% when excluding New York City.

Figure 23. A Six Year Average of Non-Farm Fertilizer Sold in Suffolk County as a portion of New York State excluding New York City in comparison to Suffolk County's 2010 population as a portion of New York State's 2010 population excluding New York City

	2010 Population	Six Year Non-Farm Average (Tons)
Suffolk County	1,493,350	24,881.87
New York State (excluding New York City)	11,202,969	133,455.44
Suffolk County as a Percentage of New York State (excluding New York City)	**13.33%**	**18.64%**

Figure 24 depicts the percent change for the years 2009 vs. 2013 for total fertilizer sold in Suffolk County as compared to New York State. While New York State saw an increase of more than 55% in total fertilizer sold, Suffolk County saw a decrease of almost 16% in total fertilizer sold for the same time period.

Figure 24. Percent Change of Total Fertilizer Sold in Suffolk County as compared to New York State, 2009 vs. 2013

Year	Total Fertilizer - Suffolk County (tons)	Total Fertilizer - New York State (tons)
2009	36,626.77	410,011.86
2013	30,822.46	636,204.97
Percent Change	**-15.85%**	**55.17%**

Suffolk County vs. Demographically Similar Counties: Nassau County and Westchester County

Long Island (Nassau and Suffolk Counties) is demographically dissimilar to the majority of New York state. Long Island is unlike upstate New York because of its high population density. Long Island is a suburb of New York City, and therefore has a lower population density. Long Island homeowners have larger properties than New York City homeowners, which in most cases means larger lawn areas.

Suffolk County is not only demographically similar to Nassau County, but also to nearby Westchester County. Figure 25 depicts the tons of non-farm fertilizer sold per residential square mile (a six year average). The average amount of non-farm fertilizer sold in Suffolk County was 71.59 tons per square mile for 2008-2013. The average amount of non-farm fertilizer sold in Nassau County was 74.97 tons per square mile and 39.57 tons per square mile in Westchester County during the same time period. While the amount of non-farm fertilizer sold per residential square mile was very similar for both Long Island counties (Nassau and Suffolk), the amount of non-farm fertilizer sold per residential square mile in the Long Island counties was about 45% more than what was sold in Westchester County.

Figure 25. Tons of Non-Farm Fertilizer Sold per Residential Square Mile (a Six Year Average)

	Tons of non-farm fertilizer sold per residential square mile (a 6 year average)
Suffolk County	71.59
Nassau County	74.97
Westchester County	39.57

3. Key Findings

- In 2012 the amount of non-farm fertilizer sold in Suffolk County was 80% of all fertilizer sold.
- In 2013 the amount of non-farm fertilizer sold in Suffolk County decreased by 30%. In 2013 the amount of non-farm fertilizer sold in Suffolk County was 59% of all fertilizer sold.
- Suffolk County uses 39.8% more fertilizer for non-farm purposes than the rest of the state (excluding New York City) based on its population.

- Since 2009 total fertilizer sales in all of New York State increased by 55%. Total fertilizer sales decreased in Suffolk County by 16% during this same time period.

4. Further Discussion

Suffolk County relies on data from the State of New York, Department of Agriculture and Markets (NYS Ag & Markets) to furnish our Nitrogen Fertilizer Reduction Initiative Annual Report. Suffolk County relies exclusively on data provided by NYS Ag & Markets and reports the data as it becomes available.

Suffolk County writes its Annual Report based on fertilizer sales data, which does not represent the amount of fertilizer that was applied in the county.

In comparison to fertilizer sales data, 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.

Furthermore, it would be extremely difficult to accurately relate changes in water quality to the effectiveness of public education from the nitrogen fertilizer reduction initiative alone, 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.

The Nitrogen Fertilizer Reduction Initiative is an important component of Suffolk County's comprehensive approach to reduce nitrogen in our waterways. This initiative, together with the Reclaim Our Water Initiative, Suffolk County envisions a future with the continued ability to provide a healthy and safe supply of potable water to County residents.