



# Connecticut Department of Energy and Environmental Protection

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Mattabassett WPCF

## Report of the Nitrogen Credit Advisory Board for Calendar Years 2014 and 2015 To the Joint Standing Environment Committee of the General Assembly

September 30, 2016

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**REPORT OF THE NITROGEN CREDIT ADVISORY BOARD  
FOR CALENDAR YEARS 2014 and 2015**

**TO THE JOINT STANDING ENVIRONMENT COMMITTEE  
OF THE GENERAL ASSEMBLY**

**Concerning the**

**NITROGEN CREDIT EXCHANGE PROGRAM**

**As required by  
Section 22a-523(c) of the  
Connecticut General Statutes**

**September 30, 2016**

This report has been prepared by the Nitrogen Credit Advisory Board and is respectfully submitted to the Joint Standing Environment Committee of the General Assembly pursuant to the requirement of Connecticut General Statutes (CGS) Section 22a-523(c). Such section requires that the Nitrogen Credit Advisory Board submit to the Joint Standing Environment Committee of the General Assembly a report that addresses issues associated with the implementation of the Nitrogen Credit Exchange Program. This report covers the period from January 1, 2014 to December 31, 2015.

This report provides a summary of the technical progress and financial requirements that the Nitrogen Credit Advisory Board deems necessary to achieve progress in this important program in reducing nitrogen loads to the Long Island Sound. The continued success of this program is dependent upon the development and application of innovative approaches and management techniques to meet nutrient reduction goals for the Long Island Sound.

## Executive Summary

In accordance with CGS Sec. 22a-523(c) the Nitrogen Credit Advisory Board (NCAB) submits this Report for calendar years 2014 and 2015 on the progress of the Nitrogen Credit Exchange Program.

### *Major accomplishments and activities relative to the 2014 and 2015 program operations include:*

- One of DEEP's management strategies to reduce nitrogen loading was to implement an innovative nitrogen-trading program among the municipal Water Pollution Control Facilities (WPCFs) located throughout the State which are covered under the General Permit for Nitrogen Discharges. The goal was to cost-effectively reduce the nitrogen load from those sources by about 64% by the end of 2014 through:
  - Encouraging denitrification at WPCFs with increased Clean Water Fund (CWF) grants
  - Spreading nitrogen removal upgrades over thirteen years, thereby reducing the financial impact on the CWF
- The State met the Total Maximum Daily Load (TMDL) in 2013. In 2014, the State just missed the TMDL, mostly due to three large WPCFs being under construction (Hartford WPCF, Mattabassett WPCF and New Haven WPCF), as well as the extreme cold weather at the beginning of the year.
- In 2015, the State met the TMDL, having the lowest amount of nitrogen reaching LIS since the start of the Nitrogen Credit Exchange Program. The TMDL was met in part because the Mattabassett WPCF's nitrogen levels dropped nearly by half.
- In 2014, the price of a credit was higher than 2013 due to increases in chemical and electrical costs.
- In 2014, forty WPCFs sold credits and thirty-nine WPCFs purchased credits.
- In 2015, the price of a credit was higher than 2014 because of the inclusion of capital costs for two large facilities coming on-line.
- In 2015, fifty-one WPCFs sold credits and twenty-eight WPCFs purchased credits.

### *The NCAB highlights:*

- The Clean Water Fund Project Priority List for fiscal years (FY) 2014 and 2015 was issued in its final form on July 18, 2014 and provided a plan of expenditure of \$67M in general obligation bonds and \$318M in revenue bonds in FY 2014 and in FY 2015, \$218M in general obligation bonds and \$261M revenue bonds. A portion of those funds for FY 2014 and FY 2015 were expended for nitrogen removal projects in Mattabassett, Hartford, New Haven, Plymouth, Manchester, and the Middletown WPCF abandonment project. Middletown flows will be directed to the Mattabassett District WPCF in 2019. Nitrogen removal projects that are currently under construction include Rocky Hill and Farmington.
- Fifty-four (54) WPCFs have become project facilities completing construction for nitrogen removal through 2015, with an expected total of fifty-eight (58) project facilities completing construction by 2018. The Mattabassett District WPCF and the Hartford WPCF completed

construction in 2014, while Manchester, New Haven, and Plymouth completed construction in 2015 and became project facilities in 2016. The cost for the Clean Water Fund for project facilities to remove 16,381 eq. lbs of N/day is \$452M to date with an expected cost of \$97M for projects in process through 2022. It is estimated that \$200 – 300 million have been saved by not requiring all WPCFs to upgrade.

- The Nitrogen General Permit was renewed during 2015 and the effective date was January 1, 2016, expiring in December 2018.
- The DEEP is projecting that in the future, the State will continue to comply with the TMDL since another two WPCFs with significant nitrogen loads will complete nitrogen removal projects by 2018. This will be aided by the continued ability of the operators to optimize nitrogen removal at the WPCFs.
- In 2015, the State subsidized nitrogen credit purchases in the amount of \$583,715. To address the unsustainable State subsidization of the program, and to avoid discontinuing the program, on June 5, 2015, [Public Act 15-38](#), *An Act Concerning the Sustainability of the Nitrogen Credit Exchange Program* was signed by the Governor. DEEP and the NCAB proposed the legislation to move the nitrogen trading program to self-sufficiency ("State subsidy neutral") for the 2015 trading calendar year, with credit exchange transactions to be completed by August 2016.
- The self-sufficiency scenario will be implemented in the following manner: the WPCFs not meeting their Nitrogen General Permit (NGP) limit ("the buyers") will continue to buy credits calculated in the usual manner; the WPCFs meeting their NGP limit ("the sellers") will divide the funds paid by the buyers proportionally, based on the seller's relative performance.

## **I. Introduction**

### **Background**

Long Island Sound's (LIS) most pressing water quality problem is caused by over enrichment of nutrients, specifically nitrogen, which leads to greatly reduced levels of dissolved oxygen (DO) in the bottom waters of western LIS. The overload of nitrogen fuels excessive growth of algae, which eventually dies, sinks to the bottom, and decays. During decay, the oxygen is consumed by bacteria and the DO in the water falls to levels well below those allowable in State Water Quality Standards. Low oxygen levels, or "hypoxia" typically occur during the months of July through September. These conditions are inadequate to support healthy populations of fish and shellfish because they create an ecosystem imbalance by disrupting the feeding, growth, and reproduction of nearly all forms of aquatic life. Primary sources of nitrogen include municipal WPCFs discharges, atmospheric deposition, and runoff from urban, suburban, and agricultural areas.

The Federal Clean Water Act requires that the State establish Total Maximum Daily Loads (TMDLs) for all water bodies that do not meet the minimum State Water Quality Standards, such as Long Island Sound. Once the State has established a TMDL, federal law requires that it be reviewed and approved by the federal Environmental Protection Agency (EPA). In April 2001, EPA approved Connecticut and New York's jointly submitted TMDL to address the impairment of Long Island Sound water quality that results from excessive nitrogen loading. The TMDL established the maximum loading amount of nitrogen that the Long Island Sound can assimilate without causing impaired water quality. It also apportioned the maximum loading amount among various sources, and laid out a plan to achieve the loading reductions necessary to meet State Water Quality Standards.

In the TMDL, the primary sources of nitrogen enrichment in the LIS are targeted for control, which include discharges from WPCFs, storm water runoff, and atmospheric deposition. By 2014, the TMDL requires both CT and NY to achieve a 58.5% collective reduction of nitrogen loading from point discharges and urban and agricultural runoff sources to the LIS from an established baseline. A 64% reduction goal was also set for WPCFs through a waste load allocation (WLA) process.

"Nitrogen trading" was identified as a mechanism for cost-effectively attaining the aggregate goal for Connecticut WPCFs. Public Act 01-180, codified in the Connecticut General Statutes in Sections 22a-521 through 527, established a Nitrogen Credit Exchange (NCE) overseen by a Nitrogen Credit Advisory Board (NCAB – Attachment A), and authorized issuance of a Nitrogen General Permit (NGP). Collectively, the NGP, NCE, and NCAB form the foundation for the nitrogen-trading program instituted by Connecticut in 2002, which has successfully completed 14 years of operation.

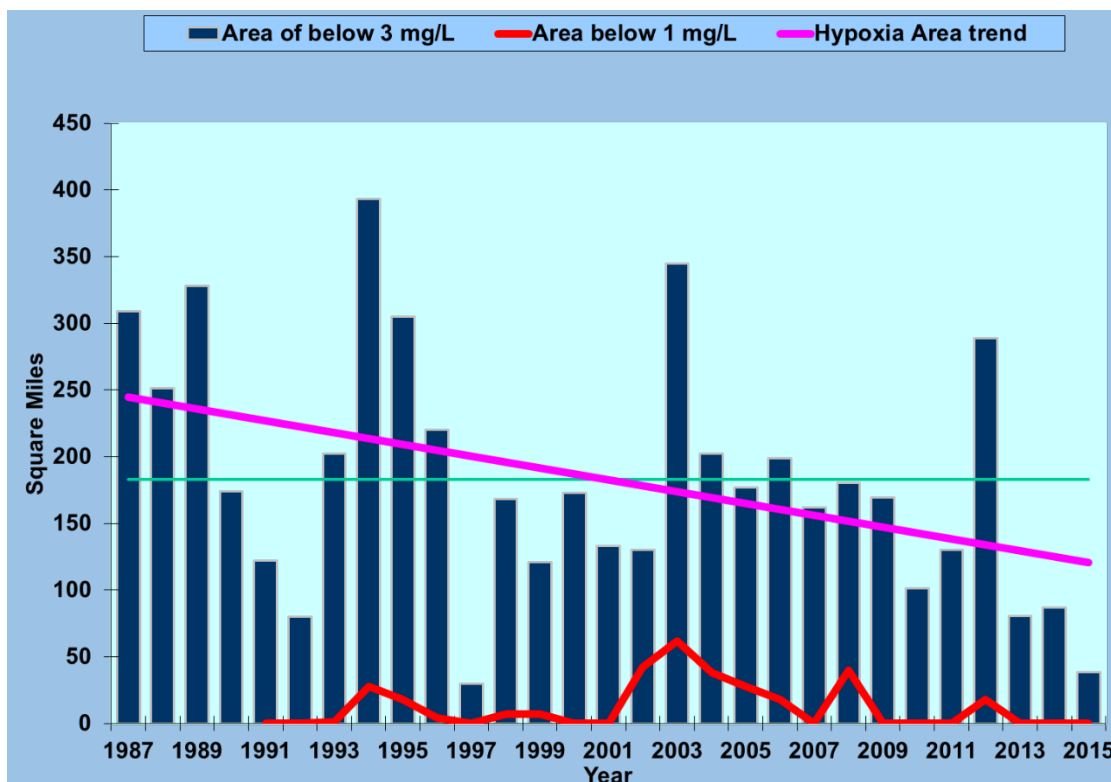
### **Condition of Long Island Sound**

Nitrogen trading has led to measurable reductions in Connecticut's nitrogen load to LIS. Signs of improvement in hypoxia are evident, but more reductions are still needed to meet management goals to attain a healthy LIS. Added attention must be directed towards point sources from outside of Connecticut and from atmospheric sources, and storm water and nonpoint source runoff.

The area affected by hypoxia in LIS monitored each summer by DEEP staff with funding from the EPA Long Island Sound Study (LISS), provides a good indicator of the overall condition and long term trend (Figure 1). Although annual variation is large, subject to changing weather conditions that affect the severity of hypoxia each year, the underlying trend in hypoxic area is downward. That change is illustrated by the direction of the Hypoxic Area trend (Figure 1) and although there have been periods of increase and decrease, overall, it shows a decreasing trend. Since 1987, the affected area has averaged

about 182.7 square miles and throughout the last 10 years, only the 2003 and 2012 were significantly higher than the long term average. Taking into consideration that several of the warmest years on record, which exacerbate hypoxia, have occurred in the last 10 years, the areal indicator still appears to be benefitting from nitrogen management.

According to the Northeast Regional Climate Center, July and August of 2015 were 2-3 degrees warmer than normal, even though early spring temperatures were below normal across the Northeast. Additionally, precipitation was below normal for the summer period (June-August). Compared to the averages throughout the 27-year period, the hypoxia level in 2015 was below average in area and close to average in duration. In fact, 2015 had the second smallest area behind 1997, which had an area of 38.3 square miles.



**Figure 1. Area and trend of hypoxia in Long Island Sound, 1987-2015.**

During 2015, hypoxia in Long Island Sound reached its maximum extent by mid-August and continued into September, finally subsiding around September.

### **2014 and 2015 Performance of the Nitrogen Credit Exchange**

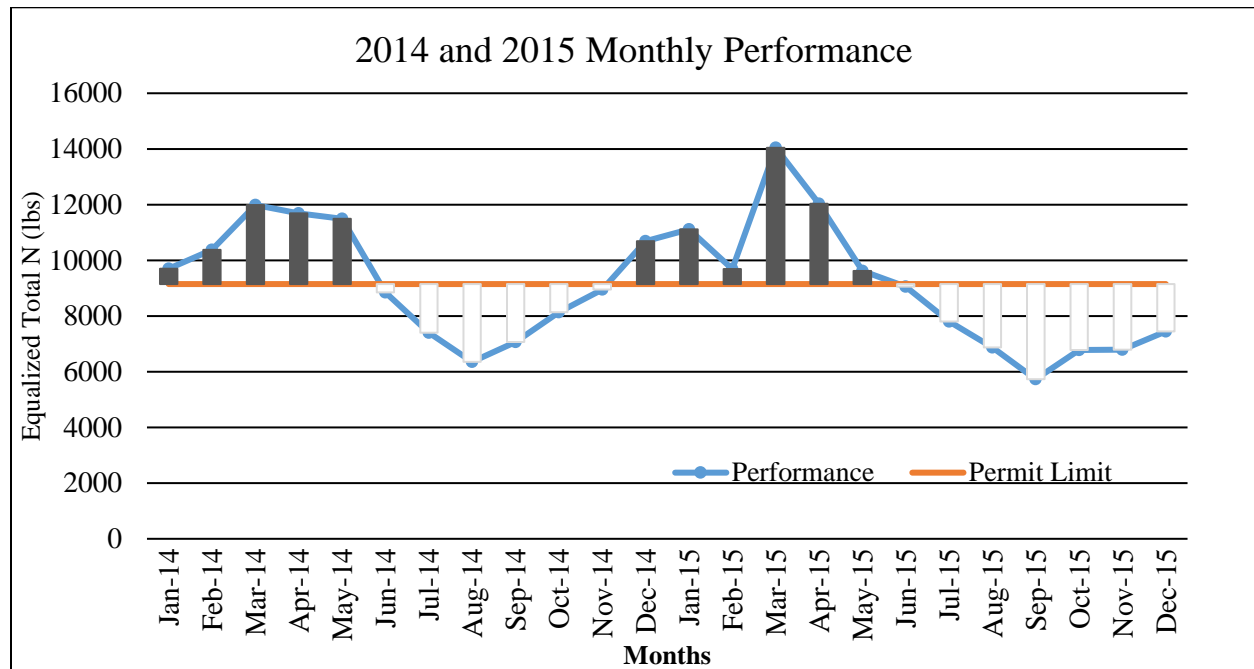
In 2014, the nitrogen loading from WPCFs to LIS averaged approximately 9,393 eq. lbs N/day, which is 245 eq. lbs N/day higher than the 2014 TMDL permit limit of 9,148 eq. lbs N/day (Attachment B). The extreme cold weather as well as ongoing construction at the two largest WPCFs in the State certainly did not help.

March 2014 had the highest aggregate nitrogen load in that year with 11,983 eq. lbs N/day, due to the combination of generally wet and cold weather within the first 5 months of that year (Figure 2).



The State did comply with the 2015 TMDL permit limit, despite the extreme cold weather at the beginning of the year and the ongoing construction at New Haven’s WPCF. The equalized average in that year was 8,914 lbs/day (Attachment C).

September 2015 had the best aggregate monthly performance with 5,732 eq. lbs N/day (Figure 2) since the program started, beating the previous record performance in 2014 of 6,359 eq. lbs N/day. The completion of construction at WPCFs in Manchester, New Haven, and Plymouth in 2015, as well as the warm weather during the summer ultimately helped the State to comply with their 2015 TMDL permit limit of 9,148 lbs/day.



**Figure 2. Monthly aggregate performance of 79 facilities during 2014 and 2015.**

## II. The 2014 and 2015 Nitrogen Credit Exchange

### Credit Price

The NCAB proposes an annual value for equalized nitrogen credits to the Commissioner of Department of Energy and Environmental Protection. The NCAB derives this value by dividing the total annual project cost by the reduction in equalized pounds of nitrogen. The statute identifies the total project cost as: 1) capital expenditures for construction of nitrogen removal facilities and 2) ongoing operation and maintenance costs for nitrogen removal treatment.

Cost of an equalized credit is derived by the following formula:

$$\text{The value of an equalized credit} = \frac{\text{Capital Costs} + \text{Operational Costs}}{\text{Total amount of equalized nitrogen reduced from project facilities}}$$

"Nitrogen Removal Project" is defined as any alteration financed by Connecticut’s Clean Water Fund (CWF) of the physical structure of a wastewater treatment facility specifically constructed to remove nitrogen. A "Project Facility" is further defined as any facility with a fully operational nitrogen removal system of any scale on January 1 of the trading year. Under this definition, Putnam became a project



facility in 2014, while in 2015 Mattabasset became a project facility. Hartford was already considered a project facility since 2009 when an interim phase 1 nitrogen removal project was installed. Therefore, Fifty-four (54) WPCFs have become project facilities by completing construction for nitrogen removal through 2015.

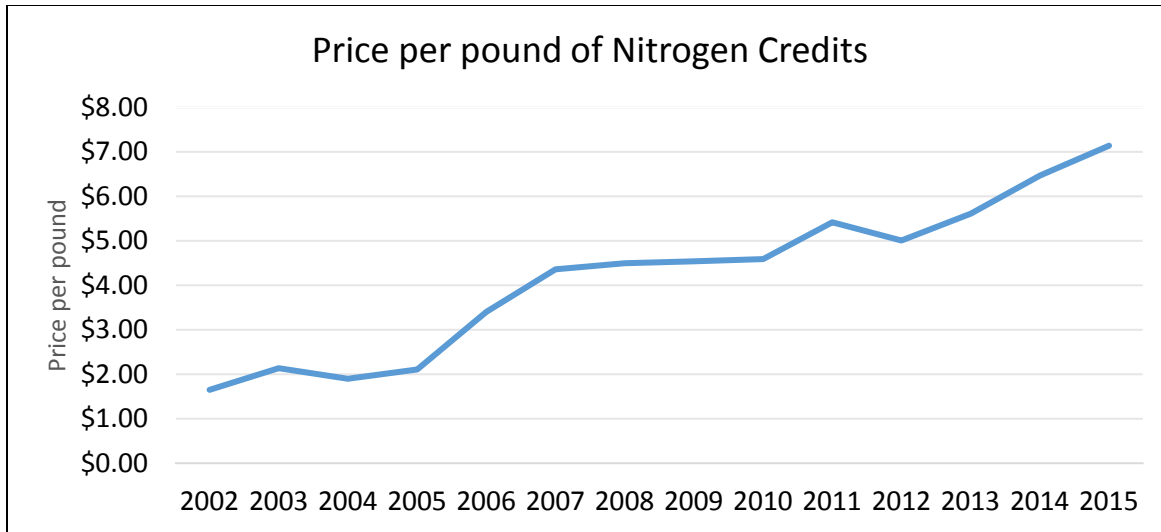
"Capital Costs" were established by the NCAB as the annual CWF repayment amount associated with the construction of nitrogen treatment facilities set forth in the loan agreement between the municipality and DEEP. Financing derived from grants to municipalities is not considered to be part of the capital cost for the purpose of setting credit prices. Using this procedure, the NCAB established the annual capital cost for nitrogen treatment in 2014 as \$11,896,916 (Attachment I). This value represents the annual interest and repayment of principal on the 2% loans for nitrogen removal processes. In 2015, the annual capital cost for nitrogen treatment increased to \$16,829,230 since two large facilities, Mattabasset and Hartford became project facilities. (Attachment J).

"Operation and maintenance costs" were estimated by means of a survey sent to all project facilities. The Department staff reviewed all survey data for consistency and reasonableness and an estimate of \$22,632,427 was adopted by the NCAB as the annual operation and maintenance cost for nitrogen removal in 2014. Combining capital and operation and maintenance costs yielded a total cost of \$34,529,343 (Attachment I). In 2015, the total annual operation and maintenance cost didn't increase substantially because electricity usage stayed stable. The total annual cost in 2015 was \$39,531,090, slightly higher than that of 2014 (Attachment J).

The reduction in equalized pounds of nitrogen was calculated by subtracting the actual end-of-pipe pounds of nitrogen discharged by each of the project facilities from the "baseline" loading established for that facility in the TMDL for Long Island Sound. The baseline loading represents the loading of nitrogen each facility would have discharged if no nitrogen treatment was provided. Load reductions for each facility were multiplied by the equalization factor for the facility (converting the pounds reduced to equalized pounds reduced) and the statewide reduction was calculated by summing the equalized pounds reduced for all project facilities. Using this procedure, a total of 14,606 eq. lbs N/day was reduced by the 53 project facilities that were online in 2014 (Attachment G). Based on these analyses, the cost in 2014 was determined by dividing the total project cost of \$34,529,343 by 14,606 pounds per day of equalized nitrogen removed during the year multiplied by 365 days in the year. In 2015, the total project cost of \$39,531,090 divided by the 15,166 pounds per day of equalized nitrogen which was removed by the 54 project facilities that were online in 2015.

The NCAB formally submitted recommendations to DEEP Commissioner Klee to establish the value of an equalized nitrogen credit at \$6.47 for trading in 2014 and \$7.14 in 2015. The Deputy Commissioner, on behalf of the Commissioner, accepted these recommendations and issued draft rulings pursuant to CGS Section 22a-527 (Attachment L & M). No municipality petitioned for a review of the Commissioner's draft ruling during the statutory 15-day review period either time, and the draft rulings became final establishing the value of an equalized nitrogen credit at \$6.47 for 2014 and \$7.14 for 2015.

The price of a nitrogen credit was higher by \$.86 in 2014 compared to 2013 because of the slight increase in Operation and Maintenance costs and because less pounds were removed in 2013 than 2014. The price of a nitrogen credit was higher in 2015 by \$.67 than it was in 2014.



**Figure 3. Price per pound of Nitrogen Credits 2002 - 2015.**

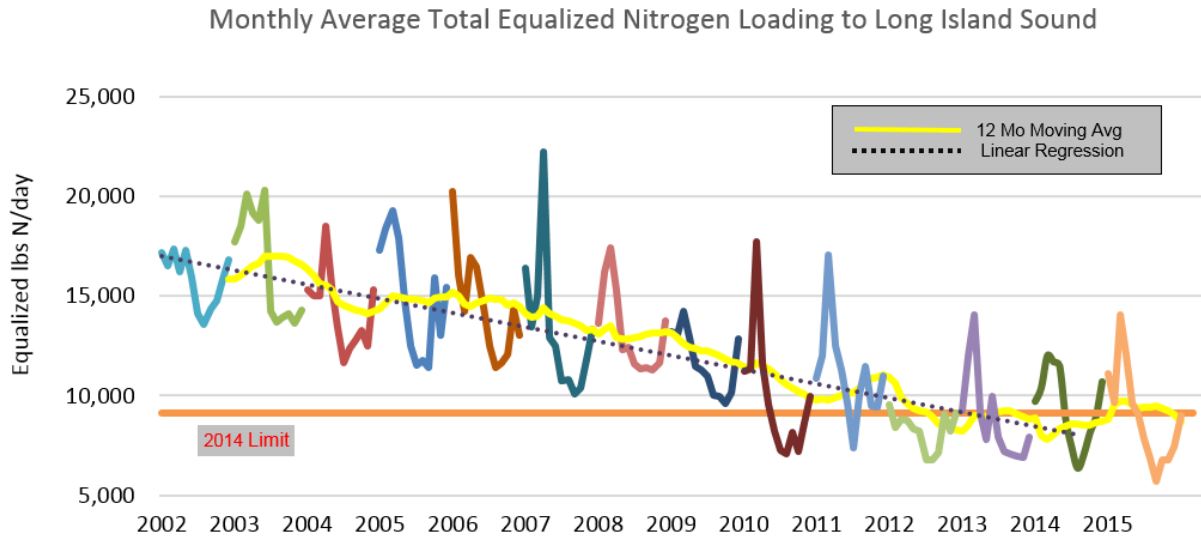
### **Numbers of Credits Traded and Final Balances**

In 2014, thirty-nine facilities were required to purchase credits in order to remain in compliance with the Nitrogen General Permit. The total amount of purchased credits amounted to \$4,171,301 (Attachment E). However, forty WPCFs sold credits which amounted to a total value of \$3,567,452 (Attachment E). The State was slightly over the permit limit in 2014 which resulted in fewer municipalities being able to sell rather than purchase nitrogen credits. In 2015, the State was in compliance with their permit limit therefore more (fifty-one) municipalities were able to sell credits. The value for facilities that sold credits (fifty-one facilities) was \$5,500,696, while the value for facilities that purchased credits (twenty-eight facilities) was \$4,916,981 (Attachment F).

### **III. Progress towards TMDL goal**

#### **Nitrogen Loading Trend**

At the start of the Nitrogen Credit Exchange Program in 2002, the nitrogen loading from WPCFs to LIS averaged approximately 15,840 eq. lbs N/day, and the equalized permit limit was 18,220 eq. lbs N/day. In 2015, the equalized average dropped to 8,914 eq. lbs N/day, which is 6,926 lbs lower than the average nitrogen load in 2002. Looking at the linear trendline as well as the 12 month moving average (yellow line) in Figure 3, the total equalized nitrogen loading to LIS has been constantly decreasing due to the increased number of WPCFs completing upgrades for nitrogen removal facilities. By the end of 2015, a total of 68% of WPCFs involved in the Nitrogen Credit Exchange Program became project facilities, which ultimately helped the State comply with the TMDL permit limit.



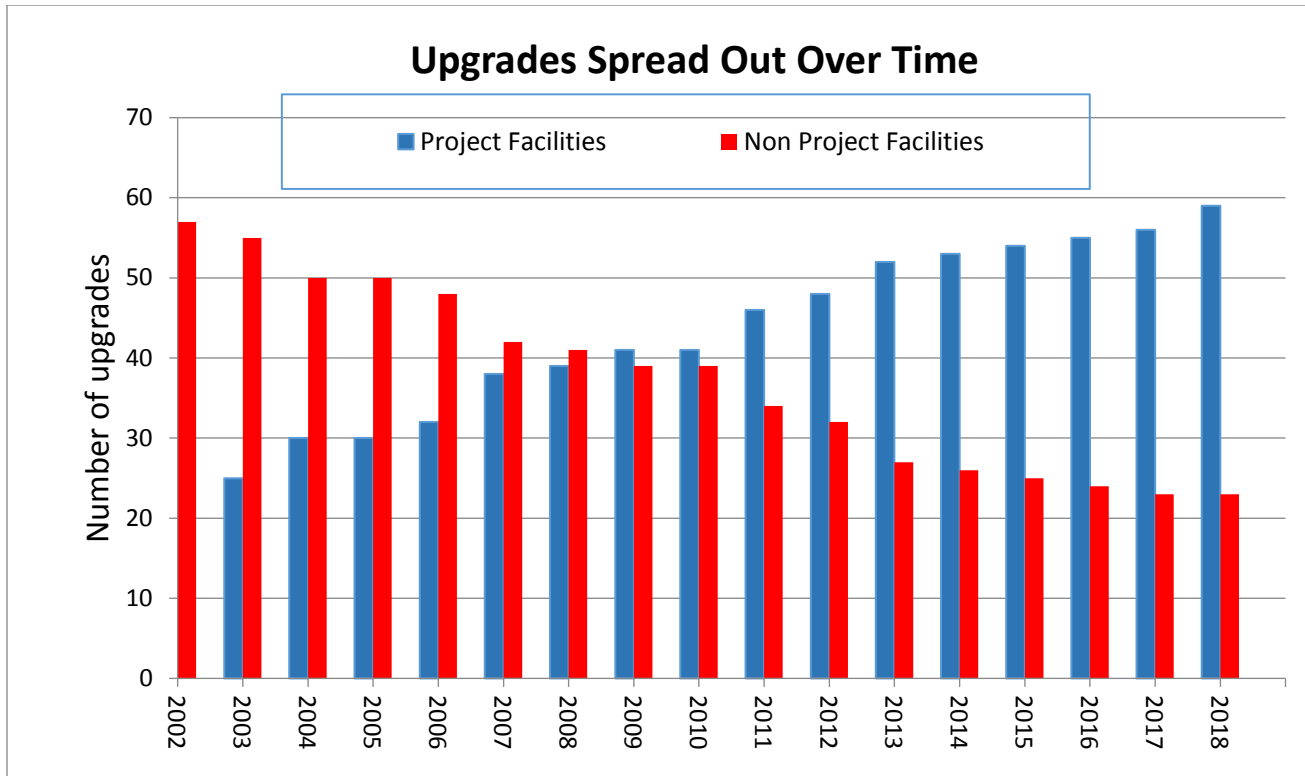
**Figure 4. Monthly average total nitrogen loading to Long Island Sound 2002-2015**

**Meeting the 2014 Waste load Allocation and Permit Limits.**

The nitrogen trading program has been an innovative approach to cost effectively meet the TMDL goal of reducing nitrogen loading by 65% by:

- Encouraging denitrification at WPCFs by providing enhanced Clean Water Fund grants
- Spreading nitrogen removal upgrades over twelve years, allowing WPCFs to purchase credits rather than immediately upgrade to meet 65% removal requirements
- Providing a fiscal alternative to the immediate expenditure of capital funds.

The DEEP is projecting that the State will continue to comply with the TMDL through 2018 as an additional 216 eq. lbs N/day is projected to be reduced as a result of projects in Rocky Hill and Farmington, and Middletown flows being directed to the Mattabassett District WPCF. This will be aided by the continued ability of the operators to optimize nitrogen removal at the WPCFs. A total of 58 project facilities are anticipated by the 2018 trading year (Figure 4).



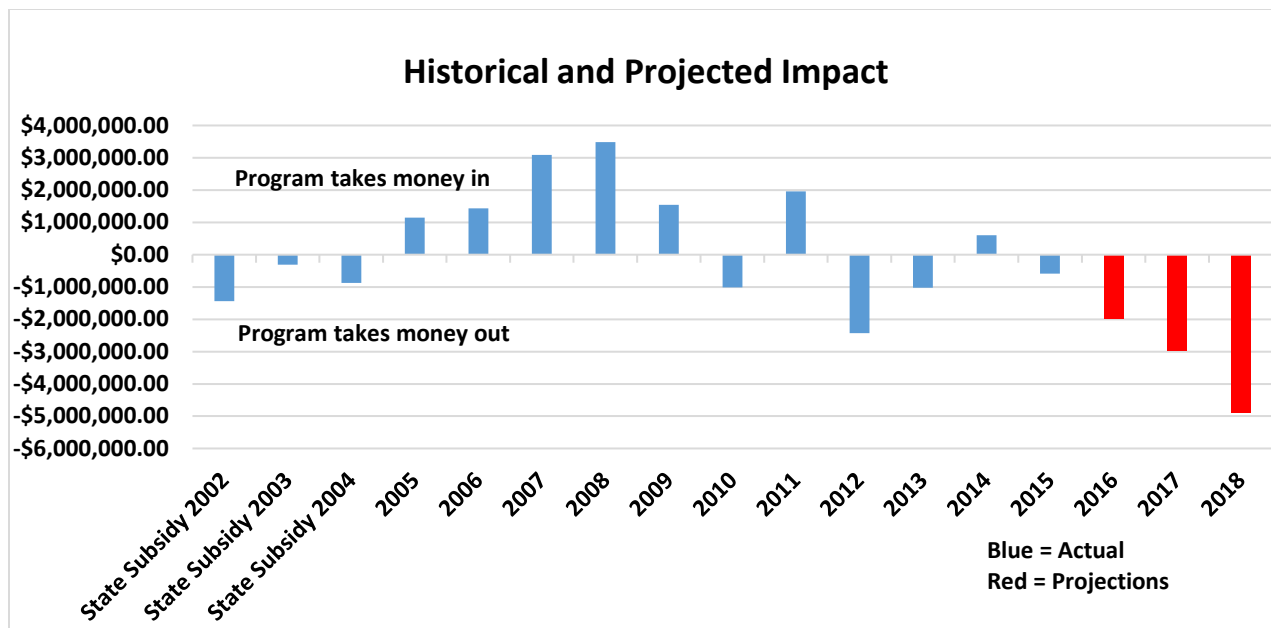
**Figure 5. Upgrades of WPCFs 2002-2018**

**Revisions to the Program**

In 2014, thirty-nine WPCFs were required to purchase credits in order to maintain compliance with the Nitrogen General Permit at a value of \$4,171,301. In the same year, forty WPCFs sold credits valued at \$3,567,452 (Attachment E).

In 2015, twenty-eight WPCFs were required to purchase credits in order to comply with the Nitrogen General Permit at a value of \$4,916,981 and fifty-one WPCFs sold credits valued at \$5,500,696. This left an excess of credits valued at \$583,715 that the State had to purchase in 2015 (Attachment F).

The projections for 2018, following the current program and based on an average performance year, would have had the State subsidizing the program at around \$5 million per year (Figure 5). This level of continued subsidization was determined not to be sustainable for the State.



**Figure 6. Balance Buyers-Sellers and Projections**

To address the unsustainable State subsidization of the Nitrogen Trading Program, the DEEP and the NCAB explored different scenarios.

In 2014, the NCAB voted to move the trading program forward to self-sufficiency and statutory changes were done to avoid long-term State subsidization.

The self-sufficiency scenario achieves a revenue-neutral state in the following manner: The WPCF not meeting the Nitrogen General Permit goals (“the buyers”) will continue to buy credits and the WPCFs meeting the Nitrogen General Permit goals (“the sellers”) will divide the funds paid by the buyers proportionally, based on the seller’s relative performance. Most sellers will receive a reduction in the amount received as the State would no longer be subsidizing credits and the number of buyers is decreasing.

The next steps to comply with the near-term goals of the trading program are to:

- Maintain compliance with the TMDL by continuing to encourage optimizing denitrification at WPCFs consistent with requirements in WPCF NPDES permits
- Continue the use of the Nitrogen General Permit, renewed in 2015
- Maintain options for future compliance should the TMDL be modified
- Move the trading program to self-sufficiency to eliminate continuing State subsidy in trading calendar year 2016

#### **IV. Finances**

##### **The Clean Water Fund (CWF)**

The FY 2014 and FY 2015 State capital budget increased Connecticut’s ability to meet State wastewater infrastructure needs and provided a stimulus to a sagging economy. This budget set a new high for Clean Water Fund allocations at a time when the economic benefits to the State were most needed.

The CWF Priority List for FY 2014 and FY 2015 became effective on July 18, 2014. The level of State funding for the CWF program was as follows:

FY	General Obligation Bonds	Revenue Bonds	Total Funding
2014	\$67M	\$318M	\$385M
2015	\$218M	\$261M	\$479M

A portion of the available funding for FY 2014 and FY 2015 was expended for nitrogen removal projects in Mattabassett, Hartford, New Haven, Plymouth, Manchester and the Middletown WPCF abandonment project. Middletown flows will be directed to the Mattabassett District WPCF in 2019. It is expected that in FY 2016 and FY 2017, nitrogen removal projects will be under construction in Rocky Hill, Norwich, Farmington, East Hartford, and Torrington.

### **Investment in Projects Online**

Putnam became a project facility for the 2014 trading year and Hartford (Phase 2) and Mattabassett for the 2015 trading year. Hartford and Mattabassett were funded by the CWF with a total upgrade investment of \$106 million with the denitrification portion resulting in an annual CWF loan repayment cost of \$5 million. The full list of nitrogen removal projects that have been completed or are currently approved for funding by the CWF are shown in Attachment K.

The Nitrogen Trading Program has been an innovative approach to cost effectively meet the 2014 TMDL. It is estimated that this fiscal strategy has resulted in cost savings of \$300 - \$400 million. To date, \$452 million has been funded by the CWF to upgrade 59 facilities for nitrogen removal costs.

### **Use of Nitrogen Credit Exchange Funds**

According to CGS Sec. 22a-524(b)(11), the Commissioner, in consultation with the NCAB, shall: "Establish accounts of funds created from the purchase and sale of equivalent nitrogen credits to be used for administration of the Nitrogen Credit Exchange Program and which may be used for nitrogen removal projects, habitat restoration projects and research". Furthermore, in CGS Sec. 22a-524(b)(12), the Commissioner, in consultation with the NCAB, shall: "Establish any other policies or procedures the commissioner may deem necessary to carry out the Nitrogen Credit Exchange Program; and CGS, Sec. 22a-524(b)(13) provides abilities to "establish a technical assistance program" to educate and assist municipalities in implementing the Nitrogen Credit Exchange Program".

Over the past years, the NCAB recommended the funds be used for training and providing technical assistance.

Other projects that are in progress and funded with the credit exchange funds are:

- Providing funding to the USGS for enhanced Connecticut River monitoring. In November 2007, \$180,000 was allocated to monitor the river. In December 2010, the NCAB allocated an additional \$90,000 for FY 2011 and FY 2012 to continue monitoring and in 2012, an additional \$45,000 was allocated to monitor the river during 2013. USGS monitored nitrogen loads during different seasons and during the storms in 2011 and 2012. The monitoring of the Connecticut River at Middle Haddam uses new and novel approaches for continuous total nitrogen monitoring. The project is ongoing and the data analysis developed under this project element will help to advance the understanding of the hydrologic and water-quality processes in the tidal environment, as well as advancing both field and analytical methodology. Supplemental funding

of \$206,000 and \$100,000 respectively, was approved to continue nitrogen monitoring in 2014 and 2015 at the Connecticut River at Middle Haddam.

- The NCAB funded enhanced nutrient monitoring Statewide by partnering with the USGS. In 2008, \$240,000 was provided for monitoring to be conducted on rivers throughout the State to better determine nitrogen loads from within and outside of Connecticut. An additional \$323,500 was allocated to keep monitoring in federal fiscal year 2011 (\$45,000) and 2012 (\$45,000) and 2013 (100,000). Using those data along with their existing database USGS released a report on nitrogen loads and trends to Long Island Sound entitled *Estimated Nitrogen Loads from Selected Tributaries in Connecticut Drainage to Long Island Sound, 1999 – 2009*. <http://pubs.usgs.gov/sir/2013/5171/>. Another \$100,000 was funded to continue monitoring in 2014 and 2015 in rivers throughout the State.
- The nitrogen load monitoring at different sites are the core network for Long Island Sound nitrogen load calculations. The results from the sites allow us to highlight the changes that have taken place at some of the sewage treatment plants. USGS is finalizing regression models to calculate nitrogen from continuously measured data and the web tool has been built to present the data more frequently.
- The NCAB has also recommended five years of membership (2011-2015) in the Water Environment Research Foundation (WERF), now Water Environment & Reuse Foundation (WE&RF), at a cost of \$10,250 per year. WERF keeps members informed on the latest research, technology, technical discussion groups, seminars, and workshops relevant to treatment plant operations and nitrogen removal.
- The NCAB recommended \$1,966,500 be used for funding the purchase of on-line (automated) or portable analyzers for dissolved oxygen (DO) and nitrogen analyzer equipment for those WPCFs that don't currently have equipment, or adequate equipment. WPCFs were reimbursed 75% of the purchase price, which is estimated to be \$40,000 for two on-line analyzers and \$3,000 for portable analyzers. Seventeen facilities requested money and were reimbursed in the total amount of \$550,097. Facilities have been better able to control the amount of dissolved oxygen entering the anoxic zones and optimize nitrate recycles and supplemental carbon.

## **V. Revisions to the TMDL/Upper Connecticut River**

The Total Maximum Daily Load (TMDL) for nitrogen, adopted in 2001, included a timeline for regular evaluation of TMDL progress and revisions, as appropriate, in order to account for the phased implementation approach of the TMDL. These steps were anticipated to account for finalization of the federal dissolved oxygen criteria for coastal waters, anticipated changes in Connecticut and New York water quality standards, a new System-Wide Eutrophication Model (SWEM) for Long Island Sound, and more specific nitrogen reduction targets for Upper Connecticut River Sources throughout Massachusetts, New Hampshire and Vermont and for atmospheric deposition. To date, the federal dissolved oxygen criteria has been finalized, Connecticut and New York's water quality standards for dissolved oxygen have been adopted, the SWEM model has been adapted for Long Island Sound, and several studies related to nitrogen loading and delivery in the Upper Connecticut River watershed have been completed. In 2010, the EPA Regional Administrators (Regions 1 and 2) and the Commissioners from the Long Island Sound watershed States agreed to proceed with a five-State TMDL. A TMDL workgroup was formed which held bi-weekly conference calls to work through the necessary tasks relative to TMDL implementation and evaluation. In 2011, the workgroup identified technical issues and held a joint meeting with State water directors and EPA. The outcome of this meeting was to develop an enhanced



implementation plan for the current TMDL, while moving forward with a more comprehensive analysis to support the revision of the TMDL at a later date. In 2013, the five-States and the New England Interstate Water Pollution Control Commission completed an evaluation of current storm water and nonpoint source control efforts to qualitatively assess whether they were adequate for meeting the 2000 TMDL load allocations. The final report is available on DEEP's website: ([http://www.ct.gov/deep/lib/deep/water/lis\\_water\\_quality/nitrogen\\_control\\_program/tmdl.pdf](http://www.ct.gov/deep/lib/deep/water/lis_water_quality/nitrogen_control_program/tmdl.pdf)). EPA's Long Island Sound Study continues to work towards the development of a tracking system to quantitatively assess progress relative to the original 2000 TMDL nonpoint source and storm water allocations.

In 2015, EPA released a new nitrogen reduction strategy for LIS which is intended to advance implementation of the TMDL and increase the area subject to nitrogen reductions. The approach addresses three watershed groups of LIS: coastal watersheds (embayments), large riverine watersheds (Housatonic River, Connecticut River, and Thames River), and Western Long Island Sound (offshore). EPA's strategy involves the use of nitrogen thresholds to develop ecologically based targets for each of these groups. Currently, DEEP is developing its second generation nitrogen strategy. DEEP's strategy will focus on nitrogen reductions in three main areas: wastewater treatment plants, nonpoint source and storm water management, and embayments. DEEP recently released a draft Integrated Resources Water Management Report that prioritizes watersheds and embayments for further analysis within the next five years. A pilot study to evaluate the impacts of nitrogen in the Niantic River Estuary is currently being overseen by members of the Niantic River Nitrogen Work Group.

A project to improve the SWEM model was undertaken in 2010 and funded by the Long Island Sound Study. The project improved the calibration of SWEM to more accurately reflect actual production and respiration estimates, incorporated an algal production formulation, developed high resolution output in NETCDF format, and developed a website dedicated to making the SWEM model more accessible to the scientific community. This project increased the model's consistency with the scientific communities' understanding of mixing and circulation in estuaries when compared to the previous version. Although the model is now more consistent with observed estimates of primary production and community respiration, the model continues to over predict dissolved oxygen levels observed in the bottom water of LIS. At this time, the model has limited applicability to management and will be considered with other model applications to determine the best modeling approach for LIS.

## **VII. Attachments**

- A. Nitrogen Credit Advisory Board Members 2014-2015
- B. Total Nitrogen Balance Sheet – 2014 Monthly Averages by Plant
- C. Total Nitrogen Balance Sheet – 2015 Monthly Averages by Plant
- D. Total Nitrogen Balance Sheet – Monthly Averages by Plant 2002 - 2015
- E. LIS Total Nitrogen Credit Exchange Balance – 2014
- F. LIS Total Nitrogen Credit Exchange Balance – 2015
- G. Equalized lbs Reduced by Project Facilities 2014
- H. Equalized lbs Reduced by Project Facilities 2015
- I. Total Annual Project Cost 2014
- J. Total Annual Project Costs 2015
- K. Nitrogen Removal Projects Financed by the CWF through 2015
- L. Notice of Proposed Value of an Equivalent Nitrogen Credit for 2014
- M. Notice of Proposed Value of an Equivalent Nitrogen Credit for 2015
- N. General Permit for Nitrogen Discharges
- O. LIS Total Nitrogen Credit Exchange Projections – 2016 and 2017
- P. Nitrogen Credit Advisory Board 2017 Meeting Schedule

## **VIII. Acknowledgements**

DEEP thanks to the members of the NCAB for their contributions to this document and ongoing participation in the NCE Program.

**Attachment A**

**LIST OF APPOINTEES 2014-2015**

	<b><u>Name</u></b>	<b><u>Current Appointing Authority</u></b>	<b><u>Term</u></b>	<b><u>Term Expires*</u></b>
1.	Vacant	Senate Majority Leader	3 years	
2.	April Capone Office of Policy and Management 450 Capital Avenue Hartford, CT 06106	Ben Barnes Office of Policy and Management	No specific term	
3.	Thomas A. Tyler The Metropolitan District 240 Brainard Road Hartford, CT 06114	Senate President Pro Tempore	3 years	
4.	Betsey Wingfield Bureau Chief DEEP 79 Elm St Hartford, CT 06016 Phone: (860) 424-3704	Robert Klee Commissioner Environmental Protection	No specific term	
5.	Marie Moylan Hoadley Office of the Treasurer 55 Elm Street Hartford, CT 06106 Phone: (860) 702-3138	Denise L. Nappier Treasurer Office of the Treasurer	No specific term	
6.	Astrid T. Hanzalek 31 Abraham Terrace Suffield, CT 06078 Phone: (860) 668-2739	Lawrence F. Cafero, Jr. House Minority Leader (Ward Appointee)	3 years	

7.	Vacant	House Majority Leader	3 years	June 2008 *
8.	Joseph Michelangelo 1 Fitzgerald Lane Branford, CT 06405	John McKinney Senate Minority Leader	3 years	January 2013*
9.	Vacant	Governor	3 years	
10.	Guy P. Russo 599 Chamberlain Hill Road Middletown, CT 06457	Joe Aresimowicz House Majority Leader	3 years	
11.	Vacant	Senate Majority Leader		
12.	William Norton, Director City of West Haven WPCA 355 Main Street West Haven, CT06516 (203) 937-3706	Christopher G. Donovan Speaker of the House	3 years	February 2008*

\* Appointees remain active until removed by their appointees' authority

Attachment B

## Total Nitrogen Balance Sheet -2014 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Zone 1														
GROTON CITY WPCF	99	98	69	71	91	150	113	104	79	71	93	103	90	145
GROTON TOWN WPCF	153	220	237	218	247	205	209	254	264	188	149	210	253	201
JEWETT CITY WPCF	15	7	15	9	6	4	4	4	3	3	3	4	12	21
KILLINGLY WPCF	131	151	122	151	173	274	264	208	90	97	125	104	73	125
LEDYARD WPCF	7	7	18	8	7	8	6	6	6	5	4	4	4	5
MONTVILLE WPCF	118	62	52	50	68	92	135	57	42	33	39	57	59	62
NEW LONDON WPCF	386	281	290	305	252	301	321	252	274	236	205	267	325	343
NORWICH WPCF	201	562	652	692	788	688	523	533	488	384	471	573	452	498
PLAINFIELD NORTH WPCF	34	88	107	153	139	142	92	87	76	32	37	51	67	71
PLAINFIELD VILLAGE WPCF	24	49	55	50	43	49	73	41	79	26	10	43	59	54
PUTNAM WPCF	53	42	45	74	68	52	51	31	29	24	29	24	31	47
SPRAGUE WPCF	7	12	22	16	13	17	10	6	8	12	11	9	6	16
STAFFORD SPRINGS WPCF	60	89	101	97	113	157	97	85	69	68	66	69	53	93
STONINGTON BOROUGH WPCF	14	14	22	27	24	32	19	8	7	6	11	8	3	6
STONINGTON MYSTIC WPCF	27	30	39	35	36	40	46	53	50	12	13	12	9	12
STONINGTON PAWCATUCK WPCF	24	16	24	22	23	27	18	14	12	9	8	13	12	11
THOMPSON WPCF	10	47	29	51	71	61	75	63	51	43	30	29	31	27
UCONN WPCF	44	73	130	127	134	122	38	19	25	29	50	67	57	82
WINDHAM WPCF	125	141	130	229	395	262	114	103	83	68	69	66	84	85
Zone 2														
BRISTOL WPCF	398	508	496	451	490	770	746	531	415	359	430	437	417	558
CANTON WPCF	24	81	99	111	104	88	94	68	64	46	71	73	82	77
EAST HAMPTON WPCF	54	83	116	107	82	64	92	67	47	72	78	74	103	98
EAST HARTFORD WPCF	292	462	562	629	651	601	595	657	362	317	232	229	318	386
EAST WINDSOR WPCF	59	30	37	41	34	49	43	35	25	10	17	22	22	27
ENFIELD WPCF	278	253	268	227	247	321	239	269	215	233	246	234	228	309
FARMINGTON WPCF	178	311	308	279	317	318	544	388	325	208	182	246	253	361
GLASTONBURY WPCF	98	62	48	44	81	56	81	64	83	46	72	52	44	72
HARTFORD WPCF	2377	3194	4434	4099	4308	4351	4437	2267	1752	1752	1829	1805	3430	3863
MANCHESTER WPCF	312	674	1095	1054	1115	1119	499	650	624	365	367	417	351	427
MATTABASSETT WPCF	834	1198	2018	2282	2328	1740	1776	434	428	500	396	503	771	1203
MIDDLETOWN WPCF	222	544	555	574	560	871	592	482	420	397	540	426	455	651
NEW HARTFORD WPCF	3	4	3	2	2	9	14	6	4	2	2	1	1	1
PLAINVILLE WPCF	101	112	62	121	156	148	177	95	106	53	108	99	110	114

## Total Nitrogen Balance Sheet -2014 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PLYMOUTH WPCF	42	67	78	52	66	75	68	52	60	43	39	68	89	118
PORTLAND WPCF	31	21	17	22	30	39	35	17	13	14	15	18	15	22
ROCKY HILL WPCF	288	420	351	272	430	568	485	392	395	429	360	358	409	588
SIMSBURY WPCF	107	57	61	78	49	58	54	40	51	78	77	68	32	41
SOUTH WINDSOR WPCF	106	103	81	95	93	88	119	115	107	105	115	105	110	102
SUFFIELD WPCF	45	27	38	35	51	52	21	10	15	9	10	15	15	47
VERNON WPCF	184	427	432	467	427	499	612	536	385	401	356	287	327	393
WINDSOR LOCKS WPCF	66	56	82	54	63	81	68	47	51	47	44	42	44	45
WINDSOR POQUONOCK WPCF	98	525	534	510	560	671	609	534	501	460	449	510	464	503
WINSTED WPCF	64	84	97	107	100	137	96	65	56	52	60	77	67	99

### Zone 3

BRANFORD WPCF	192	108	95	115	138	200	90	122	111	113	64	80	55	111
CHESHIRE WPCF	103	73	44	105	67	163	72	49	58	56	60	82	41	76
MERIDEN WPCF	449	145	154	131	150	337	208	111	85	91	60	87	101	222
NEW HAVEN EAST WPCF	1568	2894	1491	1596	2109	1676	2684	3311	2874	2155	3723	4326	4211	4572
NORTH HAVEN WPCF	158	158	269	169	191	164	192	156	148	119	115	108	118	143
SOUTHINGTON WPCF	204	198	442	569	559	169	118	59	65	77	69	52	76	122
WALLINGFORD WPCF	269	423	532	508	594	748	516	317	252	197	240	297	397	480
WEST HAVEN WPCF	353	291	357	536	557	317	289	280	136	187	167	162	196	302

### Zone 4

ANSONIA WPCF	115	59	55	65	76	97	75	51	50	44	38	42	47	66
BEACON FALLS WPCF	12	52	59	54	64	54	48	28	38	40	50	63	63	58
DANBURY WPCF	442	374	487	338	419	358	305	434	470	313	317	303	328	421
DERBY WPCF	71	66	50	54	92	69	116	52	51	51	47	52	70	90
LITCHFIELD WPCF	24	21	27	28	30	31	42	11	15	10	12	12	15	21
MILFORD BEAVER BROOK WPCF	94	55	49	65	50	91	77	40	27	43	51	49	50	68
MILFORD HOUSATONIC WPCF	307	365	304	505	380	1297	281	400	193	171	89	138	294	327
NAUGATUCK TREATMENT Co.	246	232	259	251	292	424	307	213	176	139	138	162	162	255
NEW MILFORD WPCF	28	25	31	31	17	22	28	30	29	24	25	21	17	26
NEWTOWN WPCF	42	13	10	9	16	14	13	10	10	8	9	13	19	24
NORFOLK WPCF	11	16	16	15	19	27	35	15	13	9	6	12	10	15
NORTH CANAAN WPCF	13	25	25	31	27	35	29	23	25	23	16	20	24	26
SALISBURY WPCF	21	28	32	27	26	29	28	20	30	29	30	37	29	24
SEYMOUR WPCF	61	63	30	28	82	136	120	76	46	33	30	56	46	68

# Total Nitrogen Balance Sheet -2014 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SHELTON WPCF	106	64	68	69	60	72	81	85	36	39	59	100	37	64
STRATFORD WPCF	356	352	242	431	774	720	621	230	216	210	174	153	170	288
THOMASTON WPCF	42	29	43	29	33	34	55	37	26	26	14	12	15	21
TORRINGTON WPCF	248	250	314	248	282	259	322	221	195	205	186	178	207	380
WATERBURY WPCF	1010	667	1107	711	843	1048	1304	595	354	234	242	282	504	777

## Zone 5

BRIDGEPORT EAST WPCF	362	400	616	689	515	436	292	275	277	243	221	284	438	514
BRIDGEPORT WEST WPCF	1041	925	955	893	1013	1434	927	871	827	782	686	969	822	916
FAIRFIELD WPCF	406	273	260	263	241	347	372	425	259	177	154	234	255	291
WESTPORT WPCF	87	28	33	38	71	21	22	26	18	18	17	21	23	22

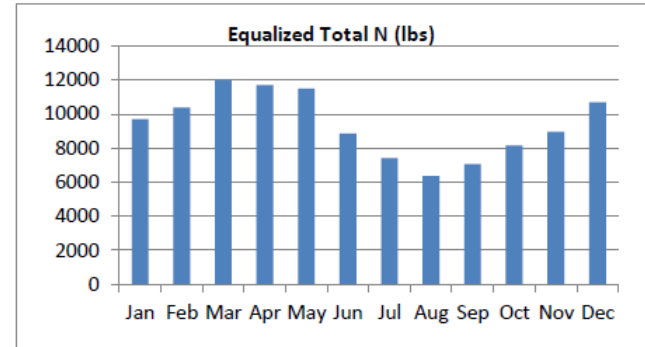
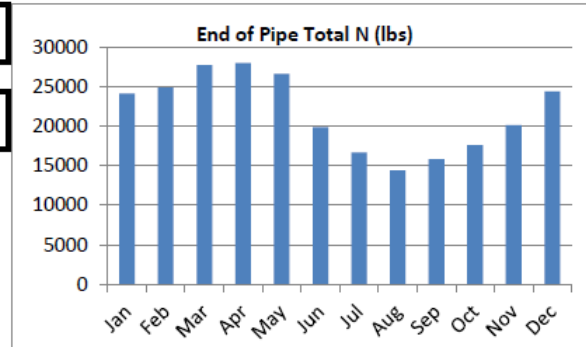
## Zone 6

GREENWICH WPCF	479	475	539	583	625	483	514	394	529	400	340	410	440	437
NEW CANAAN WPCF	64	26	39	35	32	41	35	16	15	16	12	19	23	24
NORWALK WPCF	718	738	551	988	1629	737	958	803	494	494	499	496	570	633
RIDGEFIELD SOUTH ST. WPCF	29	43	58	60	66	50	34	37	28	22	28	34	36	63
STAMFORD WPCF	926	408	401	476	504	370	1052	264	236	258	277	321	359	381

End of Pipe Total			24075	24841	27678	27966	26566	19836	16651	14400	15783	17566	20105	24337
Equalized Total			9702	10380	11983	11689	11494	8853	7400	6359	7067	8141	8958	10684

End of Pipe Permit = 18,450  
End of Pipe Avg = 21,650

Equalized Permit = 9,148  
Equalized Avg = 9,393





Attachment C

## Total Nitrogen Balance Sheet -2015 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Zone 1														
GROTON CITY WPCF	99	80	94	95	129	77	71	83	74	54	50	103	66	59
GROTON TOWN WPCF	153	240	250	170	202	158	173	191	476	296	216	214	242	288
JEWETT CITY WPCF	15	9	15	28	13	6	7	5	4	3	3	6	5	8
KILLINGLY WPCF	131	129	176	242	244	249	134	87	46	62	85	78	87	53
LEDYARD WPCF	7	4	4	5	5	4	3	3	3	4	5	4	4	6
MONTVILLE WPCF	118	55	64	58	65	71	44	119	41	42	57	26	32	46
NEW LONDON WPCF	386	280	298	198	388	347	233	252	324	250	261	299	233	280
NORWICH WPCF	201	452	431	294	642	538	408	284	255	273	528	459	708	601
PLAINFIELD NORTH WPCF	34	63	70	78	124	117	41	38	28	37	33	63	64	65
PLAINFIELD VILLAGE WPCF	24	56	67	65	58	40	42	42	30	66	73	73	68	53
PUTNAM WPCF	53	43	76	73	110	72	19	24	23	18	19	27	23	32
SPRAGUE WPCF	7	9	13	14	14	11	7	12	5	6	2	9	3	12
STAFFORD SPRINGS WPCF	60	74	92	99	100	110	69	66	71	53	55	57	52	61
STONINGTON BOROUGH WPCF	14	4	4	4	6	4	3	5	5	4	2	4	3	3
STONINGTON MYSTIC WPCF	27	15	12	14	17	12	11	11	15	15	17	20	20	21
STONINGTON PAWCATUCK WPCF	24	11	12	11	14	14	10	9	11	6	11	11	10	13
THOMPSON WPCF	10	36	40	22	51	55	37	27	13	24	26	49	49	44
UCONN WPCF	44	57	81	87	119	90	36	25	18	16	46	53	43	65
WINDHAM WPCF	125	92	75	60	105	203	76	93	129	52	71	75	76	88
Zone 2														
BRISTOL WPCF	398	427	518	480	526	515	524	587	427	318	348	282	287	312
CANTON WPCF	24	59	65	51	87	81	86	68	49	36	40	48	43	58
EAST HAMPTON WPCF	54	80	103	95	96	79	54	52	55	81	122	68	73	80
EAST HARTFORD WPCF	292	309	453	375	360	354	291	265	274	272	251	276	272	260
EAST WINDSOR WPCF	59	28	27	37	27	26	24	33	37	17	19	41	23	26
ENFIELD WPCF	278	238	235	216	324	265	184	199	248	294	251	204	254	178
FARMINGTON WPCF	178	373	427	518	683	524	263	379	197	224	327	317	295	317
GLASTONBURY WPCF	98	49	65	49	50	44	54	50	33	41	44	35	64	62
HARTFORD WPCF	2377	4360	5076	4626	9170	7879	6103	5867	3597	2026	1846	1671	1922	2540
MANCHESTER WPCF	312	293	314	365	435	722	419	252	194	135	129	172	175	200
MATTABASSETT WPCF	834	822	1561	1864	1921	1661	417	504	378	307	385	268	275	326
MIDDLETOWN WPCF	222	500	525	510	774	696	680	468	395	311	362	398	389	488
NEW HARTFORD WPCF	3	1	1	1	1	0	1	1	1	1	1	2	0	1
PLAINVILLE WPCF	101	82	106	95	158	182	110	79	49	39	42	46	37	42

## Total Nitrogen Balance Sheet -2015 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
PLYMOUTH WPCF	42	57	76	110	78	85	72	71	28	34	13	31	46	37
PORTLAND WPCF	31	23	16	25	51	48	21	17	14	12	14	19	14	21
ROCKY HILL WPCF	288	457	432	437	544	537	376	501	461	454	490	418	408	425
SIMSBURY WPCF	107	37	46	41	38	45	42	43	43	36	24	28	26	30
SOUTH WINDSOR WPCF	106	104	111	101	109	91	113	99	101	104	101	101	100	115
SUFFIELD WPCF	45	22	29	22	28	29	16	32	29	14	9	11	16	29
VERNON WPCF	184	395	439	539	487	490	379	382	296	283	376	405	327	334
WINDSOR LOCKS WPCF	66	51	50	46	67	96	48	60	45	40	38	42	38	47
WINDSOR POQUONOCK WPCF	98	503	444	507	587	676	504	540	466	466	472	501	428	447
WINSTED WPCF	64	72	88	88	90	91	61	81	70	63	59	48	62	64

### Zone 3

BRANFORD WPCF	192	92	70	67	128	136	87	95	94	84	115	71	64	89
CHESHIRE WPCF	103	60	64	102	63	120	42	42	52	42	44	54	34	55
MERIDEN WPCF	449	116	111	138	302	170	99	82	94	65	65	75	85	103
NEW HAVEN EAST WPCF	1568	3183	4500	3763	5218	4188	4358	4340	3916	3321	1476	1414	1024	679
NORTH HAVEN WPCF	158	138	154	134	143	170	134	138	139	107	108	138	148	148
SOUTHINGTON WPCF	204	84	72	104	64	178	79	63	64	86	57	49	62	124
WALLINGFORD WPCF	269	463	483	420	635	767	733	526	315	305	244	314	476	339
WEST HAVEN WPCF	353	211	252	270	304	231	172	154	140	170	180	263	195	201

### Zone 4

ANSONIA WPCF	115	52	96	92	64	64	43	39	36	35	33	40	38	39
BEACON FALLS WPCF	12	50	46	51	55	52	41	30	36	47	57	51	61	73
DANBURY WPCF	442	339	351	409	434	425	290	405	331	322	261	251	248	340
DERBY WPCF	71	68	97	64	76	70	69	72	48	42	80	44	53	95
LITCHFIELD WPCF	24	16	16	19	28	34	17	10	9	7	8	12	14	14
MILFORD BEAVER BROOK WPCF	94	51	59	95	78	50	35	28	44	47	41	42	54	37
MILFORD HOUSATONIC WPCF	307	262	571	386	644	328	215	142	210	116	152	113	114	149
NAUGATUCK TREATMENT Co.	246	182	236	218	230	271	218	160	150	186	124	117	130	145
NEW MILFORD WPCF	28	24	24	24	23	30	24	25	24	28	22	21	20	21
NEWTOWN WPCF	42	15	23	18	19	18	13	14	12	10	11	12	15	9
NORFOLK WPCF	11	12	12	9	18	19	14	9	11	6	4	6	16	20
NORTH CANAAN WPCF	13	27	23	29	30	42	26	33	29	18	16	21	27	32
SALISBURY WPCF	21	22	19	20	22	33	26	28	30	26	16	17	12	14
SEYMOUR WPCF	61	53	56	33	42	55	54	53	146	53	37	37	31	39

# Total Nitrogen Balance Sheet -2015 Monthly Averages by Plant

Plant	Limit	Avg	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SHELTON WPCF	106	87	89	108	110	109	54	136	128	30	60	97	59	69
STRATFORD WPCF	356	245	271	293	583	531	187	141	116	166	179	181	163	132
THOMASTON WPCF	42	21	24	20	26	32	27	22	21	14	16	17	15	16
TORRINGTON WPCF	248	274	311	332	413	381	296	283	206	230	192	202	242	199
WATERBURY WPCF	1010	571	597	346	706	1094	546	668	499	368	343	740	442	500

## Zone 5

BRIDGEPORT EAST WPCF	362	357	455	479	679	303	333	209	141	241	304	405	311	426
BRIDGEPORT WEST WPCF	1041	1029	1472	812	1393	1065	583	735	549	603	516	1106	1606	1913
FAIRFIELD WPCF	406	296	349	295	324	364	401	262	284	203	252	253	228	332
WESTPORT WPCF	87	20	26	23	48	27	16	14	12	12	7	15	15	19

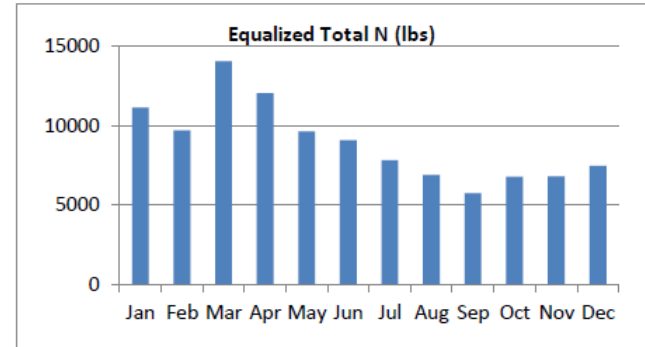
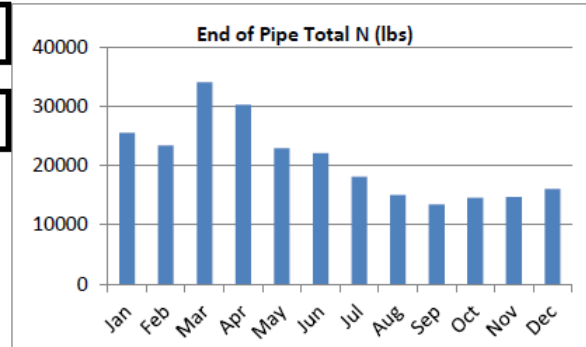
## Zone 6

GREENWICH WPCF	479	441	424	389	654	563	596	354	405	358	342	372	393	447
NEW CANAAN WPCF	64	17	25	16	41	31	11	8	12	8	7	11	14	17
NORWALK WPCF	718	583	582	463	775	571	538	572	524	615	542	650	550	615
RIDGEFIELD SOUTH ST. WPCF	29	43	51	73	77	41	36	39	31	27	31	39	36	36
STAMFORD WPCF	926	278	401	425	480	289	239	143	154	139	165	249	309	338

End of Pipe Total			25493	23354	34026	30246	22918	22080	18070	15026	13430	14561	14666	16061
Equalized Total			11117	9684	14041	12036	9618	9055	7799	6867	5732	6776	6797	7449

End of Pipe Permit = 18,450  
End of Pipe Avg = 20,828

Equalized Permit = 9,148  
Equalized Avg = 8,914



Attachment D

Total Nitrogen Balance Sheet – Monthly Averages by Plant 2002-2015

	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>Average</u> <u>2011-2015</u>
<b>ZONE:1</b>															
GROTON CITY WPCF	210	161	179	132	118	129	110	114	107	99	76	98	98	80	90
GROTON TOWN WPCF	566	465	447	444	470	421	451	353	278	260	246	199	220	240	233
JEWETT CITY WPCF	36	40	39	13	10	13	13	8	9	6	5	11	7	9	8
KILLINGLY WPCF	162	147	159	177	152	158	191	126	170	247	225	277	151	129	206
LEDYARD WPC	5	3	4	5	7	5	7	5	5	6	6	6	7	4	6
MONTVILLE WPCF	187	153	222	92	98	69	82	91	82	115	63	54	62	55	70
NEW LONDON WPCF	449	405	332	434	423	414	377	391	335	304	243	296	281	280	281
NORWICH WPCF	758	986	769	748	828	684	673	612	481	470	457	535	562	452	495
PLAINFIELD NORTH WPCF	50	87	78	90	119	108	105	88	95	65	66	108	88	63	78
PLAINFIELD VILLAGE WPCF	32	44	41	49	54	42	42	43	51	31	28	48	49	56	42
PUTNAM WPCF	163	170	174	193	205	206	206	157	140	147	153	68	42	43	91
SPRAGUE WPCF	15	7	10	13	22	14	15	21	21	16	7	12	12	9	11
STAFFORD SPRINGS WPCF	135	131	121	131	114	120	160	162	129	191	208	164	89	74	145
STONINGTON BOROUGH WPCF	55	55	42	47	37	22	19	13	11	8	7	11	14	4	9
STONINGTON MYSTIC WPCF	36	43	49	48	51	31	30	25	32	28	30	41	30	15	29
STONINGTON PAWCATUCK	46	34	46	30	25	18	19	25	33	32	22	18	16	11	20
THOMPSON WPCF	21	35	29	33	28	28	21	18	30	29	44	31	47	36	37
UCONN WPCF	78	70	107	65	94	67	103	83	65	55	52	60	73	57	59
WINDHAM WPCF	265	243	216	165	167	174	258	364	340	289	146	112	141	92	156
<b>End of Pipe Total</b>	<b>3269</b>	<b>3279</b>	<b>3064</b>	<b>2909</b>	<b>3022</b>	<b>2723</b>	<b>2882</b>	<b>2699</b>	<b>2414</b>	<b>2398</b>	<b>2084</b>	<b>2149</b>	<b>1989</b>	<b>1709</b>	<b>2066</b>
<b>ZONE:2</b>															
BRISTOL WPCF	949	1121	793	567	575	532	511	452	560	632	416	517	508	427	500
CANTON WPCF	70	87	101	106	113	92	99	100	121	103	90	95	81	59	86
EAST HAMPTON WPCF	86	119	96	85	140	110	136	121	117	127	82	101	83	80	95
EAST HARTFORD WPCF	755	749	812	803	902	391	417	418	366	505	397	525	462	309	440
EAST WINDSOR WPCF	20	34	31	45	32	32	27	26	20	31	32	29	30	28	30
ENFIELD WPCF	914	839	275	535	331	218	272	282	248	324	219	252	253	238	257
FARMINGTON WPCF	386	354	401	398	440	433	309	269	250	340	241	289	311	373	311
GLASTONBURY WPCF	263	307	340	214	290	295	364	223	118	101	77	51	62	49	68
HARTFORD WPCF	5978	5900	6529	6831	7408	5839	5326	4217	3841	5090	3282	3888	3194	4360	3963
MANCHESTER WPCF	822	762	755	772	785	715	705	851	866	1069	1064	946	674	293	809

### Total Nitrogen Balance Sheet – Monthly Averages by Plant 2002-2015

	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>Average 2011-2015</u>
MATTABASSETT WPCF	2120	1795	1453	1408	1202	1129	1053	1123	1261	1377	1200	1127	1198	822	1145
MIDDLETOWN WPCF	392	385	424	486	440	397	446	490	497	567	521	581	544	501	543
NEW HARTFORD WPCF												3	4	1	3
PLAINVILLE WPCF	252	304	311	285	301	280	315	135	97	129	122	104	112	82	110
PLYMOUTH WPCF	73	69	68	76	80	71	87	85	68	100	74	83	67	57	76
PORTLAND WPCF	24	28	36	33	34	26	33	33	28	39	25	23	21	23	26
ROCKY HILL WPCF	631	767	780	919	787	610	484	526	498	542	446	412	420	457	455
SIMSBURY WPCF	344	316	323	368	206	84	70	84	43	84	50	48	57	37	55
SOUTH WINDSOR WPCF	298	324	317	340	298	322	323	326	342	276	111	109	103	104	141
SUFFIELD WPCF	34	37	38	72	88	74	88	47	25	35	34	36	27	22	31
VERNON WPCF	483	663	538	488	580	469	426	361	386	520	422	344	427	395	422
WINDSOR LOCKS WPCF	131	116	100	143	98	94	110	113	96	89	58	71	56	51	65
WINDSOR POQUONOCK	427	422	441	467	432	419	457	450	494	500	483	512	525	503	505
WINSTED WPCF	250	187	201	206	223	120	82	66	64	70	63	79	84	72	74
<b>End of Pipe Total</b>	<b>15701</b>	<b>15683</b>	<b>15163</b>	<b>15647</b>	<b>15785</b>	<b>12752</b>	<b>12140</b>	<b>10798</b>	<b>9642</b>	<b>12650</b>	<b>9509</b>	<b>10225</b>	<b>9303</b>	<b>9343</b>	<b>10210</b>
<b>ZONE:3</b>															
BRANFORD WPCF	142	79	129	135	103	111	105	94	110	102	94	131	108	92	105
CHESHIRE WPCF	468	492	536	480	171	74	75	63	38	74	48	78	73	60	67
MERIDEN WPCF	860	917	882	781	827	810	1008	1051	696	253	142	164	145	116	164
NEW HAVEN EAST WPCF	1400	1630	1408	1703	2271	2201	1650	1592	1494	1993	1493	1667	2894	3183	2246
NORTH HAVEN WPCF	534	502	489	424	226	214	249	191	164	199	172	150	158	138	163
SOUTHINGTON WPCF	819	798	768	754	761	868	911	725	194	262	99	99	198	83	148
WALLINGFORD WPCF	549	601	627	657	522	340	381	429	456	517	356	427	423	463	437
WEST HAVEN WPCF	796	668	511	601	546	498	779	549	612	673	326	249	291	211	350
<b>End of Pipe Total</b>	<b>5568</b>	<b>5687</b>	<b>5349</b>	<b>5535</b>	<b>5427</b>	<b>5116</b>	<b>5158</b>	<b>4694</b>	<b>3764</b>	<b>4073</b>	<b>2730</b>	<b>2965</b>	<b>4290</b>	<b>4346</b>	<b>3680</b>
<b>ZONE:4</b>															
ANSONIA WPCF	273	307	260	287	289	237	260	270	178	76	63	59	59	52	62
BEACON FALLS WPCF	41	45	38	42	44	50	57	58	60	52	40	42	52	50	47
DANBURY WPCF	1866	1875	1825	1766	2072	1778	1885	1974	644	576	462	401	374	339	430
DERBY WPCF	53	64	58	59	65	63	64	64	63	82	71	54	66	68	68
LITCHFIELD WPCF	67	54	35	49	39	38	45	43	35	39	24	24	21	16	25



### Total Nitrogen Balance Sheet – Monthly Averages by Plant 2002-2015

	<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>Average 2011-2015</u>
MILFORD BEAVER BROOK	130	180	120	127	130	132	121	137	101	127	74	70	55	51	75
MILFORD HOUSATONIC	439	429	431	479	574	662	742	324	238	598	291	343	365	262	372
NAUGATUCK TREATMENT	479	440	234	279	263	250	344	345	248	320	222	251	232	182	241
NEW MILFORD WPCF	76	52	56	91	86	88	103	109	135	117	32	27	25	24	45
NEWTOWN WPCF	34	50	32	24	36	26	19	18	21	20	18	15	13	15	16
NORFOLK WPCF	9	13	12	20	29	32	29	26	23	30	21	17	16	12	19
NORTH CANAAN WPCF	18	22	21	31	23	25	24	25	26	26	24	28	25	27	26
SALISBURY WPCF	27	27	23	28	29	28	34	32	34	35	28	33	28	22	29
SEYMOUR WPCF	55	56	61	69	66	62	58	69	62	89	41	52	63	53	60
SHELTON WPCF	452	545	509	501	480	413	219	219	113	121	69	61			84
SOUTHURY TR. SCHOOL	17	18	16	14	10	7	8	4	7	9	3	3	64	87	33
STRAITFORD WPCF	535	646	431	539	537	616	1425	605	245	259	179	300	352	245	267
THOMASTON WPCF	35	51	45	45	44	32	42	40	25	27	18	31	29	21	25
TORRINGTON WPCF	283	299	287	254	265	247	275	226	242	298	195	266	250	274	257
WATERBURY WPCF	778	1335	913	965	1001	1034	869	857	802	914	582	742	667	571	695
<b>End of Pipe Total</b>	<b>5667</b>	<b>6508</b>	<b>5407</b>	<b>5669</b>	<b>6082</b>	<b>5820</b>	<b>6623</b>	<b>5445</b>	<b>3302</b>	<b>3815</b>	<b>2457</b>	<b>2819</b>	<b>2756</b>	<b>2371</b>	<b>2876</b>
<b>ZONE:5</b>															
BRIDGEPORT EAST WPCF	568	615	459	470	468	271	253	301	412	376	325	444	400	357	380
BRIDGEPORT WEST WPCF	2305	2306	1158	1564	1145	1146	1262	1019	1211	1017	1006	919	925	1029	979
FAIRFIELD WPCF	735	453	417	383	530	408	488	431	325	388	338	296	273	296	318
WESTPORT WPCF	140	133	152	148	153	70	44	38	41	35	25	27	28	20	27
<b>End of Pipe Total</b>	<b>3748</b>	<b>3508</b>	<b>2186</b>	<b>2565</b>	<b>2296</b>	<b>1895</b>	<b>2047</b>	<b>1789</b>	<b>1989</b>	<b>1816</b>	<b>1694</b>	<b>1686</b>	<b>1626</b>	<b>1702</b>	<b>1704</b>
<b>ZONE:6</b>															
GREENWICH WPCF	410	459	443	556	520	697	479	461	458	572	430	443	475	441	472
NEW CANAAN WPCF	21	24	20	30	30	38	29	30	29	39	21	25	26	17	26
NORWALK WPCF	605	888	784	818	755	1043	766	881	600	742	640	702	738	583	681
RIDGEFIELD SOUTH ST.	23	27	28	35	28	32	34	38	42	39	38	47	43	43	42
STAMFORD WPCF	1652	1645	1523	1418	1029	726	550	510	497	592	506	440	408	278	445
<b>End of Pipe Total</b>	<b>2711</b>	<b>3044</b>	<b>2798</b>	<b>2857</b>	<b>2362</b>	<b>2536</b>	<b>1858</b>	<b>1920</b>	<b>1626</b>	<b>1984</b>	<b>1635</b>	<b>1657</b>	<b>1690</b>	<b>1362</b>	<b>2146</b>
<b>State End of Pipe Total</b>	<b>36664</b>	<b>37708</b>	<b>33966</b>	<b>33182</b>	<b>34974</b>	<b>30842</b>	<b>30702</b>	<b>27345</b>	<b>27345</b>	<b>26736</b>	<b>20109</b>	<b>21501</b>	<b>21654</b>	<b>20833</b>	<b>22682</b>

## LIS Total Nitrogen Credit Exchange Balance - 2014

SELLING Credits		BUYING Credits	
<u>Facility Name</u>		<u>Facility Name</u>	
STAMFORD WPCF	\$1,223,283	NEW HAVEN EAST WPCF	\$1,878,849
WATERBURY WPCF	\$486,007	HARTFORD WPCF	\$385,877
MERIDEN WPCF	\$351,776	WALLINGFORD WPCF	\$218,207
FAIRFIELD WPCF	\$266,973	WINDSOR POQUONOCK WPCF	\$191,593
BRIDGEPORT WEST WPCF	\$232,849	MATTABASSETT WPCF	\$171,921
BRANFORD WPCF	\$119,022	MANCHESTER WPCF	\$162,427
WESTPORT WPCF	\$118,432	NORWICH WPCF	\$153,454
NEW CANAAN WPCF	\$89,739	MIDDLETOWN WPCF	\$152,084
ANSONIA WPCF	\$88,605	VERNON WPCF	\$109,033
WEST HAVEN WPCF	\$87,850	MILFORD HOUSATONIC WPCF	\$91,770
DANBURY WPCF	\$73,869	BRIDGEPORT EAST WPCF	\$76,278
SHELTON WPCF	\$66,454	EAST HARTFORD WPCF	\$76,278
MILFORD BEAVER BROOK WPCF	\$61,707	BEACON FALLS WPCF	\$63,290
NEW LONDON WPCF	\$44,633	ROCKY HILL WPCF	\$62,345
CHESHIRE WPCF	\$34,715	FARMINGTON WPCF	\$56,536
NEWTOWN WPCF	\$31,503	NORWALK WPCF	\$47,231
MONTVILLE WPCF	\$23,804	BRISTOL WPCF	\$46,759
SIMSBURY WPCF	\$21,254	RIDGEFIELD SOUTH ST. WPCF	\$33,062
NAUGATUCK TREATMENT Co.	\$19,837	GROTON TOWN WPCF	\$28,480
THOMASTON WPCF	\$18,420	CANTON WPCF	\$24,230
GLASTONBURY WPCF	\$17,003	PLAINFIELD NORTH WPCF	\$17,853
EAST WINDSOR WPCF	\$13,012	THOMPSON WPCF	\$15,728
ENFIELD WPCF	\$11,217	EAST HAMPTON WPCF	\$13,697
GREENWICH WPCF	\$9,446	PLYMOUTH WPCF	\$10,627
SUFFIELD WPCF	\$8,077	STAFFORD SPRINGS WPCF	\$10,273
DERBY WPCF	\$7,911	UCONN WPCF	\$10,273
SOUTHINGTON WPCF	\$6,943	NORTH CANAAN WPCF	\$9,919
STRATFORD WPCF	\$6,329	WINSTED WPCF	\$8,502
PORTLAND WPCF	\$4,723	PLAINFIELD VILLAGE WPCF	\$8,265
WINDSOR LOCKS WPCF	\$4,487	KILLINGLY WPCF	\$6,612
PUTNAM WPCF	\$3,637	SALISBURY WPCF	\$5,786
NEW MILFORD WPCF	\$3,259	WINDHAM WPCF	\$5,668
STONINGTON PAWCATUCK WPCF	\$3,212	PLAINVILLE WPCF	\$4,676
JEWETT CITY WPCF	\$3,212	NORFOLK WPCF	\$4,133
LITCHFIELD WPCF	\$2,480	SEYMOUR WPCF	\$3,164
SOUTH WINDSOR WPCF	\$1,346	TORRINGTON WPCF	\$2,834
GROTON CITY WPCF	\$425	SPRAGUE WPCF	\$1,889
LEDYARD WPCF	\$0	STONINGTON MYSTIC WPCF	\$1,275
NORTH HAVEN WPCF	\$0	NEW HARTFORD WPCF	\$425
STONINGTON BOROUGH WPCF	\$0		
<b>TOTAL</b>	<b>\$3,567,452</b>	<b>TOTAL</b>	<b>\$4,171,301</b>

Difference: Selling - Buying = (\$603,848)
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**BOLD = Clean Water Fund Nitrogen Project Facility**

The final balance (annual dollar amount) for each facility was calculated by subtracting the facility's 2014 TN loading as reported to DEEP, from the facility's General Permit 2014 limit; The difference was then multiplied by the E-factor for that facility to determine the number of credits available to sell or needed to purchase. Credits were then multiplied by the value of a credit (\$6.47) to calculate the annual balance shown above.
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Attachment F

LIS Total Nitrogen Credit Exchange Final Balance - 2015

SELLING Credits		BUYING Credits	
Facility Name		Facility Name	
STAMFORD WPCF	\$1,688,753	NEW HAVEN EAST WPCF	\$2,525,311
WATERBURY WPCF	\$686,447	HARTFORD WPCF	\$1,033,579
MERIDEN WPCF	\$425,237	WALLINGFORD WPCF	\$303,350
NORWALK WPCF	\$351,824	WINDSOR POQUONOCK WPCF	\$200,539
FAIRFIELD WPCF	\$243,670	MIDDLETOWN WPCF	\$144,899
WEST HAVEN WPCF	\$222,040	NORWICH WPCF	\$117,744
STRATFORD WPCF	\$193,816	VERNON WPCF	\$104,479
BRANFORD WPCF	\$156,366	FARMINGTON WPCF	\$91,474
SOUTHINGTON WPCF	\$153,239	ROCKY HILL WPCF	\$88,086
WESTPORT WPCF	\$148,417	BEACON FALLS WPCF	\$66,351
DANBURY WPCF	\$123,477	GROTON TOWN WPCF	\$40,812
NEW CANAAN WPCF	\$122,487	TORRINGTON WPCF	\$40,655
ANSONIA WPCF	\$110,003	RIDGEFIELD SOUTH ST. WPCF	\$36,485
NAUGATUCK TREATMENT Co.	\$100,074	CANTON WPCF	\$16,418
GREENWICH WPCF	\$99,032	BRISTOL WPCF	\$13,604
MILFORD HOUSATONIC WPCF	\$78,574	EAST HAMPTON WPCF	\$13,552
MILFORD BEAVER BROOK WP	\$75,082	NORTH CANAAN WPCF	\$12,770
CHESHIRE WPCF	\$54,911	THOMPSON WPCF	\$12,197
NEW LONDON WPCF	\$49,724	PLAINFIELD VILLAGE WPCF	\$11,675
SHELTON WPCF	\$33,176	PLAINFIELD NORTH WPCF	\$10,581
SIMSBURY WPCF	\$32,837	EAST HARTFORD WPCF	\$8,418
THOMASTON WPCF	\$32,837	PLYMOUTH WPCF	\$7,036
NEWTOWN WPCF	\$32,368	STAFFORD SPRINGS WPCF	\$5,473
NORTH HAVEN WPCF	\$31,273	UCONN WPCF	\$5,082
MONTVILLE WPCF	\$29,553	WINSTED WPCF	\$3,753
BRIDGEPORT WEST WPCF	\$26,582	NORFOLK WPCF	\$912
GLASTONBURY WPCF	\$25,540	SALISBURY WPCF	\$912
ENFIELD WPCF	\$19,806	SPRAGUE WPCF	\$834
EAST WINDSOR WPCF	\$15,350		
SEYMOUR WPCF	\$13,969		
WINDHAM WPCF	\$12,900		
SUFFIELD WPCF	\$11,389		
BRIDGEPORT EAST WPCF	\$11,076		
MANCHESTER WPCF	\$9,408		
GROTON CITY WPCF	\$8,913		
PLAINVILLE WPCF	\$8,913		
WINDSOR LOCKS WPCF	\$7,427		
LITCHFIELD WPCF	\$7,297		
MATTABASSETT WPCF	\$6,255		
STONINGTON PAWCATUCK WP	\$5,759		
STONINGTON MYSTIC WPCF	\$5,629		
DERBY WPCF	\$5,238		
NEW MILFORD WPCF	\$4,795		
STONINGTON BOROUGH WPCF	\$4,691		
PORTLAND WPCF	\$4,170		
PUTNAM WPCF	\$3,649		
JEWETT CITY WPCF	\$2,658		
LEDYARD WPCF	\$1,407		
SOUTH WINDSOR WPCF	\$990		
NEW HARTFORD WPCF	\$938		
KILLINGLY WPCF	\$730		
<b>TOTAL</b>	<b>\$5,500,696</b>	<b>TOTAL</b>	<b>\$4,916,981</b>

Difference: Selling - Buying = \$583,715

**BOLD = Clean Water Fund Nitrogen Project Facility**

The final balance (annual dollar amount) for each facility was calculated by subtracting the facility's 2015 TN loading as reported to DEEP, from the facility's General Permit 2015 limit; The difference was then multiplied by the E-factor for that facility to determine the number of credits available to sell or needed to purchase. Credits were then multiplied by the value of a credit (\$7.14) to calculate the annual balance shown above.

Attachment G

Equalized lbs Reduced by Project Facilities and Cost of Credit 2014

Project Facilities	Baseload	Average TN	EOP Reduced	E Factor	E Pounds Reduced
ANSONIA WPCF	314	59	255	0.67	170.85
BRANFORD WPCF	526	108	418	0.6	250.8
BRIDGEPORT EAST WPCF	991	400	591	0.85	502.35
BRIDGEPORT WEST WPCF	2852	925	1927	0.85	1637.95
BRISTOL WPCF	1091	508	583	0.18	104.94
CHESHIRE WPCF	281	73	208	0.49	101.92
DANBURY WPCF	1211	374	837	0.46	385.02
DERBY WPCF	195	66	129	0.67	86.43
EAST HAMPTON WPCF	148	83	65	0.2	13
EAST HARTFORD WPCF	801	462	339	0.19	64.41
EAST WINDSOR WPCF	163	30	133	0.19	25.27
ENFIELD WPCF	763	253	510	0.19	96.9
FAIRFIELD WPCF	1113	273	840	0.85	714
GLASTONBURY WPCF	268	62	206	0.2	41.2
GREENWICH WPCF	1313	475	838	1	838
GROTON TOWN WPCF	420	220	200	0.18	36
HARTFORD WPCF	6512	3194	3318	0.2	663.6
JEWETT CITY WPCF	42	7	35	0.17	5.95
LEDYARD WPCF	20	7	13	0.18	2.34
LITCHFIELD WPCF	64	21	43	0.35	15.05
MERIDEN WPCF	1230	145	1085	0.49	531.65
MILFORD BEAVER BROOK WPCF	258	55	203	0.67	136.01
MILFORD HOUSATONIC WPCF	844	365	479	0.67	320.93
NEW CANAAN WPCF	175	26	149	1	149
NEW HARTFORD WPCF	12	4	8	0.18	1.44
NEW HAVEN EAST WPCF	4294	2894	1400	0.6	840
NEW MILFORD WPCF	66	25	41	0.46	18.86
NEW LONDON WPCF	1057	281	776	0.18	139.68
NEWTOWN WPCF	45	13	32	0.46	14.72
NORTH HAVEN WPCF	433	158	275	0.6	165
NORWALK WPCF	1967	738	1229	1	1229
PLAINVILLE WPCF	277	112	165	0.18	29.7
PORTLAND WPCF	86	21	65	0.2	13
PUTNAM WPCF	145	42	103	0.14	14.42
RIDGEFIELD SOUTH ST. WPCF	80	43	37	1	37
SEYMOUR WPCF	167	63	104	0.67	69.68
SHELTON WPCF	290	64	226	0.67	151.42
SIMSBURY WPCF	293	57	236	0.18	42.48
SOUTHINGTON WPCF	557	198	359	0.49	175.91
SOUTH WINDSOR WPCF	289	103	186	0.19	35.34
STAFFORD WPCF	164	89	75	0.15	11.25
STAMFORD WPCF	2536	408	2128	1	2128
STRATFORD WPCF	974	352	622	0.67	416.74
SUFFIELD WPCF	122	27	95	0.19	18.05
THOMASTON WPCF	114	29	85	0.6	51

**Equalized lbs Reduced by Project Facilities and Cost of Credit 2014**

<b>Project Facilities</b>	<b>Baseload</b>	<b>Average TN</b>	<b>EOP Reduced</b>	<b>E Factor</b>	<b>E Pounds Reduced</b>
UCONN WPCF	120	73	47	0.15	7.05
WALLINGFORD WPCF	737	423	314	0.6	188.4
WATERBURY WPCF	2766	667	2099	0.6	1259.4
WEST HAVEN WPCF	967	291	676	0.6	405.6
WESTPORT WPCF	238	28	210	0.85	178.5
WINDHAM WPCF	344	141	203	0.15	30.45
WINDSOR LOCKS WPCF	180	56	124	0.19	23.56
WINSTED WPCF	175	84	91	0.18	16.38
<b>Total</b>					<b>14605.6</b>
<b>Project Cost</b>					<b>\$ 34,529,343.00</b>
<b>Credit Cost:</b>					<b>\$ 6.47</b>
<b>BOLD=New Project Plant for Year 2014</b>					

Attachment H

Equalized lbs Reduced by Project Facilities and Cost of Credit 2015

Project Facilities	Baseload	Average TN	EOP Reduced	E Factor	E Pounds Reduced
ANSONIA WPCF	314	52	262	0.67	175.54
BRANFORD WPCF	526	92	434	0.6	260.4
BRIDGEPORT EAST WPCF	991	357	634	0.85	538.9
BRIDGEPORT WEST WPCF	2852	1029	1823	0.85	1549.55
BRISTOL WPCF	1091	427	664	0.18	119.52
CHESHIRE WPCF	281	60	221	0.49	108.29
DANBURY WPCF	1211	339	872	0.46	401.12
DERBY WPCF	195	68	127	0.67	85.09
EAST HAMPTON WPCF	148	80	68	0.2	13.6
EAST HARTFORD WPCF	801	309	492	0.19	93.48
EAST WINDSOR WPCF	163	28	135	0.19	25.65
ENFIELD WPCF	763	238	525	0.19	99.75
FAIRFIELD WPCF	1113	296	817	0.85	694.45
GLASTONBURY WPCF	268	49	219	0.2	43.8
GREENWICH WPCF	1313	441	872	1	872
GROTON TOWN WPCF	420	240	180	0.18	32.4
HARTFORD WPCF	6512	4360	2152	0.2	430.4
JEWETT CITY WPCF	42	9	33	0.17	5.61
LEDYARD WPCF	20	4	16	0.18	2.88
LITCHFIELD WPCF	64	16	48	0.35	16.8
MATTABASSETT WPCF	2285	822	1463	0.2	292.6
MERIDEN WPCF	1230	116	1114	0.49	545.86
MILFORD BEAVER BROOK WPCF	258	51	207	0.67	138.69
MILFORD HOUSATONIC WPCF	844	262	582	0.67	389.94
NEW CANAAN WPCF	175	17	158	1	158
NEW HARTFORD WPCF	12	1	11	0.18	1.98
NEW HAVEN EAST WPCF	4294	3183	1111	0.6	666.6
NEW MILFORD WPCF	66	24	42	0.46	19.32
NEW LONDON WPCF	1057	280	777	0.18	139.86
NEWTOWN WPCF	45	15	30	0.46	13.8
NORTH HAVEN WPCF	433	138	295	0.6	177
NORWALK WPCF	1967	583	1384	1	1384
PLAINVILLE WPCF	277	82	195	0.18	35.1
PORTLAND WPCF	86	23	63	0.2	12.6
PUTNAM WPCF	145	43	102	0.14	14.28
RIDGEFIELD SOUTH ST. WPCF	80	43	37	1	37
SEYMOUR WPCF	167	53	114	0.67	76.38
SHELTON WPCF	290	87	203	0.67	136.01
SIMSBURY WPCF	293	37	256	0.18	46.08
SOUTHINGTON WPCF	557	84	473	0.49	231.77
SOUTH WINDSOR WPCF	289	104	185	0.19	35.15
STAFFORD WPCF	164	74	90	0.15	13.5
STAMFORD WPCF	2536	278	2258	1	2258
STRATFORD WPCF	974	245	729	0.67	488.43
SUFFIELD WPCF	122	22	100	0.19	19

**Equalized lbs Reduced by Project Facilities and Cost of Credit 2015**

<b>Project Facilities</b>	<b>Baseload</b>	<b>Average TN</b>	<b>EOP Reduced</b>	<b>E Factor</b>	<b>E Pounds Reduced</b>
THOMASTON WPCF	114	21	93	0.6	55.8
UCONN WPCF	120	57	63	0.15	9.45
WALLINGFORD WPCF	737	463	274	0.6	164.4
WATERBURY WPCF	2766	571	2195	0.6	1317
WEST HAVEN WPCF	967	211	756	0.6	453.6
WESTPORT WPCF	238	20	218	0.85	185.3
WINDHAM WPCF	344	92	252	0.15	37.8
WINDSOR LOCKS WPCF	180	51	129	0.19	24.51
WINSTED WPCF	175	72	103	0.18	18.54
<b>Total</b>					<b>15166.58</b>
<b>Project Cost</b>					<b>\$ 39,531,090.00</b>
<b>Credit Cost:</b>					<b>\$ 7.14</b>
<b>BOLD=New Project Plant for Year 2015</b>					

Attachment I

**Total Annual Project Cost 2014**

<b>Project facilities</b>	<b>Total Annual Capital Cost</b>	<b>Total Annual O&amp;M Cost</b>	<b>Total Annual Project Cost</b>
ANSONIA WPCF	\$465,697	\$280,940	\$746,637
BRANFORD WPCF	\$168,661	\$434,689	\$603,350
BRIDGEPORT EAST WPCF	\$51,755	\$685,746	\$737,501
BRIDGEPORT WEST WPCF	\$155,266	\$959,585	\$1,114,851
BRISTOL WPCF	\$28,759	\$101,557	\$130,316
CHESHIRE WPCF	\$317,316	\$317,405	\$634,721
DANBURY WPCF	\$46,466	\$625,214	\$671,680
DERBY WPCF	\$31,785	\$106,482	\$138,267
EAST HAMPTON WPCF	\$30,144	\$155,213	\$185,357
EAST HARTFORD WPCF	\$82,707	\$177,636	\$260,343
EAST WINDSOR WPCF	\$61,136	\$323,472	\$384,608
ENFIELD WPCF	\$0	\$295,673	\$295,673
FAIRFIELD WPCF	\$514,885	\$569,991	\$1,084,876
GLASTONBURY WPCF	\$272,568	\$467,984	\$740,552
GREENWICH WPCF	\$0	\$199,055	\$199,055
GROTON TOWN WPCF	\$242,100	\$164,489	\$406,589
HARTFORD WPCF	\$107,555	\$2,959,059	\$3,066,614
JEWETT CITY WPCF	\$65,659	\$190,229	\$255,888
LEDYARD WPCF	\$18,062	\$32,973	\$51,035
LITCHFIELD WPCF	\$45,829	\$201,753	\$247,582
MERIDEN WPCF	\$492,418	\$1,075,290	\$1,567,708
MILFORD BEAVER BROOK WPCF	\$143,806	\$211,136	\$354,942
MILFORD HOUSATONIC WPCF	\$399,082	\$407,861	\$806,943
NEW CANAAN WPCF	\$56,656	\$108,721	\$165,377
NEW HARTFORD WPCF	\$0	\$92,675	\$92,675
NEW HAVEN EAST WPCF	\$151,122	\$720,423	\$871,545
NEW LONDON WPCF	\$54,978	\$483,634	\$538,612
NEW MILFORD WPCF	\$299,782	\$190,734	\$490,516
NEWTOWN WPCF	\$72,954	\$91,376	\$164,330
NORTH HAVEN WPCF	\$54,418	\$133,249	\$187,667
NORWALK WPCF	\$276,853	\$608,532	\$885,385
PLAINVILLE WPCF	\$253,448	\$436,432	\$689,880
PORTLAND WPCF	\$44,740	\$170,877	\$215,617
<b>PUTNAM WPCF</b>	\$0	\$321,828	\$321,828

<b>Project facilities</b>	<b>Total Annual Capital Cost</b>	<b>Total Annual O&amp;M Cost</b>	<b>Total Annual Project Cost</b>
RIDGEFIELD SOUTH ST. WPCF	\$0	\$62,765	\$62,765
SEYMOUR WPCF	\$14,654	\$208,087	\$222,741
SIMSBURY WPCF	\$211,063	\$189,525	\$400,588
SHELTON WPCF	\$21,642	\$449,213	\$470,855
SOUTHINGTON WPCF	\$201,085	\$610,344	\$811,429
SOUTH WINDSOR WPCF	\$303,783	\$201,498	\$505,281
STAFFORD WPCF	\$0	\$86,419	\$86,419
STAMFORD WPCF	\$2,238,236	\$1,354,195	\$3,592,431
STRATFORD WPCF	\$648,477	\$509,964	\$1,158,441
SUFFIELD WPCF	\$0	\$81,638	\$81,638
THOMASTON WPCF	\$56,408	\$153,543	\$209,951
UCONN WPCF	\$0	\$307,581	\$307,581
WALLINGFORD WPCF	\$122,125	\$268,318	\$390,443
WATERBURY WPCF	\$737,935	\$1,643,045	\$2,380,980
WEST HAVEN WPCF	\$359,358	\$1,808,515	\$2,167,873
WESTPORT WPCF	\$1,688,193	\$69,004	\$1,757,197
WINDHAM WPCF	\$159,477	\$133,899	\$293,376
WINDSOR LOCKS WPCF	\$84,200	\$131,961	\$216,161
WINSTED WPCF	\$43,673	\$61,000	\$104,673
<b>TOTAL</b>	<b>\$11,896,916</b>	<b>\$22,632,427</b>	<b>\$34,529,343</b>
<b>BOLD = New Project Plant for Year 2014</b>			

## Attachment J

## Total Annual Project Cost 2015

<b>Project facilities</b>	<b>Total Annual Capital Cost</b>	<b>Total Annual O&amp;M Cost</b>	<b>Total Annual Project Cost</b>
ANSONIA WPCF	\$465,697	\$280,940	\$746,637
BRANFORD WPCF	\$168,661	\$362,857	\$531,518
BRIDGEPORT EAST WPCF	\$51,755	\$768,454	\$820,209
BRIDGEPORT WEST WPCF	\$155,266	\$1,158,460	\$1,313,726
BRISTOL WPCF	\$28,759	\$106,460	\$135,219
CHESHIRE WPCF	\$317,316	\$290,672	\$607,988
DANBURY WPCF	\$46,466	\$529,941	\$576,407
DERBY WPCF	\$31,785	\$98,980	\$130,765
EAST HAMPTON WPCF	\$30,144	\$148,779	\$178,923
EAST HARTFORD WPCF	\$82,707	\$203,675	\$286,382
EAST WINDSOR WPCF	\$61,136	\$106,415	\$167,551
ENFIELD WPCF	\$0	\$314,093	\$314,093
FAIRFIELD WPCF	\$514,885	\$577,876	\$1,092,761
GLASTONBURY WPCF	\$272,568	\$473,020	\$745,588
GREENWICH WPCF	\$0	\$177,327	\$177,327
GROTON TOWN WPCF	\$242,100	\$221,191	\$463,291
<b>HARTFORD WPCF</b>	<b>\$3,804,815</b>	<b>\$2,659,530</b>	<b>\$6,464,345</b>
JEWETT CITY WPCF	\$65,659	\$153,807	\$219,466
LEDYARD WPCF	\$18,062	\$38,987	\$57,049
LITCHFIELD WPCF	\$45,829	\$212,496	\$258,325
<b>MATTABASSETT WPCF</b>	<b>\$1,235,054</b>	<b>\$616,955</b>	<b>\$1,852,009</b>
MERIDEN WPCF	\$492,418	\$1,003,379	\$1,495,797
MILFORD BEAVER BROOK WPCF	\$143,806	\$200,806	\$344,612
MILFORD HOUSATONIC WPCF	\$399,082	\$469,433	\$868,515
NEW CANAAN WPCF	\$56,656	\$129,810	\$186,466
NEW HARTFORD WPCF	\$0	\$94,422	\$94,422
NEW HAVEN EAST WPCF	\$151,122	\$698,900	\$850,022
NEW LONDON WPCF	\$54,978	\$485,726	\$540,704
NEW MILFORD WPCF	\$299,782	\$166,921	\$466,703
NEWTOWN WPCF	\$72,954	\$91,376	\$164,330
NORTH HAVEN WPCF	\$54,418	\$127,930	\$182,348
NORWALK WPCF	\$276,853	\$772,741	\$1,049,594
PLAINVILLE WPCF	\$253,448	\$431,846	\$685,294
PORTLAND WPCF	\$44,740	\$145,971	\$190,711



<b>Project facilities</b>	<b>Total Annual Capital Cost</b>	<b>Total Annual O&amp;M Cost</b>	<b>Total Annual Project Cost</b>
PUTNAM WPCF	\$0	\$321,828	\$321,828
RIDGEFIELD SOUTH ST. WPCF	\$0	\$63,254	\$63,254
SEYMOUR WPCF	\$14,654	\$186,596	\$201,250
SIMSBURY WPCF	\$211,063	\$79,626	\$290,689
SHELTON WPCF	\$21,642	\$442,610	\$464,252
SOUTHINGTON WPCF	\$201,085	\$690,029	\$891,114
SOUTH WINDSOR WPCF	\$303,783	\$200,707	\$504,490
STAFFORD WPCF	\$0	\$71,905	\$71,905
STAMFORD WPCF	\$2,238,236	\$1,144,858	\$3,383,094
STRATFORD WPCF	\$648,477	\$414,368	\$1,062,845
SUFFIELD WPCF	\$0	\$172,282	\$172,282
THOMASTON WPCF	\$56,408	\$148,803	\$205,211
UCONN WPCF	\$0	\$244,028	\$244,028
WALLINGFORD WPCF	\$122,125	\$278,982	\$401,107
WATERBURY WPCF	\$737,935	\$1,456,930	\$2,194,865
WEST HAVEN WPCF	\$359,358	\$1,982,434	\$2,341,792
WESTPORT WPCF	\$1,688,193	\$69,710	\$1,757,903
WINDHAM WPCF	\$159,477	\$216,665	\$376,142
WINDSOR LOCKS WPCF	\$84,200	\$119,166	\$203,366
WINSTED WPCF	\$43,673	\$76,903	\$120,576
<b>TOTAL</b>	<b>\$16,829,230</b>	<b>\$22,701,860</b>	<b>\$39,531,090</b>
<b>BOLD = New Project Plant for Year 2015</b>			

**Attachment K**

<b>Nitrogen Removal Projects Financed by the CWF through 2015</b>						
<b>City or Town</b>	<b>Total Project Cost (\$)</b>	<b>Nitrogen Cost Portion (\$)</b>	<b>Year Project Completed</b>	<b>Baseline lbs/day</b>	<b>2014 lbs/day</b>	<b>2015 lbs/day</b>
Seymour	9,800,000	250,000	1993	167	63	53
East Windsor	10,000,000	1,000,000	1996	163	30	28
Fairfield Phase 1	4,700,000	4,700,000	1996	1113	273	296
Greenwich	500,000	500,000	1996	1313	475	441
Milford BB Phase 1	1,000,000	1,000,000	1996	258	55	51
Milford H Phase 1	650,000	650,000	1996	844	365	262
Norwalk Phase 1	1,100,000	1,100,000	1996	1967	738	583
Ridgefield	200,000	200,000	1996	80	43	43
Stratford Phase 1	800,000	800,000	1996	974	352	245
Univ. of Conn	12,000,000	1,058,000	1996	120	73	57
West Haven Phase 1	750,000	750,000	1996	967	291	211
Westport Phase 1	400,000	400,000	1996	238	28	20
Ledyard	3,500,000	350,000	1997	20	7	4
New Haven Phase 1	8,200,000	8,200,000	1997	4294	2894	3183
Newtown	12,000,000	1,058,000	1997	45	13	15
Stamford Phase 1	3,500,000	3,500,000	1997	2536	408	278
Derby	2,763,000	677,000	2000	195	66	68
New Canaan	14,000,000	1,235,000	2000	175	26	17
Norwalk Phase 2	56,000,000	5,538,000	2000	1967	738	583
Waterbury	120,000,000	17,359,000	2000	2766	667	571
East Hampton	690,000	690,000	2001	148	83	80
Thomaston	9,313,000	1,164,000	2001	114	29	21
New London	3,069,000	2,669,000	2002	1057	281	280
Portland	5,200,000	1,047,000	2002	86	21	23
Branford	21,542,000	3,158,000	2003	526	108	92
Fairfield Phase 2	40,551,000	12,046,000	2003	1113	273	296
Windsor Locks	2,349,000	1,841,000	2003	180	56	51
Bridgeport E Phase 1	2,090,000	2,090,000	2004	991	400	357
Bridgeport W Phase 1	2,375,000	2,375,000	2004	2852	925	1029
Bristol	584,000	584,000	2004	1091	508	427
Enfield	2,390,000	2,390,000	2004	763	253	238
Litchfield	4,000,000	1,000,000	2004	64	21	16
Jewett City	10,000,000	1,500,000	2005	42	7	9
Stamford Phase 2	97,223,000	59,500,000	2006	2536	408	278
North Haven	1,000,000	1,000,000	2006	433	158	138

<b>City or Town</b>	<b>Total Project Cost (\$)</b>	<b>Nitrogen Cost Portion (\$)</b>	<b>Year Project Completed</b>	<b>Baseline lbs/day</b>	<b>2014 lbs/day</b>	<b>2015 lbs/day</b>
Wallingford	2,276,000	2,276,000	2006	737	423	463
East Hartford	1,965,000	1,965,000	2007	801	462	309
Cheshire	5,775,000	5,775,000	2007	281	73	60
Simsbury	21,231,000	4,044,000	2007	293	57	37
Suffield	4,075,000	3,370,000	2007	122	27	22
Winsted	1,100,000	1,100,000	2007	175	84	72
Westport Phase 2	37,131,000	8,253,000	2008	238	28	20
Shelton	21,642,000	4,293,000	2008	290	64	87
Hartford Phase 1	6,900,000	6,900,000	2008	6512	3194	4360
Plainville	22,931,076	4,815,525	2008	277	112	82
Milford BB Phase 2	11,700,000	1,613,000	2009	258	55	51
Milford H Phase 2	34,900,000	10,038,000	2009	844	365	262
Stratford Phase 2	54,000,000	10,116,000	2009	974	352	245
Danbury	5,000,000	5,000,000	2010	1211	374	339
Groton Town	16,551,000	4,842,000	2010	420	220	240
Southington	13,000,000	13,000,000	2010	433	198	84
Meriden	42,455,000	32,517,000	2010	1230	145	116
New Hartford	10,000,000	1,000,000	2010	12	4	1
Stafford	Funded by USDA		2011	164	89	74
Glastonbury	23,701,000	272,570	2011	268	62	49
South Windsor	36,000,000	7,300,000	2012	289	103	104
Windham	22,917,000	1,638,583	2012	344	141	92
New Milford	29,900,000	6,080,545	2012	66	25	24
West Haven	55,000,000	13,200,000	2012	967	291	211
Ansonia	41,731,000	10,015,000	2012	314	59	52
Putnam	Funded by USDA		2014	145	42	43
Mattabassett	107,864,987	31,084,566	2014	228	1198	822
Manchester	52,185,765	7,695,619	2015	855	674	293
New Haven	61,043,403	11,262,508	2015	4294	2894	3183
Plymouth	1,200,499	728,845	2015	114	67	57
Rocky Hill	53,236,199	7,373,705	2017	789	420	457
Hartford Phase 2	547,000,000	74,688,881	2018	6512	3194	4360

**Attachment L**



79 Elm Street • Hartford, CT 06106-5127

[www.ct.gov/deep](http://www.ct.gov/deep)

Affirmative Action/Equal Opportunity Employer

**Notice of Proposed Value of an Equivalent Nitrogen Credit for 2014**

To: Connecticut Municipalities with Sewage Treatment Facilities

From: Macky McCleary, Deputy Commissioner, Department of Energy and Environmental Protection  
Betsey Wingfield, Chair, Nitrogen Credit Advisory Board

The Connecticut Department of Energy and Environmental Protection, working with the Nitrogen Credit Advisory Board, have established a Nitrogen Credit Exchange Program and General Permit to comply with Sections 22a-521 through 22a-527 of the General Statutes of Connecticut (The Nitrogen Reduction Program in Connecticut for Long Island Sound).

Under the exchange program, the cost of a credit is calculated on an annual basis. Accordingly, pursuant to Section 22a-527(b), the Nitrogen Credit Advisory Board hereby gives notice that it proposes an annual value for an equivalent nitrogen credit of \$6.47 for calendar year 2014. This value was derived, as specified in Section 22a-527(b), by dividing the total annual project cost for nitrogen removal projects at Connecticut sewage treatment facilities by the reduction in equivalent pounds of nitrogen achieved.

The Commissioner of the Department of Environmental Protection hereby issues a draft ruling accepting the Board's proposal of a value of \$6.47 for an equivalent nitrogen credit in calendar year 2014. You have until March 2<sup>nd</sup>, 2015 to review the data. Please look over the data for your facility and if you have any questions or objections please contact Iliana Raffa at the number listed below.

Pursuant to Section 22a-527(c), the Commissioner's draft ruling shall become final if no municipality or group of municipalities petition for a review of the proposed value of an equivalent nitrogen credit within 15 business days after the issuance date of the Commissioner's draft ruling.

Enclosed with this notice is a table that lists the facilities that will be buying and selling nitrogen credits under this program for the year 2014. Should you have any questions please contact Ms. Iliana Raffa of the Department's Water Protection and Land Reuse Bureau at 860-424-3758 or email Ms. Raffa at [iliana.raffa@ct.gov](mailto:iliana.raffa@ct.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read "Betsey Wingfield".

Betsey Wingfield  
Chairman, Nitrogen Credit Advisory Board

Sincerely,

A handwritten signature in blue ink, appearing to read "Macky McCleary".

Macky McCleary,  
Deputy Commissioner  
Date: February 3, 2015

cc: April Capone, Office of Policy Management  
Timothy Dowding, Stamford  
Thomas Tyler, Metropolitan District Commission  
Brian Armet, Mattabasset District  
Joseph Michelangelo, Fairfield

Astrid T. Hanzalek, Suffield  
William Norton, West Haven  
Guy P. Russo, Middletown  
Kristin Wirtanen, Treasurer's Office

**Attachment M**



79 Elm Street • Hartford, CT 06106-5127

[www.ct.gov/deep](http://www.ct.gov/deep)

Affirmative Action/Equal Opportunity Employer

**Notice of Proposed Value of an Equivalent Nitrogen Credit for 2015**

To: Connecticut Municipalities with Sewage Treatment Facilities

From: Michael J. Sullivan, Deputy Commissioner Department of Energy and Environmental Protection  
Betsey Wingfield, Chair, Nitrogen Credit Advisory Board

The Connecticut Department of Energy and Environmental Protection, working with the Nitrogen Credit Advisory Board, has established a Nitrogen Credit Exchange Program and General Permit to comply with Sections 22a-521 through 22a-527 of the General Statutes of Connecticut (The Nitrogen Reduction Program in Connecticut for Long Island Sound).

Under the exchange program, the cost of a credit is calculated on an annual basis. Accordingly, pursuant to Section 22a-527(b), the Nitrogen Credit Advisory Board hereby gives notice that it proposes an annual value for an equivalent nitrogen credit of \$7.14 for calendar year 2015. This value was derived, as specified in Section 22a-527(b), by dividing the total annual project cost for nitrogen removal projects at Connecticut sewage treatment facilities by the reduction in equivalent pounds of nitrogen achieved.

The Commissioner of the Department of Environmental Protection hereby issues a draft ruling accepting the Board's proposal of a value of \$7.14 for an equivalent nitrogen credit in calendar year 2015. You have until March 31, 2016 to review the data. Please look over the data for your facility and if you have any questions or objections please contact Iliana Raffa at the number listed below.


Pursuant to Section 22a-527(c), the Commissioner's draft ruling shall become final if no municipality or group of municipalities petition for a review of the proposed value of an equivalent nitrogen credit within 15 business days after the issuance date of the Commissioner's draft ruling.

Enclosed with this notice is a table that lists the facilities that will be buying and selling nitrogen credits under this program for the year 2015. Should you have any questions please contact Ms. Iliana Raffa of the Department's Water Protection and Land Reuse Bureau at 860-424-3758 or email Ms. Raffa at [iliana.raffa@ct.gov](mailto:iliana.raffa@ct.gov).

Sincerely,

  
Betsey Wingfield  
Chairman, Nitrogen Credit Advisory Board

Sincerely,

  
Michael J. Sullivan,  
Deputy Commissioner  
Date: March 18, 2016

cc:

April Capone, Office of Policy Management  
Astrid T. Hanzalek, Suffield  
William Norton, West Haven  
Joseph Michelangelo, Fairfield  
Thomas Tyler, Metropolitan District Commission  
Guy P. Russo, Middletown

## Attachment N



79 Elm Street • Hartford, CT 06106-5127

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Affirmative Action/Equal Opportunity Employer

# General Permit for Nitrogen Discharges

**Effective Date: January 1, 2016**  
**Expiration Date: December 31, 2018**

Bureau of Water Protection and Land Reuse  
Water Planning and Standards Division  
860-424-3704

# General Permit for Nitrogen Discharges

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# General Permit for Nitrogen Discharges

## Section 1. Authority

This general permit is issued under the authority of sections 22a-521 through 527 and Chapter 446k of the Connecticut General Statutes.

## Section 2. Definitions

As used in this general permit, and as defined or modified from section 22a-521 of the Connecticut General Statutes:

*"Annual mass loading of total nitrogen"* (expressed in pounds per day) means the sum of monthly mass loading of total nitrogen for each month from January through December divided by 12 and rounded to the nearest whole number.

*"Authorized activity"* means any activity authorized by this general permit.

*"CFR"* means Code of Federal Regulations.

*"Commissioner"* means commissioner as defined by section 22a-2(b) of the General Statutes

*"Daily composite"* means a composite sample taken over a full operating day consisting of grab samples collected at equal intervals of no more than sixty (60) minutes and combined proportionally to flow; or, a composite sample continuously collected over a full operating day proportional to flow.

*"Daily mass loading of total nitrogen"* (expressed in pounds per day) means the total nitrogen concentration (expressed in mg/L to the nearest 0.1 mg/L) multiplied by the total daily flow (expressed as MGD, to the nearest 0.1 MGD for facilities with a design capacity of 1.0 MGD or greater and to the nearest 0.01 MGD for facilities with a design capacity of less than 1.0 MGD) then multiplied by 8.34 and rounded to the nearest whole number to convert to pounds per day units.

*"Department"* means the Department of Energy and Environmental Protection.

*"Discharge Monitoring Report"* or *"DMR"* means a report form provided or approved by the commissioner for use by a permittee to submit discharge monitoring data to the Department relating to compliance with limits and conditions established in the individual permit for a facility.

*"Equivalency factor"* means a ratio of the unit response of dissolved oxygen to nitrogen in Long Island Sound for each POTW based on the geographic location of the specific POTW's discharge point divided by the unit response of the geographic area with the highest impact.

*"Equivalent nitrogen credit"* means a nitrogen credit multiplied by the equivalency factor.

*"Individual permit"* means a permit issued to a named permittee under section 22a-430-4of the Regulations of Connecticut State Agencies.

*"Monthly mass loading of total nitrogen"* (expressed in pounds per day) means the sum of the daily mass loading of total nitrogen for each monitored day during the month divided by the number of

monitoring days during the month and rounded to the nearest whole number.

*"Municipality"* means municipality as defined by section 22a-423 of the Connecticut General Statutes.

*"Nitrogen analysis report"* or *"NAR"* means a report form provided or approved by the commissioner for use by a permittee in submitting monitoring data to the Department related to the discharge of nitrogen from a facility.

*"Nitrogen credit"* means the difference between the annual mass loading of total nitrogen specified for a POTW in the general permit for treated nitrogen discharges and the monitored annual mass loading of total nitrogen discharged by that POTW expressed as pounds of nitrogen per day.

*"Nitrogen credit exchange program"* means the program within the Department established pursuant to section 22a-524 of the Connecticut General Statutes.

*"Nitrogen wasteload allocation"* means a total load of nitrogen assigned to a discharger expressed in pounds per day of total nitrogen discharged.

*"Permittee"* means a municipality or person discharging nitrogen as authorized by the general permit.

*"Person"* means person as defined by section 22a-423 of the Connecticut General Statutes.

*"Publicly owned treatment works"* or *"POTW"* means a system used for the collection, treatment or disposal of sewage from one or more parcels of land and that discharges to the waters of the state and is owned by a municipality of the state.

*"Sample date"* means the date on which the daily composite sampling ended.

*"Total daily flow"* means the total flow of wastewater over an operating day.

*"Total maximum daily load"* or *"TMDL"* means the total maximum daily load analysis to achieve water quality standards for dissolved oxygen in Long Island Sound as established by the Department and as approved by the United States Environmental Protection Agency on April 3, 2001.

*"Total nitrogen"* means the total of the concentrations of ammonia nitrogen, organic nitrogen, nitrite nitrogen, and nitrate nitrogen expressed as milligrams of nitrogen per liter.

### **Section 3. Authorization Under This General Permit**

#### **(a) Eligible Activities or Discharges**

This general permit authorizes the discharge of total nitrogen from the POTWs listed in Appendix 1 of this general permit, provided the activities are conducted in accordance with this general permit.

This general permit does not authorize any discharge of water, substance or material into the waters of the state other than the one specified in this section. Any person or municipality which initiates, creates, originates or maintains such a discharge must first apply for and obtain authorization under section 22a-430 of the General Statutes.

(b) *Geographic Area*

This general permit applies throughout the State of Connecticut.

(c) *Effective Date and Expiration Date of this General Permit*

This general permit is effective on January 1, 2016, and expires on December 31, 2018.

(d) *Effective Date of Authorization*

An activity is authorized by this general permit on the date the general permit is issued.

**Section 4. Conditions of this General Permit**

A permittee shall conduct activities authorized by this general permit in accordance with the following conditions:

(a) *Discharge Limits*

- (1) Annual discharge limit applicable to each POTW are set forth in Appendix 1, which is incorporated herein in its entirety, as part of this general permit.
- (2) Each permittee shall limit the discharge of nitrogen to the annual discharge limits set forth in Appendix 1 of this general permit, except as set forth in Section 4(b)(1)(b) of this general permit.

(b) *Compliance During Term of Permit*

- (1) A permittee shall be in compliance with its annual discharge limits of this general permit if:
  - (a) the POTW's annual mass loading of total nitrogen is less than or equal to the discharge limit set forth in Appendix 1 of this general permit; or,
  - (b) the permittee has secured state-owned equivalent nitrogen credits equal to the amount the POTW exceeded the annual discharge limit set forth in Appendix 1 of this general permit in accordance with the Nitrogen Credit Exchange Program and sections 22a-521 through 527 of the Connecticut General Statutes.
- (2) A permittee shall be out of compliance with the annual discharge limits of the general permit and subject to the enforcement provisions of chapter 446k of the Connecticut General Statutes if:
  - (a) the POTW's annual mass loading of total nitrogen is greater than the discharge limit set forth in Appendix 1 of this general permit; and

- (b) the permittee fails to secure sufficient state-owned equivalent nitrogen credits in a timely manner in accordance with the Nitrogen Credit Exchange Program and sections 22a-521 through 527 of the Connecticut General Statutes.

(c) *Operation of Nitrogen Removal Process Equipment*

The permittee shall not bypass or fail to operate any of the approved nitrogen removal equipment or processes without the written approval of the commissioner. The permittee shall operate all necessary equipment to optimize nitrogen removal so as to reduce nitrogen discharges to the maximum extent practicable. This includes but is not limited to all recycle pumping systems, aeration equipment, aeration tank cycling, mixing equipment, anoxic basins, chemical feed systems or any other process equipment necessary for the optimal removal of nitrogen.

(d) *Monitoring Requirements*

- (1) Effective upon issuance of this general permit, the permittee shall monitor total nitrogen in the final effluent in accordance with the following frequency:
  - (a) POTWs with a design flow rate specified in the individual permit for the facility of less than 10,000,000 gallons per day shall monitor the final effluent at a minimum frequency of weekly.
  - (b) POTWs with a design flow rate specified in the individual permit for the facility equal to or greater than 10,000,000 gallons per day shall monitor the final effluent at a minimum frequency of twice per week.
- (2) Monitoring requirements shall commence on *January 1, 2016*.
- (3) Final effluent and monitoring locations shall be identical to that used to determine compliance with final effluent limitations and monitoring conditions established in the individual permit for the facility.
- (4) All samples analyzed to determine compliance with limits on total nitrogen shall be daily composite samples unless otherwise approved in writing by the commissioner.
- (5) Chemical analyses to determine compliance with effluent limits and conditions established in this general permit shall be performed using the methods approved in or pursuant to 40 CFR 136 unless an alternative method has been approved in writing pursuant to 40 CFR 136.4.
- (6) The permittee shall measure the total daily flow of wastewater received by the facility at the main flow meter as set forth in the individual permit for the facility.
- (7) In the event of a flow meter malfunction on a day when a sample for total



nitrogen analysis is collected, the permittee shall utilize the arithmetic average of the 7 highest daily flows measured during the previous 30-day period to calculate the total daily nitrogen loading unless an alternative procedure has been agreed to by the commissioner.

*(e) Reporting Requirements*

The results of chemical analysis for the total nitrogen in all samples collected during the month and the total daily flow of effluent for each day on which a sample is collected during the month shall be entered on the Nitrogen Analysis Reports (NAR) and reported to the Department. Results must also be entered in Discharge Monitoring Reports (DMR) as a calculated monthly mass loading of total nitrogen. The NAR and DMR must be received at the following address by the 15<sup>th</sup> day of the month following the month samples are collected.

ATTN: Municipal Wastewater Monitoring Coordinator  
Water Planning and Standards Division  
Bureau of Water Protection and Land Reuse  
Connecticut Department of Energy and Environmental Protection  
79 Elm Street  
Hartford, CT 06106-5127

*(f) Record Keeping Requirements*

The permittee shall retain copies of all reports required by this general permit, and records of all data used to compile these reports for a period of at least five years from the date of the report submission to the Department.

**Section 5. General Conditions**

*(a) Duty to Correct and Report Violations*

Upon learning of a violation of a condition of this general permit, including any failure of flow monitoring equipment, the permittee shall immediately take all reasonable action to determine the cause of such violation, correct such violation and mitigate its results, prevent further such violation, and report in writing such violation and such corrective action to the commissioner within five (5) days of the permittee learning of such violation. Such report shall be certified in accordance with Section 5(c) of this general permit.

*(b) Duty to Provide Information*

If the commissioner requests any information pertinent to the authorized activity or to compliance with this general permit, the permittee shall provide such information in writing within thirty (30) days of such request. Such information shall be certified in accordance with Section 5(c) of this general permit.

(c) *Certification of Documents*

Any document, including but not limited to any notice, which is submitted to the commissioner under this general permit shall be signed by, as applicable, the permittee in accordance with section 22a-430-3(b)(2) of the Regulations of Connecticut State Agencies, and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows:

“I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that a false statement made in the submitted information may be punishable as a criminal offense, in accordance with section 22a-6 of the General Statutes, pursuant to section 53a-157b of the General Statutes, and in accordance with any other applicable statute.”

(d) *Date of Filing*

For purposes of this general permit, the date of filing with the commissioner of any document is the date such document is received by the commissioner. The word “day” as used in this general permit means the calendar day, if any date specified in the general permit falls on a Saturday, Sunday, or legal holiday, such deadline shall be the next business day thereafter.

(e) *False Statements*

Any false statement in any information submitted pursuant to this general permit may be punishable as a criminal offense, in accordance with section 22a-6 of the General Statutes, pursuant to section 53a-157b of the General Statutes, and in accordance with any other applicable statute.

(f) *Correction of Inaccuracies*

Within fifteen days after the date a permittee becomes aware of a change in any information in any material submitted pursuant to this general permit, or becomes aware that any such information is inaccurate or misleading or that any relevant information has been omitted, such permittee shall correct the inaccurate or misleading information or supply the omitted information in writing to the commissioner. Such information shall be certified in accordance with Section 5(c) of this general permit.

(g) *Other Applicable Law*

Nothing in this general permit shall relieve the permittee of the obligation to comply with any applicable federal, state and local law, including but not limited to the obligation to obtain and comply with any authorizations required by such law. In the event a POTW is subject to a more stringent nitrogen limitation than set forth in this general permit, the permittee shall comply with that more stringent limitation and may not purchase or transfer nitrogen credits to comply with that additional limitation.

*(h) Other Rights*

This general permit is subject to and does not derogate any present or future rights or powers of the State of Connecticut and conveys no rights in real or personal property nor any exclusive privileges, and is subject to all public and private rights and to any federal, state, and local laws pertinent to the property or activity affected by such general permit. In conducting any discharge authorized hereunder, the permittee may not cause pollution, impairment, or destruction of the air, water, or other natural resources of this state. The issuance of this general permit shall not create any presumption that this general permit should or will be renewed.

**Section 5. Commissioner's Powers**

*(a) Abatement of Violations*

The commissioner may take any action provided by law to abate a violation of this general permit, including the commencement of proceedings to collect penalties for such violation. The commissioner may, by summary proceedings or otherwise and for any reason provided by law, including violation of this general permit, revoke a permittee's authorization hereunder in accordance with sections 22a-3a-2 through 22a-3a-6, inclusive, of the Regulations of Connecticut State Agencies. Nothing herein shall be construed to affect any remedy available to the commissioner by law.

*(b) General Permit Revocation, Suspension, or Modification*

The commissioner may, for any reason provided by law, by summary proceedings or otherwise, revoke or suspend this general permit or modify it to establish any appropriate conditions, schedules of compliance, or other provisions which may be necessary to protect human health or the environment or to implement the TMDL.

Issued Date: January 1, 2016

MICHAEL SULLIVAN  
Deputy Commissioner

This is a true and accurate copy of the general permit executed on **January 1, 2016** by the Department of Energy and Environmental Protection.



**APPENDIX 1**  
ANNUAL DISCHARGE LIMITS FOR TOTAL NITROGEN

Zone	Publicly Owned Treatment Works	Equivalency Factor	Total Nitrogen (Pounds/Day) 2016-2018
1	JEWETT CITY WPCF	0.17	15
1	GROTON CITY WPCF	0.18	99
1	GROTON TOWN WPCF	0.18	153
1	KILLINGLY WPCF	0.14	131
1	LEDYARD WPC	0.18	7
1	MONTVILLE WPCF	0.18	118
1	NEW LONDON WPCF	0.18	386
1	NORWICH WPCF	0.18	201
1	STONINGTON PAWCATUCK WPCF	0.17	24
1	PLAINFIELD NORTH WPCF	0.14	34
1	PLAINFIELD VILLAGE WPCF	0.14	24
1	PUTNAM WPCF	0.14	53
1	SPRAGUE WPCF	0.16	7
1	STAFFORD SPRINGS WPCF	0.15	60
1	STONINGTON BOROUGH WPCF	0.18	14
1	STONINGTON MYSTIC WPCF	0.18	27
1	THOMPSON WPCF	0.14	10
1	UCONN WPCF	0.15	44
1	WINDHAM WPCF	0.15	125
2	BRISTOL WPCF	0.18	398
2	CANTON WPCF	0.18	24
2	EAST HAMPTON WPCF	0.20	54
2	EAST HARTFORD WPCF	0.19	292
2	EAST WINDSOR WPCF	0.19	59
2	ENFIELD WPCF	0.19	278
2	FARMINGTON WPCF	0.18	178
2	GLASTONBURY WPCF	0.20	98
2	HARTFORD WPCF	0.20	2377
2	MANCHESTER WPCF	0.19	312
2	MATTABASSET WPCF	0.20	834
2	MIDDLETOWN WPCF	0.20	222
2	NEW HARTFORD	0.18	3
2	PLAINVILLE WPCF	0.18	101
2	PLYMOUTH WPCF	0.18	42
2	WINDSOR POQUONOCK WPCF	0.19	98
2	PORTLAND WPCF	0.20	31
2	ROCKY HILL WPCF	0.20	288
2	SIMSBURY WPCF	0.18	107

Zone	Publicly Owned Treatment Works	Equivalency Factor	Total Nitrogen (Pounds/Day) 2016-2018
2	SOUTH WINDSOR WPCF	0.19	106
2	SUFFIELD WPCF	0.19	45
2	VERNON WPCF	0.19	184
2	WINDSOR LOCKS WPCF	0.19	66
2	WINSTED WPCF	0.18	64
3	BRANFORD WPCF	0.60	192
3	CHESHIRE WPCF	0.49	103
3	MERIDEN WPCF	0.49	449
3	NEW HAVEN EAST WPCF	0.60	1568
3	NORTH HAVEN WPCF	0.60	158
3	SOUTHINGTON WPCF	0.49	204
3	WALLINGFORD WPCF	0.60	269
3	WEST HAVEN WPCF	0.60	353
4	ANSONIA WPCF	0.67	115
4	BEACON FALLS WPCF	0.67	12
4	DANBURY WPCF	0.46	442
4	DERBY WPCF	0.67	71
4	LITCHFIELD WPCF	0.35	24
4	MILFORD BEAVER BROOK WPCF	0.67	94
4	MILFORD HOUSATONIC WPCF	0.67	307
4	NAUGATUCK TREATMENT Co.	0.60	246
4	NEW MILFORD WPCF	0.46	28
4	NEWTOWN WPCF	0.46	42
4	NORFOLK WPCF	0.35	11
4	NORTH CANAAN WPCF	0.35	13
4	SALISBURY WPCF	0.35	21
4	SEYMOUR WPCF	0.67	61
4	SHELTON WPCF	0.67	106
4	SOUTHBURY TR. SCHOOL WPCF	0.46	15
4	STRATFORD WPCF	0.67	356
4	THOMASTON WPCF	0.60	42
4	TORRINGTON WPCF	0.60	248
4	WATERBURY WPCF	0.60	1049
5	BRIDGEPORT EAST WPCF	0.85	362
5	BRIDGEPORT WEST WPCF	0.85	1041
5	FAIRFIELD WPCF	0.85	406
5	WESTPORT WPCF	0.85	87
6	GREENWICH WPCF	1.00	479
6	NEW CANAAN WPCF	1.00	64
6	NORWALK WPCF	1.00	718
6	RIDGEFIELD SOUTH ST. WPCF	1.00	29
6	STAMFORD WPCF	1.00	926

Attachment O

**LIS Total Nitrogen Credit Exchange**  
**PROJECTIONS - 2016 and 2017**  
**Under the Self-Sufficient Program (Effective 2016)**

<u>SELLING Credits</u>			<u>BUYING Credits</u>		
<u>Facility Name</u>	<u>2016 at \$4.60</u>	<u>2017 at \$4.48</u>	<u>Facility Name</u>	<u>2016 at \$7.15</u>	<u>2017 at \$6.96</u>
STAMFORD WPCF	\$807,857	\$786,390	HARTFORD WPCF	\$680,623	\$662,536
WATERBURY WPCF	\$317,432	\$308,997	WALLINGFORD WPCF	\$263,063	\$256,072
MERIDEN WPCF	\$234,547	\$228,315	NEW HAVEN EAST WPCF	\$234,878	\$228,636
FAIRFIELD WPCF	\$125,629	\$122,291	WINDSOR POQUONOCK	\$201,812	\$196,449
STRATFORD WPCF	\$100,151	\$97,489	MIDDLETOWN WPCF	\$167,546	\$163,094
BRIDGEPORT WEST WPCF	\$88,512	\$86,160	NORWICH WPCF	\$138,108	\$134,438
BRANFORD WPCF	\$87,672	\$85,342	VERNON WPCF	\$118,013	\$114,877
WESTPORT WPCF	\$85,656	\$83,380	ROCKY HILL WPCF	\$87,166	\$84,849
WEST HAVEN WPCF	\$84,649	\$82,399	EAST HARTFORD WPCF	\$73,386	\$71,436
SOUTHINGTON WPCF	\$69,130	\$67,293	FARMINGTON WPCF	\$62,477	\$60,817
ANSONIA WPCF	\$64,142	\$62,437	BEACON FALLS WPCF	\$61,199	\$59,572
NEW CANAAN WPCF	\$63,822	\$62,126	BRISTOL WPCF	\$47,915	\$46,642
NORWALK WPCF	\$62,143	\$60,492	BRIDGEPORT EAST WPCF	\$39,929	\$38,868
MILFORD BEAVER BROOK	\$34,884	\$33,957	GROTON TOWN WPCF	\$37,580	\$36,582
NEW LONDON WPCF	\$31,743	\$30,900	RIDGEFIELD SOUTH ST.	\$33,927	\$33,025
CHESHIRE WPCF	\$29,627	\$28,840	STAFFORD SPRINGS WPCF	\$33,274	\$32,390
SHELTON WPCF	\$29,258	\$28,480	CANTON WPCF	\$29,125	\$28,351
NEWTOWN WPCF	\$20,087	\$19,553	EAST HAMPTON WPCF	\$21,400	\$20,831
THOMASTON WPCF	\$17,131	\$16,676	PLAINFIELD NORTH WPCF	\$16,076	\$15,649
SIMSBURY WPCF	\$15,720	\$15,303	PLYMOUTH WPCF	\$15,972	\$15,547
MONTVILLE WPCF	\$14,511	\$14,126	TORRINGTON WPCF	\$14,093	\$13,718
GREENWICH WPCF	\$11,757	\$11,444	MILFORD HOUSATONIC	\$13,988	\$13,617
GLASTONBURY WPCF	\$10,077	\$9,809	THOMPSON WPCF	\$12,683	\$12,346
DANBURY WPCF	\$9,271	\$9,025	NORTH CANAAN WPCF	\$11,874	\$11,559
EAST WINDSOR WPCF	\$9,254	\$9,008	NORTH HAVEN WPCF	\$7,829	\$7,621
ENFIELD WPCF	\$6,701	\$6,523	SALISBURY WPCF	\$7,307	\$7,113
MANCHESTER WPCF	\$6,063	\$5,902	NORFOLK WPCF	\$7,307	\$7,114
NAUGATUCK TREATMENT	\$5,039	\$4,905	PLAINFIELD VILLAGE WPCF	\$6,577	\$6,402
SUFFIELD WPCF	\$4,468	\$4,349	UCONN WPCF	\$5,872	\$5,716
MATTABASSETT WPCF	\$4,031	\$3,924	WINSTED WPCF	\$4,698	\$4,573
DERBY WPCF	\$3,376	\$3,286	PLAINVILLE WPCF	\$4,228	\$4,115
GROTON CITY WPCF	\$2,721	\$2,649	KILLINGLY WPCF	\$3,288	\$3,201
NEW MILFORD WPCF	\$2,318	\$2,256	SPRAGUE WPCF	\$1,670	\$1,626
JEWETT CITY WPCF	\$1,999	\$1,946	SOUTHBURY TR. SCHOOL	\$1,200	\$1,169
PORTLAND WPCF	\$1,680	\$1,635	STONINGTON MYSTIC WP	\$940	\$915
STONINGTON BOROUGH WPCF	\$1,512	\$1,471	LITCHFIELD WPCF	\$913	\$889
STONINGTON PAWCATUCK	\$1,142	\$1,112	SOUTH WINDSOR WPCF	\$496	\$483
SEYMOUR WPCF	\$1,125	\$1,095			
WINDHAM WPCF	\$504	\$490			
PUTNAM WPCF	\$470	\$458			
WINDSOR LOCKS WPCF	\$319	\$311			
LEDYARD WPC	\$302	\$294			
NEW HARTFORD WPCF	\$0	\$0			
<b>Sum</b>	<b>\$2,468,432</b>	<b>\$2,402,838</b>		<b>\$2,468,432</b>	<b>\$2,402,838</b>

Self-Sufficient Program was approved under Public Act 15-38. The program consists of the buyers buying the credits they need to meet with their General Permit with those Payments being shared by the sellers proportionally. The 2016 year data is traded in 2017 and the 2017 data is traded in 2018. The 2016 & 2017 price of a credit projections are based on nitrogen data from 2011 - 2015. Subject to change.

**Attachment P**

**Nitrogen Credit Advisory Board 2017 Meeting Schedule**

All meetings are scheduled for 10:00 am at 79 Elm Street, Hartford, CT 06106-5127

February 15, 2017

March 15, 2017

June 14, 2017

October 25, 2017