# Establishing Nitrogen Target Concentrations for Three Long Island Sound Watershed Groupings:

Embayments, Large Riverine Systems, and Western Long Island Sound Open Water

Subtask H. Summary of Reductions

*Submitted to:*

U.S. Environmental Protection Agency
Region 1 and Long Island Sound Office

*Submitted by:*

Tetra Tech, Inc.

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*This Tetra Tech technical study was commissioned by the United States Environmental Protection Agency (EPA) to synthesize and analyze water quality data to assess nitrogen-related water quality conditions in Long Island Sound and its embayments, based on the best scientific information reasonably available. This study is neither a proposed Total Maximum Daily Load (TMDL), nor proposed water quality criteria, nor recommended criteria. The study is not a regulation, is not guidance, and cannot impose legally binding requirements on EPA, States, Tribes, or the regulated community. The technical study might not apply to a particular situation or circumstance, but it is intended as a source of relevant information to be used by water quality managers, at their discretion, in developing nitrogen reduction strategies.*

# Subtask H. Summary of Reductions

## Contents

## Introduction

The goal of this task is to provide technical support and outline potential decision-making processes for federal, state, and local partners to utilize in developing nitrogen reduction strategies for the Long Island Sound (LIS) waterbodies included in this effort. This task translates the nitrogen target concentrations documented in the subtasks F and G memos into percent reduction targets for watershed loads to each embayment waterbody within Long Island Sound (LIS). This was accomplished with a simple mixing model frequently applied in similar contexts. The results are percent reduction goals for each waterbody, that if implemented through a loading distribution process, could be expected to support attainment of the nitrogen target concentrations.

## Methods

Once a target concentration and an appropriate averaging period are established for a waterbody, the concentration target can be converted to an estimated load reduction using a zero-order mixing model approach. This approach starts with the mass balance for load to an embayment:

$$Q_0C_0 + Q_{LIS}C_{LIS} = Q_{out}C_e \qquad \text{(Equation 1)}$$

where

$Q_0$ = watershed inflow

$C_0$ = existing watershed average total nitrogen (TN) inflow concentration

$Q_{LIS}$ = boundary flow into the embayment from LIS

$C_{LIS}$ = boundary TN concentration in LIS

$Q_{out}$ = total flow out of the embayment to LIS

$C_e$ = existing embayment TN concentration

See Figure H-1 for an illustration of these terms.

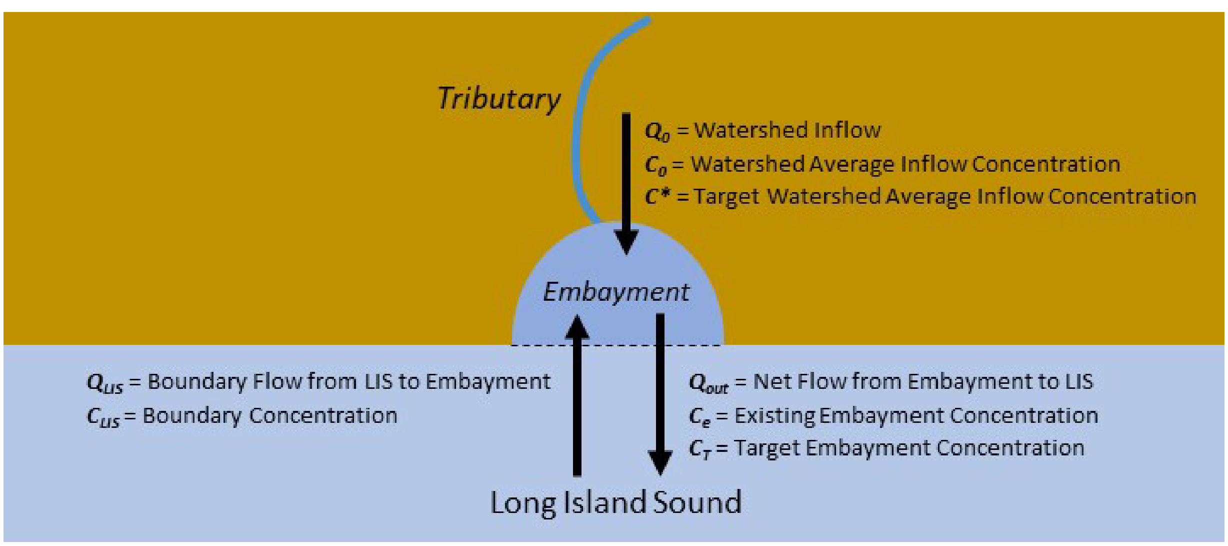



**Figure H-1. Conceptual Model of Zero-Order Mixing Model and Variables Used in the Derivation of the Load Reduction**

At steady state, the change in embayment volume is zero, and therefore:

$$Q_{out} = Q_0 + Q_{LIS} \qquad \text{(Equation 2)}$$

Simple dilution calculations do not fully describe the detailed time history of TN concentrations in an embayment. If sufficient data were available, a more sophisticated representation of nitrogen cycling in estuaries would consider the variety of local nitrogen transformations, exchanges with the sediment, and gaseous emissions to the atmosphere. EPA assumes that the net rate of internal gains or losses are small compared to the nitrogen turnover associated with external exchange and mixing; therefore, nitrogen concentrations are sufficiently conservative for this effort, but EPA acknowledges that this is a simplification. Under these assumptions, simple dilution calculations are sufficient to obtain an estimate of the reduction in loading from the local watershed that would be required to achieve a target TN concentration within an embayment.

The goal of this effort is to identify the reduction necessary to meet the growing season (April to September) target concentrations in the embayments ($C_T$) defined in the subtasks F and G memos. This reduction is achieved by reducing the growing season watershed average inflow concentration from $C_0$ to a target watershed average inflow concentration $C^*$ that achieves the target. The fractional reduction needed is represented by

$$1 - \frac{C^*}{C_0} \qquad \text{(Equation 3)}$$

Concentration of a conservative constituent in an embayment, $C_e$, can be represented by rearranging Equation 1 and applying the substitution in Equation 2 as

$$C_e = \frac{(C_0 Q_0 + C_{LIS} Q_{LIS})}{(Q_0 + Q_{LIS})} \qquad \text{(Equation 4)}$$

For salinity EPA can assume that $C_0$ is insignificant relative to $C_{LIS}$ ($C_0 \approx 0$ is appropriate because it represents net watershed freshwater inflow from the land).[1] With that assumption,

$$C_{e-salinity} \approx \frac{(C_{LIS} Q_{LIS})}{(Q_o + Q_{LIS})} = C_{LIS} \times D \qquad \text{(Equation 5)}$$

where

$$D = \frac{C_e}{C_{LIS}} = \frac{(Q_{LIS})}{(Q_0 + Q_{LIS})} \qquad \text{(Equation 6)}$$

$D$ is a dilution factor for the embayment relative to water in LIS and can be obtained from the salinity results ($S_e/S_{LIS}$) in Memo E. $Q_0$ and $Q_{LIS}$ are then related by

$$Q_0 = Q_{LIS}\left(\frac{1}{D} - 1\right) \qquad \text{(Equation 7)}$$

[1] Refer to Appendix 1 in Anning, D.W, and M.E. Flynn. 2014. *Dissolved-Solids Sources, Loads, Yields, and Concentrations in Streams of the Conterminous United States*. U.S. Geological Survey Scientific Investigations Report 2014-5012, 101 p. http://dx.doi.org/10.3133/sir20145012.

One can then estimate the concentration of any other conservative constituent for which $C_0$ is nonzero using the mixing and dilution information deduced from salinity by substituting the definition of $Q_0$ (Equation 7) into the general equation for $C_e$ (Equation 4), such that

$$C_e = \frac{\left(C_0\left(\frac{1}{D}-1\right)+C_{LIS}\right)}{\left(\frac{1}{D}\right)} \qquad \text{(Equation 8)}$$

or

$$C_0 = \frac{{C_e}/{D} - C_{LIS}}{{1}/{D} - 1} \qquad \text{(Equation 9)}$$

To estimate the target watershed average inflow concentration ($C^*$) that yields a target concentration in the estuary of $C_T$, substitute $C_T$ for $C_e$ in Equation 9 to obtain

$$C^* = \frac{{C_T}/{D} - C_{LIS}}{{1}/{D} - 1} \qquad \text{(Equation 10)}$$

The required percent reduction in watershed inflow concentration (Equation 3) can then be calculated from C* using equation 9 and empirical estimates of $C_0$ as

$$\left(1 - \frac{C^*}{C_0}\right) \times 100 \qquad \text{(Equation 11)}$$

Since one rarely empirically knows the watershed average inflow concentration across all watershed inputs to a waterbody, one combines equations 9 and 10 to calculate the reductions using:

$$1 - \frac{C^*}{C_0} = 1 - \frac{\frac{{C_T}/{D} - C_{LIS}}{{1}/{D} - 1}}{\frac{{C_e}/{D} - C_{LIS}}{{1}/{D} - 1}} = \frac{(C_e - C_T)}{\left\{C_e - \left[C_{LIS} \times \left(\frac{S_e}{S_{LIS}}\right)\right]\right\}} \qquad \text{(Equation 12)}$$

Equations 11 and 12 provide an estimate of the needed percent reduction in nitrogen sources under approximate steady-state conditions. The approach assumes that any gains of TN to the water column from the sediment are ultimately derived from external loading and that the balance between denitrification losses and nitrogen fixation by cyanobacteria and other nitrogen-fixing organisms are small relative to the external loads and exchanges. As denitrification is expected to be greater than nitrogen fixation in nitrogen-enriched waters, these two equations more likely overestimate the percent reduction needed rather than underestimate it. Alternatively stated, if the net flux due to denitrification minus nitrogen fixation was known and was incorporated into the mass balance, the estimated reduction needed would be less.

The embayment estimates focus on the reductions from the landward side. Reductions could also come from the boundary side (reductions that lower $C_{LIS}$). Those reductions would have to be estimated by applying iterative reductions to the LIS boundary as well as to the landward side. Example estimates to changes in landward reductions for presumed reductions in boundary concentrations are provided for each waterbody section.

For the open waters (Western Narrows, Eastern Narrows, and the Combined Western and Eastern Narrows), reductions focus on the western and landward (northern and southern) sides. The eastern side of the waterbodies is considered the boundary. For these waters, reductions from both the boundary and the landward sides are, however, likely needed and are discussed in the respective waterbody sections.

Two approaches were used to estimate values for $C_e$. First, EPA estimated mean growing season TN concentrations in each waterbody using available surface water quality data (subtask D). Second, for the embayments only, EPA estimated a growing season average TN concentration for each embayment using a hierarchical model whose general approach is explained in the subtasks F and G memo. For this application, however, EPA modeled average growing season TN using the following equation:

$$TN_{ij} = \beta_0 + \beta_{0j} + e_{ij} \qquad \text{(Equation 13)}$$

where $\beta_0$ is the global intercept, $\beta_{0j}$ are the intercept adjustments for each embayment group, $e_{ij}$ is the error term, $j$ is the index for each embayment group, and $i$ is the index for each observation within group $j$. EPA used a Gaussian (normal) distribution with a natural log link. The final model contained 4,131 observations across 177 stations. This included all TN data for surface samples observed during the growing season in all embayments. Similar to the regression models in subtasks F and G, this hierarchical model allowed EPA to estimate growing season average TN concentrations for embayments ($C_e$) for which EPA did not have sufficient surface water quality data to calculate a mean concentration. Table H-1 shows the results.

**Table H-1. Estimated Average Growing Season TN Concentrations for Each Priority Embayment**

| Waterbody | Hierarchical TN Estimate ($C_e$) (mg/L) |
|---|---|
| Pawcatuck River, RI and CT | 0.549 |
| Stonington Harbor, CT | 0.321 |
| Saugatuck Estuary, CT | 0.573 |
| Norwalk Harbor, CT | 0.461 |
| Mystic Harbor, CT | 0.562 |
| Niantic Bay, CT | 0.268 |
| Farm River, CT | 0.461 |
| Southport Harbor / Sasco Brook, CT | 0.461 |
| Northport-Centerport Harbor Complex, NY | 0.350 |
| Port Jefferson Harbor, NY | 0.272 |
| Nissequogue River, NY | 0.488 |
| Stony Brook Harbor, NY | 0.284 |
| Mt. Sinai Harbor, NY | 0.319 |
| Eastern Narrows, CT and NY[a] | 0.383 |
| Western Narrows, NY[a] | 0.965 |
| Eastern and Western Narrows (Combined), CT and NY[a] | 0.674 |
| Connecticut River, CT | 0.485 |
| Mamaroneck River, NY | 0.746 |
| Hempstead Harbor, NY | 0.632 |
| Huntington Bay, NY | 0.268 |
| Huntington Harbor, NY | 0.408 |
| Lloyd Harbor, NY | 0.302 |
| Oyster Bay/Cold Spring Harbor Complex, NY | 1.289 |
| Manhasset Bay, NY | 0.782 |

| Waterbody | Hierarchical TN Estimate ($C_e$) (mg/L) |
|---|---|
| Pequonnock River, CT | 0.349 |
| Byram River, CT and NY | 0.461 |
| New Haven Harbor, CT | 0.429 |
| Little Narragansett Bay, CT and RI | 0.453 |
| Housatonic River, MA and CT | 0.461 |
| Thames River, CT | 0.461 |

*Notes:* mg/L = milligrams per liter

[a] Averages for the Narrows are the arithmetic averages of the open water station data.

To estimate $C_{LIS}$, EPA needed to estimate the seasonal average TN concentration at the boundary of each embayment and the open water segments (Eastern Narrows, Western Narrows, and Eastern and Western Narrows Combined). Common spatial interpolation methods include inverse distance weighting (IDW) and kriging. IDW is a deterministic method (no estimate of uncertainty), whereas kriging is a geostatistical method that produces an estimate of uncertainty. IDW analysis results can sometimes produce a "bullseye" effect when viewing a map of predictions, while kriging results tend to appear more natural. Based on these two differences, kriging was selected as the spatial interpolation method.

EPA used R software (R Core Team 2019) to perform the statistical analysis. The package "geoR" (Ribeiro and Diggle 2016) was used to run the kriging analysis. To estimate $C_{LIS}$, EPA used TN observations (subtask D) taken from the surface at open water stations across LIS. The kriging input requires a single value per location, so the median growing season TN value was used in the model (n = 106 stations).

Kriging uses generalized least squares to model both the main predictors (typically longitude and latitude) and the spatial dependency in the data. Spatial dependency is modeled using a covariance function. Commonly selected functions include the Matern, exponential, and spherical covariance functions. The variograms were modeled as isotropic, meaning that the variance versus distance relationship was assumed not to vary based on the direction (e.g., Northeast) from station "A" to "B." The exponential function fit the data the best based on visual assessment of the (semi)variogram (Figure H-2).

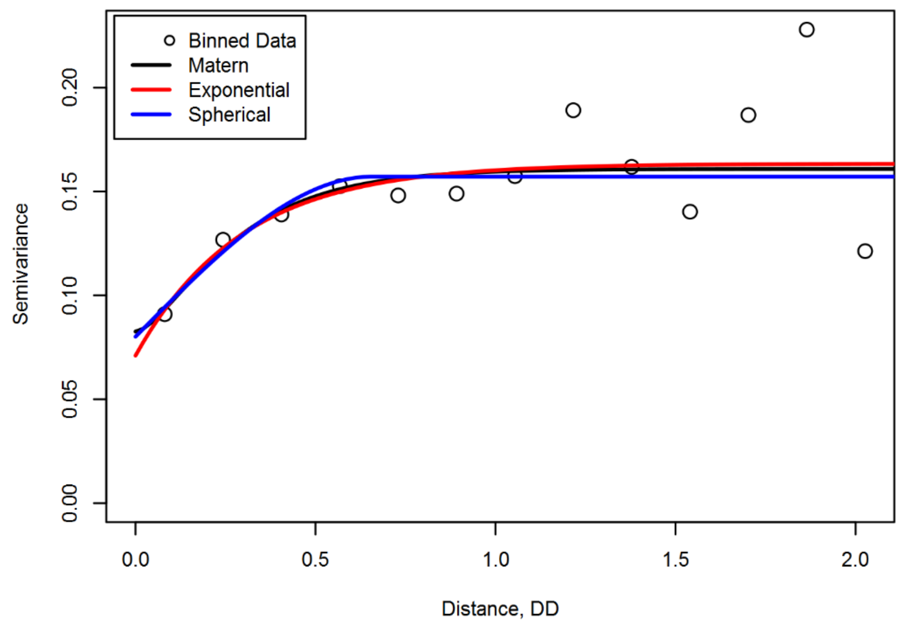



**Figure H-2. Variogram of Variation Versus Distance (Decimal Degrees); Various Covariance Functions Were Compared to Observed (Binned) Data**

The formula for the exponential covariance function is

$$Semivariance = Partial.Sill * \exp\left(-\frac{h}{Range}\right) + Nugget \qquad \text{(Equation 13)}$$

where *Partial.Sill*, *Range*, and *Nugget* are estimated parameters that describe the shape of the covariance function in Figure H-2, and *h* is the observed distance between two samples. The variogram is an exponential function where the variance increases nonlinearly as distance (h) increases. *Nugget* is the y-intercept term, *Range* is the x-distance where the curve plateaus, and *Partial.Sill* is the “plateau - nugget” y-distance on the curve.

The kriging equation for the main predictors is

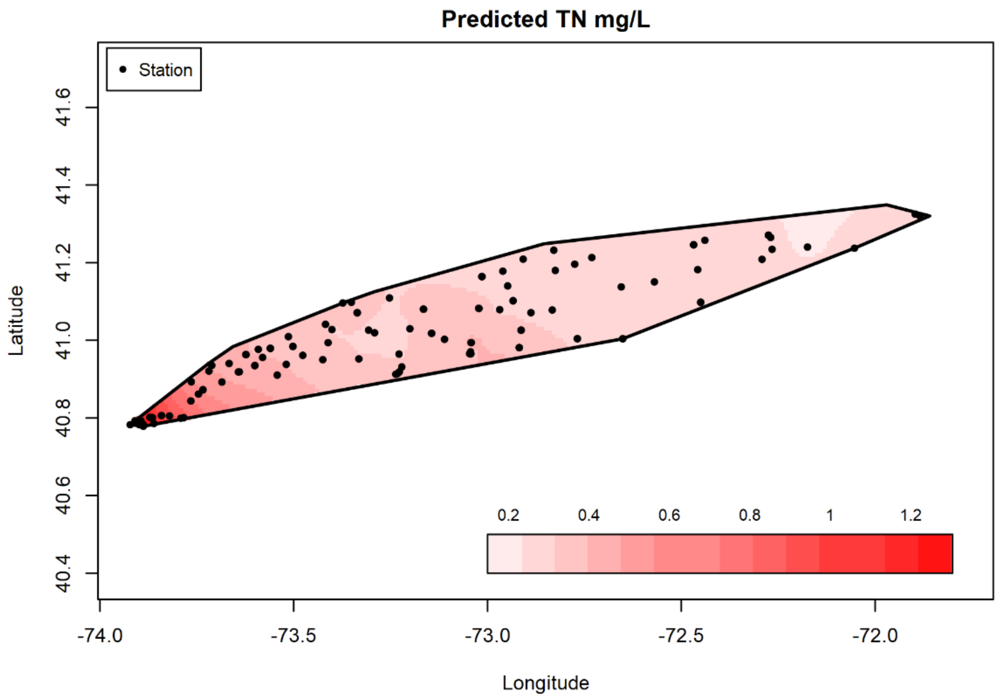
$$TN_i = Intercept + \beta 1 * Longitude_i + \beta 2 * Latitude_i + e_i \qquad \text{(Equation 14)}$$

where *TN* is the growing season average, β1 and β2 are calibrated parameters, *Longitude* and *Latitude* are in decimal degrees, *e* is the (spatially correlated) error, and *i* is the station index. EPA used a natural log link during modeling. Parameter estimates for the kriging and covariance function are presented in Table H-2.

**Table H-2. Kriging Parameter Estimates**

| Parameter | Estimate |
|---|---|
| Intercept | 13.6 |
| β1 | -0.47 |
| β2 | -1.20 |
| Nugget | 0.071 |
| Partial Sill | 0.087 |
| Range | 0.39 |

The modeled growing season average TN concentrations across the entire LIS and the standard error around those averages are presented in Figure H-3.



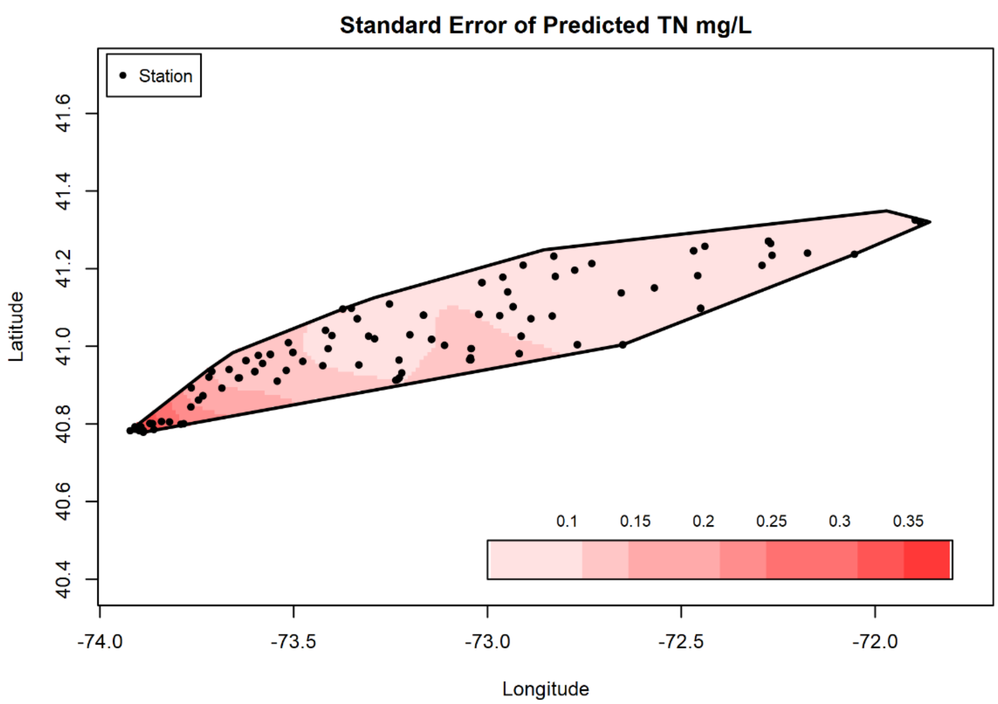




**Figure H-3. Spatially Averaged Growing Season Predicted Average TN Concentration (*Top Image*) and Standard Error of the Predicted Average TN Concentration (*Bottom Image*) across LIS. Estimated Nitrogen Concentrations (mg/L) Identified on the Contour Lines. Darker Red Denotes Increased TN Concentration (*Top Image*) and Increased Standard Error (*Bottom Image*).**

From these spatially averaged TN concentrations, EPA was able to estimate a $C_{LIS}$ value at any boundary location in LIS, which EPA extracted for each waterbody (Table H-3). Because sampling locations rarely aligned with the precise boundary, EPA selected coordinates near the middle of the embayment/LIS boundary. For $C_{LIS}$ values associated with the Narrows, EPA used the average of predicted TN values of a set of points placed 1 kilometer apart along the given boundary.

**Table H-3. Estimated Average and Standard Error Growing Season TN Concentrations at the LIS Boundary of Each Embayment Using Spatial Average Modeling**

| Waterbody | Latitude | Longitude | Growing Season Average ($C_{LIS}$) (mg/L) | Standard Error (mg/L) |
|---|---|---|---|---|
| Pawcatuck River, RI and CT | 41.3203 | -71.8593 | 0.213 | 0.072 |
| Stonington Harbor, CT | 41.3260 | -71.9091 | 0.220 | 0.072 |
| Saugatuck Estuary, CT | 41.1009 | -73.3604 | 0.333 | 0.101 |
| Norwalk Harbor, CT | 41.0629 | -73.3970 | 0.314 | 0.095 |
| Mystic Harbor, CT | 41.3489 | -71.9703 | 0.206 | 0.071 |
| Niantic Bay, CT | 41.2961 | -72.1822 | 0.193 | 0.063 |
| Farm River, CT | 41.2487 | -72.8539 | 0.224 | 0.072 |
| Southport Harbor / Sasco Brook, CT | 41.1252 | -73.2917 | 0.306 | 0.097 |
| Northport-Centerport Harbor Complex, NY | 40.9106 | -73.4034 | 0.349 | 0.111 |
| Port Jefferson Harbor, NY | 40.9715 | -73.0925 | 0.371 | 0.113 |
| Nissequogue River, NY | 40.9083 | -73.2323 | 0.332 | 0.099 |
| Stony Brook Harbor, NY | 40.9301 | -73.1479 | 0.351 | 0.111 |
| Mt. Sinai Harbor, NY | 40.9657 | -73.0437 | 0.389 | 0.114 |
| Eastern Narrows, CT and NY[a] | 41.0008 | -73.4066 | 0.308 | 0.090 |
| Western Narrows, NY | 40.8747 | -73.7615 | 0.639 | 0.069 |
| Eastern and Western Narrows (Combined), CT and NY[a] | 40.9569 | -73.5300 | 0.308 | 0.152 |
| Connecticut River, CT | 41.2731 | -72.3320 | 0.218 | 0.171 |
| Mamaroneck River, NY | 40.9398 | -73.7205 | 0.504 | 0.109 |
| Hempstead Harbor, NY | 40.8600 | -73.6671 | 0.551 | 0.116 |
| Huntington Bay, NY | 40.9206 | -73.4176 | 0.346 | 0.115 |
| Huntington Harbor, NY | 40.9073 | -73.4329 | 0.365 | 0.123 |
| Lloyd Harbor, NY | 40.9109 | -73.4355 | 0.363 | 0.200 |
| Oyster Bay/Cold Spring Harbor Complex, NY | 40.9205 | -73.5082 | 0.404 | 0.098 |
| Manhasset Bay, NY | 40.8437 | -73.7455 | 0.672 | 0.132 |
| Pequonnock River, CT | 41.1551 | -73.1791 | 0.297 | 0.074 |
| Byram River, CT and NY | 40.9836 | -73.6568 | 0.428 | 0.071 |
| New Haven Harbor, CT | 41.2227 | -72.9390 | 0.232 | 0.094 |
| Little Narragansett Bay, CT and RI | 41.3187 | -71.8682 | 0.215 | 0.068 |
| Housatonic River, MA and CT | 41.1572 | -73.0961 | 0.291 | 0.072 |
| Thames River, CT | 41.3179 | -72.0818 | 0.198 | 0.072 |

*Notes:* mg/L = milligrams per liter

[a] The Eastern Narrows boundary is the same as for the Eastern and Western Narrows (Combined).

With these estimates of $C_e$ and $C_{LIS}$, along with the estimated target concentration $C_T$ from subtask G for each embayment and the salinity-based dilution estimates from subtask E (Table H-4), EPA then used Equation 12 to calculate the percent reduction for each embayment. EPA also provided reduction scenarios where the boundary concentration is also systematically reduced. EPA recognizes that ongoing reduction efforts across the LIS watershed are affecting the boundary condition and the boundary condition may continue to change in the future (e.g., as a result of further nitrogen reductions to LIS). So, while management for any one embayment may focus on its individual watershed for load reductions, EPA wanted to provide scenarios that account for potential reductions in the boundary side itself.

**Table H-4. Salinity-Based Dilution Estimates from Subtask E**

| Waterbody | $S_e/S_{LIS}$ (Dilution) |
|---|---|
| Pawcatuck River, RI and CT | 0.995 |
| Stonington Harbor, CT | 0.966 |
| Saugatuck Estuary, CT[a] | 0.951 |
| Norwalk Harbor, CT | 0.957 |
| Mystic Harbor, CT | 0.997 |
| Niantic Bay, CT[a] | 0.940 |
| Farm River, CT | 0.982 |
| Southport Harbor / Sasco Brook, CT | 0.982 |
| Northport-Centerport Harbor Complex, NY[a] | 0.976 |
| Port Jefferson Harbor, NY | 0.985 |
| Nissequogue River, NY | 0.989 |
| Stony Brook Harbor, NY | 0.992 |
| Mt. Sinai Harbor, NY | 0.992 |
| Eastern and Western Narrows (Combined), CT and NY[b] | 1.000 |
| Connecticut River, CT | 0.240 |
| Mamaroneck River, NY | 0.908 |
| Hempstead Harbor, NY | 0.985 |
| Huntington Bay, NY | 0.991 |
| Huntington Harbor, NY | 0.991 |
| Lloyd Harbor, NY | 0.988 |
| Oyster Bay/Cold Spring Harbor Complex, NY[a] | 0.965 |
| Manhasset Bay, NY | 0.983 |
| Pequonnock River, CT | 0.961 |
| Byram River, CT and NY | 0.980 |
| New Haven Harbor, CT | 0.767 |
| Little Narragansett Bay, CT and RI | 0.979 |
| Housatonic River, MA and CT | 0.880 |
| Thames River, CT | 1.000 |

[a] Based on Vaudrey (2016) delineations, this larger embayment is made up of multiple smaller embayments. EPA selected the smallest dilution factor (i.e., the lowest number), representing the greatest contribution from fresh water.
[b] The Eastern Narrows boundary is the same as for the Eastern and Western Narrows (Combined).

Target concentration minima are truncated at 0.200 mg/L, which was considered background for LIS, seeing as it was equivalent to the 5th percentile of the distribution analysis (see subtask F memo) and is similar to a long-term time series of eastern LIS water, which was reported as similar to concentrations in the Atlantic shelf adjacent to and exchanging with LIS (Vlahos et al. 2020). Maxima were truncated at 0.490 mg/L for seagrass and 0.600 mg/L for aquatic life use, which were considered upper acceptable levels to protect these assessment endpoints based on the literature (see subtask F memo). The average was derived from all values that met the minimum and maximum limits.

### *Sample Calculation*

In order to improve transparency, a sample calculation using data from the Pawcatuck River is provided here. For the Pawcatuck the following values were estimated from the methods above:

Average Target Embayment TN Concentration ($C_T$) (mg/L): 0.343

Existing Embayment TN Concentration ($C_e$) (mg/L): 0.550

Boundary Condition Concentration ($C_{LIS}$) (mg/L): 0.213

Dilution ($D$): 0.995

Then, substituting these into equation 12, one gets the percent reduction solution:

$$\frac{(C_e - C_T)}{\left\{C_e - \left[C_{LIS} \times \left(\frac{S_e}{S_{LIS}}\right)\right]\right\}} = \frac{(0.550 - 0.343)}{\{0.550 - [0.213 \times (0.995)]\}} = \frac{(0.207)}{\{0.550 - [212]\}} = \frac{(0.207)}{\{0.338\}} = 61.2\%$$

## Results

This section provides the values for each parameter in Equation 11 and the resulting percent reductions for each waterbody associated with the mean, minimum, and maximum target concentration. Also shown are percent reductions where the boundary concentration is reduced as well (e.g., as a result of other nitrogen reductions to LIS). Estimates of percent reductions for embayments ranged from 18% to 96%. The average reduction was 67%.

Suffolk County, NY, developed a Subwatersheds Wastewater Plan in 2020, subsequently approved by NYSDEC as a Nine Element (9E) Watershed Plan. The 9E Plan, which increases priority for additional state and federal funding, comprehensively looks at nitrogen pollution in Suffolk County, including embayments in LIS. For the plan, Suffolk County modeled nitrogen loads from wastewater, fertilizer, and atmospheric deposition at the parcel level to the groundwater. Using the model's data, load reduction goals have been developed for all Suffolk County waterbodies. The plan's recommendations will allow Suffolk County to target priority areas for reducing nitrogen coming from wastewater. In April 2021, EPA approved the 9E Plan as an *Alternative Restoration Plan* for the eight waters that are on New York's Section 303(d) list and identified as impaired due to nitrogen.

This effort was done in parallel with EPA's work, highlighting the importance of determining necessary nitrogen reductions. The two approaches slightly differed and resulting recommended nitrogen load reduction goals vary in some cases. The results of this soundwide evaluation do not supplant the Suffolk County reduction goals, but offer independent verification that the need for reductions in nitrogen pollution identified by Suffolk County are scientifically defensible.

### *H.1 Pawcatuck River, RI and CT*

Figure H-4 shows a map of the Pawcatuck River watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

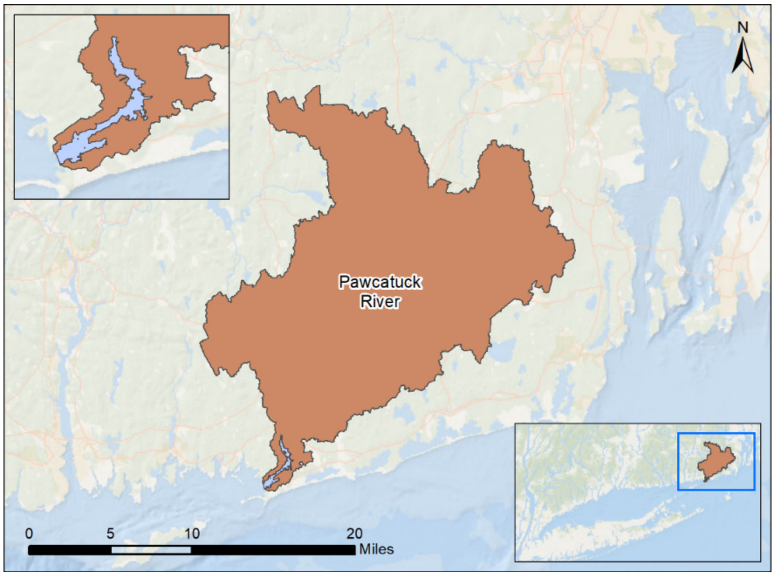



**Figure H-4. Pawcatuck River Watershed, RI and CT**

Table H-5 provides estimated TN reduction levels for the Pawcatuck River watershed.

**Table H-5. Estimated TN Reduction Levels for Pawcatuck River Watershed, RI and CT**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.180 | 0.740 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.550 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.213 | | | | | |
| Dilution (*D*) | 0.995 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.343 | | 0.200 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 61% | | 103% | | 18% | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 59% | | 100% | | 17% | |
| 0.250 mg/L | Current Boundary Below These Values | | | | | |
| 0.300 mg/L | | | | | | |
| 0.350 mg/L | | | | | | |

*Notes:* mg/L = milligrams per liter

[a] Target concentration minimum (min) is truncated at 0.200 mg/L, which was considered background for LIS. Maxima (max) were truncated at 0.490 mg/L for seagrass and 0.600 mg/L for aquatic life, which were considered upper acceptable levels to protect these assessment endpoints based on the literature (see subtask F memo). The average (avg) was derived from all values that met the minimum and maximum limits.

[b] Mathematically unrealistic reduction calculations are indicated in one of three ways in tables H-5 to H-32:

(1) Percent reductions greater than 100% occur when the contribution from the boundary ($\{C_{LIS}\times(S_e/S_{LIS})\}$), the right side of the denominator in equation 12, exceeds the target ($C_T$), the right side of the numerator in equation 12, are shown in gray text.

(2) When the target concentration is greater than the embayment concentration, the percent reduction is shown as $C_T>C_e$.

(3) When the contribution from the boundary ({CLIS×(Se/SLIS)}), the right side of the denominator in equation 12, is greater than the existing embayment concentration ($C_e$), the left side of the denominator in equation 12, the denominator is negative and the percent reduction is impractically negative. This is shown as $\{C_{LIS}\times(S_e/S_{LIS})\}>C_e$.

### *H.2 Stonington Harbor, CT*

Figure H-5 shows a map of the Stonington Harbor watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

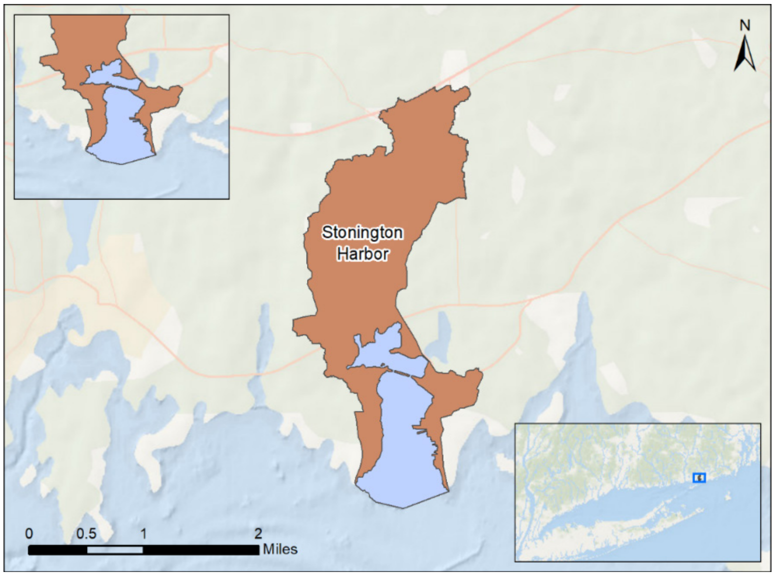



**Figure H-5. Stonington Harbor Watershed, CT**

Table H-6 provides estimated TN reductions levels for the Stonington Harbor watershed.

**Table H-6. Estimated TN Reduction Levels for Stonington Harbor Watershed, CT**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.360 | 1.19 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.320 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.220 | | | | | |
| Dilution ($D$) | 0.966 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.346 | | 0.280 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | $C_T$>$C_e$ | | 38% | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | $C_T$>$C_e$ | | 32% | | $C_T$>$C_e$ | |
| 0.250 mg/L | Current Boundary Below These Values | | | | | |
| 0.300 mg/L | | | | | | |
| 0.350 mg/L | | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

### H.3 Saugatuck Estuary, CT[2]

Figure H-6 shows a map of the Saugatuck Estuary watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

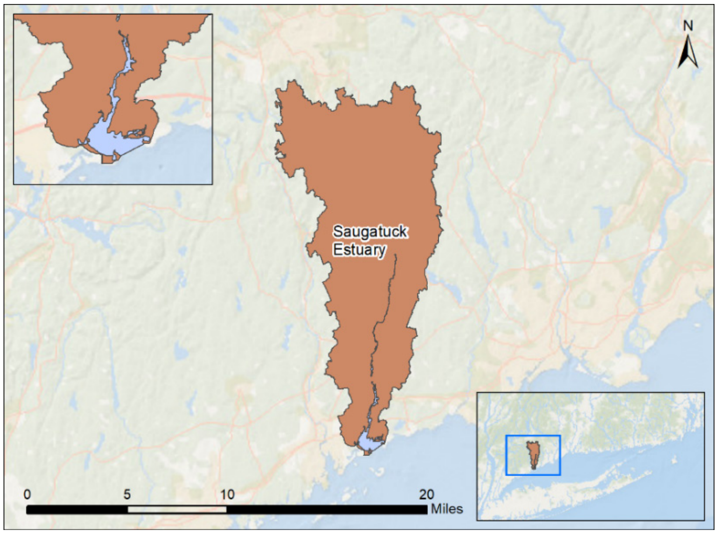



**Figure H-6. Saugatuck Estuary Watershed, CT**

Table H-7 provides estimated TN reductions levels for the Saugatuck Estuary watershed.

**Table H-7. Estimated TN Reduction Levels for Saugatuck Estuary Watershed, CT**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.170 | 0.630 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.573 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.334 | | | | | |
| Dilution ($D$) | 0.951 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.343 | | 0.200 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 90% | | 146% | | 32% | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 60% | | 97% | | 22% | |
| 0.250 mg/L | 69% | | 111% | | 25% | |
| 0.300 mg/L | 80% | | 130% | | 29% | |
| 0.350 mg/L | Current Boundary Below These Values | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

[2] Includes two Vaudrey et al. (2016) embayments: Saugatuck River, CT, and Saugatuck River, North, CT (freshwater).

### *H.4 Norwalk Harbor, CT*

Figure H-7 shows a map of the Norwalk Harbor watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

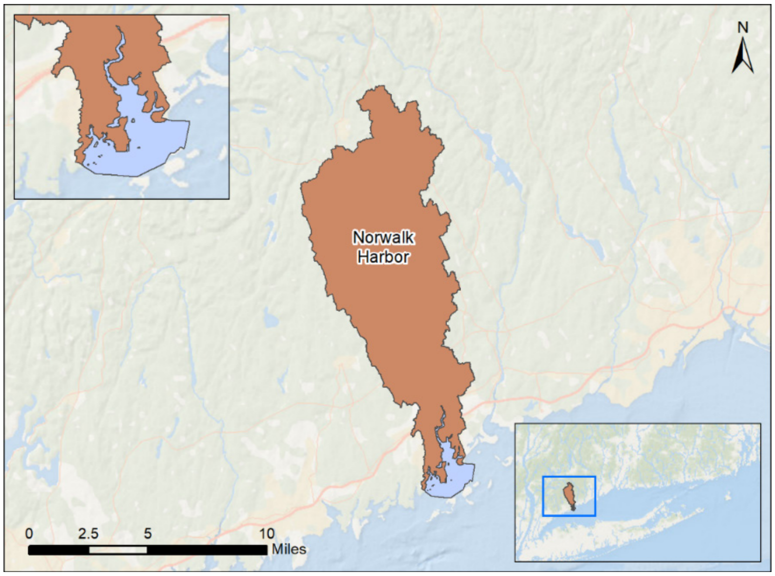



**Figure H-7. Norwalk Harbor Watershed, CT**

Table H-8 provides estimated TN reductions levels for the Norwalk Harbor watershed.

**Table H-8. Estimated TN Reduction Levels for Norwalk Harbor Watershed, CT**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.270 | 0.740 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.461 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.314 | | | | | |
| Dilution *(D)* | 0.957 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.328 | | 0.270 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 83% | | 119% | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 49% | | 71% | | $C_T$>$C_e$ | |
| 0.250 mg/L | 60% | | 86% | | $C_T$>$C_e$ | |
| 0.300 mg/L | 77% | | 110% | | $C_T$>$C_e$ | |
| 0.350 mg/L | Current Boundary Below These Values | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

### *H.5 Mystic Harbor, CT*

Figure H-8 shows a map of the Mystic Harbor watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

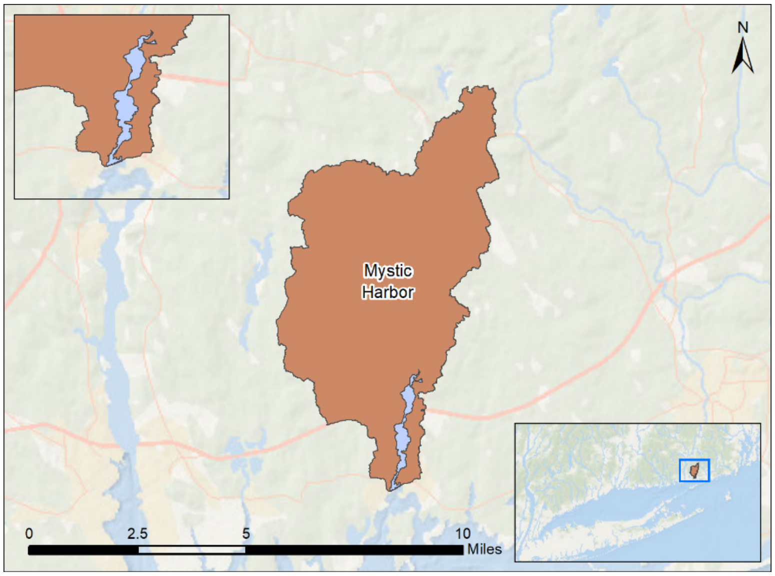



**Figure H-8. Mystic Harbor Watershed, CT**

Table H-9 provides estimated TN reductions levels for the Mystic Harbor watershed.

**Table H-9. Estimated TN Reduction Levels for Mystic Harbor Watershed, CT**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.230 | 0.650 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.562 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.206 | | | | | |
| Dilution ($D$) | 0.997 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.320 | | 0.230 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 68% | | 93% | | 20% | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 67% | | 92% | | 20% | |
| 0.250 mg/L | Current Boundary Below These Values | | | | | |
| 0.300 mg/L | | | | | | |
| 0.350 mg/L | | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

### H.6 Niantic Bay, CT[3]

Figure H-9 shows a map of the Niantic Bay watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

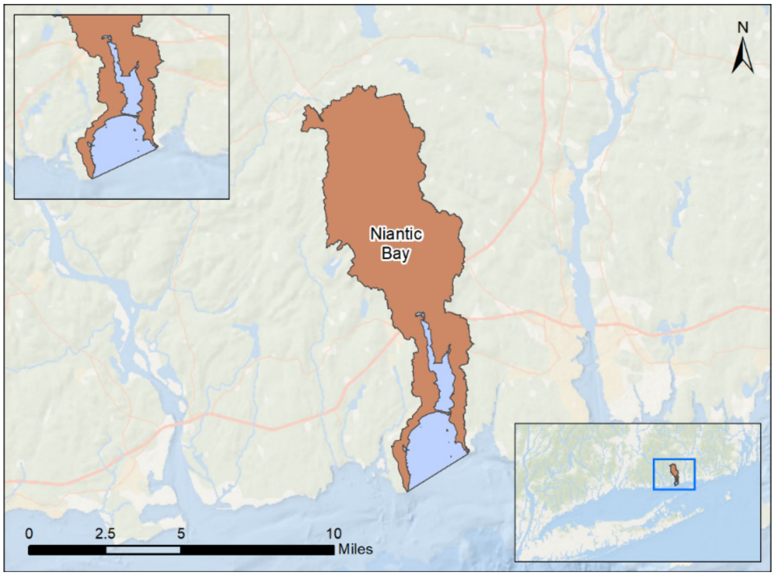



**Figure H-9. Niantic Bay Watershed, CT**

Table H-10 provides estimated TN reductions levels for the Niantic Bay watershed.

**Table H-10. Estimated TN Reduction Levels for Niantic Bay Watershed, CT**

<table>
<tr><th rowspan="2">Concentration-Based Value</th><th colspan="4">Seagrass</th><th colspan="2">Other Aquatic Life</th></tr>
<tr><th colspan="2">Stressor-Response</th><th>Literature</th><th>Distribution</th><th>Literature</th><th>Distribution</th></tr>
<tr><td>Target Concentrations ($C_T$) (mg/L)</td><td>0.270</td><td>0.840</td><td>0.400</td><td>0.280</td><td>0.410</td><td>0.280</td></tr>
<tr><td>Embayment Concentration ($C_e$) (mg/L)</td><td colspan="6">0.268</td></tr>
<tr><td>Boundary Condition Concentration ($C_{LIS}$) (mg/L)</td><td colspan="6">0.193</td></tr>
<tr><td>Dilution *(D)*</td><td colspan="6">0.940</td></tr>
<tr><td colspan="7"></td></tr>
<tr><td rowspan="2">Target Concentrations ($C_T$)[a] (mg/L)</td><td colspan="2">Avg[a]</td><td colspan="2">Min[a]</td><td colspan="2">Max[a]</td></tr>
<tr><td colspan="2">0.328</td><td colspan="2">0.270</td><td colspan="2">0.490</td></tr>
<tr><td>Percent Reduction at Existing Boundary Condition[b]</td><td colspan="2">$C_T$>$C_e$</td><td colspan="2">$C_T$>$C_e$</td><td colspan="2">$C_T$>$C_e$</td></tr>
<tr><td colspan="7">Percent Reduction[b] if Boundary Reduced to:</td></tr>
<tr><td>0.200 mg/L</td><td colspan="6" rowspan="4">Current Boundary Below These Values</td></tr>
<tr><td>0.250 mg/L</td></tr>
<tr><td>0.300 mg/L</td></tr>
<tr><td>0.350 mg/L</td></tr>
</table>

See page H-13 (Table H-5) for footnote descriptions.

[3] Includes two Vaudrey et al. (2016) embayments: Niantic River, CT, and Niantic Bay, CT.

### H.7 Farm River, CT

Figure H-10 shows a map of the Farm River watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

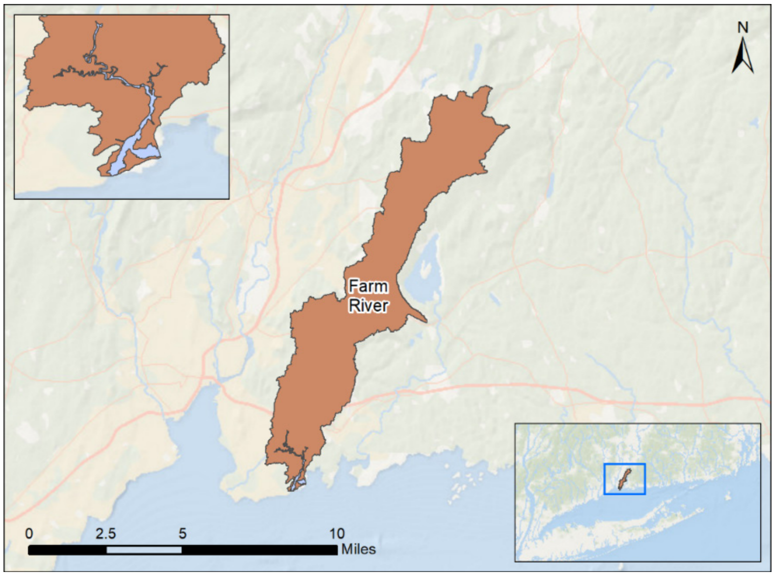



**Figure H-10. Farm River Watershed, CT**

Table H-11 provides estimated TN reductions levels for the Farm River watershed.

**Table H-11. Estimated TN Reduction Levels for Farm River Watershed, CT**

| Concentration-Based Value | Seagrass | | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.270 | 0.740 | 0.400 | 0.280 | | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.461 | | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.225 | | | | | | |
| Dilution *(D)* | 0.982 | | | | | | |
| | | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | | Max[a] | |
| | 0.328 | | 0.270 | | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 55% | | 79% | | | $C_T > C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | | |
| 0.200 mg/L | 50% | | 72% | | | $C_T > C_e$ | |
| 0.250 mg/L | Current Boundary Below These Values | | | | | | |
| 0.300 mg/L | | | | | | | |
| 0.350 mg/L | | | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

### *H.8 Southport Harbor/Sasco Brook, CT*[4]

Figure H-11 shows a map of the Southport Harbor/Sasco Brook watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

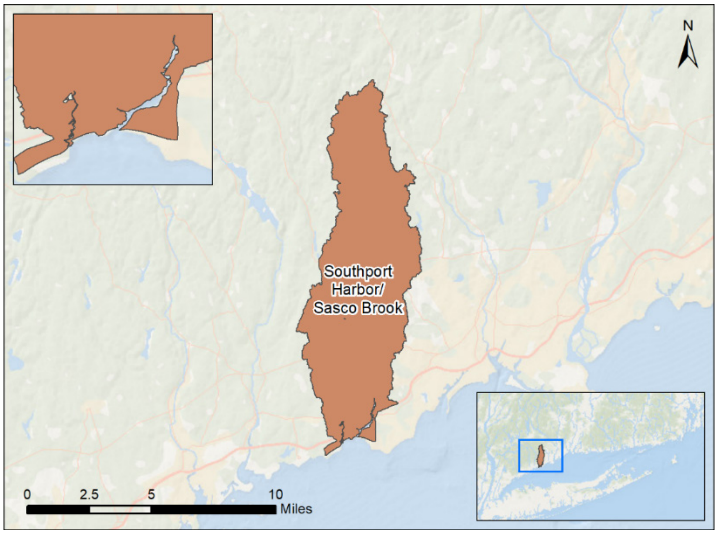



**Figure H-11. Southport Harbor/Sasco Brook Watershed, CT**

Table H-12 provides estimated TN reductions levels for the Southport Harbor/Sasco Brook watershed.

**Table H-12. Estimated TN Reduction Levels for Southport Harbor/Sasco Brook Watershed, CT**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.270 | 0.740 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.461 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.307 | | | | | |
| Dilution *(D)* | 0.982 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.328 | | 0.270 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 83% | | 119% | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 50% | | 72% | | $C_T$>$C_e$ | |
| 0.250 mg/L | 62% | | 89% | | $C_T$>$C_e$ | |
| 0.300 mg/L | 80% | | 115% | | $C_T$>$C_e$ | |
| 0.350 mg/L | Current Boundary Below These Values | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

[4] Includes two Vaudrey et al. (2016) embayments: Mill River, CT, and Sasco Brook, CT.

### *H.9 Northport-Centerport Harbor Complex, NY*[5]

Figure H-12 shows a map of the Northport-Centerport Harbor Complex watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

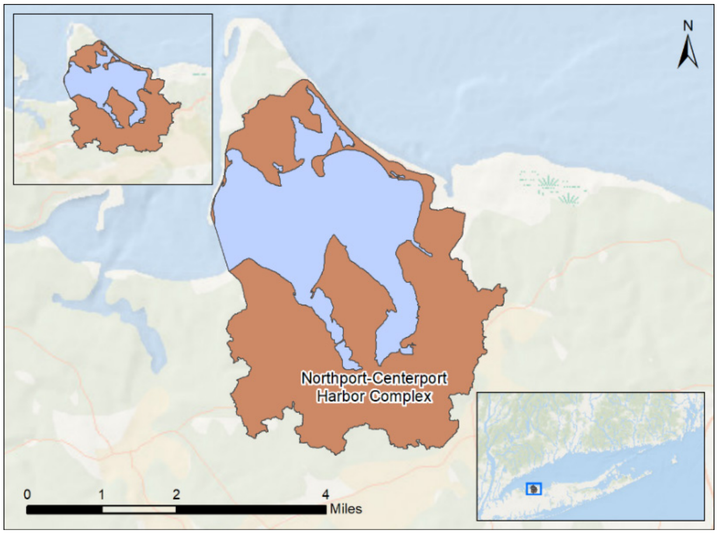



**Figure H-12. Northport-Centerport Harbor Complex Watershed, NY**

Table H-13 provides estimated TN reductions levels for the Northport-Centerport Harbor Complex watershed.

**Table H-13. Estimated TN Reduction Levels for Northport-Centerport Harbor Complex Watershed, NY**

| **Concentration-Based Value** | **Seagrass** | | | | **Other Aquatic Life** | |
|---|---|---|---|---|---|---|
| | **Stressor-Response** | | **Literature** | **Distribution** | **Literature** | **Distribution** |
| Target Concentrations ($C_T$) (mg/L) | 0.160 | 0.600 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.350 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.349 | | | | | |
| Dilution *(D)* | 0.976 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.343 | | 0.200 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 86% | | 1654% | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 5% | | 97% | | $C_T$>$C_e$ | |
| 0.250 mg/L | 7% | | 142% | | $C_T$>$C_e$ | |
| 0.300 mg/L | 14% | | 262% | | $C_T$>$C_e$ | |
| 0.350 mg/L | Current Boundary Below These Values | | | | | |

See page H-13 (Table H-5) for footnote descriptions. Page H-11 provides background about Suffolk County's parallel effort to determine load reduction goals.

[5] Includes three Vaudrey et al. (2016) embayments: Centerport Harbor; Northport Bay; and Northport Harbor, NY.

### *H.10 Port Jefferson Harbor, NY*

Figure H-13 shows a map of the Port Jefferson Harbor watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

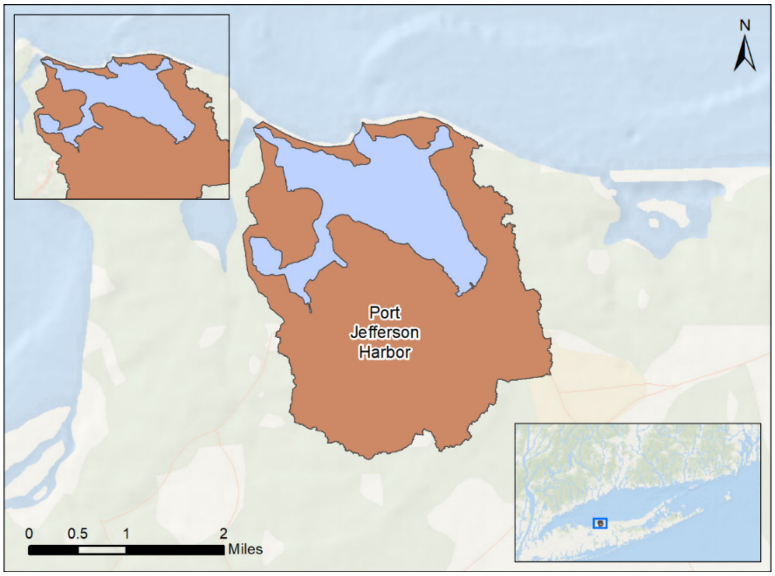



**Figure H-13. Port Jefferson Harbor Watershed, NY**

Table H-14 provides estimated TN reductions levels for the Port Jefferson Harbor watershed.

**Table H-14. Estimated TN Reduction Levels for Port Jefferson Harbor Watershed, NY**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.230 | 0.910 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.273 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.371 | | | | | |
| Dilution *(D)* | 0.985 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.320 | | 0.230 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | $C_T>C_e$ | | $\{C_{LIS}\times(S_e/S_{LIS})\}>C_e$ | | $C_T>C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | $C_T>C_e$ | | 56% | | $C_T>C_e$ | |
| 0.250 mg/L | $C_T>C_e$ | | 162% | | $C_T>C_e$ | |
| 0.300 mg/L | $C_T>C_e$ | | $\{C_{LIS}\times(S_e/S_{LIS})\}>C_e$ | | $C_T>C_e$ | |
| 0.350 mg/L | $C_T>C_e$ | | $\{C_{LIS}\times(S_e/S_{LIS})\}>C_e$ | | $C_T>C_e$ | |

See page H-13 (Table H-5) for footnote descriptions. Page H-11 provides background about Suffolk County's parallel effort to determine load reduction goals.

### *H.11 Nissequogue River, NY*

Figure H-14 shows a map of the Nissequogue River watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

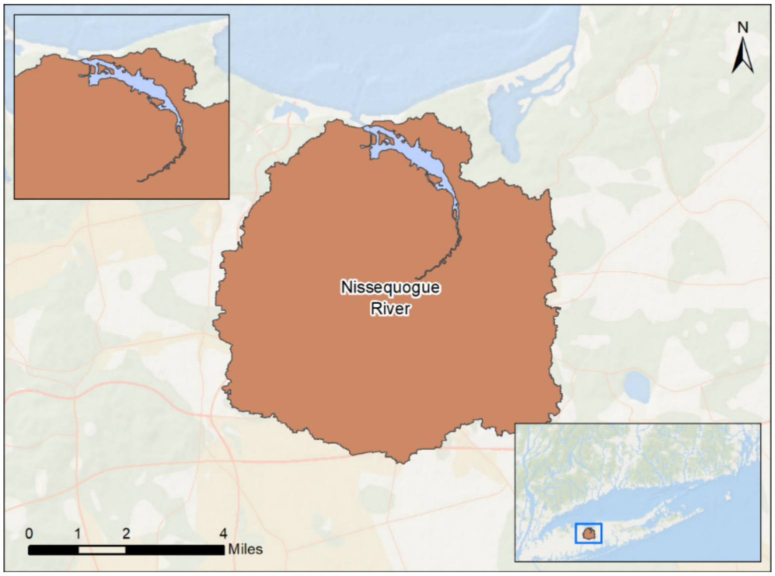



**Figure H-14. Nissequogue River Watershed, NY**

Table H-15 provides estimated TN reductions levels for the Nissequogue River watershed.

**Table H-15. Estimated TN Reduction Levels for Nissequogue River Watershed, NY**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.300 | 1.110 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.488 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.332 | | | | | |
| Dilution *(D)* | 0.989 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.334 | | 0.280 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 96% | | 130% | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 53% | | 72% | | $C_T$>$C_e$ | |
| 0.250 mg/L | 64% | | 86% | | $C_T$>$C_e$ | |
| 0.300 mg/L | 80% | | 109% | | $C_T$>$C_e$ | |
| 0.350 mg/L | Current Boundary Below These Values | | | | | |

See page H-13 (Table H-5) for footnote descriptions. Page H-11 provides background about Suffolk County's parallel effort to determine load reduction goals.

### *H.12 Stony Brook Harbor, NY*

Figure H-15 shows a map of the Stony Brook Harbor watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

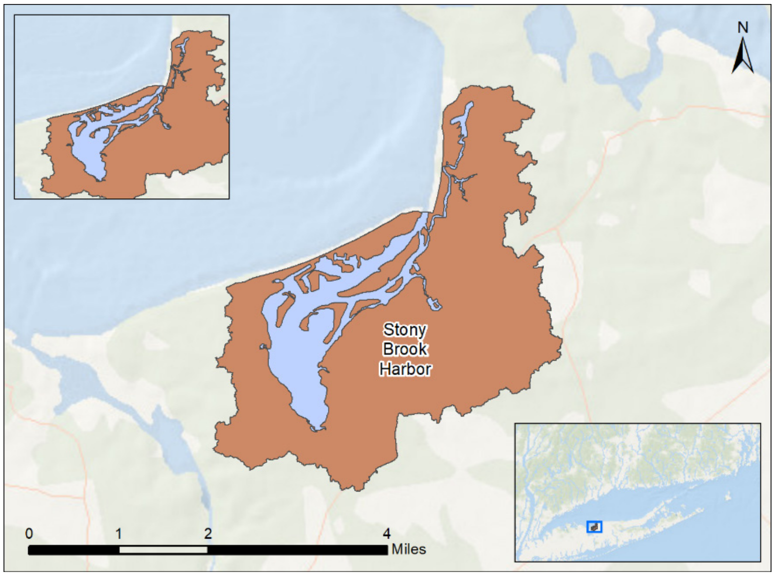



**Figure H-15. Stony Brook Harbor Watershed, NY**

Table H-16 provides estimated TN reductions levels for the Stony Brook Harbor watershed.

**Table H-16. Estimated TN Reduction Levels for Stony Brook Harbor Watershed, NY**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.210 | 0.920 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.284 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.352 | | | | | |
| Dilution *(D)* | 0.992 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.316 | | 0.210 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | $C_T>C_e$ | | $\{C_{LIS}\times(S_e/S_{LIS})\}>C_e$ | | $C_T>C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | $C_T>C_e$ | | 86% | | $C_T>C_e$ | |
| 0.250 mg/L | $C_T>C_e$ | | 204% | | $C_T>C_e$ | |
| 0.300 mg/L | $C_T>C_e$ | | $\{C_{LIS}\times(S_e/S_{LIS})\}>C_e$ | | $C_T>C_e$ | |
| 0.350 mg/L | $C_T>C_e$ | | $\{C_{LIS}\times(S_e/S_{LIS})\}>C_e$ | | $C_T>C_e$ | |

See page H-13 (Table H-5) for footnote descriptions. Page H-11 provides background about Suffolk County's parallel effort to determine load reduction goals.

### *H.13 Mt. Sinai Harbor, NY*

Figure H-16 shows a map of the Mt. Sinai Harbor watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

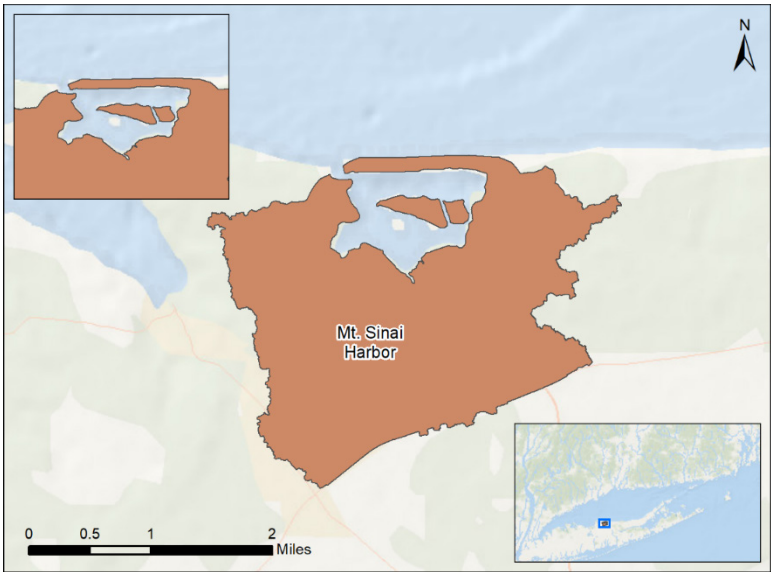



**Figure H-16. Mt. Sinai Harbor Watershed, NY**

Table H-17 provides estimated TN reductions levels for the Mt. Sinai Harbor watershed.

**Table H-17. Estimated TN Reduction Levels for Mt. Sinai Harbor Watershed, NY**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.270 | 0.950 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.319 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.389 | | | | | |
| Dilution *(D)* | 0.992 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.328 | | 0.270 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | $C_T$>$C_e$ | | {$C_{LIS}$×($S_e$/$S_{LIS}$)}>$C_e$ | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | $C_T$>$C_e$ | | 40% | | $C_T$>$C_e$ | |
| 0.250 mg/L | $C_T$>$C_e$ | | 69% | | $C_T$>$C_e$ | |
| 0.300 mg/L | $C_T$>$C_e$ | | 232% | | $C_T$>$C_e$ | |
| 0.350 mg/L | $C_T$>$C_e$ | | {$C_{LIS}$×($S_e$/$S_{LIS}$)}>$C_e$ | | $C_T$>$C_e$ | |

See page H-13 (Table H-5) for footnote descriptions. Page H-11 provides background about Suffolk County's parallel effort to determine load reduction goals.

### *H.14 Eastern and Western Narrows (Combined), CT and NY*

Figure H-17 shows a map of the Eastern and Western Narrows (combined) watersheds. Water quality data used for analyzing the watersheds are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

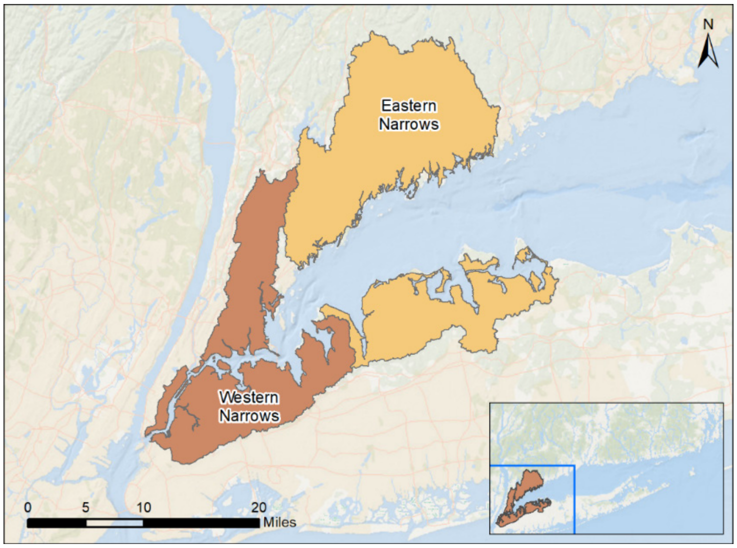



**Figure H-17. Eastern and Western Narrows (Combined) Watersheds, CT and NY**

Table H-18 provides estimated TN reductions levels for the Eastern and Western Narrows (combined) watersheds.

**Table H-18. Estimated TN Reduction Levels for Eastern and Western Narrows (Combined) Watersheds, CT and NY**

| Concentration-Based Value | Seagrass | | | Other Aquatic Life | |
|---|---|---|---|---|---|
| | Stressor-Response | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | [redacted] | | | 0.410 | 0.240 |
| Embayment Concentration ($C_e$) (mg/L) | 0.674 | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.308 | | | | |
| Dilution *(D)* | 1.000 | | | | |
| | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | Min[a] | | Max[a] | |
| | 0.325 | 0.240 | | 0.410 | |
| Percent Reduction at Existing Boundary Condition[b] | 95% | 119% | | 72% | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | |
| 0.200 mg/L | 74% | 92% | | 56% | |
| 0.250 mg/L | 82% | 102% | | 62% | |
| 0.300 mg/L | 93% | 116% | | 71% | |
| 0.350 mg/L | Current Boundary Below These Values | | | | |

See page H-13 (Table H-5) for footnote descriptions.

### *H.15 Connecticut River, CT*

Figure H-18 shows a map of the Connecticut River area of influence. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

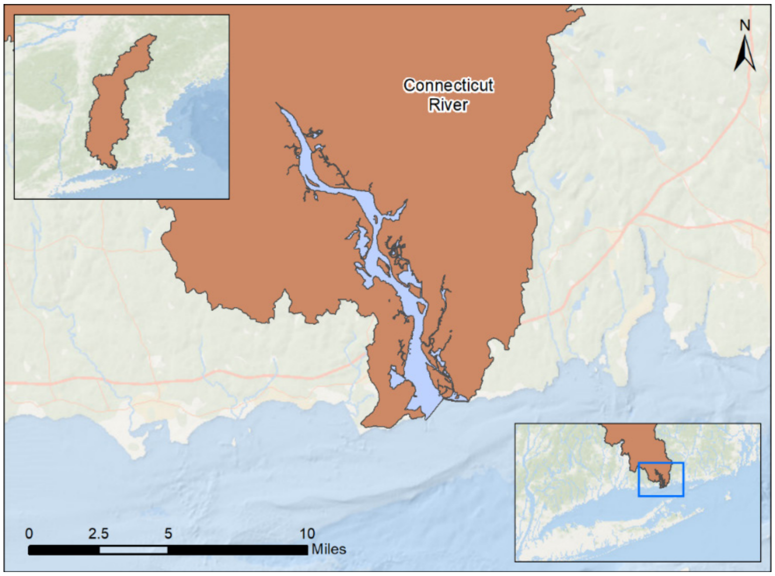



**Figure H-18. Connecticut River, CT, Area of Influence**

Table H-19 provides estimated TN reductions levels for the Connecticut River area of influence.

**Table H-19. Estimated TN Reduction Levels for Connecticut River, CT, Area of Influence**

| **Concentration-Based Value** | **Seagrass** | | | | **Other Aquatic Life** | |
|---|---|---|---|---|---|---|
| | **Stressor-Response** | | **Literature** | **Distribution** | **Literature** | **Distribution** |
| Target Concentrations ($C_T$) (mg/L) | 0.160 | 0.730 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.485 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.218 | | | | | |
| Dilution *(D)* | 0.240 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.343 | | 0.200 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 33% | | 66% | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 33% | | 65% | | $C_T$>$C_e$ | |
| 0.250 mg/L | Current Boundary Below These Values | | | | | |
| 0.300 mg/L | | | | | | |
| 0.350 mg/L | | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

### H.16 Mamaroneck River, NY

Figure H-19 shows a map of the Mamaroneck River watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

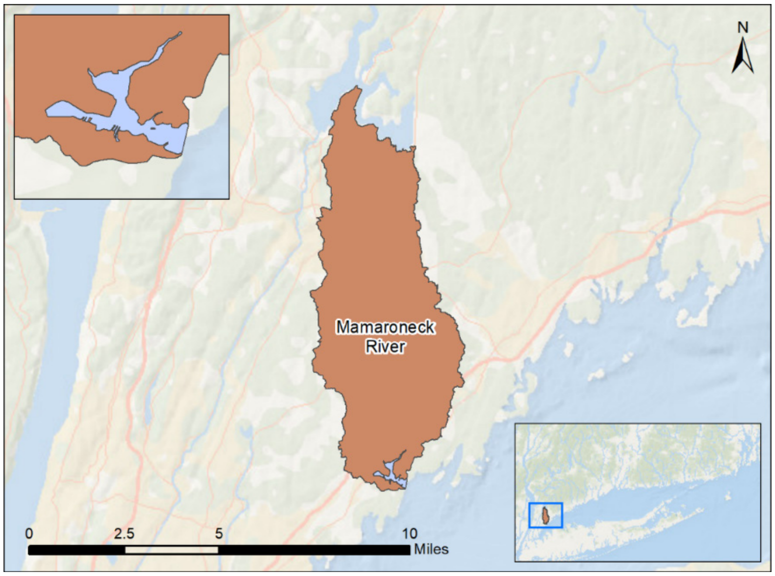



**Figure H-19. Mamaroneck River Watershed, NY**

Table H-20 provides estimated TN reduction levels for the Mamaroneck River watershed.

**Table H-20. Estimated TN Reduction Levels for Mamaroneck River Watershed, NY**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.240 | 0.770 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.746 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.504 | | | | | |
| Dilution *(D)* | 0.908 | | | | | |

| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | Min[a] | Max[a] |
|---|---|---|---|
| | 0.322 | 0.240 | 0.490 |
| Percent Reduction at Existing Boundary Condition[b] | 147% | 175% | 89% |
| Percent Reduction[b] if Boundary Reduced to: | | | |
| 0.200 mg/L | 75% | 90% | 45% |
| 0.250 mg/L | 82% | 97% | 49% |
| 0.300 mg/L | 90% | 107% | 54% |
| 0.350 mg/L | 99% | 118% | 60% |

See page H-13 (Table H-5) for footnote descriptions.

### *H.17 Hempstead Harbor, NY*

Figure H-20 shows a map of the Hempstead Harbor watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

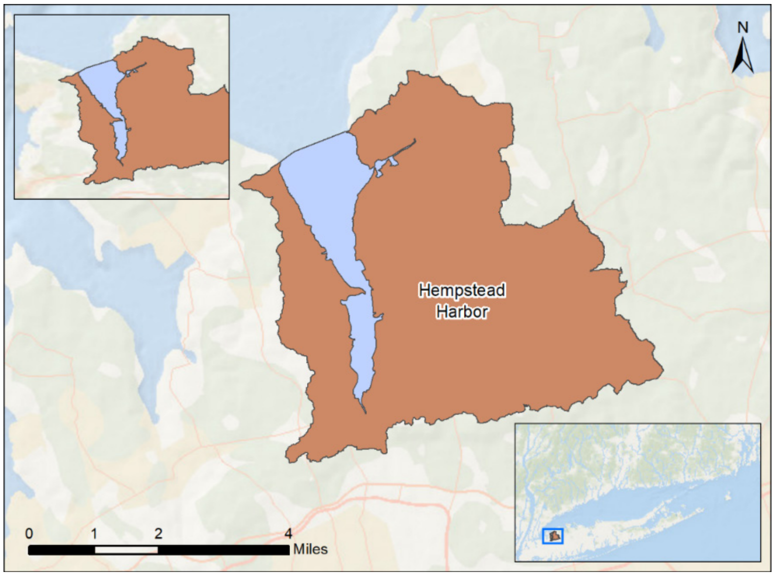



**Figure H-20. Hempstead Harbor Watershed, NY**

Table H-21 provides estimated TN reduction levels for the Hempstead Harbor watershed.

**Table H-21. Estimated TN Reduction Levels for Hempstead Harbor Watershed, NY**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.190 | 0.590 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.632 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.551 | | | | | |
| Dilution *(D)* | 0.985 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.343 | | 0.200 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 324% | | 484% | | 159% | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 67% | | 99% | | 33% | |
| 0.250 mg/L | 75% | | 112% | | 37% | |
| 0.300 mg/L | 86% | | 128% | | 42% | |
| 0.350 mg/L | 101% | | 150% | | 49% | |

See page H-13 (Table H-5) for footnote descriptions.

### *H.18 Areas Adjacent to the Northport–Centerport Harbor Complex, NY*

Figure H-21 shows a map of the Areas Adjacent to Northport–Centerport Harbor Complex watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

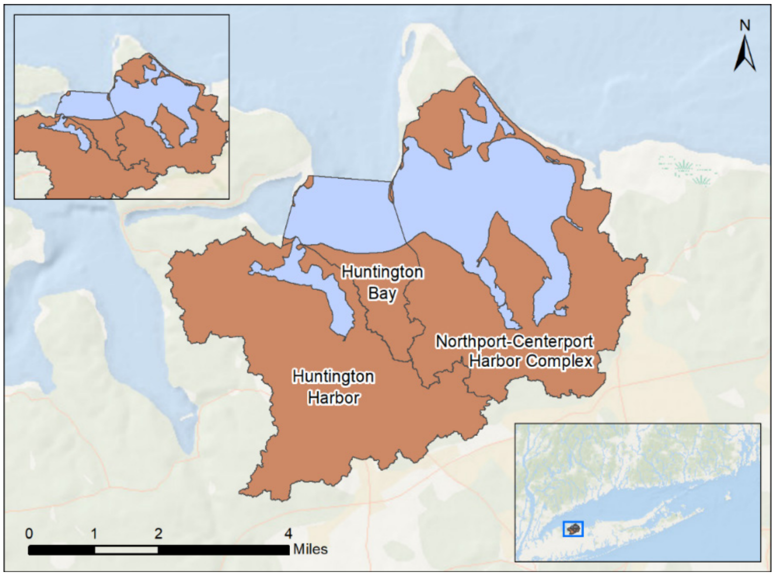



**Figure H-21. Areas Adjacent to the Northport–Centerport Harbor Complex Watershed, NY**

Table H-22 to Table H-24 provide estimated TN reduction levels for the Areas Adjacent to the Northport–Centerport Harbor Complex watershed.

**Table H-22. Estimated TN Reduction Levels for the Huntington Bay Watershed, NY**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.270 | 0.840 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.268 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.347 | | | | | |
| Dilution *(D)* | 0.991 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.328 | | 0.270 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | $C_T$>$C_e$ | | $C_T$>$C_e$ | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | $C_T$>$C_e$ | | $C_T$>$C_e$ | | $C_T$>$C_e$ | |
| 0.250 mg/L | $C_T$>$C_e$ | | $C_T$>$C_e$ | | $C_T$>$C_e$ | |
| 0.300 mg/L | $C_T$>$C_e$ | | $C_T$>$C_e$ | | $C_T$>$C_e$ | |
| 0.350 mg/L | $C_T$>$C_e$ | | $C_T$>$C_e$ | | $C_T$>$C_e$ | |

See page H-13 (Table H-5) for footnote descriptions. Page H-11 provides background about Suffolk County's parallel effort to determine load reduction goals.

### Table H-23. Estimated TN Reduction Levels for the Huntington Harbor Watershed, NY

| Concentration-Based Value | Seagrass | | | Other Aquatic Life | |
|---|---|---|---|---|---|
| | Stressor-Response | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.540 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.408 | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.365 | | | | |
| Dilution $(D)$ | 0.991 | | | | |
| | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | Min[a] | Max[a] | | |
| | 0.343 | 0.280 | 0.490 | | |
| Percent Reduction at Existing Boundary Condition[b] | 142% | 278% | $C_T$>$C_e$ | | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | |
| 0.200 mg/L | 31% | 61% | $C_T$>$C_e$ | | |
| 0.250 mg/L | 41% | 80% | $C_T$>$C_e$ | | |
| 0.300 mg/L | 59% | 116% | $C_T$>$C_e$ | | |
| 0.350 mg/L | 107% | 209% | $C_T$>$C_e$ | | |

See page H-13 (Table H-5) for footnote descriptions. Page H-11 provides background about Suffolk County's parallel effort to determine load reduction goals.

### Table H-24. Estimated TN Reduction Levels for the Lloyd Harbor Watershed, NY

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.310 | 0.840 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.302 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.364 | | | | | |
| Dilution $(D)$ | 0.988 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | Min[a] | Max[a] | | | |
| | 0.336 | 0.280 | 0.490 | | | |
| Percent Reduction at Existing Boundary Condition[b] | $C_T$>$C_e$ | $\{C_{LIS}\times(S_e/S_{LIS})\}>C_e$ | $C_T$>$C_e$ | | | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | $C_T$>$C_e$ | 21% | $C_T$>$C_e$ | | | |
| 0.250 mg/L | $C_T$>$C_e$ | 40% | $C_T$>$C_e$ | | | |
| 0.300 mg/L | $C_T$>$C_e$ | 378% | $C_T$>$C_e$ | | | |
| 0.350 mg/L | $C_T$>$C_e$ | $\{C_{LIS}\times(S_e/S_{LIS})\}>C_e$ | $C_T$>$C_e$ | | | |

See page H-13 (Table H-5) for footnote descriptions. Page H-11 provides background about Suffolk County's parallel effort to determine load reduction goals.

### *H.19 Oyster Bay/Cold Spring Harbor Complex, NY*

Figure H-22 shows a map of the Oyster Bay/Cold Spring Harbor Complex watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

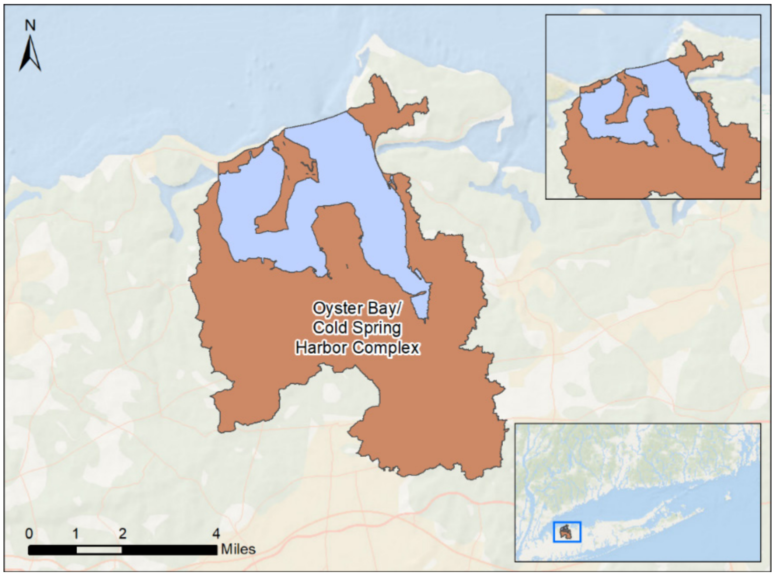



**Figure H-22. Oyster Bay/Cold Spring Harbor Complex Watershed, NY**

Table H-25 provides estimated TN reduction levels for the Oyster Bay/Cold Spring Harbor Complex watershed.

**Table H-25. Estimated TN Reduction Levels for Oyster Bay/Cold Spring Harbor Complex Watershed, NY**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.160 | 0.430 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 1.290 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.404 | | | | | |
| Dilution *(D)* | 0.965 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.360 | | 0.200 | | 0.430 | |
| Percent Reduction at Existing Boundary Condition[b] | 103% | | 121% | | 96% | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 85% | | 99% | | 78% | |
| 0.250 mg/L | 89% | | 104% | | 82% | |
| 0.300 mg/L | 93% | | 109% | | 86% | |
| 0.350 mg/L | 98% | | 114% | | 90% | |

See page H-13 (Table H-5) for footnote descriptions. Page H-11 provides background about Suffolk County's parallel effort to determine load reduction goals.

### *H.20 Manhasset Bay, NY*

Figure H-23 shows a map of the Manhasset Bay watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

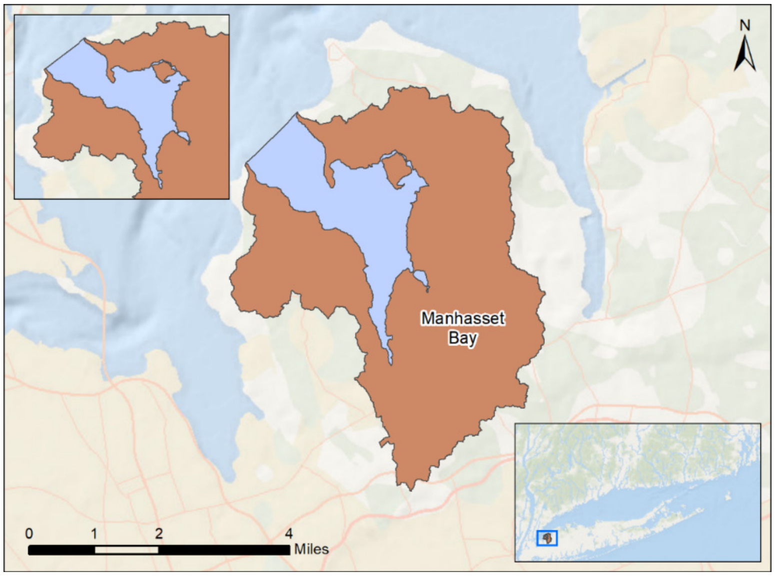



**Figure H-23. Manhasset Bay Watershed, NY**

Table H-26 provides estimated TN reduction levels for the Manhasset Bay watershed.

**Table H-26. Estimated TN Reduction Levels for Manhasset Bay Watershed, NY**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.170 | 0.590 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.782 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.672 | | | | | |
| Dilution *(D)* | 0.983 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.343 | | 0.200 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 360% | | 477% | | 239% | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 75% | | 99% | | 50% | |
| 0.250 mg/L | 82% | | 109% | | 54% | |
| 0.300 mg/L | 90% | | 119% | | 60% | |
| 0.350 mg/L | 100% | | 133% | | 67% | |

See page H-13 (Table H-5) for footnote descriptions.

### H.21 Pequonnock River, CT

Figure H-24 shows a map of the Pequonnock River watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

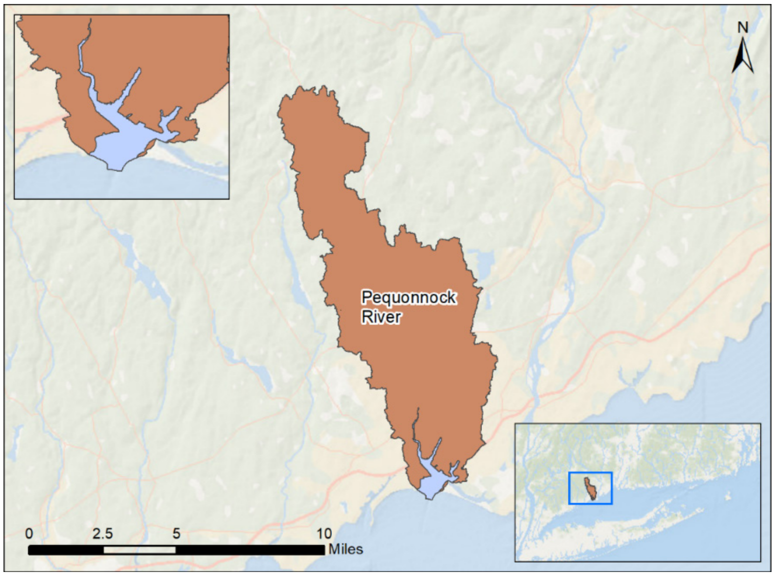



**Figure H-24. Pequonnock River Watershed, CT**

Table H-27 provides estimated TN reduction levels for the Pequonnock River watershed.

**Table H-27. Estimated TN Reduction Levels for Pequonnock River Watershed, CT**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.220 | 0.700 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.349 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.297 | | | | | |
| Dilution *(D)* | 0.961 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.318 | | 0.220 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 48% | | 203% | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 20% | | 82% | | $C_T$>$C_e$ | |
| 0.250 mg/L | 28% | | 119% | | $C_T$>$C_e$ | |
| 0.300 mg/L | Current Boundary Below These Values | | | | | |
| 0.350 mg/L | | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

### H.22 Byram River, CT and NY

Figure H-25 shows a map of the Byram River watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

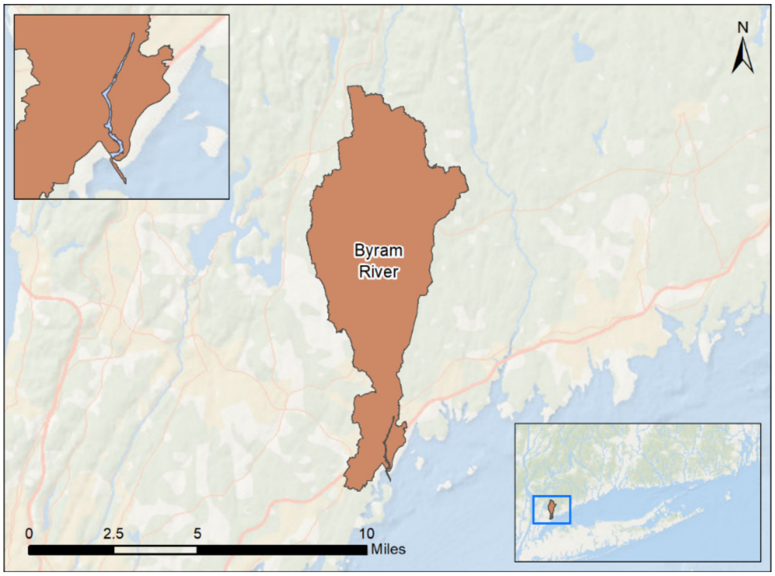



**Figure H-25. Byram River Watershed, CT and NY**

Table H-28 provides estimated TN reduction levels for the Byram River watershed.

**Table H-28. Estimated TN Reduction Levels for Byram River Watershed, CT and NY**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.270 | 0.740 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.461 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.428 | | | | | |
| Dilution *(D)* | 0.980 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.328 | | 0.270 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 319% | | 458% | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 50% | | 72% | | $C_T$>$C_e$ | |
| 0.250 mg/L | 62% | | 88% | | $C_T$>$C_e$ | |
| 0.300 mg/L | 80% | | 114% | | $C_T$>$C_e$ | |
| 0.350 mg/L | 113% | | 162% | | $C_T$>$C_e$ | |

See page H-13 (Table H-5) for footnote descriptions.

### *H.23 New Haven Harbor, CT*

Figure H-26 shows a map of the New Haven Harbor watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

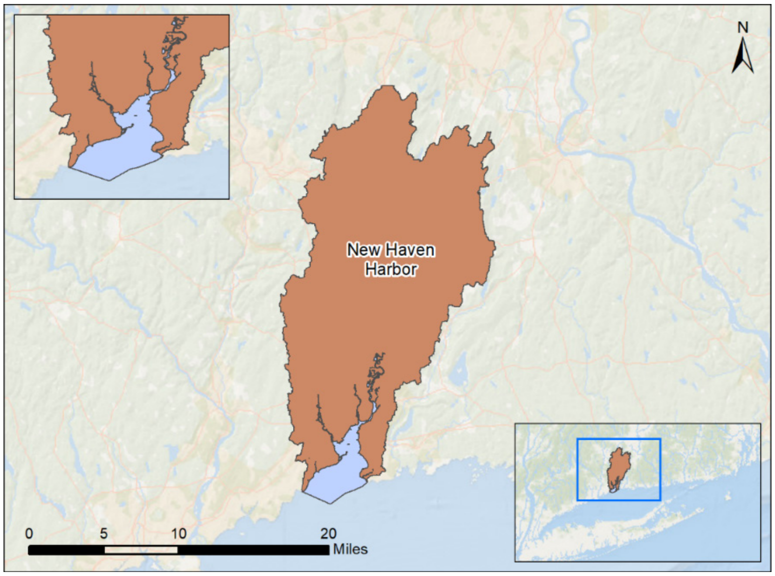



**Figure H-26. New Haven Harbor Watershed, CT**

Table H-29 provides estimated TN reduction levels for the New Haven Harbor watershed.

**Table H-29. Estimated TN Reduction Levels for New Haven Harbor Watershed, CT**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.200 | 0.660 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.429 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.233 | | | | | |
| Dilution *(D)* | 0.737 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.343 | | 0.200 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 34% | | 91% | | $C_T > C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 31% | | 83% | | $C_T > C_e$ | |
| 0.250 mg/L | Current Boundary Below These Values | | | | | |
| 0.300 mg/L | | | | | | |
| 0.350 mg/L | | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

### H.24 Little Narragansett Bay, CT and RI

Figure H-27 shows a map of the Little Narragansett Bay watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

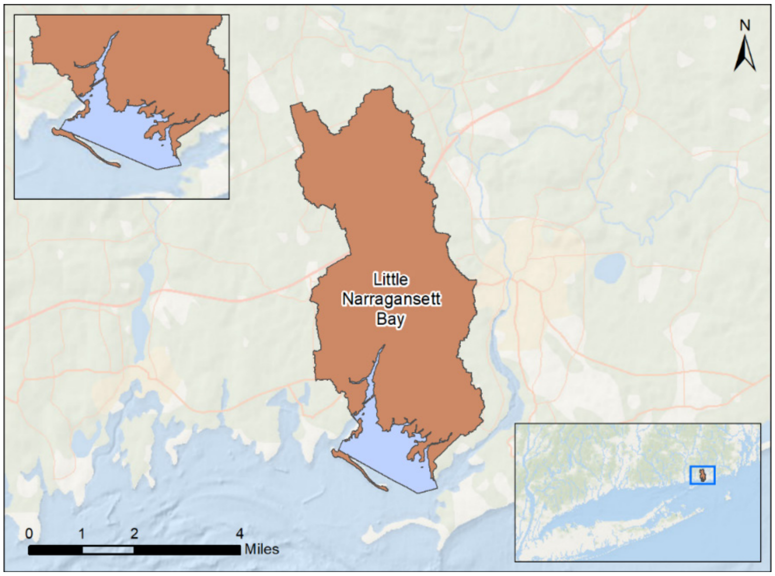



**Figure H-27. Little Narragansett Bay Watershed, CT and RI**

Table H-30 provides estimated TN reduction levels for the Little Narragansett Bay watershed.

**Table H-30. Estimated TN Reduction Levels for Little Narragansett Bay Watershed, CT and RI**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.230 | 0.800 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.453 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.215 | | | | | |
| Dilution *(D)* | 0.979 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.320 | | 0.230 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 55% | | 92% | | $C_T > C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 52% | | 87% | | $C_T > C_e$ | |
| 0.250 mg/L | Current Boundary Below These Values | | | | | |
| 0.300 mg/L | | | | | | |
| 0.350 mg/L | | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

### *H.25 Housatonic River, MA and CT*

Figure H-28 shows a map of the Housatonic River watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

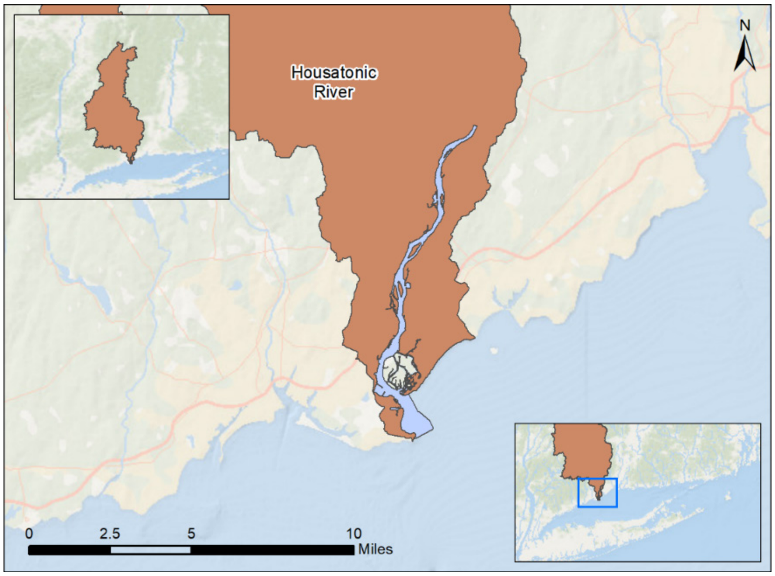



**Figure H-28. Housatonic River Watershed, MA and CT**

Table H-31 provides estimated TN reduction levels for the Housatonic River watershed.

**Table H-31. Estimated TN Reduction Levels for Housatonic River Watershed, MA and CT**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.280 | 0.760 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.461 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.291 | | | | | |
| Dilution *(D)* | 0.880 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.330 | | 0.280 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 64% | | 88% | | $C_T > C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | 46% | | 64% | | $C_T > C_e$ | |
| 0.250 mg/L | 54% | | 75% | | $C_T > C_e$ | |
| 0.300 mg/L | Current Boundary Below These Values | | | | | |
| 0.350 mg/L | | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

### *H.26 Thames River, CT*

Figure H-29 shows a map of the Thames River watershed. Water quality data used for analyzing the watershed are available in the memo for *Subtask D: Summary of Existing Water Quality Data.*

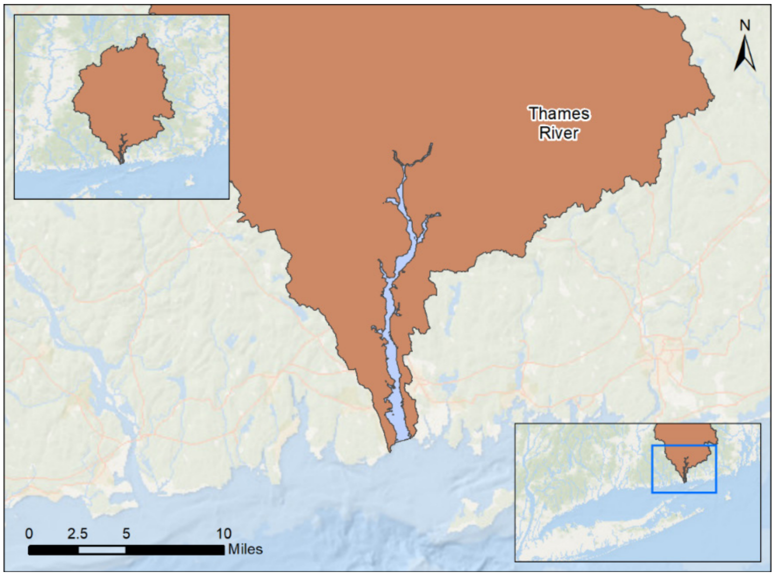



**Figure H-29. Thames River Watershed, CT**

Table H-32 provides estimated TN reduction levels for the Thames River watershed.

**Table H-32. Estimated TN Reduction Levels for Thames River Watershed, CT**

| Concentration-Based Value | Seagrass | | | | Other Aquatic Life | |
|---|---|---|---|---|---|---|
| | Stressor-Response | | Literature | Distribution | Literature | Distribution |
| Target Concentrations ($C_T$) (mg/L) | 0.250 | 0.690 | 0.400 | 0.280 | 0.410 | 0.280 |
| Embayment Concentration ($C_e$) (mg/L) | 0.461 | | | | | |
| Boundary Condition Concentration ($C_{LIS}$) (mg/L) | 0.198 | | | | | |
| Dilution *(D)* | 1.000 | | | | | |
| | | | | | | |
| Target Concentrations ($C_T$)[a] (mg/L) | Avg[a] | | Min[a] | | Max[a] | |
| | 0.324 | | 0.250 | | 0.490 | |
| Percent Reduction at Existing Boundary Condition[b] | 52% | | 80% | | $C_T$>$C_e$ | |
| Percent Reduction[b] if Boundary Reduced to: | | | | | | |
| 0.200 mg/L | Current Boundary Below These Values | | | | | |
| 0.250 mg/L | | | | | | |
| 0.300 mg/L | | | | | | |
| 0.350 mg/L | | | | | | |

See page H-13 (Table H-5) for footnote descriptions.

## References

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