



SUFFOLK COUNTY NORTH SHORE EMBAYMENTS WATERSHED MANAGEMENT PLAN



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On behalf of: Suffolk County Department of Health Services and
New York State Department of Environmental Conservation

EEA Inc.

GOAL

Provide a plan for Suffolk County, NY to attain the nitrogen reduction goal from nonpoint sources in accordance with the Long Island Sound Study's (LISS) Total Maximum Daily (TMDL) for nitrogen.

BACKGROUND



The Long Island Sound Study (LISS) adopted a reduction target of 58.5% for nitrogen loading from human sources to the Sound by 2014.

Zone 11 is mandated to reduce 39% of its anthropogenic nitrogen load.

LIS TMDL requires reduction of 205 tons anthropogenic nitrogen per year from Suffolk County (Management Zone 11)

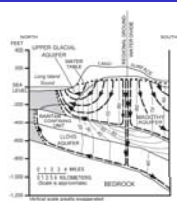
- 166 tons from point sources: 81% of 205 ton total
- 39 tons from nonpoint sources: 19% of 205 ton total
- 81% of 205 ton PS Baseline
- 12% of 314 ton NPS

Baseline

METHODOLOGY

- Establish Steering Committee
- Review Existing Programs and Previous Management Studies
- Characterize subwatersheds using available data (surface, ground, & stream resources; regional land use; point and nonpoint pollution sources; stormwater contributing areas)
- Assess assumptions of the TMDL
- Prepare the Long Island Sound Nitrogen Influx Reduction (LISNIR) Model – a mass-balance nitrogen loading model to refine assumptions of the TMDL for Suffolk County and quantify individual nitrogen inputs. Allows for the quantification of nitrogen reduction from each source through the implementation of specific Best Management Practices (BMPs).
- Develop Recommended Management Plan based upon the results of the mass-balance LISNIR Model. Recommendations were prepared according to each subwatershed and summarized into a Tiered TMDL Compliance Program.

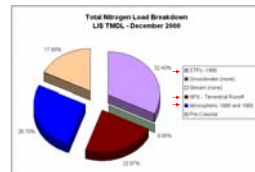
GROUNDWATER FLOW ON THE NORTH SHORE OF LONG ISLAND, NY



Source: Sorca & Monti, 2001

TMDL ASSUMPTIONS

- N sources included - Surface water discharge STPs
Atmospheric Deposition
Stormwater
Pre-colonial natural sources
- Subsurface-discharge STPs not considered
- No streams or rivers from Zone 11 were identified
- Nitrogen loading from subsurface groundwater flow not considered
- Zone 11 N load to LIS = 632 tons/yr



LISNIR MODEL

- Long Island Sound Nitrogen Influx Reduction (LISNIR) Model
- Mass-balance model
- GIS-based spatial data (e.g. Population, land use)
- Quantifies N loads at the source and identifies stormwater or groundwater N mobilization pathway to LIS.
- Assumes most fertilizer and pet waste within direct stormwater contribution areas (generally within 2,000' of shoreline) enters LIS via stormwater – fewer attenuation opportunities.
- Accounts for natural attenuation within root zone, vadose zone and aquifer when NPS nitrogen is recharged to groundwater.
- Provides a finer-scale, region specific method to quantify individual N sources, which allows for the best prioritization of management options.
- LISNIR allows a prediction of how the greatest reduction can occur if management techniques are applied.

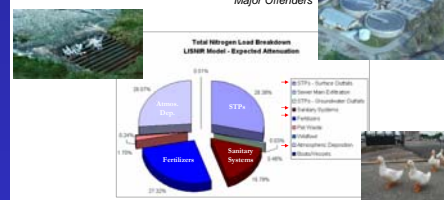
Non-point Sources

- Sanitary systems*
- Leached fertilizers*
- Stormwater (fertilizer runoff, animal waste)
- Atmospheric deposition*

Point Sources

- STP Surface water outfalls*
- Subsurface-leaching STPs
- Sewer main exfiltration/infiltration

* Major Offenders



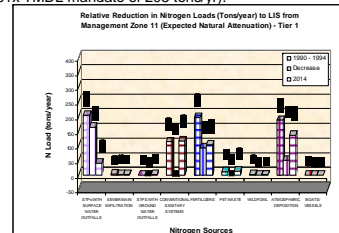
- LISNIR Model estimates actual anthropogenic N load to the north shore embayments ranges from 638 to 1,067 tons/yr

Baseline Nitrogen Load Estimates to Long Island Sound from Management Zone 11

N Load Estimation Method	Nonpoint Source Load (tons/yr)	Point Source Load (tons/yr)	Total N Load (tons/yr)
LIS TMDL, 2000	437	201	632
LIS TMDL, 2000 (anthropogenic N only)	314	201	519
LISNIR Model (NPSA, 2006) (anthropogenic N only)*	638 - 863	201	638 - 1,067

*Range indicates nitrogen loads with minimum and maximum (expected) amounts of attenuation applied.

- Implementation of a Tiered Reduction Strategy can reduce as much as 304.25 to 329.86 total tons nitrogen per year (1.48 to 1.61x TMDL mandate of 205 tons/yr)



MEETING THE TMDL

Point sources:

- Surface water STP upgrades (as per TMDL) to meet effluent limit of <5mg/L
- Subsurface-discharge STP upgrades to meet effluent limit of 5mg/L

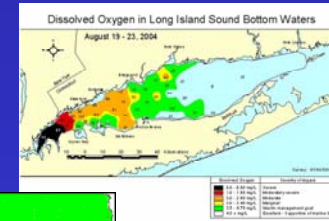
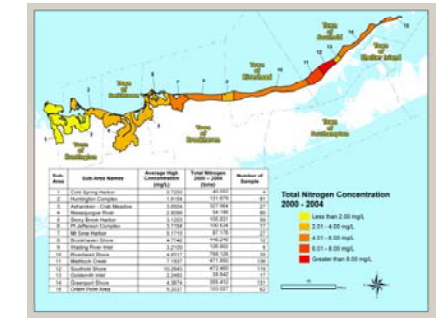
Nonpoint sources:

- Expand sewer districts to service high density, high groundwater and near shore residential/commercial areas.
- Amend Suffolk County Sanitary Code to increase minimum lot size in Groundwater Management Zone IV from 20,000 to 40,000 SF.
- Consider replacing traditional sanitary systems with alternative innovative system technology in sensitive areas where sewerage is not possible.
- Land preservation and County/Town acquisition of sensitive parcels (SC 2% Property Transfer Tax).
- Comply with Phase II stormwater requirements and implement stormwater BMPs.
- Reduce fertilizer applications county-wide.
 - Encourage reduction of residential fertilizers to 1 to 2 lbs N per 1,000 SF of lawn per year – target lawn care companies and SFDs
 - Expanding Peconic Estuary Program's Golf Course Nitrogen Challenge to limit N leaching to < 2mg/L
 - Support agricultural programs to reduce N leaching to < 10mg/L
- Promote control of pet waste and discourage duck feeding.
- Promote stewardship through public education and volunteer programs.
 - Establish volunteer aquaculture facilities similar to SPAT in Southold.
 - Promote volunteer water quality monitoring to educate as well as track BMP implementation success.
- Enforce 'No Discharge Zones' within embayments.
- Provide boater BMPs and pump-out facility information with free bilge sock at start of each boating season.

Studies published by USGS and Suffolk County have shown that significant amounts of groundwater enter Long Island Sound via subsurface groundwater outflow.



Groundwater models illustrate that nitrogen levels are highest in the eastern portion of the County, where agriculture has traditionally dominated the landscape.



HYPOXIA IN LONG ISLAND SOUND



PRIORITY NITROGEN MANAGEMENT AREAS