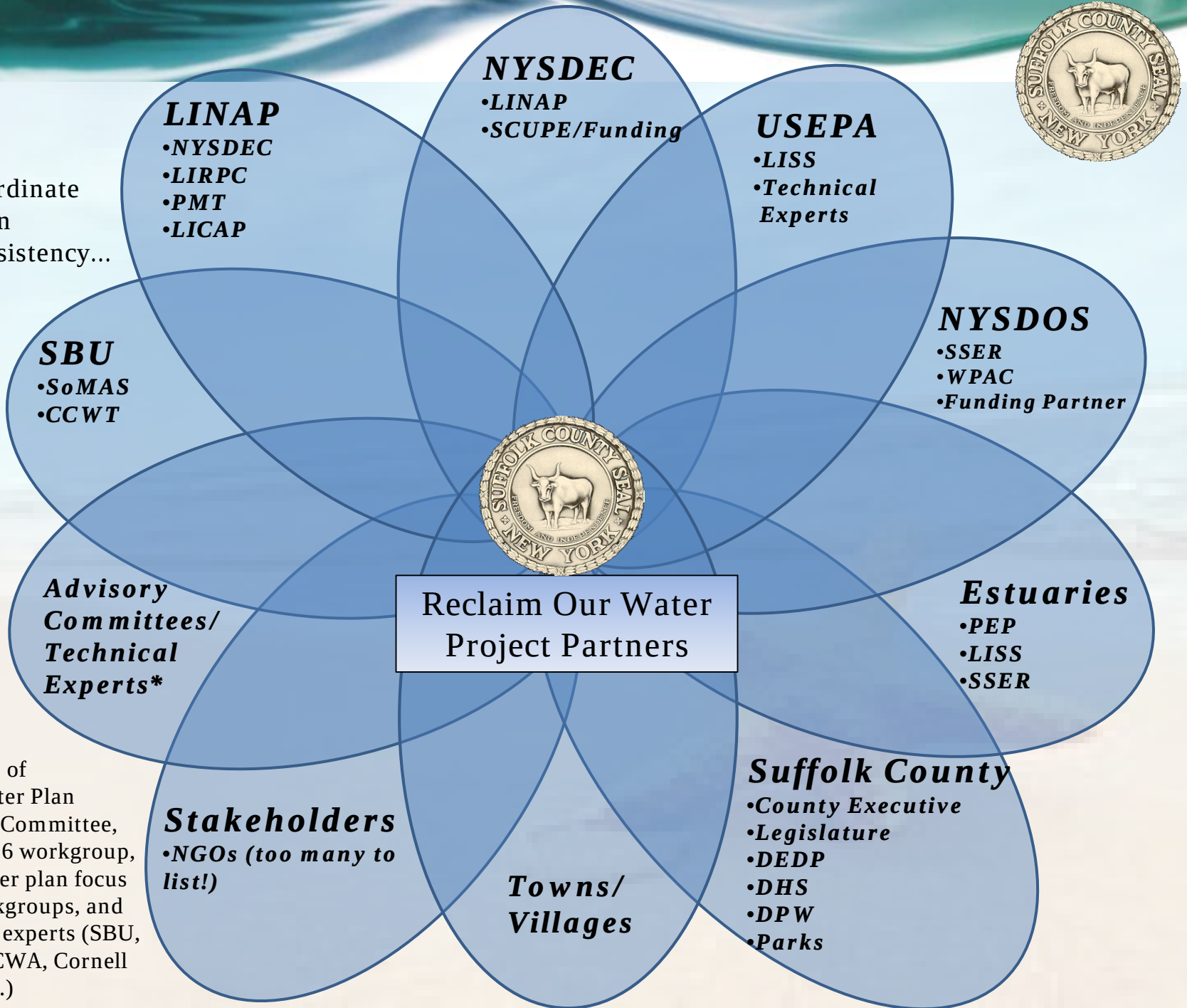
SUFFOLK COUNTY
SUBWATERSHEDS WASTEWATER PLAN

Reclaim Our Water

- Coordinate
- Align
- Consistency…



*Consists of Wastewater Plan Advisory Committee, Article 5/6 workgroup, wastewater plan focus area workgroups, and technical experts (SBU, USGS, SCWA, Cornell Coop, etc.)

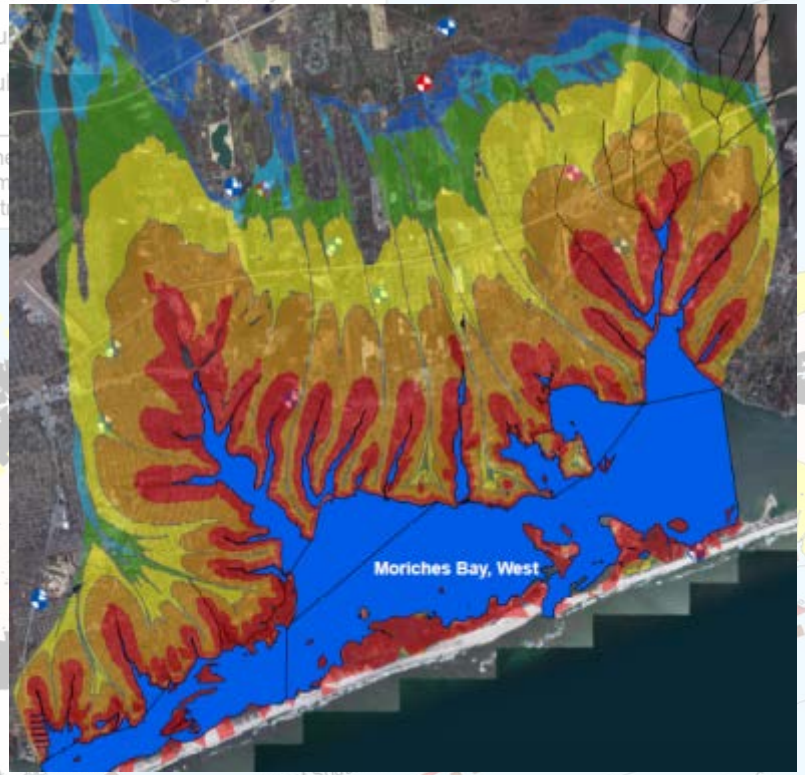
SUBWATERSHEDS WASTEWATER PLAN

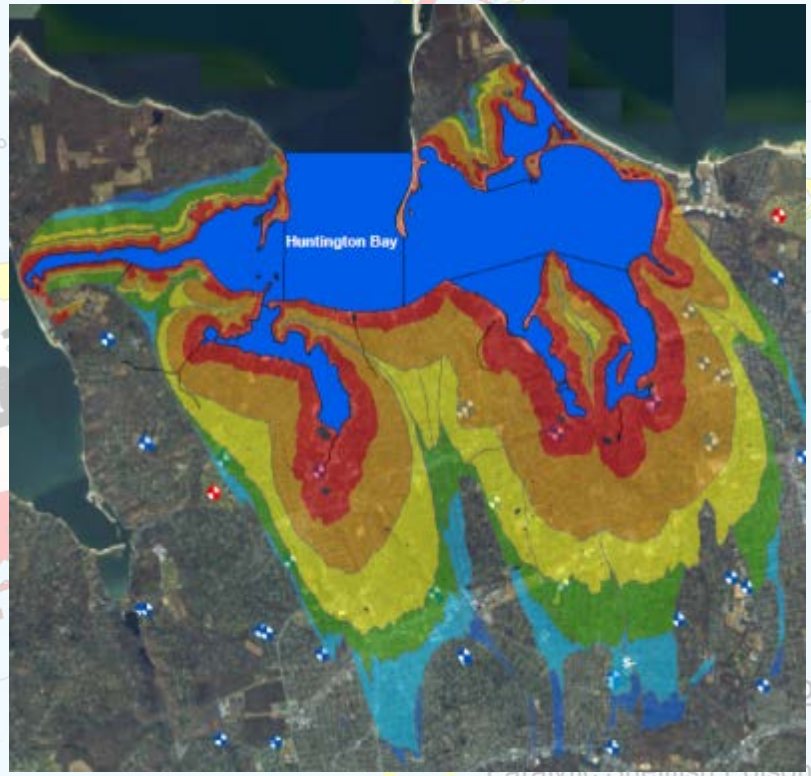
- **Science Based Bridge to Support Policy Decisions - Transition from Septic Demo and SIP to wide-scale implementation**
- **Provide recommended blueprint for wastewater upgrades:** Set priority areas, nitrogen load reduction goals, and describe where, when, and what methods to implement to meet reduction goals (I/A OWTS, sewering, clustered, other)
- Establish uniform and consistent set of subwatershed boundaries for all priority areas (surface water, drinking water, groundwater)
- Develop nitrogen load rates
- Develop receiving water residence times (surface water sensitivity)
- Establish baseline water quality
- Establishment of tiered priority areas
- Define endpoints (e.g., water clarity, dissolved oxygen, HABs, SAV, etc.)
- Establish first order nitrogen load reduction goals for all of the County's surface water, drinking water, and groundwater resources
- Recommendations for *wastewater upgrades* for each priority tier
- Evaluation annual costs for various implementation options to support funding recommendations

SUBWATERSHEDS WASTEWATER PLAN PROGRESS UPDATE

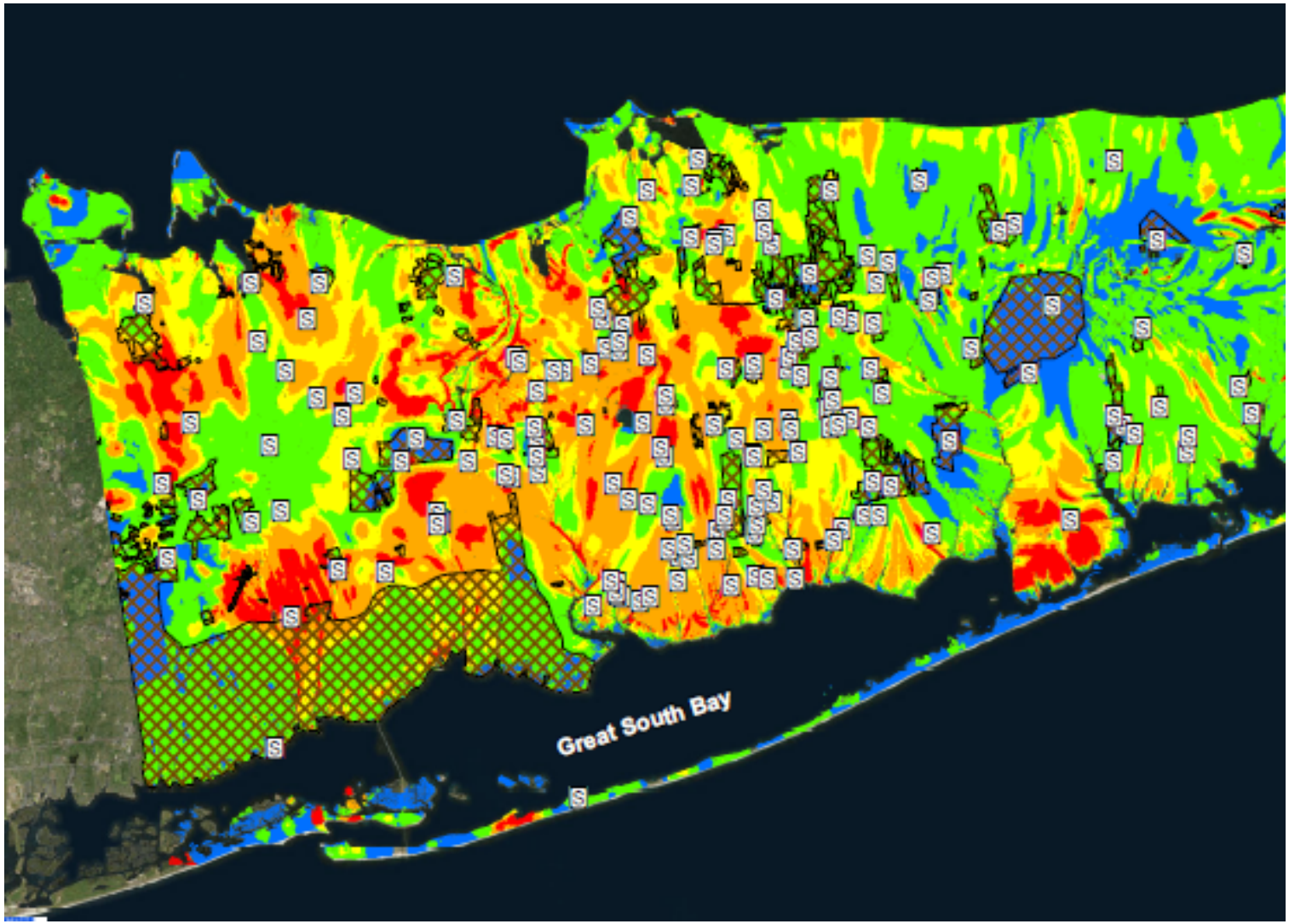
- **Established Uniform and Consistent Set of Land Use Data**
- **Developed Countywide Fictitious Full Buildout Land Use Scenario**
- **Identified Surface Water Quality Data Gaps and Collect Data**
  - ✓ Identified 70 water bodies with no data
  - ✓ Collected an additional **~90** surface water samples to fill data gaps and support evaluations
  - ✓ Collected additional bathymetry data to support hydrodynamic model data gaps
- **Completed Subwatershed Delineations of 191 Waterbodies**
- **Completed Nitrogen Load Projections**
- **Completed Surface Water Hydrodynamic Modeling**
- **Developed DRAFT Priority Area Rankings**
- **Currently Refining Load Reduction Goal Methodology and Completing Evaluations**
- **SWP GEIS Final Scope Prepared/Adopted – Spring 2017**

SUBWATERSHED DELINEATIONS

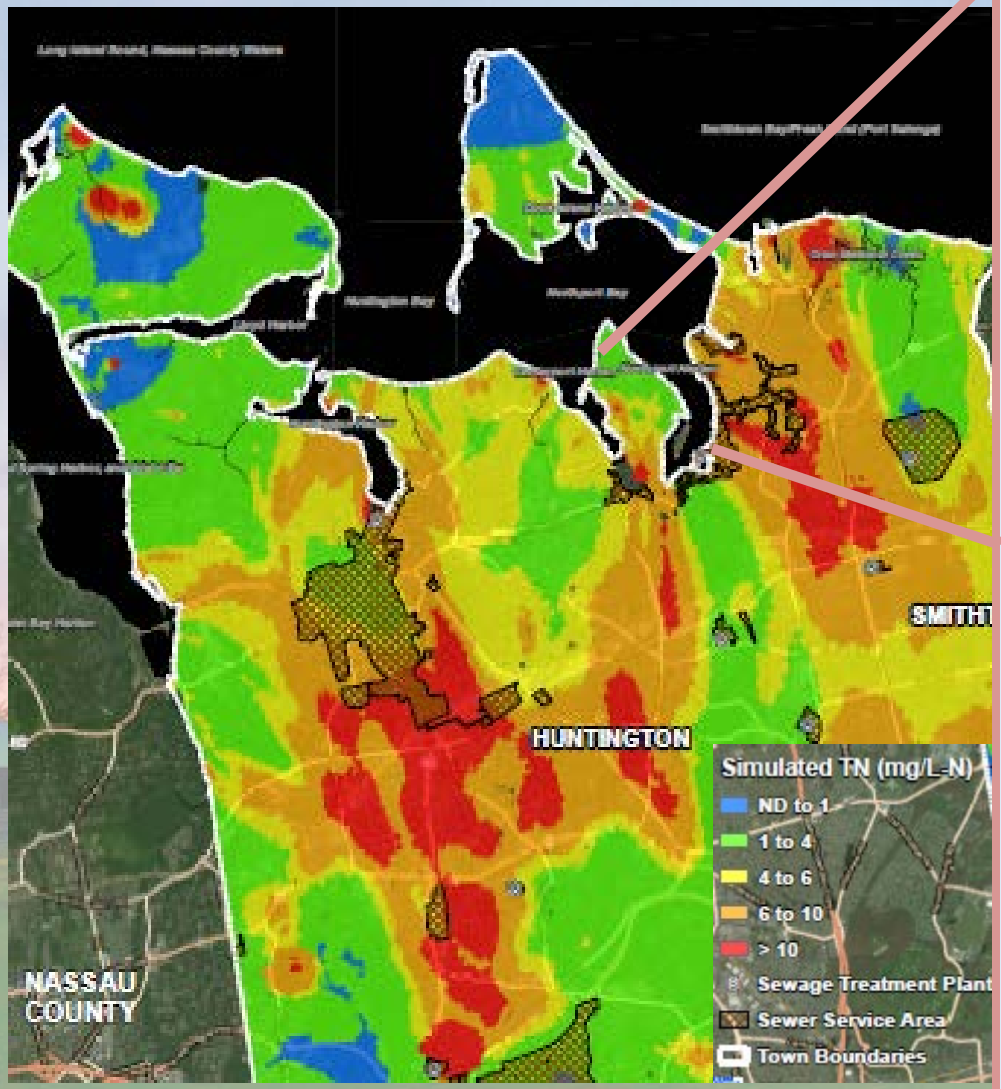


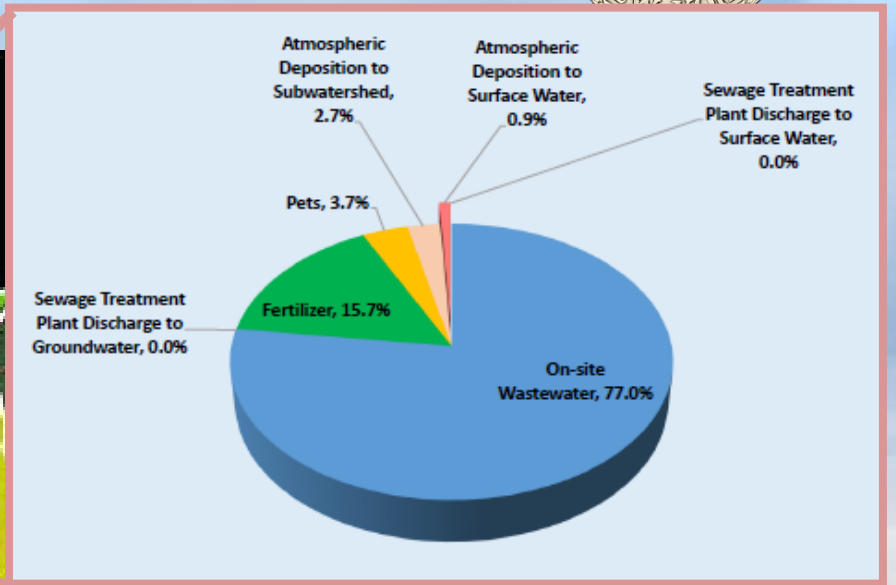


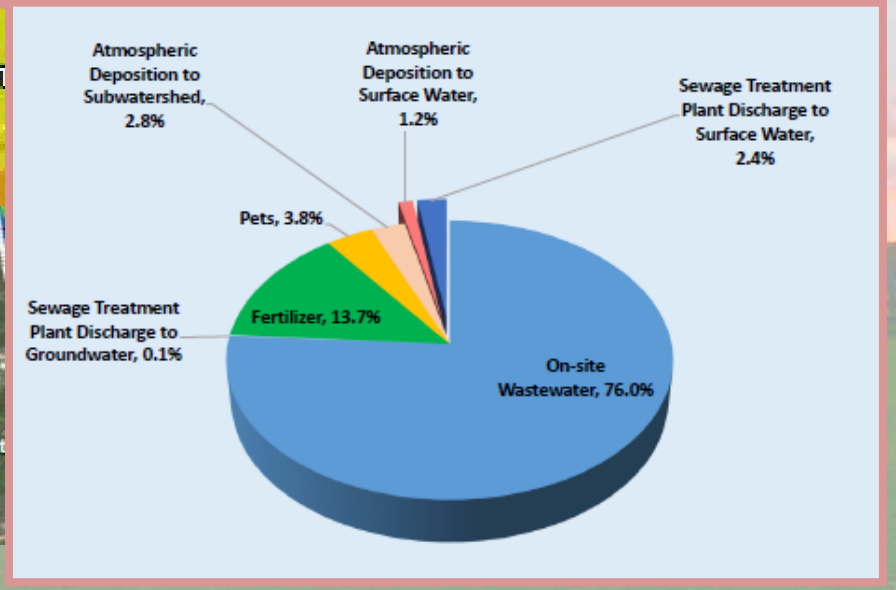
Nitrogen Load Modeling



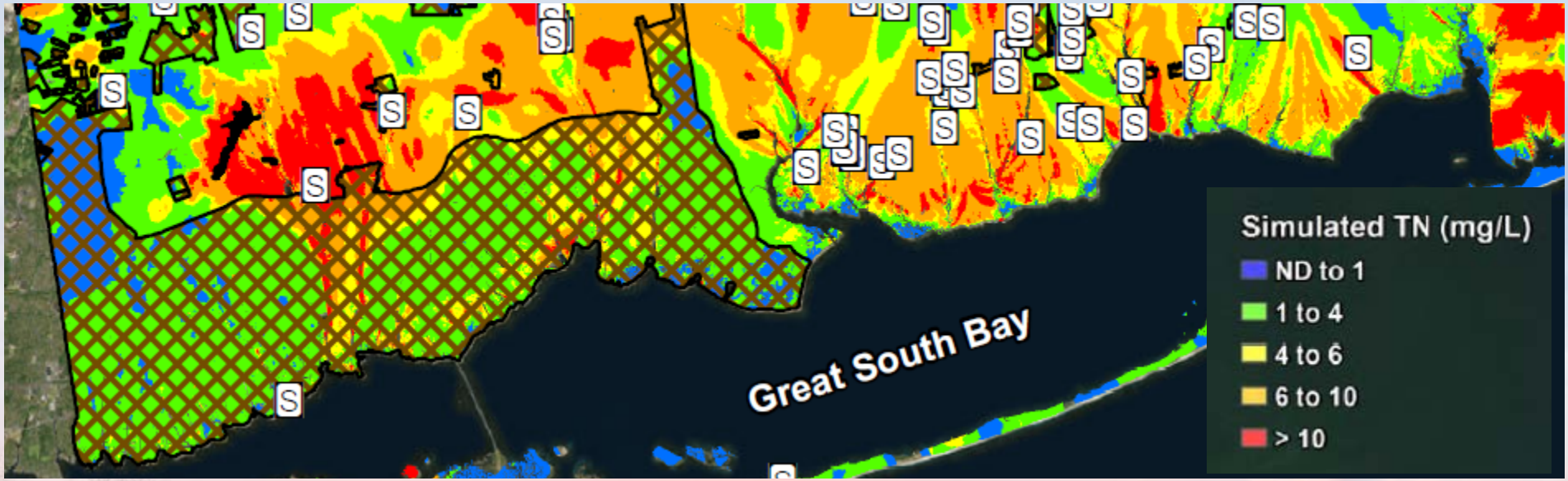
NITROGEN LOAD MODELING

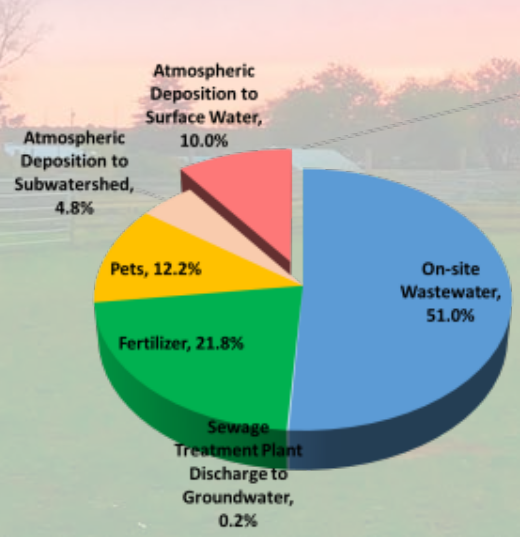


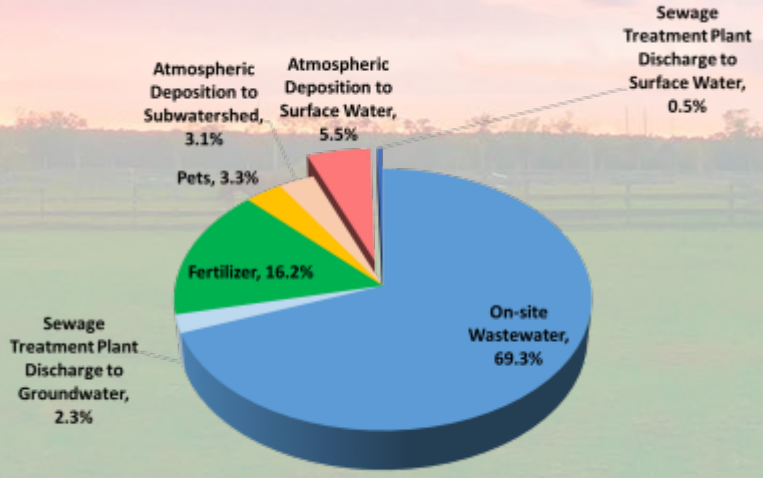




Nitrogen Load Modeling





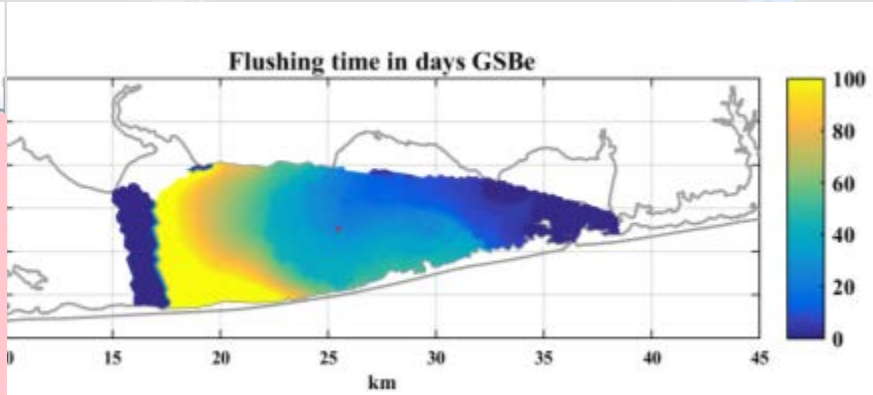


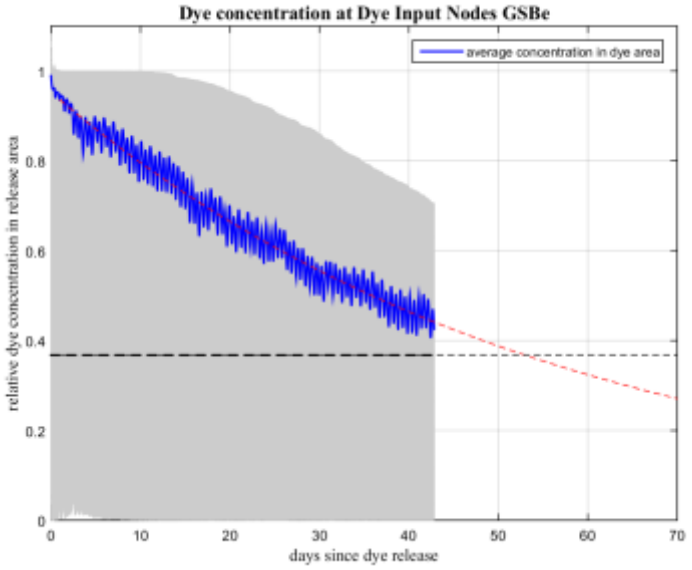
*All Subwatersheds Wastewater Plan data is considered DRAFT and subject to revision

HYDRODYNAMIC MODELING

Draft Flushing Time Results - Suffolk County, LI for SCDHS SWP

Rank #	PWL Name (Estuary)	Total Residence Time 6
1	Great Peconic Bay and Minor Coves	221.9
2	Great South Bay, East	120.0
3	Mecox Bay and Tribs	84.2
4	Little Peconic Bay	80.8
5	Great South Bay, Middle	76.0
6	West Neck Bay and Creek	73.1
7	Scallop Pond	72.1
8	Georgica Pond	47.2
9	Hashamomuck Pond/Long Creek and Budds Pond	45.0
10	Moriches Bay East	45.0
11	Shelter Island Sound, South, and Tribs	41.0
12	Coecles Harbor	39.6
13	Hallock/Long Beach Bay and Tidal Tribs	39.3
14	Spring Pond	38.8
15	Shelter Island Sound, North, and Tribs	35.9
16	Sag Harbor Cove and Tribs	35.5
17	Halsey Neck Pond	34.0
18	Sagaponack Pond and Poxabogue Pond	32.4
19	Noyack Bay	28.3
20	Great South Bay, West	27.0
21	Heady and Taylor Creeks and Tribs	25.1
22	Flanders Bay, East/Center, and Tribs	22.3
23	Shinnecock Bay West	21.0
24	Forge River and Tidal Tribs	19.9
25	Napeague Harbor and Tidal Tribs	19.1
26	Wading River	19.1
27	Tiana Bay and Tidal Tribs	19.0
28	Shinnecock Bay East	18.6
29	Shinnecock Bay - Bennet Cove (Cormorant Cove)	17.3
30	Reeves Bay and Tidal Tribs	17.0
31	Dunton Lake, Upper, and Tribs and Hedges Creek	16.6
32	Lloyd Harbor	16.0
33	Peconic River, Lower and Tidal Tribs	16.0
34	Terrell River	15.8
35	Northport Bay	15.0
36	Menantic Creek	14.9
37	Stirling Creek and Basin	14.9
38	Northport Harbor	14.9





***Currently evaluating Suffolk LIS West, Central, East using previous work completed by SBU and HDR, Inc; and Gardiners Bay using tidal prism.

DATABASE DEVELOPMENT - HABS

*****Minimum ~140 HAB events in past 10 years*****

Number of HAB Events in the Past 10 Years

	Environmental HABs			Human Health HABs		
	Rust Tide	**Brown Tide**	**Other**	**Blue-Green**	**Red Tide DSP**	**Red Tide PSP**
Acabonack Harbor	1					
Agawam Lake				4		
Beaverdam Pond			1			
Bellport Bay		7	2			
Big Little Fresh Pond			8			
Big Reed Pond				3		
Carlls River			2			
Carmans River Lower, and Tribs			1			
Centerport Harbor			2			2
Cold Spring Harbor					5	
Connetquot River, Lower, and Tribs			7			
Conscience Bay & Tidal Tribs				1		
Cutchogue Harbor			2			
Dam Pond						1
Deep Hole Creek						1
Duck Island Harbor			2			
Flanders Bay, East/Center, and Tribs	1		3			1
Flanders Bay, West/Lower Sawmill Creek			10			
Forge River & Tidal Tribs		4	4		2	2
Forge River Cove & Tidal Tribs		4	4			
Fort Pond				2		
Georgica Pond				4		
Goldsmith Inlet			1			
Great Cove		9	2			
Great Peconic Bay and minor coves	1		1			1
Great South Bay East		9	2			
Great South Bay Middle		9	2			
Great South Bay West		8	2			

PRIORITY RANKING
MARINE WATERS

Subwatershed	Predicted N Load (1)	Residence Time (2)	Total Nitrogen Concentration (3)	Total Phosphorus Concentration	Dissolved Oxygen (4)	HABS (5)		Chl-a (6)	Clarity (7)
						HAB - Human Health	HAB - Environmental		
	(#/volume/yr)	(10%, days)	90th Percentile of Last 10 Years (grab-samples, mg/L)	90th Percentile of Last 10 Years (grab-samples, mg/L)	10th percentile of bottom of last ten years (mg/L)	# of Blooms in Last 10 Years	# of Blooms in Last 10 Years	90th Percentile of Last 10 Years (grab-samples, mg/L)	Secchi depth (ft)
	-N	-N	-N	-N	+N	-N	-N	-N	+N
Weight	15	25	10	2	15	13	10	5	5

Notes
(1) - Major driver of this program; identifies the magnitude of the problem that needs to be addressed
(2) - Primary potential mitigating factor. Still considering whether 1/e or 10% of remaining mass should be used.
(3) - Balancing factor for Predicted N Load. Accounts for "other" n-load sources such as benthic flux.
(4) - While DO may be affected by a number of factors - it remains a key indicator of water body health & ability to support ecological communities
(5) - HAB impact to be scaled by type of stress. Health (e.g., PSP, DSP, Cyano)= highest concern; Environmental (Brown Tide, Rust Tide) = second highest; and "other" = lowest.
(6) - General indicator of ecological health and primary response variable n-load reduction goals.
(7) - Impacts public perception, tourism, and ecological health (e.g., SAV). Initial assessment uses value, qualitative approach will rank considering secchi depth and depth and will be a Q. Sebonac Bay will be evaluated separately
(8) - If a subwatershed does not have data to characterize a parameter, the average value for all characterized subwatersheds will be added.

Priority Ranking
Marine Waters

*All results are draft and for demonstration purposes only.

Subwatershed	Rank
Meetinghouse Creek and Tribs	1
Forge River and Tidal Tribs	2
Terry's Creek and Tribs	3
Quantuck Bay	4
Northport Harbor	5
Brushes Creek	6
Seatuck Cove and Tidal Tribs	7
Stillman Creek	8
Nicoll Bay	9
Great South Bay, East	10
Penniman Creek and Tidal Tribs	11
Connetquot River, Lower, and Tribs	12
Wickapogue Pond	13
Quantuck Canal/Moneybogue Bay	14
Bellport Bay	15
Flanders Bay, West/Lower Sawmill Creek	16
Peconic River, Lower, and Tidal Tribs	17
Great South Bay, Middle	18
Green Creek, Upper, and Tribs	19
Patchogue Bay	20
Patchogue River	21
Wainscott Pond/Fairfield Pond	22
Moriches Bay East	23
Great Cove	24
Brown Creek	25
Agawam Lake	26
Carmans River Lower, and Tribs	27
Grand Canal	28
Shinnecock Bay West	29
Great South Bay, West	30
Cold Spring Harbor, and Tidal Tribs	31
Shinnecock Bay Central	32
Carlls River	33
Deep Hole Creek	34

Subwatershed	Rank
Fort Pond Bay	166
Brightwaters Canal, Nosreka, Mirror, and Cascade Lakes	165
Northwest Harbor	164
Long Island Sound, Suffolk County, East	163
Shelter Island Sound, South, and Tribs	162
Napeague Bay	161
Awixa Creek	160
Noyack Bay	159
Lake Montauk	158
Sag Harbor	157
West Neck Harbor	156
Corey Creek and Tidal Tribs	155
Stirling Creek and Basin	154
Hog Creek and Tidal Tribs	153
Hallock/Long Beach Bay and Tidal Tribs	152
Coecles Harbor	151
Town/Jockey Creeks and Tidal Tribs	150
Three Mile Harbor	149
Shelter Island Sound, North, and Tribs	148
Southold Bay	147
Napeague Harbor and Tidal Tribs	146
Wooley Pond	145
Mill Creek and Tidal Tribs	144
North Sea Harbor and Tribs	143
Dickerson Creek	142
Cold Spring Pond and Tribs	141
Northwest Creek and Tidal Tribs	140
Goose Creek	139
Red Creek Pond and Tidal Tribs	138
Dering Harbor	137
Goose Neck Creek	136
Orient Harbor and minor Tidal Tribs	135
Menantic Creek	134
Mt Sinai Harbor and Tidal Tribs	133

Priority Ranking
Marine Waters

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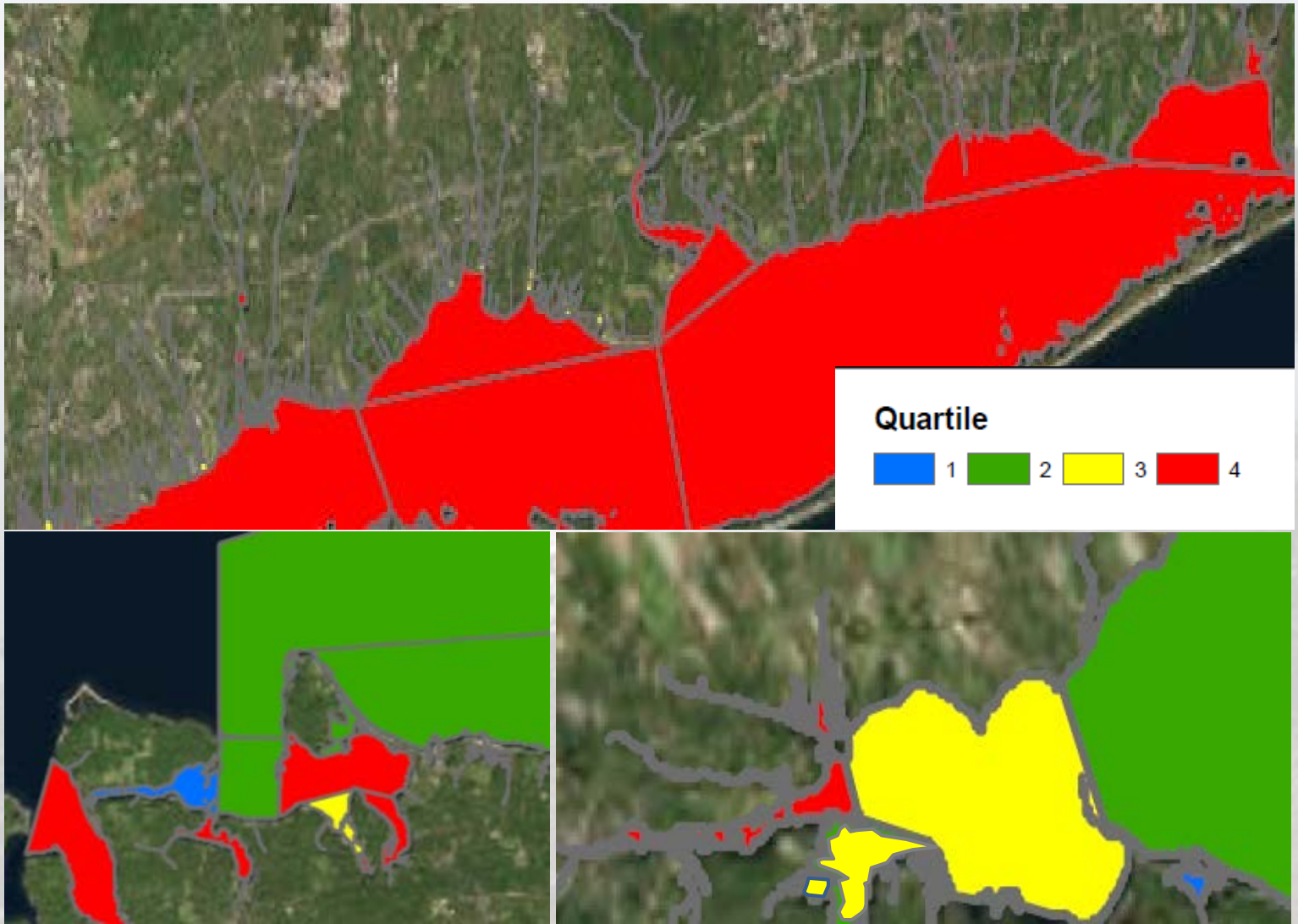

Load Reduction Goals – Overall Approach

1. Local reference water body comparison

    - Three Methods:

        a. Overall water quality
        b. Response-specific criterion
        c. Comparison to general Countywide ranking tiers

2. Local stress-response relationships, possibly supplemented with regional data

3. Use of existing guidance values. E.g., USEPA protection of DO and eelgrass values.

    - Likely used solely as a supporting line of evidence; but, may consider use if local data fail to make statistical relationships; particularly for fresh waters

Load Reduction Goals – HABs

Stress-Response Relationships Under Consideration

- Predicted Nitrogen Load * Residence Time Versus:

  - ✓ # of HAB events over look back period (BT, RT, BGA)
  - ✓ # of "Other" HAB events over past 10 years
  - ✓ # of HAB days above threshold over look back period
  - ✓ 90th Percentile Chl-A with Objective <20 ug/l
  - ✓ Other Ideas?

Reference Waterbody Approach
Marine Overall Water quality

*All results are draft and for demonstration purposes only.

Overall Water Quality Reference Approach - Tidal Waterbody - Residence Time 4 to 7 Days

Reference Waterbody ID	Unit Nitrogen Load lbs/year/m3
Mt Sinai Harbor	0.017
North Sea Harbor	0.013
Sag Harbor	0.009
Average Unit Load	**0.013**

Stressed Waterbody ID	Unit Nitrogen Load lbs/year/m3	Required Reduction to Achieve Average Reference Load (%)
James Creek	0.08	84%
Northport Harbor	0.06	78%
Centerport Habor	0.035	63%

Reference Waterbody Approach
Marine Response Specific

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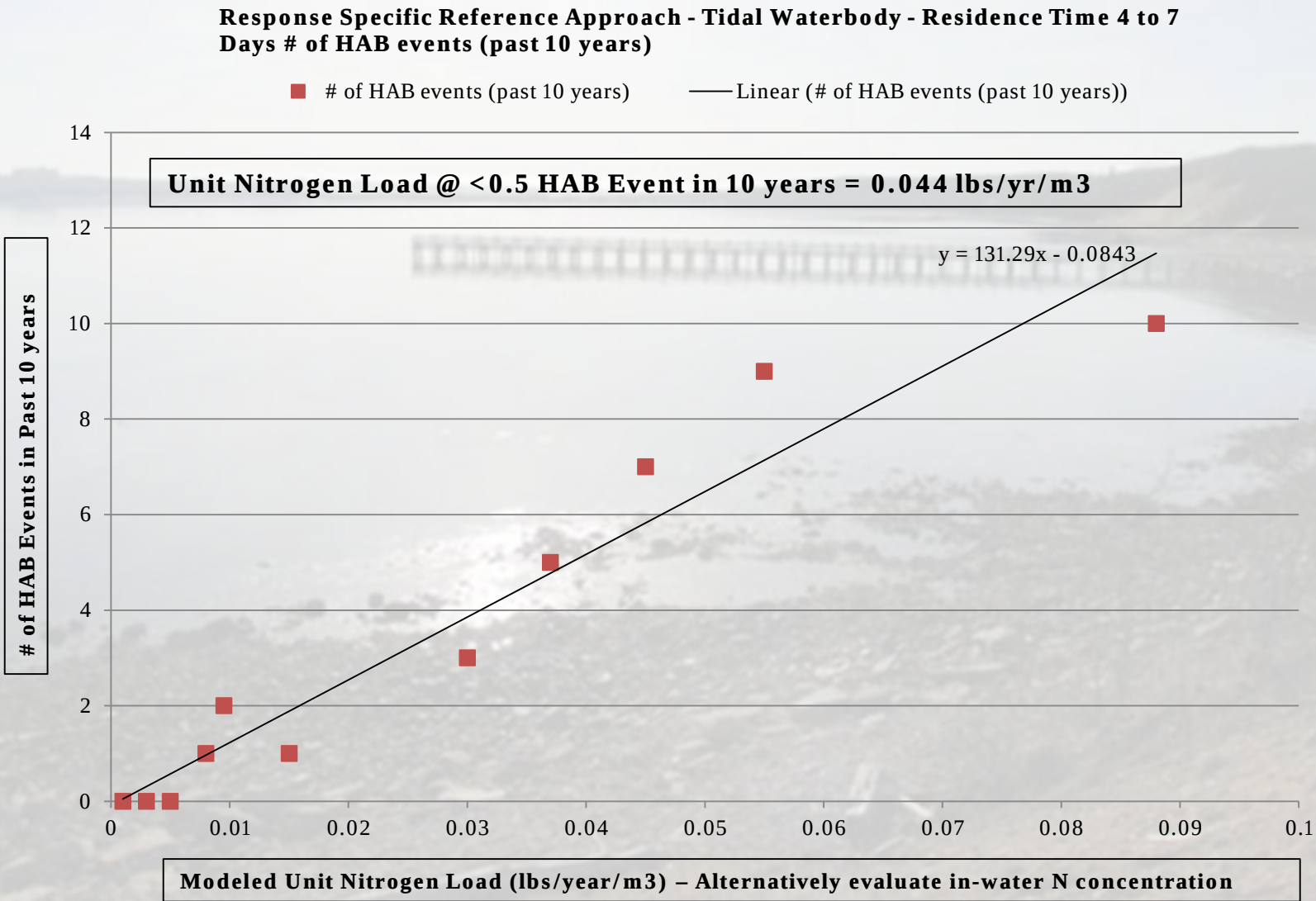
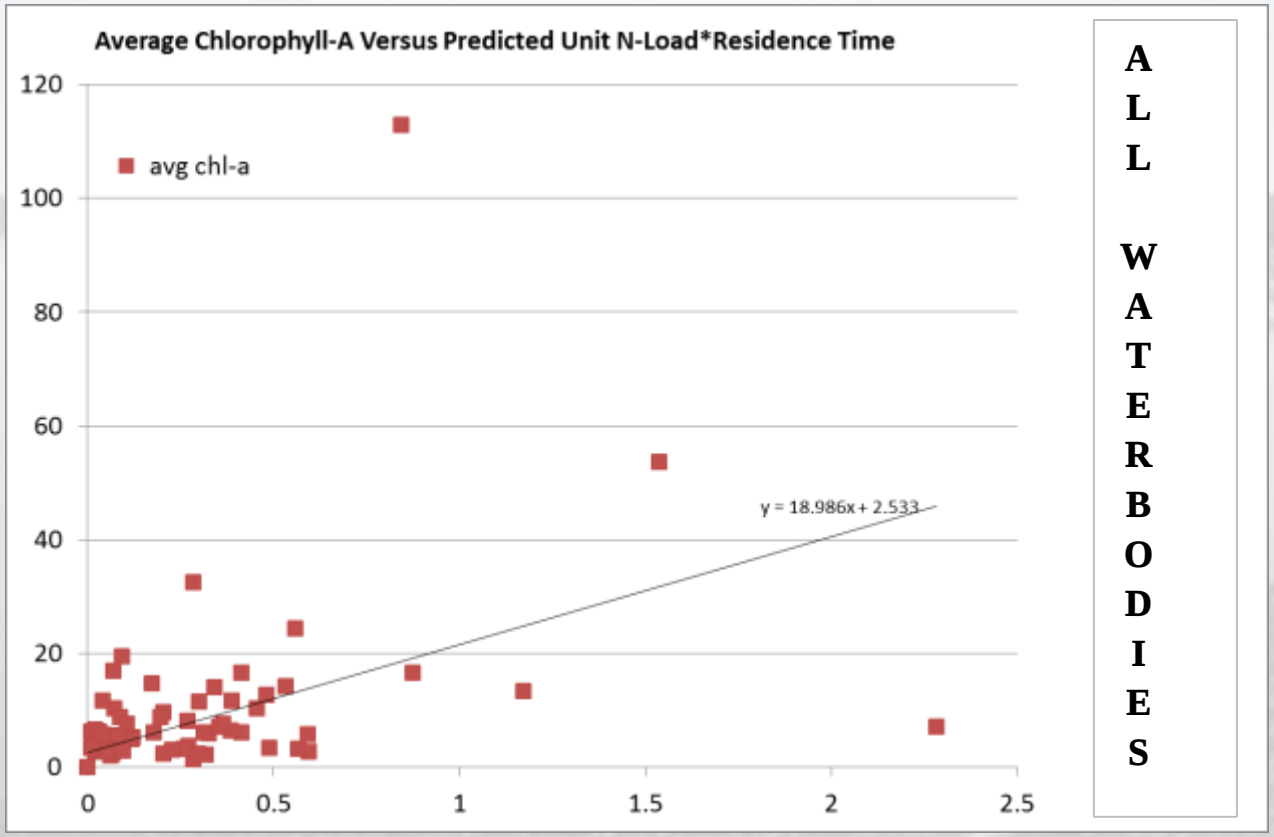


STRESS-RESPONSE



Theoretical Load Reduction Goal to Meet Chl-A 5.5 ug/l

Subwatershed	%
Meetinghouse Creek and Tribs	41%
Forge River and Tidal Tribs	89%
Terry's Creek and Tribs	89%
Quantuck Bay	NA
Northport Harbor	57%
Brushes Creek	NA
Seatuck Cove and Tidal Tribs	79%
Stillman Creek	95%
Nicoll Bay	51%
Great South Bay, East	86%
Penniman Creek and Tidal Tribs	NA
Connetquot River, Lower, and Tribs	69%
Wickapogue Pond	NA
Quantuck Canal/Moneybogue Bay	NA
Bellport Bay	38%
Flanders Bay, West/Lower Sawmill Creek	44%
Peconic River, Lower, and Tidal Tribs	80%
Great South Bay, Middle	20%
Green Creek, Upper, and Tribs	90%
Patchogue Bay	60%
Patchogue River	91%
Wainscott Pond/Fairfield Pond	NA
Moriches Bay East	65%
Great Cove	3%
Brown Creek	93%
Agawam Lake	NA
Carmans River Lower, and Tribs	93%
Grand Canal	77%
Shinnecock Bay West	56%
Great South Bay, West	20%
Cold Spring Harbor, and Tidal Tribs	NA
Shinnecock Bay Central	NA
Carlls River	81%
Deep Hole Creek	NA

*Predicted n-load based upon 200 year travel time subwatershed.

*All results are draft and for demonstration purposes only.

Next steps

- Next Priority Area/Endpoints Workgroup ~2 weeks
- Quarterly WPAC Meeting Late May/Early June 2018
- First Draft Subwatersheds Wastewater Plan ~July 2018
- Final Draft SWP - August/September 2018
- 2nd Stakeholders Meeting July/August
- Final SWP and SEQRA Findings Statement - Fall/Winter 2018

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