

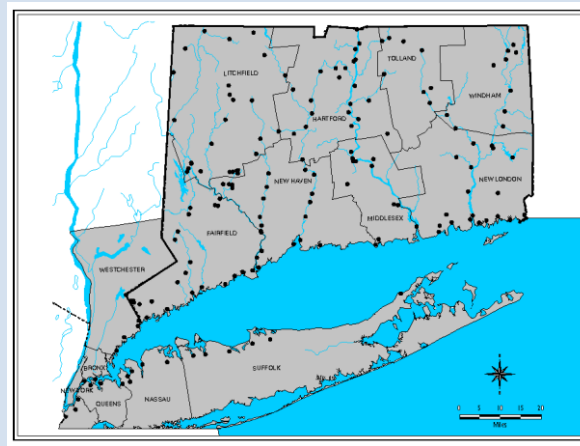


Connecticut Department of Energy and Environmental Protection



Connecticut Department of
**ENERGY &
ENVIRONMENTAL
PROTECTION**

Connecticut's Long Island Sound Nitrogen Program



March 6, 2019

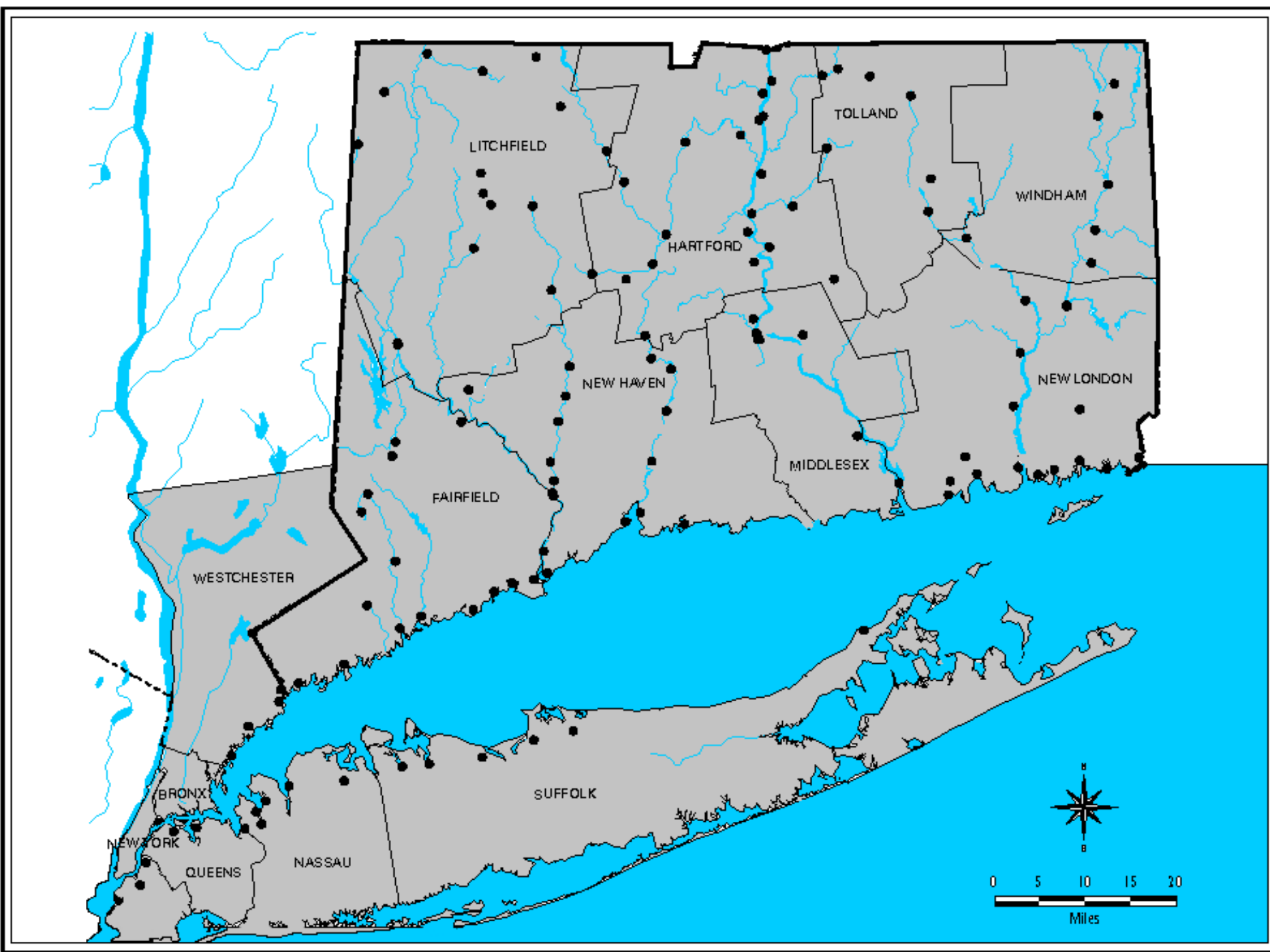
Puget Sound Nutrient Forum

Rowland C. Denny

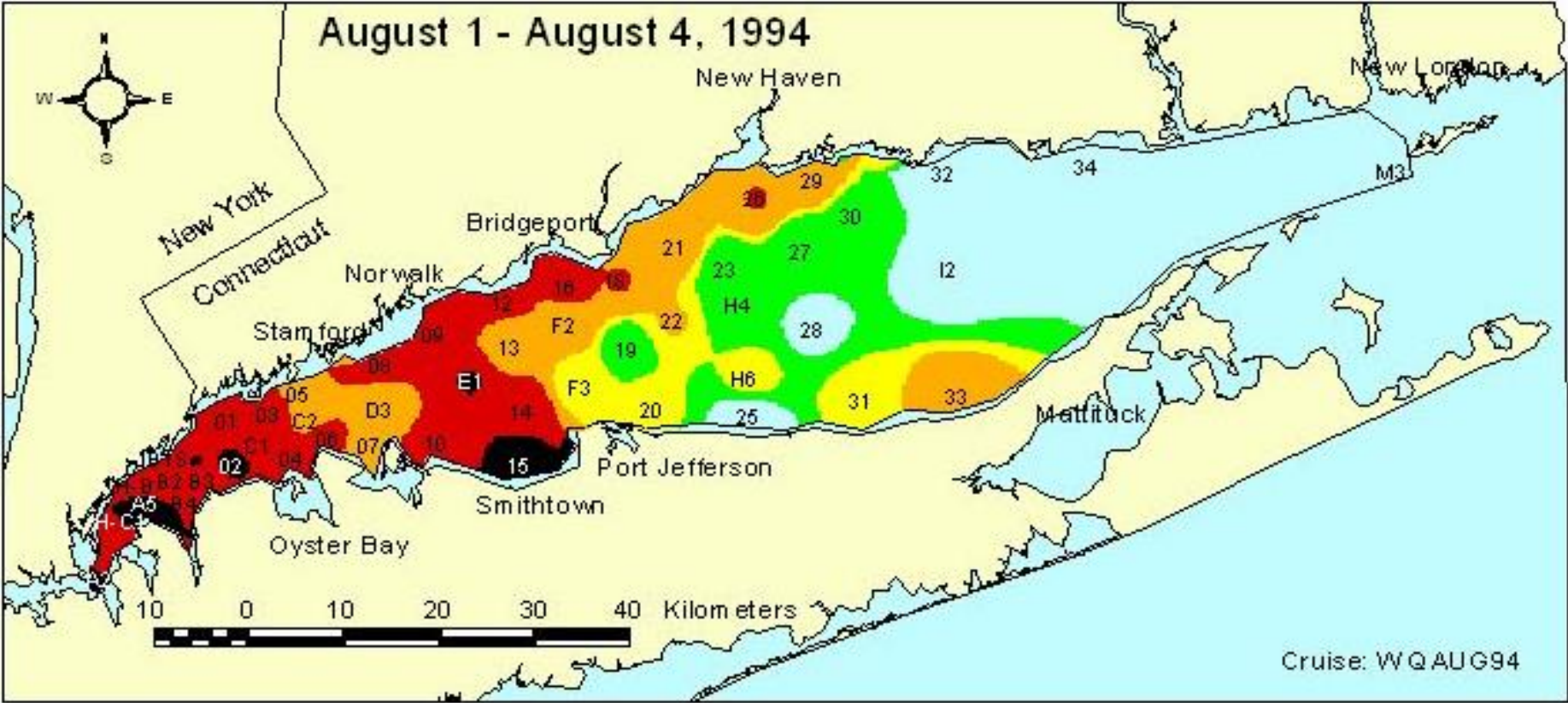
Supervising Environmental Analyst



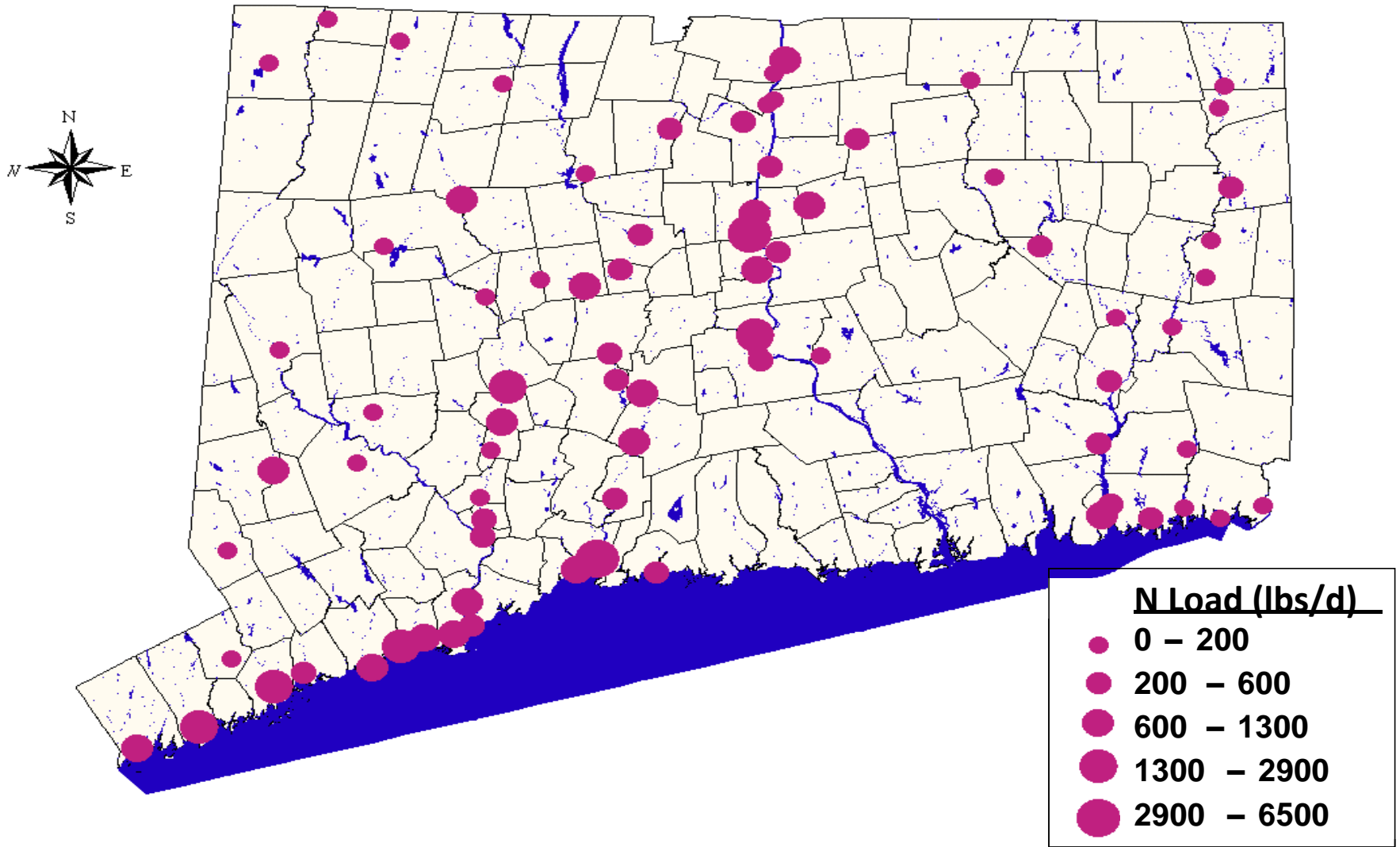
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Connecticut's Long Island Sound Nitrogen Program



STP Nitrogen Baseline Loads



Distribution of 79 Connecticut STPs participating in nitrogen trading. Dots are proportional to baseline, end of pipe nitrogen loads (lbs/day).

Connecticut's LIS Nitrogen Program

- The Long Island Sound TMDL
- The General Permit
- Trading



The Long Island Sound TMDL

- The Long Island Sound Study – 1985
 - Congress appropriated \$
- Significant level of monitoring since 1986
- Management Conference - 1988
- Status Report and Interim Actions for Hypoxia Management – 1990 *Phase I*



The Long Island Sound TMDL

- By 1994 there were 48 axial and lateral monitoring stations
- Developed a Comprehensive Conservation and Management Plan – 1994 *Phase II*
- CT, NY and EPA adopted *Phase III Actions for Hypoxia Management* – 1998



The Long Island Sound TMDL

- Draft TMDL prepared by New York and Connecticut
 - Public and Municipal Meetings
 - 1998, 1999 and Revised 2000
 - MOS – Model based on years of worst hypoxia
- EPA reviewed and approved - 2001
- Enforceable Schedule
 - 23.4% by August 2004
 - 43.9% by August 2009
 - 58.5% by August 2014



The Long Island Sound TMDL

- Allows for Trading between POTWs
- 58.5% Reduction in Total Nitrogen Loading
 - The reduction applied to WWTPs in CT is 63.5%



The Long Island Sound TMDL

- 25% Aggregate WWTP Reductions for Upstream States (MA, NH, VT)
- 10% Reduction in NPS (the entire watershed)
- Atmospheric Reductions
 - 18% reduction expected (CAA)



The Long Island Sound TMDL

Nitrogen WLA for Connecticut Point Source Discharges

Facility Name	Baseline End-of-Pipe (lbs/day)	WLA End-of-Pipe (lbs/day)
Zone 6		
Greenwich WPCF	1313	479
New Canaan WPCF	175	64
Norwalk WPCF	1967	718
Ridgefield South St. WPCF	80	29
Stamford WPCF	2536	926
Subtotal	6071	2216



General Permit for Nitrogen Discharges

Using NPDES Permits to set limits

- High Compliance Cost
- High Non-Compliance Cost
- Rewards those that go last

Difficult to implement 79 NPDES permits



General Permit for Nitrogen Discharges

Using a General Permit to meet goals

- Easier to implement for limited staff
- Everyone gets the same implementation schedule
- Facilitates Trading



General Permit for Nitrogen Discharges

- Public Act 01-180, An Act Concerning Nitrogen Reduction In Long Island Sound – GP authority
- First issued January 1, 2002
- Latest renewal effective January 1, 2019
- Lists WLA for all 79 point sources covered
- Authorizes the discharge of Total Nitrogen



General Permit for Nitrogen Discharges

- Set limits from TMDL stepping down until 2014
 - 23.4% by August 2004
 - 43.9% by August 2009
 - 58.5% by August 2014
- Set frequency of monitoring
 - POTWs Less Than 10 MGD Design - Weekly
 - POTWs Greater Than 10 MGD Design - Twice per Week
- Requires operation of installed processes
- Allows for trading to meet limits



General Permit for Nitrogen Discharges

Nitrogen WLA for Connecticut Point Source Discharges

EQ factor	Facility Name	Baseline End-of-Pipe (lbs/day)	WLA End-of-Pipe (lbs/day)
0.14	Thompson	28	10
0.20	MDC Hartford	6512	2377
0.49	Meriden	1230	449
0.67	Stratford	974	356
0.85	Fairfield	1113	406
1	Norwalk	1967	718



Trading Fundamentals

	Point Source	Non-Point Source
Common water quality problem	YES	YES
Technically feasible to meet pollutant reduction target	YES	UNCERTAIN
Compelling member benefits, especially economic	YES	PS to NPS/SW
Ability to quantify and track pollutant loads	YES	NO
Credit costs based upon agreed protocols	YES	YES
Diverse market, viable supply and demand	YES	NO
Reduce overall cost	YES	PS to NPS/SW
Transaction costs low relative to price	YES	NO



Connecticut's Nitrogen Trading Program

- Governed by the General Permit
- Public Act 01-180, An Act Concerning Nitrogen Reduction In Long Island Sound – Established NCAB to manage
- Incentive Based – Not Free Market
- NCAB Sets Credit Prices Based on Legislated Formula
 - Annual Project Capital Costs and Annual O&M Costs
- Scheduled Annual Trades
- Transactions through the State “Bank”
- POTW to POTW only



Goals of the Trading Program in 2002

Meet the TMDL by 2014 cost-effectively by

- Encouraging denitrification at STPs
- Spreading out upgrades over thirteen years
 - Western and larger facilities expected first
- Efficiently using funding and resources

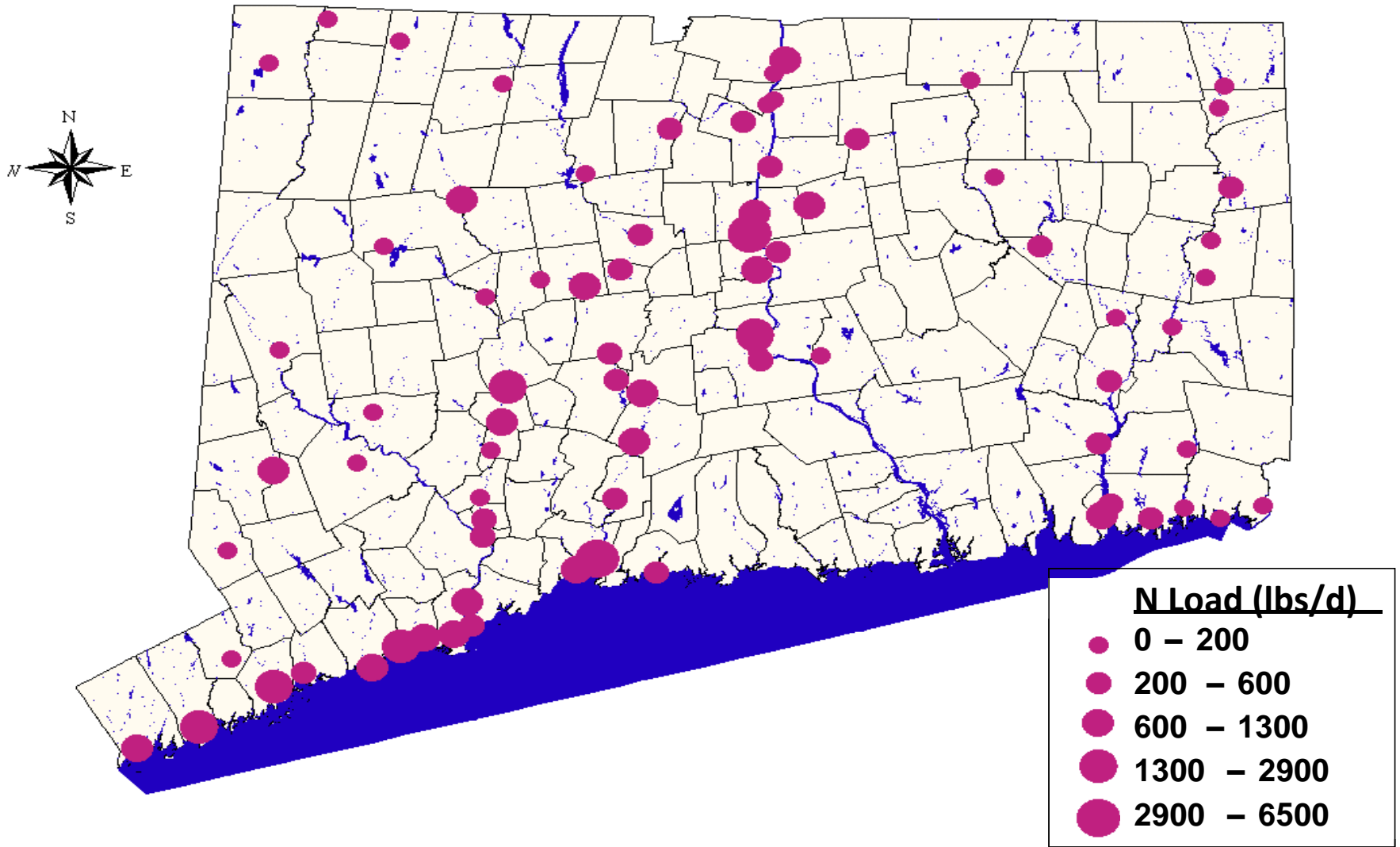


Encouraging denitrification at STPs

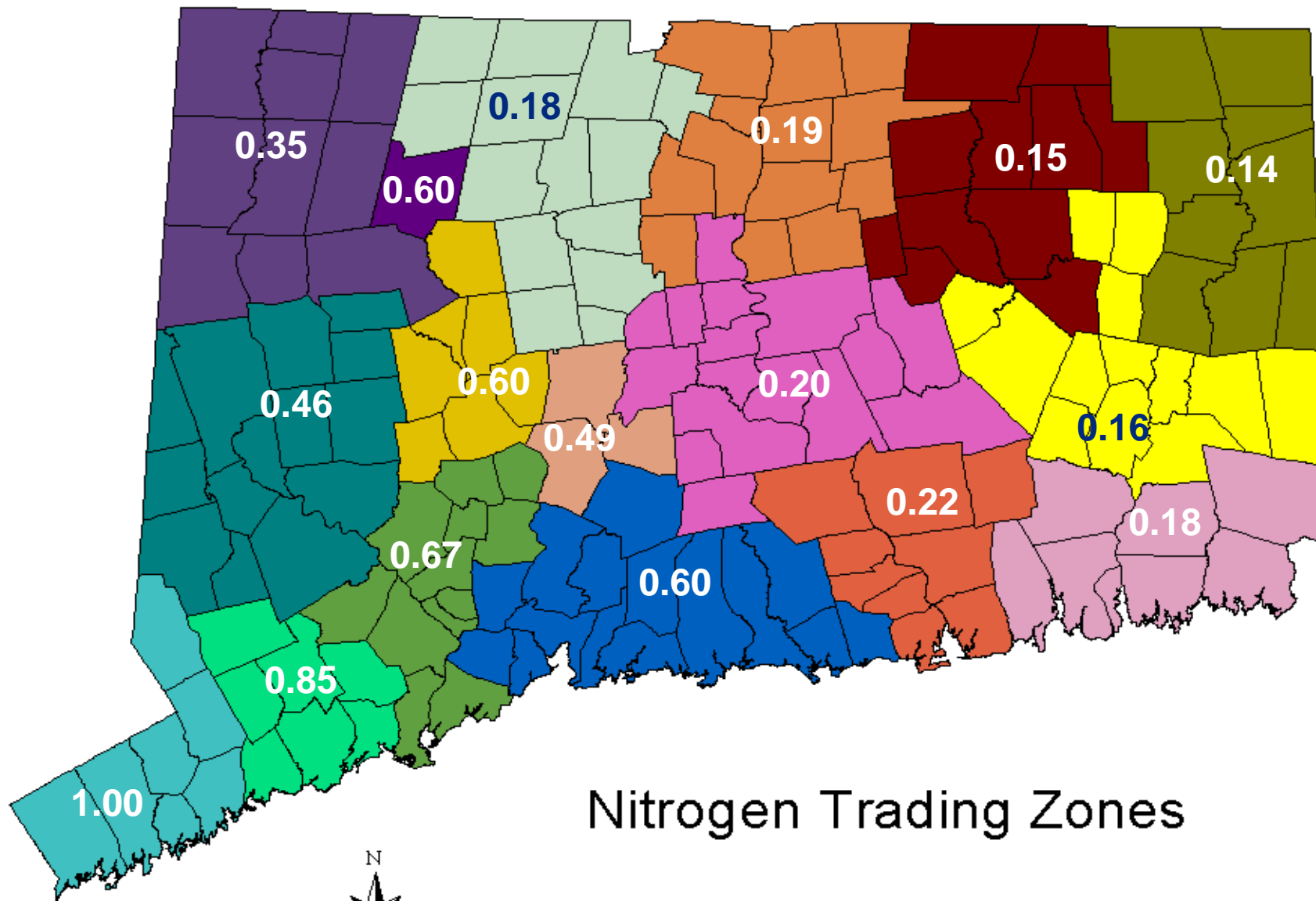
- Some grant only projects for interim BNR
- Increased grants to 30% on costs related to BNR from 20%
- 20% grant on other costs continued
- 20 year loan at 2% continued



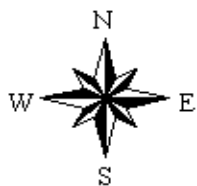
STP Nitrogen Baseline Loads



Distribution of 79 Connecticut STPs participating in nitrogen trading. Dots are proportional to baseline, end of pipe nitrogen loads (lbs/day).



Nitrogen Trading Zones



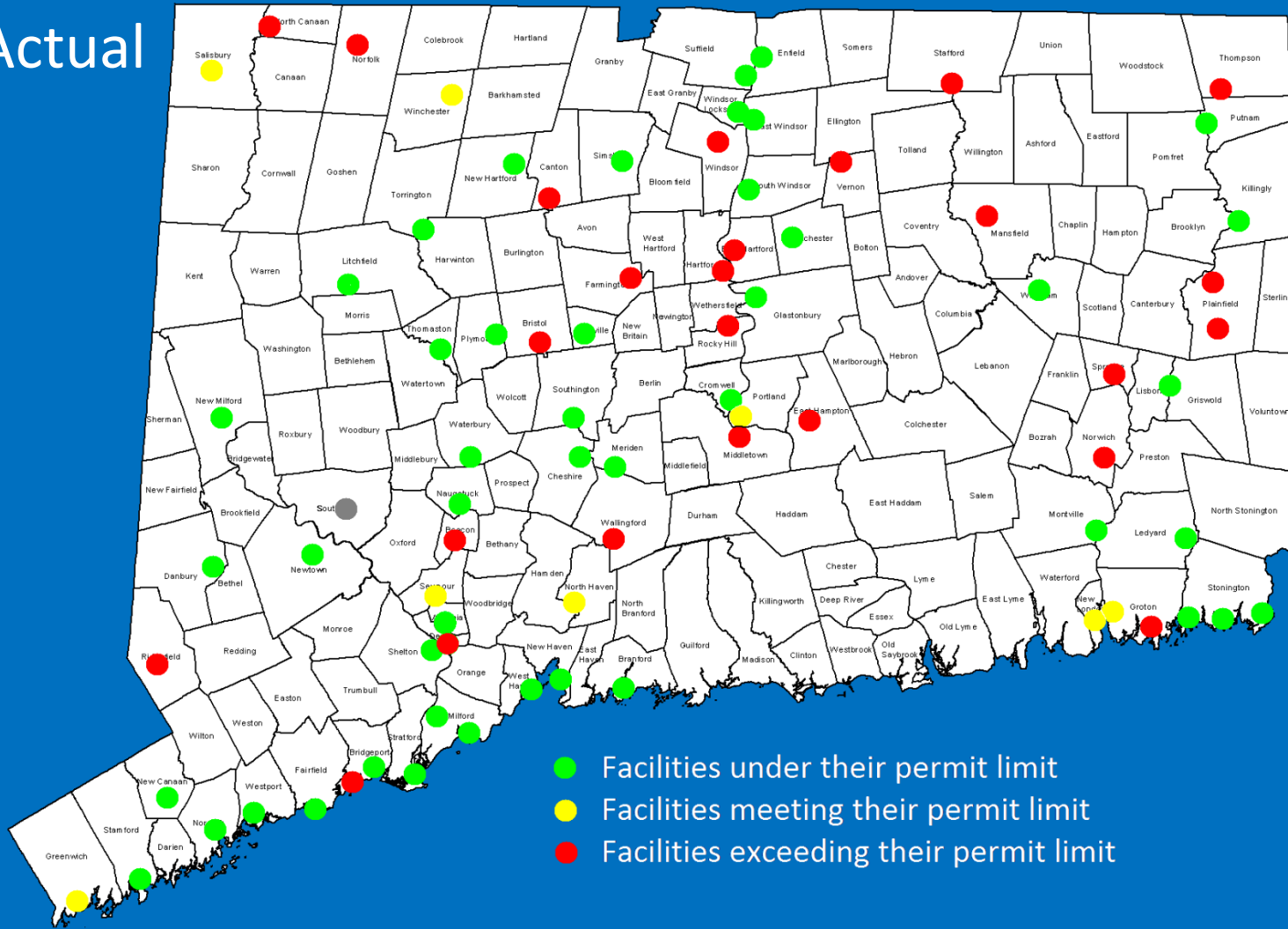
Trading Program Accomplishments

- Compliance with the TMDL by 2014
- Cost-effective implementation of the TMDL
 - (cost savings of over \$400 million)
- 61 facility upgrades
 - \$452 million invested in CWF project facilities to remove TN
- Moved the trading program to self-sufficiency



Trading Program Accomplishments

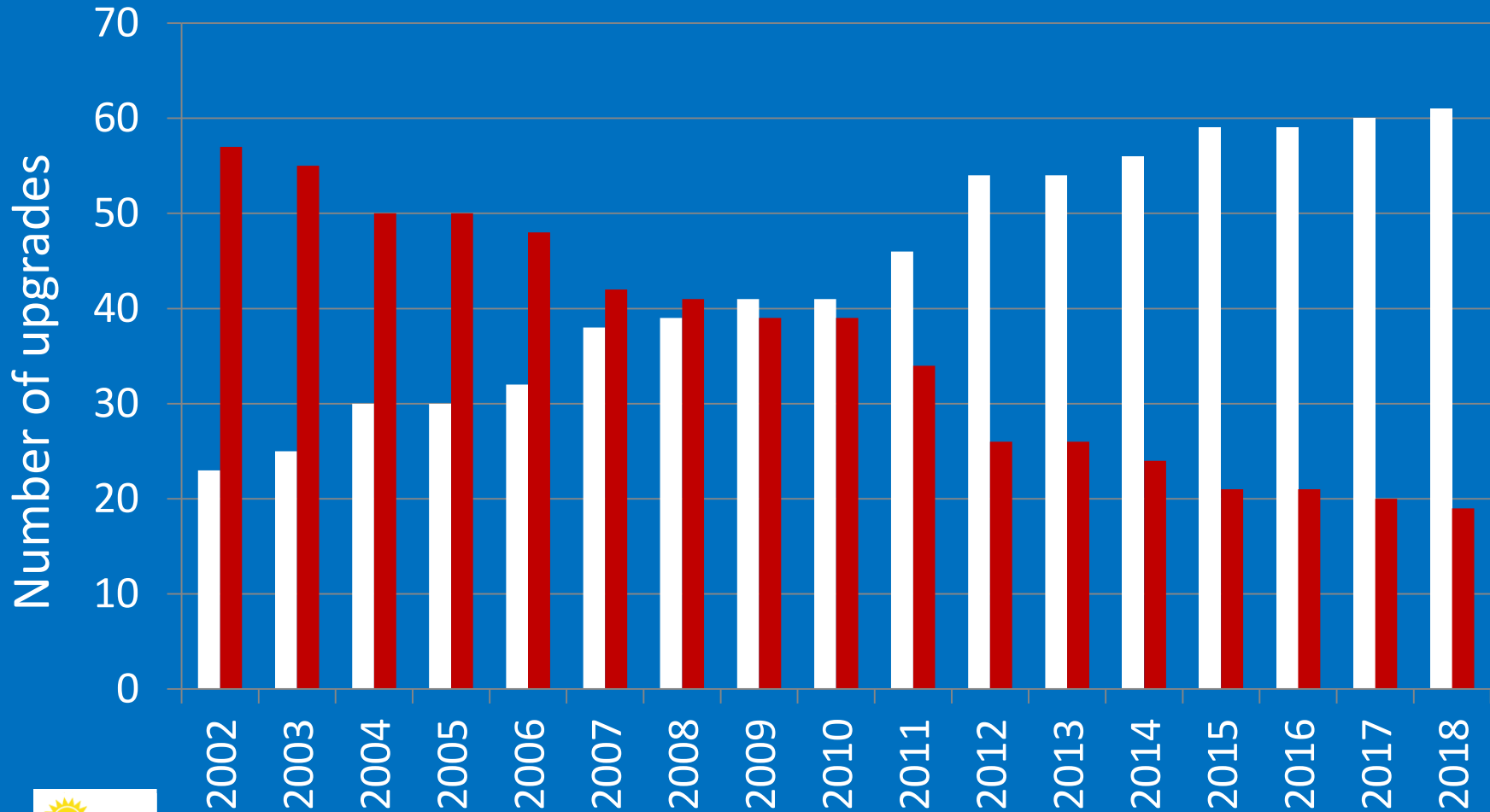
2017 Actual



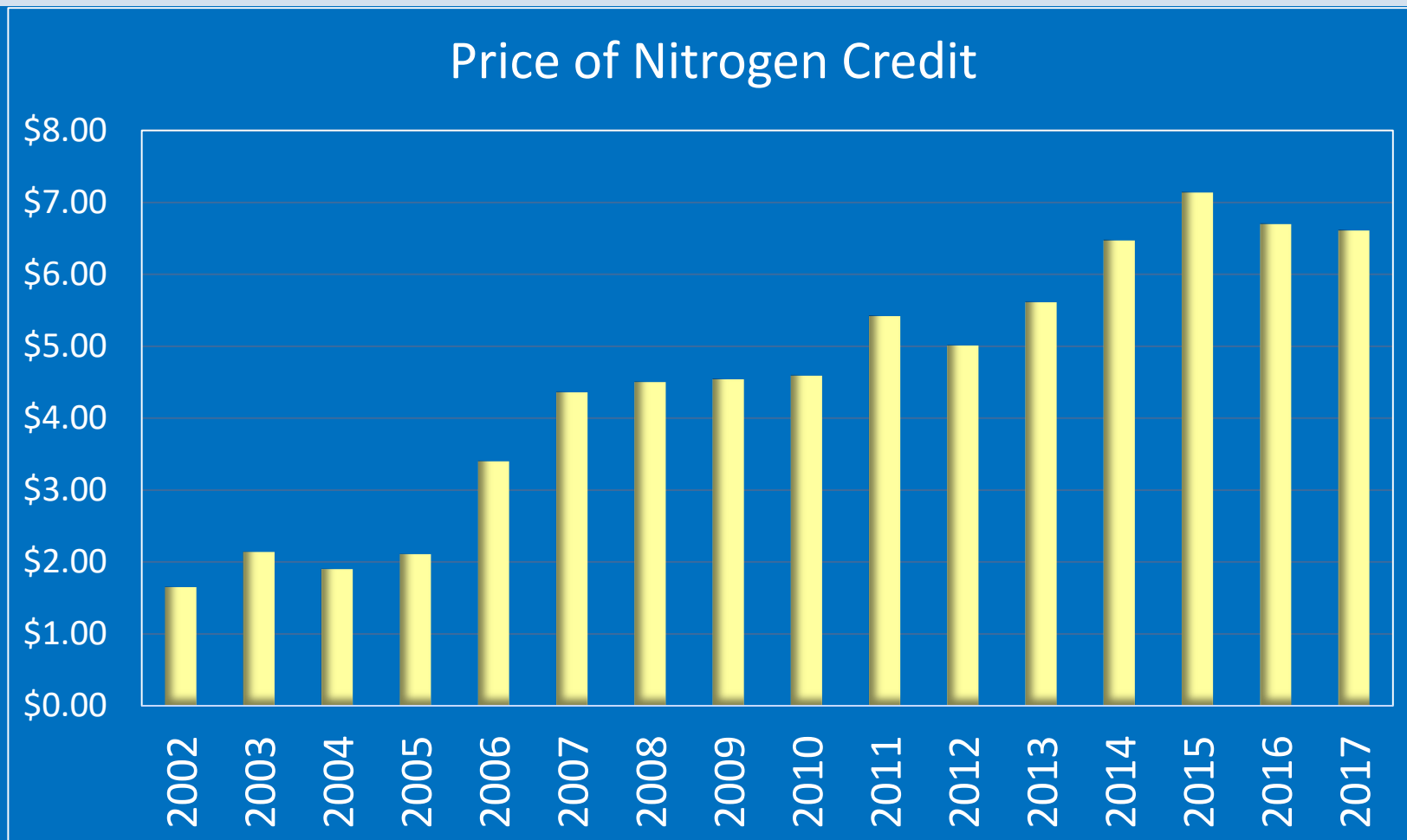
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Upgrades spread out over time

■ Project Facilities ■ Non Project Facilities



Cost of a Credit 2002 – 2017

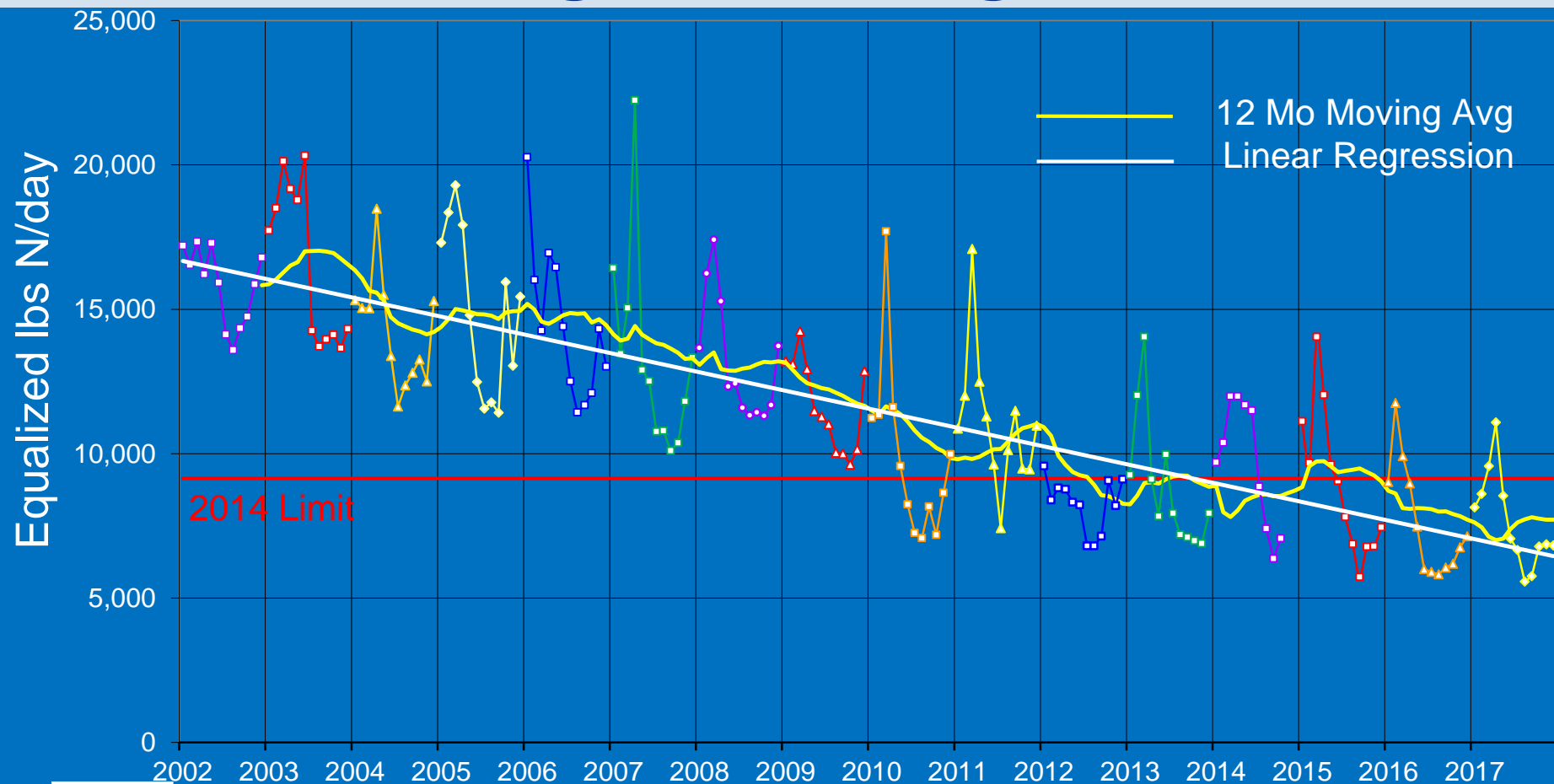


* In 2016 – the price of a credit for buyers is \$2.61

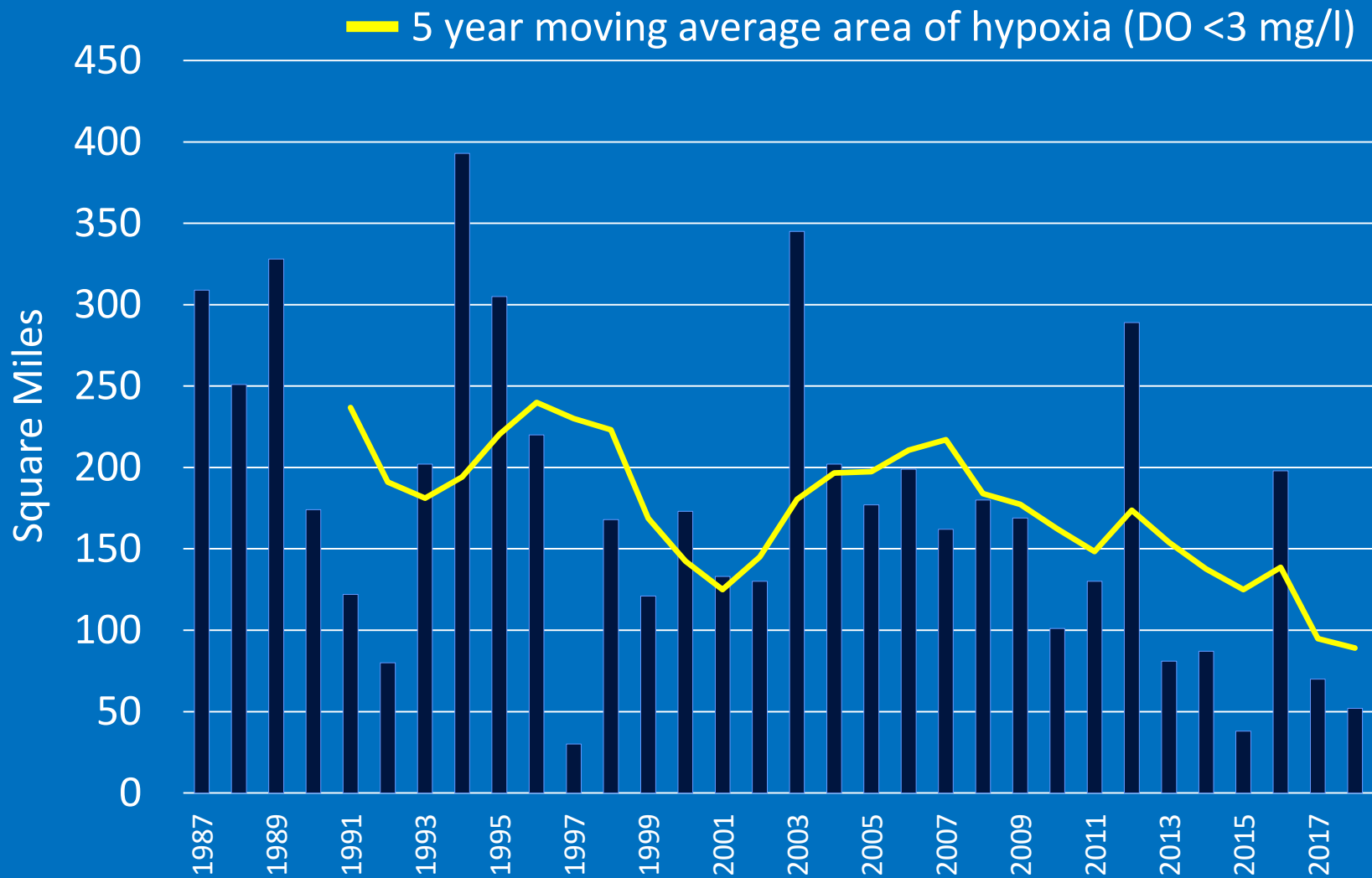
* In 2017 – the price of a credit for buyers is \$2.59



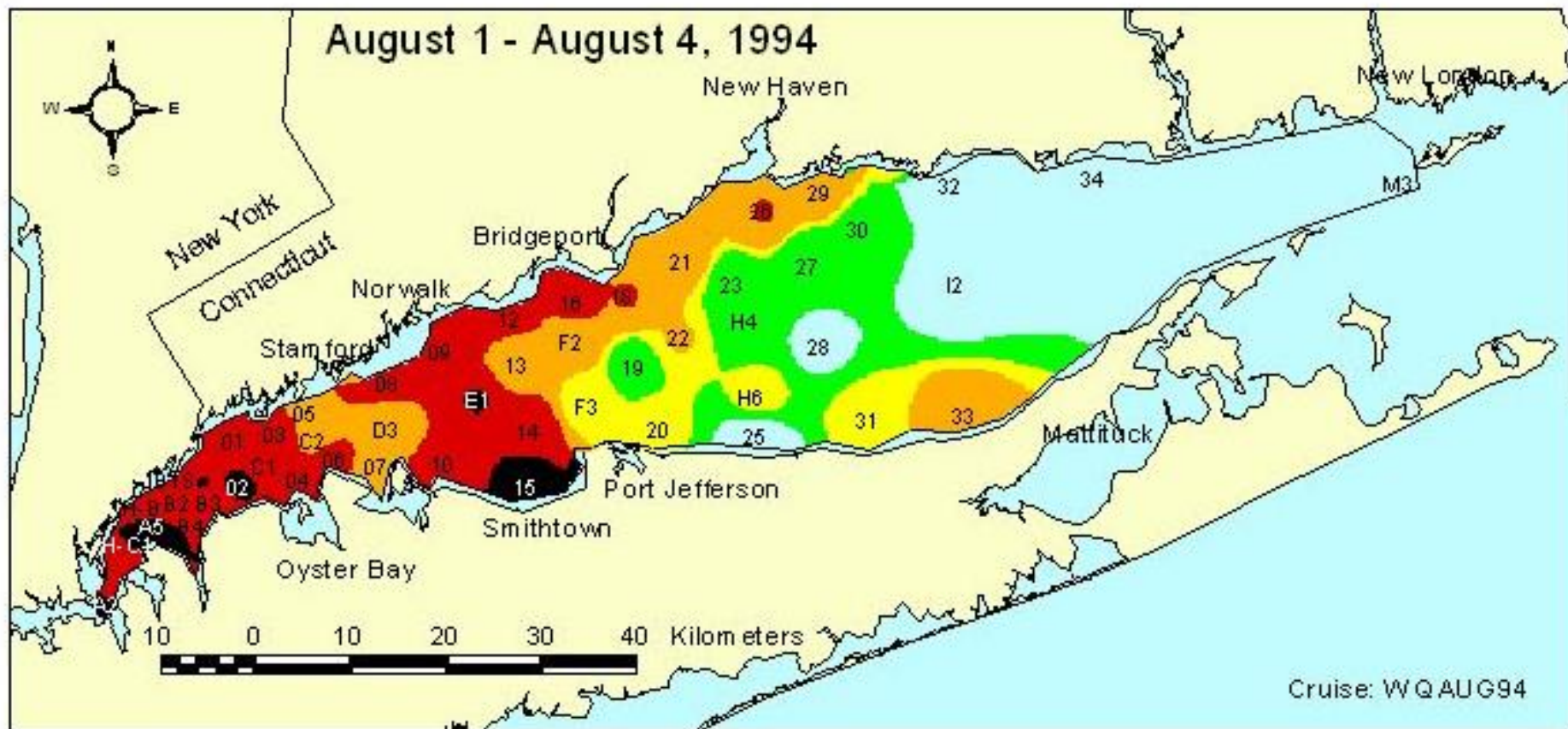
Monthly average total equalized nitrogen loading to LIS



Square Miles of Hypoxia in LIS



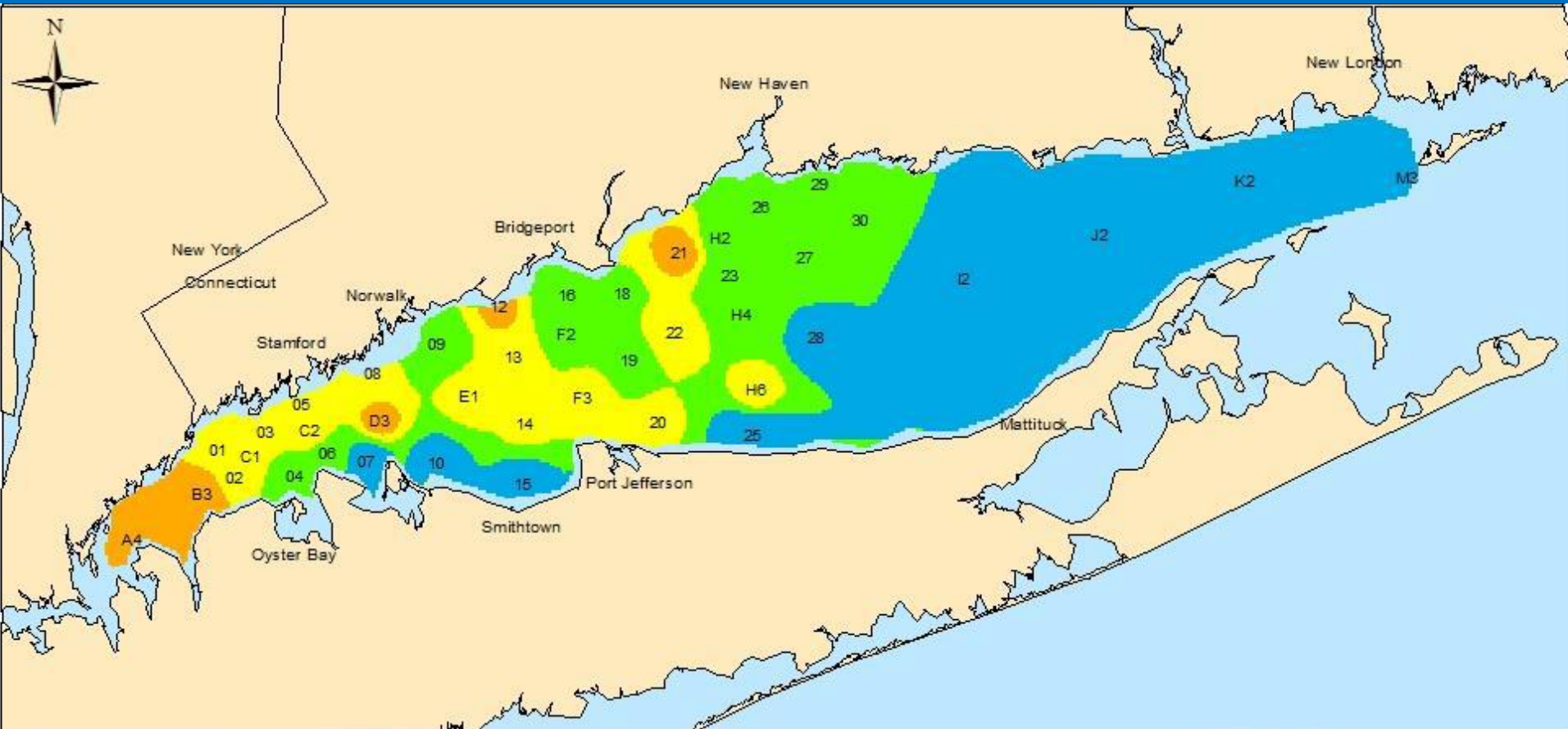
Trading Program Accomplishments



Trading Program Accomplishments

Dissolved Oxygen in Long Island Sound Bottom Waters

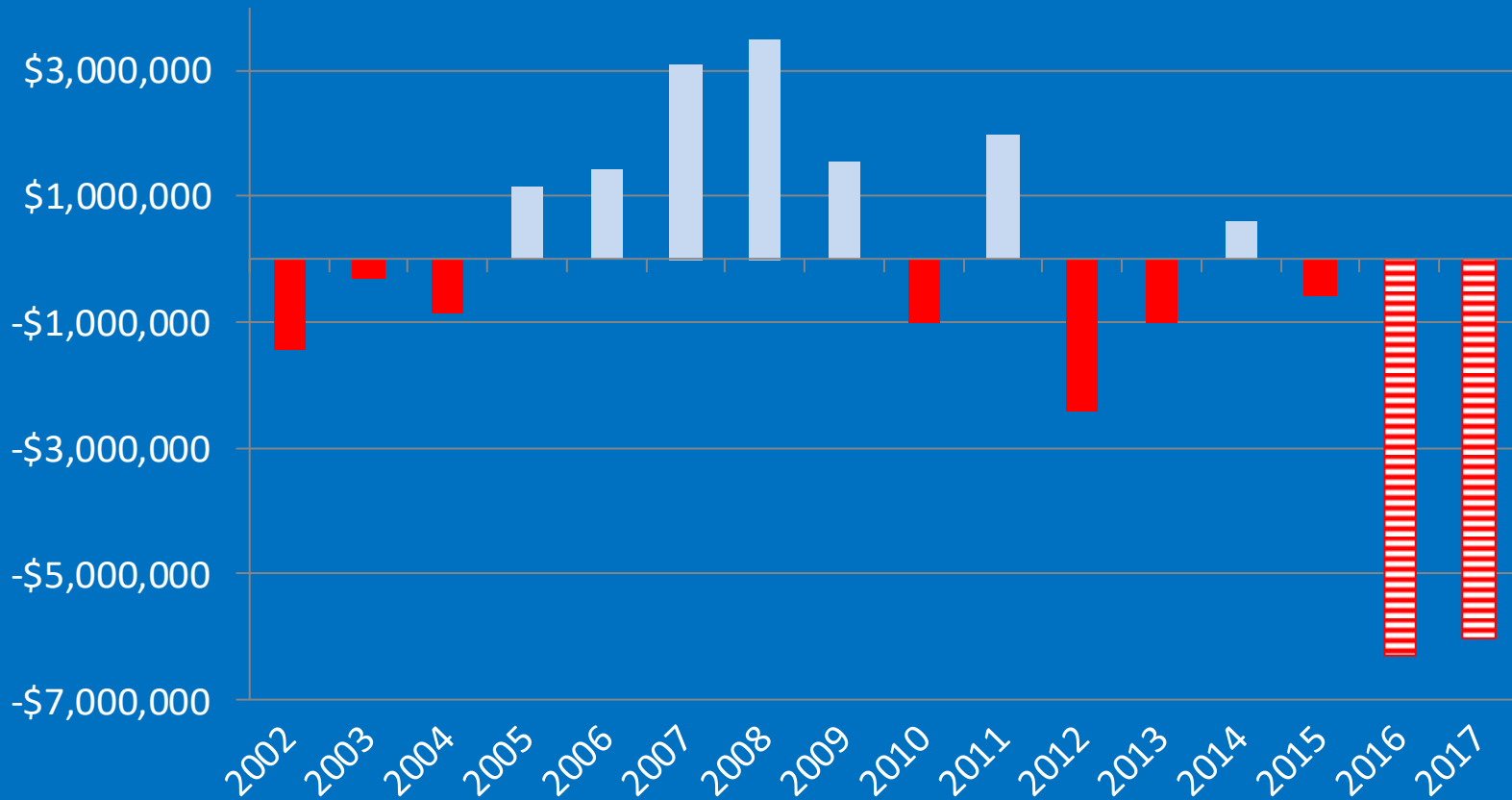
27 August – 29 August 2018



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Changes to the Trading Program

Impact on Program



Self-sufficiency

2013

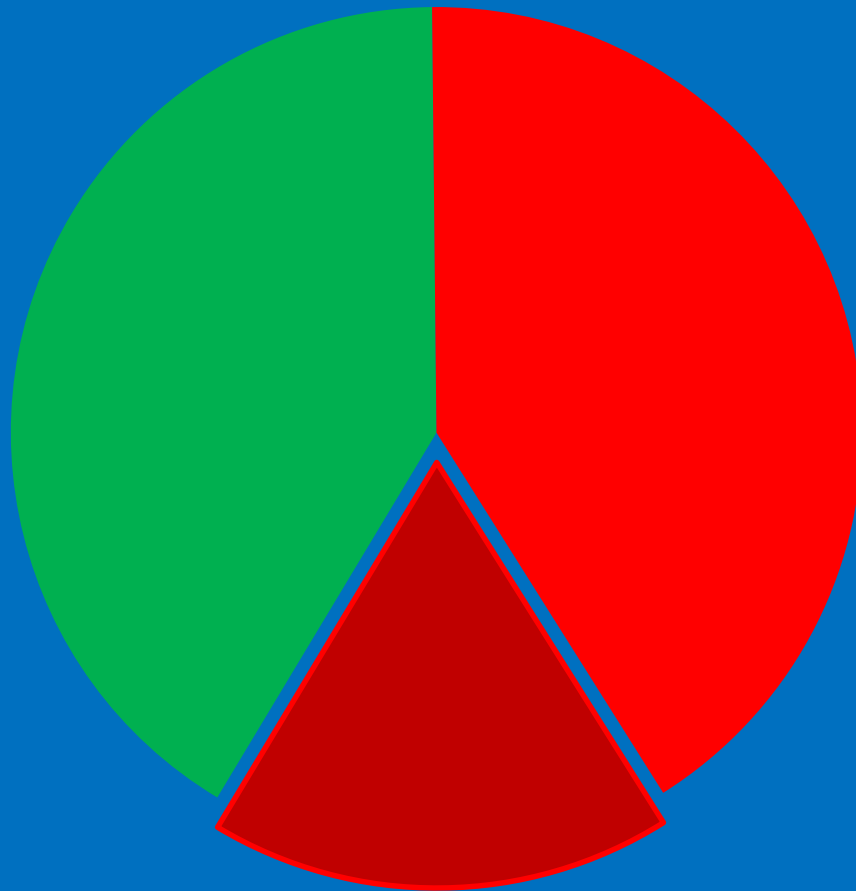


- Buyer's credits needed
- Sellers's credits available



Self-sufficiency

2013



■ Buyer's credits needed

■ Sellers's credits available

■ Trading account subsidy

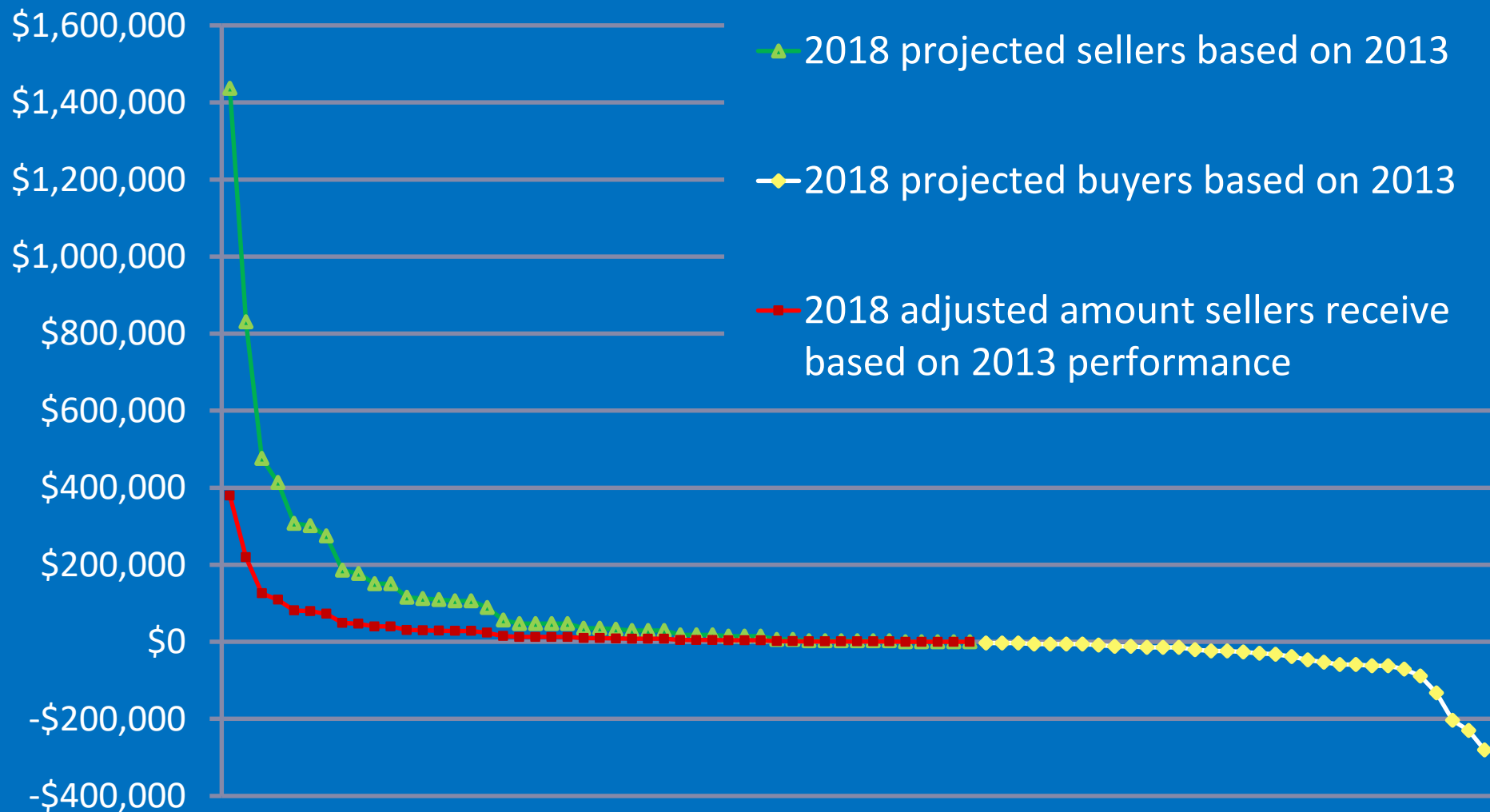


Scenarios evaluated

- Discontinue the trading program
- Drop low producing sellers
- Drop inefficient sellers
- Buyers buy all of the credits produced
- Buyers buy the credits they need to meet their General Permit limit and those payments are shared by the sellers



Self-sufficiency



Plants in Trading Program



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Near-term Goals of the Trading Program

- Continue to maintain compliance with TMDL
 - Encourage optimized denitrification at WWTPs
 - Continue efficient use of resources & funding
 - Continue support of data collection
- Continue utilization of General Permit
 - Renewal completed – effective January 1, 2019
- Maintain Options for future TMDL compliance
 - Continue to incentivize upgrades



The near-term

2019 – 2022 Nitrogen Upgrades:

- Under Construction
 - Farmington
 - Middletown Abandonment
 - Torrington
 - Killingly
- In Planning
 - Wallingford
 - Norwich
 - Plainfield
 - Sprague
- Under Design
 - Ridgefield
 - Vernon





Questions?

www.ct.gov/deep/municipalwastewater

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