Connecticut’s Long Island Sound Nitrogen Program

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Puget Sound Nutrient Forum
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Connecticut Department of Energy and Environmental Protection
Connecticut’s Long Island Sound Nitrogen Program

August 1 - August 4, 1994

Connecticut Department of Energy and Environmental Protection
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

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

<table>
<thead>
<tr>
<th>EQ factor</th>
<th>Facility Name</th>
<th>Baseline End-of-Pipe (lbs/day)</th>
<th>WLA End-of-Pipe (lbs/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.14</td>
<td>Thompson</td>
<td>28</td>
<td>10</td>
</tr>
<tr>
<td>0.20</td>
<td>MDC Hartford</td>
<td>6512</td>
<td>2377</td>
</tr>
<tr>
<td>0.49</td>
<td>Meriden</td>
<td>1230</td>
<td>449</td>
</tr>
<tr>
<td>0.67</td>
<td>Stratford</td>
<td>974</td>
<td>356</td>
</tr>
<tr>
<td>0.85</td>
<td>Fairfield</td>
<td>1113</td>
<td>406</td>
</tr>
<tr>
<td>1</td>
<td>Norwalk</td>
<td>1967</td>
<td>718</td>
</tr>
</tbody>
</table>
## Trading Fundamentals

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

- **Green** facilities under their permit limit
- **Yellow** facilities meeting their permit limit
- **Red** facilities exceeding their permit limit

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Upgrades spread out over time

- Project Facilities
- Non Project Facilities

Number of upgrades

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Cost of a Credit 2002 – 2017

* In 2016 – the price of a credit for sellers is $2.61
* In 2017 – the price of a credit for sellers is $2.59
Monthly average total equalized nitrogen loading to LIS

Equalized lbs N/day

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Square Miles of Hypoxia in LIS

- 5 year moving average area of hypoxia (DO <3 mg/l)

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Trading Program Accomplishments
Trading Program Accomplishments

Dissolved Oxygen in Long Island Sound Bottom Waters
27 August – 29 August 2018

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Self-sufficiency

2013

- Green: Buyer's credits needed
- Red: Sellers' credits available

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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

- 2018 projected sellers based on 2013
- 2018 projected buyers based on 2013
- 2018 adjusted amount sellers receive based on 2013 performance

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

- **Under Design**
  - Ridgefield
  - Vernon

- **In Planning**
  - Wallingford
  - Norwich
  - Plainfield
  - Sprague
Questions?

www.ct.gov/deep/municipalwastewater

Please contact:

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