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TESTIMONY OF
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DIRECTOR
SAVE THE SOUND

BEFORE THE NEW YORK CITY COUNCIL
COMMITTEE ON ENVIRONMENTAL PROTECTION

HEARING: "OVERSIGHT - THE CITY'S WASTEWATER INFRASTRUCTURE – CURRENT CONDITION AND FUTURE PLANS"

DECEMBER 12, 2017

Good morning Chairman Constantinides, members of the Committee on Environmental Protection and City Council members. I'm Tracy Brown, director of Save the Sound. Save the Sound is a bi-state program of Connecticut Fund for the Environment with offices in Mamaroneck, NY and New Haven CT. Our mission is to restore and protect Long Island Sound and its environs. I appreciate the opportunity to testify today on behalf of Save the Sound and our members.

Summary of Testimony

For decades, excess nitrogen entering our coastal waterways have devastated the health of Long Island Sound and the East River[1]. The impacts are clear: low-oxygen waters and fish die-offs, murky waters and harmful algae blooms, and disappearing coastal marshes. We have made progress reducing human generated nitrogen pollution over the last 20 years, but must make further reductions if we want a healthy Sound that is safe for people and wildlife.

New York City recently met an important goal, established in the 2001 Nitrogen TMDL, to reduce nitrogen pollution entering Long Island Sound from East River wastewater treatment plants (WWTPS) by 58.5% based on 1990 levels. This tremendous investment in the health of the Sound—$900 million invested in upgrades at four East River WWTPs—will pay dividends in cleaner water and a healthier ecosystem for years to come.

Thanks to this investment, and similar ones made in other Sound coastal communities, the hypoxic (low oxygen) dead zone in western Long Island Sound is now smaller. However it is

[1] Latimer, J.S., M.Tedesco, R.L. Swanson, C.Yarish, P.Stacey, and C. Garza, eds. 2014. Long Island Sound: Prospects for the Urban Sea. Springer Series on Environmental Management. Springer Publishers, NY. p.539.

still there, stretching from the East River past the coasts of Westchester and Nassau County in the hot summer months, wreaking havoc on marine life and critical ecosystems.

The East River, which connects Long Island Sound with New York Harbor, receives 60% of the treated wastewater effluent in New York City. The River carries this large burden of nitrogen pollution into Long Island Sound. Overall the nitrogen from the East River accounts for 33% by volume of the nitrogen entering Long Island Sound; 18% when adjusted for impact on Sound water quality.[2]

New York City's six East River WWTPs discharge approximately 35 tons of nitrogen every day into the East River (Figure 1). These six plants still account for 97% of the city's nitrogen load to the Sound.

Plant	Nitrogen (lbs./day)	Nitrogen (lbs./day) Adjusted for LIS*
Bowery Bay	10,858	2,280
Hunts Point	6,592	1,384
Tallman Island	4,092	859
Wards Island	13,858	2,910
Newtown Creek	31,658	3,482
Red Hook	3,917	430
* 2016 Average Nitrogen Discharges: Adjusted for Impact on Long Island Sound Water Quality		

Figure 1: The New York City wastewater treatment plants that impact Long Island Sound. These wastewater plants handle 60% of NYC's wastewater.

Save the Sound offers the following recommendations:

- At this time New York City is trading nitrogen credits with Westchester County, which has yet to meet its nitrogen reduction commitment. This demonstrates the City's ability to exceed the 58.5% nitrogen removal target committed to in the 2001 Nitrogen TMDL. Based on this fact, and the need to continue to ratchet down on nitrogen for the health and future of Long Island Sound, the East River, and our communities, Save the Sound calls on New York City to increase its nitrogen treatment at the four upgraded plants to achieve a 70% nitrogen reduction rate in 2018 and beyond.

[2] Save the Sound, 2017. New York City Nitrogen Report: East River and Long Island Sound. Available from: https://greencitiesbluewaters.files.wordpress.com/2017/11/nyc11-22evening.pdf.

- If additional nitrogen reductions are needed, upgrading the Newtown Creek wastewater treatment plant to include nitrogen removal should be evaluated. This plant is one of two remaining East River WWTPs which did not get upgraded to treat nitrogen. Taking into account the adjustment for impact on Long Island Sound water quality, 30% of the remaining nitrogen load from the East River is coming from the Newtown Creek plant (Figure 2).

- Save the Sound calls on New York City to clean the bays and harbors of the East River and Long Island Sound by revisiting and improving the Combined Sewage Overflow (CSO) Long Terms Control Plans for those communities. These waterways, home to Orchard Beach and many neighborhood swimming clubs where the public most often comes into contact with city waterways, are stressed from nitrogen and fecal bacteria pollution. Strategies designed to meet safe fecal bacteria standards should not come at the expense of other important environmental goals and responsibilities such as protecting our living shorelines, coastal habitats and the wildlife that rely on them. Save the Sound calls on New York City to reject chlorination of CSOs in Alley Creek, Flushing Creek and the Hutchinson River and focus instead on CSO flow reduction.

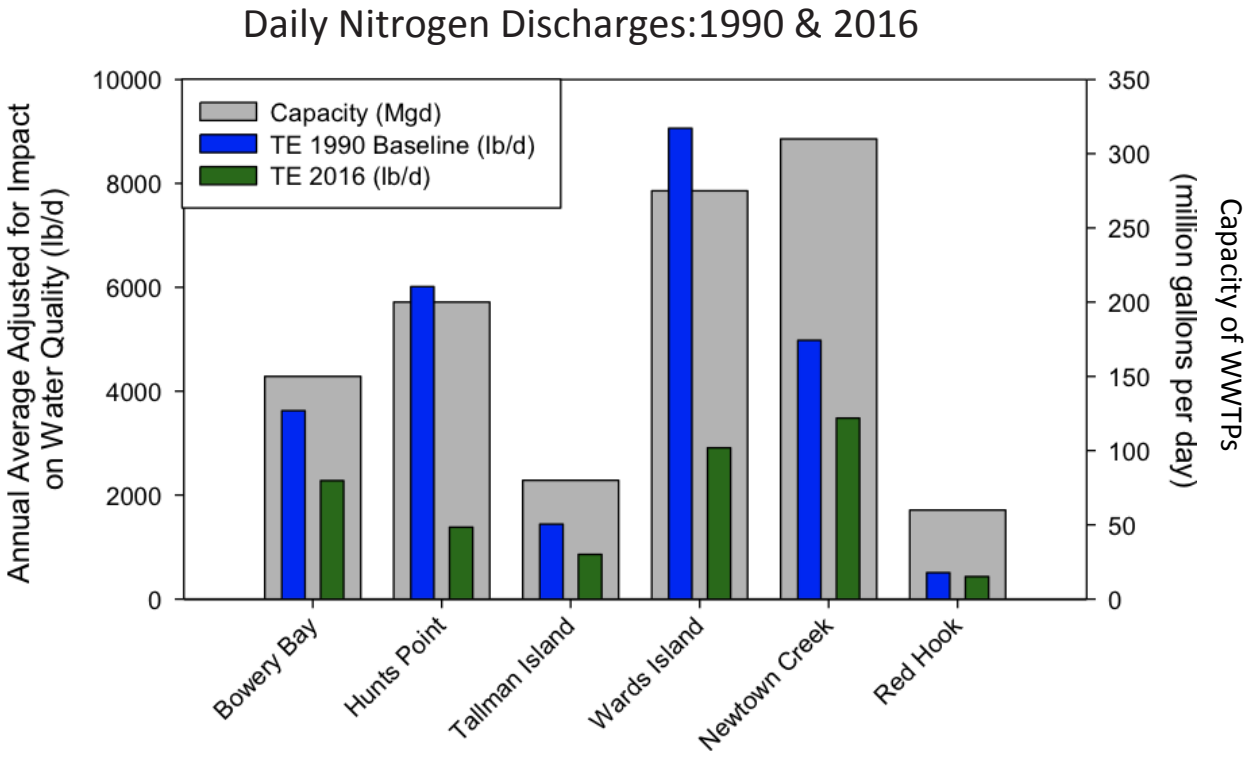

Figure 2: Load of nitrogen to the East River from wastewater treatment plants. Nitrogen in effluent adjusted for impact on Long Island Sound water quality for the six wastewater treatment plants in the East River sewershed as reported by the plants for 2016 versus the baseline of 1990. The nitrogen load was adjusted using the fractional impact of nitrogen loads on hypoxia in Long Island Sound. Image credit: Jamie Vaudrey.

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The Problem: Impacts of Excess Nitrogen

In coastal salty waters, nitrogen stimulates growth of plant-like organisms, both microscopic (phytoplankton) and those visible to the human eye (seaweed)[3]. As on land, adding nitrogen fertilizes plant life in our coastal waters, but the amount of nitrogen being added to Long Island Sound is equivalent to or greater than what we would put on an intensely farmed agricultural field[4]. While a little nitrogen is beneficial to coastal waters, too much nitrogen changes the ecosystem—fueling the growth of nuisance and toxic algae blooms, creating low oxygen dead zones where fish can't survive, and killing the coastal marshes that provide important wildlife habitat and protect coastal communities from extreme storms—a process called eutrophication.

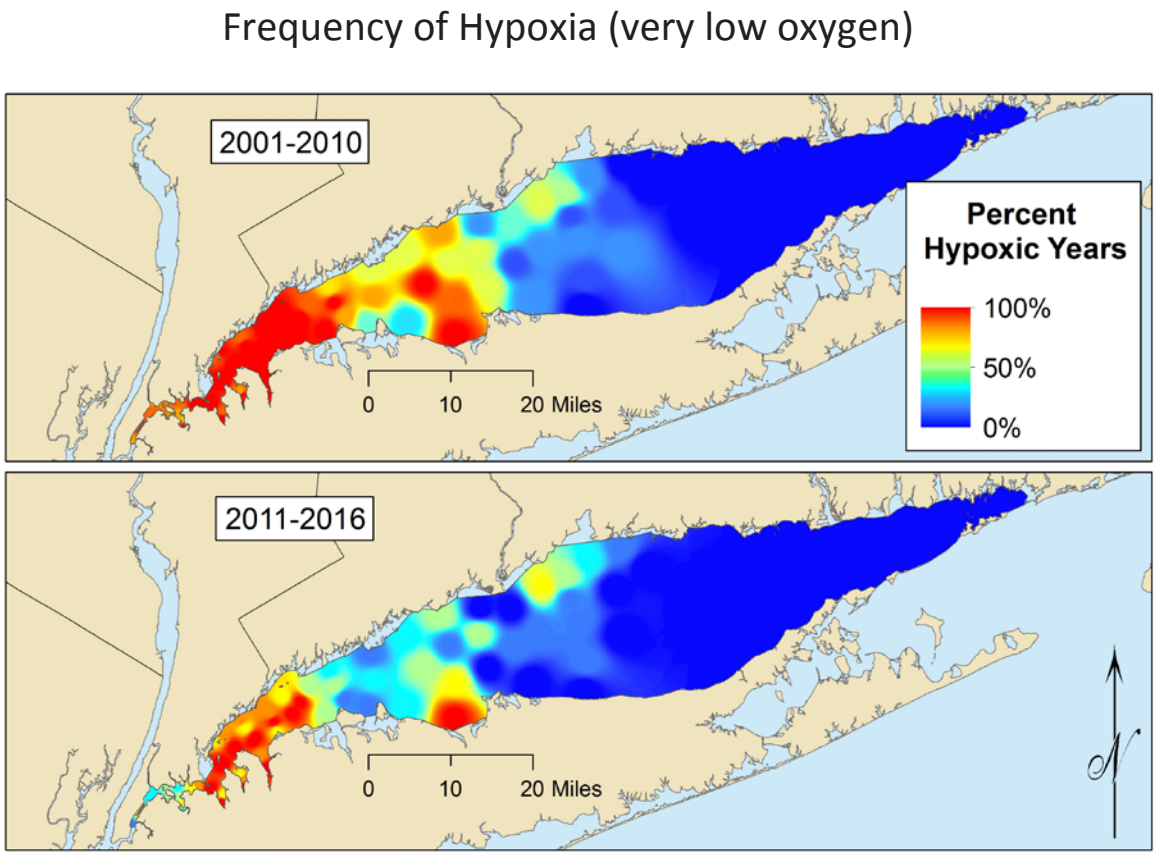

Figure 3: Frequency of hypoxic (very low oxygen, < 3 mg/L) conditions in Long Island Sound from 2001 to 2016. Red indicates higher frequency, blue is lower frequency. Image credit: Save the Sound, with data from CTDEEP, NEI- WPCC IEC, NYCDEP.

[3] Howarth, R.W. and R. Marino. 2006. Nitrogen as the limiting nutrient for eutrophication in coastal marine ecosystems: evolving views over three decades. Limnology and Oceanography. 51(1): 364-376.

[4] USEPA. 2015. EPA's Report on the Environment (ROE): Agricultural Fertilizer. Available from: https://cfpub.epa.gov/roe/indicator.cfm?i=55.

Unacceptably low levels of oxygen in the waters, or hypoxia, occur every summer as a result of the level of eutrophication in the East River and the western end of Long Island Sound (Figure 3). A comprehensive look at historic oxygen data collected by New York City Department of Environmental Protection (NYCDEP) and its predecessors demonstrates hypoxia in the East River dating back to 1920[5]. Nassau County and New York City monitoring data show hypoxia spreading as far as Cold Spring Harbor and becoming a near-annual summertime event in the early 1980s. In fact, the 1980s saw the spread of hypoxia into the Western and Central Basins of Long Island Sound[4]. A review of evidence going back 1,000 years reveals Long Island Sound summertime hypoxia did not occur until the 1800s, with a second ecosystem shift indicating worsening conditions in the 1970s[6].

Hypoxia can lead to a shift in the types of plants and animals found in an area; only those that can tolerate periods of low or no oxygen remain[7]. Eutrophication coupled with warming temperatures and acidification of the waters due to climate change exacerbates these changes; both the number of different types of marine life and the total number of individuals can decrease[8].

The good news is that the area of hypoxia in the Sound may have decreased by roughly half of what it was in 1987; we need a few more years of monitoring to confirm this decrease because it varies widely year-to-year. Investments in upgrades to wastewater treatment plants that discharge to the Sound over the last 20 years have driven this reduction.

Even with these reductions in area, hypoxia continues to be an annual occurrence in the East River and Western Sound. The overall hypoxic area of approximately 95 square miles in 2017 is still much larger than in 1920 when hypoxia was found only in the 11.5 square miles of the East River.

New York City's Progress on Nitrogen Reductions

New York Department of Environmental Conservation (NYSDEC) and CTDEEP created a nitrogen TMDL for Long Island Sound in 2000. Among other requirements, the plan mandated a 58.5% reduction of nitrogen discharged to the Sound from wastewater treatment plants serving New York City, Long Island, Westchester County, and Connecticut, through a phased approach over 15 years, using 1990 levels as the baseline.[9] The target took into account reductions

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[5] Parker, C.A. and J.E. O'Reilly. 1991. Oxygen depletion in Long Island Sound: A historical perspective. Estuaries. 14(3):248-264. DOI: 10.2307/1351660.

[6] Varekamp, J.C., E. Thomas, K. Beuning, M.R. Buchholtz ten Brink, and E. Mecray. 2004. Environmental Change in Long Island Sound over the last 400 years. Final Report, EPA Assistance Agreement X-9812950-1. p. 28.

[7] Howell, P. and D. Simpson. 1994. Abundance of marine resources in relation to dissolved oxygen in Long Island Sound. Estuaries. 17(2): 394-402. DOI: 10.2307/1352672.

[8] Conley, D.J., J. Carstensen, R. Vaquer-Sunyer, and C.M. Duarte. 2009, Ecosystem thresholds with hypoxia. Hydrobiologia. 629: 21-29.

[9] NYSDEC and CTDEP. 2000. A total maximum daily load analysis to achieve water quality standards for dissolved oxygen in Long

expected from existing programs throughout the Sound's watershed designed to lower nitrogen loads, so the majority of new efforts to curb nitrogen fell to the wastewater treatment plants.

In New York City, the plan called for four of the six New York City wastewater treatment plants that directly impact Long Island Sound— Hunts Point, Bowery Bay, Wards Island, and Tallman Island in the Upper East River—to be upgraded to treat nitrogen. NYCDEP and NYSDEC decided to upgrade the four Upper East River plants to a degree that the nitrogen load from all six plants, adjusted for impact on Sound water quality, would be reduced by the mandated 58.5%. Therefore, the two plants in the Lower East River—Newtown Creek and Red Hook—were not upgraded to treat nitrogen.

In September 2016, New York City reached that goal after an approved deadline extension. According to NYCDEP reports, the East River wastewater treatment plants have reduced their nitrogen discharge by 60%[10]. By going above and beyond the required reductions, the East River plants were able to "trade away" their excess reductions to offset shortfalls by wastewater treatment plants in Westchester County that are still working to meet the 58.5% reduction.

The nitrogen removal technology installed at the plants converts nitrogen present in wastewater into inert nitrogen gas that is released harmlessly into the atmosphere[10]. This work required significant upgrades to much of the plants' supporting infrastructure—an investment that not only reduced nitrogen discharges, but also brought the plants into a good state of repair for decades into the future.

Action Needed

Eutrophied systems can recover and Long Island Sound is on that road to recovery. But rehabilitation of an ecosystem takes time, sometimes decades[11]. The key is to identify the main causes and work to reduce those sources. In some cases, restoration efforts will be needed to bring back critical habitats like tidal marshes, seagrass beds, and oyster reefs. These habitats are part of a vibrant and diverse Long Island Sound, and once reestablished, can also help to maintain water quality. Efforts to restore these habitats are already underway, but to ensure their continued success and to expand these habitats throughout Long Island Sound, further reductions in nitrogen inputs are needed.

Even with the most recent upgrades to the wastewater treatment plants throughout the Long Island Sound area, nitrogen inputs impacting water quality are still dominated by this sewer

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Island Sound.

[10] NYCDEP. 2017. $1 Billion Nitrogen Reduction Project Improves the Health of the East River and Long Island Sound (17-1). Available from: http://www.nyc.gov/html/dep/ html/press_releases/17-001pr.shtml#.WfpgK2iPI2w.

[11] Diaz, R.J. 2001. Overview of hypoxia around the world. Journal of Environmental Quality. 30(2): 275-281.

source which contributes about 31% of the total nitrogen load when adjusted for impact on Long Island Sound water quality (Figure 4, left). Even after achieving the 58.5% reduction of nitrogen leaving wastewater plants, the East River wastewater treatment plants alone account for 18% of the total nitrogen load to Long Island Sound, or 56% of the load originating from all sewer sources in the Long Island Sound watershed (Figure 4, right). While great progress has been made reducing the nitrogen leaving wastewater treatment plants around the Sound, including New York City, additional reductions are needed to further improve water quality. Reductions in nitrogen loads to the East River are integral to this process.

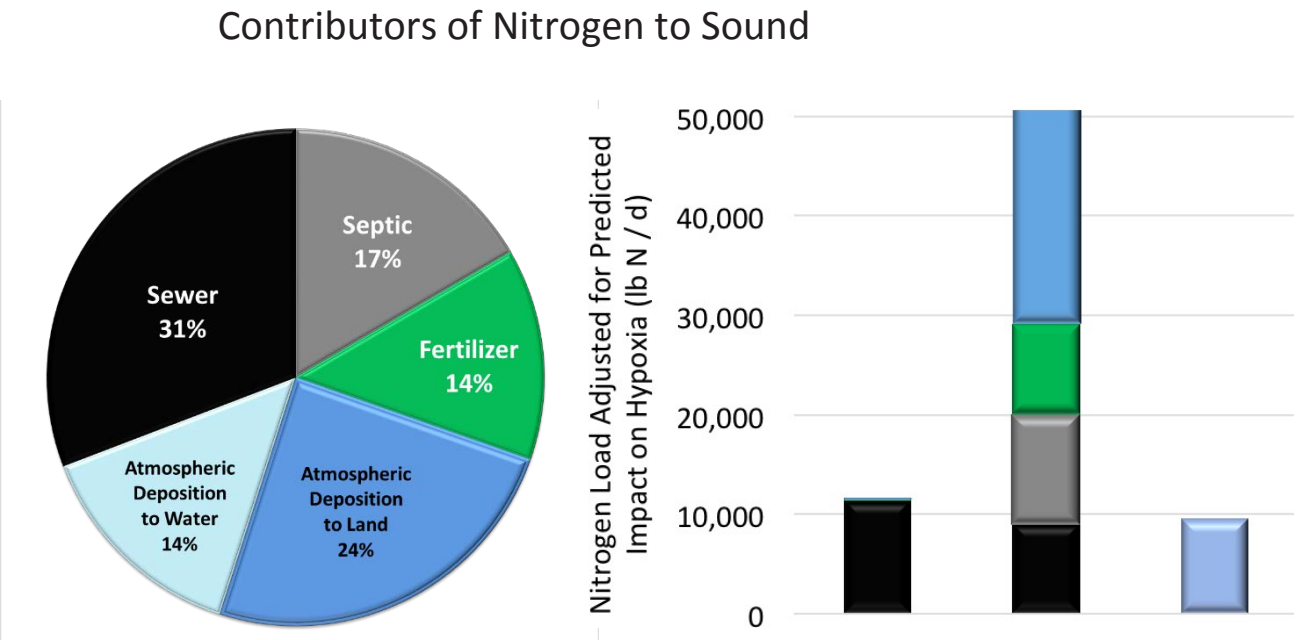

Figure 4: Source of nitrogen loads to Long Island Sound. Nitrogen loads are adjusted to account for the impact of different entry points into the Sound on water quality. Values are based on WWTP nitrogen loads from 2016 and current atmospheric deposition estimates. Septic and fertilizer were determined using the most recent census data (2010) and land cover data (2011).The pie chartshows the sum of all sources presented in the bar chart. Image credit: Jamie Vaudrey

In the East River, 97% of the nitrogen load is attributed to wastewater treatment plants. This is in stark contrast to the rest of Long Island Sound's watershed (including all areas extending up to Canada), where atmospheric deposition dominates at 47% of the load; septic is 20% and sewer is 17% of the load (Figure 4, right - middle bar).

The East River receives wastewater effluent from six treatment plants servicing the Bronx and portions of Manhattan, Queens, and Brooklyn (Figure 2).Taking into account the adjustment for impact on Long Island Sound water quality, 30% of the remaining nitrogen load is coming from one of plants that did not receive the upgrades to treat nitrogen, Newtown Creek (Figure 2). To further reduce nitrogen entering the Sound, New York City needs to continue to focus on its

wastewater treatment plants and look for further reductions they can achieve in the six wastewater treatment plants that impact the Sound. This could be achieved by getting a higher reduction using the newly installed equipment at the four Upper East River plants and/or by installing nitrogen removing technology at the Newtown Creek Plant.

EPA Calls for Additional Reductions: 2015 EPA Nitrogen Strategy

The target set for reducing nitrogen from wastewater treatment plants was met by Connecticut in 2015 and by New York State in 2016. After reviewing the response in the Sound, USEPA called for continuing efforts to reduce nitrogen, as detailed in the Long Island Sound Nitrogen Strategy issued in 2015[12,13]. This new guidance document moves beyond wastewater treatment plants, recommending a more holistic approach to addressing the nitrogen pollution problem.
The four central recommendations are:

1. Complement Long Island Sound TMDL nitrogen management initiatives with efforts to address other eutrophication-related impacts; for instance, involving coastal communities in addressing local problems caused by nitrogen.

2. Convert the current nutrient criteria from a narrative which describes the desired goal (i.e. eliminate hypoxia) to numeric criteria (i.e. nitrogen in the water cannot exceed X kilograms per liter).

3. Customize the numeric criteria for each of three watershed groupings:
   a. Coastal watersheds that directly drain to embayments or nearshore waters.
   b. The three large rivers that drain into the Sound—the Connecticut River, Housatonic River, and Thames River.
   c. Western Long Island Sound coastal watersheds with large, direct discharging wastewater treatment plants (includes plants located in portions of New York City, Westchester County, Nassau County).

4. Continue to support monitoring, modeling, and researching the link between nitrogen loading and bottom-water dissolved oxygen conditions in the open waters of the Sound.

As noted in EPA's cover letter accompanying the Long Island Sound Nitrogen Strategy, "Despite this progress, there is more to do."[11] Improving water quality in Long Island Sound,

[12] USEPA Region 1 and USEPA Region 2. 2015. LIS Nitrogen Strategy Cover Letter, 12-23-15. p. 4. Available from: http://longislandsoundstudy.net/wp-content/uploads/2016/02/ LIS-Nitrogen-Strategy-Cover-Letter-final-12-23-15.pdf.

[13] USEPA Region 1 and USEPA Region 2. 2015. LIS Nitro- gen Strategy enclosure: Evolving the Long Island Sound nitrogen reduction strategy. p. 13. Available from: http:// longislandsoundstudy.net/wp-content/uploads/2016/02/LIS-Nitrogen- Strategy-Enclosures-12-23-15-1.pdf.

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reducing the area of hypoxia, and providing habitats supportive of a diverse and vibrant community of sea life require a continuing commitment to reduce nitrogen inputs to the Sound.

Summary

- New York City succeeded in meeting its target to reduce nitrogen pollution entering Long Island Sound from East River wastewater treatment plants.

- The hypoxic dead zone in Long Island Sound is now smaller, but still there, stretching from the East River past the coasts of Westchester and Nassau County in the hot summer months, wreaking havoc on marine life and critical ecosystems.

- New York City remains one of the top contributors of nitrogen to the Sound, discharging approximately 35 tons of nitrogen into the East River every day, contributing 18% of the nitrogen pollution that is de- grading water quality in Long Island Sound.

- Six East River wastewater treatment plants still account for 97% of the city's nitrogen load to the Sound.

- Save the Sound calls on New York City to increase its nitrogen treatment at the four recently upgraded plants, committing to a 70% reduction in 2018 and beyond.

- If additional nitrogen reductions are needed, upgrading the Newtown Creek wastewater treatment plant to include nitrogen removal should be evaluated.

- Save the Sound calls on New York City to clean the bays and harbors of the East River and Long Island Sound by revisiting and improving the Combined Sewage Overflow (CSO) Long Terms Control Plans for those communities, rejecting chlorination of CSOs in Alley Creek, Flushing Creek and the Hutchinson River, and focusing instead on CSO flow reduction.

Thank you for the opportunity to submit this testimony.

Respectfully,

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