FEASIBILITY OF POINT-NONPOINT NUTRIENT TRADING IN THE LONG ISLAND SOUND WATERSHED

Presented to the New England Water Environment Association
Boston, MA
January 24, 2022

Background

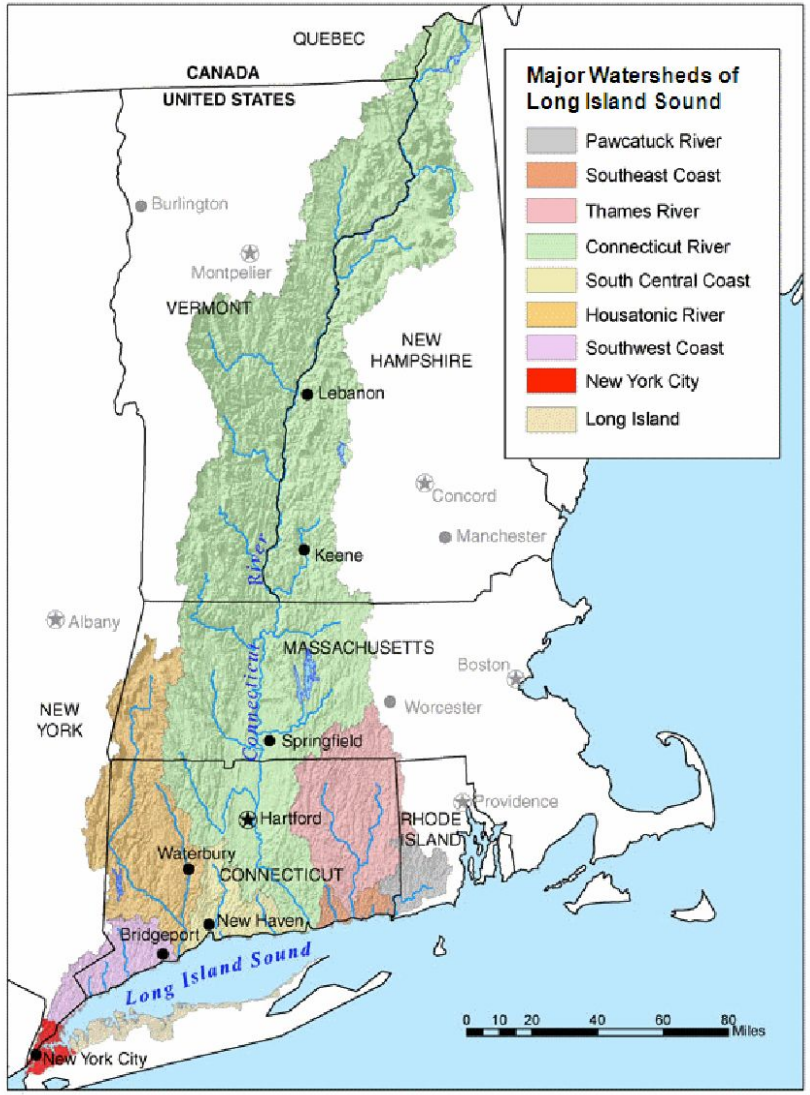

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Photo: A Harmful Algal Bloom (HAB). Source: NEIWPC, 2022. https://neiwpcc.org/our-programs/wetlands-aquatic-species/habs/.

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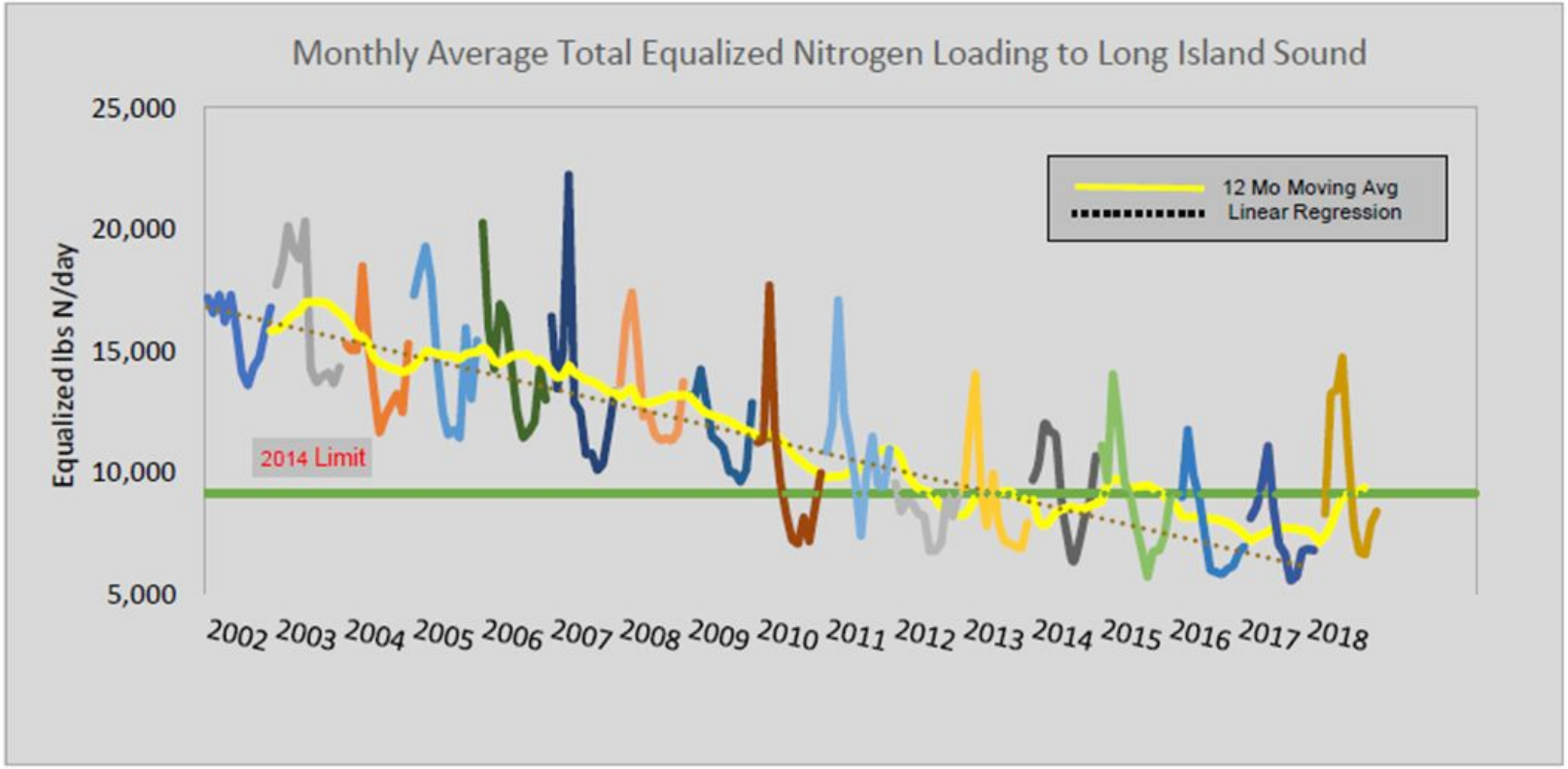

Progress and attainment of the 2014 nitrogen wasteload allocation to Long Island Sound in Connecticut's Nitrogen Credit Exchange. (Source: Dykes, 2019)

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The Questions

Can the CT nutrient trading program be expanded to include point-nonpoint sources for the entire Long Island Sound watershed (not just the LISS area)?

Under what conditions might trading be successful? Under what circumstances might it not be?

What are the obstacles and opportunities in expanding the program?

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Overview of Presentation

- Background
- The Project Team
- The Question
- Methodology
- The Conclusion
- Where Do We Go From Here?

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The Project Team

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NE IW PCC

FOOTPRINTS IN THE WATER

Long Island Sound Study
A Partnership to Restore and Protect the Sound

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Legal Stuff

- This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement (LI00A00384) to NEIWPCC in partnership with the Long Island Sound Study (LISS). The contents of this document do not necessarily reflect the views and policies of NEIWPCC, LISS or the EPA, nor does NEIWPCC, LISS or the EPA endorse trade names or recommend the use of commercial products mentioned in this document.

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Aerial view of Stickney Wastewater Treatment Plant. US Army Corps of Engineers. Creative Commons License.

Image of wastewater treatment plant. Public domain. www.wallpaperflare.com/

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Herbsigwil Farms, Manitoba, Canada.
http://srrwd.ca/projects/herbsigwil-farms-alus-riparian-perennial-grass-buffer/

Image of wastewater treatment plant. Public domain.
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Some market essentials

- A clearly delineated commodity
- A robust demand for that commodity
- A robust supply of that commodity
- Institutions to facilitate exchange

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Factors Influencing Potential Demand

- Regulatory pressure
- Population growth
- Growth in impervious surface area
- Transactions costs
- Cost of alternatives to trading
- Geographic area

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Question: How do the current discharges of nitrogen and phosphorus compare to the limits that are in place?

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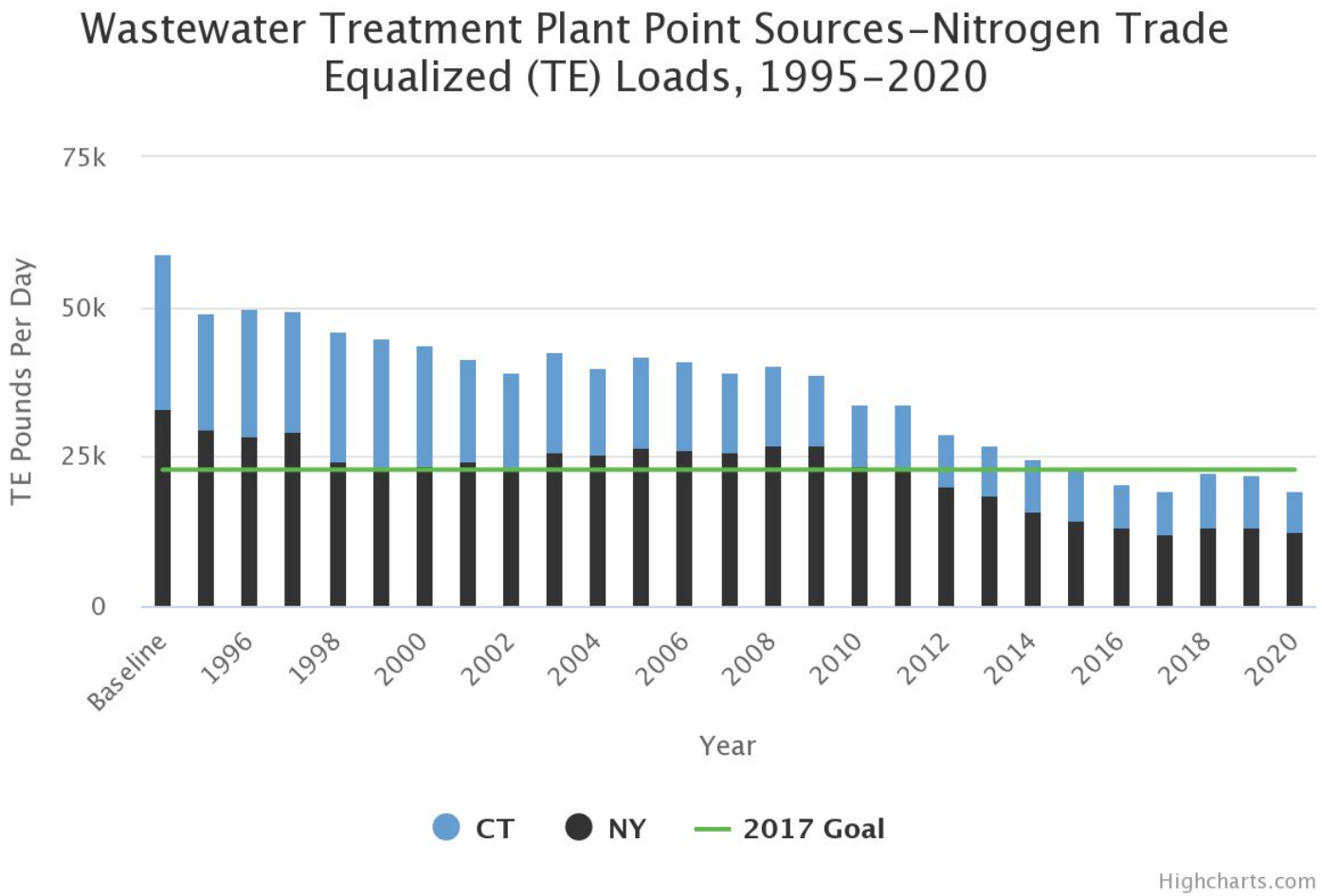

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(Source: Long Island Sound Study, 2020)

NPDES Permit Holders in Exceedance of Discharge Limits

Year	Nitrogen		Phosphorus	
	Facilities over limit	N Over (lbs/year)	Facilities over limit	P Over (lbs/year)
2016	18	8,464	10	537
2017	26	16,312	7	1,002
2018	22	10,688	13	551
2019	18	14,384	16	40,953
2020	17	4,207	20	10,769
Average	20	10,811 **(0.05%)**	13	10,761 **(0.27%)**

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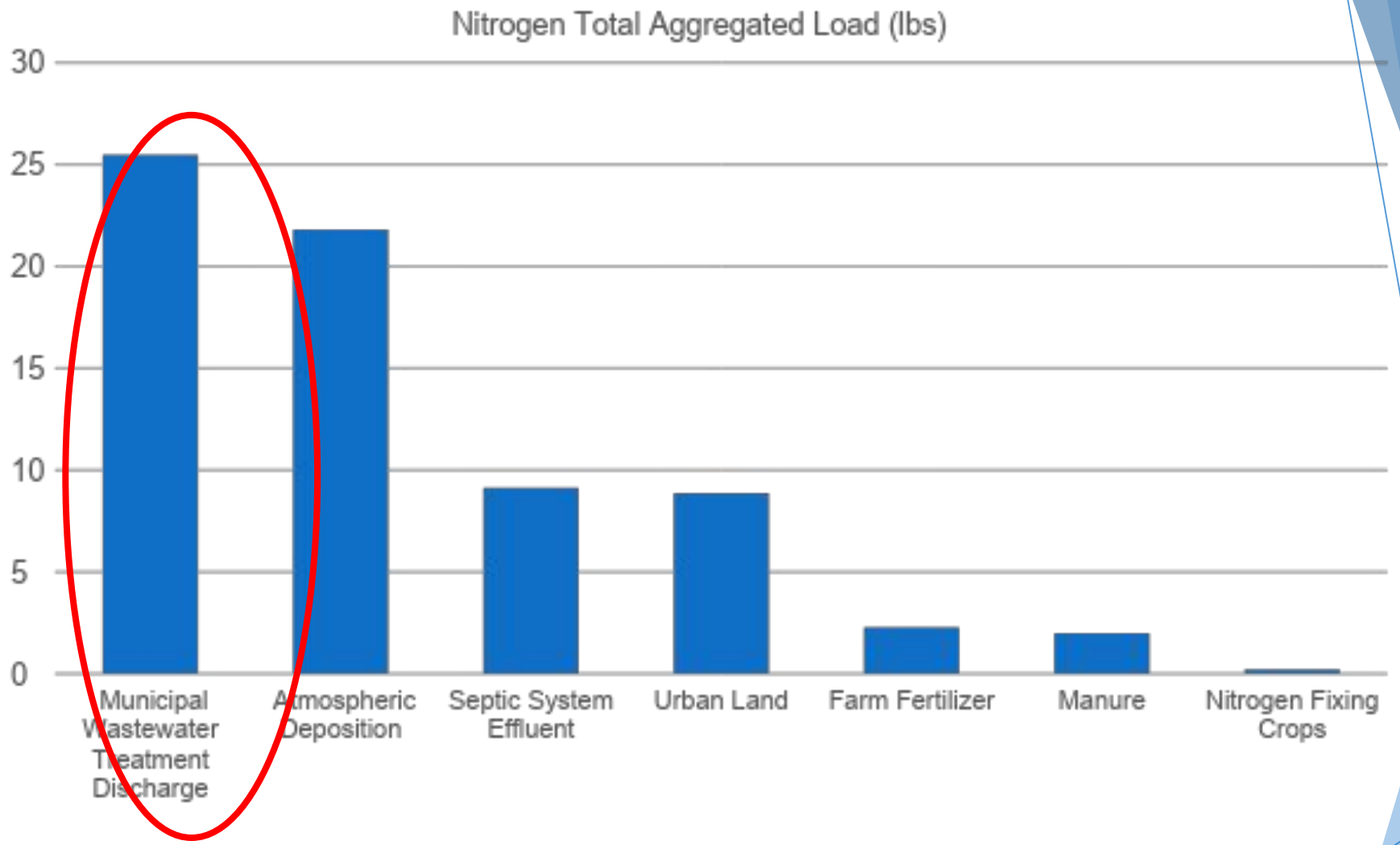

Sources of Nitrogen in the Long Island Sound watershed (United States Geological Survey, 2020)

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Question: *How do the current discharges of nitrogen and phosphorus compare to the limits that are in place?*

Answer: *Very few point sources are exceeding their allocated load.*

Implication: *Limited demand for tradeable permits from point sources.*

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Question: What about potential demand from MS4s?

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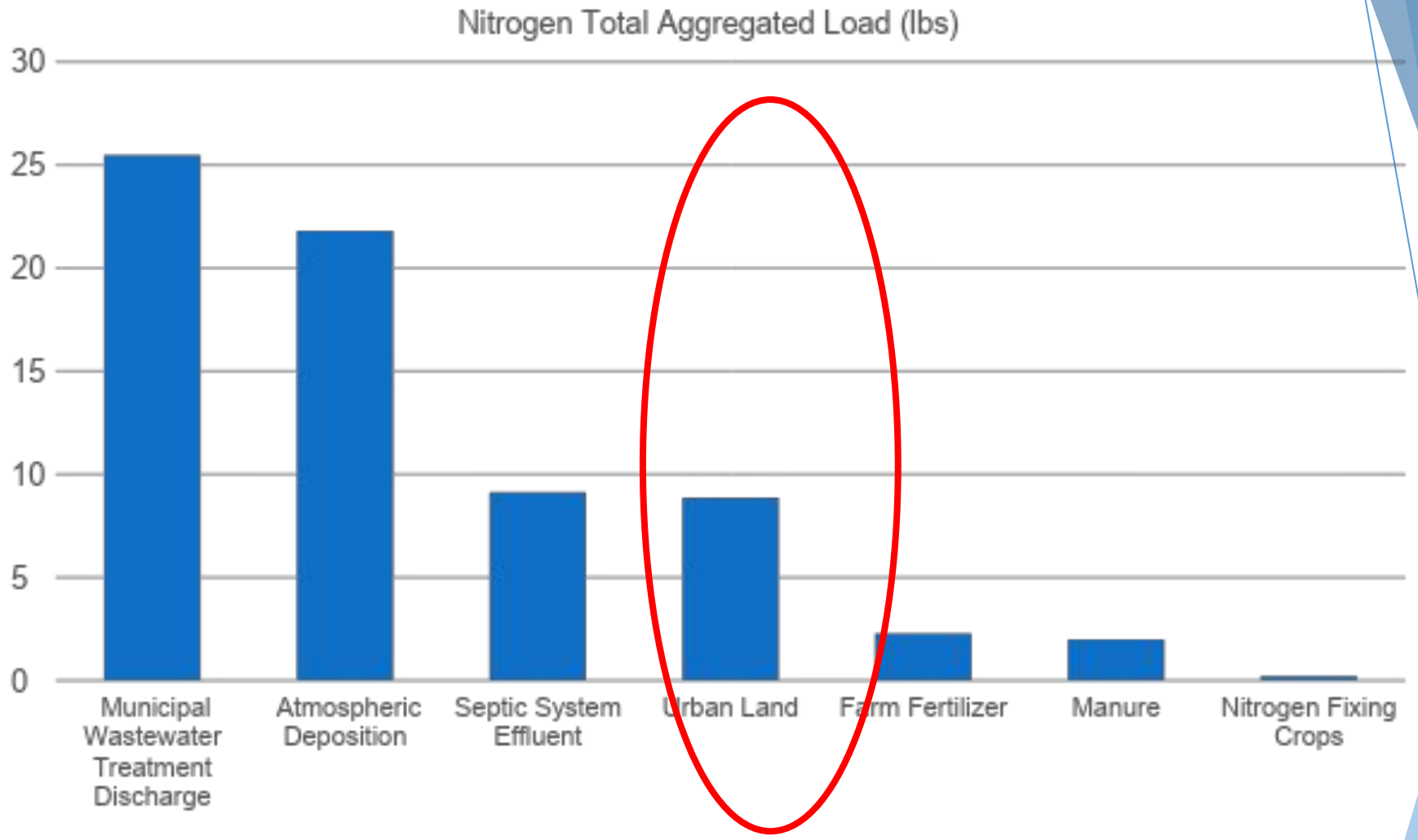

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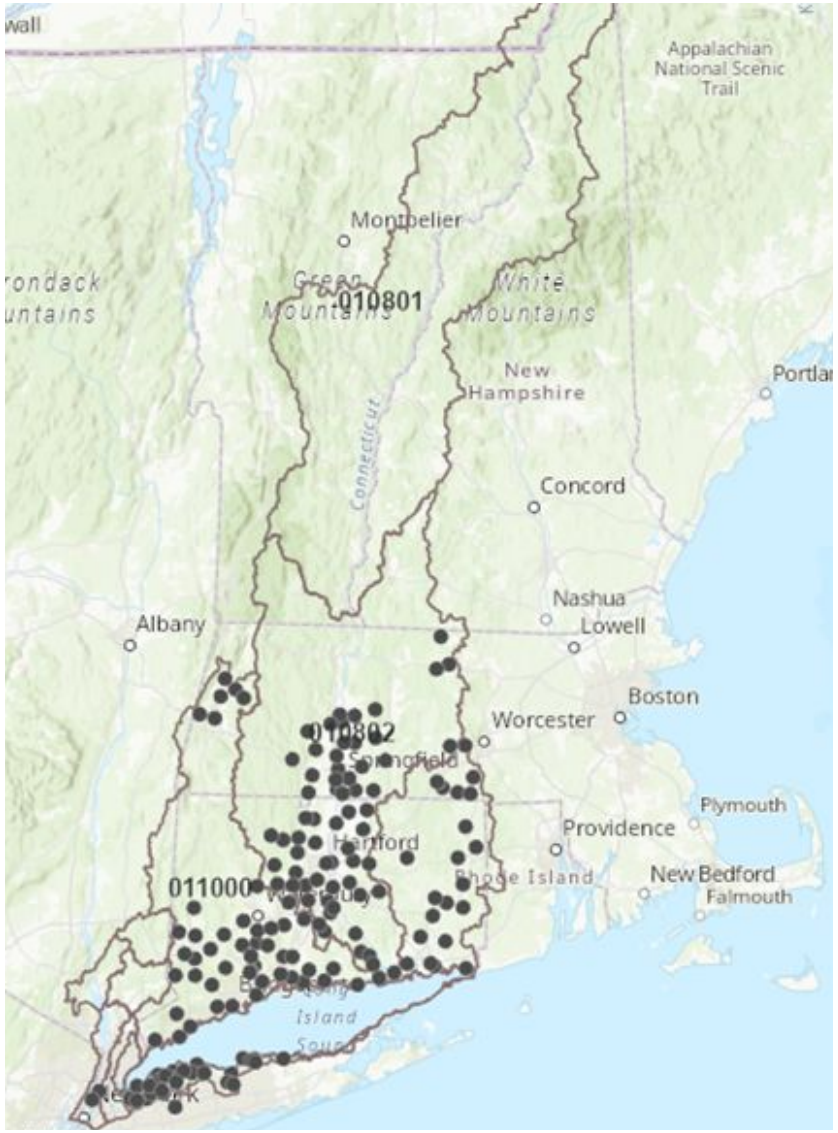

- Runoff from urban lands has historically contributed 12.7% of nitrogen and 7.8% of phosphorus to Long Island Sound.
- If urbanization and land conversion trends continue, more communities could become MS4 communities.
- **Upshot: MS4s could be a potential source of demand for nutrient credits in the future.**

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Question: What about transactions costs and alternatives to trading (opportunity costs)?

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Transactions Costs:

- Legal implications
- Uncertainty and risk
- Variability of credit market
- “Lumpiness” of investment in pollution control technology

Alternatives to Trading

- Cost of obtaining credits versus reducing pollution “in house”
- Costs of pollution control technology continues to decline
- Advances in pollution control technology: phosphorus capture?

Upshot: Given legal uncertainties, risk, and long-term planning horizons, coupled with the declining cost of pollution control per pound, credit prices would have to be very low to encourage trading.

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Summary of sources affecting potential demand

- Lack of a regulatory driver (-)
- Growth of urbanized areas (+)
- Technological advances in pollution control (-)
- Transactions costs and uncertainty (-)

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Factors Influencing Potential Supply

- Share of land cover in agriculture
- Shellfish and seaweed aquaculture
- Opportunity cost of installing BMPs
- Baseline
- Geographic restrictions

Question: What is the potential for supply from agriculture?

Photo credit: Joes Retirement Blog.
https://joesretirementblog.blogspot.com/

- The majority of acreage in farmland is located at some distance from Long Island Sound. This has implications for attenuation ratios.
- Agriculture is a small percentage of nitrogen and phosphorus discharge to the Sound.
- Opportunity cost of installing and maintaining BMPs.

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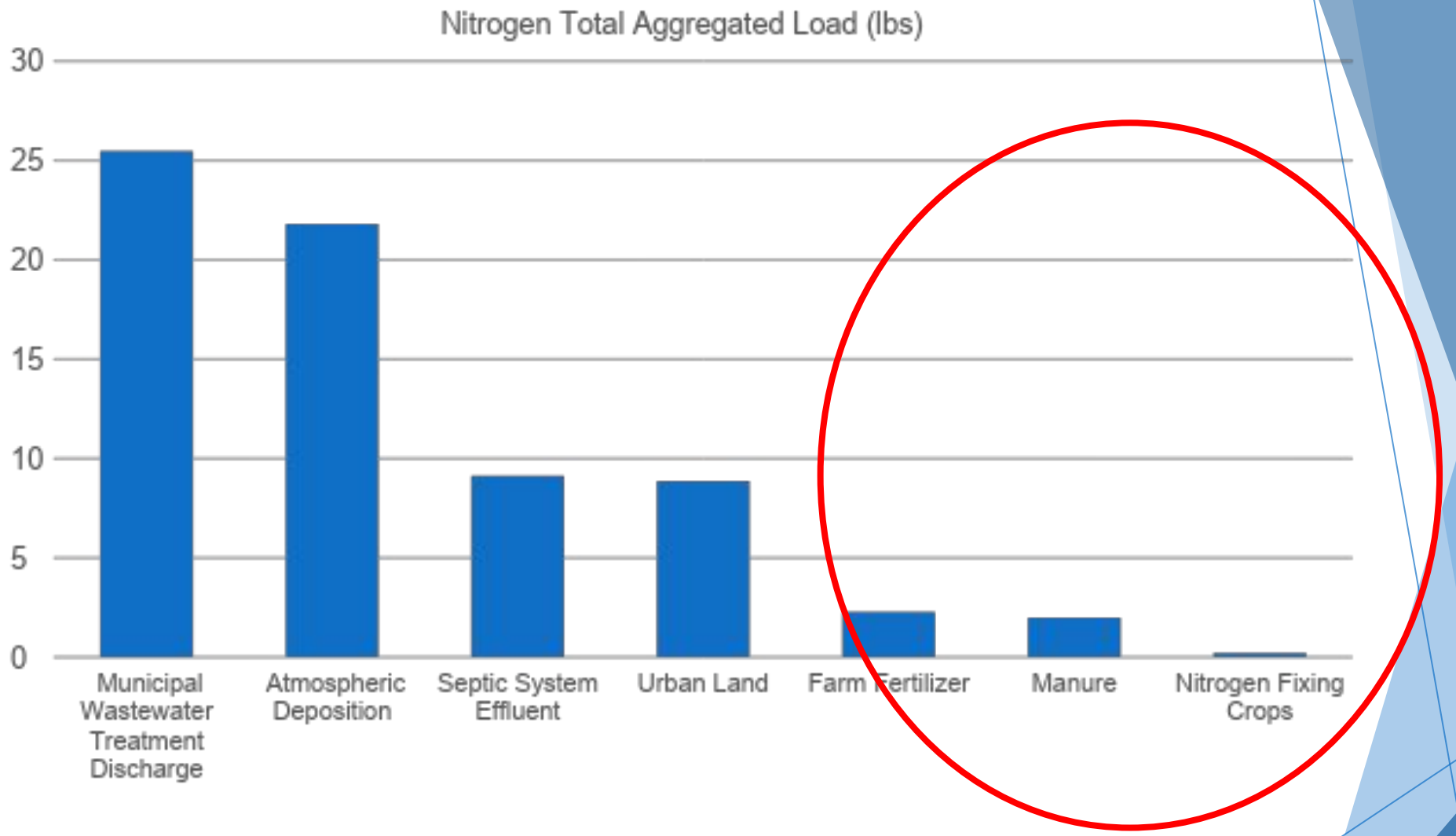

Sources of Nitrogen in the Long Island Sound watershed (United States Geological Survey, 2020)

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Question: What are the costs per pound of BMPs, and how do the costs of these strategies compare to the cost per pound of treatment facility upgrades?

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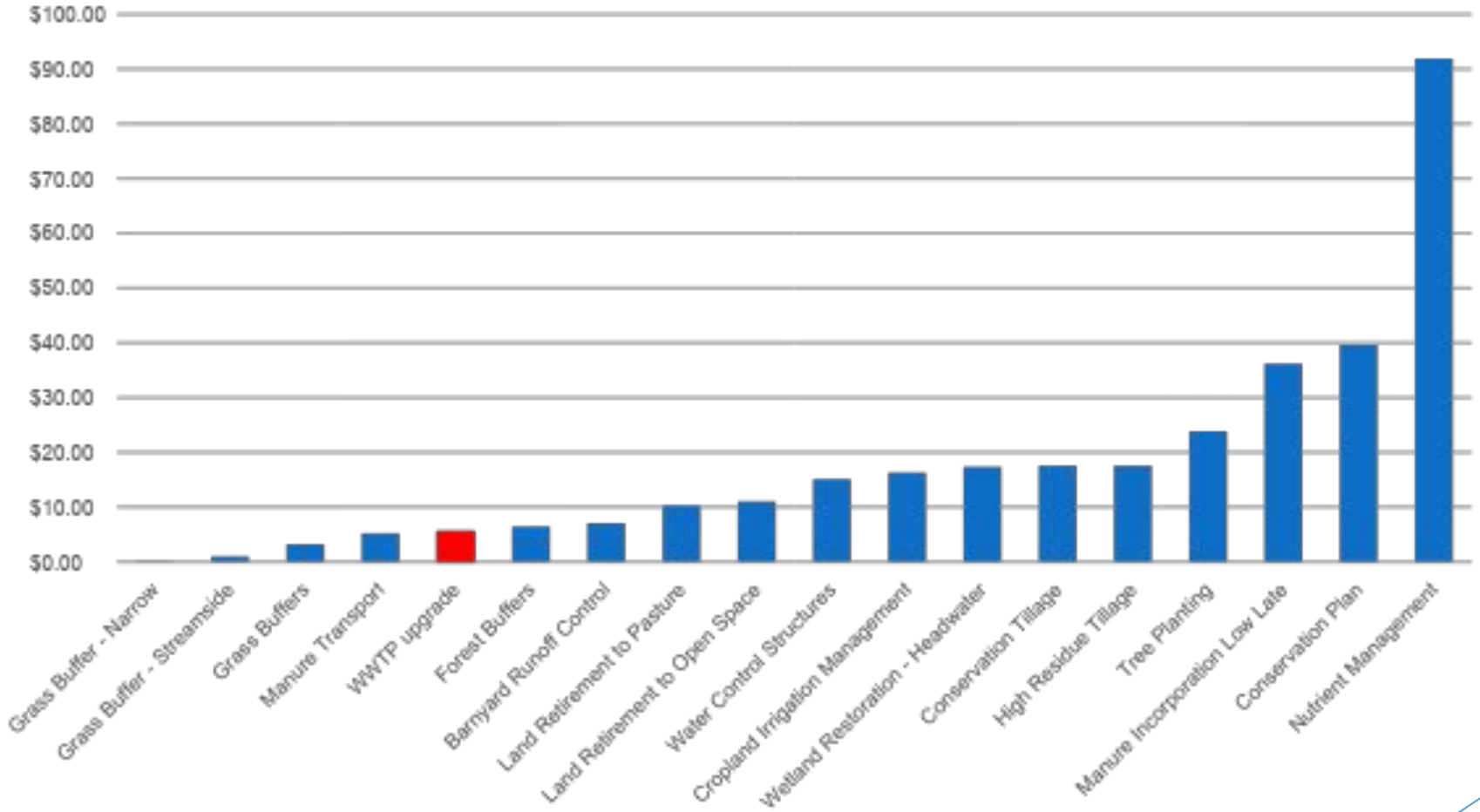
*Question: What are the costs per pound of BMPs for **nitrogen**, and how do the costs of these strategies compare to the cost per pound of treatment facility upgrades?*



Cost per pound of nitrogen removal. 2020 dollars. Note: Only those less than $100 per pound are included in the table. *(Source: Price et al, 2019)*

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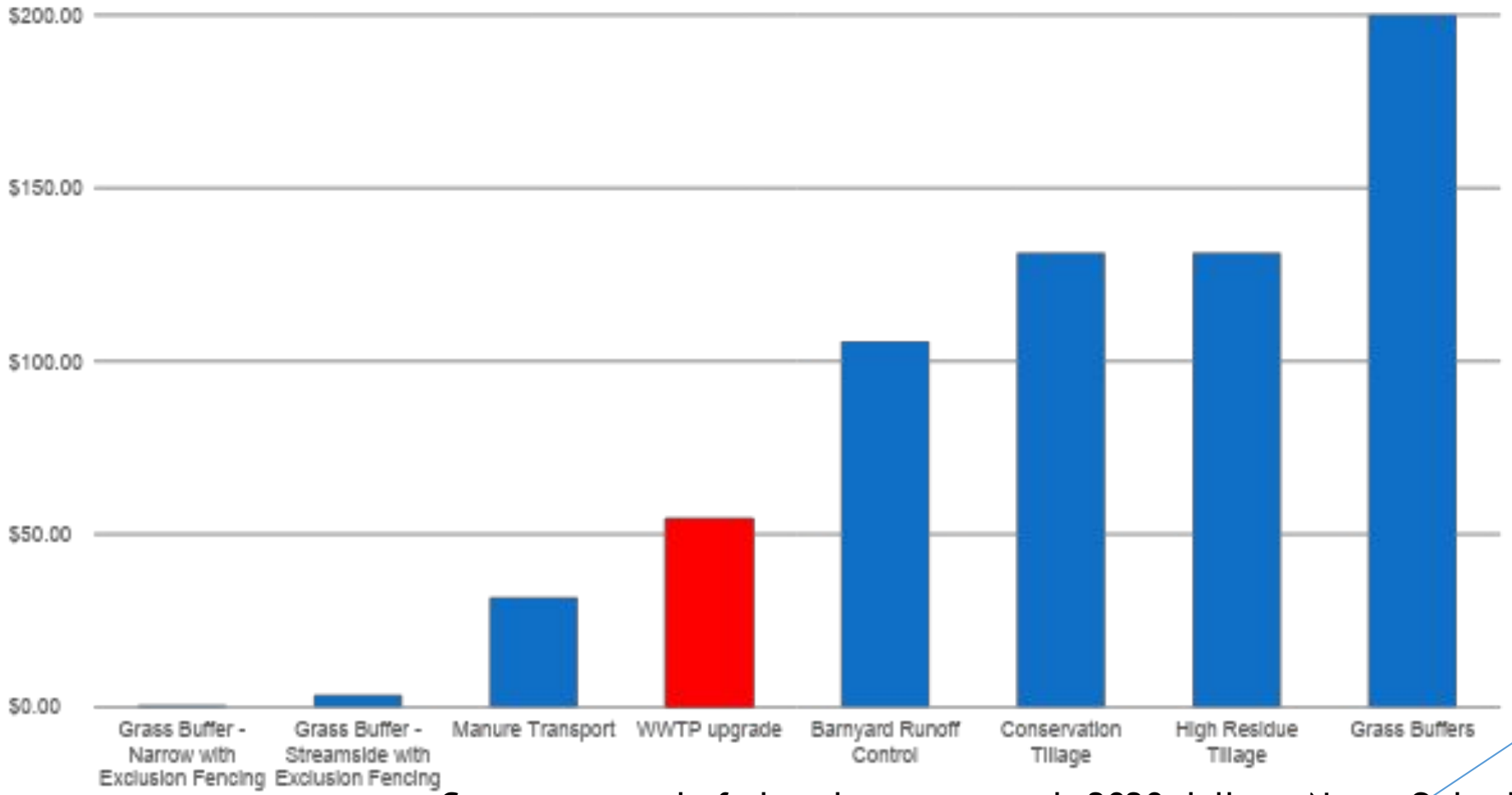

Cost per pound of phosphorus removal. 2020 dollars. Note: Only those less than $200 per pound are included in the table. *(Source: Price et al, 2019)*

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Question 5: What are the likely "wedges" between supply and demand?

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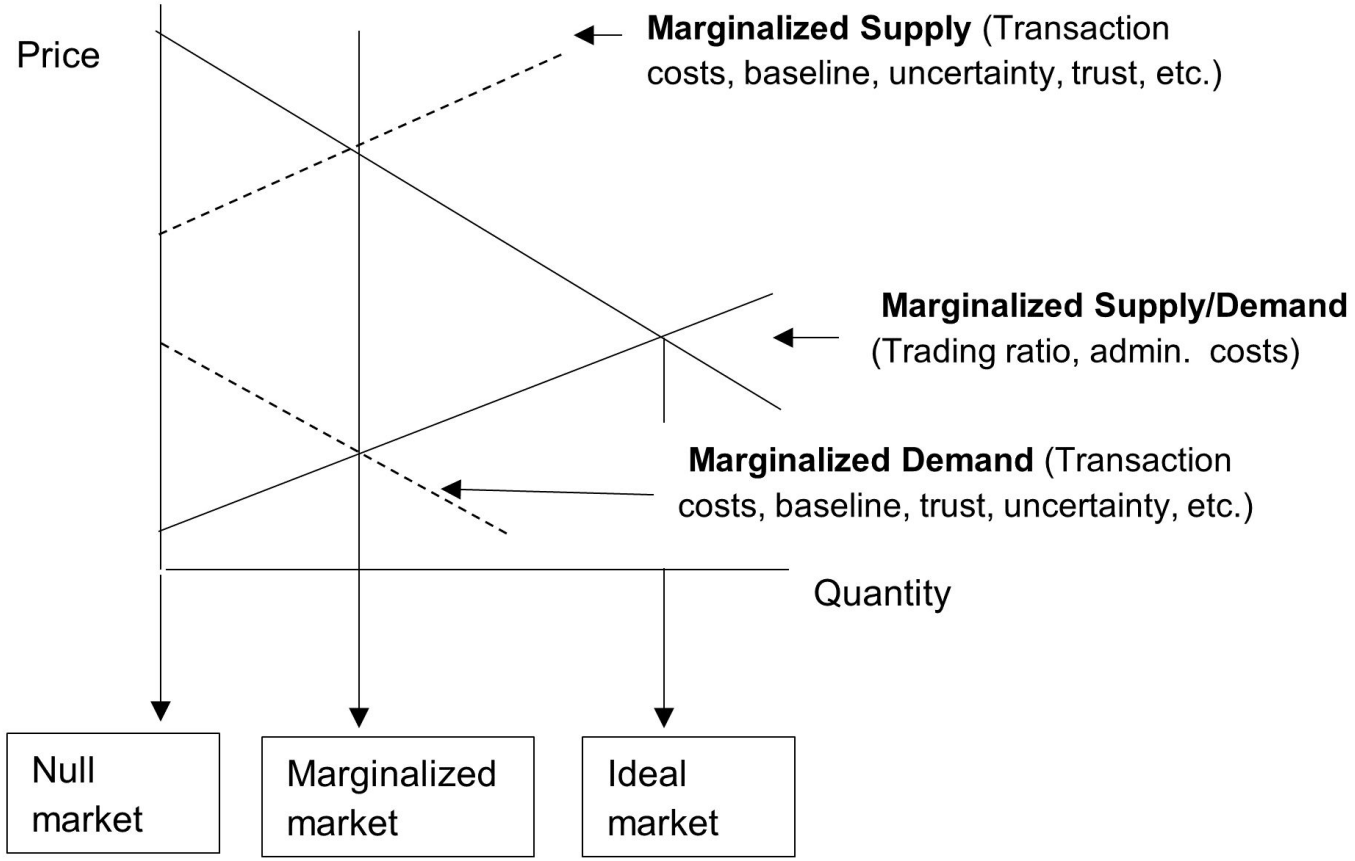
What are the likely "wedges" between supply and demand?



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(Source: Adapted from Hoag et al., 2017)

"Wedges" Between Supply and Demand

- Farmers' willingness to participate
- Trust and perceived fairness
- Administrative costs (regulatory design, credit creation, market transaction, monitoring and enforcement)
- Trading ratio
- Uncertainty

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Conclusions/Implications

- Under current conditions, potential for trading is marginal at best.
- Point sources generally meeting their allocated loads.
- In other trading schemes, demand seems to be the "limiting reagent" in any trades. Scenario seems to be similar here.
- Supply is a wildcard – we don't know how much potential supply is out there without a comprehensive survey of farms / MS4s to determine how much they are discharging, what kind of BMPs are in place (if any), and what reductions are possible.
- We also don't know how willing the "sellers" are going to be.
- Interstate trading has never arisen in the Chesapeake Bay. Not likely to be politically viable, even if it were ecologically sound (also not likely).
- Personally (and this is an opinion, rather than something I can demonstrate), stormwater may be the best bet for trading, rather than ag. But there's a **difference between economically viable and ecologically viable**.

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THANK YOU!

- More information, including reports from all the project members, are at: https://neiwpcc.org/our-programs/assessment-and-research/lis_nutrient_trading_study/

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