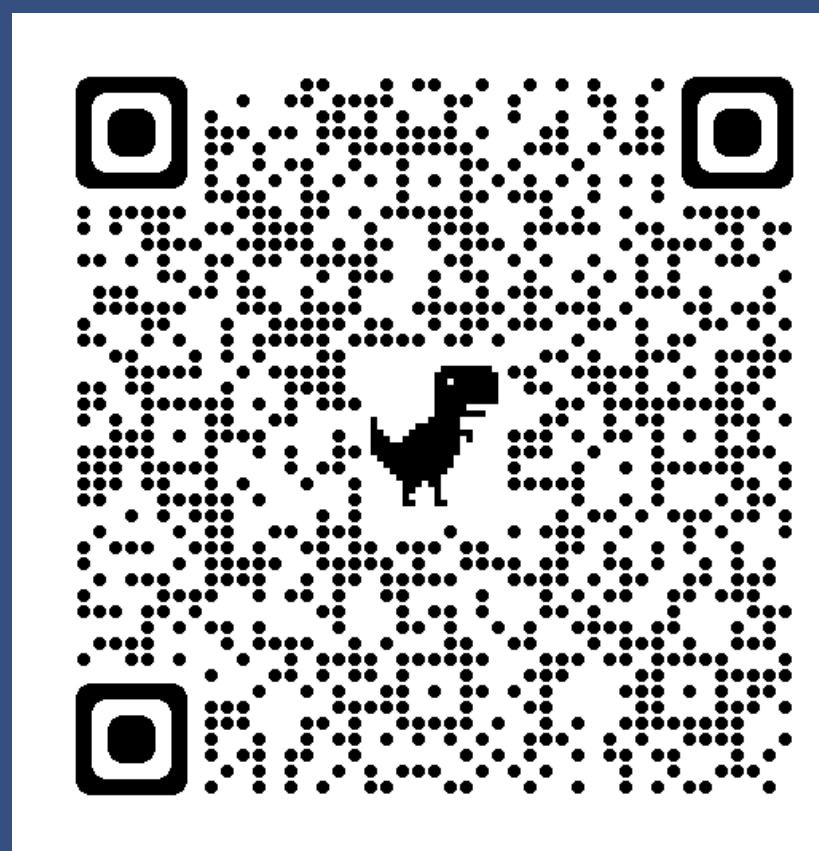


Social and Economic Factors Affecting the Attainment of Aquatic Life Uses in the Delaware River Estuary

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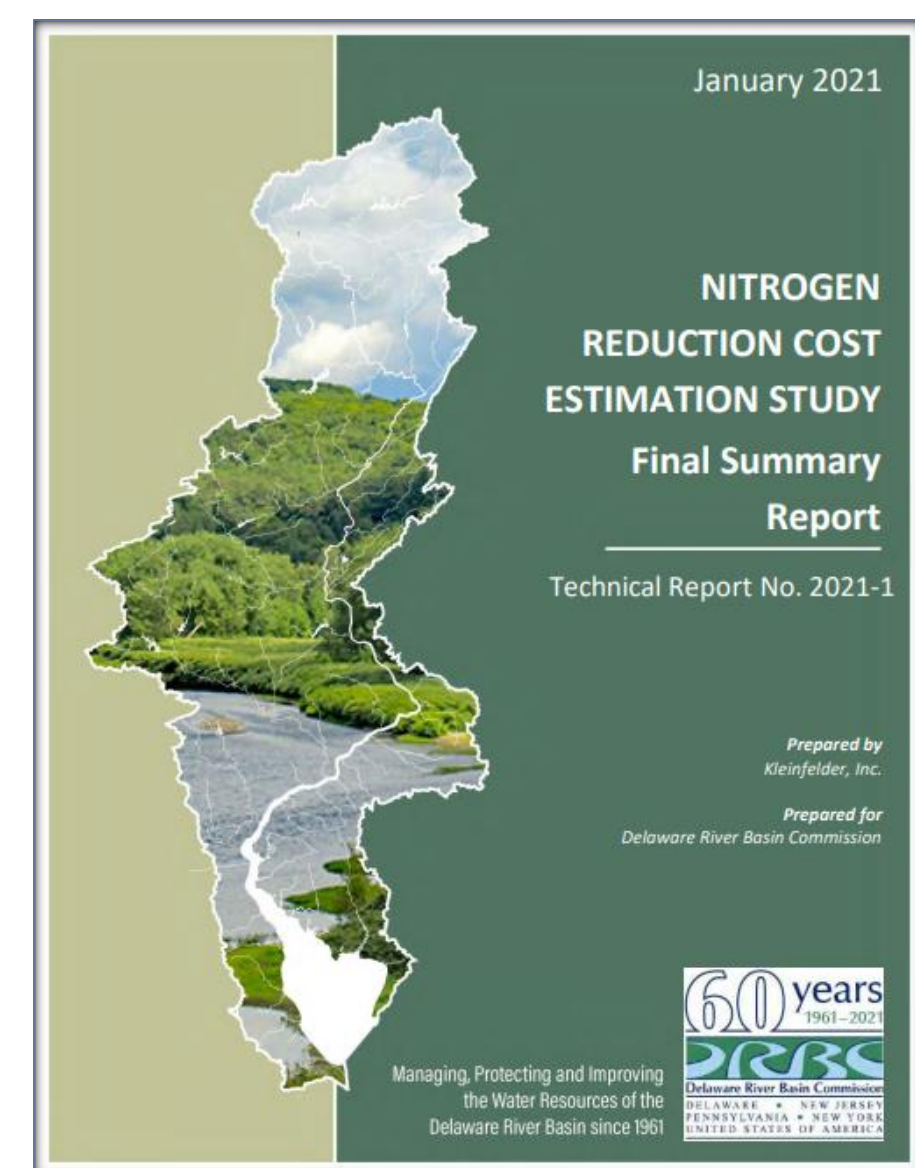


ABSTRACT

On September 30, 2022, the Delaware River Basin Commission (DRBC) issued a draft Analysis of Attainability documenting that the addition of technically feasible advanced treatment to reduce effluent ammonia nitrogen levels by nine major wastewater treatment plants discharging to the Estuary will significantly improve the level of dissolved oxygen that can be achieved, and that water quality supporting the aquatic life use of “fish propagation” is attainable throughout the Estuary. As part of the overall evaluation, DRBC evaluated the social and economic factors affecting the attainment of uses as required in DRBC Resolution No. 2017-4. DRBC computed metrics developed by the EPA and by the utility industry (AWWA) to assess the affordability of new proposed effluent levels for ammonia nitrogen. This poster will provide a detailed review of the metrics and overall assessment of the social and economic factors affecting the attainment of uses.

BACKGROUND

DRBC commissioned a Nitrogen Reduction Cost Estimation Study completed by Kleinfelder and published in 2021. In this study, Kleinfelder developed planning level cost estimates for the achievement of four new levels of effluent ammonia and total nitrogen concentrations for the Tier 1 (top 95% load of ammonia) wastewater treatment plants discharging to the Delaware River Estuary.



Annualized Cost in 2019 (Million \$ / year)

Utility	New Effluent Concentration			Total Nitrogen 4 mg/L
	Ammonia 10 mg/L	Ammonia 5 mg/L	Ammonia 1.5 mg/L	
Wilmington	6	20	26	49
CCMUA	12	15	18	35
City of Trenton	0.1	2	3	6
Hamilton Twp WPCF	3	4	4	7
Willingboro WPCF	0	0	2	3
DELCORA	4	11	14	27
Morrisville	2	2	3	5
LBCJMA	2	2	2	5
GCUA	3	4	5	11
PWD	32	50	84	179

OBJECTIVES

Objectives of this work included:

- Assess the social and economic factors affecting the attainment of aquatic life uses in the Delaware River Estuary.
- Satisfy the requirements outlined in Resolution 2017-4.
- Provide information to decision makers on the affordability of wastewater treatment processes to achieve new dissolved oxygen standards.

ACKNOWLEDGMENTS

Special thanks to everyone who provided careful review and insightful comments including the Environmental Finance Center at the University of Maryland, Tier 1 dischargers, the Water Quality Advisory Committee, and DRBC staff including Steve Tambini, Pam Bush, Namsoo Suk, Thomas Amidon, and Beth Brown.

METHODS

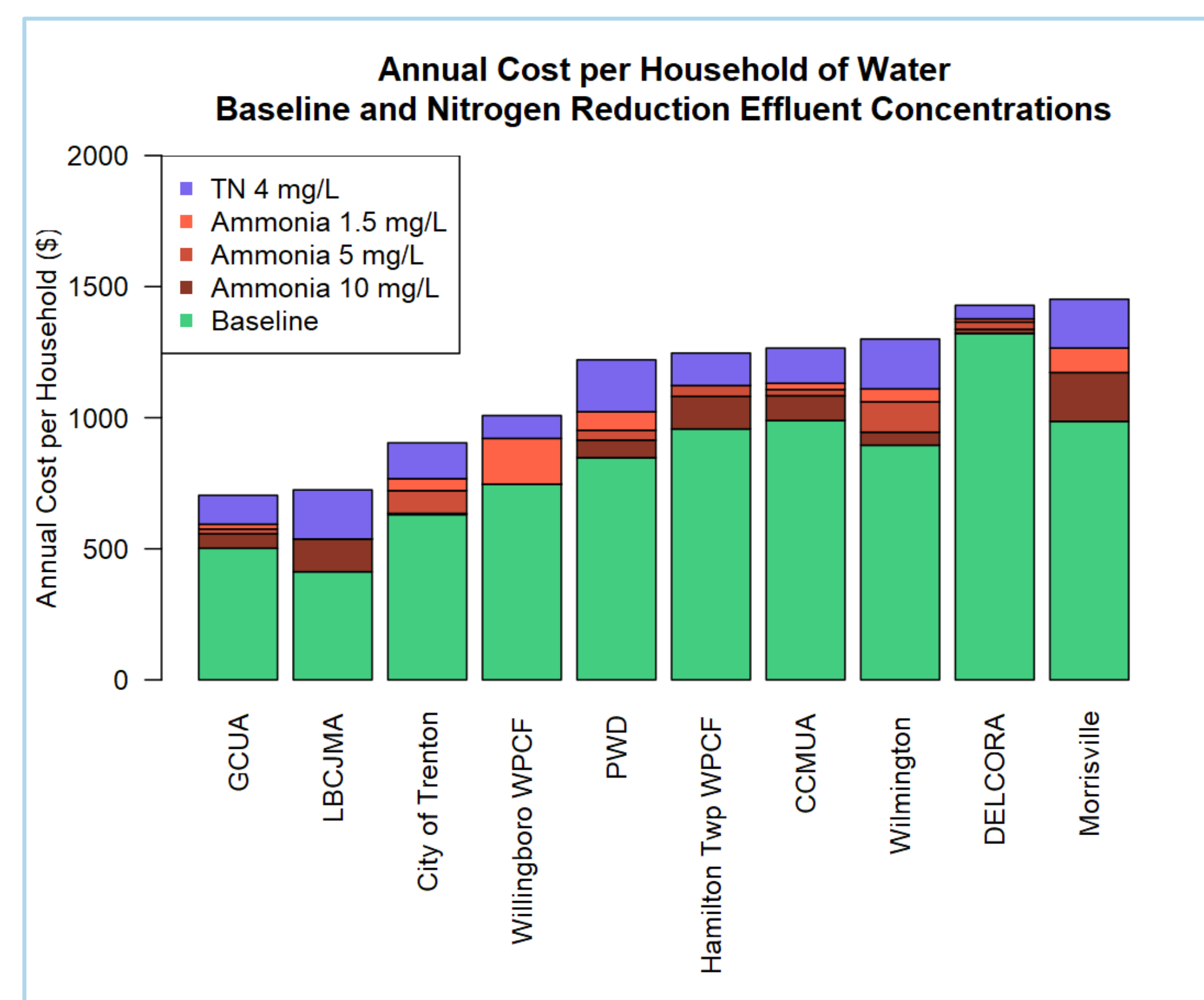
Two guidance documents were utilized to evaluate the social and economic impact of these potential costs on the affected communities.

- EPA. Proposed 2022 Clean Water Act Financial Capability Assessment Guidance. February 2022.
- AWWA et al. Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector. April 17, 2019.

Although numerous metrics were evaluated as part of the overall socio-economic evaluation, two key resulting affordability metrics are presented: the Household Affordability (HA) metric from the AWWA guidance and the Residential Indicator (RI) from the EPA guidance. These two metrics allow for the comparison of different future scenarios to each other and to the Baseline. All results are presented by utility service area. Final costs to taxpayers or rate payers will depend upon many factors, including the availability and use of federal, state and local programs that can improve affordability for utilities, communities, and individual households.

RESIDENTIAL INDICATOR RESULTS

Key indicators were computed comparing cost per household for the baseline (current costs) to each of the 4 possible alternative improved effluent concentrations.



PWD costs were estimated for each of 3 treatment plants (SW, SE, NE) and aggregated

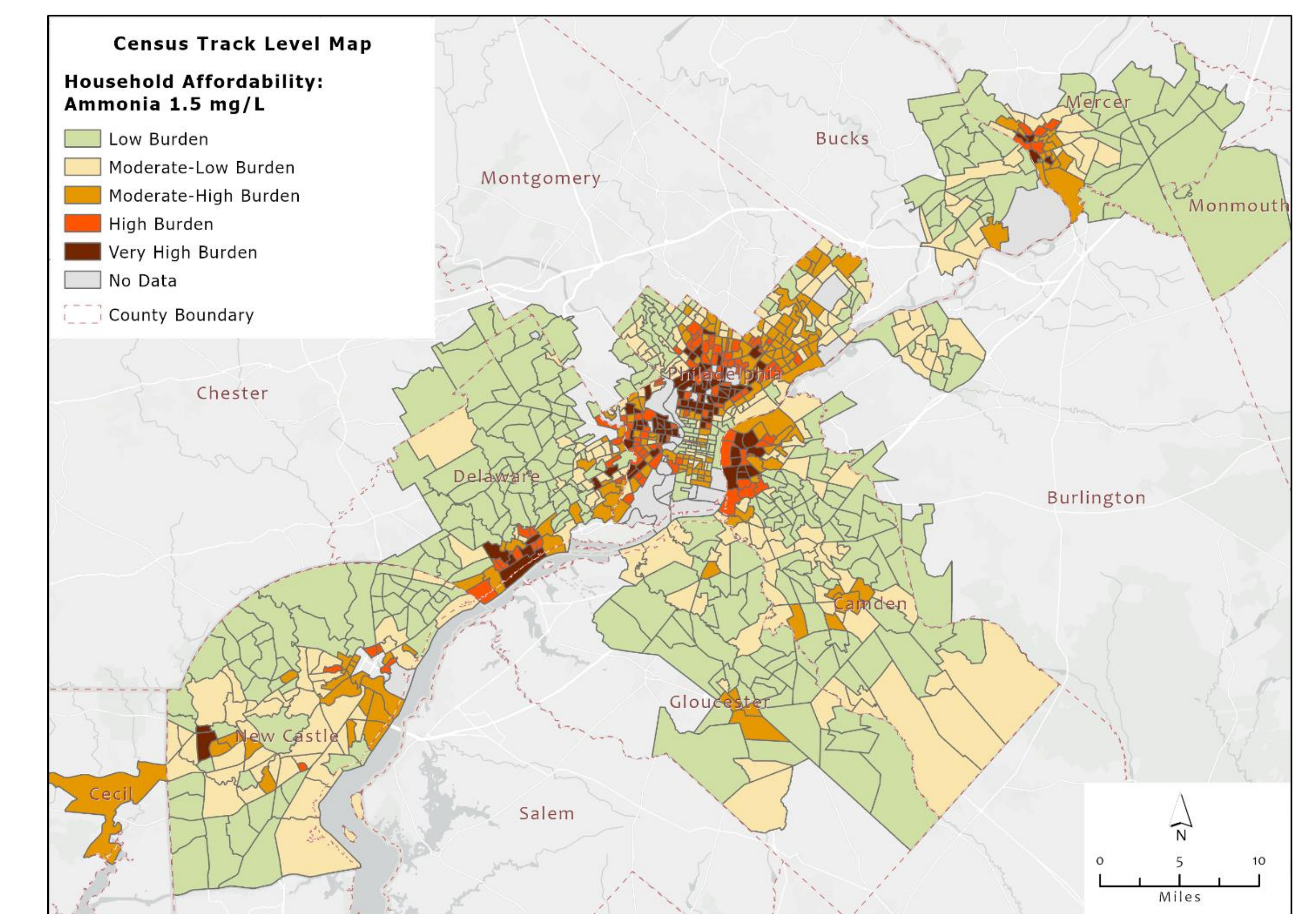
Residential Indicator Score (EPA)

Utility	Baseline	Ammonia 10 mg/L	Ammonia 5 mg/L	Ammonia 1.5 mg/L	Total Nitrogen 4 mg/L
CCMUA	MID-RANGE	MID-RANGE	MID-RANGE	MID-RANGE	MID-RANGE
City of Trenton	MID-RANGE	MID-RANGE	MID-RANGE	MID-RANGE	HIGH
DELCORA	MID-RANGE	MID-RANGE	MID-RANGE	MID-RANGE	MID-RANGE
GCUA	LOW	LOW	LOW	LOW	LOW
Hamilton Twp WPCF	MID-RANGE	MID-RANGE	MID-RANGE	MID-RANGE	MID-RANGE
LBCJMA	LOW	LOW	LOW	LOW	LOW
Morrisville	LOW	LOW	LOW	MID-RANGE	MID-RANGE
PWD	MID-RANGE	MID-RANGE	MID-RANGE	MID-RANGE	HIGH
Willingboro WPCF	LOW	LOW	LOW	MID-RANGE	MID-RANGE
Wilmington	MID-RANGE	MID-RANGE	MID-RANGE	MID-RANGE	MID-RANGE

HOUSEHOLD AFFORDABILITY SCORE

Household Affordability Score (AWWA)

Utility Name	Baseline	Ammonia 10 mg/L	Ammonia 5 mg/L	Ammonia 1.5 mg/L	Total Nitrogen 4 mg/L
CCMUA	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden
City of Trenton	Moderate-High Burden	Moderate-High Burden	Moderate-High Burden	Moderate-High Burden	Moderate-High Burden
DELCORA	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden
GCUA	Low Burden	Low Burden	Low Burden	Low Burden	Low Burden
Hamilton Twp WPCF	Low Burden	Low Burden	Low Burden	Low Burden	Low Burden
LBCJMA	Low Burden	Low Burden	Low Burden	Low Burden	Low Burden
Morrisville	Low Burden	Low Burden	Low Burden	Low Burden	Low Burden
PWD	Moderate-High Burden	Moderate-High Burden	Moderate-High Burden	Moderate-High Burden	High Burden
Willingboro WPCF	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden
Wilmington	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden	Moderate-Low Burden



CONCLUSIONS

The combined total annualized cost for the wastewater improvements recommended in DRBC’s Analysis of Attainability equals \$153M/yr in 2019 dollars, which includes the annualized present worth of \$2.6B of capital investment as well as annual operation and maintenance. For the Highest Attainable Dissolved Oxygen scenario (AA08), neither indicator shows a change to the burden category compared to the Baseline. While significant costs are associated with evaluated wastewater upgrades, and these costs are assumed to be distributed among ratepayers, the associated increase to ratepayers is not enough to increase the baseline burden category, as defined by either guidance document, to a higher category.