

Additional Monitoring Evaluation for Delaware Estuary Point Discharges

Eutrophication Model Expert Panel Meeting

July 25 & 26, 2017



Delaware River Basin Commission

DELAWARE • NEW JERSEY
PENNSYLVANIA • NEW YORK
UNITED STATES OF AMERICA

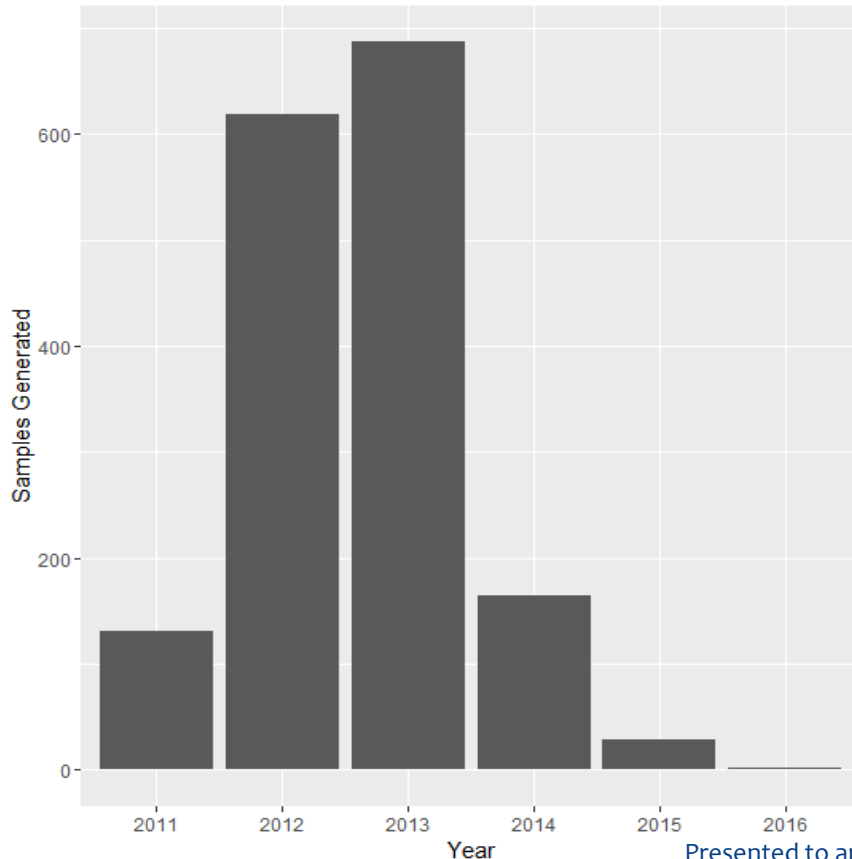
Presented to an advisory committee of the DRBC on August 24, 2017.
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Previous Point Discharge Monitoring

- * Facilities < 1 MGD: quarterly for 2 years (28 facilities)
- * Facilities > 1 MGD: monthly for 2 years (55 facilities) for:
 - * Phosphorus: Total Phosphorus, Soluble Reactive Phosphorus (SRP)
 - * Nitrogen: Ammonia, NO₃, NO₂, TKN, SKN
 - * BOD₅, CBOD₅, BOD₂₀
 - * Discharge flow (Q), Temperature, D.O., Conductivity, pH
 - * Ultimate BOD (UBOD) by the 21 discharges with largest BOD loads twice (1 summer, 1 winter)

DRBC Effluent Nutrient Data Set

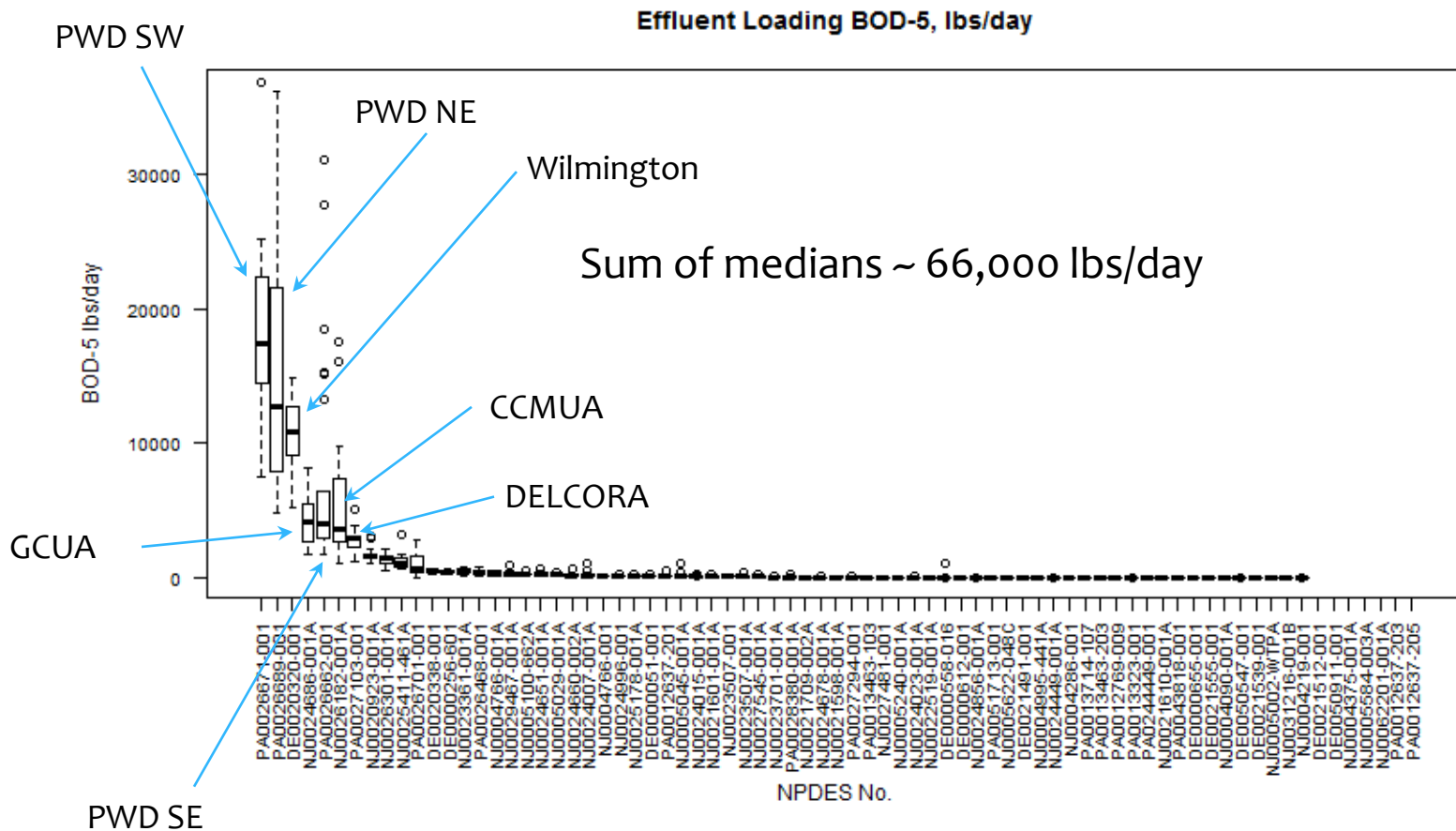
Sample Sets per Year, Point Discharge Nutrient Data



- * 71 facilities discharging to estuary
- * Also looked at AEMR and ICIS data sets
- * this data set is more complete

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BOD5 Loadings (lbs/day)



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Additional Monitoring in 2018-2019

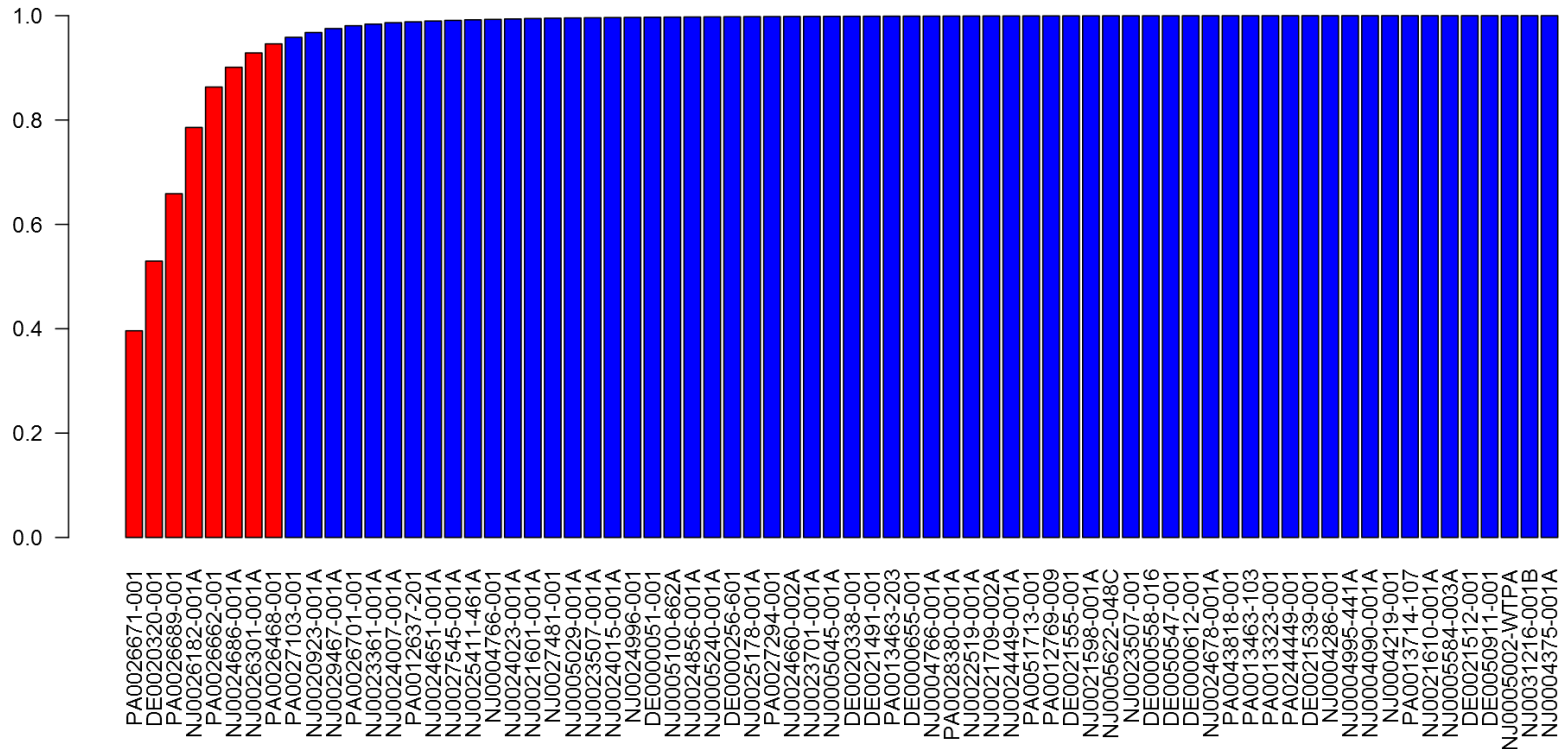
- * Need some additional monitoring in 2018 and 2019
 - * Concurrent with enhanced ambient monitoring
 - * Concurrent with model calibration period
- * One recommendation for intensive monitoring as per Chesapeake Bay TMDL
- * Selection process description and proposed parameters

Steps for Additional Monitoring Evaluation

- * Prioritization of Parameter Groups
 1. Ammonia, TKN, BOD₅
 2. Phosphorus, SRP, Nitrate, TN
- * Identify facilities contributing 95% cumulative point discharge load for 1. and 2.
- * Plot by RM
- * Recommendations for 3 tiers of monitoring intensity:
 - * Twice per week
 - * Once per week
 - * Once per month

Ammonia Incremental Cumulative Load

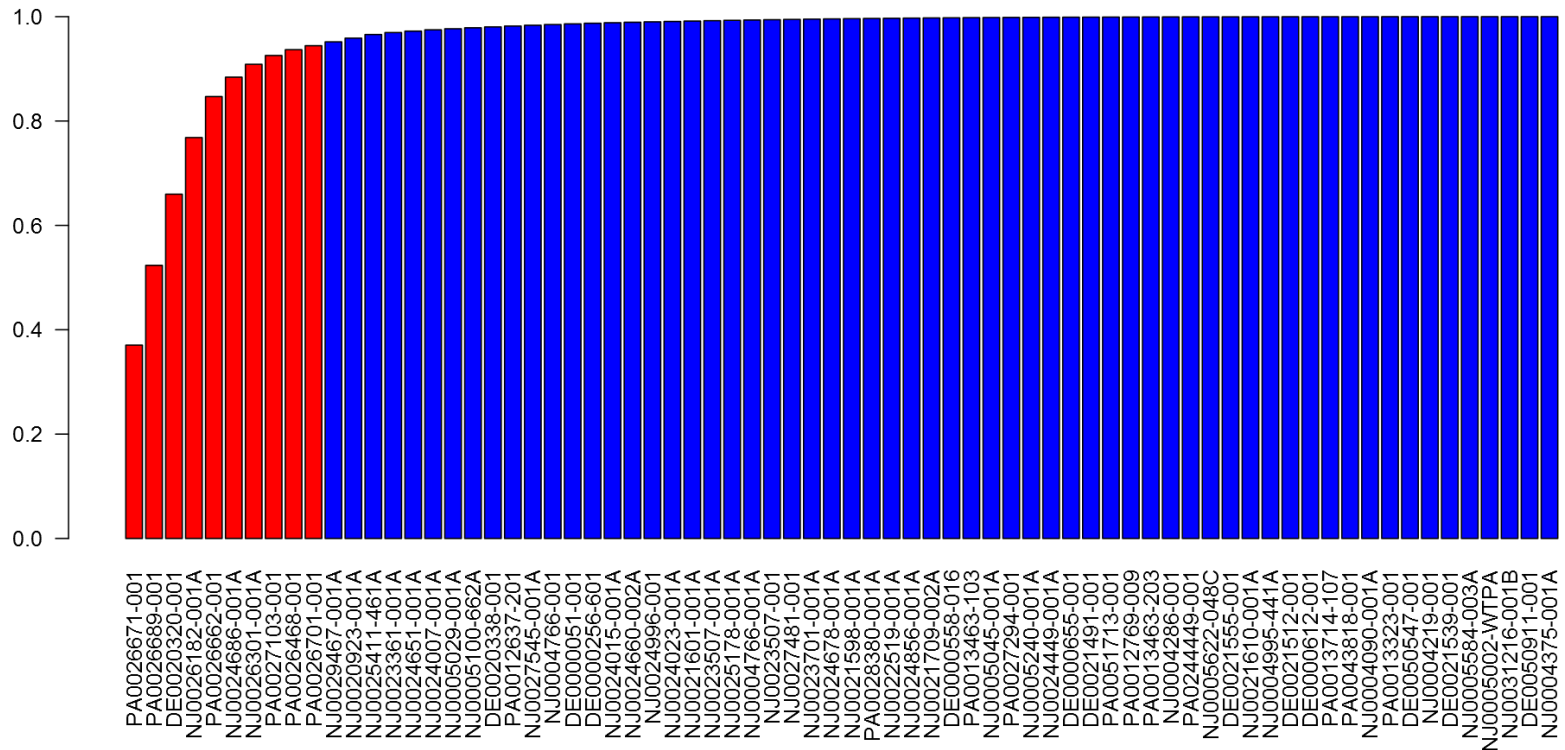
Incremental Cumulative Load NH3 - Ammonia, whole water



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TKN Incremental Cumulative Load

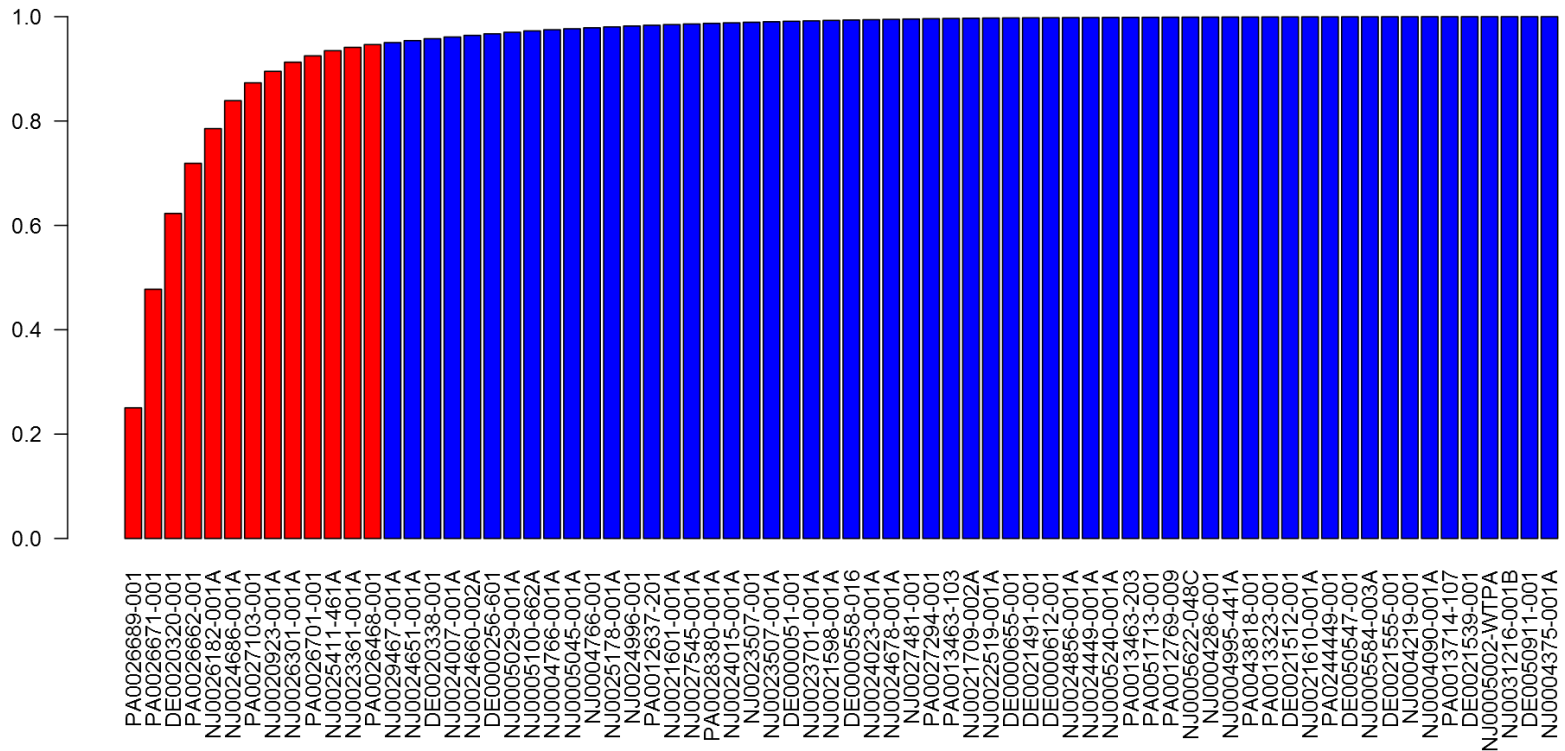
Incremental Cumulative Load TKN - Total Kjeldahl Nitrogen



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BOD₅ Incremental Cumulative Load

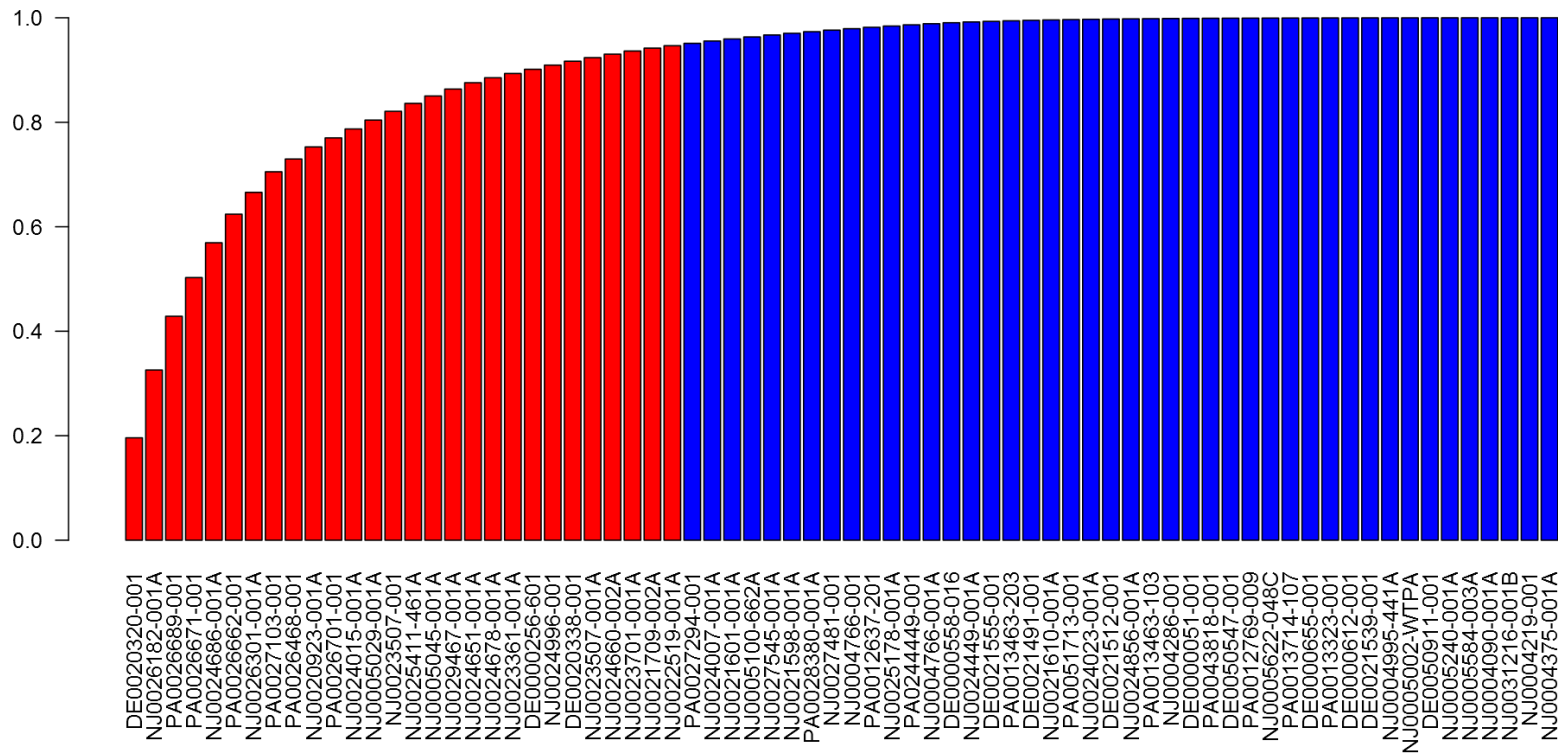
Incremental Cumulative Load BOD-5



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Phosphorus Incremental Cumulative Load

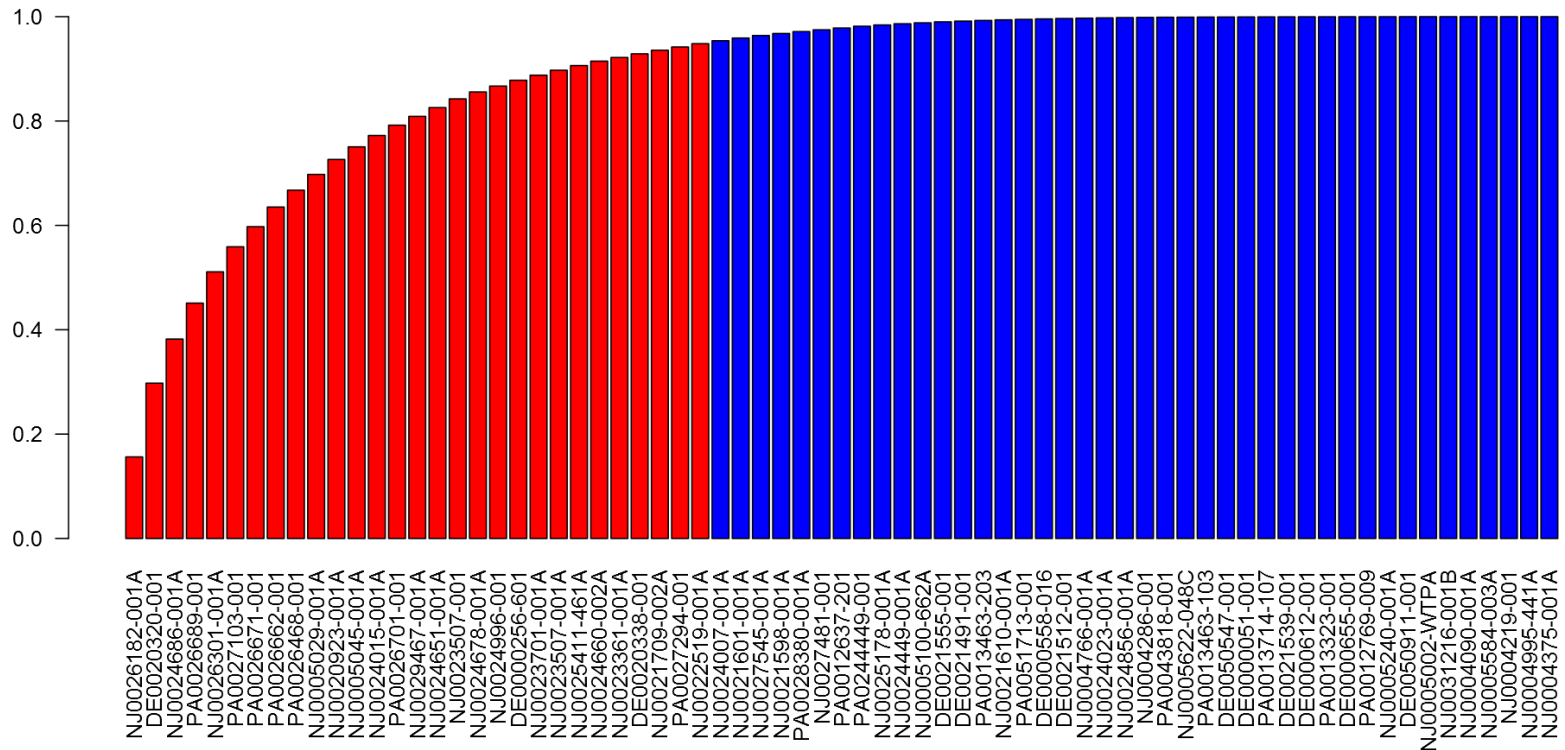
Incremental Cumulative Load TP - Total Phosphorus



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SRP Incremental Cumulative Load

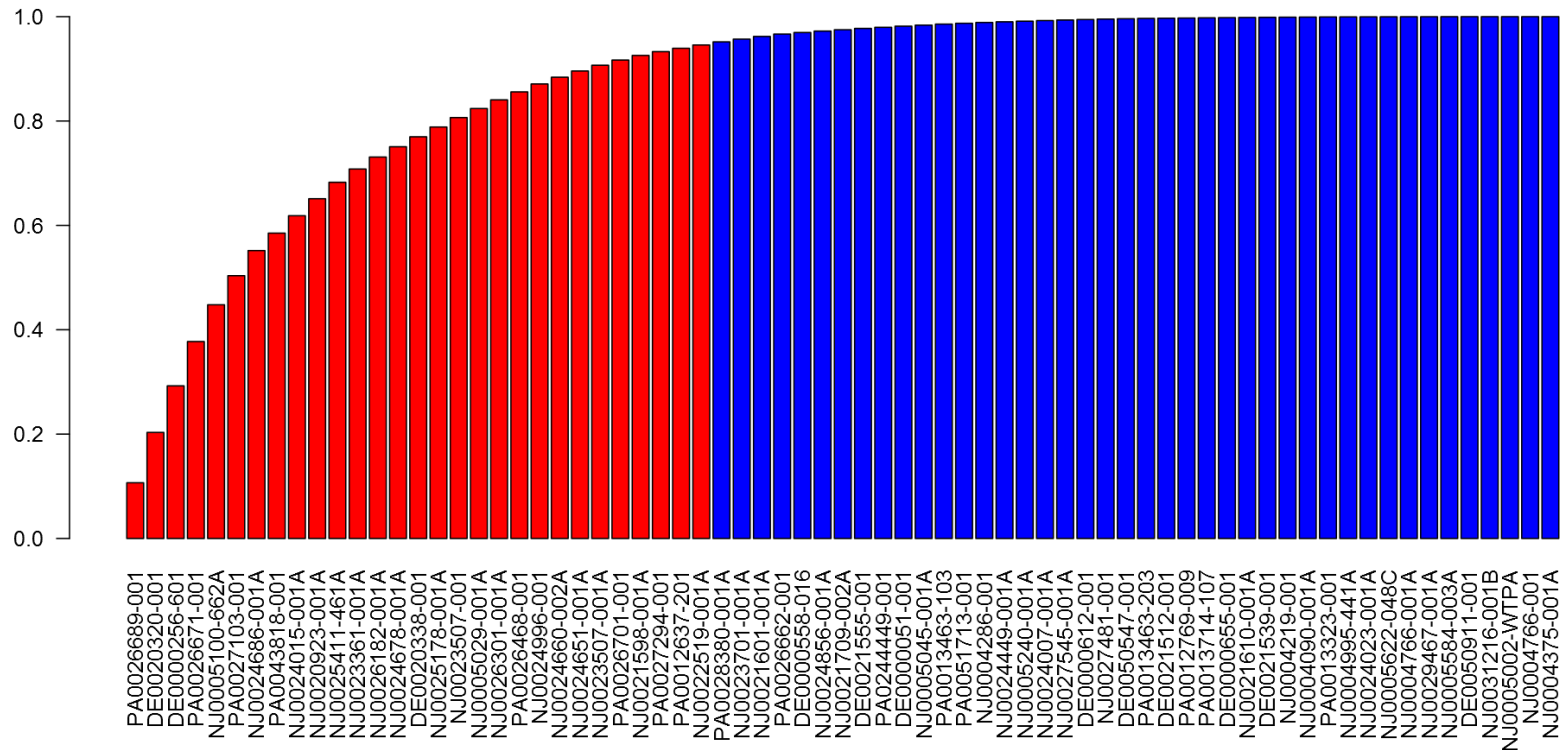
Incremental Cumulative Load SRP - Soluble Reactive Phosphorus, filtered sample



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Nitrate Incremental Cumulative Load

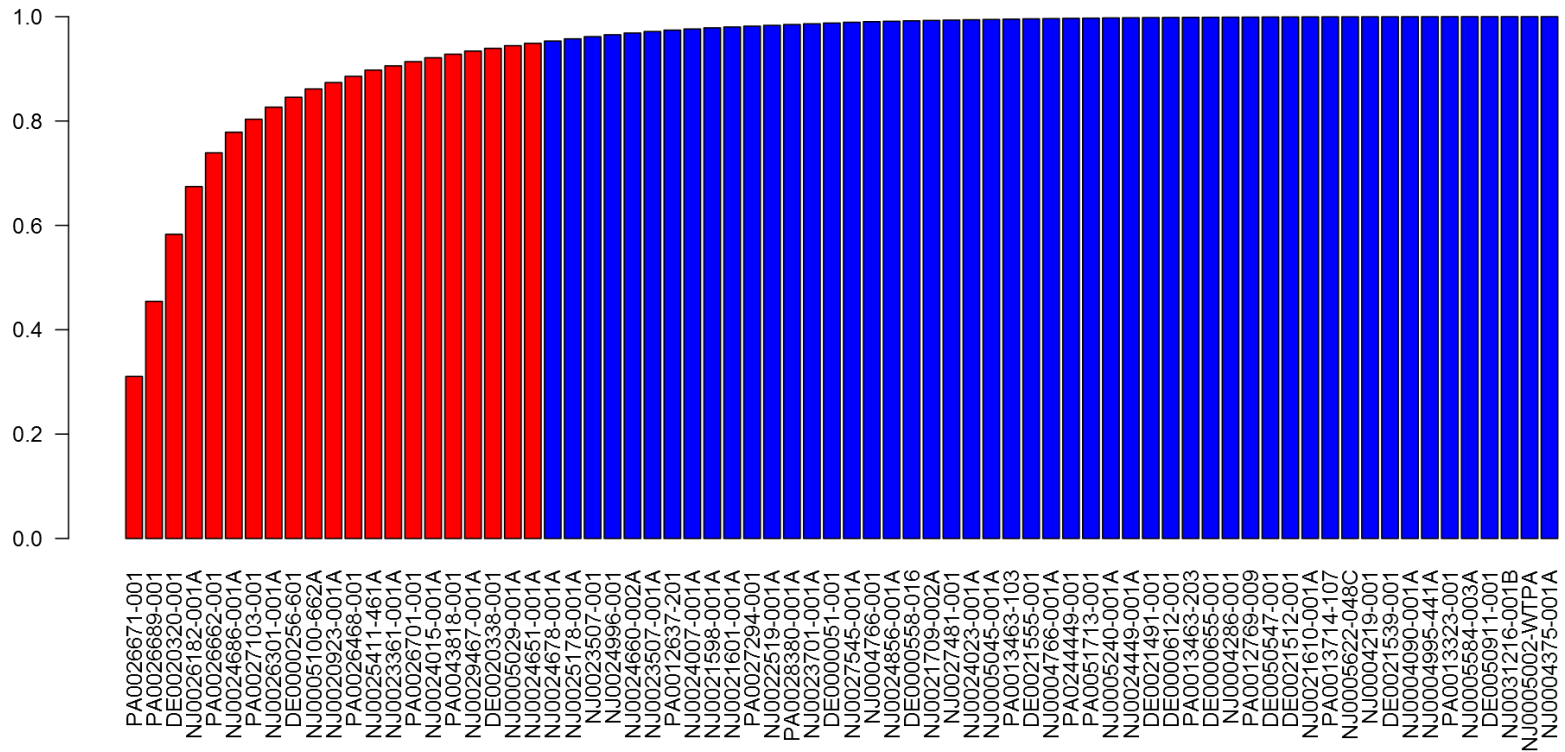
Incremental Cumulative Load NO3 - Nitrate, whole water



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Total Nitrogen Incremental Cumulative Load

Incremental Cumulative Load Total Nitrogen



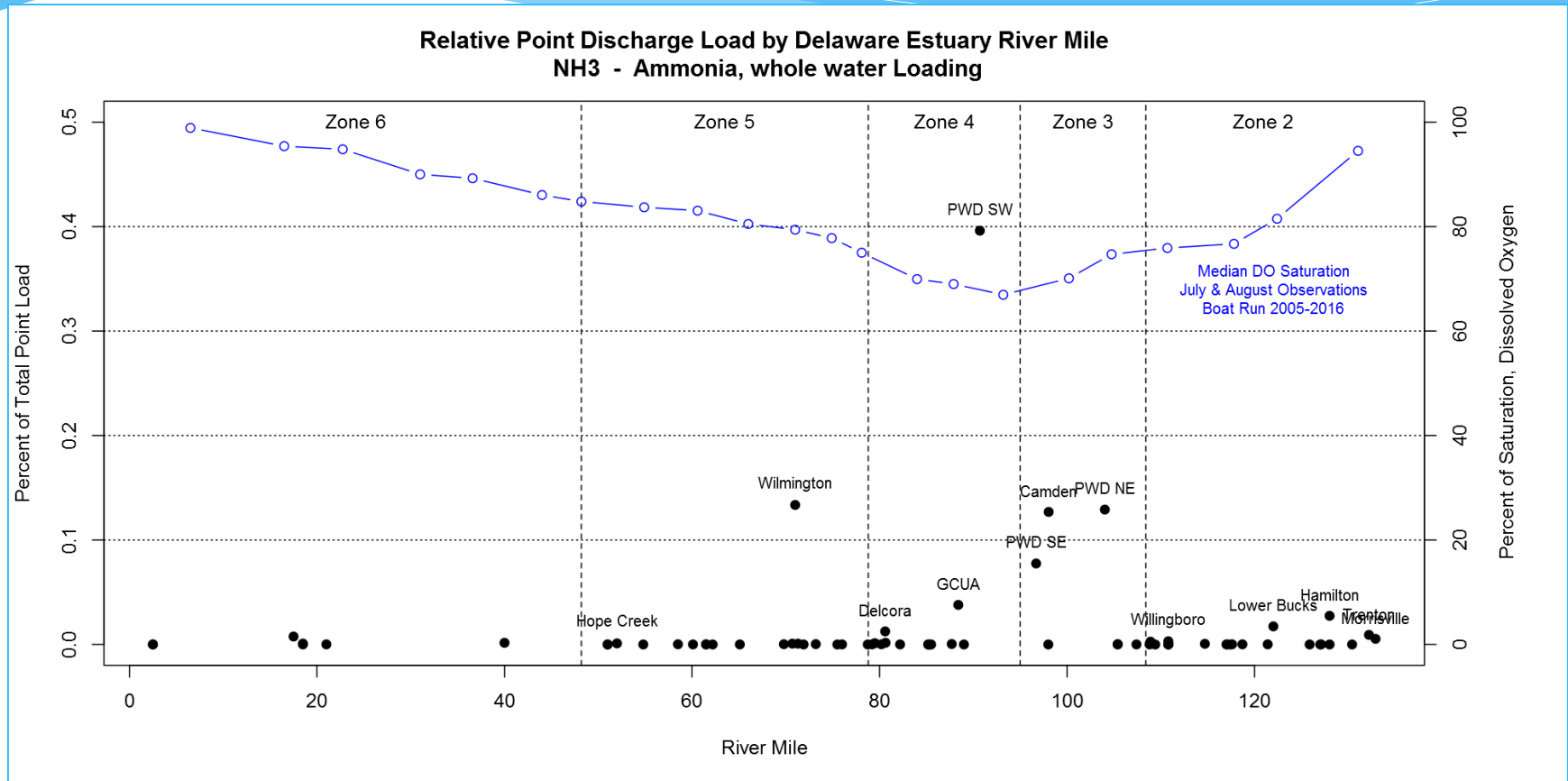
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List for Twice per Week Monitoring

| NPDES | Name |
|----------------|---|
| PA0026671-001 | PWD Southwest |
| DE0020320-001 | City of Wilmington |
| PA0026689-001 | PWD Northeast |
| NJ0026182-001A | Delaware #1 Water Pollution Control Facility (Camden) |
| PA0026662-001 | PWD Southeast |
| NJ0024686-001A | GCUA |
| NJ0026301-001A | Hamilton TWP WPCF |
| PA0026468-001 | Lower Bucks County Joint Municipal Authority |
| PA0027103-001 | Delcora |
| PA0026701-001 | Morrisville Borough Municipal Authority |
| NJ0020923-001A | Trenton Sewer Utility |
| NJ0023361-001A | Willingboro Water Pollution Control Plant |

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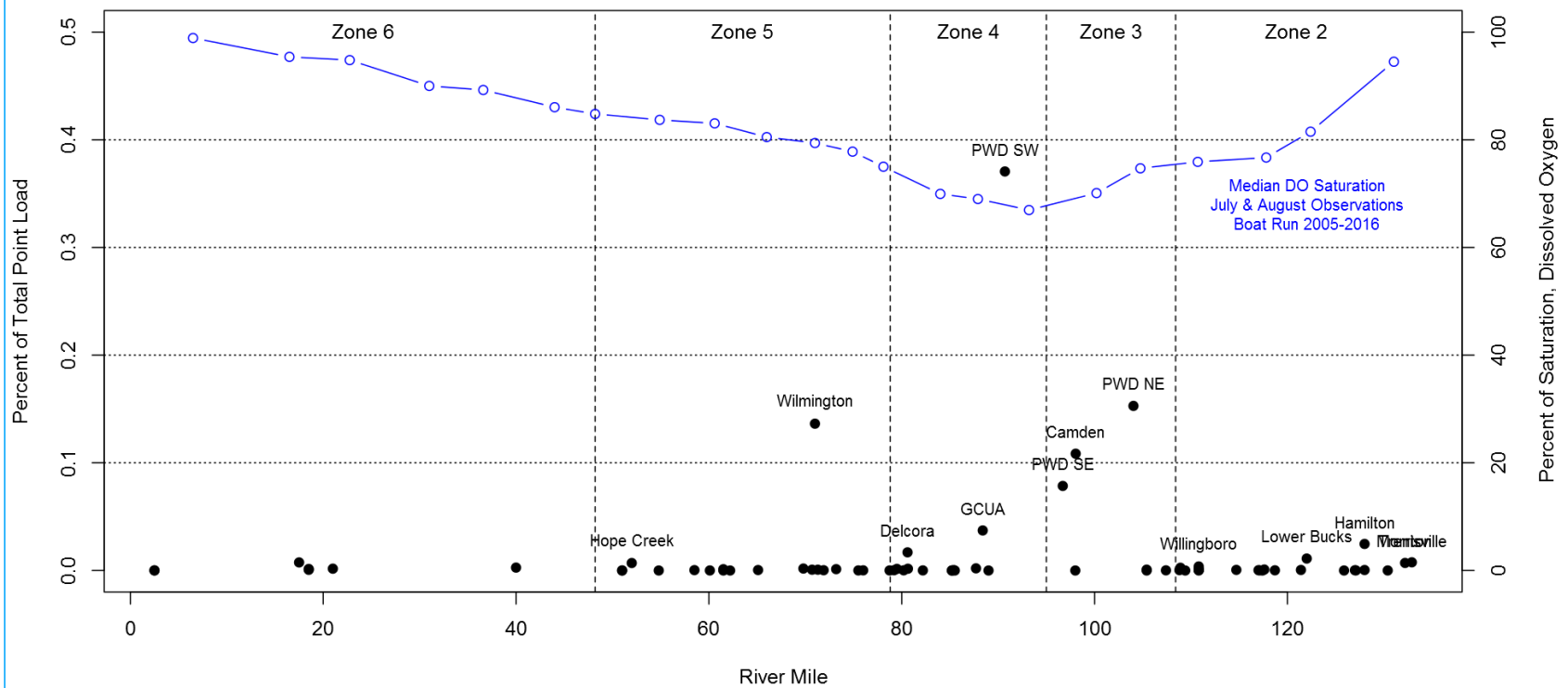
Ammonia Percent of Total Point Load by River Mile



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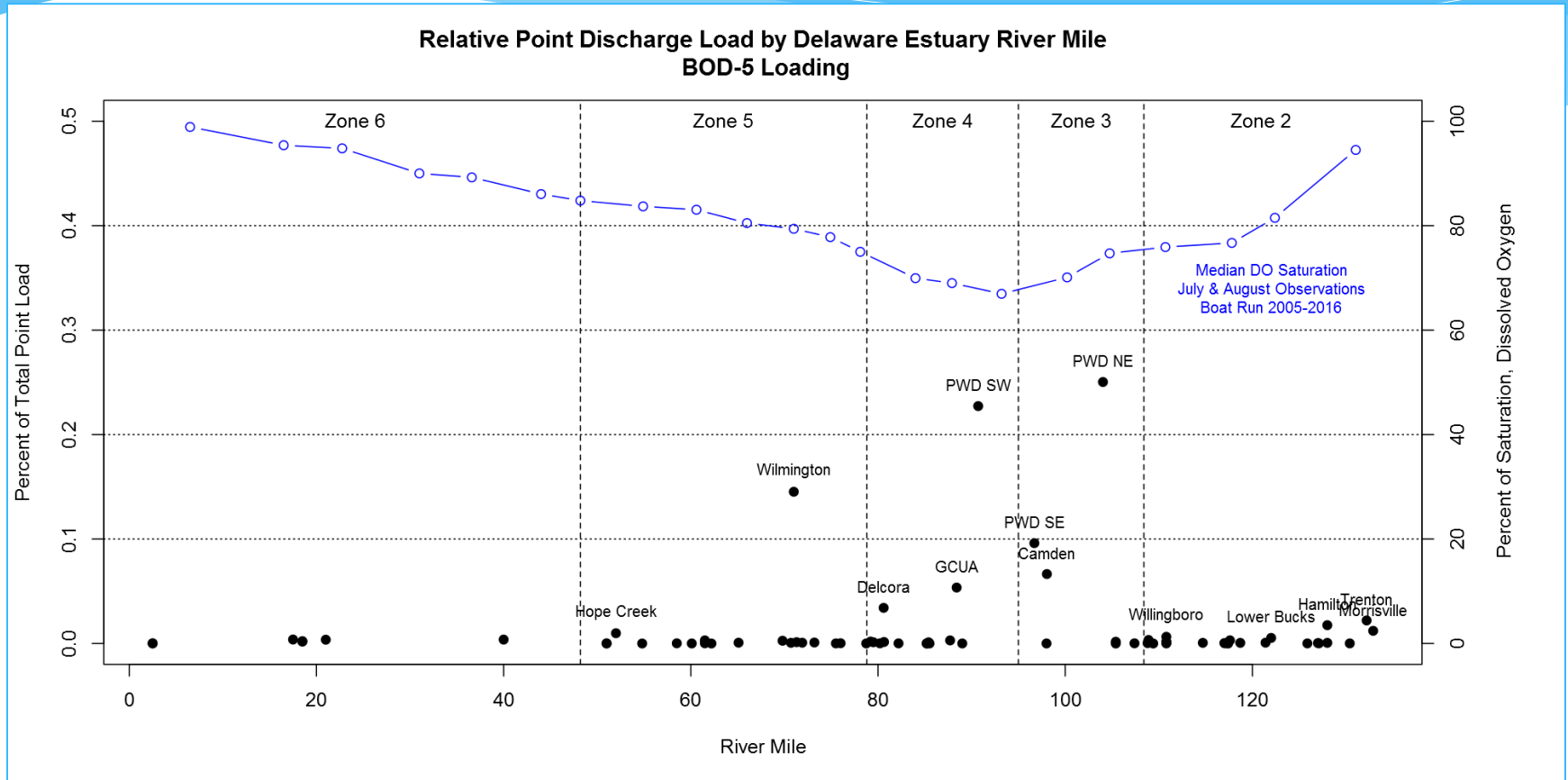
TKN Percent of Total Point Load by River Mile

Relative Point Discharge Load by Delaware Estuary River Mile
TKN - Total Kjeldahl Nitrogen Loading



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BOD₅ Percent of Total Point Load by River Mile



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Point Discharge Monitoring Recommendations for 2018-2019

- * Twice per week for 2 years (13 facilities)
 - * Once per week for 2 years (21 facilities)
 - * Once per month for 2 years (all others – 34 facilities)
-
- * Phosphorus: Total Phosphorus, Soluble Reactive Phosphorus (SRP)
 - * Nitrogen: Ammonia, NO₃, NO₂, TKN, SKN
 - * BOD₅, CBOD₅, BOD₂₀, **COD, TOC**
 - * Temperature, D.O., Conductivity, pH
 - * Discharge flow (Q) – hourly where available, daily otherwise