Comparing Results of two Sample Collection Protocols at Delaware's Non-tidal Sites

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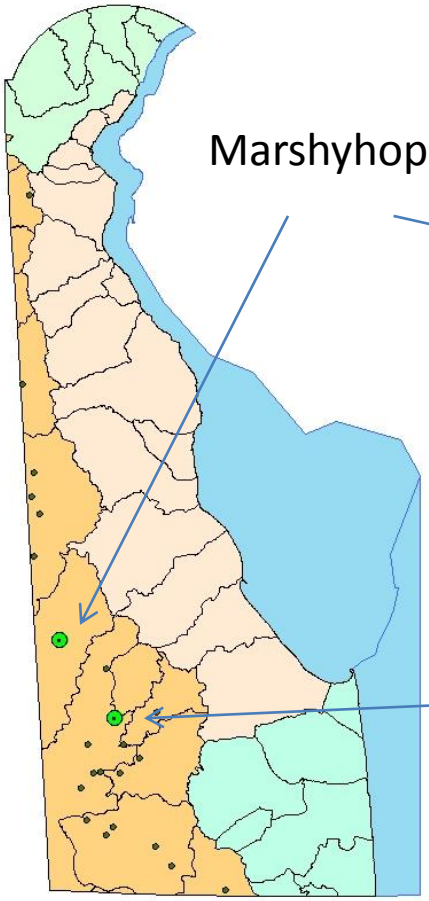
Delaware's two Non-tidal Sites



Marshyhope Creek

Nanticoke River

Sample Collection Method at the two Delaware Non-tidal Sites

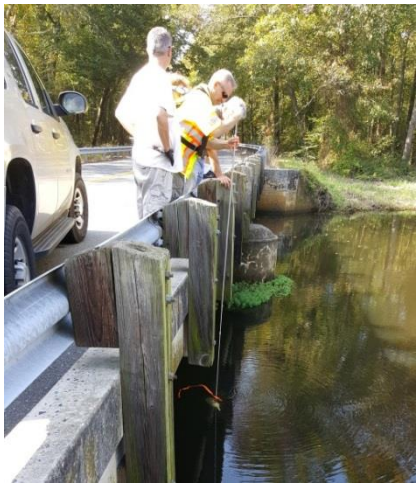
- Prior to October 2015:
  - Because the streams at the two non-tidal sites are relatively narrow and shallow, we had agreement to collect a single grab sample from the middle of the stream (similar to Delaware's General Assessment Sampling Protocol) and consider it to represent water quality condition of the stream

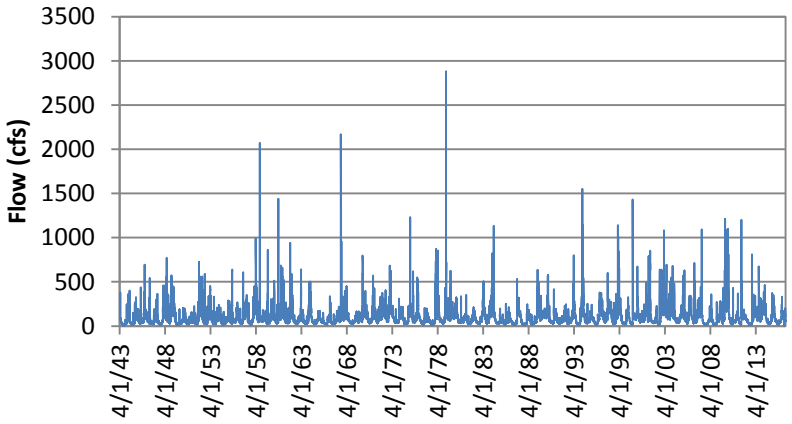
Sample Collection Method at the two Delaware Non-tidal Sites, cont.

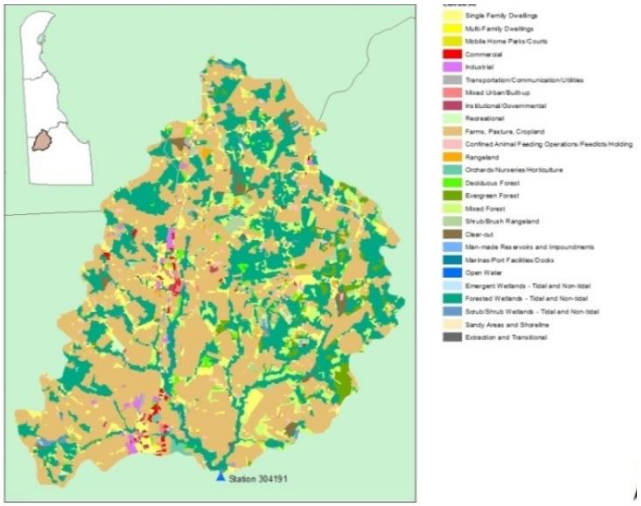
- Since October 2015:
  - Per review of DE's QAPP, Mary Ellen asked us to switch to Bay Program's Non-tidal Protocol for sample collection (equal-width increment, isokinetic, depth-integrated sampling technique)
  - Collection of samples per Bay Program's Protocol started in October 2015
  - At the same time, we decided to collect a second set of samples at each site using the previous sample collection method (grab sample at the middle of the stream) and compare the results

Nanticoke River Station

- Drainage area above the gage: 74 sq miles
- Dominant land use/land cover: Agriculture (50%), forest (35%)
- Continuous stream flow measurement since 1943
- Long term average flow: 93 cfs
- At the monitoring site, the stream is about 35 feet wide and between 2 – 4 feet deep

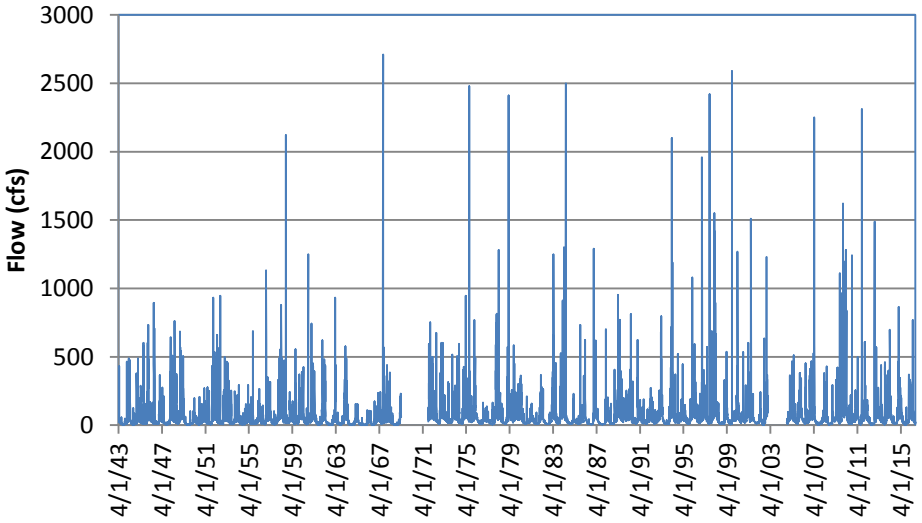


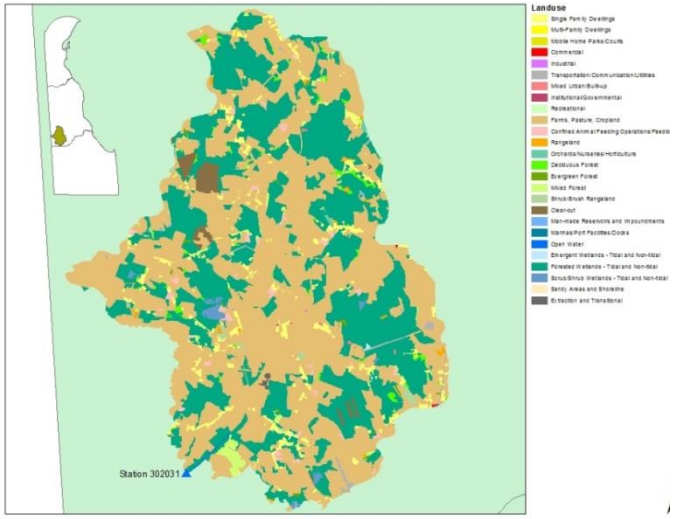




Marshyhope Creek Station

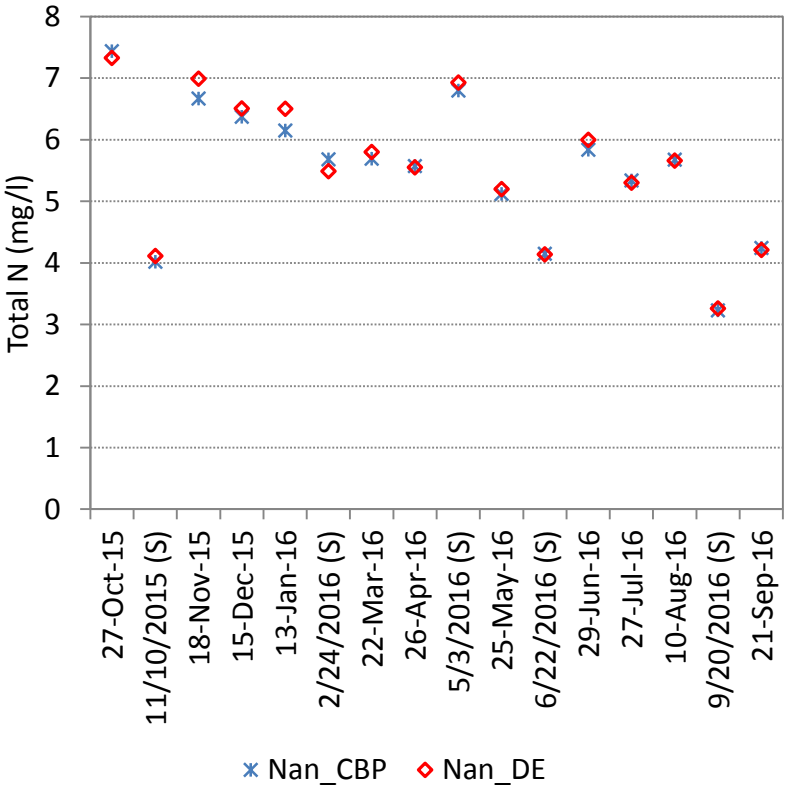
- Drainage area above the gage: 47 sq miles
- Dominant land use/land cover: Agriculture (56%), Forest (38%)
- Stream flow measurement since 1943
- Long term average flow: 55 cfs
- At sampling site, stream is about 55 ft wide and 0.5-1.0 ft deep



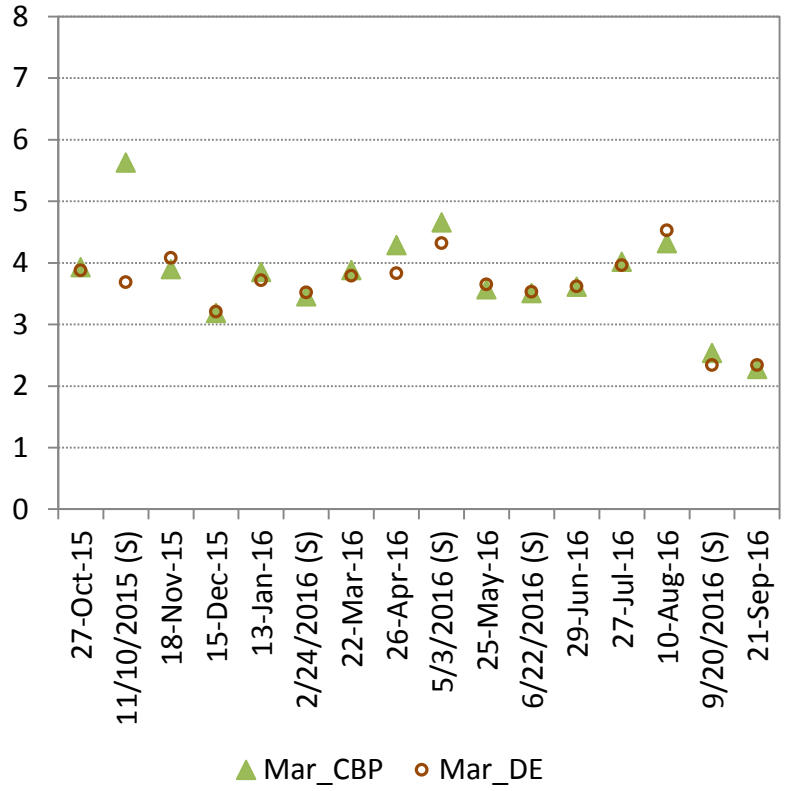


Comparing Results for Total Nitrogen

Nanticoke

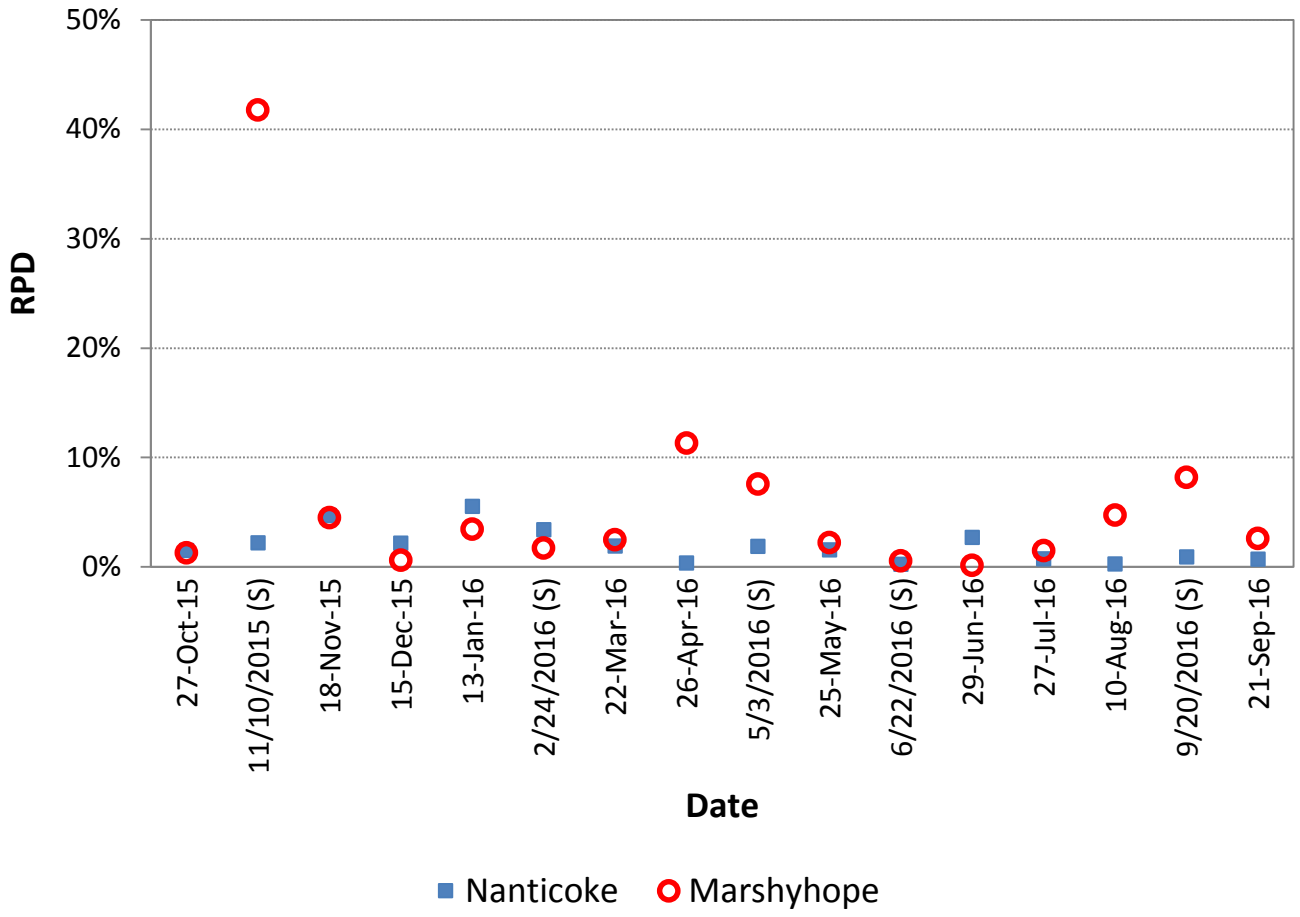


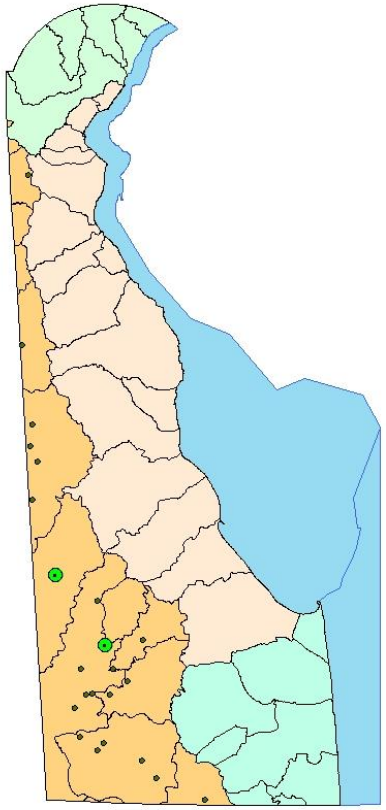
Marshyhope



Relative Percent Difference (RPD) for Total Nitrogen Results

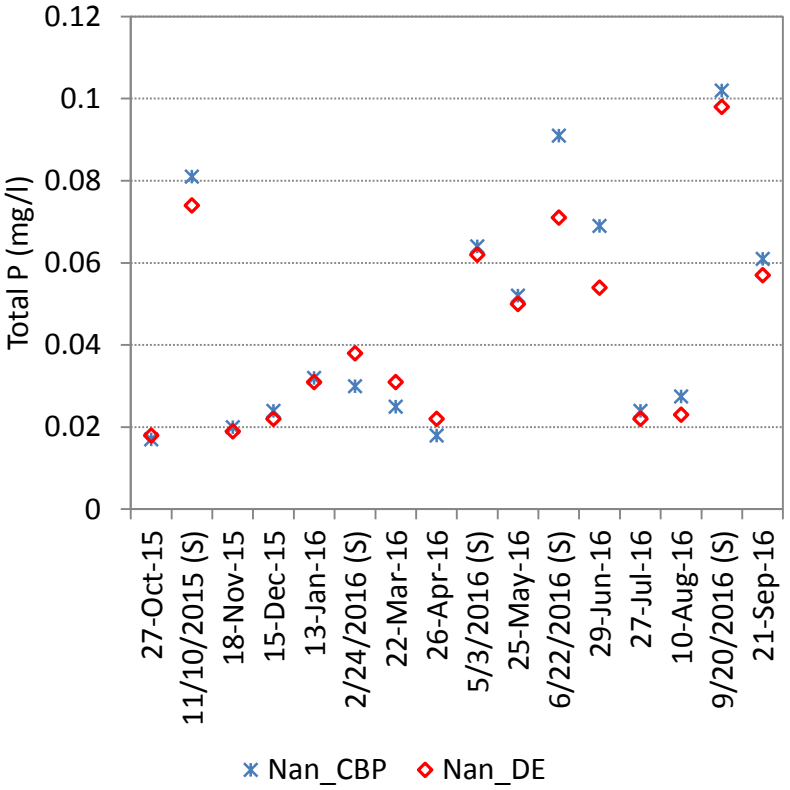
$$RPD = \frac{(C_{CBP} - C_{DE}) * 100}{(C_{CBP} + C_{DE})/2}$$



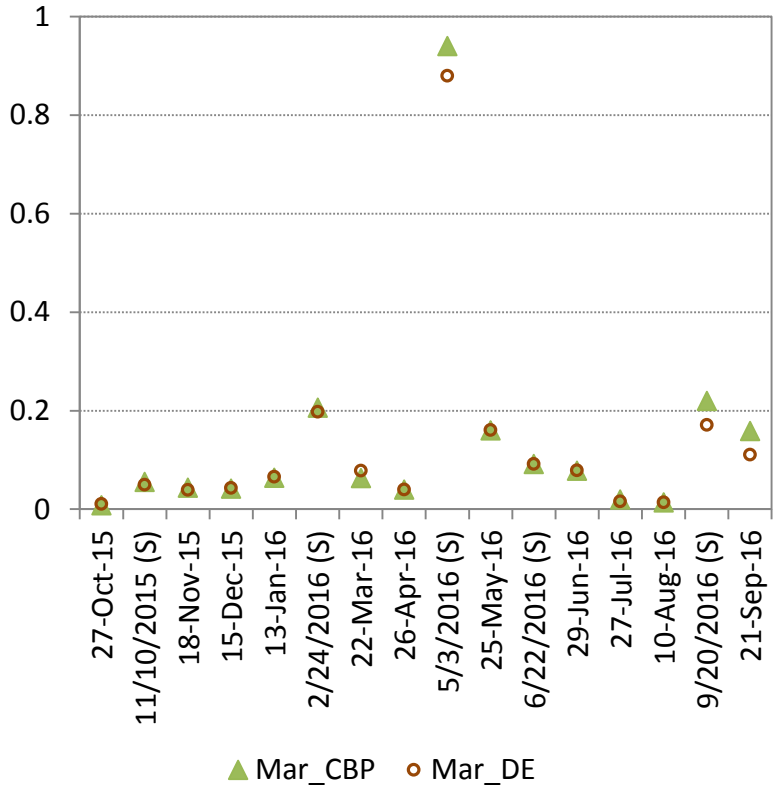


Comparing Results for Total Phosphorus

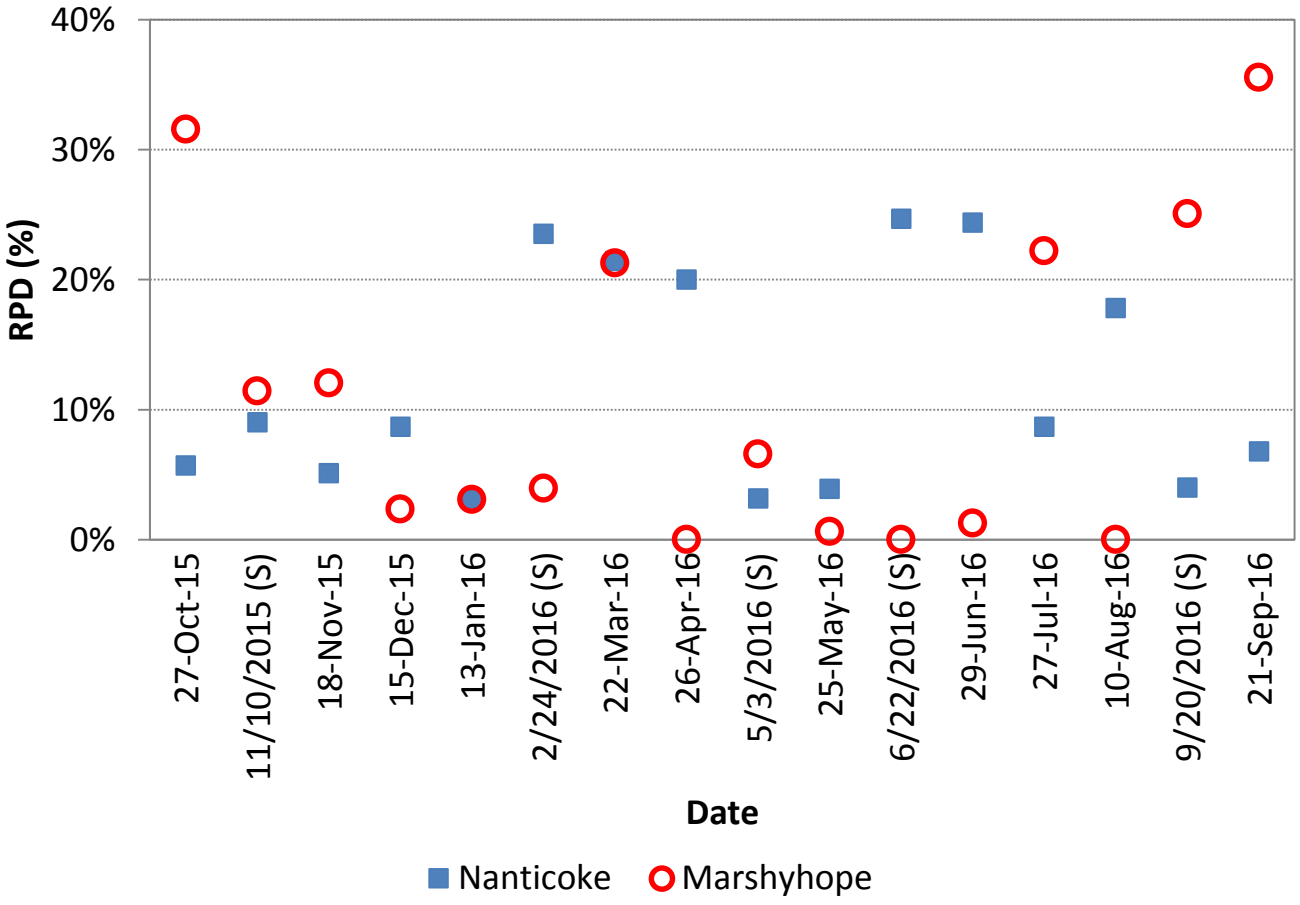
Nanticoke

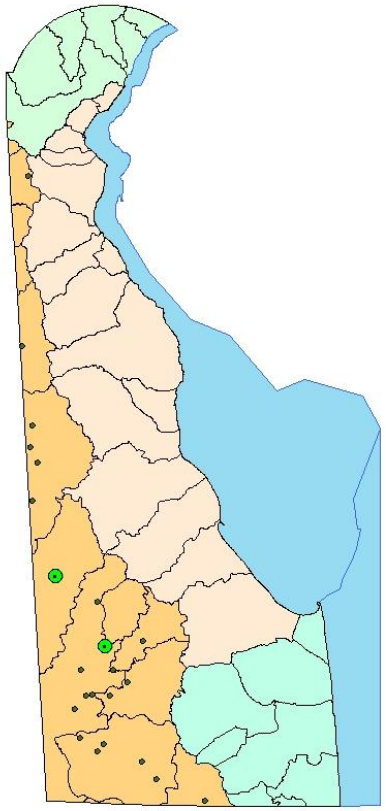


Marshyhope



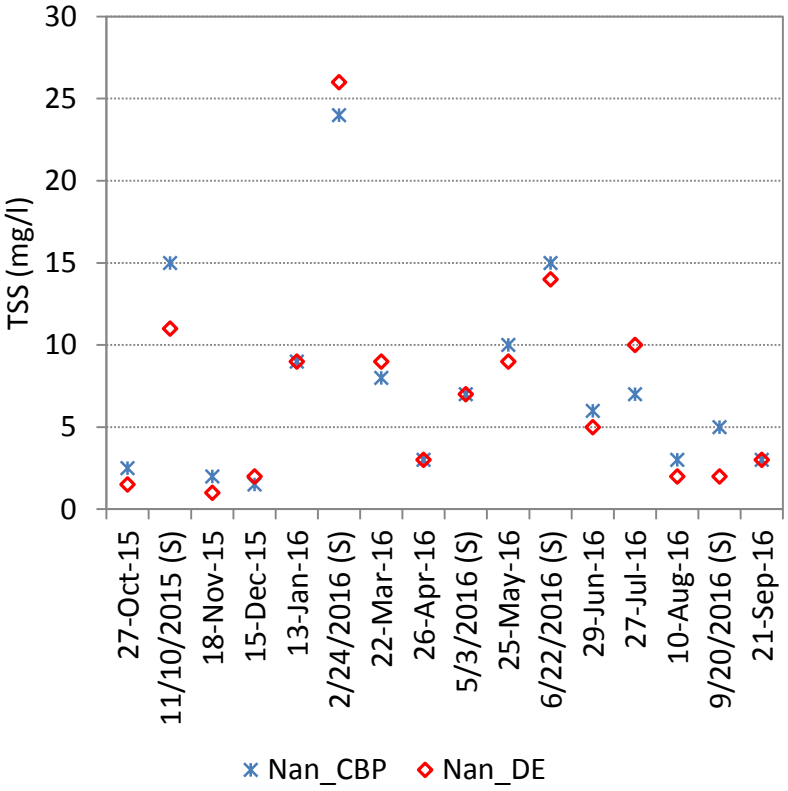
Relative Percent Difference (RPD) for Total P



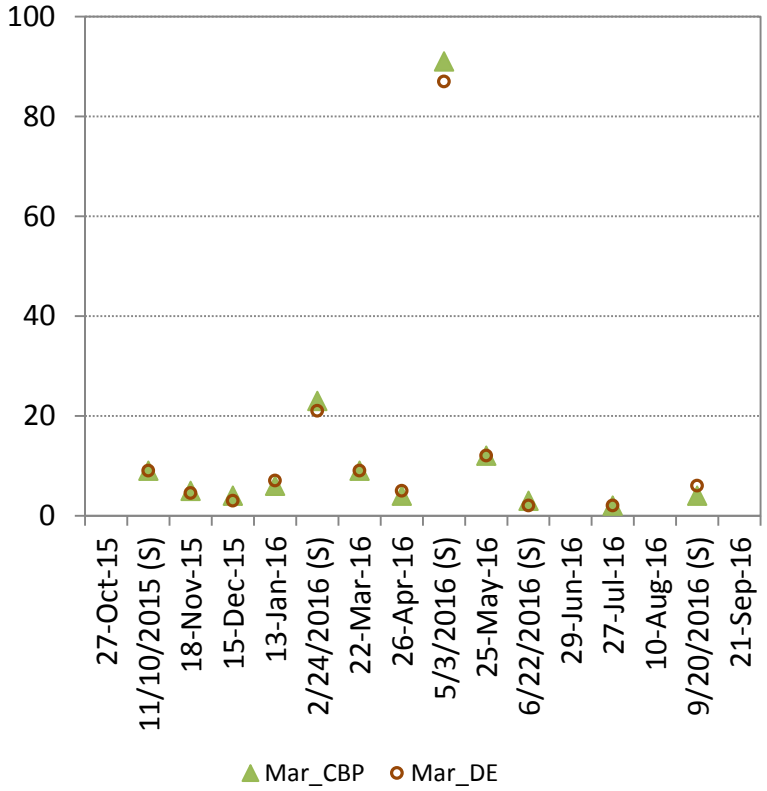


Comparing Results for TSS

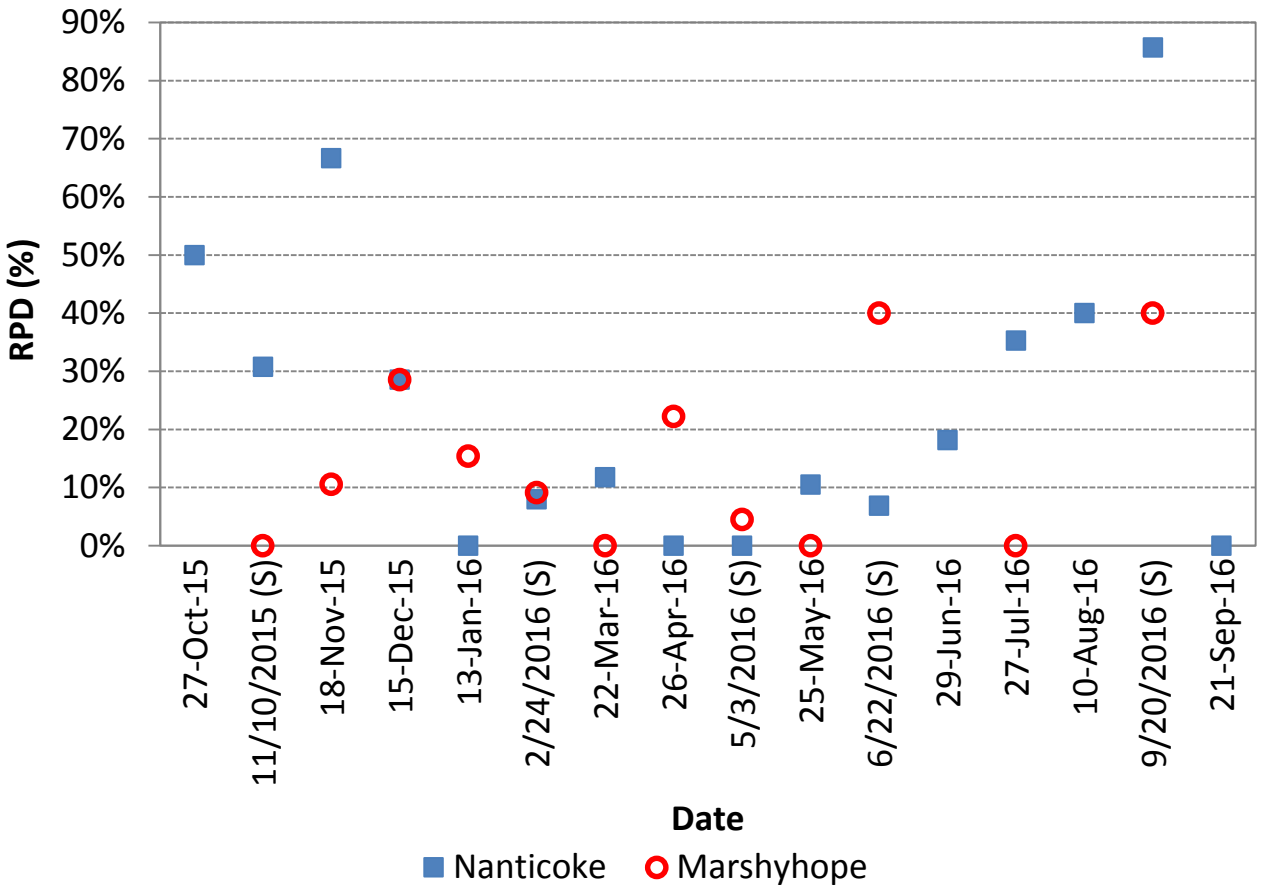
Nanticoke

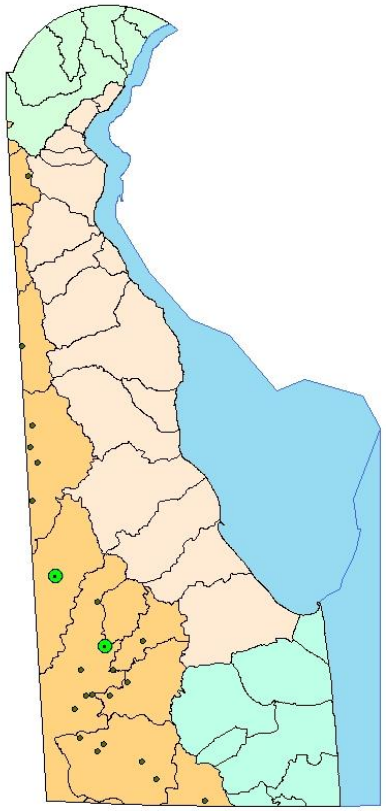


Marshyhope

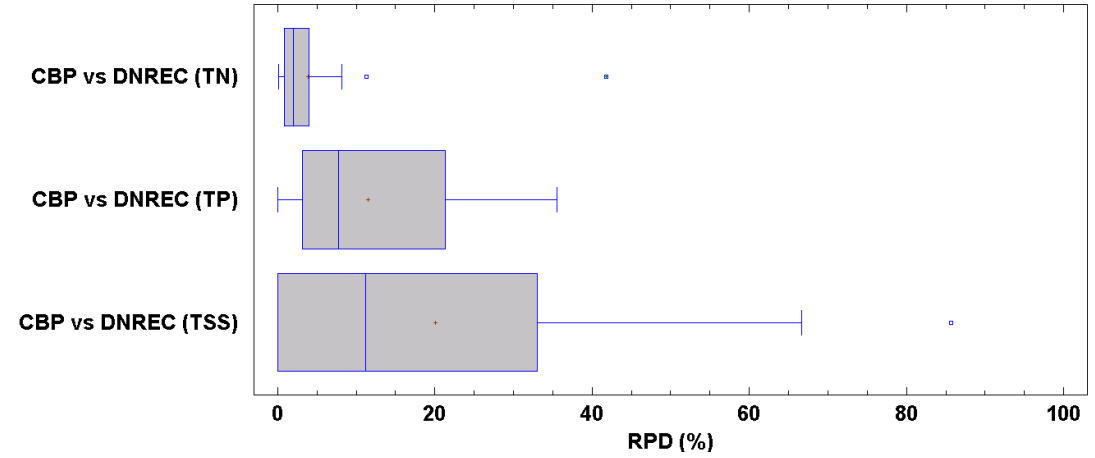


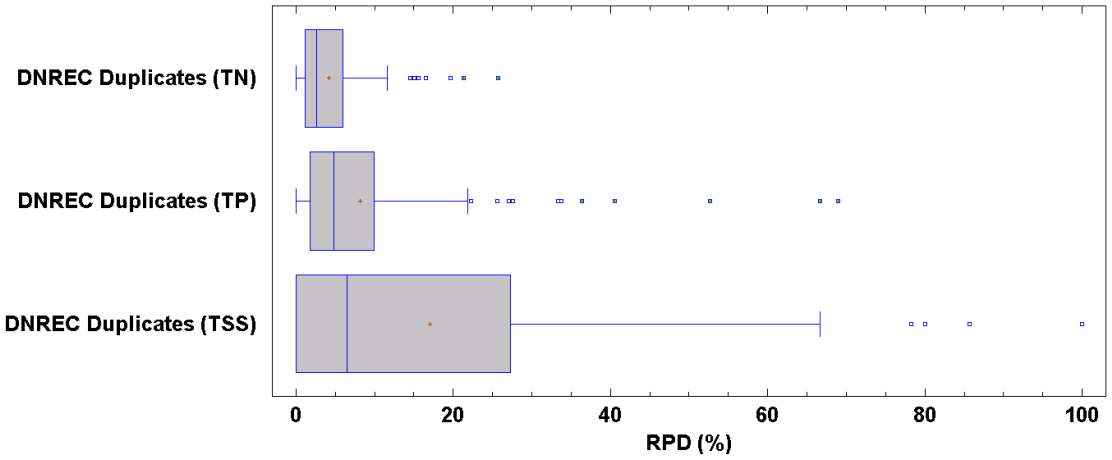
Relative Percent Difference (RPD) for TSS



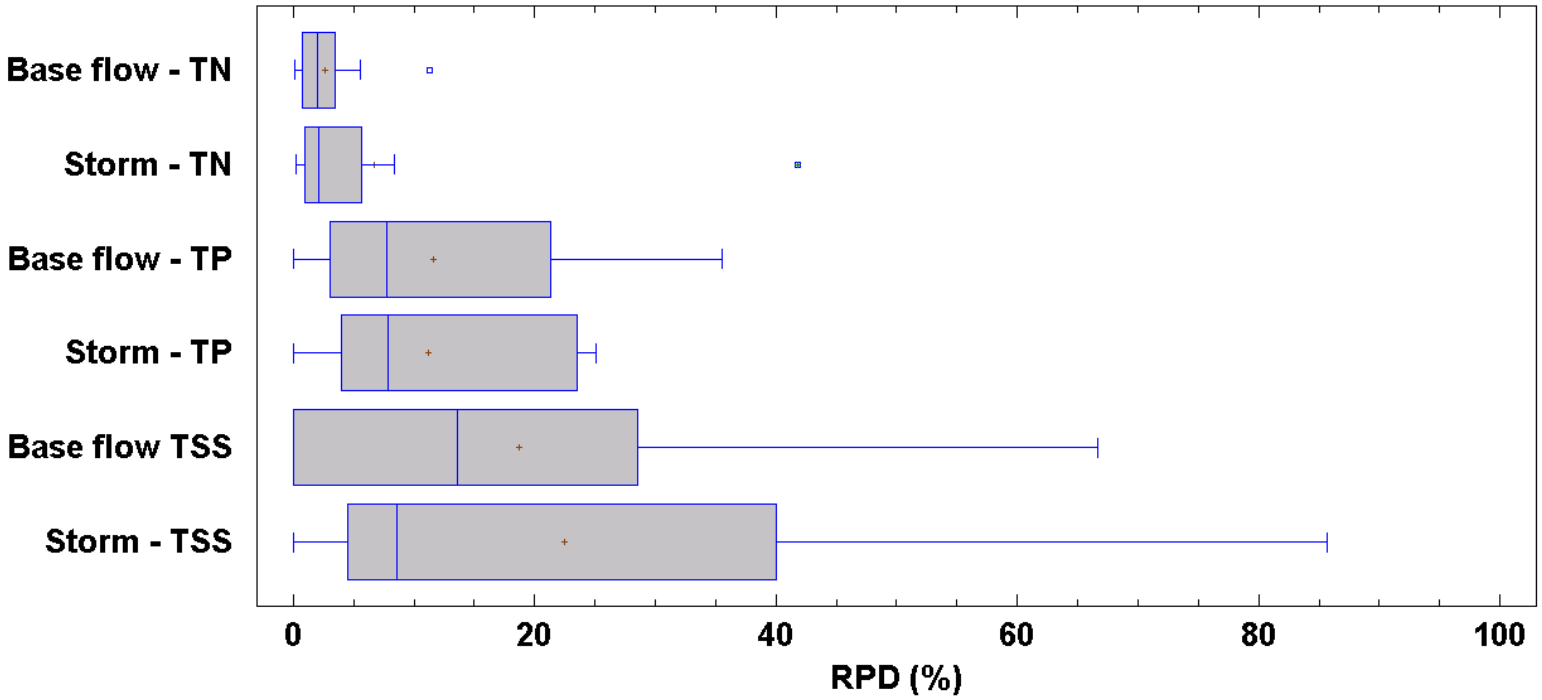


Comparing RPDs for the two Sample Collection methods at non-tidal sites with RPDs for DNREC's State-wide Duplicate Samples (2013-2016)





Are there differences between the results for Base-flow vs. Storm Samples?



Findings and Conclusions

- There is not a statistically significant difference between the results for TN, TP, and TSS when samples are collected using the CBP protocol vs. DNREC's General Assessment protocol (with regard to results mean, median, standard deviation, and distribution) at the 95% confidence level
- The Relative Percentage Difference (RPD) between results of samples collected using the above two sample collection methods are generally less than 10% for Total N, 30% for TP, and 40% for TSS
- RPDs for TN, TP, and TSS results using the above two sample collection methods are similar to RPDs for DNREC's State-wide Duplicate Samples during 2013-2016 period
- RPDs for storm samples are generally higher than for base-flow samples

Thank You!

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