Early Detection of Coastal Ecosystem Response to Management Actions

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EMECS9

Baltimore, MD

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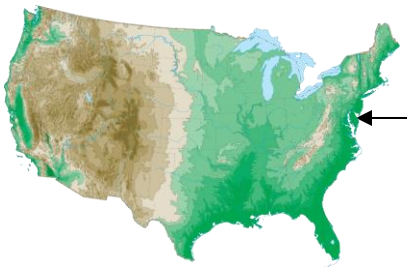
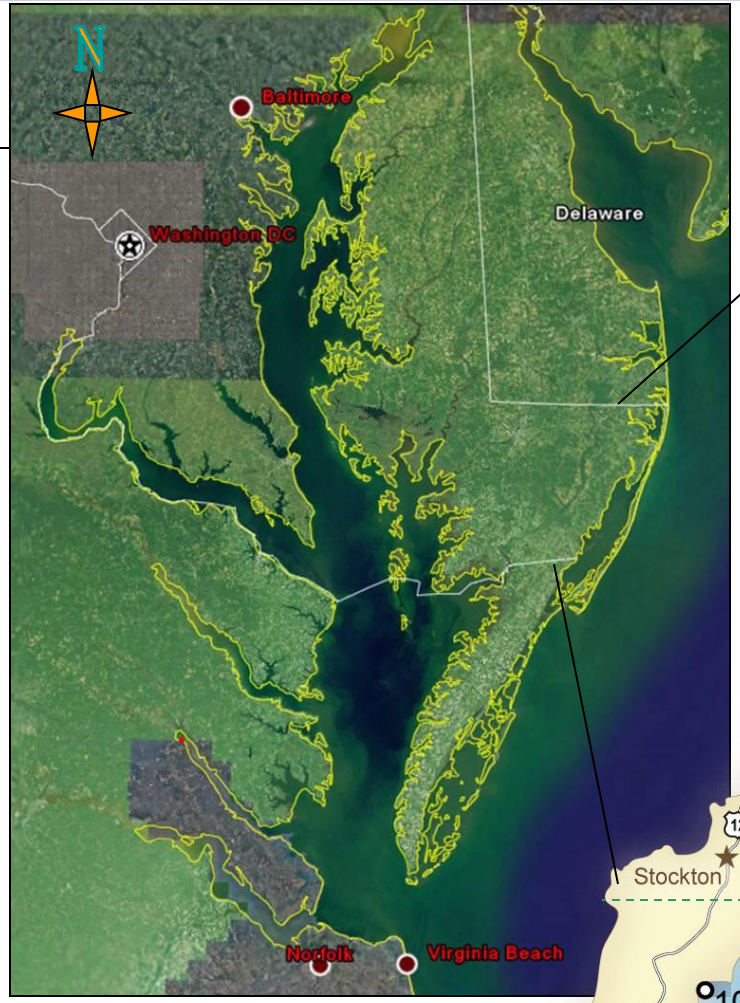
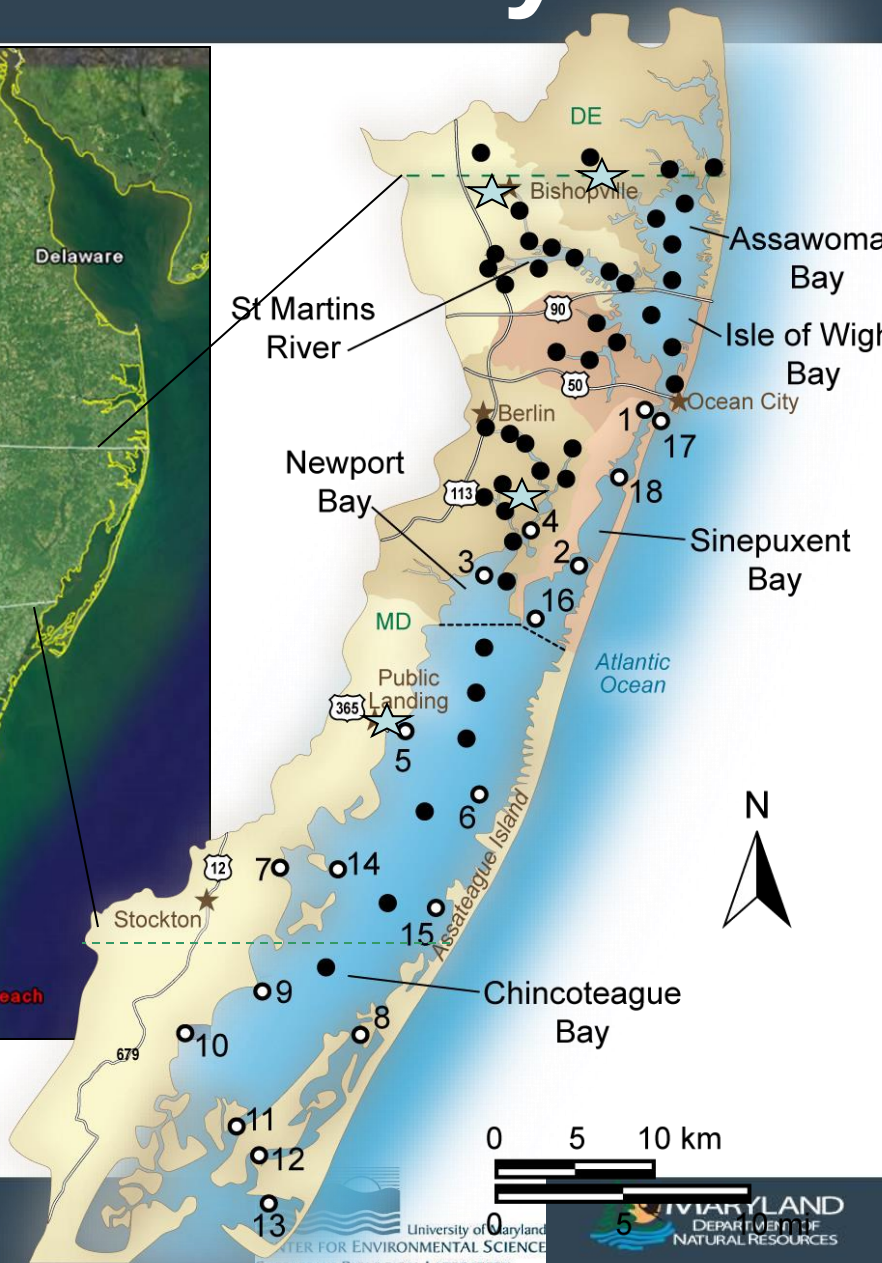
Setting: MD Coastal Bays







Sampling site locations:

Maryland Department of Natural Resources ●

National Parks Service (including site number) ○ X

Continuous monitor ☆

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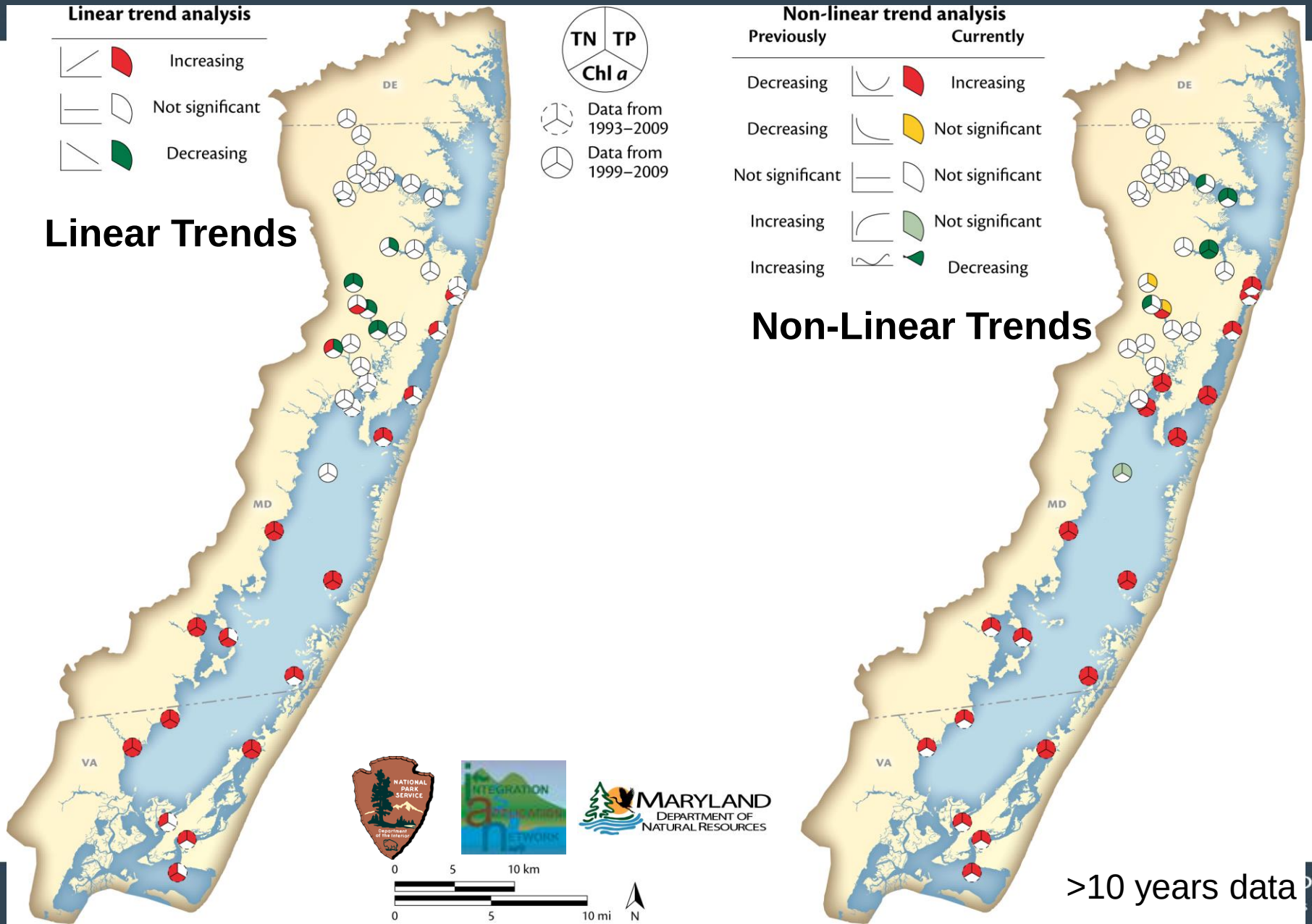
Satoumi

Many areas have no trend

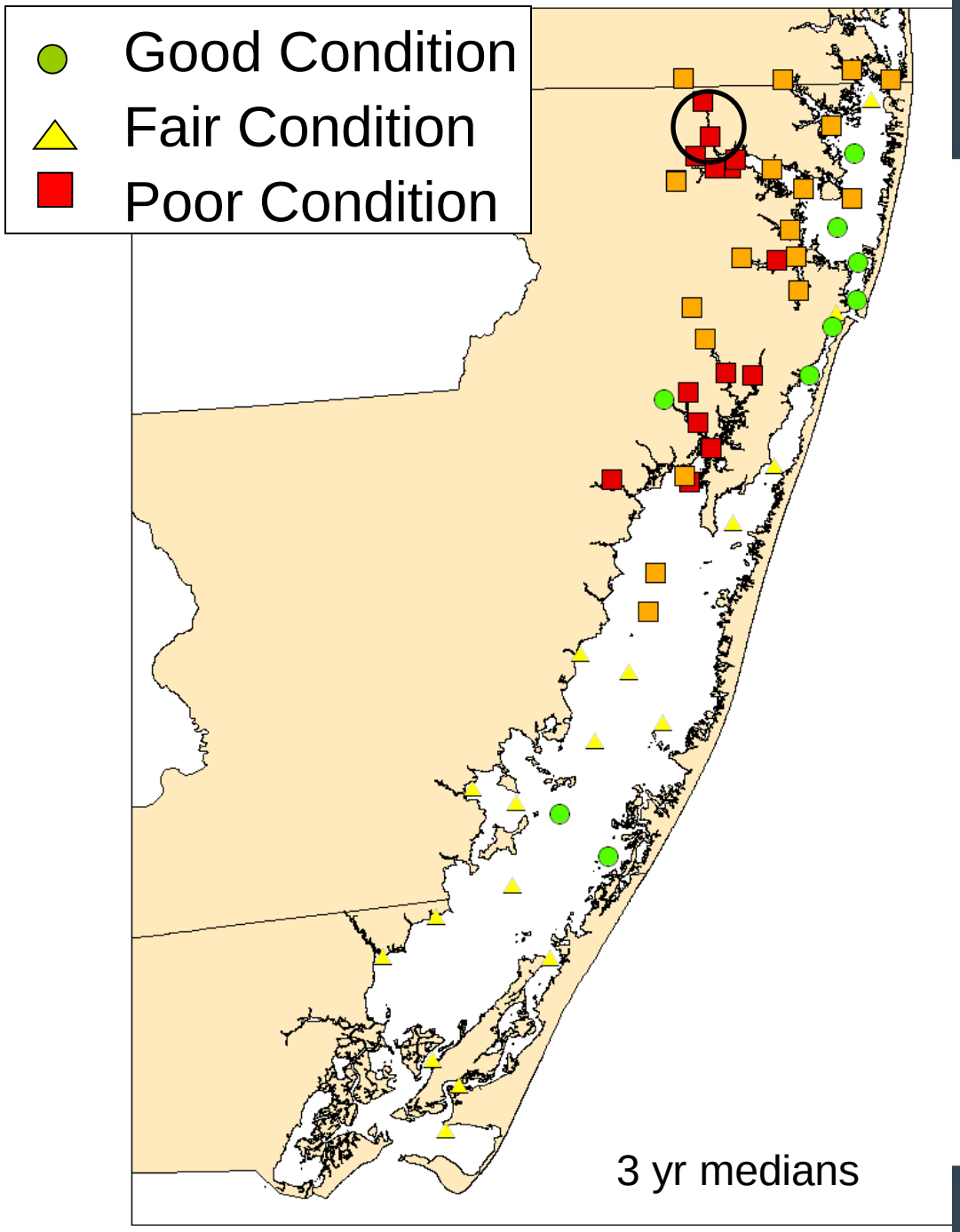


Linear Trends

Non-Linear Trends

>10 years data

Current Status



Water quality index (chl, DO, TN, TP) show areas with no trends are degraded.

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Bishopville Management Actions

1989	removal of Selbyville WWTP, Del
1992	Little land use change after 92
1997 - 2002	sewer hookups in Selbyville additional 26,000 gpd (~87 edu @300g per edu)

Two methods to track ecosystem

- Cumulative sum, Cusum, of nutrients
- Dissolved oxygen criteria assessment

CuSum analyses

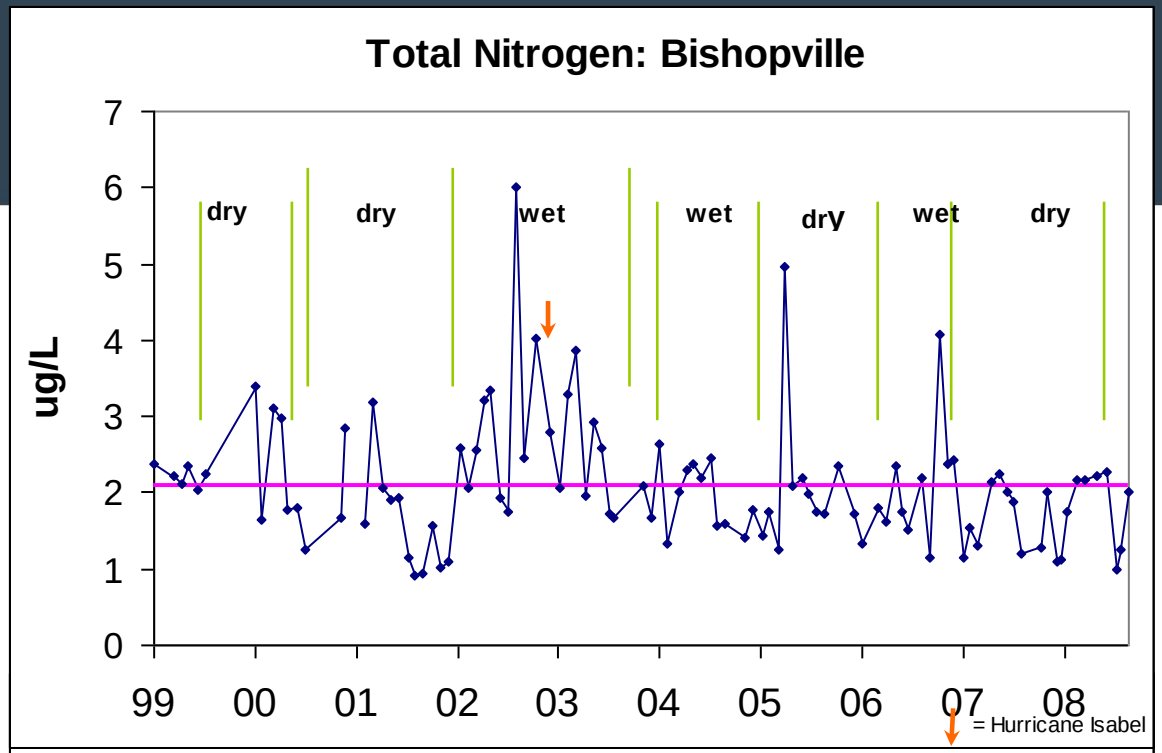
A technique for detecting the magnitude and timing of changes in means within an extended time series.

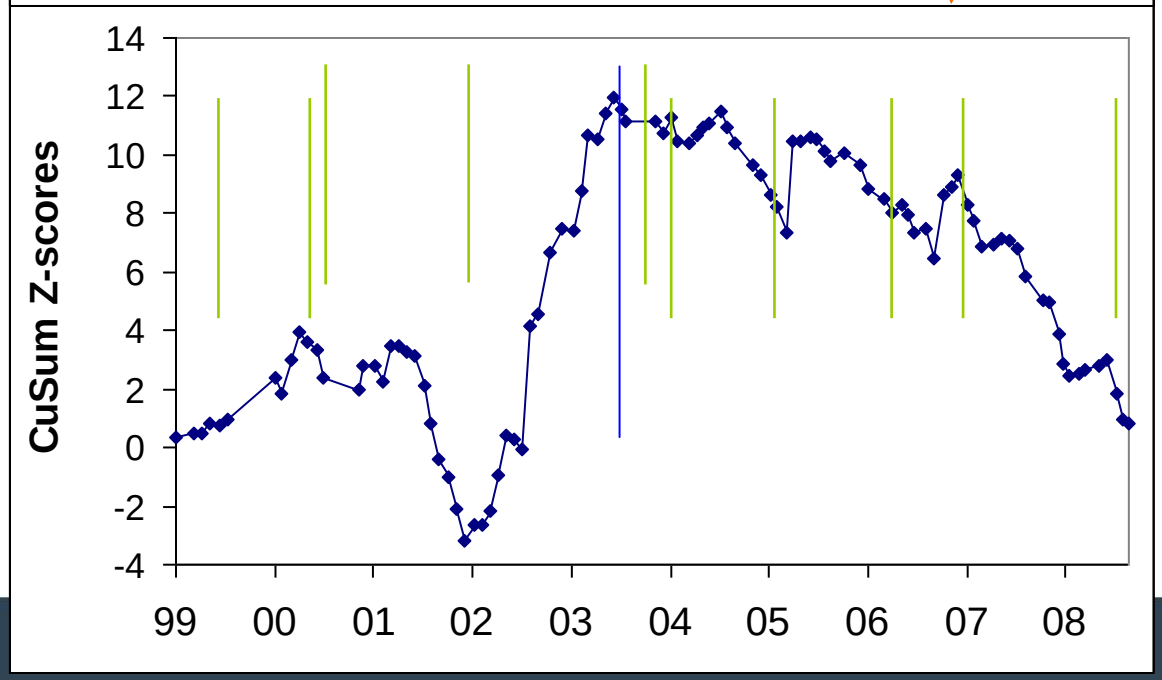
A change in the underlying mean will be reflected as a simultaneous change in the slope of the CuSum graph.

Benefits of the CuSums approach

- Match anthropogenic changes / activities to inflection points or trends
- Match climatological events / trends to inflection points or trends
- Identify potential drivers within watersheds.

Cusums indicate improvement Bishopville Prong





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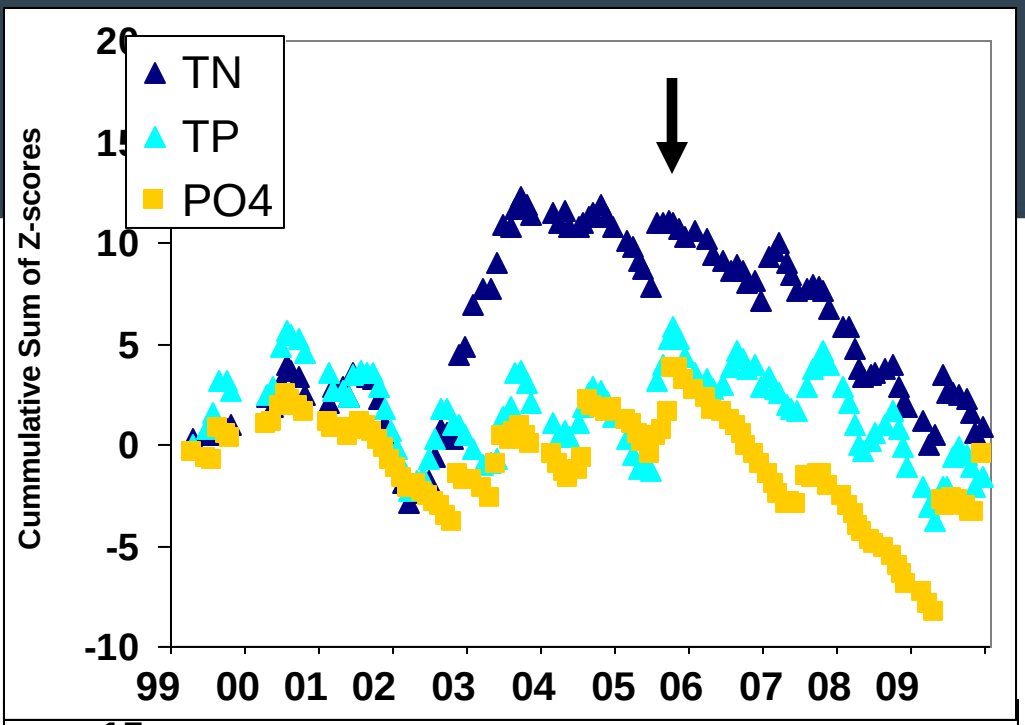

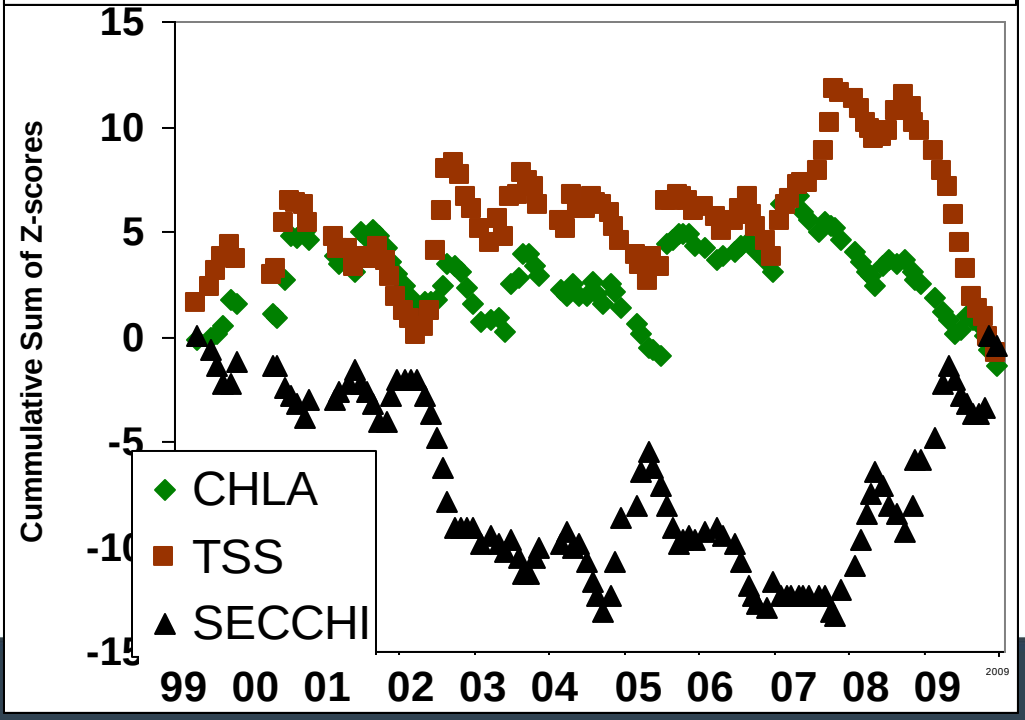

- Not all parameters show improvement

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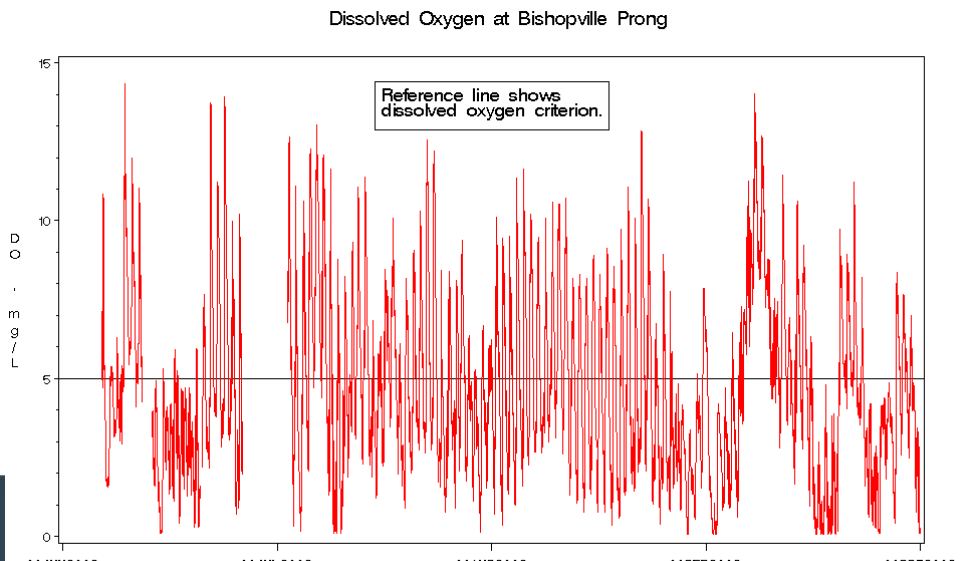
Dissolved Oxygen Assessment

- Analysis of high frequency data
  - Every 15 min
  - April to October

- Time below State thresholds



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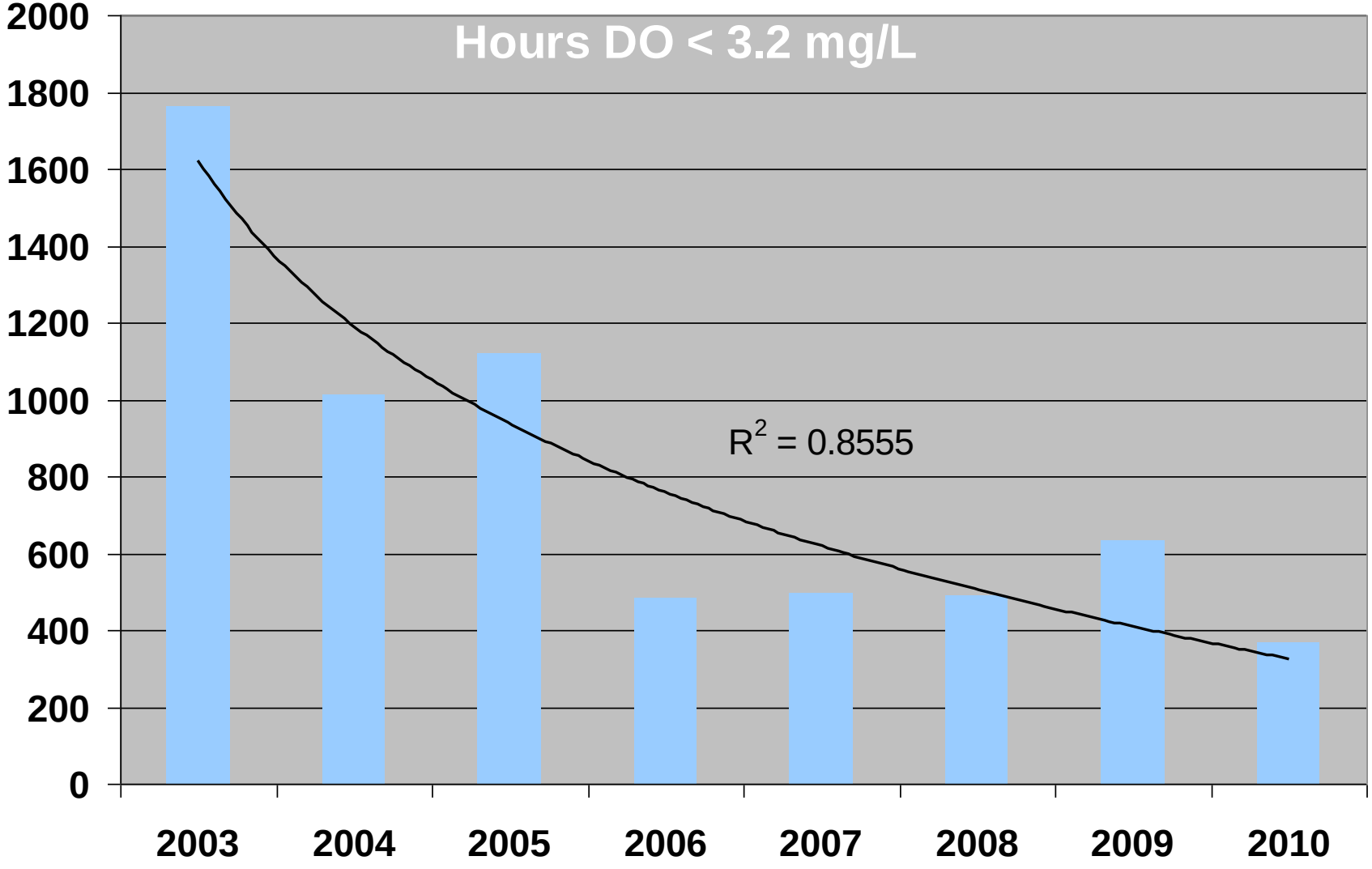
Early sign of improvement



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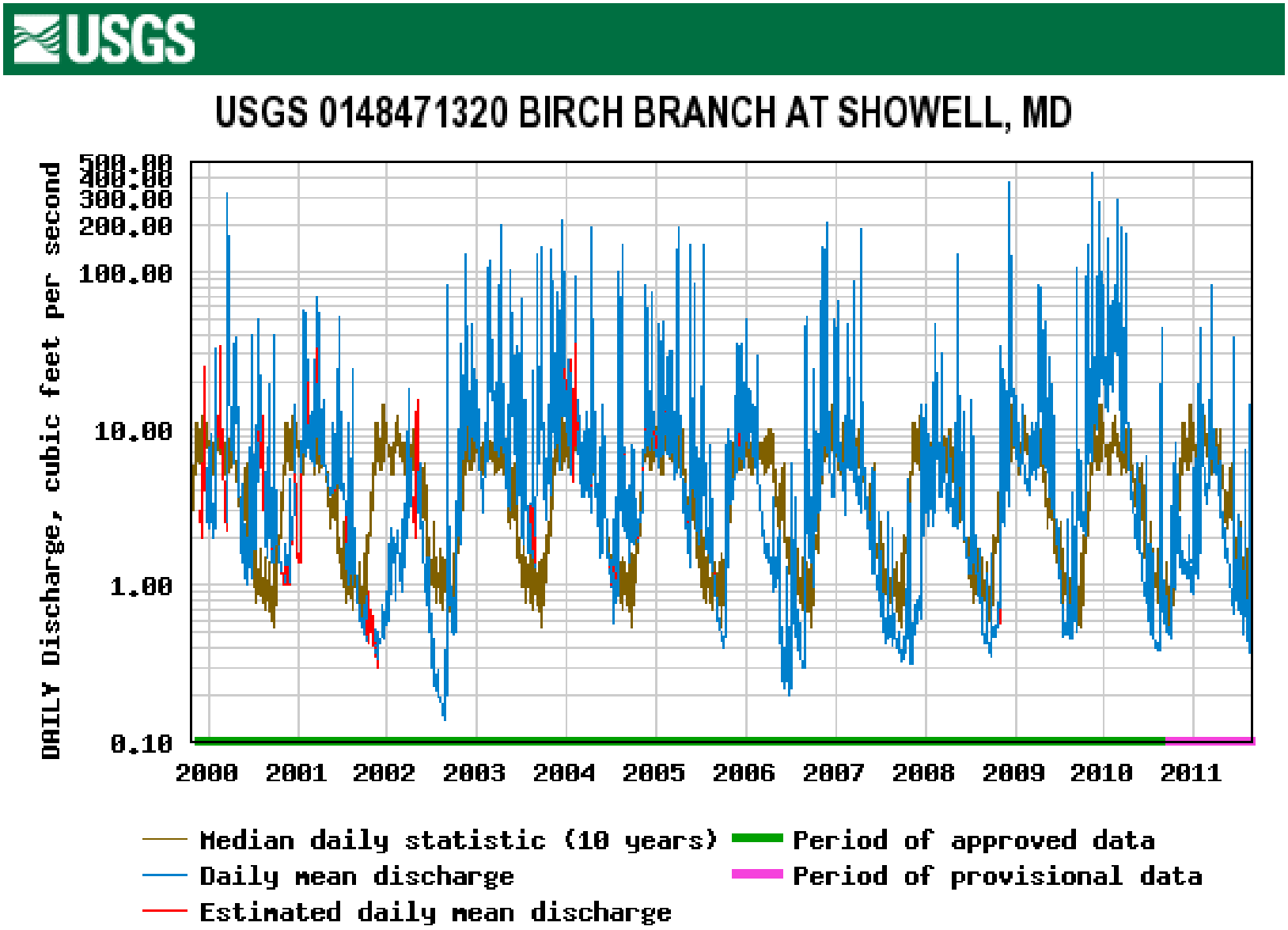
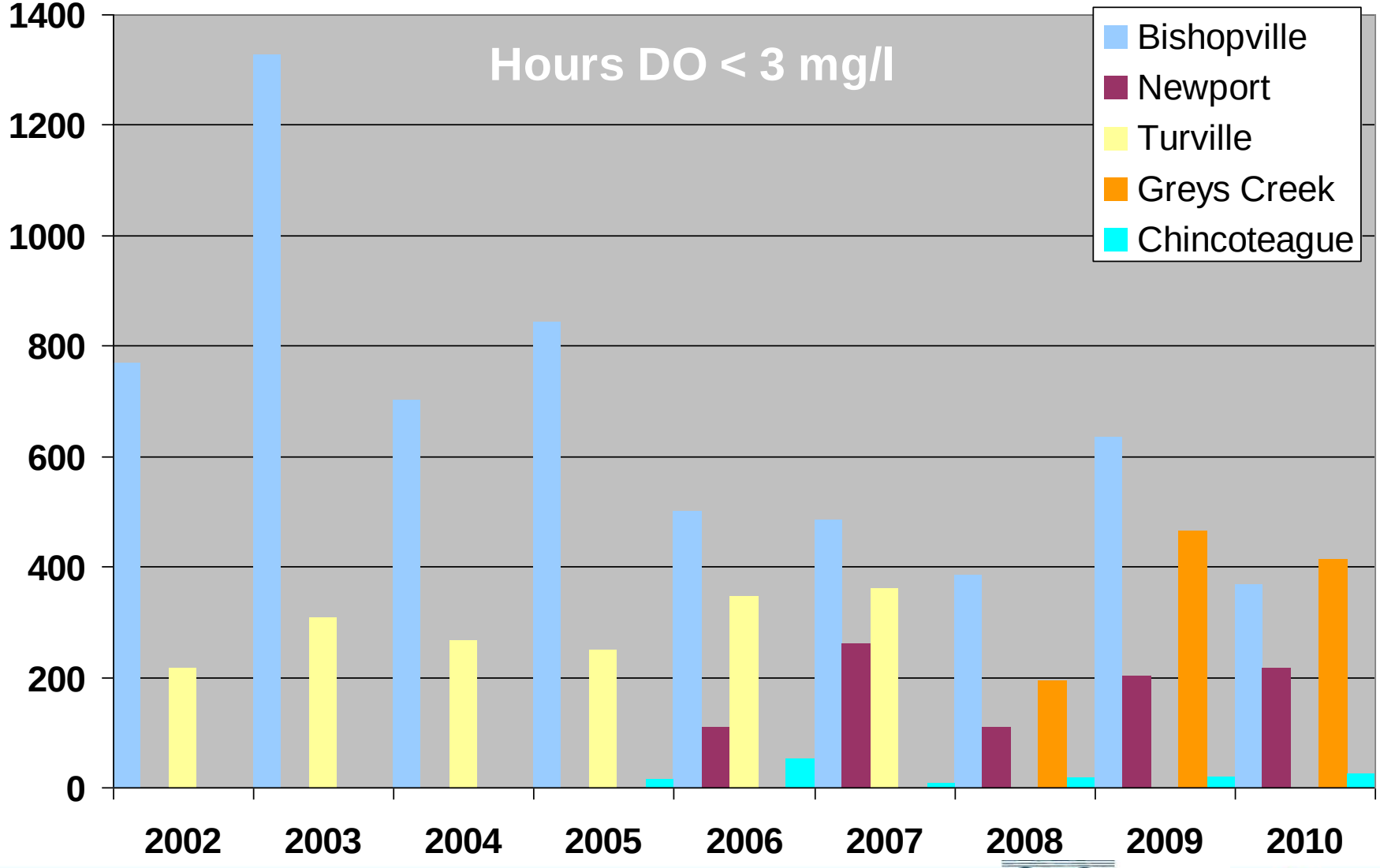
Changes not related to flow



Summary

New techniques show potential improvement.



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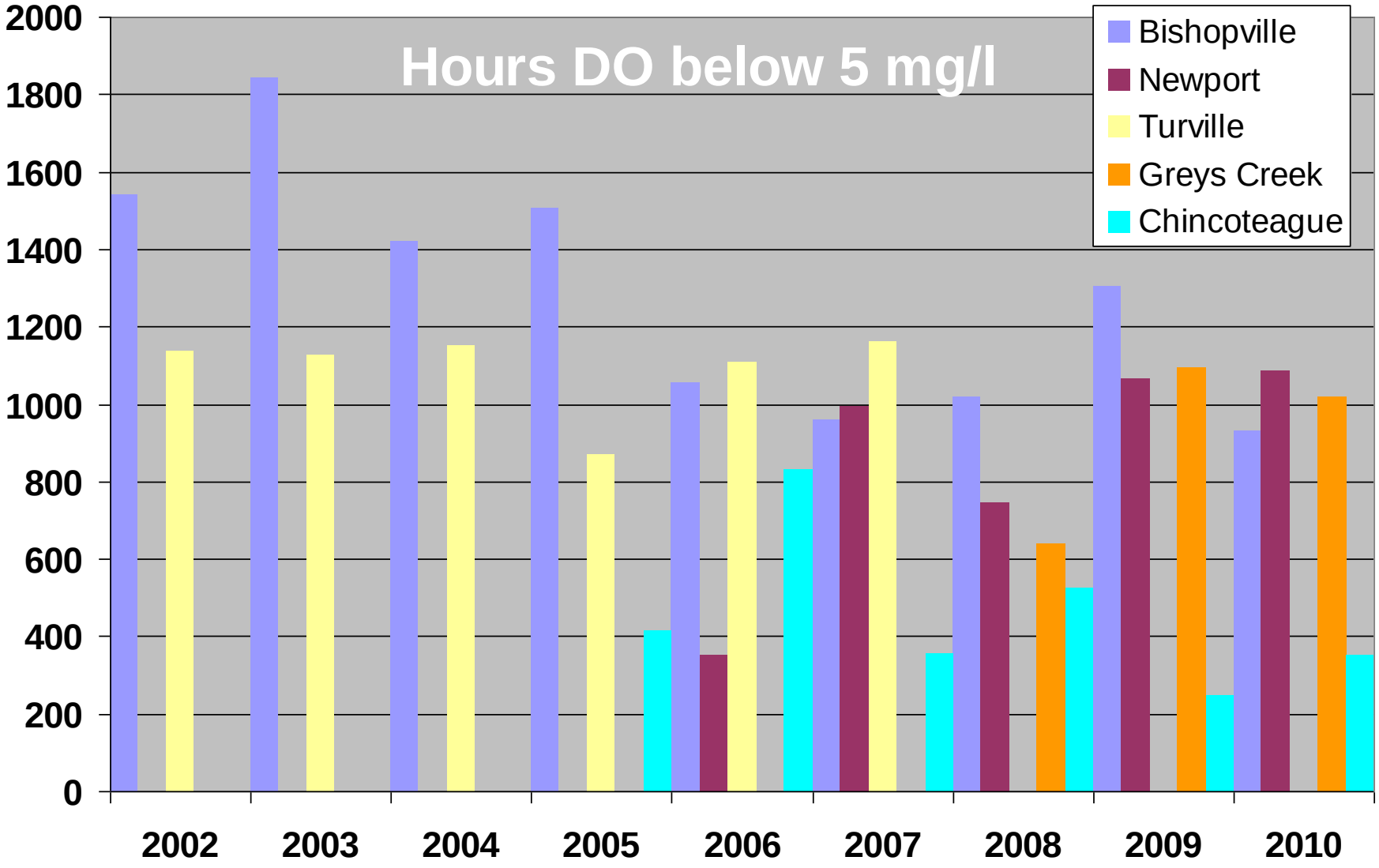

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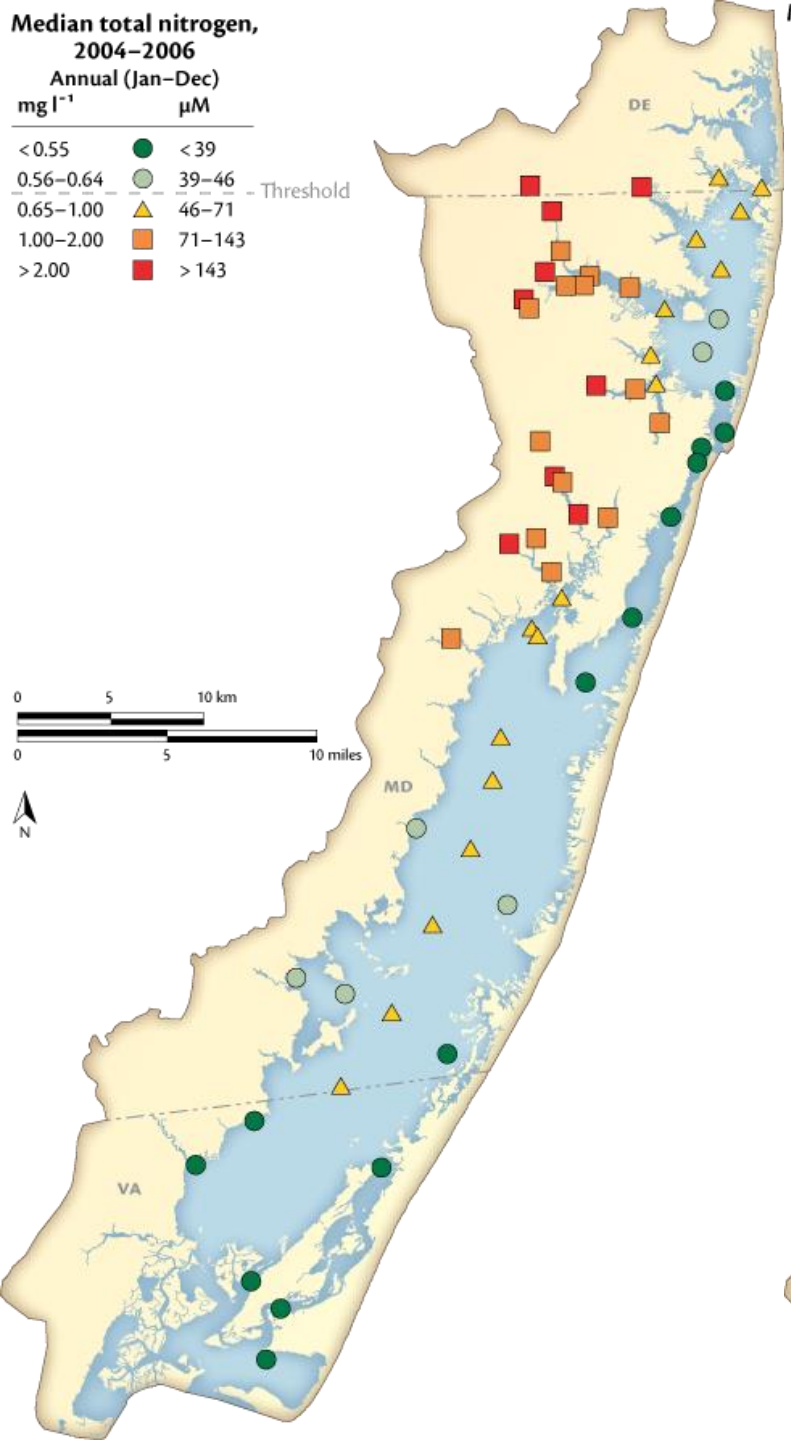

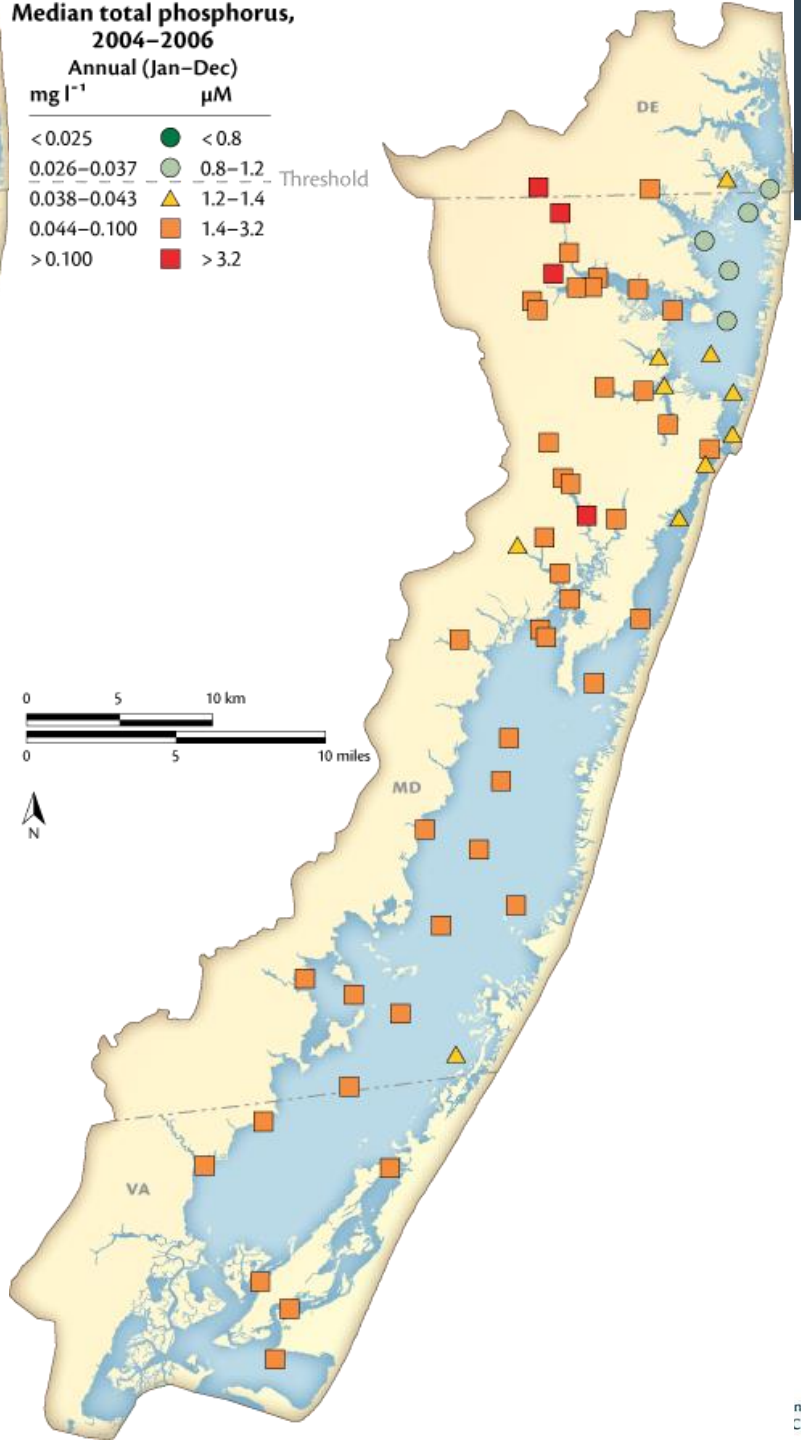

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