Proposed Assessment Methodology for ChesBay Continuous Monitoring Data and Instantaneous Min. DO Criteria

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The proposed approach for assessing Bay DO IM:

- "Subsegment out" small tribs, nearshore, and mainstem waters
- Assess mainstem using monthly mid-channel interpolated vertical profiles (applying umbrella criteria?)
- Assess the small tribs using data from "rotating" discrete monitoring
- Assess the nearshore using ConMon (3-year summer deployments)

We still need an EPA-approved assessment methodology for ConMon.

What are some existing ConMon methodologies for assessing DO?

- Virginia: “10%-10% rule”
  A water is impaired if exceedences were observed more than 10% of the time within more than 10% of the 24-hour periods monitored. (LENIENT)

- Wisconsin: “10% rule”
  A water impaired if exceedences were more than 10% of the time. (VERY LENIENT)

- Louisiana: “25% rule”
  A water is impaired if violations were observed more than 25% of the the time. (VERY LENIENT)

- Washington: “3 daily minimum values rule”
  A water is impaired if at least 3 daily minimum values are below the IM. (VERY CONSERVATIVE)

- New Jersey: “2 daily minimum values rule”
  A water is impaired if at least 2 daily minimum values are below the IM. (VERY CONSERVATIVE)

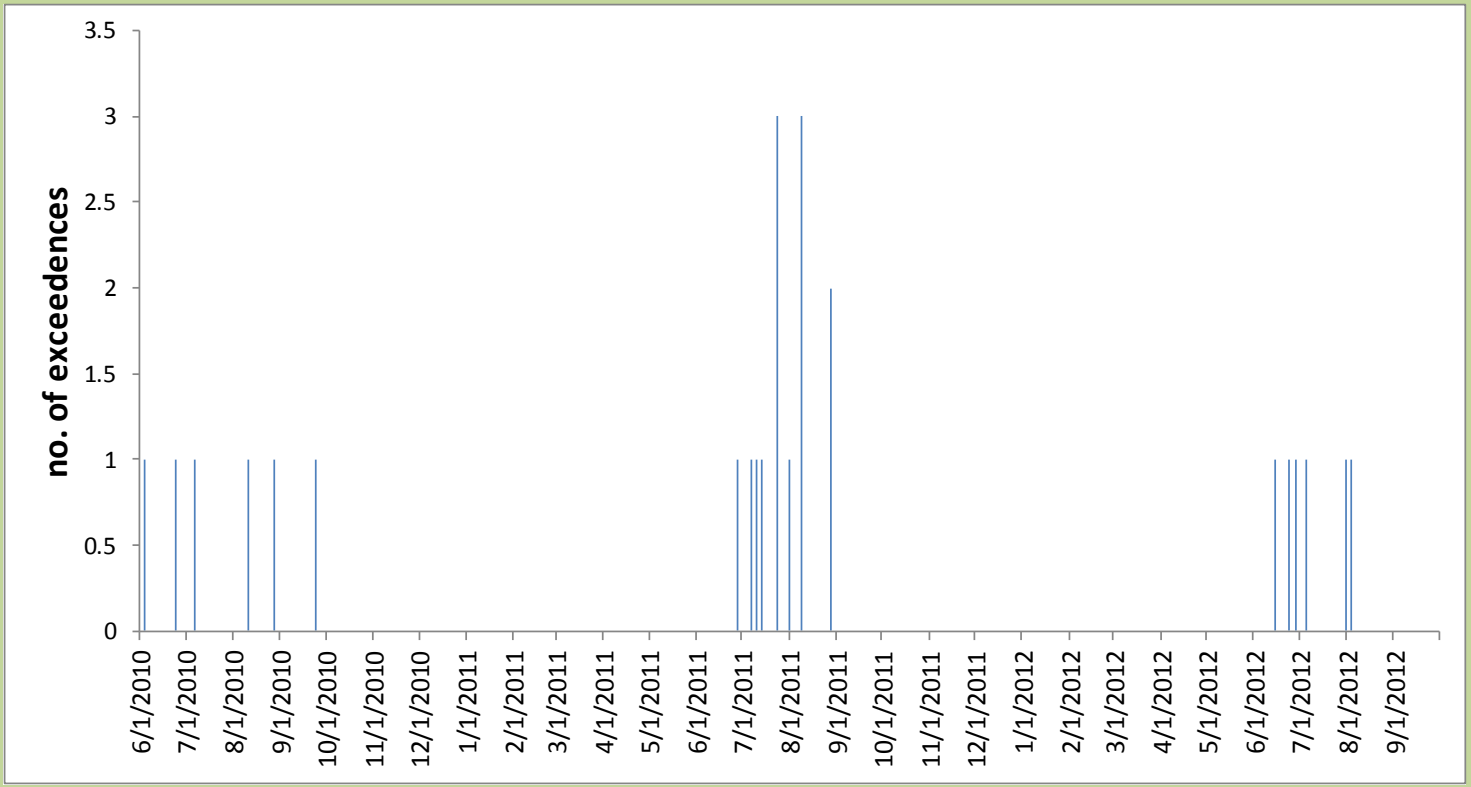
Though the states' methods differ, almost all rest on the assumption that monitors will be deployed primarily for short durations (30 days or less).

EPA recommends making determinations of impairment for conventional pollutants when *"when more than "10% of measurements exceed the water quality criterion." (EPA 2005)*

Though not stated explicitly, this recommendation assumes assessments are based on low-frequency discrete monitoring datasets, NOT ConMon.

Accounting for natural exceedences is the biggest challenge.

- The longer the deployment, the more natural variability will be captured, increasing the risk of “false positives”.

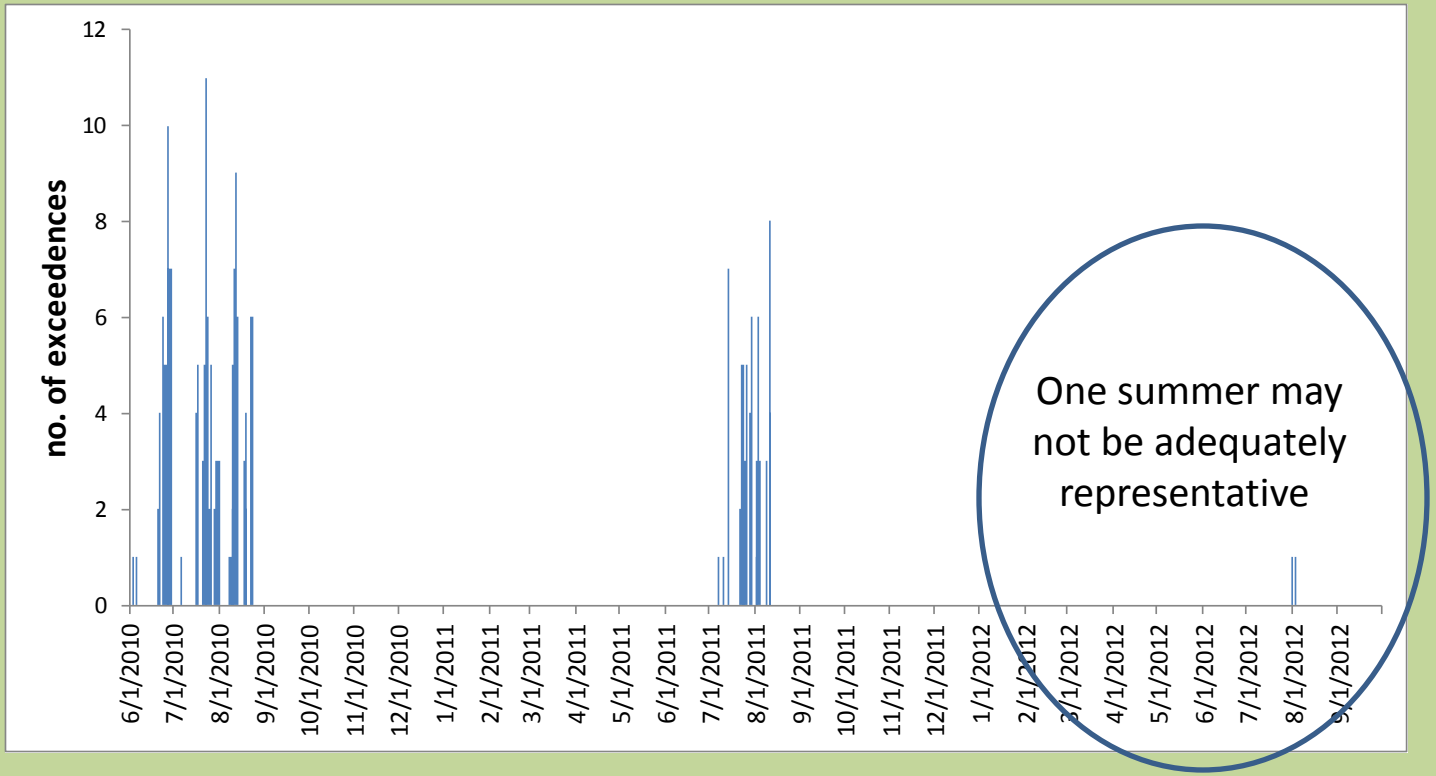


Are these exceedences “natural” or anthropogenic?

Accounting for natural exceedences is the biggest challenge.

- The longer the deployment, the more variability will be captured. More variability => increased risk of “false positives”

- But there is so much variability in the Bay waters, it is likely we will have “false negatives” if we have short deployments.



We need a method that:

- Is protective while allowing for natural variability
- Is sensitive enough to detect impairment without requiring a long deployment
- Includes frequency and duration
- Easy to implement

Proposed Methodology:

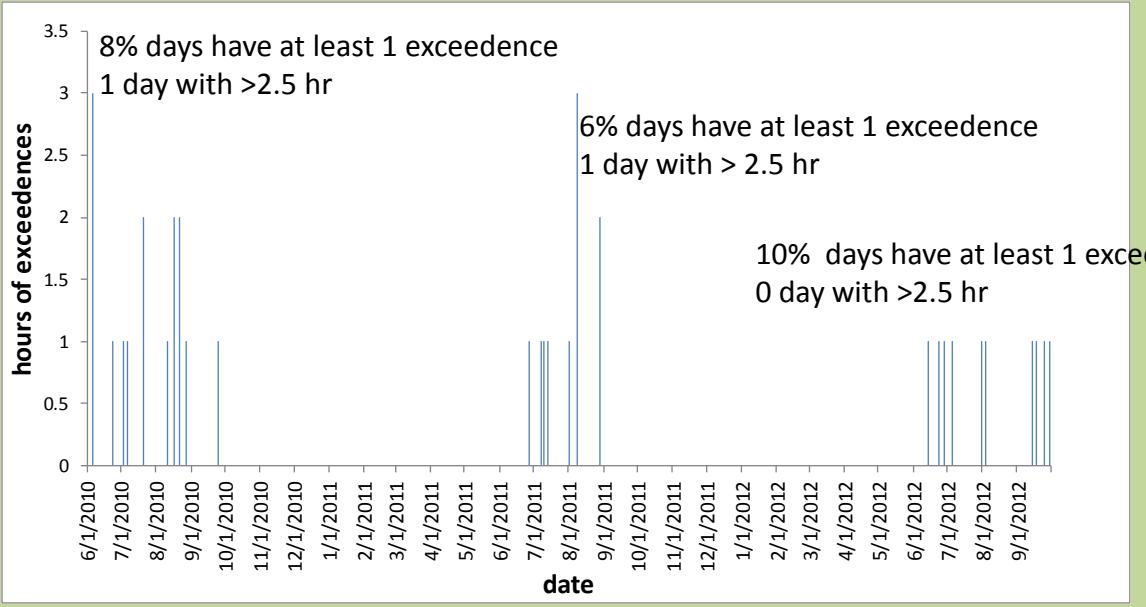
A determination of DO impairment will be made:

-If at least one DO exceedence was observed on more than 10% of the days monitored in a single season. (e.g., 120 days X 10% = 12 days can have an exceedence)

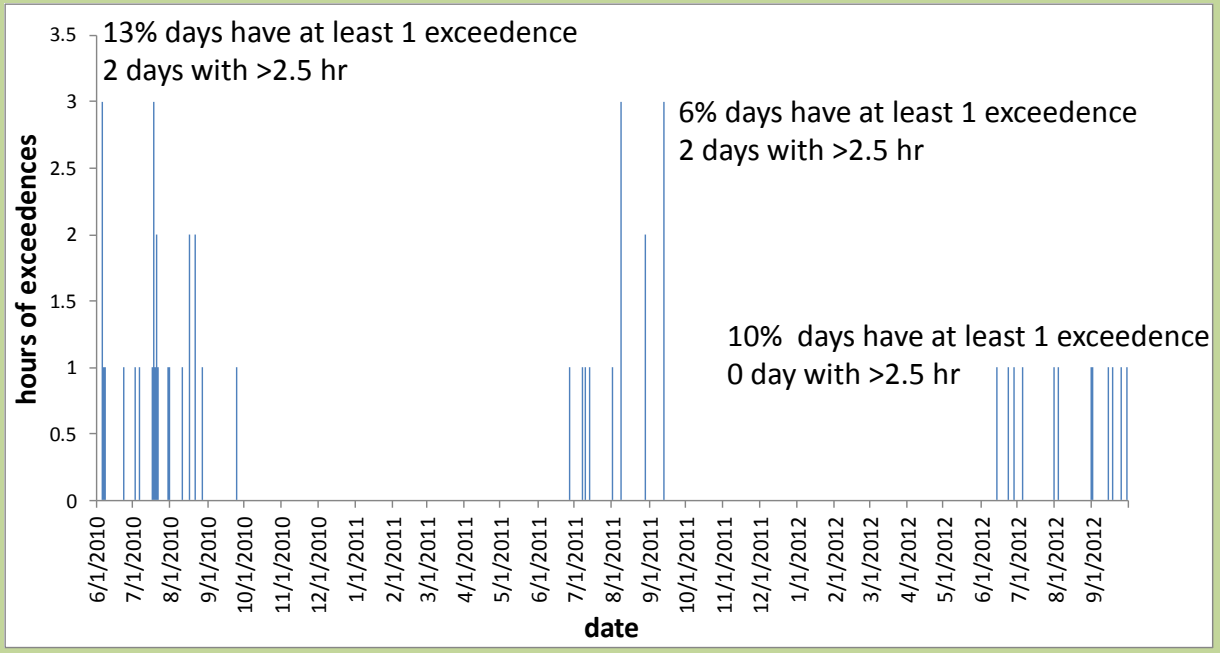
OR

- If there is more than one day in a single season where the DO concentration exceeded the criterion more than 10% of the time (e.g., 2.5 hours)

← Attainment of IM criterion



Non-attainment of IM criterion→



Segment (years assessed)	no more than 10% of days during a single season w/ exceedence	no more than one day with >2.5 hr exceedence during a single season
APPTF (2006-2008)	meets	meets
CHKOH (2006-2008)	meets	meets
JMSTF2(2006-2008)	meets	meets
JMSTF1 (2006-2008)	meets	meets
JMSOH (2006-2008)	meets	meets
JMSMH (2006-2008)	meets	fails
JMSPH (2006-2008)	meets	fails
LAFMH (2012-2013)	fails	fails
mainstem MOBPH (2008-2010)	meets	meets
Dyer Creek MOBPH (2010-2012)	meets	fails

This approach is in line with EPA's "10% rule", and it protects aquatic life from acute hypoxia—which is what minimum DO criteria are supposed to do.