

**ENVIRONMENTAL APPEALS BOARD  
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C.**

	)
CITY OF TAUNTON	)
Wastewater Treatment Plant	)
Plaintiffs,	)
v.	)
EPA Region I	)
Defendants.	)
	)

**DECLARATION OF BENJAMIN M. KIRBY**

I, Benjamin M. Kirby, make the following declaration:

1. I am employed by Hall & Associates as an Environmental Engineer and received my B.S. in Civil and Environmental Engineering from Virginia Tech in 2012.
2. I am familiar with the action filed by the City of Taunton regarding the imposition of permitted TN effluent limits by EPA Region 1 and have assisted extensively in the evaluation of the UMass Dartmouth – School for Marine Science and Technology (SMAST) data and preparation of the charts included in the City of Taunton’s comments and opening brief. EPA included a host of new graphs and regression analyses in its Response to Comments (at 88, 91-95, 99, 109-111, 114). These analyses were purportedly based on the 2004-2006 SMAST data. However, such data were not provided in EPA’s certified index. Hall & Associates requested a copy of these data from EPA counsel, Samir Bukhari.

3. On June 16, 2015, Mr. Bukhari sent via email the SMAST data developed by SMAST/Massachusetts Estuaries Project (MEP) for the *Summary of Water Quality Monitoring Program for the Mount Hope Bay Embayment System (2004 – 2006)* report and purportedly used in the derivation of Taunton's TN effluent limit. *See* Attachment 1. These data plots contain a number of anomalies, are not reproducible from the provided SMAST dataset provided by EPA, and misrepresent the actual growing season responses.
4. When attempting to duplicate data plots presented by EPA in Taunton's permit and the Response to Comments, I noticed discrepancies between the data supplied by Mr. Bukhari and the data presented by EPA in the Taunton permit documents. Specifically, Figures R4, R5, R6, R7, and R9 have missing, additional, and/or adjusted data points with no explicit justification or explanation in the permit or Response to Comments (at 91-94, 99). These charts do not reflect the data provided by Mr. Bukhari.
5. In Fig. R4 (Response to Comments at 91), there are at least two additional data points that are absent from the EPA-provided dataset (circled in red; *See* Att. 2). When plotting the EPA-provided dataset, two additional data points are evident - the data from Station 2 on 9/2/05 and Station 19 on 8/30/04 (circled in red; *See* Att. 2). The data in Fig. R4 are clustered such that there may be other missing or added data points that cannot be visually identified.
6. In Fig. R5 (Resp. to Comments at 92), there appear to be missing, additional, and/or adjusted data. To duplicate Fig. R5, I plotted data from Stations 1, 2, 18, and 19 from 2004-2006. Fig. R5 has seven data points inconsistent with the supplied dataset (circled in red; *See* Att. 3). In attempting to determine the station and date of these inconsistent data, I plotted the provided data for all years and all stations (*See* Att. 3). However,

several of the inconsistent data do not appear in the supplied dataset. Moreover, the provided dataset includes at least three data which do not appear in Fig. R5 (circled in red; *See Att. 3*).

7. In Fig. R6 (Resp. to Comments at 93), I plotted the Taunton River data using Stations 1, 2, 18, 19, and 21, as indicated in the figure title. The stations used to represent Mount Hope Bay are not explicitly reported. I added one station at a time in an attempt to replicate the data in Fig. R6. I concluded that the Mount Hope Bay stations include Stations 3, 5, 7, 8, 11-16, and MOOR/DO. The datum at ( $x = 19.95$  ug/L chl-a,  $y = 2.14$  mg/L min. DO) in Fig. R6 is from Station MHB14 in 2006, indicating that MHB14 is included in the MHB dataset. However, the Station MHB14 datum from 2005 ( $x = 12.15$  ug/L chl-a,  $y = 0.72$  mg/L min. DO) is absent from Fig. R6 (circled in red; *See Att. 4*). In addition, there are also at least two extra MHB data points and one omitted Taunton datum in Fig. R6 when compared with the provided dataset (circled in red; *See Att. 4*).

8. Fig. R7 (Resp. to Comments at 94) includes one extra or adjusted Taunton River datum and MHB datum (circled in red; *See Att. 5*). The provided dataset includes at least two additional or adjusted Taunton River data and two MHB datum (circled in red or identified with red arrow; *See Att. 5*). The data in Fig. R7 are clustered such that there may be other missing, added or adjusted data that cannot be visually identified. To represent MHB, I included Stations 3, 5, 7, 8, 11-16, and MOOR/DO.

9. In Fig. R9 (Resp. to Comments at 99), several inconsistencies were encountered. I determined that the figure title contained a typo as the datum from Station MHB1 in 2006 ( $x = 0.74$  mg/L TN,  $y = 4.14$  mg/L min. DO) is included in Fig. R9. The title should therefore read “[...] Taunton River (Stations 1, 2 – 2004-06; 18, 19 – 2004-05).” In

comparing the Taunton River datasets, there are two additional data greater than 0.65 mg/L TN in Fig. R9 than the provided dataset. In comparing the MHB datasets, Fig. R9 omits the 2005 datum from Station MHB14 ( $x = 0.409$  mg/L TN,  $y = 0.72$  mg/L min. DO) (circled in red; *See Att. 6*). In general, many of the data in Fig. R9 appear inconsistent with the provided dataset (*e.g.*, boxed and circled in red; *See Att. 6*). In fact, the trendline through the provided MHB data exhibits a positive slope as opposed to the slightly negative slope presented in Fig. R9. To represent MHB, I included Stations 3, 5, 7, 8, 11-16, and MOOR/DO from 2004-2006. Something is clearly amiss with this analysis.

**10.** Throughout my analysis, it became clear that several of the data plots and trendlines were driven primarily by outlying data points. For example, in Fig. R4, data from an individual day drive the trendline rather than the controlling growing season average data. Relying on data from relatively few individual days (12 days including 9/2/05) is subject to greater variability that may mislead the analysis. EPA's Fact Sheet and sentinel site selection process were based on growing season SMAST data (Fact Sheet at 22-23, 26-30). There is no rationale presented in the Response to Comments for switching certain graphs to daily reading assessments. If the four data from 9/2/05 are viewed as outliers, the suggested response of chlorophyll-a to TN is considerably reduced. At the same time, the  $R^2$  for the linear trendline decreases from 0.31 to 0.04, suggesting no significant statistical relationship and no predictive capabilities whatsoever. *See Att. 7.*

**11.** In Figure R5, the removal of the 2006 datum (during a year in which EPA acknowledged was an extreme wet year and as such, should be excluded from the

analysis; Fact Sheet at 26, Resp. to Comments at 81) for Station MHB2 (circled in red; *See Att. 8*) results in a nearly horizontal (but slightly increasing) trendline, indicating no demonstrable relationship between average chlorophyll-a and minimum DO in the Taunton River. My analysis included Stations 1, 2, 18, and 19.

**12.** EPA's Response to Comments and correspondence underscored that the analysis must focus on limiting TN to control chlorophyll-a to ensure no daily minimum DO below 5.0 mg/L occurs (at 72-75; Fact Sheet at 30; *See Att. 9 - EPA Region 1 letter to Mayor Hoye – 12/29/14*). To analyze the efficacy of the Taunton TN permit limit to achieve minimum DO objectives, I plotted annual minimum DO vs. average annual TN for all stations and all years included in the SMAST dataset. *See Att. 10*. The data indicate that a 0.45 mg/L TN threshold cannot possibly ensure a minimum DO for the Taunton River Estuary or Mount Hope Bay. When TN averages less than 0.45 mg/L, the data indicate that the minimum DO can range between 0.72-6.51 mg/L. When TN averages greater than 0.45 mg/L, the minimum DO can range from 2.14-7.07 mg/L. Thus, it is apparent that meeting a 0.45 mg/l TN objective will not result in any minimum DO improvement based upon the SMAST dataset.

**13.** EPA has informed Taunton that controlling chlorophyll-a is the key factor to meeting the minimum DO criteria (*See Att. 11 - EPA Region 1 letter to Mayor Hoye – 05/07/15; Resp. to Comments at 80, 91*). To further explore the sufficiency of the Taunton TN permit limit and its connection to chlorophyll-a and DO levels, I plotted bottom DO and chlorophyll-a data, used in Fig. R2 in the Response to Comments, from the Rhode Island Department of Environmental Management (RIDEM) from June-October 2011 in a box-and-whisker plot. *See Att. 12*. These data are from the same RIDEM dataset used in

Figures R2a and R2b (Resp. to Comments at 57). Below the alleged threshold of 5 ug/L chl-a (EPA's asserted excellent water quality), the daily minimum DO can range from 0.67-9.04 mg/L. While the median and average bottom DO in the 0-5 ug/L chl-a range are slightly above 5.0 mg/L, 46% of the bottom DO readings in this chl-a range fall below 5.0 mg/L. Thus, it is clear that even minimal algal growth does not ensure attainment of the 5.0 mg/l minimum DO criteria.

**14.** It should also be noted that the 2011 RIDEM data indicate that the minimum DO increases with increasing chlorophyll-a in both surface and bottom readings. *See* Att. 13. EPA's assertion that chlorophyll-a levels control minimum DO in the Taunton River Estuary or Mount Hope Bay (*See* Att. 11 - EPA Region 1 letter to Mayor Hoye – 05/07/15; Resp. to Comments at 80, 91) is obviously incorrect based on the RIDEM data identified by EPA also.

**15.** When the 2005 and 2010 RIDEM MHB daily average chl-a data are plotted (same source data as Figures 5 and 6, *see* Fact Sheet at 25), it is apparent that seasonal average chl-a levels have dropped over 22%, from 12.85 ug/L to 9.96 ug/L (*See* Att. 14). Supposing that TN reductions contributed to reduced seasonal chl-a, there is still no evidence that the Taunton River Estuary or Mount Hope Bay has responded with increased minimum DO (*See* Att. 12, 13). The conceptual model presented in the Fact Sheet (at 15) lists increased organic matter production and low DO as a primary and secondary symptom of nutrient enrichment, respectively, resulting in use impairment. Therefore, if reduced chl-a concentrations do not result in improved DO conditions, then reducing nutrients (aimed at reducing chl-a) cannot be expected to result in improved DO.

16. Although EPA claims only one SMAST monitoring station met the 5.0 mg/L minimum DO standard each year from 2004-2006 (Fact Sheet at 29; Resp. to Comments at 100), there were, in fact, two such monitoring stations, MHB10 and MHB16. *See Att.*

15. While meeting the minimum DO standard at MHB10, annual average TN ranged from 0.48-0.57 mg/L and annual average chl-a ranged from 8.5-14.6 ug/L. While meeting the minimum DO standard at MHB16, annual average TN ranged from 0.44-0.50 mg/L and annual average chl-a ranged from 10.3-14.1 ug/L. All but two of these TN and chl-a values exceed the alleged 0.45 mg/L TN and 3-5 ug/L chl-a thresholds used in deriving Taunton's TN permit limit but nevertheless result in compliance with the minimum DO standard. This indicates that higher TN levels can allow for attainment of the minimum DO criteria and that algal levels above 3-5 ug/l can maintain the minimum DO criteria.

17. Moreover, while the annual average TN at MHB8 (2005), MHB11 (2004 and 2005), and MHB12 (2004) ranged from 0.44-0.45 mg/L, the corresponding minimum DO values violated the 5.0 mg/L minimum DO standard, ranging from 2.6-4.0 mg/L, further invalidating the TN thresholds selected by EPA for the Taunton permit analyses. *See Att.*

16.

18. Numerous scientific reports have indicated that stratification is the major driver of low DO in Narragansett Bay and Mount Hope Bay. *See Att.* 17.

Much of the water column in Mount Hope Bay remained well-stratified during summer periods, mostly a result of salinity and temperature conditions, and mixing with bottom water was often limited during these periods. If surface low dissolved oxygen events are "biologically" significant, their impacts on the benthic community may be minimized by water column stratification. We have also shown that surface waters from greater Narragansett Bay can, at times, control the concentration of dissolved oxygen in Mount Hope Bay waters. This reflects, in part, the importance of exchange between Mount Hope Bay and

Narragansett Bay both in magnitude (volume), and over relatively rapid (on the order of days) time scales of mixing. The critical period for low dissolved oxygen concentrations appears to be during the late summer months, when freshwater input is low and bay water is at its warmest. (Krahforst and Carullo, 2008).

The general increase in the severity of hypoxia on a northward gradient up Narragansett Bay can largely be explained by a corresponding increase in stratification (Fig. 3) that inhibits the mixing of the well oxygenated surface waters to the bottom. Periods of reduced wind and tidal mixing with their associated increase in stratification can be expected to have the lowest DO, as was observed by the buoys (Fig. 2). In parts of the Bay where hypoxia occurs but does not persist, such as the West Passage (Fig. 4), it appears that periods of below average mixing are required for hypoxia to occur at all. [...]

Another compounding factor is that we found the water temperatures in the West Passage and upper parts of Narragansett Bay were typically between 1–3°C warmer those at the mouth of the Bay during the 2001 NMFS surveys. Warmer temperatures result in both higher respiration rates and lower oxygen solubility. Bergondo et al. (2005) found that the greatest risk of hypoxia occurred when the tidal range was below 1 m. (Melrose, Oviatt, Berman, 2007).

These excerpts and reports conclude that stratification is the main contributor of low DO conditions in Narragansett Bay and Mount Hope Bay and that thermal conditions in Mount Hope Bay influence the occurrence of low DO. However, EPA believes, “[...] the hypothesis that stratification is the primary factor influencing DO in Mount Hope Bay, but not in the Taunton River, is entirely unsupported” (Resp. to Comments at 48). EPA reiterates, “[w]hile EPA agrees that stratification and SOD are also factors influencing DO in estuarine waters, the commenter’s hypothesis that stratification is “the primary factor triggering low DO” is unsupported by any evidence (and clearly not “demonstrated” as claimed in the comment)” (*Id.* at 87). EPA’s contention is plainly incorrect based upon the detailed hydrodynamic and stratification impact analyses that have been conducted for this system. The basis for EPA’s contrary position is unknown and unreferenced in its response to comments.



If EPA indeed considered the site-specific scientific literature presented in Att. 17 as claimed in its response to comments, EPA failed to justify the basis for ignoring or discounting the researchers' well-documented conclusions.



Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 30, 2015



Benjamin M. Kirby  
Environmental Engineer  
Hall & Associates  
1620 I St. NW, Suite 701  
Washington, DC 20006

District of Columbia: SS  
Subscribed and sworn to before me, in my presence,  
this 30 day of JUNE, 2015



Luther L. Roberts III, Notary Public, D.C.

My commission expires April 14, 2016.



## ATTACHMENTS

1. Email – Samir Bukhari to John Hall - RE: We need a document please (06/17/15)

**From:** [Bukhari, Samir](#)  
**To:** [John Hall](#)  
**Cc:** [Benjamin Kirby](#)  
**Subject:** RE: We need a document please  
**Date:** Wednesday, June 17, 2015 12:02:55 PM  
**Attachments:** [MHB 2004 Final Client.pdf](#)  
[MHB 2004 Final Client.xls](#)  
[MHB 2005 Client Final.pdf](#)  
[MHB 2005 Client Final.xls](#)  
[MHB 2006 Client Final.pdf](#)  
[MHB 2006 Client Final.xls](#)  
[Mt. Hope Bay Streams Water Quality Data A E.PDF](#)  
[Mt. Hope Bay Streams Water Quality Data A E.XLS](#)

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John,

The files are attached in PDF and Excel format.

Samir

Samir Bukhari  
Assistant Regional Counsel  
US EPA Region 1  
5 Post Office Square  
Boston, MA 02109-3912  
(617) 918-1095

**From:** John Hall [mailto:[jhall@hall-associates.com](mailto:jhall@hall-associates.com)]  
**Sent:** Wednesday, June 17, 2015 10:15 AM  
**To:** Bukhari, Samir  
**Cc:** Benjamin Kirby  
**Subject:** We need a document please  
**Importance:** High

Samir

In EPA's final response to comments, as you know, numerous new graphs were created by EPA using Appendix D of the 2007 SMAST report. That appendix is not part of the published SMAST report – please provide us with a copy of that document that the Response utilized to create the charts.

Thanks

*John*

John C. Hall  
Hall & Associates  
1620 I Street, NW, Suite 701  
Washington, DC 20006

Phone: 202-463-1166

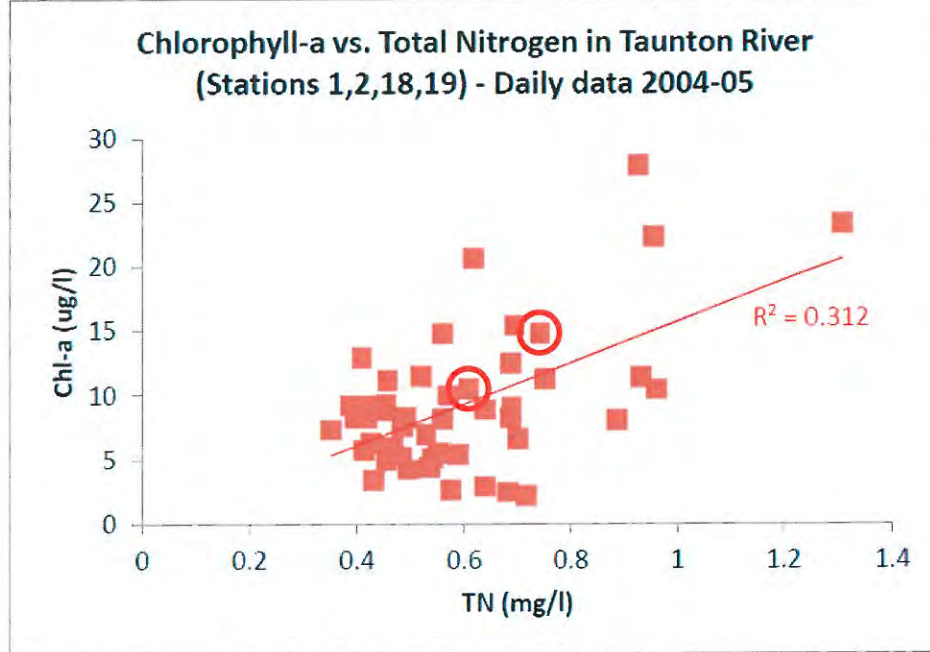
Fax: 202-463-4207

E-Mail: [jhall@hall-associates.com](mailto:jhall@hall-associates.com)

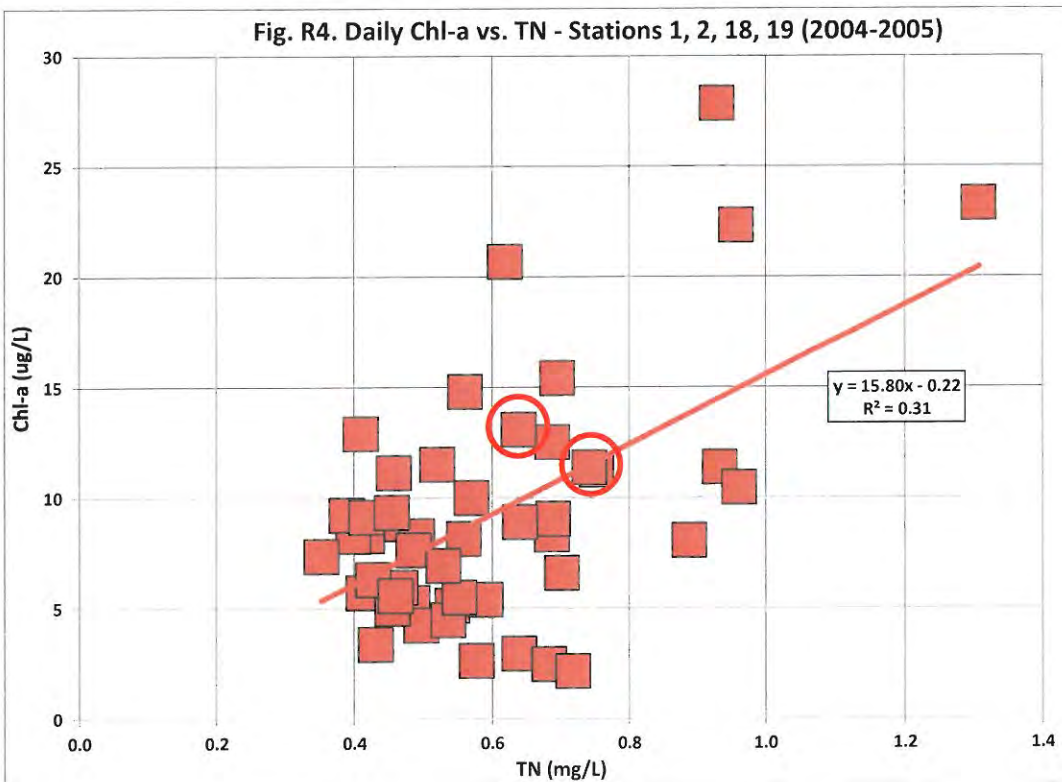
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2. EPA Response to Comments Fig. R4 vs. EPA-provided Data

Figure R4.

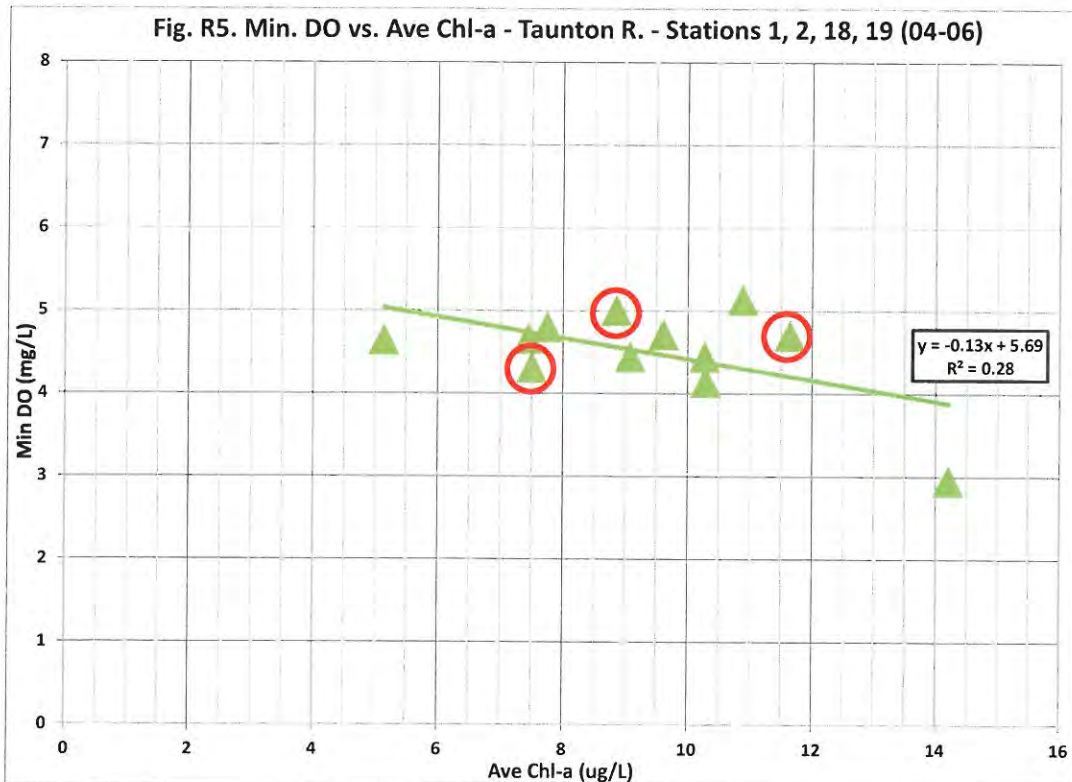
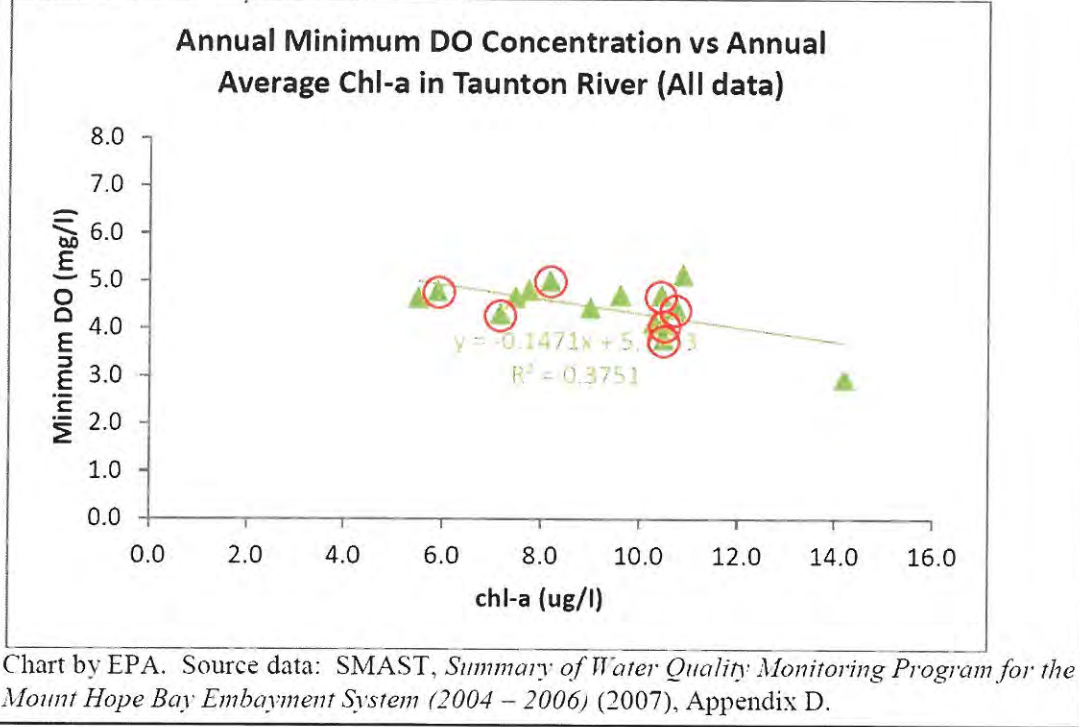


Charts by EPA. Source data: SMAST. *Summary of Water Quality Monitoring Program for the Mount Hope Bay Embayment System (2004 – 2006)* (2007). Appendix D.

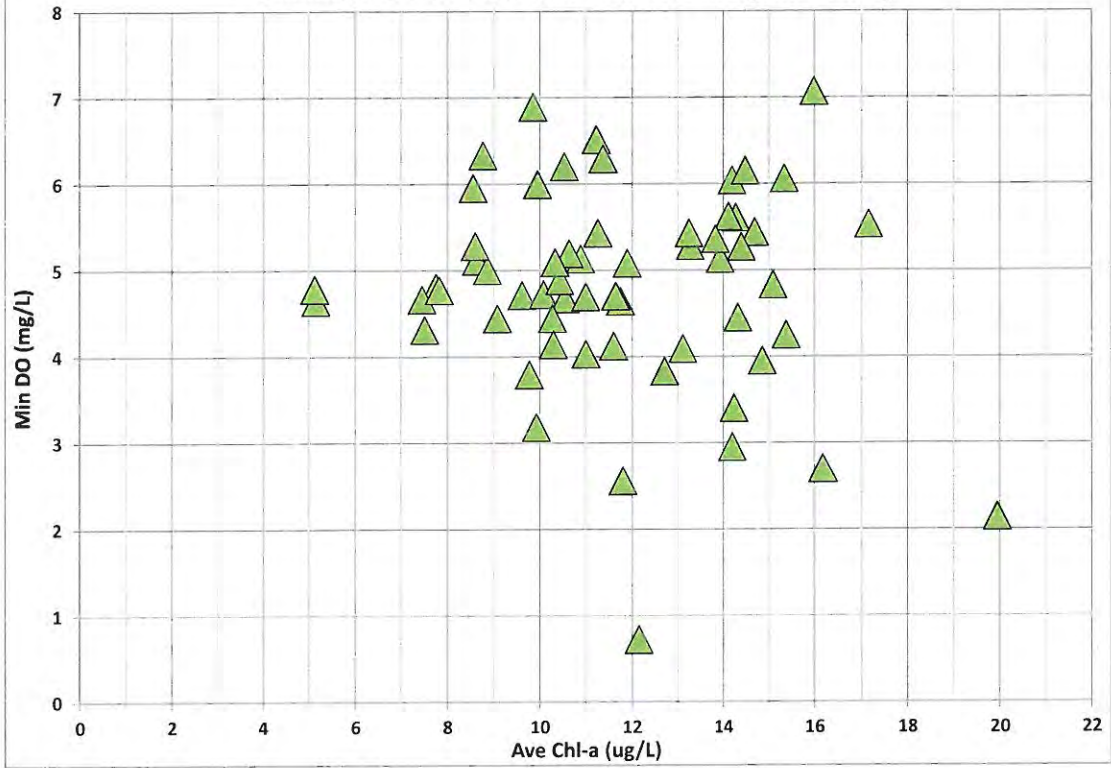


3. EPA Response to Comments Fig. R5 vs. EPA-provided Data

Figure R5.

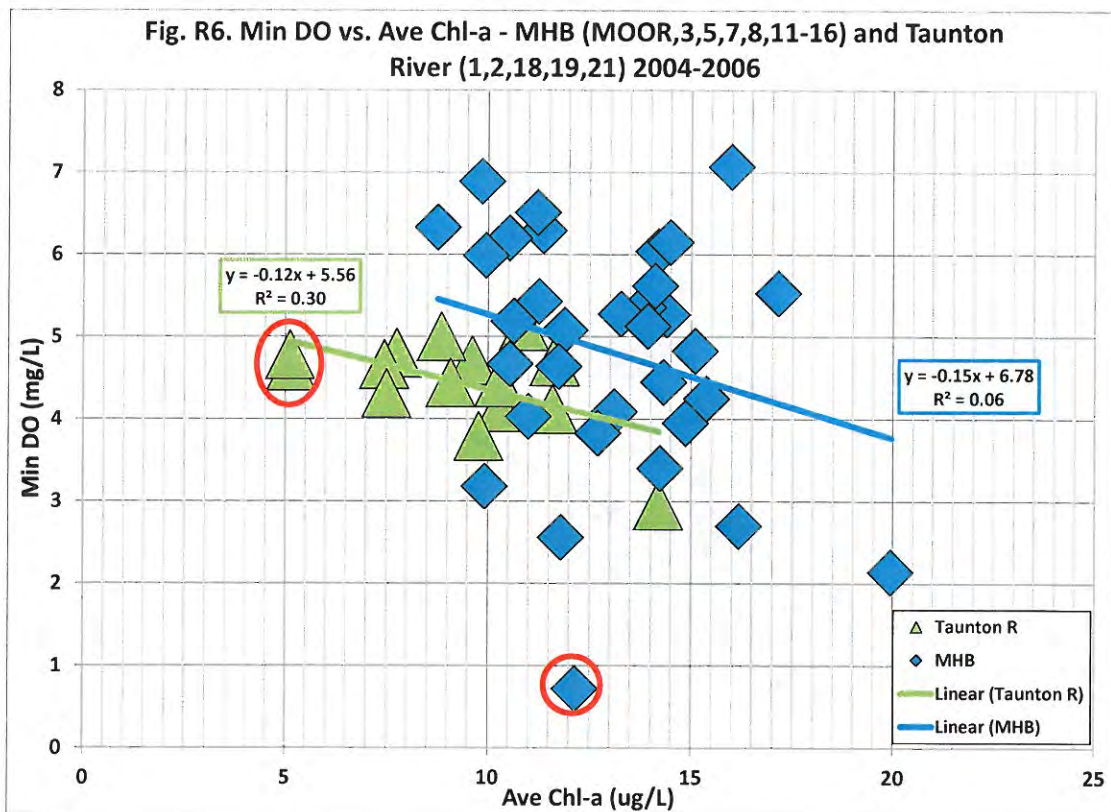
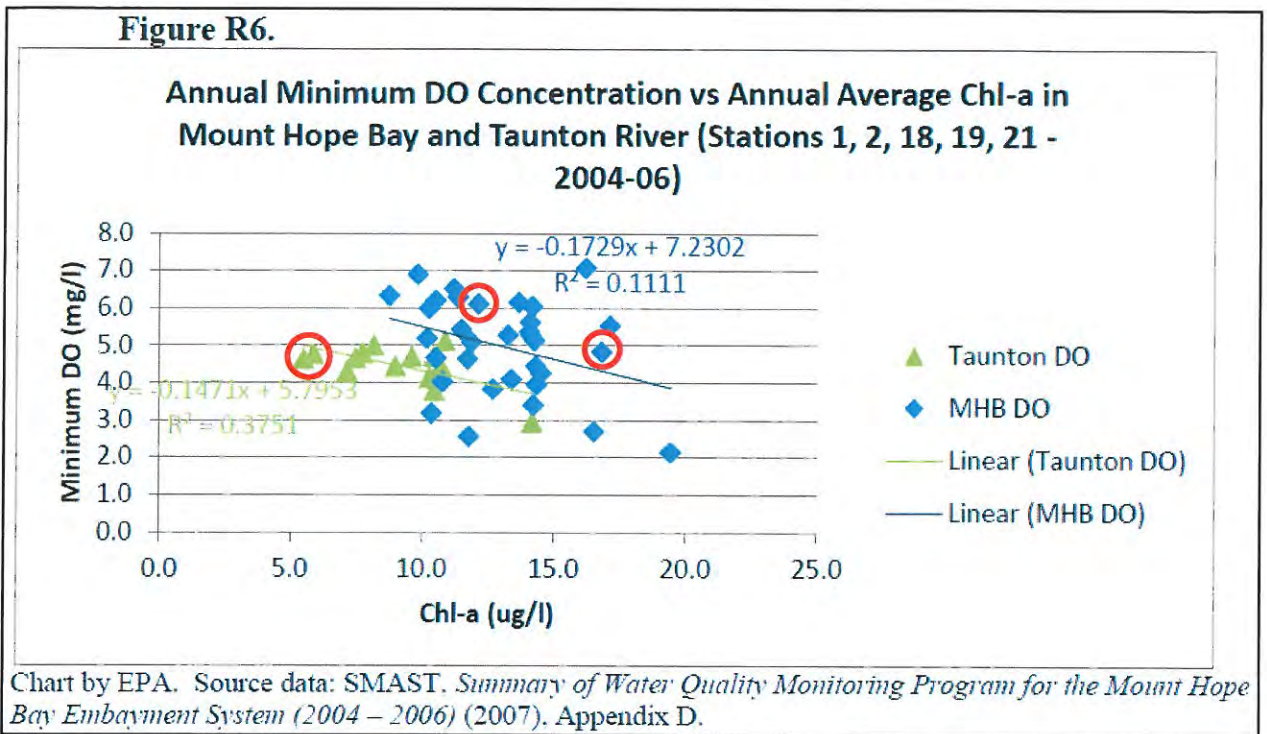


Minimum DO vs. Ave Chl-a - All Stations (2004-2006)

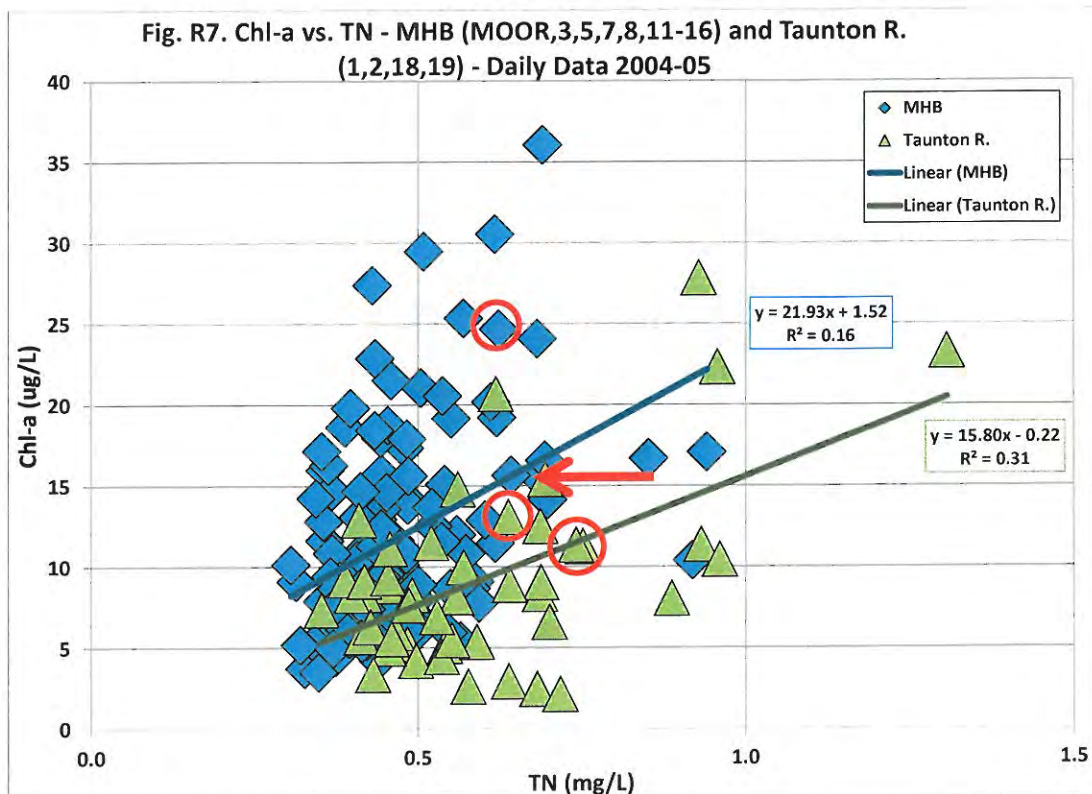
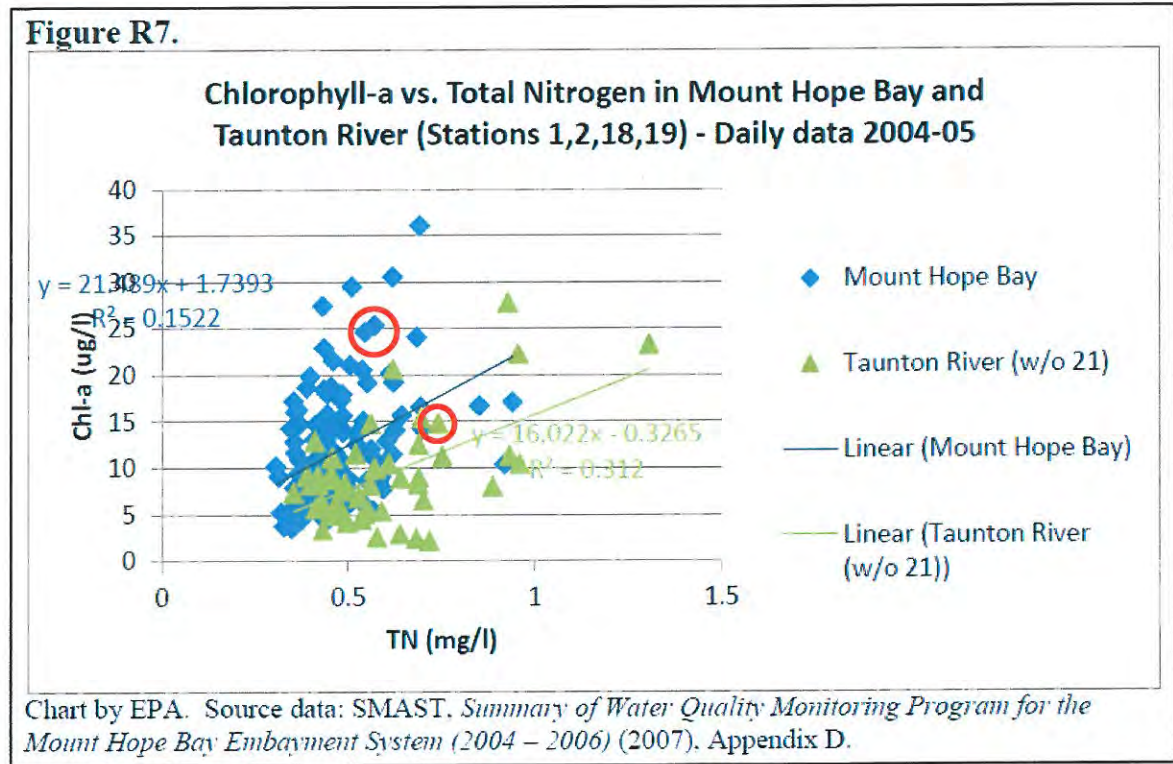




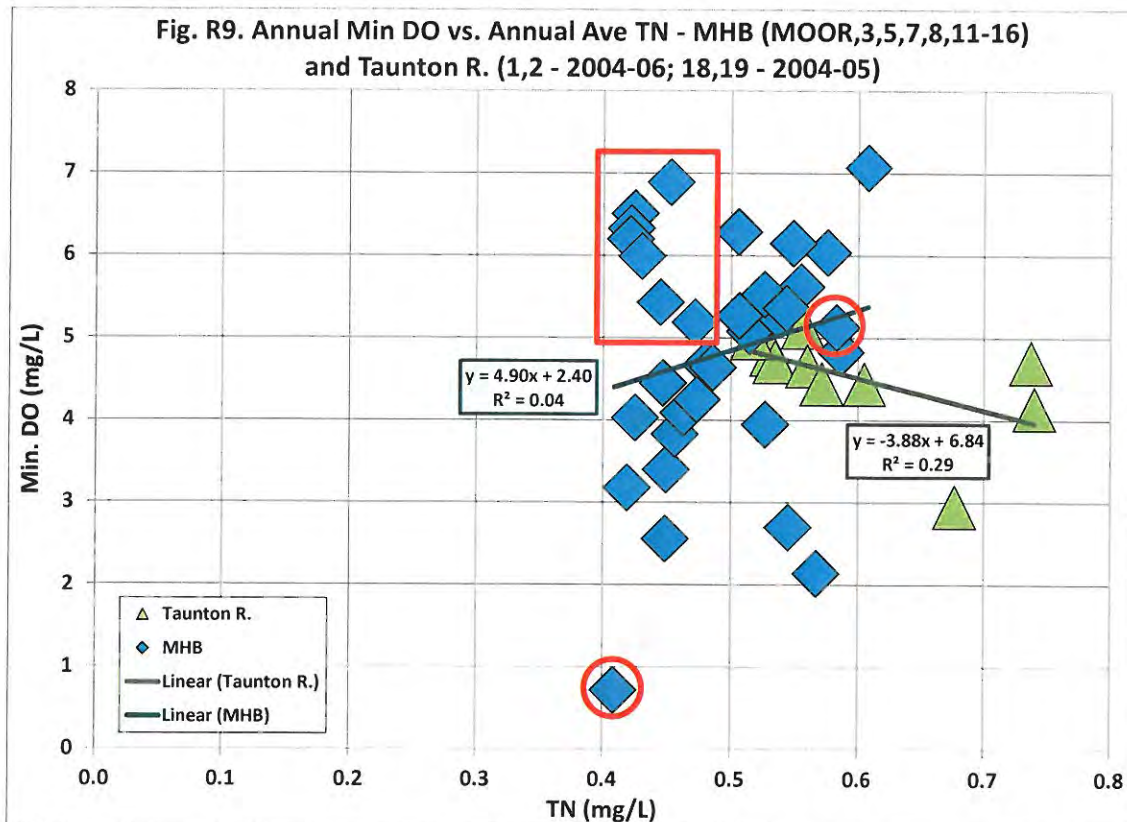
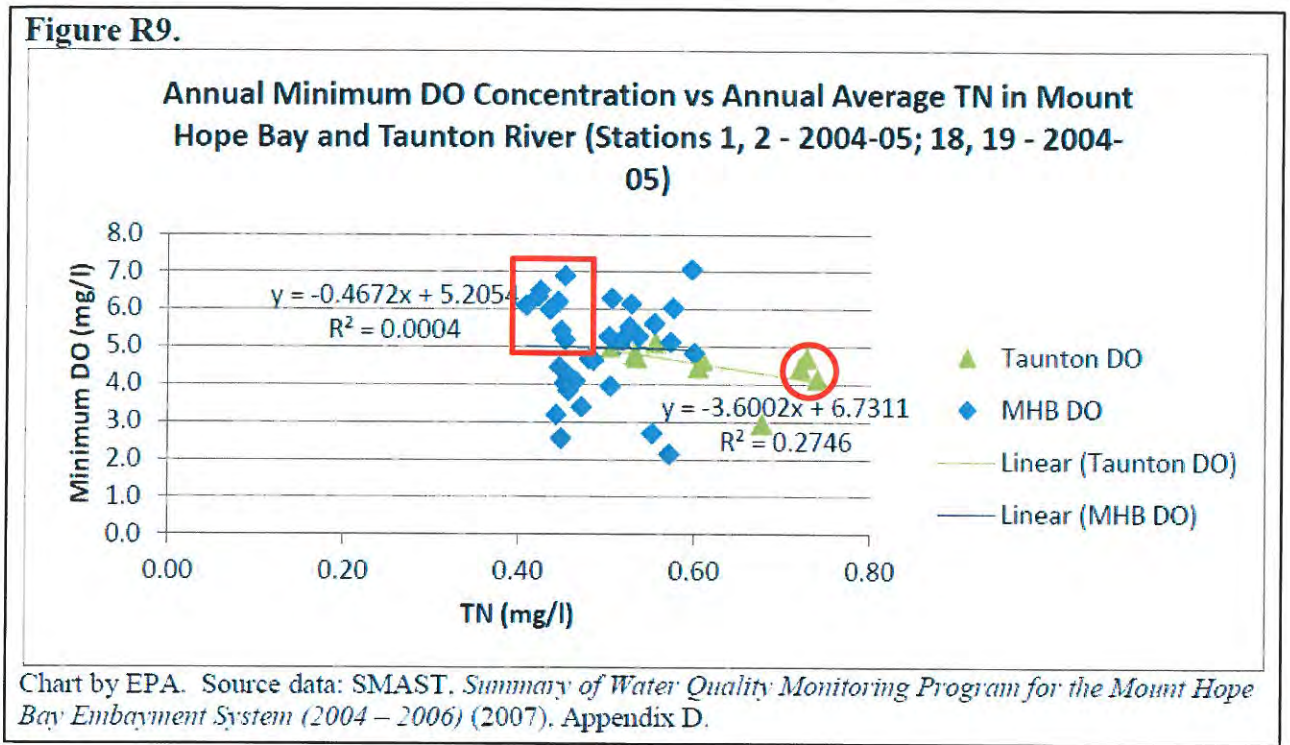
4. EPA Response to Comments Fig. R6 vs. EPA-provided Data



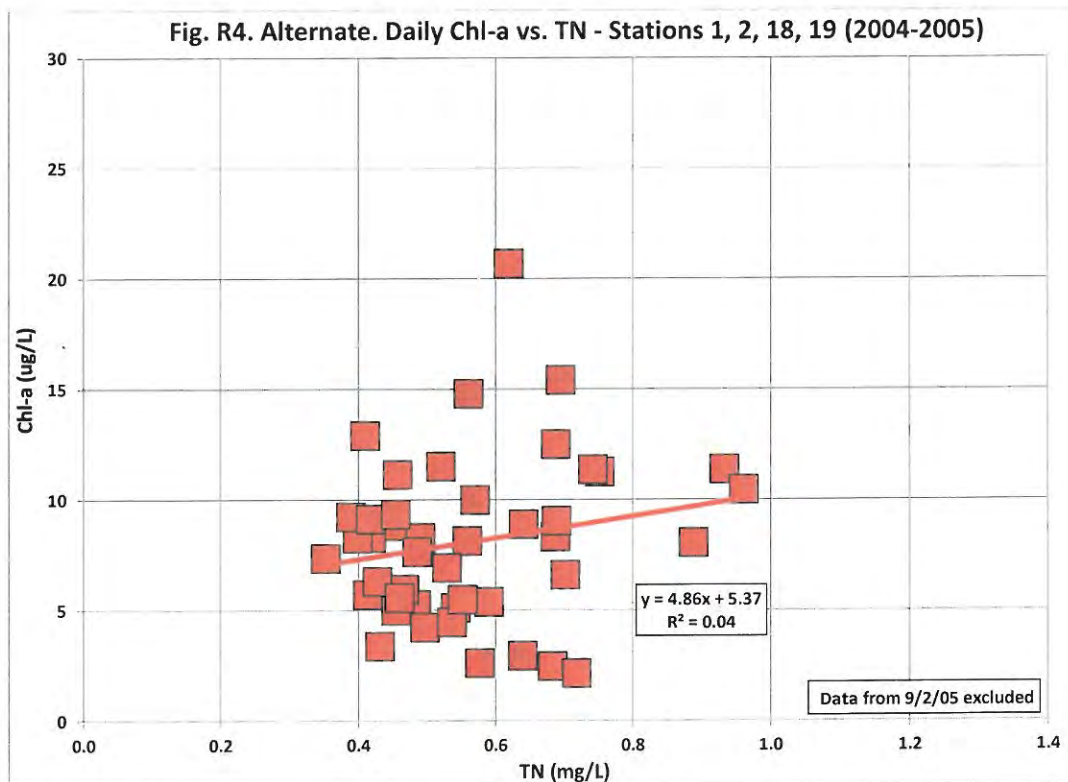
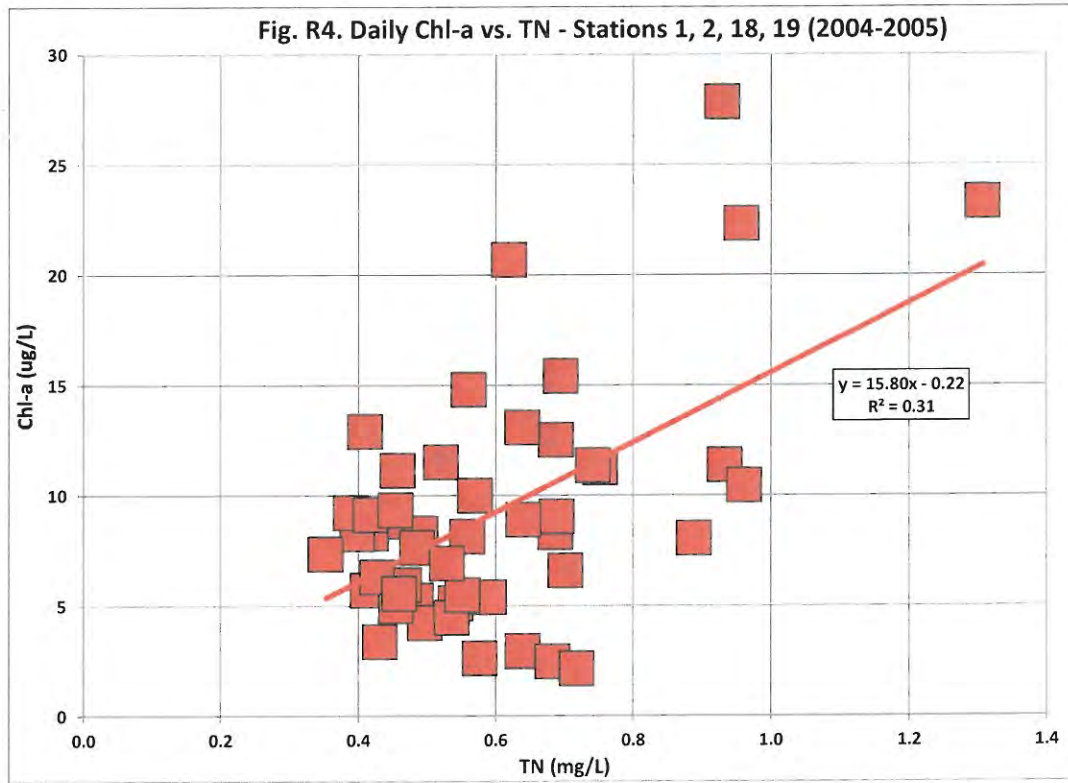
5. EPA Response to Comments Fig. R7 vs. EPA-provided Data



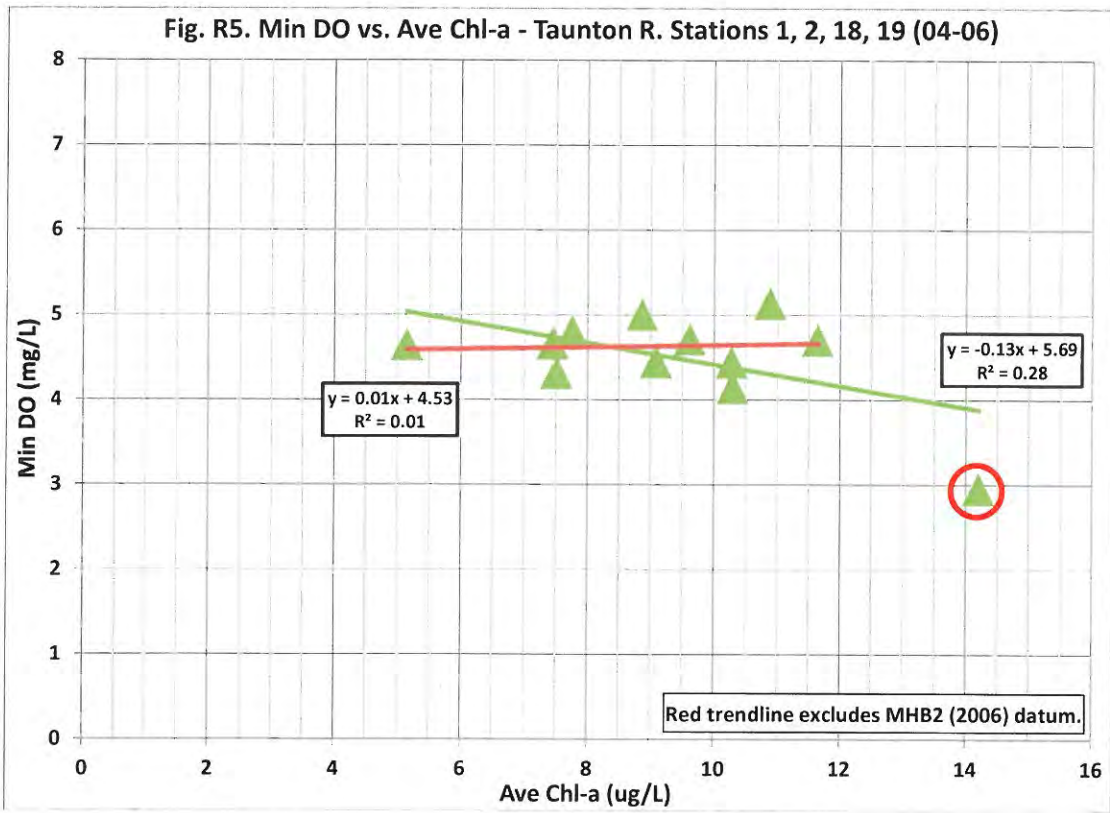
6. EPA Response to Comments Fig. R9 vs. EPA-provided Data



7. Fig. R4 vs. Fig. R4 Alternate with 9/2/05 Data Excluded



8. Fig. R5 Alternate with MHB2 2006 Datum Excluded



**9. 12/29/14 EPA Region 1 letter to Mayor Hoye**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1  
5 POST OFFICE SQUARE, SUITE 100  
BOSTON, MA 02109-3912

OFFICE OF THE  
REGIONAL ADMINISTRATOR

December 29, 2014

Mayor Thomas C. Hoye, Jr.  
City of Taunton  
141 Oak Street  
Taunton, MA 02780

Re: Correspondence dated November 19, 2014

Dear Mayor Hoye:

In response to your letter of November 19, 2014, I have previously indicated our willingness to meet with the City again at our offices in Boston. I understand you will have the City's special counsel John Hall present, and the Region will also have counsel present at that meeting. To schedule that meeting please contact Nancy Grantham of my office at (617) 918-1101. Please note that EPA Headquarters will not be attending that meeting and has requested that the Region respond to this request.

First, however, I must correct the characterization in your letter regarding the outset of the September 10 meeting at Taunton City Hall. The statement that I "refused to meet" unless the City's special counsel was excluded from the meeting is incorrect. Rather, upon learning of Mr. Hall's presence I and my staff members noted that we had asked the City for a list of participants in the meeting, and had received a list that did not include Mr. Hall or any other special or outside counsel. Relying on the list that had been provided by the City, the Region did not have its own attorney present for the meeting.

This situation resulted in considerable consternation, as I would be limited in what would be discussed in a meeting where the City had outside representation but EPA's counsel was not present. I stated this to you directly, noting that we were prepared to go forward with the meeting but that it would be a different meeting than the free exchange we had hoped for. Upon your offer to have Mr. Hall sit outside, I reiterated that I was not demanding that action, although again it would be a different meeting with Mr. Hall present. I also offered to meet with the City and Mr. Hall at another time when EPA's counsel could be present. While it was unfortunate that the situation arose because of the incomplete participant list provided by the City, we did attempt to resolve it in a way that met the City's interests. Our offer to meet again with counsel present remains open and we are prepared to schedule that meeting forthwith.

Second, my staff and I clearly indicated in the meeting that the technical arguments over the permit analyses were the subject of an extensive and public administrative proceeding that included a 630 page comment package from the City, comments from numerous environmental

groups, and an extensive administrative record. In that context, and as stated at the meeting, it was not appropriate nor even possible to respond in detail to technical arguments in that meeting. In general, however, the Region stands by its conclusion that Massachusetts and Rhode Island water quality standards for nutrients and aesthetics are not being met due to nitrogen-driven cultural eutrophication in the Taunton River Estuary and Mount Hope Bay, and that cultural eutrophication has also contributed to violations of the numeric dissolved oxygen (“DO”) standards in these waters. The Region also stands by its conclusion that the Taunton WWTP’s nitrogen discharges, which represent about 14% of the total nitrogen load, “cause, have a reasonable potential to cause, or contribute” to nitrogen-related water quality violations in the Taunton River Estuary. The Region also disagrees with the speculation that other system improvements might have fixed the DO problem, based in large part on the clear evidence that the DO problem in this system continues even after those improvements. As in EPA’s original analysis, this evidence supports the finding that nitrogen reductions to reduce eutrophication are necessary to address the DO violations.

Finally, EPA’s permitting process is a public process governed by the provisions of 40 C.F.R. Part 124. Pursuant to those regulations, EPA’s permit documentation has undergone a public comment period during which all parties have had an opportunity to comment on the appropriateness or justification of any permit conditions. EPA will provide written responses to all comments received during the public comment period. All documents in support of the fact sheet and the responses to comments are contained in the Administrative Record for the draft and final permits. Upon issuance of the final permit, 40 CFR §124.19 provides procedures to administratively appeal the Region’s decision to the Environmental Appeals Board.

The City’s characterization of EPA being “unable or unwilling to share with the public the data and analysis upon which it is relying” is unfair and unfounded. The City’s representatives have declined the Region’s invitation to review the Administrative Record. We renew this offer and will make the record available for your review when you visit our offices for the proposed meeting or at any other time. The City has also submitted FOIA requests asking for documents that “show” or “confirm” various propositions. As you know, EPA has objected to how these FOIA requests were formulated on the grounds that they did not reasonably describe the records being sought. The City’s representatives declined EPA’s offers to assist in reformulating the requests so that a response could be provided, asserting its view that the requests were in fact proper. The legal issue of whether the FOIAs were properly formulated is an area of dispute between EPA and the City and is the subject of a pending administrative appeal.<sup>1</sup>

EPA’s permitting processes are established to be fair and impartial and provide opportunity for input from all stakeholders, including members of the public and the environmental community as well as the permittee. In this case, the final permit issuance will proceed according to this ordinary course, as outlined in the permit issuance regulations. EPA does not believe it is

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<sup>1</sup> We note that the FOIA requests did not accurately reflect EPA’s statements at the meeting. *Inter alia*, quoting from the FOIA request, EPA did not state that “all the money spent by municipal entities . . . did not change oxygen demanding pollutant loadings to the system, only bacteria”; did not make statements regarding a “sentinel approach” (this term has been coined by the City’s representatives to characterize EPA’s analyses and was not used by EPA); and did not make a statement that “little water quality improvement has occurred since 2004.”



appropriate to provide for assurances that final permit issuance will be delayed pending individual meetings with permittees, resolution of FOIA disputes, or some unspecified form of "objective confirmation" addressing a specific party's concerns, as requested in your letter. The Region does, however, welcome another meeting with the City and its representatives. We look forward to continuing discussion with the City, including after the final permit is issued and any appeals are resolved.

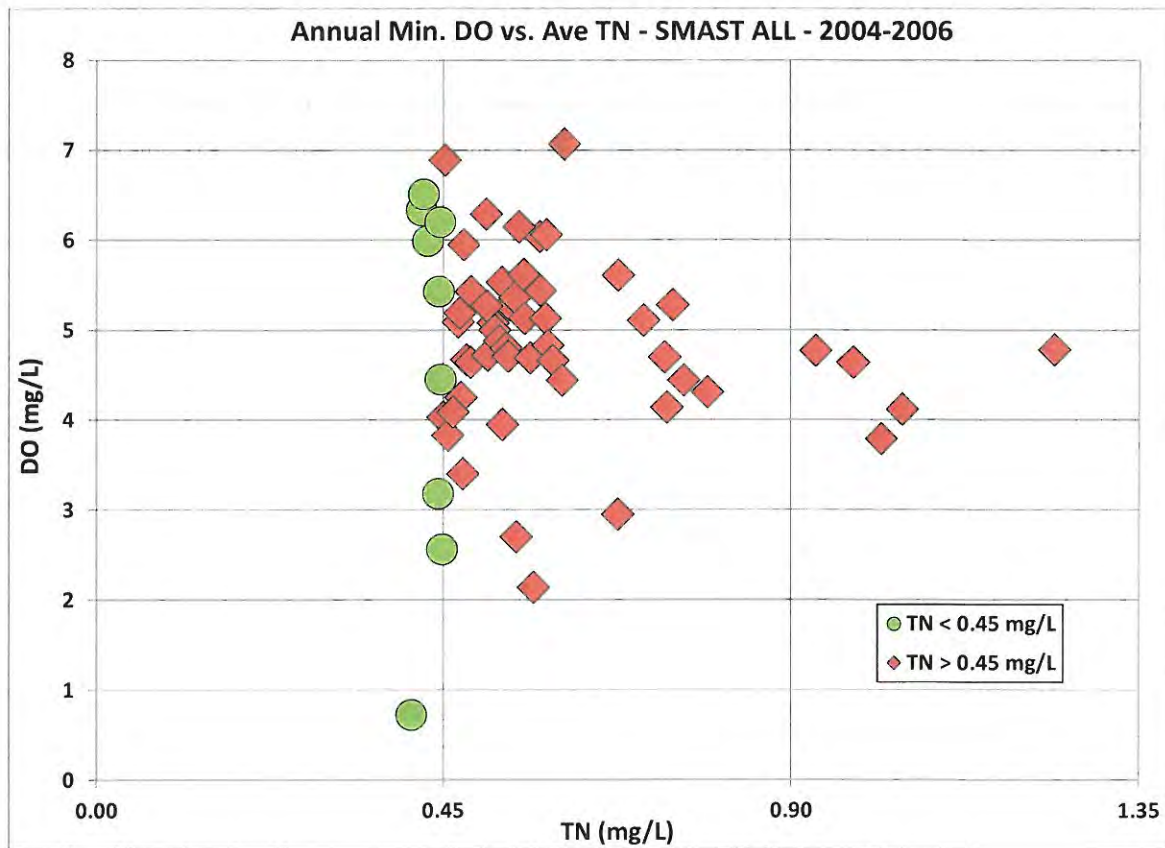
Sincerely,



H. Curtis Spalding  
Regional Administrator

cc: Ken Kopocis, OW  
Congressman Joseph P. Kennedy III  
Governor-elect Charlie Baker  
David Cash, MassDEP  
Mayor of Fall River  
Mayor of Brockton  
Massachusetts Coalition for Water Resource Stewardship  
John Hall, Hall & Associates

### 10. Taunton Permit TN Threshold Analysis



**11. 5/7/15 EPA Region 1 letter to Mayor Hoyer**



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 1  
5 POST OFFICE SQUARE, SUITE 100  
BOSTON, MA 02109-3912

May 7, 2015

The Honorable Thomas Hoye  
Mayor  
Taunton City Hall  
141 Oak Street  
Taunton, MA 02780

**Re: City of Taunton NPDES Permit TN Limit**

Dear Mayor Hoye,

This letter responds to the March 10, 2015 email correspondence from John Hall (special counsel to the City of Taunton), which summarized his understanding of the Region's approach to deriving the permit's nitrogen limitation for the City and, further, sought clarification from the Region over "what would constitute new information on proper narrative criteria implementation sufficient to reconsider the 3 mg/l TN limit" in the future.

Mr. Hall's bullet-point description of the bases for the permit's nitrogen limitation is as follows:

- [EPA] [u]sed 122.44(d) to set limit by (a) finding system impairment related to DO and (b) concluding that further TN reduction was required to eliminate that condition
- The permit analysis assumes that TN is stimulating chl a levels and the amount of chl a growth is critical to attaining the DO objective.
- Relied on 2004-2006 SMAST study to create the TN and chl a endpoints used in the permit fact sheet analysis with objective of meeting existing DO criteria
- EPA did not conduct additional modeling analyses and did not evaluate system hydrodynamics or effect of other system load reductions occurring since 2006 (like Brayton Pt) but rendered its conclusions that further reductions were required based on the limited more recent (2012) information that was available for the system which indicated DO criteria are still not met in Mount Hope Bay and TN levels are still elevated in the Taunton Estuary

As to the first bullet, the Region relied on 40 C.F.R. § 122.44(d) to determine reasonable potential and to interpret the narrative criteria. We concluded that there was reasonable potential and that TN reductions were necessary to control cultural eutrophication. DO was one key indicator used in the determination. With respect to bullet two, the Taunton River system appears to be phytoplankton (chlorophyll) dominated at this time and controlling this growth is key to controlling cultural eutrophication and attaining the DO criteria. Three, the Region utilized SMAST data as part of a weight of the evidence analysis that also included the scientific literature. Finally, the Region did evaluate the effect of other system load reductions. Reductions in Brockton's TN loads were noted in the Fact Sheet along with EPA's evaluation that this load reduction was not sufficient. This conclusion is supported by the limited more recent information that extends through 2013 (not 2012).

Similarly EPA evaluated the available information regarding impacts of Brayton Point thermal load reductions and concluded that it did not warrant changes in the permit limit analysis; again this conclusion is supported by the limited more recent information which indicated continued algae blooms and DO depletions in Mount Hope Bay.

As to what types of information would serve as sufficient basis for reconsideration of the nitrogen limit based on an alternative interpretation of the Massachusetts narrative nutrient criteria, Mr. Hall's email outlined three possibilities. Specifically:

- MassDEP adoption of less restrictive DO criteria for marine waters
- MassDEP approval of a new narrative criteria implementation method that produces less restrictive TN requirements and /or
- MassDEP approval of a Taunton Estuary water quality model showing that alternative TN requirements would still allow for attainment of the DO criteria.

Under 40 C.F.R. § 122.44(d)(1)(vi)(A), EPA after finding reasonable potential may “[e]stablish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable water quality criteria and will fully protect the designated use.” EPA confirms that each of the scenarios described above, in the event they materialize, could provide cause for reinterpreting the “calculated numeric water quality criterion” target and/or for reconsidering and imposing less restrictive TN requirements. The City should be aware, however, that the calculated target must be demonstrated to attain and maintain all applicable water quality criteria and to fully protect all designated uses for the water body, which include, but are not limited to, DO impacts. Similarly, which respect to any alternative limit, EPA must “ensure that [] [t]he level of water quality to be achieved by limits on point sources...complies with *all* applicable water quality standards[.]” 40 C.F.R. § 122.44(d)(1)(vii). (emphasis added) Additionally, to be clear, any revised DO criteria adopted by MassDEP would be subject to EPA review and approval prior to becoming the applicable water quality standard. Lastly, the fact that the scenarios above involve the Commonwealth to some extent interpreting its own water quality standards is clearly an important fact for which the Region will account.<sup>1</sup> Of course, this does not by itself end the inquiry, as the Region has an independent obligation under Section 301(b)(1)(C) to ensure the NPDES permit includes limitations necessary to meet water quality standards.<sup>2</sup>

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<sup>1</sup> See *In re Ina Road Water Pollution Control Facility*, 2 E.A.D. 99 (CJO 1985) (Region should ordinarily defer to State's interpretation of its own water quality standard regulations unless that interpretation is clearly erroneous).

<sup>2</sup> *In re City of Moscow*, 10 E.A.D. 135, 151 (EAB 2001) (EPA has an independent duty under CWA § 301(b)(1)(C) to include a more stringent permit limitation than that specified by a state if the Region reasonably believes it is necessary to achieve a state water quality standard).

We hope you found this response helpful to your decision making.

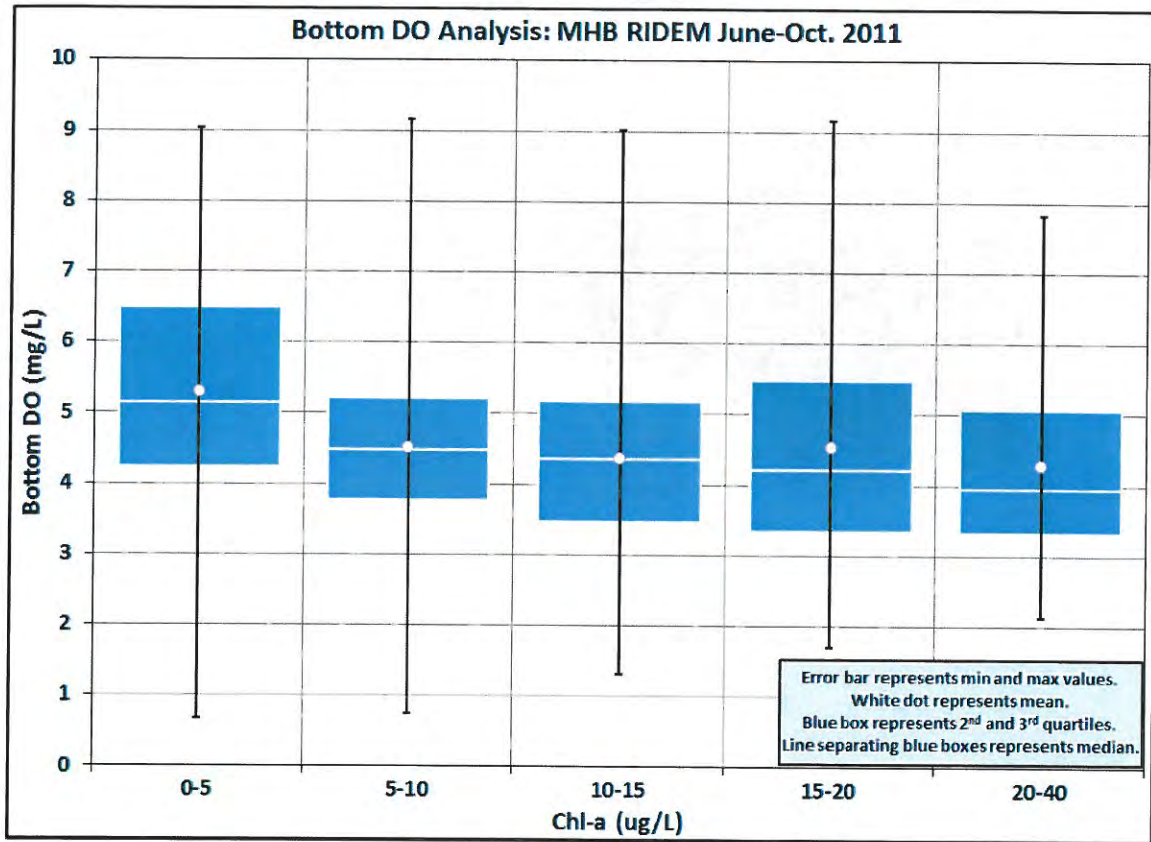
Sincerely,



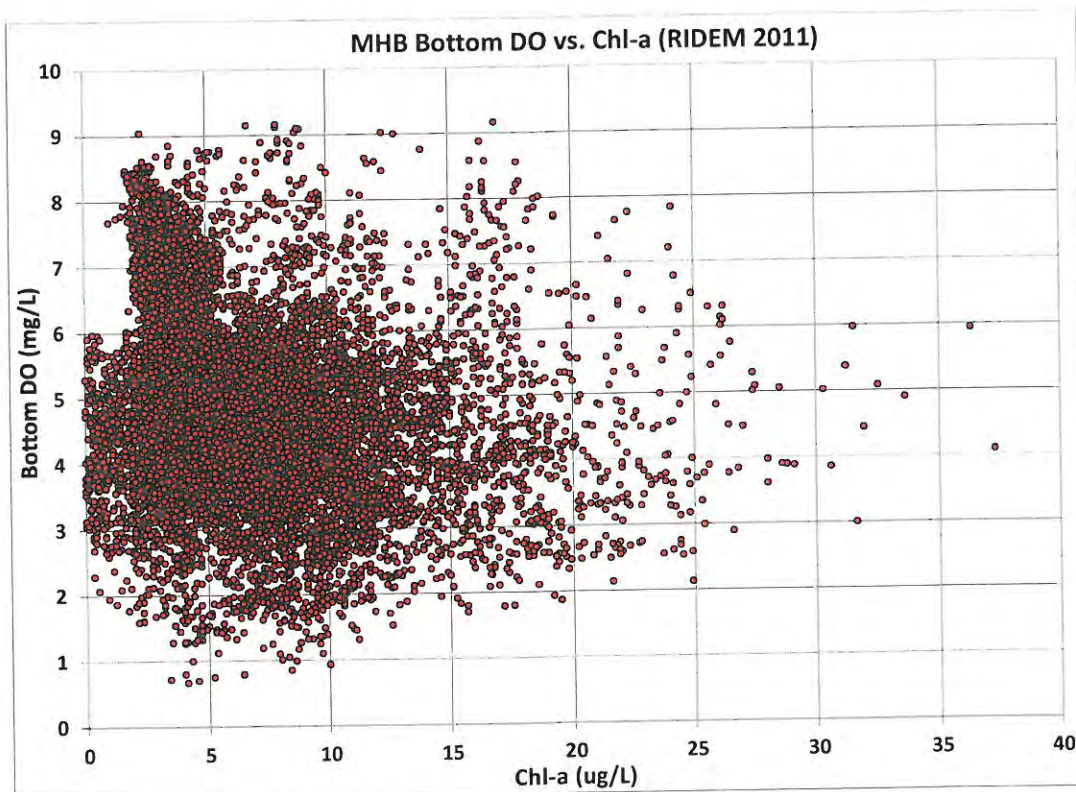
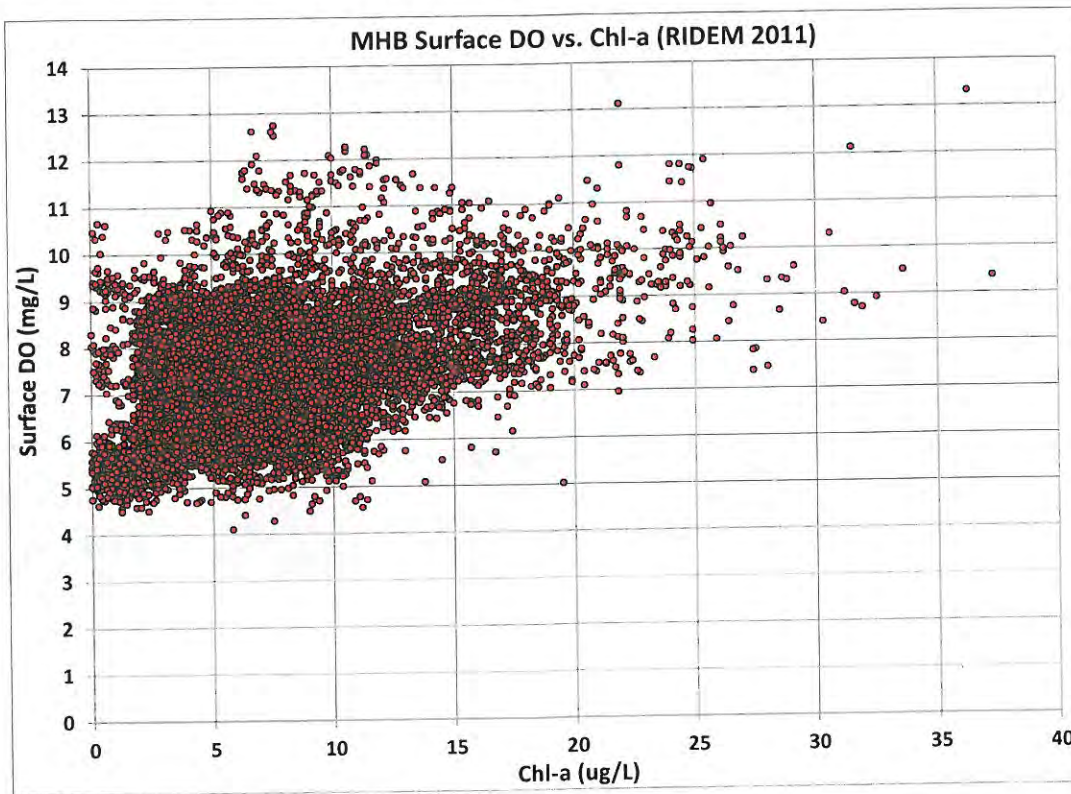
Ken Moraff, Director  
Office of Ecosystem Protection  
EPA Region 1

cc. John Hall, Esq.  
Bethany Card, MassDEP

12. RIDEM 2011 Bottom DO Monitoring vs. Ranges of Chl-a – Box and Whisker Plot

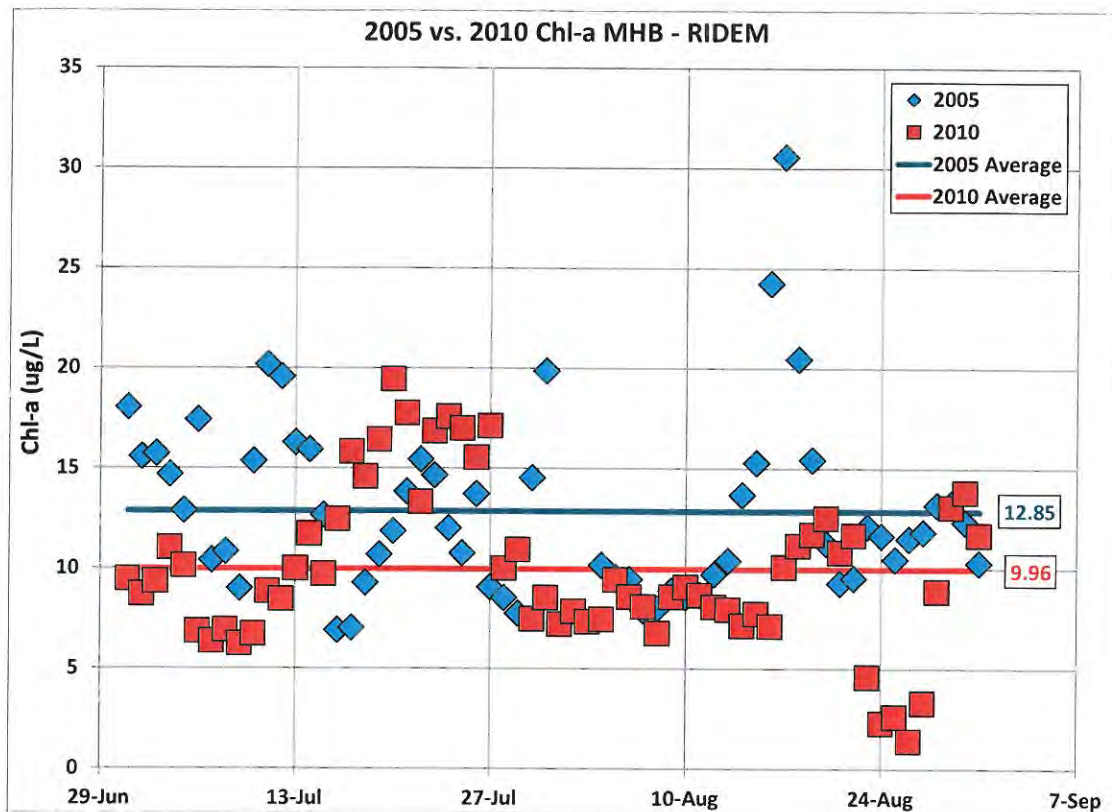


### 13. Bottom and Surface DO (15 minute intervals) – MHB - RIDEM 2011





#### 14. 2005 vs. 2010 (July-August) MHB Daily Average Chl-a - RIDEM Data



#### 15. MHB10 and MHB16 Water Quality Data Summary

Station	2004			2005			2006		
	Min. DO (mg/L)	Chl-a Mean (ug/L)	TN Mean (mg/L)	Min. DO (mg/L)	Chl-a Mean (ug/L)	TN Mean (mg/L)	Min. DO (mg/L)	Chl-a Mean (ug/L)	TN Mean (mg/L)
MHB10	6.0	8.50	0.48	5.4	13.6	0.49	5.4	14.6	0.57
MHB16	6.2	10.5	0.45	6.0	10.3	0.44	5.3	14.1	0.50

#### 16. MHB8, MHB11, and MHB12 Water Quality Data Summary

Station	2004			2005		
	Min. DO (mg/L)	Chl-a Mean (ug/L)	TN Mean (mg/L)	Min. DO (mg/L)	Chl-a Mean (ug/L)	TN Mean (mg/L)
MHB8				2.6	11.8	0.45
MHB11	3.2	10.4	0.44	4.5	14.3	0.45
MHB12	4.0	10.8	0.45			

## **17. List of Scientific Reports Regarding Stratification as a Major Contributor of Low DO Conditions in Narragansett Bay and Mount Hope Bay**

- Chen, C., Zhao, L., Cowles, G. and Rothschild, B. 2008. Critical Issues for Circulation Modeling of Narragansett Bay and Mount Hope Bay. In: Desbonnet A., Costa-Pierce, B. (eds) Science for Ecosystem-Based management- Narragansett Bay in the 21st Century. Springer, NY, 281-300.
- Krahforst, C. and Carullo, M. 2008. An Ecosystem-based Perspective of Mount Hope Bay. In Desbonnet, A. and Costa-Pierce, B.A., Science for Ecosystem-based Management. Springer 2008.
- Melrose, D.C., Oviatt, C.A., Berman, M.S. 2007. Hypoxic Events in Narragansett Bay, Rhode Island, during the Summer of 2001. Estuaries and Coasts Vol. 30, No. 1. 47-53.
- Zhao, L., Chen, C. and Cowles, G. 2006. Tidal Flushing and Eddy Shedding in Mount Hope Bay and Narragansett Bay: An Application of FVCOM. Journal of Geophysical Research 111: 1-16.