

## MINORITY REPORT-WASTEWATER VALIDATION AND DESIGN COMMITTEE

Judy Scanlon, Member- August 26, 2009

### PERSONAL BACKGROUND

My family has owned a home in Orleans for almost 50 years and my love for the environment and the Town were among the reasons I made the decision to pursue a degree in Marine Biology. Presently, I actively participate in the Town's water quality monitoring program, sampling our marine embayments, and have been doing so for the past nine years. I am a marine biologist, so I can observe more subtle environmental changes in the estuaries that many others may not notice. No one can see nitrogen, but you can see some of its adverse ecological effects. I have been observing the visible signs of "cultural eutrophication" (impacts directly related to human activities) in our estuaries for years. Some may counter that this is all anecdotal information, but regardless, there are local citizens, and qualified professionals alike, who have observed these changes as well.

I have always felt a great sense of pride when it was apparent years ago, that many of our sister towns, as well as area environmental groups, and county, state and federal agencies, began to view Orleans as a progressive leader in environmental stewardship. I was confident that this trend would continue, and having come as far as we have come today, I believed Orleans would come together to take those last critical steps required to ensure that our freshwater and marine resources would not continue to be degraded.

In 2001, over 100 citizen volunteers joined together and started sampling our three marine embayments as part of the Massachusetts Estuary Project and our town's wastewater management planning process. Volunteers came from all parts of Orleans and neighboring towns. Despite their diverse backgrounds, all participated because they recognized the effects that increased nutrients were having on our marine embayments, and the primary reason was "us." They shared a common goal, to help restore and protect the Cape Cod Bay, Nauset, and Pleasant Bay estuary systems.

I strongly disagree with the recent lack of confidence expressed by some individuals, over the established and federally approved Total Maximum Daily Loads (TMDLs) for nitrogen concentrations that were developed from the Pleasant Bay MEP Report and suggestions by some that we lack sufficient data to support moving forward to the next Phase of our wastewater management process. I would like to personally thank the more than 100 citizen volunteers in the Town of Orleans who went out and collected hundreds of water samples and took thousands of water quality measurements in our marine embayments during the last nine years. It is hoped that you do not think that all your hard work was done in vain. I assure you that this is not the case. It is because of you that I write this Minority Report.

### INTRODUCTION

The Orleans Board of Selectmen with all good intentions created the Wastewater Validation and Design Committee (WWV&D) last fall and gave them an expansive Charge. The WWV&D was charged by the Orleans Board of Selectmen (BOS) with the responsibility of conducting an "independent technical

review” (WWV&D Committee Charge approved 8-13-09) of the “SMAST Massachusetts Estuaries Project, Final Report for the Pleasant Bay System,”. Because of my background in marine science, I took this responsibility seriously and felt comfortable conducting a “general” review of the SMAST/MEP report. However, I also recognized my technical limitations (especially in the areas of water quality modeling), as I do not claim to be an expert.

I fully expected that the technically qualified consultant that we were charged with assisting the Town to select, would possess the requisite qualifications for the conduct of the actual detailed comprehensive “Peer Review.” It was always clear in my mind that our committee, despite the fact that its members were extremely intelligent and possessed a diverse set of technical skills, do not have the appropriate backgrounds or professional experience in the specific areas of the Pleasant Bay report to perform a peer review on their own.

While reviewing the MEP/Pleasant Bay report and discussing it with the other WWV&D Committee members, I have endeavored to be open minded and consider all the facts. During my professional career, and personal life, I have tried to conduct myself in a way that is respectful of others, even though I may not always agree with their views. However, a public committee must present its findings in a way that is fair and representative of both sides without errors or misrepresentation of data. I do not feel that this has been the case with the Committee’s final report and therefore offer my “Minority Report”.

I now find myself in the uncomfortable position of speaking out as a minority voice, presenting my opinion, or voicing when appropriate, my opposition of some of the findings and recommendations that the WWV&D Committee submitted to this Board on August 2, 2009.

The differences in opinion regarding the findings and recommendations contained in the WWV&D Final Report have been expressed to the Committee during our previous meetings and members are aware that on some major issues we just do not agree. Although on 7/31/09 I voted to approve the submission of the WWV&D Committee final report to the BOS, I stated for the record that my vote to submit it was solely for the purpose of moving the process forward. I made it clear that I did not agree with certain findings and recommendations contained in the report.

The following is a summary of my primary concerns. It is my hope that the Orleans BOS will consider what is contained in this Minority Report when helping make future natural resource protection and wastewater management decisions. You play a critical role in our future and we now require your strong and united leadership to move us forward.

#### CONCERN #1. Undoing all We Have Accomplished.

For many years, Orleans citizens have been working toward and demonstrating an increased awareness and understanding of how our own activities are negatively affecting the ecological health of our marine embayments and freshwater lakes and ponds. Through active volunteerism and supportive votes at Town Meeting, these citizens have demonstrated the willingness to do what is necessary to protect these resources. Through these actions, I believed that Orleans, its citizen volunteers, town

employees, and county, state and federal agencies or groups were working in concert toward a common goal: proactively taking responsibility for protecting and restoring the ecological health our natural resources and preserving them for future generations.

However it appears to me now that all we have learned over the years is at risk of being forgotten. It is also my opinion that the Town's outstanding track record for its environmental efforts is starting to unravel and I am growing increasingly concerned that the future health of our marine and freshwater natural resources, are now in jeopardy.

**CONCERN # 2 . Errors in Some WWV&D Findings, and Resulting Effects on the Public.**

Individuals on the WWV&D Committee have extensive backgrounds in technically oriented fields but not the background or experiences that would place them as peers of those who completed the MEP Pleasant Bay Report. I am not questioning anyone's intelligence or all the work committee members have devoted to review. I will also say some good, valid questions have been asked. However, while highly qualified in our own respective professional fields, we all lacked the specific expertise required to comprehensively evaluate, at the right level, the entire MEP Pleasant Bay final report or interpret its associated water quality monitoring data. Because of the lack of a sufficient and proficient understanding of complex, interrelated marine ecosystems, I believe that the WWV&D Committee failed in some cases, to do its due-diligence by first getting some of its facts straight before drawing conclusions and then presenting its findings to this Board. And now, because there are technical errors regarding some of the information being presented, many Orleans citizens are becoming confused and needlessly alarmed.

**CONCERN # 3. Lack of Emphasis and Ignoring the WHG Peer Review Conclusions and Recommendations.**

I believe that the WWV&D Committee failed to convey to the BOS sufficient emphasis on the conclusions presented by the expert technical peer review team compiled by the consultant, Woods Hole Group (WHG). Despite the great confidence our Committee exhibited in selecting the WHG, when the Final Report was issued, the majority of the Committee later appeared to ignore some of the most important findings. Despite the fact that the Town, at the request of the WWV&D Committee, spent almost \$60,000.00 of the taxpayers money to hire an expert consultant, the WWV&D Committee failed in my opinion, to widely publicize the conclusions and recommendations presented in the WHG June, 2009 Peer Review Final Report. As one would expect as a result of any detailed review by qualified experts, there will be things identified that could have been done differently, or could be done in the future, but regardless, the peer review report did not in my opinion, identify any fatal flaws in the Pleasant Bay MEP report that would be of a magnitude great enough to stop our forward progress.

For me some of the key WHG conclusions that gave me overall confidence in the Pleasant Bay MEP report were:

Page ES-6.

1. "MEP is a high quality and necessary endeavor, and is conducted by qualified and experienced scientists."
2. The MEP report for the Orleans portions of Pleasant Bay represents a strong foundation for developing a course of action to develop and comply with site-specific TMDL requirements."

Page ES-13.

1. "Although widespread losses of eelgrass are not documented throughout the estuary and the relative influence of environmental stressors is not fully understood, there is little doubt that degradation of environmental conditions has occurred due to nitrogen-induced eutrophication in the innermost parts of Pleasant Bay. There is also the potential for future degradation."
2. "In spite of uncertainty, the Task 3 Peer Review generally supports the findings of the MEP with regard to eelgrass and benthic communities, and has confidence that benthic communities can recolonize, and eelgrass beds can recover when nutrient loadings are reduced to levels suggested in the Pleasant Bay MEP report. The review confirmed that eelgrass and the benthic community respond negatively to high nutrients, including nitrogen and bioactive nitrogen in particular."
3. (Regarding low dissolved oxygen) "...dissolved oxygen levels caused by excessive nutrient loading, and particularly anoxic conditions (meaning very low oxygen) caused by eutrophication, have the primary adverse impacts on eelgrass in Pleasant Bay, particularly within the innermost portions."
4. "There is also evidence from larger ecosystems that levels of nitrogen recommended by the MEP of about 0.14-0.16 mg/L will result in ecosystem recovery."

Page ES-14. (E.6 Recommended Next Steps)

1. "As discussed above, action is ongoing and required by the Town of Orleans to comply with federal mandates for TMDLs. **The peer review results and recommendations are not intended to slow the wastewater facilities planning process, or suggest that more study is required before more progress can be made. The peer review team strongly encourages the Town to make incremental progress, and recommends certain activities that can be completed in parallel to help understand and reduce uncertainty.** "
2. "...the MEP work provides a valid basis for planning purposes."
3. "We believe the ongoing planning and design efforts should have sufficient flexibility to refine the MEP work without compromising the overall schedule."

Page ES-17

1. "Although the current configuration of the Pleasant Bay inlets to the Atlantic Ocean improves tidal flushing and water quality, **it would be overly optimistic to plan long-term wastewater facilities under the assumption that the enhanced flushing will remain** (in the absence of coastal engineering initiatives to maintain the inlet e.g., structures, dredging, sand bypassing,

etc.). We understand the design process and design life for the wastewater infrastructure will exceed 50 years, which is a time scale within which the inlet has proven to evolve substantially in the past.”

#### Concern # 4 . The Financial Risk to Town From Not Moving Forward With Wastewater Planning.

The WWV&D Committee majority members have done many presentations highlighting their belief that the Town could save millions of dollars because the Committee has determined that the Town does not need to sewer a significant portion of the Pleasant Bay watershed. The members believe they have done accurate calculations using the nine years of available MEP Pleasant Bay water quality data and shown that nitrogen levels in a significant portion of Pleasant Bay already meet or exceed the established TMDLs. Given that the committee has not received any meaningful feedback on their analysis of the water quality data, the assessment of cost savings seems to be premature. The WWV&D Committee findings have not yet been reviewed or verified as being correct.

In addition, because the Pleasant Bay watershed is not scheduled for sewerage until Phases 4, 5 and 6 of the CWMP, it will be many years until any sewerage will be initiated in that area. This leaves plenty of time for further observations of the conditions in Pleasant Bay and how they may or may not evolve. Changes will be addressed and modifications made if necessary. This is the advantage of an “adaptive management” approach. To stop forward progress in my opinion is unnecessary, and if we delay, the ecological health of our marine embayments (and freshwater ponds) will continue to suffer.

The financial risks of doing nothing have not been discussed by the WWV&D Committee or offered to the BOS for balanced consideration. It is my understanding, that there are also financial and regulatory risks to Orleans, should the Town suddenly decide NOT to continue moving forward in a timely manner with its CWMP.

1. The established TMDLs are regulatory documents that have been approved by the US Environmental Protection Agency (EPA) for compliance with the Clean Water Act.
2. The risk that someone will take legal action against the Town so that the Town must address the TMDLs is real. An environmental group such as the Conservation Law Foundation, or even the Massachusetts DEP, could say that Orleans was failing to make progress towards the TMDL, something that will be very compelling if we stop our wastewater planning process.
3. If this happens, the ability of the Town to make its own decisions about how it addresses compliance with the nitrogen TMDLs will be taken out of its hands.
4. If a judgment or consent decree is invoked, the millions of dollars available through the O’Leary Bill will not be available (0% loan from the Clean Water State Revolving Fund (SRF) for a term of up to 50 years).
5. If the Town of Orleans is under regulatory action, the loan amount falls back into regular SRF funding, which is 2% for a term of 30 years.

Recently the Town of Chatham was granted approval to receive around 55 million dollars in State Revolving Funds (SRF) loans for their wastewater management efforts.

In addition:

- Avoidance means higher costs later. Capital costs are estimated to rise 5% annually.
- There is a potential for a drop in property values if water quality restoration is not started until it becomes further degraded. Vacationers will not be attracted to a town with marginal water quality for swimming, fishing, and boating.

#### Concern # 5. Meeting Activities and Disenfranchising the Public.

I frequently found WWV&D meetings frustrating when often documents were presented for the first time, with the expectation that they would be briefly discussed and approved for distribution or submission. This allowed minimal time for review or thoughtful discussion. It often appeared to me on certain occasions, that I may have been the only one on the committee that had not previously seen the document. In addition, during several Power Point slide presentations to the BOS and Fincom, some of the slides that had been voted and approved for use during our meeting, had been revised, or new material added, and presented without whole committee review.

Orleans prides itself on good, open public dialogue on matters of general community interest. Unfortunately, I feel that the “validation” employed by the committee was not always open. For example:

On the day that the WHG presented their report to WWV&D Committee in a public forum, it was the first time that Orleans citizens had the opportunity to ask questions of the experts who conducted the Peer Review of the Pleasant Bay MEP Report. It was very disturbing to me that it had been decided by members of the Committee, that all questions from the audience would be required to be submitted to Committee members on index cards, and then certain WWV&D Committee members would decide whether the question was relevant or not. I was afraid that this would result in some of the public questions getting screened out, and my fears were realized. Some questions were not able to be asked and answered, and meaningful dialogue did not occur. These citizens had sat in the meeting for hours listening to the WWV&D Committee ask numerous detailed questions, only to be disenfranchised in the end.

#### Concern # 6. Failure to Work with Others (Other Town Committees, SMAST, DEP)

Despite encouragement from me, WWV&D Committee members seemed reluctant to meet with the appropriate Town committees (WWMSC) early on, to exchange information with a committee that had been at the forefront of the Town’s wastewater management and planning activities for almost 10 years. This was despite the fact that the committee Charge indicated that: **“Work with the Wastewater Management Steering Committee to ensure a smooth transition from comprehensive planning to the final design and construction phases.”**

A lack of communication occurred with SMAST and the MA DEP. The WWV&D Committee request to meet with all of them eventually happened, but it was too late. The result is that the relationship with

important technical and regulatory bodies have been severely strained. Because of my past experience as an environmental safety and health professional I believe that initial dialogue with these groups was essential. It did not happen.

It appears to me that a strained relationship has also developed between the WWV&D Committee and other consultants, and staff from local to County levels.

#### ADDITIONAL SPECIFIC ISSUES WITH WWV&D FINAL REPORT

Most of the comments that follow correspond to specific items/section numbers contained in the Executive Summary of the WWV&D Committee Final Report submitted to the Orleans BOS on 8/2/09. Where this occurs, the corresponding section numbers in the WWV&D Final Report are referenced. Any comments not specifically referencing a section in the report, will be identified by the heading OPINION.

OPINION: Title Page, "Peer Review"

The WWV&D Charge issued by the Orleans BOS stated that the Committee was to conduct an "independent technical review of the SMAST Report on Pleasant Bay." The WWV&D Committee was not charged with the conduct of a "Peer Review" though it incorrectly referred to its activities as such in numerous documents prepared by the Committee, during televised meeting discussions, and as a result, was incorrectly referred to as such, by the newspaper media. The WWV&D Committee review of the MEP Pleasant Bay Report was extensive, but by definition, it was not a "peer review."

Peer reviews in science are conducted by individuals who are **recognized experts in the specific technical fields that they are reviewing**. They are recognized within their own technical peer group as experts and normally have worked in their respective fields for years. Their work is widely published in peer reviewed professional journals. There is no question that members of the WWV&D Committee are intellectual peers, but no member (and I include myself) possesses the technical expertise and specific marine science-related professional experience to qualify them to conduct a comprehensive peer review of the MEP Pleasant Bay report.

RECOMMENDATION: Though there were appropriate questions generated from the WWV&D Committee review of the MEP Pleasant Bay Report, and some of which may need to be addressed. The professional consultant Woods Hole Group was selected by the Town and the WWV&D Committee to conduct a "Technical Peer Review" of portions of the MEP Pleasant Bay report. Because of the level of expertise possessed by the Woods Hole Group, the Orleans BOS should focus its attention on the findings and recommendations contained in the Final Report generated by the WHG and use it as a reliable guide in concert with the Pleasant Bay MEP report. These reports provide direction for the BOS in leading the Town's future wastewater management.

#### Section 1.0, Executive Summary-Major Findings (WWV&D)

1. In the Executive Summary, the statement was made "The major findings of the Committee (WWV&D) and the Town's consultant, Woods Hole Group (WHG) are as follows:"

- Recently the WHG requested that an errata be written regarding this statement.

Recommendation: The BOS should ask Bob Hamilton of the WHG why they requested the errata regarding Item 1 above, be generated.

- When I compared the findings in the WWV&D report with those in the WHG final report, I did not draw the conclusion that the WHG agreed with all the WWV&D Committee's major findings.
2. Statement in Section 1.1, "nitrogen levels in most of the Orleans portion of Pleasant Bay have been dropping for over 22 years."
- This statement is misleading and cannot be based on fact as actual monitoring data does not go back that far. Nutrient monitoring in Pleasant Bay was not initiated until about 10 years ago.
  - No competent scientist familiar with Pleasant Bay would make a statement like that in the absence of actual measured data.
  - Contradiction. It has been well documented globally, that where significant population growth and development have occurred within watersheds, water quality in marine embayments (and freshwater lakes and ponds) show signs of impairment. This is known as "cultural eutrophication" (e.g., eutrophication directly related to human development). This includes numerous embayments on Cape Cod and the negative effects of **increased** nutrient loading on these embayments has been well documented.
  - In a 1998 article in the Cape Cod Times written by Susan Milton titled "Cloudy Waters," she interviewed then Orleans Town Biologist and Conservation Agent Sandra Macfarlane who stated that she "had detected the effects of eutrophication for 25 years." She discussed the warning signs she observed in Lonnie's Pond from 1976 through the 1980's when increasing nutrients caused fouling from macro algae to become more and more severe each year. At the same time, there were blooms of algae (phytoplankton) in Pleasant Bay. She described the water as often being a blood-red color, and she observed lush mats of seaweed starting to cover the shore along Meetinghouse Pond and The River. She also noticed that the once sandy, hard bottom was changing to soft mud. And then in 1987, the ocean breached the barrier beach, and just like with the 2007 breach, people thought the problem was solved. And 20 years ago, just like today, these new breaches are mistakenly thought of as a solution. But as Sandra Macfarlane stated back in 1998, "...the breach was a reprieve. It didn't save the Bay."

The observations made by marine biologist Sandra Macfarlane do not support the WWV&D Committee's statement that nitrogen has been dropping for 22 years in the Bay.



3. The statement that nitrogen levels have been dropping in Little Pleasant Bay and Meetinghouse Pond (at monitoring station PBA-16) since 2000 when monitoring first began and the Figure presented on Page 16 are misleading.
  - The statement is based on calculations made by the WWV&D Committee which have not been reviewed or verified as being accurate. I am concerned that the difference in the number of data points in given sampling years will affect how robust the data is for this graph and other graphs contained in the WWV&D report.
  - The PBA-16 Meetinghouse Pond Bioactive nitrogen Figure may not be accurate as it actually combines data from two separate stations, one (PBA-16) in Meetinghouse Pond that was discontinued after 2006, and station WMO-10, which is outside Meetinghouse Pond (around the bend and further down The River). Though this error was brought to the WWV&D Committee's attention, and an "errata" issued this week, the Figure depicting a nitrogen trend still combines data from the two stations.
  
4. In Section 1.1 of the WWV&D Executive Summary, it states, "The nitrogen levels in these waters now meet or exceed DEP specifications. Sewering of the watershed surrounding the embayments which meet DEP specifications should not be necessary."
  - The calculations and predictions (including projected bioactive nitrogen trends) made by the WWV&D Committee appear to me to be based on a scenario where all conditions in the watersheds surrounding Pleasant Bay remain the same. This will not be the case. In my opinion, there was insufficient consideration given to the fact that there is a significant amount of nitrogen moving slowly through the groundwater that has yet to enter Pleasant Bay. In addition, it is expected that nutrient loads will increase as Orleans continues to move toward build-out conditions. We have not yet seen the full effects of this nitrogen contamination on our waterways. For example, septic nitrogen has not yet reached the Bay from homes more than  $\frac{3}{4}$  of a mile from away that are less than 10 years old.
  - Regardless of the accuracy of any projected trends, the idea is to meet the threshold for bioactive nitrogen concentrations at the "sentinel stations". Some will be the 0.16 mg/L for eelgrass, and some are secondary check stations for benthic infauna (organisms that live on or in the top layers of the sediments). According to the WWV&D Committee figures on pages 16, 17, 18, and 19, the established EPA approved TMDL's of 0.21 mg/L for benthic infauna, and the 0.16 mg/L are not **continuously** being met. For the few stations that they allege are meeting the required TMDL, it should be emphasized that the stations are only doing so intermittently, and not consecutively. There is too much variability in sampling frequency, sampling period duration, and year-to-year results for me to be confident in the trends shown in the WWV&D Final Report.

5. Regarding the statements related to eelgrass in Item 1.5 (page 8) and other sections of the August 4, 2009 WWV&D Final Report. I disagree with the statement that there is no reliable basis for asserting that there has been a significant decline in eelgrass distribution or habitat quality within Pleasant bay over the past several decades. I also agree with the selection by the DEP of eelgrass as the sentinel organism for the indicator of estuarine health.
- The WWV&D report contradicts the findings of the WHG noted on Page ES-13 of their report.
  - In a Reuters article dated July 1, 2009 titled “Seagrass Losses Reveal Global Coastal Crisis”, the study by Australian and American scientist to be published in the U.S. Journal Proceedings of the National Academy of Sciences, found seagrass meadows were “among the most threatened ecosystems on earth” due to populations growth, development, climate change, and ecological degradation. “Seagrasses are sentinels of change” and the loss of seagrass was an indicator of the deteriorating global marine ecosystem. “Mounting seagrass loss reveals a major global environmental crisis in coastal ecosystems”.
  - According to U.S. –based Seagrass Recovery ([www.seagrassrecovery.com](http://www.seagrassrecovery.com)), it is estimated that 70 % of all marine life in the ocean is directly dependent upon seagrass.
  - Seagrasses (which include Eelgrass) are being studied world-wide and the negative effects of excess nutrients on the health of these species is well accepted by scientists who study them. The choice of Eelgrass as the sentinel organism for Pleasant Bay is appropriate.
6. There is a statement on page 9 that “The Pleasant Bay Inlet System will continue to provide enhanced flushing of Pleasant Bay for decades.” I believe this statement is misleading.
- The new 2007 breach has been described by others as a “gift” and just as when a new breach occurred in 1987 it has bought Pleasant Bay a little more time, but the duration is unknown. Therefore the established TMDLs must still be met. DEP has told us that the TMDLs will not be altered at this time.
  - It is expected that the occurrence of the new 2007 breach in the barrier beach has benefitted water quality in some areas of Pleasant Bay but how much it has done so, especially in the upper reaches of the estuary, has yet to be fully determined. We are only in our third year of monitoring since the 2007 breach event and nitrogen concentrations still appear to be quite variable year to year.

- The concern about relying on the new breach to solve the eutrophication problem is that we don't know with absolute certainty how long the breach will last or if it will remain in its present position.
- Other considerations. Our CWMP is not just for Pleasant Bay. The reduction of nutrient loads entering the marine embayments must be done in Rock Harbor and most likely for areas within the Nauset Estuary watersheds as well.
- The Pleasant Bay area is not scheduled for sewerage until Phases 4, 5, and 6 of the CWMP so there will be plenty of time to evaluate the performance of the new breach and its impact on water quality and habitat. I believe this is the benefit of "adaptive management" as it allows for mid-course corrections if needed, to adjust for changing conditions.
- A general review of the data suggests that nitrogen may be decreasing in some of the areas of Pleasant Bay, but I personally do not conclude that it may be meeting the TMDL requirements at the sentinel stations consistently enough to meet the TMDL compliance standards. With the uncertainty of the future movement of the 2007 breach, and the fact that additional nutrient loads have yet to reach the Bay, combined with the fact that development and population is expected to increase, I would not feel comfortable making such a statement.
- The WWV&D Committee only focused on nitrogen when conducting its review and did not appear to consider other water quality parameters which were also used when developing the Pleasant Bay TMDLs. Multiple parameters are measured and analyzed by the SMAST scientists as part of the MEP Pleasant Bay monitoring efforts.
- There are other water quality criteria such as the dissolved oxygen requirements for state classified "Outstanding Resource Waters-Class SA." This standard is for keeping such designated waters as "pristine," as they are suitable for shellfish harvesting without depuration; they provide excellent habitat for fish and other aquatic life, and wildlife and for secondary (e.g., boating) and primary (e.g., swimming) contact recreation; and they have excellent aesthetic value. Pleasant Bay is a Class SA waterbody. Measures of dissolved oxygen of 6.0 mg/L and above indicate "pristine" water quality conditions as defined by the state standards (314 CMR 4.05 (4)). Throughout the Orleans MEP monitoring period (2001-the present) the MEP data show that numerous areas of Pleasant Bay continue to show dissolved oxygen concentrations below this standard. Keeping in mind that this is after the 2007 breach, as recently as last week measured dissolved oxygen concentrations at all nine stations monitored in Pleasant Bay were below the 6.0 mg/L dissolved oxygen standard. The higher the frequency of concentrations below the standards, the **stronger the case** that Pleasant Bay still meets the definition of "impaired," even without the MEP assessment.

- Dissolved oxygen and phytoplankton pigment concentrations were also considered when developing the TMDLs for Pleasant Bay. The National Oceanic and Atmospheric Administration (NOAA) found that phytoplankton pigment concentrations **above** 5.0 ug/L were found to be indicative of impacts of watershed development. Phytoplankton pigments routinely exceed this concentration in some of areas of Pleasant Bay, especially in the terminal salt ponds. This, combined with low Secchi transparency results (e.g., diminished water clarity), are related to high productivity which is indicative of eutrophic, higher nutrient conditions. Even now, after the 2007 breach, we have seen increased phytoplankton pigment concentrations (> 5ug/L) and decreased Secchi transparency readings at some of the MEP monitoring locations, especially the further up you go in the Pleasant Bay estuarine system, and especially in the terminal ponds.
  - There is a known correlation between increased nitrogen concentrations and low dissolved oxygen.
7. On page 10 of the WWV&D report, Section 2.0 Recommended Action Plan, 2.1.12 recommends that the TMDLs be recalculated.
- The Approval of the Pleasant Bay System TMDL for Total Nitrogen by the US EPA occurred on October 24, 2007. There was an extended period for public comment. I do not know if any members of the WWV&D Committee took advantage of the public comment period and asked questions or provided comments at that time. However, it is now a final compliance document.
  - The presence of the new breach does not change the threshold concentration and therefore would not be cause for a change in the TMDL.
  - There is no indication that I could find that the state DEP has ever changed a TMDL as a result of an unplanned physical change to a water body.

RECOMMENDATION: Ask DEP officials to verify or reject in writing, the major findings of the WWV&D Committee (findings 1.1-1.9) on pages 7-9 of the Final Report.