

## **MWRA Outfall Monitoring Science Advisory Panel meeting**

**October 27, 2016**

**1 pm to 4 pm**

**EPA Region 1, Leighton Hall, 5 Post Office Square, Boston, MA**

OMSAP Attendees: Judy Pederson, Bob Beardsley, Mike Shiaris, Bob Kenney

Missing: Geoff Trussel, Juanita Urban Rich, Jim Shine (but he did provide an email that Judy read at some point)

Several PIAC members are in attendance and met after the meeting.

Highlights of discussion (including interesting patterns in the monitoring), not fully a notes for all the discussions. Includes decisions made.

### **Welcome by Lynne Hamjian, EPA Region 1 Deputy Director of the Office of Ecosystem Protection**

Thanked and welcomed everyone. OMSAP plays a pivotal role in Boston Harbor cleanup, bring scientific integrity and independent voice to assure the public that resolving problems in Boston Harbor doesn't shift problems to Mass Bay.

Monitoring plan is critically important, and we value the advice provided by OMSAP.

Presented Certificate of Appreciation to Andy Solow – Matt Liebman to go to WHOI in the future to hand deliver.

Regarding the issuance of the new NPDES permit, Lynne will get back to us on projected schedule.

We are aware that membership is declining, and we will work to improve it.

### **Betsey Reilley, MWRA, Overview**

Will be discussing results from 2014 and 2015.

We have been monitoring for 9 years' baseline and 16 years' post-baseline.

For effluent, 9 years consecutive meeting the NPDES permit, and for the last five years, meeting platinum level awarded by the NACWA, the National Associate of Clean Water Agencies.

Effluent is clean and getting cleaner. Metals loading is 10% of 1990 level.

Boston Harbor waters are safer for swimming.

We need to measure what matters.

Make sure the outfall doesn't shift problems from Boston Harbor.

After 25 years of monitoring, perhaps we should focus on a flexible monitoring program, special studies, and ensure that data are always available.

### **Scott Libby, Battelle, Water Column Monitoring**

These are results for Mass Bay and nearfield, not for Cape Cod Bay for 2014 and 2015.

No chlorophyll or DO threshold exceedances or PSP toxicity detected in 2014 or 2015. **(But, *Pseudonitzschia* was recently detected at greater than 35,000 cells per liter!**

Localized elevated nitrogen in the nearfield, and patterns of stratification and results from modeling indicate outfall continues to operate as expected.

Although there was an exceedance for *Phaeocystis* because of the delay in the bloom into the summer period, it didn't seem to have any ecological impacts, in terms of low dissolved oxygen, or presence of foams, which has been observed elsewhere when there is a bloom.

Cold year impacted the biology but general patterns persisted. Due to colder winter in 2014, spring bloom was a little later.

Phytoplankton levels are low in terms of abundance and chlorophyll.

Spring and fall blooms are captured by satellite observations.

In Mass Bay, summer 2015 exhibited high numbers of zooplankton due to bivalve veligers. In general, as zooplankton increased, phytoplankton decreased. In Boston Harbor, patterns starting to look more like Mass Bay, perhaps related to the recovery of the harbor.

Utilizing moorings and remote sensing fills in the picture.

In 2016 did a rapid response survey for PSP on one survey.

Discussion on trends for Cape Cod Bay (CCB). Bob Beardsley said that URI has looked at CCB because it is warming earlier, and copepods eat the phytoplankton earlier. Ken Keay said that satellite observations pick up different annual patterns in CCB (e.g. chlorophyll present throughout the winter.)

### **Eric Nestler, Normandeau, Fish and Shellfish monitoring**

No thresholds were exceeded, e.g. nearfields sediments are healthy and well oxygenated, contaminants in sediments and fish and shellfish and mussel bioaccumulation study are declining (especially organics such as total PCB), and hard bottom communities are stable, winter flounder disease is low.

For a summary of recent results, check out the 2015 annual report for fish and shellfish.

Continue to see *Clostridium* signal near outfall. Not surprising, but it is noted that *Clostridium* spores may survive perhaps a hundred years!

Faunal assemblages follow grain size (i.e. habitat), don't see influence of outfall discharge.

Hard bottom communities are healthy.

Benthic monitoring in Boston Harbor shows community is becoming less abundant (partly related to decrease in abundance of *Ampelisca*) and more diverse.

Gender ratio of winter flounder is dependent on fish size.

Abundance of natural clean mussels in the Gulf of Maine is declining, causing problems for conducting the mussel bioaccumulation studies so went with aquaculture facility in Maine for baseline mussels. Judy Pederson feels it is important, however, to use wild caught mussels. Jack Schwartz feels that although a recent paper indicated that there is a decline of 60% of mussels since the 1970s, there are sufficient mussels in more subtidal habitats, including Boston Harbor, but requires more work to collect.

In analyzing contaminants, MWRA has used five labs over the years, and some of the analytical methods are not consistent. But, MWRA conducts inter-laboratory comparisons before starting a new lab or method so MWRA is confident of results.

### **Ken Keay, MWRA, Contingency Plan Thresholds**

Argues that *Phaeocystis* and benthic diversity thresholds which are frequent (almost 1 per year) are not attributed to outfall discharge but to regional patterns.

*Phaeocystis*: Exceedances are usually the result of the annual bloom creeping into the operational summer period, which starts in May. Unnecessary exceedances use staff time and the public may misunderstand and think that exceedances are due to outfall effect, a kind of false alarm. *Phaeocystis* blooms appear to be relatively common. See the recent paper (Borkman, D.G., Libby, P.S., Mickelson, M.J. et al. Variability of Winter-Spring Bloom *Phaeocystis pouchetii* Abundance in Massachusetts Bay. *Estuaries and Coasts* (2016) 39: 1084. doi:10.1007/s12237-016-0065-5.

MWRA presented three options regarding changing the *Phaeocystis* threshold.

1. *Delete altogether;*
2. *Change threshold from seasonal to a survey mean threshold based on maximum level observed to date; or*
3. *Change threshold from seasonal to a survey mean threshold based on the 95<sup>th</sup> percentile of the maximum level observed to date.*

*MWRA recommends option 1. Mainly due to the fact that the blooms are regional and do not appear to cause significant ecosystem impacts or nuisance to other species, such as whales.*

Regardless of CP option, monitoring and reporting for *Phaeocystis* will not change because it is part of the phytoplankton community.

OMSAP members asked questions about factors contributing to blooms and whether impacts are observed here and whether models are able to predict abundance. Temperature and nutrients and nutrient ratios seem to be related to the blooms but not strong correlations. Bob Beardsley suggested that another ecosystem model could replace the current water quality model. This model is from the

Plymouth Marine Laboratory (PML) in the UK (named “ERSEM”-the European Regional Sea Ecosystem Model) under the framework of FVCOM-BEM.

Bruce Berman of SHSB is comfortable with removing the threshold as long as monitoring is ensured.

***OMSAP consensus: drop threshold but keep monitoring.***

Higher infaunal benthic diversity threshold: Effluent discharge doesn’t appear to be cause of higher diversity observed, rather could be related to regional variability. Would still keep the lower diversity thresholds because they are clearly related to a negative impact.

MWRA recommends to delete the higher infaunal benthic diversity threshold.

Higher diversity does not appear to be related to moderately increased nutrient and organic enrichment as per the classic benthic models because other parameters such as sediment metabolism and total organic carbon have not increased.

Bruce Berman of SHSB is comfortable with removing threshold as long as reporting is continued.

***OMSAP consensus: drop threshold but keep monitoring.***

***Next step: MWRA will pursue request to EPA and MassDEP for an interim change in CP threshold and then a final change in 2017.***

**Discussion: Are we asking the right questions?**

What should monitoring look like in say, 2020?

Read Jim Shine’s email. Summary: Original intent of the monitoring plan, which was to ensure there were no surprises or disasters. We are on year 16 and there are no big surprises. Time for monitoring 2.0.

Time to ask questions, such as are there long term changes due to precipitation, circulation, etc. that might be related to the outfall. Let’s move away from the contingency plan thresholds, which have served us well. Let’s move forward and focus on the next big issues.

It is not MWRA’s role to address how climate change is affecting the ecosystem, but whether climate change is influencing how they monitor.

Mike Shiaris states that perhaps look at vibrios and pathogens, especially within shellfish.

Bob Beardsley states that we need to look at climate change impacts to the monitoring program, e.g. sea level rise, or stronger storms, which may influence flux to sediments and other factors.

Bruce Berman states that the ocean is getting deeper stormier and warmer. The work that MWRA has done has greatly improved the environment but the discharge is the second largest source of nutrients to the Gulf of Maine, and largest point source. So, it is important to keep up this work. There are new concerns about microbeads, plastics, polymers, and endocrine disruptors. So, he wouldn’t use the term “scale back” (as used by Jim Shine in his email); rather use the term “re-focus”.

Betsy Reilley implies that instead of a never ending monitoring program, let's have special studies.

Reminder that the CP and MP are attached to the permit, and are designed to be changed if necessary through a public and iterative process. But it takes time. MWRA is committed to investing in changes if necessary.

Judy says she is willing to move forward with this process. We need to form a small focus group to scope it out first. Matt Liebman will inform everyone about this process and request volunteers.

We used to focus on questions such as is it safe to swim, or are floatables causing aesthetic issues. We need to re-think the goals in mind when we consider new ways to monitor include AUVs, satellite data, and continuous monitoring.

One approach would be updating our models. Another would be to focus on sentinel monitoring as is initiated in the Gulf of Maine.

Judy will send out minutes (provided by Matt Liebman) and ask for additional information. Will pull together a symposium about looking back and looking forward. Will need to get funding as well.

## Membership

We need a new chair. We need new members. Give names to Matt and Cathy for nominations to the OMSAP.

## Attendees

<b>Name</b>	<b>Organization</b>	<b>Email</b>
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