OUTFALL MONITORING SCIENCE ADVISORY PANEL (OMSAP) MEETING
Monday, January 13, 2003, 10:00 AM to 2:00 PM, WHOI
FINAL MINUTES

AGENDA TOPICS

- Public Interest Advisory Committee (PIAC) update
- Recent nitrogen isotope data from Massachusetts and Cape Cod Bays
- 2002 observations of right whales and their prey in Cape Cod Bay
- Exceedance of the 2002 *Phaeocystis* nuisance algae summer threshold
- Increasing the taxa included in the *Pseudonitzschia* nuisance algae threshold
- Proposed revisions to the ambient monitoring plan (urea, coliform, lobster, flounder)
- Summer 2002 mussel tissue contaminant exceedance (PAHs, chlordane)
- Quality assurance for the MWRA ambient monitoring program
- Scheduling upcoming OMSAP technical workshops

SUMMARY OF ACTION ITEMS & RECOMMENDATIONS

1. OMSAP approved the July 15, 2002 and September 24, 2002 minutes with no amendments.
2. OMSAP requested MWRA return to OMSAP with a plan on the specifics of revising the *Pseudonitzschia* caution threshold and OMSAP will revisit this at a future meeting.
3. OMSAP recommends that the fecal coliform measurements in the effluent and urea measurements in the nearfield water column be dropped and that the proposed reduction in flounder and lobster sampling be reviewed at the OMSAP technical workshops.
4. OMSAP will form a focus group that will review the summer 2001 and 2002 mussel tissue contaminant exceedances and report back to OMSAP. [This meeting has been scheduled for Wednesday, March 5, 2003, 1:00-4:00 PM at MADEP Boston].

ATTENDANCE

Members Present: Andy Solow, WHOI (chair); Bob Beardsley, WHOI; Norb Jaworski, retired; Scott Nixon, U. Rhode Island; Judy Pederson, MIT/Sea Grant; Mike Shiaris, U. Mass Boston; Jim Shine, Harvard School of Public Health; and Juanita Urban-Rich, U. Mass Boston.

Observers: Adrianne Appel, freelance journalist; Ellen Baptiste Carpenter, Battelle; Theresa Barbo, Center for Coastal Studies; Bruce Berman, Save the Harbor/Save the Bay; Dave Borkman, U. Rhode Island; Peter Borrelli, Center for Coastal Studies; Mike Bothner, USGS; Jeanine Boyle, Battelle; Todd Callaghan, MCZM; James Collier, Center for Coastal Studies; Cathy Coniaris, MADEP; Larry Davoy; Mike Delaney, MWRA; Winnie Donnelly, MADEP; David Dow, NMFS; Bruce Estrella, MADMF; Anne Giblin, Marine Biological Laboratory; Maury Hall, MWRA; Doug Hersh, MWRA; Carlton Hunt, Battelle; Mingshun Jiang, U. Mass Boston; Chris John, MWRA; Ken Keay, MWRA; Ben Kelly, Save the Harbor/Save the Bay; Wendy Leo, MWRA; Matt Liebman, EPA; James Lindholm, NOAA/SBNMS; Steve Lipman, MADEP; Juan Mariscal, Narragansett Bay Commission; Stormy Mayo, Center for Coastal Studies; Robert Michener, Boston University; Mike Mickelson, MWRA; Owen Nichols, Center for Coastal Studies; Tara Nye, Association to Preserve Cape Cod; Sharon Pavignano, Narragansett Bay Commission; Jennifer Ponting, MWRA; Andrea Rex, MWRA; Steve Rhode, MWRA; Jack Schwartz, MADMF; Ted Smayda, U. Rhode Island; Dave Taylor, MWRA; Jane Tucker, Marine Biological Laboratory; Steve Tucker, Cape Cod Commission; Jeff Turner, U. Mass Dartmouth; Grace Vitale, MWRA; and David Wu, MWRA.

MINUTES

C. Coniaris introduced W. Donnelly from MADEP who will help out with OMSAP-related activities. C. Coniaris will be preparing less detailed minutes so that she can work on other projects at MADEP.

PUBLIC INTEREST ADVISORY COMMITTEE (PIAC) UPDATE

On behalf of Patty Foley (PIAC chair), B. Berman updated OMSAP on recent PIAC activities. At the September 2002 PIAC meeting, members present discussed how they would like to make sure that the public is informed of the OMSAP review of MWRA's outfall monitoring program. The group discussed possibly broadcasting a public meeting over the radio or Internet. This afternoon, PIAC plans on reviewing today's OMSAP meeting, as well as discussing the impact of the loss of state rate subsidies on MWRA.

RECENT NITROGEN ISOTOPE DATA FROM MASSACHUSETTS AND CAPE COD BAYS

J. Montoya presented recent results of the Center for Coastal Studies funded nitrogen isotope monitoring in Massachusetts and Cape Cod Bays ("the bays") [for details, see J. Montoya's 1/13/03 information briefing]. The goal of this project is to use nitrogen isotope measurements as a tool to track the movement of nitrogen into the planktonic ecosystem. He first described nitrogen isotopes in the marine environment and then presented recent measurements in the bays. This included a discussion of the spatial influence of the MWRA outfall and its contribution to the nitrogen budget.

J. Montoya explained that nitrogen has two naturally occurring stable isotopes (^{14}N and ^{15}N). We can use the isotopic signature of nitrogen, known as $\delta^{15}N$, to track the movement of nitrogen through ecosystems. The $\delta^{15}N$ of a compound is the measure of the amount of ^{15}N relative to the amount of the lighter ^{14}N (the more positive the $\delta^{15}N$, the more ^{15}N present in that sample). Most biological reactions have a slight preference for the lighter isotope ^{14}N creating "biological imprints" on the distribution of nitrogen isotopes in ecosystems.

J. Montoya then stated that the nitrogen isotope monitoring program seeks to define and monitor critical chemical and biological parameters in the bays and attempts to assess the impact of the MWRA outfall on the ecosystem of the bays. Stations in Cape Cod Bay are sampled monthly and stations between the MWRA outfall and Cape Cod Bay are sampled quarterly. Parameters measured include suspended particles (to measure particulate nitrogen, PN), zooplankton, and dissolved nutrients.

J. Montoya showed results of their analyses that indicate that the $\delta^{15}N$ of zooplankton in Cape Cod Bay has not changed appreciably in the last decade. This implies that the nitrogen injected into Massachusetts Bay by the new MWRA outfall has not yet had a significant impact on the nitrogen supply to Cape Cod Bay. The project has added stations north of Cape Cod Bay to the south of the outfall to measure the extent of the influence of the outfall. J. Montoya then showed $\delta^{15}N$ PN and zooplankton results of their summer 2001, autumn 2001, and spring 2002 sampling. He described the patterns of $\delta^{15}N$ in PN and zooplankton that imply that nitrogen from the outfall is entering the biota. He believes these patterns show the response of the ecosystem to an increase of particulate nitrogen (that he hypothesizes might be due to the discharge of dissolved inorganic nitrogen available to phytoplankton), followed by dilution farther south, and a response in the zooplankton after consuming those suspended particles. Taken together, these patterns define what the region of influence of the outfall actually is, at least in terms of the planktonic ecosystem. Though we cannot entirely rule out local sources of nitrogen, he thinks they have good evidence that the MWRA outfall is having an

influence on the nitrogen cycle in the plankton. To his knowledge, this is the first time anyone has attempted to use nitrogen isotopes to measure or trace the movement of nitrogen into a coastal planktonic ecosystem.

J. Montoya concluded that:

- The $\delta^{15}N$ of PN and zooplankton vary significantly in the region of the outfall. The $\delta^{15}N$ minimum south of the outfall provides a biogeochemical index to the penetration of effluent nitrogen into the planktonic ecosystem.
- The spatial spread of effluent nitrogen into the plankton appears to vary seasonally. The boundary of the zone of measurable effluent input to the plankton varied between ~40-70 km south of the outfall in their three surveys to date.
- A simple isotopic mixing model suggests that effluent makes a significant contribution to both PN and zooplankton biomass in the region of the outfall. Effluent may account for over half the nitrogen in PN and roughly a third of the nitrogen in zooplankton.
- Isotopes are a leading indicator of effluent impact. Shifts in the isotopic boundary may be the first indicator of impending ecosystem-level changes associated with effluent inputs.
- However, ecosystems are highly complex networks and community level changes may extend beyond the isotopically defined zone of effluent impact.

J. Montoya then answered questions about methods and results from OMSAP members and the audience. S. Nixon noted that the signal that they saw in the effluent was not much different from what was seen in the background. He asked how they can distinguish whether the signal they see is a bloom operating on the effluent nitrogen verses the nitrogen from the background. He does not see how they can clearly attribute the nitrogen source. J. Montoya agreed that this conclusion could not be clearly drawn because they need a measurement of the $\delta^{15}N$ of inorganic nitrogen throughout the bays. Right now they can qualitatively make a case that the bloom downstream of the outfall is using effluent nitrogen, but they cannot fully rule out a more localized source. J. Montoya noted that in his information briefing to OMSAP, there is a typographical error: the open circles are surface samples and the closed circles are deep samples.

2002 OBSERVATIONS OF RIGHT WHALES AND THEIR PREY IN CAPE COD BAY

S. Mayo described the 21-year right whale monitoring conducted by the Center for Coastal Studies [for details, see S. Mayo's 1/13/03 information briefing]. Right whale numbers observed in Cape Cod Bay during the late winter/early spring of 2002 appear to be the lowest on record. Possible reasons may include: competition from other high quality habitats, migratory and searching plasticity, and food resource density and competition.

S. Mayo showed plots of right whale observations and food (copepods) for 1999, 2000, 2001, and 2002. He then showed comparisons of abundances of the major types of zooplankton that right whales feed on (*Centropages*, *Pseudocalanus*, and *Calanus*) for these fours years during the late winter and early spring. The preferred right whale food (*Calanus*) abundance during the early spring of 2002 was extremely low compared to 1999, 2000, and 2001. However, *Calanus* did bloom later after the right whales left Cape Cod Bay.

S. Mayo then described the *Acartia* hypothesis that was discussed a few years ago. The *Acartia* hypothesis states that a switch to *Acartia* dominance in the marine environment may indicate a potential shift to estuarine conditions not conducive to right whale aggregation. In early spring 2002,

Acartia, because of low *Calanus* abundances, was numerically dominant for the first time in eastern Cape Cod Bay. However, his data do not support the *Acartia* hypothesis because though *Acartia* was numerically dominant due to the delayed *Calanus* bloom, *Acartia* abundances match previous years. So far in 2003, right whale observations in Cape Cod Bay are low for this time of the year.

OMSAP and the audience then asked S. Mayo questions. B. Beardsley asked how 2002 compares to 1996 when the right whale observations were also low in Cape Cod Bay. S. Mayo replied that in 2002, the feeding rates were lower, the residency times were lower, and no calves were observed in Cape Cod Bay. D. Dow asked where the right whales were in 2002. S. Mayo replied that the right whales were observed to be feeding on rich densities of adult zooplankton east of Cape Cod Bay, along a thermal boundary northeast of Highland Light.

EXCEEDANCE OF THE 2002 *PHAEOCYSTIS* NUISANCE ALGAE SUMMER THRESHOLD

M. Mickelson presented information on the summer 2002 *Phaeocystis* caution threshold exceedance [for details see MWRA's notification of the exceedance at: http://www.mwra.state.ma.us/harbor/pdf/20021209amx.pdf and MWRA's 1/13/03 information briefing]. *Phaeocystis* is a globular, colonial, mucillagenous nuisance algae. The threshold was triggered was because a sampling survey that normally takes place in late April was delayed until early May due to bad weather. The "summer" season, used to calculate the seasonal threshold begins May 1 and this May survey sampled a spring *Phaeocystis* bloom that was in decline. The summer threshold was triggered because it is much lower than the spring threshold, which is when *Phaeocystis* is typically measured. M. Mickelson noted a typographical error in the *Phaeocystis* information briefing: in figure 3, in the 1997 plot, there should be a box around "5". He then answered the questions provided by the Inter-Agency Advisory Committee before today's meeting to MWRA. OMSAP had a brief discussion and agreed that this threshold exceedance was more of a sampling artifact, and not an environmental concern.

INCREASING THE TAXA INCLUDED IN THE *PSEUDONITZSCHIA* NUISANCE ALGAE THRESHOLD

K. Keay presented a proposal from the MWRA to OMSAP to revise their *Pseudonitzschia* caution threshold by adding more species within the family *Nitzschiaceae* that produce domoic acid. Domoic acid is a toxin that can cause amnesic shellfish poisoning in humans. Computation of the threshold is based on the 95th percentile of the distribution of baseline seasonal means, thus adding additional species would increase the threshold, but not change the sensitivity of the threshold. [For more information, see MWRA's 1/13/03 information briefing.]

OMSAP and the audience then discussed this proposal. T. Smayda does not think that revising the threshold by adding species would give any advanced warning or additional protection, in fact, he feels that it would give a false sense of security. He thinks *Pseudonitzschia* should be measured, but that the threshold should be removed unless there are numbers measured for each species as well as measurements of domoic acid. After discussing the sampling and analysis methods, several OMSAP members thought that MWRA should perhaps be conservative and group domoic acid-producing species of *Nitzschiaceae* together. However OMSAP then decided to postpone any recommendations and asked MWRA to come back to OMSAP with a plan on the specifics of revising the threshold and OMSAP will revisit this request.

ACTION: OMSAP requested MWRA return to OMSAP with a plan on the specifics of revising the *Pseudonitzschia* caution threshold and OMSAP will revisit this at a future meeting.

PROPOSED REVISIONS TO THE AMBIENT MONITORING PLAN (UREA, COLIFORM, LOBSTER, FLOUNDER)

A. Rex reviewed MWRA's proposed revisions [for details go to: http://www.mwra.state.ma.us/harbor/pdf/20021113_amb_mon_mods.pdf and MWRA's 1/13/03 information briefing]. There are four proposed revisions: (1) drop the requirement for measuring total coliform in the effluent, since fecal coliform is currently measured to measure the effectiveness of disinfection; (2) drop two of the four reference sites (Nantasket Beach and Broad Sound) for flounder sampling; (3) drop the Deer Island Flats and East Cape Cod Bay sampling locations for lobster because they are not relevant to interpretation of the data at the outfall site; and (4) stop measuring urea in the water column monitoring since urea is included in the extensive total dissolved nitrogen measurements. OMSAP then discussed each proposed revision.

Total coliform: OMSAP agreed to recommend that total coliform measurements be dropped since fecal coliform is also being measured, as is *Enterococcus*.

Flounder: J. Schwartz noted that several years ago, there was a discussion on whether there was a need for more detailed flounder population studies by measuring contaminants in individual fish rather than compositing. He wondered if there was any interest to do that, and since many of the toxins bioaccumulate over several years, he questioned whether there is a need for annual flounder sampling. J. Pederson said that compositing was thoroughly discussed in the past and it was agreed that the pooling of flounder samples was appropriate because we are looking at human health as opposed to individual differences within the fish population. S. Nixon suggested that since changes are being seen and because the changes in flounder tissue take place over several years, that MWRA keep the same number of stations, but sample less frequently. OMSAP decided to postpone recommendations on flounder monitoring until the OMSAP technical workshops.

Lobster: B. Berman noted that lobsters are important from the public's perspective and he feels that lobster monitoring should continue. J. Schwartz thinks it is premature to stop sampling at the Deer Island Flats and E. Cape Cod Bay stations. As with the flounder sampling, he thinks compositing loses detailed information about the population. J. Shine thinks that the approach should be tailored to what we are monitoring for. Are we monitoring for the health of the lobsters or humans? If it is for lobster health, we would want to know what the source of the contamination was. If it is for human health reasons, then sampling at the outfall is all that is necessary. D. Dow thinks it is important to keep the same level of lobster monitoring so that if the decline in lobsters observed in Long Island Sound and S. Cape Cod moves into Massachusetts Bay, then there will be data to show that the outfall was not causing the decline. N. Jaworski thinks that there is value in keeping the lobster monitoring for another 2-3 years. J. Urban-Rich agreed and suggested instead of reducing the stations, to sample less frequently. J. Shine suggested sampling at the outfall every year, but the sampling the reference sites every other year. OMSAP decided to postpone recommendations on lobster monitoring until the OMSAP technical workshops.

Urea: OMSAP agreed to recommend that MWRA drop the urea water column measurements since total dissolved organic nitrogen is thoroughly measured.

ACTION: OMSAP agreed to recommend that the fecal coliform measurements in the effluent and urea measurements in the nearfield water column be dropped and that the proposed reduction in flounder and lobster sampling be reviewed at the OMSAP technical workshops.

SUMMER 2002 MUSSEL TISSUE CONTAMINANT EXCEEDANCE (PAHS, CHLORDANE)
M. Hall described the summer 2002 mussel tissue contaminant exceedance [for more details see: http://www.mwra.state.ma.us/harbor/pdf/20021213amx.pdf]. M. Liebman thinks that this is a complicated issue that requires an in-depth discussion and that there is not enough time on the agenda. In addition, he would like to invite scientists from the EPA Narragansett Lab to participate in the discussion. He suggested that OMSAP form a focus group to review the exceedances and report back to the entire group.

ACTION: OMSAP agreed to form a focus group that will review the summer 2001 and 2002 mussel tissue contaminant exceedances. The focus group will meet in February or March and will report back to OMSAP. [This meeting has been scheduled for Wednesday, March 5, 2003, 1:00-4:00 PM at MADEP Boston].

QUALITY ASSURANCE FOR THE MWRA AMBIENT MONITORING PROGRAM
W. Leo gave an overview of MWRA's quality assurance program, as requested by OMSAP at their July 15, 2002 meeting. [For details see MWRA's 1/13/03 information briefing]. There was a brief discussion of the topic. N. Jaworski asked where EPA's data quality objectives are addressed. W. Leo replied that the MWRA program was set up when EPA's data quality objectives were still being formalized. However, the ambient monitoring plan does address EPA's objectives and the details have all been outlined in the Combined Work/Quality Assurance Project Plans [go to: http://www.mwra.state.ma.us/harbor/enquad/].

SCHEDULING UPCOMING OMSAP TECHNICAL WORKSHOPS
C. Coniaris asked OMSAP and the audience what dates during the months of April through June 2003 to avoid scheduling the OMSAP technical workshops. The purpose of these workshops is to review MWRA's ambient monitoring plan. The first workshop will address effluent, pathogens, sediment chemistry, and fish/shellfish monitoring. The second workshop will address water quality and benthic community monitoring. OMSAP and audience members suggested not scheduling the workshops during April school vacation and the month of May (professors are busy then). C. Coniaris noted that W. Donnelly will assist OMSAP in scheduling and planning for the workshops.

ADJOURNED

MEETING HANDOUTS:
- Agenda
- January 2003 OMSAP/PIAC/IAAC membership lists
- July 2002 and September 2002 draft OMSAP minutes
- Information briefings

Summary prepared by C. Coniaris. Post-meeting comments are included in [brackets]. All such comments have been inserted for clarification only. They do not, nor are they intended to, suggest that such insertions were part of the live meeting components and have been expressly set-off so as to avoid such inference.

OUTFALL MONITORING SCIENCE ADVISORY PANEL
Mussel Tissue Contaminant Focus Group Meeting
Wednesday, March 5, 2003, 1:00 PM – 4:00 PM, MADEP Boston

DRAFT SUMMARY

Purpose of Meeting

At their January 2003 meeting, the Outfall Monitoring Science Advisory Panel (OMSAP) decided to convene a focus group to review the summer 2001 and 2002 caution level exceedances of chlordane and PAHs in mussels from caged mussel deployments over the MWRA outfall.

Focus Group Members

Members are from OMSAP, the Public Interest Advisory Committee (PIAC), the Inter-Agency Advisory Committee (IAAC), and EPA's Narragansett Lab: Judy Pederson (MIT SeaGrant, OMSAP, focus group co-chair), Jim Shine (Harvard School of Public Health, OMSAP, focus group co-chair), Todd Callaghan (MCZM, IAAC), Marianne Farrington (New England Aquarium, PIAC), Sal Genovese (Safer Waters in MA, PIAC), Matt Liebman (EPA, IAAC), Tara Nye (Association to Preserve Cape Cod, PIAC), Rich Pruell (EPA Lab, Narragansett), and Jack Schwartz, (MADMF, IAAC).

Other Attendees:
Cathy Coniaris (MADEP), Winifred Donnelly (MADEP), Maury Hall (MWRA), Ken Keay (MWRA), Ben Kelly (Save the Harbor/Save the Bay), Andrea Rex (MWRA), and Steve Rhode (MWRA).

Background

MWRA has been monitoring contaminant bioaccumulation in mussels suspended in cages in four areas (Boston Inner Harbor, Deer Island Light, Outfall in Mass Bay, and Cape Cod Bay) since 1991. MWRA's outfall in Massachusetts Bay went on-line in September 2000. Mussels are suspended at the edge of the effluent mixing zone, and because they accumulate contaminants from the water, they can be used to detect very low levels of contamination in the surrounding waters. Mussels are sensitive measures of effluent and ambient water quality and also integrate water quality over time.

Meeting Summary

M. Hall presented an overview of the caged mussel monitoring, the caution thresholds for chlordane and PAHs, and the exceedances[1]. The focus group discussed the monitoring and then reviewed the questions presented to them in the agenda:

Should we be concerned about low-level bioaccumulation over the long term?
The group agreed that this is something to watch, but that two years of data are not enough to decide whether there is a concern at the present time.

Are the levels of chlordane and PAHs in the MWRA effluent higher now than before the offshore outfall went on-line?

[1] For more information go to: MWRA 2001 Fish and Shellfish Report http://www.mwra.state.ma.us/harbor/enquad/pdf/2002-14.pdf, summer 2001 exceedance notice http://www.mwra.state.ma.us/harbor/html/20020125amx.htm and summer 2002 exceedance notice http://www.mwra.state.ma.us/harbor/pdf/20021213amx.pdf.

MWRA presented data that showed that concentrations of chlordane and PAHs in effluent have not increased since the offshore outfall went on-line. The group agreed that the levels of chlordane and PAH in mussels were very low.

Are other shellfish monitoring efforts measuring elevated levels of chlordane and PAHs?
The group briefly discussed the Gulfwatch program that monitors the bioaccumulation of contaminants in mussels throughout the Gulf of Maine. M. Hall has requested recent data from them.

Are the current thresholds appropriate?
The group agreed that the current thresholds are *not* appropriate. The group could not reach a consensus at the meeting of how to change the thresholds and made no recommendations for changing them at this time.

Is the current caged mussel monitoring approach appropriate?
The focus group suggests that the monitoring approach remain the same for summer 2003.

Conclusions
The focus group agreed that even though the current chlordane and PAH thresholds are not appropriate, there has not been enough analysis of post-discharge data to revise the thresholds. They also agreed that the mussel monitoring program is important to track treatment plant performance and recommend that there are no changes to the caged mussel monitoring for summer 2003. Until the thresholds are revised, future exceedances are expected. The listserver exceedance notice to the public should include a statement explaining that based on past review of the monitoring data, OMSAP has anticipated this exceedance, views the exceedance as a precaution, but more accurate thresholds and/or revisions to the monitoring approach will be incorporated when more data are available.

In the meantime, the focus group asks that MWRA review the following approaches to threshold development and report back to the focus group at a later date. Possible approaches include:

- Use the statistical characteristics of existing data to develop a threshold that shows a significant difference from the expected levels.
- Develop thresholds using some percentage below the concentration of a contaminant that causes mussel narcosis.
- Develop thresholds by evaluating 5-year trends in data. For example, track and report four years of data, then in the fifth year see if there is a trend that causes a threshold exceedance.
- Develop a threshold that uses running averages (e.g. compare one year to the previous three).
- Use FDA levels as thresholds (even though they may be too high).
- Have thresholds for only the contaminants that biomagnify (e.g. PAHs and perhaps chlordane do not biomagnify).

Adjourned

This summary was prepared by Cathy Coniaris and Winnie Donnelly and was reviewed by the focus group prior to submittal to OMSAP.

OUTFALL MONITORING SCIENCE ADVISORY PANEL (OMSAP)
2003 MONITORING REVIEW WORKSHOP #1
Monday, March 31, 2003 – Tuesday, April 1, 2003, 10:00 AM – 5:00 PM
WHOI Redfield Auditorium
DRAFT

SYNOPSIS OF RECOMMENDATIONS

- **Effluent monitoring.** No recommended changes.
- **Sediment contaminant studies.** OMSAP recommends that MWRA:
    1. Sample at all benthic community stations for sediment contaminants every three years (i.e. no sampling in 2003 and 2004, sample in 2005). Note that these stations will be reviewed by OMSAP during the benthic community/nutrient flux workshop in summer 2003.
    2. Sample a set number of stations every year for sediment contaminants at least through 2005 (MWRA will propose stations to OMSAP at the June 2003 water quality workshop. OMSAP requested they provide a justification as to why the stations are chosen).
    3. Continue to sample for spores of *Clostridium perfringens* (tracer of effluent solids), total organic carbon, and sediment grain size every year at all benthic community stations.
    4. Continue the USGS/MWRA cooperative special study to analyze sediment trap and core samples for tracers of effluent solids (e.g. silver, *Clostridium*) through 2005. Review results after 2005 field season to determine whether additional work is needed and submit proposed changes to OMSAP.
- **Fish and shellfish monitoring (flounder, lobster, mussels).** OMSAP recommends that MWRA:
    1. Begin sampling for fish and shellfish contaminants on a three-year cycle (i.e. contaminants in flounder, lobster, and mussels will be monitored in 2003 and then in 2006). However, flounder histopathology will continue to be sampled annually.
    2. Keep the outfall site, Deer Island flats, eastern Cape Cod Bay, and Nantasket Beach flounder sampling locations, but drop the Broad Sound flounder sampling location. Samples from Broad Sound do not seem to be providing information relevant to MWRA's outfall discharge.
    3. Research several approaches to revising the mussel tissue contaminant Contingency Plan thresholds and present their findings to the OMSAP mussel tissue contaminant focus group.
- **Hard bottom monitoring.** OMSAP recommends that MWRA:
    1. Shift the locations of two stations, beginning with the 2003 sampling season. The epibenthic communities at these two locations are either not abundant, or very heterogeneous, and do not provide useful information for the study. For details on station locations go to: http://www.mwra.state.ma.us/harbor/enquad/pdf/ms-083.pdf.

The recommended changes to the sediment contaminant and fish and shellfish monitoring are based on OMSAP's agreement that any accumulation of toxic chemicals in sediments, fish and shellfish would occur slowly and that MWRA should now shift from looking for acute effects of the outfall to chronic effects. Though there would be a reduction in information collected, variability has already been characterized by the baseline measurements, and the monitoring should be conducted in the context of a scientific understanding of the system. OMSAP believes that their proposed recommendations to the monitoring will not reduce the efficacy of the outfall monitoring program.

MWRA's schedule for submitting the proposed revisions to EPA/MADEP. Public comment will be solicited for each of these submissions.

- Hard bottom community (interim) modifications will be submitted for review in April 2003.
- Sediment chemistry (interim) modifications will be submitted for review shortly after the June 2003 OMSAP workshop.
- Fish and shellfish modifications, together with the interim modifications for hard bottom community and sediment chemistry, will be submitted for review by November 15, 2003 (annual submission of proposed monitoring revisions).

ATTENDANCE:
Monday, March 31, 2003
Members Present: Andy Solow, WHOI (chair); Bob Beardsley, WHOI; Bob Kenney, U. Rhode Island; Scott Nixon, U. Rhode Island; Judy Pederson, MIT/Sea Grant; Jim Shine, Harvard School of Public Health; and Juanita Urban-Rich, U. Mass Boston.

Observers: Ellen Baptiste Carpenter, Battelle; Bruce Berman, Save the Harbor/Save the Bay; Mike Bothner, USGS; Jeanine Boyle, Battelle; Brad Butman, USGS; Todd Callaghan, MCZM; Cathy Coniaris, MADEP; John Crusius, USGS; Deirdre Dahlen, Battelle; Mike Delaney, MWRA; Winnie Donnelly, MADEP; David Dow, NMFS; Martin Dowgert, USFDA; Patty Foley, SH/SB; Sal Genovese, Safer Waters in MA; Maury Hall, MWRA; Carlton Hunt, Battelle; Ken Keay, MWRA; Ben Kelly, SH/SB; Wendy Leo, MWRA; Matt Liebman, EPA; Mike Mickelson, MWRA; Tara Nye, Association to Preserve Cape Cod; Jack Pearce, Marine Pollution Bulletin; Andrea Rex, MWRA; Mason Smith, Conservation Law Foundation; Dave Taylor, MWRA; Steve Tucker, Cape Cod Commission; Grace Vitale, MWRA; David Wu, MWRA; Jonathan Yeo, MWRA; and Suh Yuen Liang, MWRA.

Tuesday, April 1, 2003
Members Present: Andy Solow, WHOI (chair); Bob Beardsley, WHOI; Bob Kenney, U. Rhode Island; Scott Nixon, U. Rhode Island; Judy Pederson, MIT/Sea Grant; Jim Shine, Harvard School of Public Health; and Juanita Urban-Rich, U. Mass Boston.

Observers: Ellen Baptiste Carpenter, Battelle; Bruce Berman, Save the Harbor/Save the Bay; Jim Blake, ENSR; Mike Bothner, USGS; Jeanine Boyle, Battelle; John Bratton, USGS; Todd Callaghan, MCZM; Cathy Coniaris, MADEP; John Crusius, USGS; Winnie Donnelly, MADEP; David Dow, NMFS; Martin Dowgert, USFDA; Bruce Estrella, MADMF; Patty Foley, SH/SB; Maury Hall, MWRA; Barbara Hecker, Hecker Environmental; Carlton Hunt, Battelle; Chris John, MWRA; Ken Keay, MWRA; Ben Kelly, SH/SB; Lisa Lefkovitz, Battelle; Wendy Leo, MWRA; Matt Liebman, EPA; Mike Mickelson, MWRA; Michael Moore, WHOI; Pam Neobert, ENSR; Tara Nye, Association to Preserve Cape Cod; Jack Pearce, Marine Pollution Bulletin; Andrea Rex, MWRA; Steve Rhode, MWRA; Jack Schwartz, MADMF; Mason Smith, Conservation Law Foundation; Dave Taylor, MWRA; Steve Tucker, Cape Cod Commission; Isabelle Williams, ENSR; and Suh Yuen Liang, MWRA.

MEETING HANDOUTS:
- Agenda
- April 2003 OMSAP/PIAC/IAAC membership lists
- January 2003 draft OMSAP minutes
- Information briefings and overheads of presentations

OUTFALL MONITORING SCIENCE ADVISORY PANEL (OMSAP)
2003 MONITORING REVIEW WORKSHOP #2
Wednesday, June 18, 2003 – Thursday, June 19, 2003, 10:00 AM – 5:00 PM
WHOI Clark 507
FINAL

SYNOPSIS OF RECOMMENDATIONS

Soft bottom sediment contaminant monitoring. At the April workshop, OMSAP requested that MWRA present a justification for choosing stations for annual sampling. At this workshop, MWRA presented their rationale for opting for three potential stations (NF12, NF17, and NF24) and OMSAP recommended that of these three stations, NF12 and NF17 be sampled annually for sediment contaminants. All other sediment contaminant stations will be sampled on a three-year cycle beginning in 2005. The sediment grain sizes at NF12 and NF17 do not vary from year to year as much as NF24 therefore making them better candidates for annual sampling because of less interannual variability due to varying grain size.

Water column monitoring. MWRA presented results from their effluent and ambient water column monitoring as well as additional remote sensing data collected from the SeaWIFS satellite. MWRA also presented the results of the OMSAP-recommended statistical analysis that evaluated redundancy over time and space in the nearfield.

- OMSAP recommends that the nearfield stations be reduced from 21 to 7. The stations that would be maintained are: N01, N04, N07, N10, N16, N18, and N20.
- OMSAP recommends that the number of nearfield surveys be reduced from 17 to 12. The surveys that would be maintained are: February, February/March, March, April, May, June, July, August, 2 surveys in September, and 2 surveys in October. The survey schedule maintains the spring and fall surveys when plankton blooms and low dissolved oxygen are a concern.
- OMSAP also recommends that these changes be approved on the condition that MWRA augment the instrumentation on the USGS and NOAA moorings near the outfall that collect continuous water quality data. Continuous dissolved oxygen data, for example, would help determine when phytoplankton blooms begin, end, and decompose. OMSAP members suggested that the moorings have about five sensors (2-3 in the surface mixed layer, 1 mid-depth, and one bottom) that measure dissolved oxygen, salinity, temperature, fluorescence, and possibly other parameters such as longwave and shortwave radiation. MWRA agreed to report back to OMSAP in the near future on their plans for adding instrumentation to the moorings.
- OMSAP requests that MWRA repeat their statistical analysis examining the number of nearfield stations using only post-discharge data. Though the results of this analysis would not change their recommendations, members felt that this exercise would yield useful information.
- To reduce the error in primary production calculations introduced by the reduction of surveys, OMSAP suggests that MWRA examine interpolating the coefficients of the production curves and then use daily irradiance values for each day between the primary production sampling dates.

Workshop #1. OMSAP approved the synopsis of their March 31-April 1, 2003 workshop with no amendments.

General Comments. The recommended changes to the water column monitoring are based on a consensus of OMSAP members that there is both spatial and temporal redundancy in the nearfield sampling. In addition, MWRA should take advantage of innovations in water quality monitoring such as satellite information and continued improvements in the technology and reliability of instruments that are attached to moorings and collect continuous water quality data. Though the recommended revisions will still provide enough information about the nearfield, these technological advances can supplement the monitoring results at a lower cost than mobilizing a field survey. The use of continuous data would also facilitate a potential transition from fixed/scheduled sampling to responsive sampling (e.g. mobilizing a survey when sensors in Mass Bay indicate high surface dissolved oxygen during a phytoplankton bloom).

MWRA's schedule for submitting the proposed revisions to EPA/MADEP. This plan will include changes that were requested on an interim basis and other changes that have been discussed at the workshops.

- MWRA will submit proposed revisions to OMSAP, public, EPA, and MADEP August 13, 2003
- OMSAP will meet in October
- OMSAP will submit recommendations to EPA and MADEP in mid-October
- MWRA will submit a final draft on Friday, November 14, 2003, notice in Environmental Monitor
- Formal public and regulatory comment period
- EPA and MADEP makes determinations on proposed revisions
- MWRA will implement approved revisions in 2004

MWRA's information briefing for this workshop is located at:
http://www.mwra.state.ma.us/harbor/enquad/pdf/ms-085.pdf

ATTENDANCE:
Wednesday, June 18, 2003
Members Present: Andy Solow, WHOI (chair); Bob Beardsley, WHOI; Bob Kenney, U. Rhode Island; Norb Jaworski, retired; Scott Nixon, U. Rhode Island; Judy Pederson, MIT/Sea Grant; Mike Shiaris, U Mass Boston; and Jim Shine, Harvard School of Public Health.

Observers: Ellen Baptiste Carpenter, Battelle; Bruce Berman, Save the Harbor/Save the Bay (SH/SB); Mike Bothner, USGS; Jeanine Boyle, Battelle; Brad Butman, USGS; Todd Callaghan, MCZM; Cathy Coniaris, MADEP; Kelly Coughlin, MWRA; Mike Delaney, MWRA; David Dow, NMFS; Martin Dowgert, USFDA; Patty Foley, SH/SB; Rocky Geyer, WHOI; Maury Hall, MWRA; Carlton Hunt, Battelle; Mingshun Jiang, U Mass Boston; Chris John, MWRA; Ken Keay, MWRA; Ben Kelly, SH/SB; Suh Yuen Liang, MWRA; Scott Libby, Battelle; Matt Liebman, EPA; Mike Mickelson, MWRA; David Mountain, NMFS; Tara Nye, Association to Preserve Cape Cod; Candace Oviatt, U Rhode Island; Jeff Reade, MWRA; Andrea Rex, MWRA; Steve Rhode, MWRA; Ajit Subramaniam, U Maryland; Dave Taylor, MWRA; Steve Tucker, Cape Cod Commission; Jeff Turner, U Mass Dartmouth; Grace Vitale, MWRA; and Meng Zhou, U Mass Boston.

Thursday, June 19, 2003
Members Present: Andy Solow, WHOI (chair); Bob Beardsley, WHOI; Bob Kenney, U. Rhode Island; Norb Jaworski, retired; Scott Nixon, U. Rhode Island; Judy Pederson, MIT/Sea Grant; and Jim Shine, Harvard School of Public Health.

Observers: Ellen Baptiste Carpenter, Battelle; Bruce Berman, Save the Harbor/Save the Bay (SH/SB); David Borkman, U Rhode Island; Peter Borrelli, Center for Coastal Studies; Jeanine Boyle, Battelle; Todd Callaghan, MCZM; Cathy Coniaris, MADEP; David Dow, NMFS; Martin Dowgert, USFDA; Patty Foley, SH/SB; Carlton Hunt, Battelle; Mingshun Jiang, U Mass Boston; Chris John, MWRA; Ken Keay, MWRA; Ben Kelly, SH/SB; Suh Yuen Liang, MWRA; Scott Libby, Battelle; Matt Liebman, EPA; Mike Mickelson, MWRA; Tara Nye, Association to Preserve Cape Cod; Candace Oviatt, U Rhode Island; Andrea Rex, MWRA; Steve Rhode, MWRA; Steve Rust, Battelle; Dave Taylor, MWRA; Steve Tucker, Cape Cod Commission; Jeff Turner, U Mass Dartmouth; Anna Vilase, MWRA; and Meng Zhou, U Mass Boston.

MEETING HANDOUTS:

- Agenda
- June 2003 OMSAP/PIAC/IAAC membership lists
- Draft March/April workshop summary
- Information briefings and overheads of presentations

OUTFALL MONITORING SCIENCE ADVISORY PANEL (OMSAP)
2003 MONITORING REVIEW WORKSHOP #3
Thursday, July 24, 2003, 10:00 AM – 3:00 PM
EPA Boston
FINAL

SYNOPSIS OF RECOMMENDATIONS

Nutrient flux measurements. MWRA presented results of the nutrient flux measurements and proposed eliminating urea measurements since urea is only a minor component of the net nitrogen flux in Massachusetts Bay and Stellwagen Basin and the measurements have not added to the understanding of benthic responses to nitrogen loading. MWRA also proposed eliminating porewater profiles of nutrients, alkalinities, and dissolved sulfides. These measurements are not routine, but are instead used to understand the patterns seen in the laboratory flux data. Since there are other parameters measured that can explain patterns in flux data, MWRA proposed that porewater profiles are not sampled unless significant changes in the fluxes or very low redox values are measured. MWRA also presented their plans to change the method they use to measure denitrification. Though a newer method (membrane inlet mass spectrometer or MIMS) provides different results from the established method used since 1992, the scientists that conduct the measurements feel that the data are more accurate. OMSAP deliberated over these three proposed revisions and voted to recommend these changes to EPA and MADEP. OMSAP requests that MWRA compare the newer MIMS denitrification method with another stochiometric method to see if the results are comparable.

Benthic community monitoring. MWRA presented results of their monitoring and proposed revisions to the sampling beginning in 2004. They proposed to continue sampling the infaunal community at NF12 and NF17 annually and to randomly split the remaining stations into two equal subsets that would be sampled on alternating years. The entire benthic community monitoring sampling design will be reviewed again when the 2005 data are being analyzed. The nearfield sediment profile imaging study will continue unchanged through 2005. OMSAP reviewed the statistical analyses presented at the workshop and recommended that EPA and MADEP accept the proposed revisions. OMSAP would like to have a discussion at their October 21, 2003 meeting on the implications of the change in sampling on the thresholds.

Update on improving data collection from moorings. At their June workshop, OMSAP recommended that MWRA investigate options that would improve the data collection from several buoys in Massachusetts Bay. OMSAP, MWRA, USGS, and NOAA are currently having discussions on how to augment the instrument arrays on the USGS and NOAA moorings near the MWRA outfall. MWRA will present a progress report at the October 21, 2003 OMSAP meeting.

Workshop #2. OMSAP approved the synopsis of their June 18-19, 2003 workshop with no amendments.

MWRA's schedule for submitting the proposed revisions to EPA/MADEP. This plan will include changes that were requested on an interim basis and other changes that have been discussed at the workshops.

- MWRA will submit proposed revisions to OMSAP, public, EPA, and MADEP in late summer
- OMSAP will meet October 21, 2003 at WHOI, Redfield Auditorium
- OMSAP will submit recommendations to EPA and MADEP after their October meeting
- MWRA will submit a final draft on Friday, November 14, 2003, notice in Environmental Monitor
- Formal public and regulatory comment period
- EPA and MADEP makes determinations on proposed revisions
- MWRA will implement approved revisions in 2004

MWRA's information briefing for this workshop is located at:
http://www.mwra.state.ma.us/harbor/html/omsap_briefing.htm

ATTENDANCE:
Members Present: Andy Solow, WHOI (chair); Bob Beardsley, WHOI; Bob Kenney, U. Rhode Island; Norb Jaworski, retired; Judy Pederson, MIT/Sea Grant; and Jim Shine, Harvard School of Public Health.

Observers: Ellen Baptiste Carpenter, Battelle; Bruce Berman, Save the Harbor/Save the Bay; Jim Blake, ENSR; Todd Callaghan, MCZM; Cathy Coniaris, MADEP; Christian Krahforst, MA Bays Program; Mike Delaney, MWRA; Winnie Donnelly, MADEP; David Dow, NMFS; Tom Fredette, USACE; Sal Genovese, Safer Waters in MA; Anne Giblin, Marine Biological Laboratory; Doug Hersh, MWRA; Carlton Hunt, Battelle; Ken Keay, MWRA; Ben Kelly, SH/SB; Suh Yuen Liang, MWRA; Matt Liebman, EPA; Nancy Maciolek, ENSR; Mike Mickelson, MWRA; Tara Nye, Association to Preserve Cape Cod; Andrea Rex, MWRA; Larry Schafer, observer; Jane Tucker, MBL; and Grace Vitale, MWRA.

MEETING HANDOUTS:
- Agenda
- July 2003 OMSAP/PIAC/IAAC membership lists
- Draft June workshop summary
- Information briefings and overheads of presentations

OUTFALL MONITORING SCIENCE ADVISORY PANEL (OMSAP) MEETING
Tuesday, October 21, 2003, 10:00 AM to 3:00 PM, WHOI

DRAFT MINUTES

AGENDA TOPICS

- Review of MWRA's draft revised Ambient Monitoring Plan
- Update on MWRA's efforts to improve data collection from buoys
- MWRA's July 2003 zooplankton report
- External lesions observed on some winter flounder during 2003 sampling
- Quarterly Contingency Plan update
- Items Requested by OMSAP at 2003 Workshops:
    - Requested statistical analyses on water column data
    - Threshold implications of infaunal sampling changes approved by OMSAP

SUMMARY OF ACTION ITEMS & RECOMMENDATIONS

1. OMSAP approved the July 24, 2003 workshop summary with no amendments.
2. OMSAP requests a change in the June 18-19, 2003 workshop summary. In the third bullet under water column monitoring, add the word "consider": "OMSAP also recommends that these changes be approved on the condition that MWRA *consider* augment*ing* the instrumentation on the USGS and NOAA moorings near the outfall that collect continuous water quality data." OMSAP also would like a note added indicating that they recommend MWRA consider other mooring locations and technologies as well.
3. OMSAP and audience members provided comments to MWRA's draft revised Ambient Monitoring Plan [comments listed below].
4. OMSAP recommends that MWRA plan an invited workshop of experts to discuss the goals, issues, technologies, and costs of augmenting their ambient monitoring with continuous water quality monitoring and additional use of satellite data.
5. OMSAP commented on MWRA's July 2003 zooplankton report [comments listed below].
6. OMSAP recommends that MWRA conduct a special study to investigate the recent observations of flounder lesions. OMSAP recommends that MWRA work with MADMF, NMFS, EPA, MADEP, Dr. Michael Moore (WHOI), Dr. Roxanna Smolowitz (MBL), and other fish biologists to investigate the occurrence of blind side flounder lesions in Boston Harbor and Massachusetts Bay. OMSAP suggests that MWRA also contact the New England Fishery Management Council and that the Inter-Agency Advisory Committee convene to further discuss this issue.
7. OMSAP recommends that as part of the flounder lesion special study, that MWRA and the other agencies involved with fisheries develop a lesion identification protocol so that future identification of lesions is more consistent.

ATTENDANCE

Members Present: Andy Solow, WHOI (chair); Bob Beardsley, WHOI; Scott Nixon, U. Rhode Island; Judy Pederson, MIT/Sea Grant; Jim Shine, Harvard School of Public Health; and Juanita Urban-Rich, U. Mass Boston.

Observers: Ellen Baptiste Carpenter, Battelle; Bruce Berman, Save the Harbor/Save the Bay; Mike Bothner, USGS; Jeanine Boyle, Battelle; Todd Callaghan, MCZM; Cathy Coniaris, MADEP; Mike Delaney, MWRA; Winnie Donnelly, MADEP; David Dow, NMFS; Patty Foley, Save the Harbor/Save the Bay; Maury Hall, MWRA; Carlton Hunt, Battelle; Mingshun Jiang, U. Mass Boston; Ken Keay,

MWRA; Wendy Leo, MWRA; Suh Yuen Liang, MWRA; Matt Liebman, EPA; Megan Lim, Save the Harbor/Save the Bay; Mike Mickelson, MWRA; Michael Moore, WHOI; Tara Nye, Association to Preserve Cape Cod; Andrea Rex, MWRA; Jack Schwartz, MADMF; Steve Tucker, Cape Cod Commission; and Jeff Turner, U. Mass Dartmouth.

MINUTES

REVIEW OF MWRA'S DRAFT REVISED AMBIENT MONITORING PLAN (AMP)

A. Rex reviewed the draft revised AMP and OMSAP and the audience provided comments. The document has been rewritten and OMSAP's recommended revisions have been added. [Document is located at: http://www.mwra.state.ma.us/harbor/enquad/pdf/ms-087.pdf].

Specific comments:

- Effluent monitoring – no comments
- Water column monitoring
    - Add dates when new measurements were added. (M. Liebman)
    - Note both reasons as to why the boundary stations were added. (1) The stations were added as requested by the Model Evaluation Group because (2) they felt that it was important to examine the Gulf of Maine influence on the nearfield. (D. Dow)
    - Find a way to make sure that the original Ambient Monitoring Plan is always available, i.e. on CDs at libraries, or on the web. (B. Berman and S. Tucker)
- Benthic monitoring – no comments
- Fish and shellfish monitoring
    - OMSAP approved of the proposed fish and shellfish monitoring revisions.
    - OMSAP recommends that MWRA conduct a special study to investigate the recent observations of flounder lesions. OMSAP recommends that MWRA work with MADMF, NMFS, EPA, MADEP, Dr. Michael Moore (WHOI), Dr. Roxanna Smolowitz (MBL), and other fish biologists to investigate the occurrence of blind side flounder lesions in Boston Harbor and Massachusetts Bay. OMSAP suggests that MWRA also contact the New England Fishery Management Council and that the Inter-Agency Advisory Committee convene to further discuss this issue.
    - OMSAP recommends that as part of this special study, that MWRA and the other agencies involved with fisheries develop a lesion identification protocol so that future identification of lesions is more consistent.
    - Under the proposed revision for fish and shellfish contaminant monitoring, a Contingency Plan threshold exceedance would not be re-sampled for verification until another three years. If a Contingency Plan threshold was exceeded, then re-sampling should be required the following year. (J. Schwartz)

General OMSAP comments:

- Evaluate the feasibility of sampling according to the "ecological" calendar and not be tied to the Julian calendar, e.g. begin sampling for the year when the winter-spring bloom occurs, not on a specific calendar date.
- OMSAP approved of the changes in the draft revised AMP.

UPDATE ON MWRA'S EFFORTS TO IMPROVE DATA COLLECTION FROM BUOYS

M. Mickelson presented information about the National Weather Service (NWS) and US Geological Survey (USGS) buoys currently collecting data in Massachusetts Bay. He also showed preliminary data from a NWS test buoy off the coast of Florida. At this time there are three plausible options:

(1) Attach near-surface instruments to the NWS Boston buoy 44013.
(2) Attach sub-surface instruments to the USGS buoy "A".
(3) Deploy a new buoy with instruments at several depths in the water column.

OMSAP recommends that MWRA plan an invited workshop of experts to discuss the goals, issues, technologies, and costs of augmenting their ambient monitoring with continuous water quality monitoring and additional use of satellite data.

MWRA'S JULY 2003 ZOOPLANKTON REPORT

K. Keay summarized MWRA's attempts to develop a zooplankton threshold and OMSAP's review of these thresholds. In 2000, OMSAP recommended that MWRA delete the *Acartia*-based zooplankton threshold and instead conduct an analysis of the zooplankton data to examine whether a "conveyor belt" flows from north to south that influences the zooplankton dynamics in Massachusetts and Cape Cod Bays. J. Turner then reviewed MWRA's zooplankton report submitted to EPA, MADEP, and OMSAP in July 2003. [Report is located at: http://www.mwra.state.ma.us/harbor/enquad/pdf/2003-06.pdf]

OMSAP then commented on the report.

- OMSAP felt that MWRA adequately examined the Gulf of Maine-Cape Cod Bay "conveyor belt" hypothesis and that there does not appear to be a strong year-round north-south conveyor belt of flow that influences zooplankton dynamics.
- OMSAP believes that at the present time, MWRA no longer should be attempting to develop a zooplankton threshold. MWRA's past proposed thresholds have not proven to be useful indicators of excessive nutrient enrichment.
- OMSAP suggested three ideas for future analysis of the zooplankton data:
    - Plot *Calanus* vs. temperature. J. Pederson thought Bob Kenney had examined this (as it pertains to right whales) and C. Coniaris agreed to contact him.
    - Plot primary production vs. zooplankton.
    - Examine regionwide zooplankton data to help interpret the zooplankton in the nearfield.

EXTERNAL LESIONS OBSERVED ON SOME WINTER FLOUNDER DURING 2003 SAMPLING

M. Moore presented recent observations of lesions on the blind side (bottom) of winter flounder [Report will be posted on MWRA's website shortly]. Lesion prevalence data for April 2003 flounder sampling:

Station	Ulcer Prevalence % (sample size)
Outfall site	24% (70)
Broad Sound	16% (50)
Nantasket Beach	6% (50)
Eastern Cape Cod Bay	0% (50)
Deer Island	20-27% (15)*

* 3-4 flounder were recalled in hindsight to bear ulcers

M. Moore presented MADMF and NMFS observations of similar lesions on winter flounder in central and western Massachusetts Bay. He also noted that sores noted on winter flounder in 2001 during MWRA sampling were similar to the lesions seen in 2003. Cultures of the bacteria from the 2003 lesions did not yield a common pathogenic bacterium. Skin ulceration in fish has been documented in other parts of the world, but the causes and stressors involved are not well understood. M. Moore recommends that MWRA implement a more systemic way of identifying and recording the lesions (e.g. on-board identification charts with photographs of different types of lesions of varying severity) and MWRA

intends to implement this recommendation. OMSAP agreed that this was important to implement and that it should be in place by the spring 2004 sampling survey. OMSAP also recommends that MWRA conduct a special study, in conjunction with other agencies and possibly the New England Fishery Management Council, to further examine the lesions in winter flounder [for more details, see page 2 for OMSAP's comments on MWRA's draft revised Ambient Monitoring Plan].

QUARTERLY CONTINGENCY PLAN UPDATE

M. Mickelson presented samples of the types of information that are reported on the MWRA website. Quarterly reporting of effluent and ambient monitoring is posted on the Contingency Plan web page listed below.

Boston Harbor and Massachusetts Bay	http://www.mwra.state.ma.us/harbor/html/bhrecov.htm
MWRA's NPDES Permit: an overview	http://www.mwra.state.ma.us/harbor/html/npdes.htm
Contingency Plan	http://www.mwra.state.ma.us/harbor/html/contingency.htm

OMSAP-REQUESTED STATISTICAL ANALYSES ON WATER COLUMN DATA

At the June 18-19, 2003 water quality monitoring review workshop, OMSAP recommended the reduction in nearfield stations from 21 to 7 based on the statistical analysis (using both pre- and post-discharge data) presented by MWRA showing that the survey means and variances from 7 stations were very similar to those based on data collected at 21 stations. OMSAP had requested that MWRA repeat this analysis using only post-discharge data. S. Liang presented the results of this analysis. In summary, the analysis using only post-discharge data shows show similar patterns to the analysis using both pre- and post-discharge data although ammonium, as expected, has greater spatial variability in the post-discharge data. OMSAP thanked MWRA for conducting the analysis, as requested.

THRESHOLD IMPLICATIONS OF INFAUNAL SAMPLING CHANGES APPROVED BY OMSAP

At the July 24, 2003 benthic monitoring review workshop, OMSAP recommended that the benthic infaunal stations be split in two and sampled on alternate years. They also requested that MWRA evaluate how this would affect MWRA's infaunal community Contingency Plan thresholds. K. Keay presented the results of the evaluation and concluded that this change in sampling would affect the thresholds only slightly. From MWRA's information briefing: "….starting in 2004, MWRA will test nearfield annual means for infaunal diversity thresholds against trigger levels derived from the baseline data for the station subset sampled that year. Thus the probability of exceeding a threshold by chance will stay the same." OMSAP approved of this approach.

ADJOURNED

MEETING HANDOUTS:

- Agenda
- October 2003 OMSAP/PIAC/IAAC membership lists
- July 2003 draft OMSAP workshop summary
- MWRA information briefings
- Draft revised MWRA ambient outfall monitoring plan

Summary prepared by C. Coniaris. Post-meeting comments are included in [brackets]. All such comments have been inserted for clarification only. They do not, nor are they intended to, suggest that such insertions were part of the live meeting components and have been expressly set-off so as to avoid such inference.