



Science and Technical Advisory Committee
Partnership for the Delaware Estuary: A National Estuary Program
www.DelawareEstuary.org

**Annual Joint Meeting of the Science and Technical Advisory Committee
and the Monitoring Advisory and Coordination Committee**

Meeting Minutes (Meeting No. 43)

Tuesday, April 25, 2017

9:30 A.M. to 3:00 P.M.

Delaware River Basin Commission – Goddard Conference Room
25 Cosey Rd., West Trenton, NJ 08628

STAC Attendees:

Gregory Breese – USFWS
David Bushek – Rutgers U
Thomas Fikslin – DRBC
Jeff Fischer – USGS
John Yagecic – DRBC
Desmond Kahn – Fishery
Investigations
Gerald Kauffman – Udel
Danielle Kreeger – PDE
Kari St. Laurent – DNREC
Lori Lester – NJ DEP
Kristin Regan – EPA R2
Alison Rogerson* – DNREC
Kelly Somers – EPA R3
Ken Strait – PSEG
Elizabeth Watson – Drexel
David Wolanksi* - DNREC

MACC Attendees & Guests:

Emily Baumbach – PDE
Lance Butler – PWD
Greg Cavallo – DRBC
Sheila Eyler – USFWS
Matthew Fritch – PWD
LeeAnn Haaf – PDE
Heather Hackathorne - USGS
Doug Haltmeier – NJDOH Lab
Matthew Konfirst – EPA
Don Knorr* – PA DEP
Stephanie Kroll* - ANS
John Kushwara – EPA
Robert Limbeck – DRBC
Ron MacGillivray – DRBC
Meg McGuire – Delaware Currents
Ken Najjar - DRBC
Angela Padeletti – PDE
Glenn Palmer* – ARCADIS
Elaine Panuccio – DRBC
Victor Porcetti – NJ DEP
Jonathan Sharp* – UDEL
Fred Stine – Delaware Riverkeeper
Namsoo Suk – DRBC
Eric Vowinkel – Rutgers U
Li Zheng – DRBC

**Participated on phone and GoToMeeting*

I. Welcome & Call to Order

- 9:30 am: **John Yagecic** (DRBC, MACC Chair) called the joint STAC/MACC meeting to order
- **J. Yagecic** informed the group of the waterproof Delaware River Recreation Maps published by DRBC available as a show of appreciation for participating organizations and their hard work to protect the Delaware River
- The sign-in sheet was circulated for attendance

II. Discussion of STAC and MACC notes from previous meeting

- **Greg Breese** (USFWS, STAC *ad hoc* Vice-Chair) motioned for the group to approve the previous STAC meeting minutes
 - STAC members (in person and on phone) voted to approve the minutes from the previous STAC meeting (Thursday, January 12th)
- **Danielle Kreeger** (PDE, STAC Science Advisor) noted that dates for the next STAC meeting will be discussed at the at the end of the meeting

III. TREB Revision Recaps

- **D. Kreeger** noted that a public version of the TREB will not be created since DELEP partners are focusing on the CCMP revision
 - Four subcontracted partners are working with PDE and the STAC to coordinate updates to major chapters. There are numerous additional authors and data contributors.
 - The focus is on indicators needed for the CCMP, and where new data are available to extend trend lines.
 - Since at least half of the 2012 TREB indicators are being updated, the TREB will be issued as a new 2017 version, rather than a supplement to the 2012 report.
 - Indicators that are updated for 2017 will be shown in bold text in the table of contents.
 - The STAC and MACC will be given the opportunity to peer review the revised TREB.
 - LeeAnn Haaf of PDE is currently compiling info for the report received from the authors and serves as point person, with Danielle Kreeger.
 - We anticipate that the first full draft of the TREB will be available by summer's end.
 - John Yagecic and LeeAnn Haaf will now summarize examples of key findings and datasets for the new TREB.

A. TREB Water Quality

- **J. Yagecic** reviewed the current indicators for tidal and non-tidal areas, and showed DO data as an example of a key parameter.
- Currently using long-term data on DO from USGS from 1965 through 2016
 - Data depicting a long period of time where DO was low from 1965 through the late 1980s (i.e., not meeting criteria of 3.5 mg/L)
 - From the late 1980s on DO increased, including very high DO in 2014 and 2015
 - The methodology for assessing DO has changed. The older method was through a Clark cell oxygen membrane, whereas data are now collected using a DO meter
 - Both methods are calibrated to Winkler Titration and saturation, and so both methods should be reporting the same values
- **D. Kreeger** noted that Desmond Kahn previously pointed out that although the 24-hour daily mean is important for tracking long-term status and trends, from a fisheries perspective it might be worth reporting the daily minimum. If a fish can't breathe even for a short time, this might cause mortality, and this might not be captured using a daily mean
- **J. Yagecic** reviewed data for the Time Series Decomposition for Daily % DO Saturation, showing raw saturation data, a seasonal component, and some remaining trends that can't be explained by seasonality
 - Looking at repeated seasonal patterns, improvements were noted in some areas

- Nitrates and phosphates were assessed by river kilometer via the Delaware River Boat Run monitoring program, The dataset is nicely structured, with higher nitrate levels between river kilometers 90 to 150, whereas phosphate levels were consistent throughout the estuary
 - A long data gap for phosphate was noted between 1985 and 2000
- Salinity trends were mapped using data from the boat run and University of Delaware
 - The log of chloride by river kilometer shows the limits of freshwater in the estuary
- pH continues to be monitored in the estuary by USGS monitors
 - There are excellent long-term datasets. It is particularly interesting to look at pH values per year collected from the Delaware River at Chester, PA
 - pH conditions increased later in the time series
 - We were expecting to see the opposite trend due to ocean acidification, but the pH increase may have resulted from improvements to wastewater treatment, by removing excess carbon
- Temperature (°C) trends were summarized using the Day of Year criteria. This analysis shows periodic exceedances of criteria in Zone 3
 - Long-term temperature trends were displayed using summer residuals for the Delaware River
 - Summer residuals sampled at Ben Franklin Bridge demonstrated a decrease in temperature, whereas summer residuals collected at Reedy Island demonstrated an increase in temperature
 - This different was likely due to global climate change (at Reedy), but also slight cooling in the upper part of the estuary (Ben Franklin)
- Nutrient concentrations measured in non-tidal areas demonstrated lower nitrate levels (mg/L) in the upper region of the Delaware Basin
- The Special Protection Waters Programs report, created in 2016, is discussed in TREB
 - This report showed no measureable changes taking place in a majority of the 440 site comparisons
 - 88% of water quality tests conducted showed no degradation
- Temperature in non-tidal areas is discussed in TREB using criteria on PA Warm Water Fishes (WWF), with observations taken in the Delaware River at Trenton
 - The number of exceedances per year remained relatively constant, independent of warmer and cooler years
- **Ron MacGillivray** (DRBC) reported on water quality criteria and mentioned that measurable concentration changes will be discussed in the TREB, which will include emerging contaminants
 - Ron said that he is working with a graduate student at West Chester University to summarize that status of emerging contaminants in the TREB
- **Desmond Kahn** (Fishery Investigations) asked why July was chosen for the DO Daily Mean Values data analysis (box and whisker plot)
 - **J. Yagecic** noted that July was chosen as the most likely worst-case condition. By meeting criteria during the month of July, it is very likely that DO requirements were met for the rest of the year

- **Tom Fikslin** (DRBC) noted that data for historical contaminants date back to 1990, and these data include PCB trends
 - The trends were not unexpected due to sediment contamination being picked up by fish
 - Sediment data from Zone 2 for fish tissue contaminant concentration (ng/g lipid) displays a decline in historic contaminants
 - The status of Stage 2 TMDLs will be discussed in TREB

B. Other TREB Updates

- **LeeAnn Haaf** (PDE) gave an update on the status of TREB writing and timeline
 - Most draft narratives and data analyses have been submitted to PDE, but we're still waiting on a few sections, including Freshwater Mussels, Public Access Points, Fish Passage
 - A list of indicators was shown. Topics outlined in green are complete, red topics still need to be submitted, yellow topics need to be formatted, and orange topics will be written if time is available
 - We're now requesting high quality graphics
 - The first round of review will be by subject and by volunteers who signed up to look at specific sections
 - The timeline for final products received from subcontractors has been extended from the end of February to the end of April
 - The first round of peer review will be completed by June, and after revising, a second round should be finished by the end of July
- **D. Kahn** asked if STAC and MACC members will have the opportunity to review sections that they did not write
- **D. Kreeger** replied that all STAC and MACC members will be able to review the full TREB once it is assembled and after the first 2 rounds of targeted review.
- **D. Kreeger** added that TREB 2017 will be referenced in the CCMP. The first State of the Estuary report was included in the 1996 CCMP.
- **Ken Najjar** (DRBC) explained how the data regarding water quantity has dramatically improved since the 2012 TREB. More robust datasets now display where water is going, and the narrative for this 2017 report will be more substantial than in 2012
 - The trends in water quantity show that usage of water has been downward trending, despite increasing population
 - Hydroelectric power use has been increasing
 - **Action Item:** *Ken Najjar will send final water quality/quantity indicator drafts to PDE as soon as possible*

IV. Enhanced Monitoring Activities for Estuary Eutrophication Modeling

- **J. Yagecic** and **Elaine Panuccio** (DRBC) gave an update on data from the year-around Boat Run Monitoring Program
 - A project is underway to define aquatic life use in the estuary. The result will ultimately be more protective DO criteria

- To assist this effort, the boat run monitoring program was expanded to be full year, collecting monthly nutrient concentrations
 - The program will now collect data through December
 - Samples are being collected from the Calhoun Street Bridge twice per month and analyzed by NJDOH for nutrients
- **Namsoo Suk** (DRBC) noted that a Spectral Analyzer for nitrate concentration was deployed at Trenton and Chester
 - The Delaware River at Trenton currently provides more than 60% of freshwater inflow to the Delaware Estuary
 - Data will be used for model calibration and to review point source discharges
 - The timeframe for deployment is January 2018 – December 2019
 - The continuous nitrate sensors will be checked using nitrate spot measurements
 - They will also look into DOC measurements
- **Robert Limbeck** (DRBC) reported on estuary phytoplankton data
 - Phytoplankton are at the base of the food chain for the bay, and they produce a lot of oxygen. But there is no in-depth monitoring of phytoplankton across the bay
 - Phytoplankton species data suggest that diatoms are more dominant, compared to PWD data
 - Three major groups dominate, with occasional blooms of other types
 - We will be meeting with a modeling group to look into eutrophication modeling
 - This effort is capable of detecting major trends and identifying where we can expect blooms to occur
 - The report will be issued soon after working with PWD on data collection and analysis
- **D. Kahn** asked whether we have the ability to detect low productivity in the Delaware Bay, and if the dominance of diatoms has any implications for eutrophication status in the Estuary
- **R. Limbeck:** PWD data was not collected from the bay portion
 - Improvements in water quality are signified by the presence of diatoms
 - Water quality is much better now than it has been in about 100 years
 - Types of expected community changes include increased photosynthesis
 - The species composition could be interpreted as signifying more eutrophication since the species are not always truly planktonic. But many benthic species can be delivered from freshwater inflow
- **R. Limbeck:** In addition to PWD datasets, there may be other data to share through New Jersey marine monitoring data looking at phytoplankton blooms
- **D. Kreeger:** Worked with Rutgers and Versar to monitor the quantity and quality of microparticulate matter (seston) in the Delaware Bay between 2000 and 2015, with up to 18 sample stations assessed mainly from April to November
 - This focus was on oyster food composition and its potential effects on oyster productivity
 - Metrics included TSS, POM, chlorophyll-a, and the proximate biochemistry (protein, lipid, carbohydrate)
 - Trends were pronounced, showing high TSS throughout, but seston quality declined, especially for chlorophyll and seston protein, and especially in summer months

- Primary production in the water column may be on the decline, and the amount of refractory detritus may be increasing, possibly from eroding marshes
- From an oyster's perspective, this trend signals a large dilution in food quality
- **K. St. Laurent:** Certain types of phytoplankton can have different elemental ratios and are unable to transfer benefits to consumers
 - Rutgers is using flow cytometry to study whether animals might be feeding on other organisms besides phytoplankton
- **R. Limbeck:** Picoplankton associated with marshes is not a major component of composition in the sample
- **T. Fikslin:** The transport of carbon from upstream is partially incorporated in the modeling effort, and that has shown that the transport is fairly consistent
- **D. Kreeger:** TSS measures have been highly variable, but it does appear that TSS has not changed. It's the quality of the material that has dropped substantially, as per the seston study
- **J. Yagecic** gave an update on salinity data from the Lewes ferry monitoring and additional salinity monitoring via NOAA PORTS (mouth of Bay and C&D Canal)
 - If we can accurately quantify downstream models, we can compare the model simulations with what is being recorded on salinity
 - Entered into a contractual agreement with NOAA PORTS to collect data, from a salt flux perspective to know what is coming into the estuary
 - **Jonathan Sharp** (UDEL): Reviewing the Lewes ferry salinity data, each faint point is a salinity measurement, with some additional evaluation of the data to look at ebb and flow and high tide and low tide
 - Expect to produce a report in the next few months working with University of Delaware

V. CCMP Update

- **Emily Baumbach** (PDE) gave an update on the CCMP Revision process:
 - We've been moving forward with the following three themes and associated goal areas – Clean Water: Toxics, Nutrients, Flow; Strong Communities: Community Resilience and Access, Public Awareness and Engagement; Healthy Habitats: Wetlands, Forests, Shellfish
 - Expert Workshop Summary
 - Nine “expert workshops” were held (3 workshops covering each of the 3 themes) between November, 2016, and February, 2017. There were 175 participants.
 - Three “climate vulnerability workshops” (1 covering each theme, 57 participants) were held in March, 2017
 - Seventy organizations were represented, across all CCMP revision workshops
 - Climate Vulnerability Workshop Results
 - Climate vulnerability workshop participants reviewed draft strategies from the expert workshops and considered whether and how climate change might affect the strategies
 - This Climate Vulnerability Assessment included a risk identification and risk analysis taking into account diverse climate stressors and potential risks

- Results mirrored the feedback received at the initial 9 expert workshops, but some minor changes in strategies were suggested to reflect potential climate change impacts
- STAC/MACC Engagement Points
 - The STAC and EIC will be provided with a draft of the new CCMP prior to the joint meeting in September, 2017
 - The MACC agreed to draft the CCMP monitoring approach section, but that will occur following the STAC/EIC meeting and associated CCMP review period
- Next Steps/Schedule
 - There will also be a series of half-day public workshops, and reporting out on specific goals/strategies at other workgroup/committee meetings, during summer to fall, 2017

VI. CCMP Monitoring Sections & 2018 Workshop Discussion

- **D. Kreeger** - the revised CCMP will be about 100 pages in length, with 4 pages devoted to a financing section, and 4 pages devoted to a monitoring approach
 - MACC will draft the first round of the monitoring plan
 - MACC-led draft with STAC assistance
 - DRBC has been taking the lead on monitoring coordination for the Delaware Estuary Program for many
 - The STAC and MACC meeting annually to foster sharing regarding monitoring activities and to coordinate using an organic, bottom-up approach. Together with other events like the Science and Environmental Summit, we can gather info to inventory datasets and help set priorities for monitoring
 - The EPA guidance on the monitoring approach for the CCMP was distilled down to a checklist by Jen Adkins of PDE
 - Bullet #6 suggests a high level of thinking collectively about what should be the priority items for the next ten years
- **D. Kreeger** noted that the 2018 Monitoring Workshop could be an action in the monitoring approach section of the revised CCMP. Participants can be given an opportunity to share monitoring inventories, activities, needs, and potential new goals and partners
 - Depending on the nature of the workshop, a tangible outcome could be a white paper that identifies monitoring gaps
- **D. Kreeger** asked STAC and MACC participants if a monitoring event would be helpful?
 - ANS and DRWI are already planning to have a workshop covering monitoring next year, and DELEP partners might potentially work with them
 - **D. Kahn:** Could the focus be expanded from physical variables to also include living resources?
 - **D. Kreeger:** The monitoring of fish, wildlife, and wetlands conducted by PDE and STAC group affiliates would be woven into the monitoring workshop
 - **T. Fikslin:** The original CCMP outlined living resources and water quality research
 - Living resource monitoring wasn't coordinated by a single lead agency, but rather across multiple organizations

- **D. Kahn:** There is a large amount of living resource monitoring that takes place that the MACC and PDE are not aware of (e.g. fishery surveys that have been conducted for many years). It would be helpful to bridge this knowledge gap.
 - The Delaware Bay and River Fish and Wildlife Coop is more concerned with the upper portion of the Delaware River
 - The workshop could include high quality monitoring for fish and wildlife that doesn't get covered by current work conducted by PDE or DELEP partners
- **Angela Padeletti (PDE)** noted how this workshop could be an opportunity to promote monitoring projects that are currently taking place
 - This would be an opportunity to inventory what various groups are doing and identify data sources currently available
- **G. Breese:** May be difficult to plan since there is a high volume of monitoring projects in different disciplines going on in the region
 - DELEP doesn't cover all monitoring aspects and it may be easier to discuss living resources after narrowing the scope down
 - We can't just say we want to promote all aspects of monitoring
 - Example: DELEP does not heavily focus on research related to red knots, but other agencies are working on this extensively
 - Need to be strategic and targeted while pointing to particular priorities
 - Can potentially see the estuary program covering sturgeon to add value, but a discussion needs to take place first with representatives of the groups already working on those other resources
 - **D. Kreeger** clarified that PDE does not coordinate monitoring for things like red knots and sturgeon since we don't have the authority to do so. But more importantly, we focus on resources that no other group is leading (niche filling).
- **T. Fikslin:** Would be good to bring people together that are actually conducting the research and monitoring because this would help to identify gaps and potential funding shortages
- **D. Kreeger** reminded the group that a white paper was created in 2006 following the 2005 Science Summit, highlighting how various research and monitoring fits into the larger needs for the Delaware Estuary
 - Participants shared what they perceived were the top 10 needs for science and management of the estuary
 - If there is enough participation at this monitoring event, we could potentially create another white paper outlining top monitoring needs in the estuary
- **J. Yagecic:** Value in this workshop would include summarizing and coordinating water quality monitoring as well as living resource monitoring, and finding more ways these areas overlap since there is a need to strengthen our understanding of their linkages
 - Establishing some type of monitoring inventory would benefit DRBC
 - Helpful to work with others that we normally don't interact with
 - Good idea to promote monitoring programs by promoting the datasets
- **D. Kreeger** polled STAC/MACC members, with a majority of participants expressing interest in participating in a monitoring workshop

- **K. St. Laurent:** One outcome could be a simple table of partners that have current data on various resources, as a starting point
- **D. Kreeger:** The timeframe for the monitoring workshop would be between biennial Science Summits, and before the start of field season, potentially in February or March, 2018
 - A next step would be forming a workshop planning committee and get together with ANS and DRWI
 - Need to decide whether this would be smaller and targeted (day-long workshop) or a larger event over multiple days (conference)
 - Planning and convening the event should be listed as one of the early actions in the revised CCMP
- **Ken Strait (PSEG):** Will need to keep the event tied to the CCMP
 - Cautioned how large-scale general/comprehensive events take high amount of preparation if covering a wide scope
 - Point is to track measurable outcomes on what is accurate and feasible for tracking
- **G. Breese** noted that it will be difficult to attract attendance by a diverse group for just a short workshop that strives to cover a broad spectrum of monitoring areas
 - Experts in living resources may choose not to attend since there will be a high level of information shared covering water quality data, etc.
 - Proposed holding more than one workshop, or an event that has each day targeting specific areas geared to particular participants based on their expertise
 - **D. Kreeger:** Resource-specific meetings tend to miss the linkages. For example, it would be interesting to look at the effects of living resources and wetlands on water quality, as well as vice versa. There can be value in bringing groups together that don't normally interact

VII. Data & Assessment Accessibility Update

- **J. Yagecic** reviewed how to maximize the use of data beyond writing and sharing reports
 - The Boat Run Monitoring program uses Shiny App using R statistical language. The data are built into the app. Users can select various parameters of interest (e.g. salinity, temp, DO, turbidity) as well as a particular timeframe, and then generate a box and whisker plot through the Delaware Estuary Water Quality Explorer App
- **E. Pannuccio** gave an overview of the Special Protection Water Explorer App
 - Can choose parameters and select between interstate (mainstem) or boundary control points (tributaries)
 - There are some limitations since the monitoring program historically took place from May to September each year, and data outside this period is collected by USGS and state agencies
 - This app also displays a data table summary with basic statistics for each site
 - Currently working on creating a way to download the data straight from the site
 - **J. Yagecic:** Through this interactive platform, users can answer questions they think of
- **J. Yagecic** presented the Near Real-Time Water Quality Dashboard tools
 - Updated daily
 - Red line represents the criteria and black dots represent 24-hr mean for DO
 - Darkest dot represents most recent mean

- Faint tail represents previous mean
 - Can identify where temperatures are relative to criteria
 - Mainstem Delaware River estimated maximum Total Dissolved Solids reported daily from USGS displays that all TDS points are currently below the standard
- **J. Yagecic** reviewed tools available on the Near Real-Time Flow Dashboard
 - Animated graph detailing the water yield in the Delaware Basin over several days
 - Mainstem Delaware River Discharge Profile displays the profile of the Delaware River mean daily discharge for the previous day using USGS data
 - Animated Delaware Estuary Water Surface Elevation plot provides observed and predicted hourly water surface elevations from the previous two days through the next two days
 - Data retrieved from NOAA PORTS stations in the Delaware Estuary
 - Data depends on a scripted analyses developed in R scripts
 - **J. Yagecic** also explained how chloride criteria looks at a 15-day average for a drinking water endpoint
 - Cannot view if a threshold is above on one particular day with this average
 - Viewers can conduct a query for a particular dataset and download the data you are interested in reviewing

VIII. Monitoring Updates Roundtable

- **E. Pannuccio** reviewed the Boat Run Radiochemistry
 - 22 locations were sampled between River Mile 6.5 and 131.04 from April-October 2016
 - Sampled 1/month with gross alpha and beta sampled collected at all locations and tritium samples at 5 locations (River Mile 44.0 to 66.0)
 - **J. Yagecic** explained how NJDEP requested DRBC to sample between River Mile 44.0 and 66.0 in 2015 due to high levels of outdoor tritium at PSEG nuclear facilities and then requested to add alpha and beta to Boat Run as well
 - River Miles 6.5 and 22.75 have highest exceedances (tritium, gross alpha and gross beta)
 - Levels of these three indicators are not increasing based on the current results
- **R. Limbeck** reviewed the Lower Delaware Measurable Change Assessment (2009-2011)
 - Conditions currently better than the standard levels
 - Want to keep this good quality and review if degradation has occurred
 - Majority of parameters have experienced no change or have improved
 - Protection process involving permitting can be more cost effective compared to some TMDLs
 - Looking to repair water quality in particular instances working with Special Protection Waters
- **R. Limbeck** reviewed the Existing Water Quality Atlas of the Delaware River
 - Includes maps, watershed population, land use & flow statistics, and site-specific existing water quality tables
 - Best existing scientific knowledge of water quality flow, and characteristics of Delaware River and its tributaries
 - Future updates include adding a list of discharges/limits, data links, new sites/parameters/study results, with the intention for the report to become a living document

- **R. MacGillivray** reviewed the PFAS one-pager, which outlined monitoring currently taking place. This one-pager focused on flame retardant compounds used in nonstick surface materials for firefighting, which is a big concern in groundwater contamination. Also data for compounds in fish and sediment monitoring
 - Have not exceeded EPA or human health advisories for these compounds
 - Decreasing concentrations were seen closer to urban areas, including manufacturing facilities and postconsumer discharge
 - Stewardship program initiated to reduce levels
 - The proposed NJ limit is significantly lower than the current EPA limit
 - All are listed as advisories at this point and are not legally binding
- **G. Cavallo** presented Sediment PCB results conducted in September 2016 at 60 sites to evaluate long-term trends and potential sources of PCBs
 - Results displayed high concentrations of PCBs in urban areas, with the Delaware Bay area relatively clean (less than 10,000 pg/g)
 - Decrease in PCB levels overall from 2000 to 2016
 - Important to continue monitoring on a regular basis to see how PCBs will ultimately impact the water column, and point/non-point sources and contaminated sites to examine reductions
- **Lance Butler** (PWD): Reported out on chlorophyll sensors located at USGS Ben Franklin (River Miles 133, 110, 100). Continuous measurements can be used to create a time series and develop a rating curve
 - Future work will include seasonal surveys to look at sediment processing
- **D. Kreeger** gave an update on PDE Wetland Monitoring
 - The MACWA monitoring of tidal wetlands is less intensive this year due to reduced funding, however core metrics will continue to be assessed at priority stations (e.g., 33 surface elevation tables at 11 stations)
 - Our current focus is to show how these wetland monitoring data can be used to guide restoration decision-making, identify marshes that are impaired, and to help design successful restoration projects
- **K. St. Laurent**: Two long-term monitoring transects were established at St. Jones Reserve and Blackbird Creek (capturing tidal freshwater)
- **D. Kreeger** reported that funding has been approved by PennVest to support construction of a freshwater mussel hatchery
 - The mussel restoration strategy by PDE and partners focused on water quality enhancement via mussel bed restoration, but the program also has conservation benefits because freshwater mussels are the most imperiled animals in North America
 - The potential hatchery location is at Bartram's Gardens, to be operated by PDE staff and partners such as PWD
 - Award details are still being determined, but the expected amount is \$7.9 million, representing the largest award PDE has ever received
 - Covers the construction phase and some hatchery start up work
 - Satellite facilities for seed rearing and aquaculture beds at key sites of impairment are being considered as well

- In addition to the eventual production hatchery, a demonstration hatchery opened in February 2016 as a new exhibit at the Fairmount Waterworks
- **Dave Bushek** (Rutgers Haskin Shellfish Research Lab): Oyster populations associated with the commercial wild fishery have been doing very well in both DE and NJ, but populations are still nowhere near historic levels
 - A peer review committee declared that the Delaware Bay wild oyster fishery is officially a “sustainable fishery”
 - Catch rates have been their highest since 1999, and there has been an upward trend
 - Non-harvestable populations should be assessed since they also contribute to ecosystem services such as providing filtration capacity
 - There is an active effort to coordinate oyster aquaculture with the management of other natural resources, such as the recovery of red knots
 - Sub-tidal aquaculture has the potential to revitalize production in lower bay
 - Natural populations can no longer live on the bottom in lower bay areas, but off-bottom aquaculture is now viable
- **Dave Wolanski** (DNREC): expressed concern regarding funding for monitoring, since significantly down
 - DNREC hopes to sustain current projects for now
- **Victor Porcetti** (NJ DEP) reported out on lower Delaware tributaries for biological monitoring of macroinvertebrates. This is to develop a coastal plain index. NJDEP will also be monitoring in the upper Delaware
- **Heather Hackathorne** (USGS): On April 1st 2017, USGS expanded continuous water quality monitoring to include chlorophyll A, and now provides real-time readings
 - Looking forward to monitoring new parameters at real time
- **Stephanie Kroll** (ANS): Monitoring by the DRWI will focus this year on sampling sites that are located downstream and upstream of previous restoration projects
 - 65 sites are located in the Schuylkill, Brandywine, Christina, Musconetcong, Tookany Tacony, and Wissahickon
 - Developing data management plan for July 2017
 - Site list is being coordinated through a bioinformatics group
 - Developed tools for monitoring each subwatershed which are posted online to display land use and loading data
 - This effort will help locate point sources and identify the best places to invest for the best impact
- **R. Limbeck**: Installing climate monitoring sensors, coordinating with NJ DEP
 - Sensors placed in relation to dam removal projects
 - Delaware River biological monitoring program will shift to match with PADEP monitoring
- **Kelly Somers** (EPA) reported that if any data is to be pulled off main EPA pages, the datasets will still be housed on the site
 - Don't be surprised if see some changes in terminology on the EPA pages
 - **J. Yagecic**: If it looks as though any datasets will be permanently removed from federal sites, MACC members would appreciate having the opportunity to preserve those datasets

- **D. Kreeger:** The next STAC meeting will might be held in June or July, or it might be delayed until the STAC/EIC meeting in September, 2017
 - Elections will take place over the next month or two electronically, and there are currently 5 open seats

Adjourn

3:00

*For additional information, please contact **Danielle Kreeger**, Phone: 302-655-4990 x104, email: DKreeger@DelawareEstuary.org*

DRAFT