



Annual Joint Meeting of the Science and Technical Advisory Committee (STAC) and the Estuary Implementation Committee (EIC)

Wednesday, October 24, 2018

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

John Heinz National Wildlife Refuge at Tinicum
8601 Lindbergh Blvd, Philadelphia, PA 19153

EIC Attendees:

Jennifer Adkins (PDE)
Kelly Anderson (PWD)
Greg Breese (USFWS)
Kimberly Cole (DNREC)
*Evelyn Huertas (EPAR2)
Megan Mackey (EPAR3)
*Rhonda Manning (PADEP)
Ken Najjar (DRBC)
Michelle Price-Fay (EPAR3)
*Irene Purdy (EPAR2)
Jay Springer (NJDEP)

STAC Attendees

David Bushek (Rutgers Haskin Lab)
Lance Butler (PWD)
Kevin Hess (PADEP)
Desmond Kahn (Fishery Investigations)
Jerry Kauffman (UDel WRC)
Susan Kilham (Drexel)
Danielle Kreeger (PDE)
Daphne Munroe (Rutgers Haskin Lab)
Alison Rogerson (DNREC)
*Pete Rowe (NJ Sea Grant)
*Kari St. Laurent (DNREC)
Ken Strait (PSEG)
Namsoo Suk (DRBC)
David Wolanksi (DNREC)

Other Attendees

Emily Baumbach (PDE)
Irina Beal (PDE)
Drew Budelis (Versar)

Welcome & Introductions

Jennifer Adkins and Sue Kilham called the meeting to order at 9:08AM, welcomed everyone, and opened with meeting attendees' introductions. Afterward, Jen provided an overview of the day's agenda and noted that there would be time towards the end of the meeting for partners to provide roundtable updates.

PDE Board and NEPORT Updates

Jennifer Adkins provided updates from the PDE Board of Directors meeting on September 6th, noting that the Board met without the EIC for this meeting, which had more focus on fundraising than other meetings. At this meeting, the Board also discussed the funding agreement with PennVest and its investment in the hatchery and agreed to move the annual review of advocacy guidelines to the February meeting each year, instead of the September meeting so that new Board members and EIC would be there for it. Val Jones from Valerie M. Jones Associates, Consultants in Philanthropy gave a lunchtime presentation after the meeting on fundraising methodology.

Danielle Kreeger explained how a technical committee for the hatchery will be formed for peer review soon and a related high-level workshop will take place right after the Science Summit. PDE is still in search of a Mussel Hatchery Construction Project Manager. This position was posted on PDE's website over the summer. PDE's Grants Coordinator, Lorestine Pittman, recently retired from PDE and will be

replaced shortly. The most recent NEP Meeting took place in San Francisco on October 3rd through 6th, where sessions were presented and moderated on climate resiliency by Josh Moody and Jen Adkins, respectively. Jen noted that there were also presentations and discussion at this NEP meeting on the topic of engaging environmental justice communities.

Emily Baumbach provided updates on 2018 NEPORT results on dollars leveraged and habitat acres restored as part of the annual GPRA (Government Performance and Results Act) reporting process that uses an NEP Online Reporting Tool. Total acres submitted for 2018 were 3,905 acres (DE – 1054, PA – 570, NJ – 2280). The highest number of acres for project categories this year were Forest/Woodland (1584 acres), Agriculture/Ranch Land (1085 acres), Beach (737 acres), and Tidal Wetland (276 acres). The highest number of acres were submitted for the restoration techniques of Land Acquisition (1976 acres), Nutrient Management (1022 acres), Placement of Dredge Material (508 acres), and Stormwater/Runoff controls (174 acres). A majority of projects contributed to the activity of Protection (52%), followed by Rehabilitation (29%), Enhancement (16%), Establishment (2%), and Reestablishment (1%). Dollars leveraged came to a total of \$6.5 million, with \$5.07 million in cash and \$1.43 million in-kind. The highest level of funding came through private funds at \$2.5 million, followed by local funds at \$1.5 million, federal funds at \$1.4 million, and state funds at \$1 million. Emily informed meeting participants that they can review the approved habitat projects from the Delaware Estuary Program as well as the other NEPs on EPA's NEPmap at www.epa.gov/nep/nepmap. Jen Adkins informed participants that these projects are submitted by the state partners and highlight projects supported by the estuary program. There are many other projects taking place in this region that are not reported through this process. Danielle Kreeger explained how the level of investment for these projects and funding needs are outlined in TREB Chapter 8 on restoration with the need of the Delaware Estuary listed at nearly \$100 million per year.

Revised CCMP

Jen Adkins reviewed an updated version of the Index of CCMP Actions to be included in the next version of the draft Revised CCMP. This updated actions list was created in response to a request from EPA to outline the original CCMP actions compared to new goals and strategies. Jen reminded meeting participants that two versions of the revised CCMP were circulated to the STAC and EIC prior to this meeting for their review. One version provides all edits received from the STAC and EIC for reference with color coding and comment responses from PDE. The second version has areas flagged in red highlight for discussion during the meeting today with three main items in need of STAC and EIC discussion: changes in the Introduction, changes in CCMP Goal 1, changes in other areas throughout the draft CCMP.

1) Changes to the CCMP Introduction

a) Land Use Cover Map comment

Jen Adkins explained that the comment received from EPAR2 suggested to include how the various land use types affect water quality and ecology of the Estuary. The comment then suggests to explain how the percentage of land cover is reflected in CCMP actions for site specific context in the document. Danielle Kreeger explained how we have focused on specific resources and coordinating at the watershed level by facilitating the work of others rather than specific locations. Desmond Kahn explained one how approach to respond to this comment included describing the different

habitat types or areas (i.e., tidal wetlands and open waters is our focus) and then explain why these areas are generally important. Jen Adkins explained how what's in the suggestion is not reflective of how we are approaching priorities in the plan, but PDE could take a look at how the actions are connected to land use and land cover. Greg Breese suggested simply explaining how priorities were targeted for the CCMP and EPAR2 noted that this table would adequately address the comment.

b) Process detail comment

Irene Purdy explained the comment from EPAR2 which suggested that the Introduction section would benefit by having more information on the estuary itself to help the public better understand the resource. Additionally, there was a comment submitted that the section seemed heavy on CCMP revision process. A few members of the STAC and EIC along with EPA HQ thought the level of detail for the process should be left in the plan since it helps readers to understand the extensive process. People looking at the CCMP for the first time may not realize that this revision is shorter and more reader friendly than the original. Some EIC members felt that this process language is important and should be retained. To keep this process information in the draft and still address this comment, the STAC and EIC suggested putting it into a callout box in the document so those not interested in process could skip it. There was no interest expressed by the STAC or EIC related to adding more information about the estuary into the Introduction.

c) Recommendation for transition text between Introduction and first CCMP theme (Clean Waters)

EIC and STAC members concurred that there was no need to include transition text in this type of report as recommended by EPAR2 in this comment. There is already an outline of the CCMP themes, goals, and strategies at the beginning of the document. What may help to address this comment is the finalization of the document which will include graphics that create a clear break between the introduction section, the Clean Waters theme, and following sections in the Revised CCMP.

2) Changes to Goal 1: Reduce Nutrient Pollution and its Impacts

a) Goal language comment

Danielle Kreeger explained how the earlier text on this topic was in multiple paragraphs and was trimmed down to only a few sentences. Greg Breese said that the reader may have actually misinterpreted what this section was saying, and deleting "from toxic algae" may reduce the confusion in this sentence. Namsoo Suk explained that algal blooms hold DO and contribute to decomposition, but not all algae species are toxic. Several STAC members suggested removing the word "toxic" from the reference in this sentence, and rewrite as "excessive" or "harmful" algal blooms. Kelly Anderson explained how you can have algae problems that cause public health problems even though they are not necessarily contributed to HABs. The CCMP needs to explain this difference between toxic blooms versus blooms related to eutrophication that can lead to depleted oxygen. Greg Breese noted how it might be worth including this information in a separate callout box to explain the difference between toxic algal blooms and eutrophication.

Jen Adkins explained how HABs are a large issue nationally and should have some mention of this somewhere in the main text of the Revised CCMP. Several STAC members agreed that it is worth mentioning in this plan to help guide future actions even though there have not been any

widespread historic issues caused by HABs in the Delaware Estuary. Jen Adkins and Kelly Anderson agreed to work together to craft updated language in this section. Kelly Anderson explained how Pennsylvania recently had a specific Do Not Drink order for about a week that PADEP took very seriously. Jerry Kauffman explained how the Newark Reservoir was closed for a period of time in 2017 due to HABs (*Microcystis*), with N levels normally at 4-5ppm with the water tanks increasing to nearly 93 ppm. Jerry also asked if the nomenclature in the CCMP has been cross-checked with the nomenclature in the TREB. The CCMP might list algal growth while the TREB might refer to algal blooms for terminology. Another example is the CCMP reference to non-tidal wetlands while the TREB refers to them as freshwater wetlands. Danielle Kreeger explained how the both the CCMP and TREB differentiate between tidal and non-tidal since it's hard to go wrong with this terminology and it is very straightforward (compared to agency use of "coastal wetlands versus "inland" wetlands which is less clear).

STAC and EIC agreed to replace the sentence flagged in this section with the following language:

"Excessive algal growth and resulting algae bloom decomposition can decrease oxygen in waters to levels that are dangerous to aquatic life."

Jen Adkins also informed STAC and EIC members how EPA R2 and R3 recommended to strike the updated language at the end of the introduction text in Clean Waters Goal 1 and revert to the previous language used in this paragraph. EIC and STAC members agreed to accept those changes.

b) Proposed changes to "How We Will Measure Success"

Jen informed STAC and EIC members how the language for the measures were originally crafted at the last in-person meeting with Steering Committee (SC) members. Jen then asked how the STAC and EIC wanted to proceed with the suggested edits since they were previously vetted and approved by the SC. Irene Purdy explained how these edits aren't necessarily saying anything different, but provide information a bit more clearly and directly. Sue Kilham agreed that the changes to the measures should be accepted, and the EIC and STAC agreed to accept suggested edits by EPAR2 on all four measures in this goal.

3) Changes in other areas throughout the CCMP

a) Strategy C1.3 comment in strategy description

Kelly Somers explained how this was one of her comments and had simply flagged this since she wasn't sure if the geographic area needed to be specified here. Danielle Kreeger explained how later in the description, natural areas and public access points are called out as the locations across the region and implies that partners are trying to protect and enhance these specific areas. Kelly Somers agreed that no changes were needed in this section.

b) Strategy H1.1 comment on the first Performance Measure & Key Deliverable

Jen Adkins explained how this comment submitted by DRBC provided a good opportunity to check in with the state agencies on their level of comfort on the language on this measure, "Complete baseline rapid condition assessments (e.g., Mid-Atlantic Tidal Wetland Rapid Assessment Method) for all watersheds adjoining the Delaware Estuary by 2025". Ken Najjar explained how the way this measure reads, it leaves the responsibility to the states for this action. Alison Rogerson explained

how the actual bullet only says that baselines will be completed, and does not call out the state departments specifically, so DNREC does not object to this statement. No objections were made by the other state agencies to change language so the STAC and EIC agreed to proceed with the current language.

c) Strategy H1.4 comment on reference to climate change impacts on non-tidal wetlands

Kevin Hess explained his comment asking if the CCMP could similarly go into further detail regarding non-tidal wetlands and climate change. Kevin explained how it makes sense to not include further information on climate change in this section if there is a gap on this topic related to climate change impacts. Danielle Kreeger explained how Strategies H1.1, H1.2, and H1.3 focus on tidal wetlands because they were informed by our past climate vulnerability assessments, whereas we have less information regarding climate impacts to non-tidal wetlands for this region. Jen Adkins asked if the states felt that there was anything that should be added in regards to climate change and non-tidal wetlands. Greg Breese suggested that language could be added to this section to explain how there is a data gap on climate change impacts and non-tidal wetlands. PDE will include a sentence on the need for further research on the effects on climate change on non-tidal wetlands.

Jen Adkins informed STAC and EIC members that any remaining edits on the full draft CCMP are due to PDE by Tuesday, October 30th. PDE will then send out a new version of the draft with edits received by the professional editor on November 8th with a deadline for the EIC to send additional comments by Thursday, November 15th. PDE will then turn over a new version and other materials to send to the SC before November 22nd. Ken Strait cautioned that editors can sometimes completely rewrite entire sections of a document and try to make sure this doesn't happen with the editor that PDE chooses to review the draft.

Monitoring Workshop

Danielle Kreeger provided an overview of the Monitoring Approach included in the draft Revised CCMP. The approach includes how tracking CCMP progress will be measured and also provides ongoing activities/new efforts underway to help coordinate efforts and share monitoring results for the Delaware Estuary. Coordination efforts related to monitoring outlined in this approach include the annual joint meetings of the STAC/MACC (every year), collaboration on State of the Estuary reporting (every ~5 years), and a monitoring workshop (every 5 years). The goal of the Monitoring Assessment is to inventory critical monitoring in the region and establish a list of monitoring priorities. The creation of a Monitoring Assessment Report will provide a baseline for a 5-year reassessment, help track CCMP implementation, and provide opportunities to explore new linkages among ecosystem features.

The monitoring workshop will take place at John Heinz National Wildlife Refuge on Tuesday, October 30th. The goals of this workshop are to review the draft inventory of monitoring programs, begin to identify gaps in data collection, and gather input to help prioritize future monitoring efforts. Monitoring topics will be broken down into thematic groups for discussion at the workshop to review important resources and parameters, missing programs and parameters, geographic data gaps, and new efforts and programs to be prioritized in the future. The draft inventory currently includes over 400 monitoring programs that have been submitted by 30 organizations and partnerships. Following the workshop, PDE will work with contractors from RK&K to review the input received and send out a follow-up survey to gather additional information. The results of this follow-up survey will help refine the inventory and assist in prioritizing and ranking monitoring workshop results. Results of the workshop and inventory as

well as a draft Needs Assessment Report will be presented at the 2019 Science Summit. Sue Kilham recommended displaying a poster at the Science Summit listing all of the organizations that have contributed to the monitoring inventory to provide the opportunity for organizations to see if they still need to contribute their monitoring information.

Lunch

Towards the end of the lunch break, the STAC and EIC discussed potential cover art ideas for the Revised CCMP. Several STAC and EIC members preferred Option 1 of the current draft designs since it captured natural areas as well as urban areas of the watershed. Kim Cole suggested using three photos in the cover art with one image representing each of the three themes of the revised CCMP (waters, communities, habitats). Sue Kilham and Greg Breese suggested using a photograph of a species that DELEP partners are actively monitoring in the estuary and is an iconic species for the region (e.g., horseshoe crabs). Jen Adkins recommended to use a photo with people since it's good to have faces in pictures from a public relations perspective.

2019 Delaware Estuary Science and Environmental Summit

Danielle Kreeger informed meeting participants that the theme for the Science Summit this year is *Estuary 2029: Saving our System through Collaboration*. The summit will be held at the Grand Hotel in Cape May, NJ from January 27th through 30th. Danielle thanked Dave Bushek for inviting Drs. Mark Botton and Bob Loveland to give a plenary session on horseshoe crabs. Dr. Brandon Jones will be the other plenary speaker at the Science Summit. Dr. Jones is from the National Science Foundation and leads national efforts to promote diversity in STEM in multiple sectors. There will be over 100 oral presentations at the summit. Renee Brecht of PDE is also bringing fresh ideas to the outreach track at the summit this year with talks that focus on citizen science and science messaging and translation.

The Monday sessions will kick off with Mark Botton and Bob Loveland as the keynote. Science talks on Monday will cover water quality, living resources, and monitoring with special sessions on decision tree, blue carbon, and oil spill. Outreach talks on Monday will cover science communication, utilities & sustainability, and environmental justice. There will also be a poster session in the late afternoon of both Monday and Tuesday (~30 poster abstracts received and approved right now). Dinner will be provided on Monday. The dinner program will include a CCMP bingo session, where participants can win prizes. The game will be designed to show summit attendees how their work relates and connects to the CCMP, and vice versa. On Tuesday, science session topics will include restoration, wetlands, blue collar bivalves, Philadelphia Water Management, DRBC work (e.g., Boat Run), marine debris, and water quality. Outreach topics on Tuesday will include Bayshore tourism, placemaking, and STEM & education. Right before lunch on Tuesday, Dr. Brandon Jones will give the keynote. Wednesday science sessions will focus on monitoring, restoration, and will then close after lunch with a hot topics session. Outreach talks on Wednesday will focus on citizen science, community education, MS4s, and how to improve programming.

PDE will be notifying speakers that they have been accepted to present at the summit over the next few days. Sarah Bouboulis at PDE is the point-person for coordinating abstracts and session layouts. There are usually 2 moderators for each session. Kelly Anderson offered to help moderate the Philly Water Planning session. Ken Najjar offered to assist with moderating one of the monitoring sessions. Danielle Kreeger noted that the 2019 Nominee for the Jonathan Sharp Delaware Estuary Lifetime Achievement Award is Frank Lobiondo. Lobiondo has really championed bipartisan efforts in Washington, D.C. and

work around the Bayshore and lower Delaware. LoBiondo is also the co-chair for the Estuary Caucus in Washington, D.C. and has been instrumental in saving federal budgets. Jen Adkins explained how LoBiondo has been a champion on a national basis for the National Estuary Program and played a leading role in securing funding for shell planting from 2005-2009. Sue Kilham noted how it's a great idea for LoBiondo to be the award recipient and it seems appropriate to give this award to him at this point in his career. Jen Adkins also explained how PDE is planning to invite the new NJDEP commissioner to give some remarks somewhere during the program at the summit since she is a supporter of the National Estuary Program and previously worked for EPA.

STAC and EIC members discussed how to showcase the revised CCMP during the summit this year. One idea was to provide lanyards attached to thumb drives with electronic copies of the revised CCMP. Another idea was to provide a gift like a bottle opener to celebrate the completion of the plan. Posters could be on display at an exhibit table that demonstrates how each of the summit sessions play into the CCMP. The presentations in the program could also be color coded to show each of them are connected to CCMP goals. Since the 2017 TREB has not been officially rolled out at a large public event, electronic copies of both the CCMP and TREB could be provided to summit attendees. A few STAC members requested to have limited hard copies of both the TREB and CCMP available at the Science Summit. Ad space could also be sold to organizations (e.g., YSI) during the Monday evening CCMP program. Soliciting sponsorship for the thumb drives was another idea suggested by the STAC and EIC. A few meeting participants requested that all members of the STAC and EIC be provided with hard copies of both the 2017 TREB and the revised CCMP upon completion.

November 29th Steering Committee Meeting

Jen Adkins explained how the largest agenda item on the upcoming Steering Committee (SC) call is on the Revised CCMP. CCMP call topics include an overview of the draft CCMP, final next steps on the revision timeline, and then discussion on rolling out the CCMP in January and holding a press release in February. Another topic on the SC call agenda will include the 2019 NEP Program Evaluation. Jen informed meeting participants that PDE will undergo its program evaluation by EPA in 2019. Each NEP undergoes a program evaluation once every five years. The site visits will take place from April 30th through May 2nd. At the beginning of the November 29th call, SC members will be invited to provide brief comments on their top 3 priorities/initiatives for the Delaware Estuary for 2019. PDE will briefly report-out on some updates regarding next steps with PennVest and the freshwater mussel production hatchery during this call. Sue Kilham recommended that the 2017 TREB be brought up during the SC meeting to remind SC members of this finished report.

Roundtable Updates

Jen Adkins informed meeting participants of a new effort with other partners in the region under development with funding from the William Penn Foundation related to recreational use and access. This effort may lead to a new revenue source for the CCMP and actions related to designated uses, recreation, and access. PDE also received the 2018 President's Fishery Conservation Award (non-member award) from the prestigious American Fisheries Society, one of oldest professional scientific societies that exist in the United States. The meeting took place at the 2018 American Fisheries Society Annual Meeting in Atlantic City, New Jersey.

Ken Najjar reported how there has been progress at DRBC on conservation, water audits, consumptive use, and related policy. Ken reported that the FFMRP, a 5-year flexible plan that was passed about a year ago, focused on auditing public water supply systems to find out where lost audits are for water loss control. DRBC estimates that about 25% of water in the Delaware River Basin is taken from water resources and never reaches the customer (roughly 150 million gallons each day).

Namsoo Suk reported that DRBC is developing hydrodynamic and water quality models to find linkages to nutrient reductions for certain species. Some monitoring is taking place on a weekly basis while other projects are on a monthly basis (currently monitoring 25 tributaries on a monthly basis in Trenton and the Schuylkill). DRBC is also conducting a light extinction spatial study in ambient waters. DRBC also continues to develop the eutrophication model to see how much nutrient reduction can achieve ambient DO. DRBC is also evaluating primary productivity along the main-stem Delaware. DRBC is conducting hydrodynamic modeling from Trenton to the mouth of the Bay looking from the continental shelf to the downstream boundary. DRBC is also using EFCD modeling and Wasp 8 to collect water quality data with support from EPA.

Jay Springer reported that the NJDEP Integrated Reports change locations in New Jersey every two years, with the prior focus on Barnegat Bay/lower Delaware. New Jersey will now be moving to the upper Delaware for the next integrated report process. NJDEP's funding for water quality restoration grants will prioritize the Delaware. NJDEP has been involved in planning Barnegat Bay Blitz to get people to help clean up NJ beaches and public lands and is looking to work with PDE to expand the South Jersey Scrub next year.

Kelly Anderson reported that PWD will present at the upcoming WRA DRB conference and cover how utilities will be affected by sea level rise and climate change adaptation programs and review downscaling climate models to be applicable to Philadelphia models. PWD will also be giving talks at Science Summit in January with presentations on salinity modeling along with other industrial users and how flow is being managed upstream. PWD presentations will also look at chloride and how it relates to road salt since wastewater treatment is not an effective means of removing salt. At the Summit, PWD will also review work around the DO resolution at DRBC and what this means for modifications in the denitrification process. PWD will also give a broad overview of water quality monitoring efforts underway and changes in infrastructure (gray and green infrastructure).

Lance Butler provided PWD mussel hatchery updates. A memorandum agreement was recently signed with the members of the Aquatic Research and Restoration Center (ARRC). Members include governmental and NGOs to help address urban water quality issues related to ecosystem services. ARRC projects will include propagating and restoring freshwater mussels as well as migratory fish propagation (e.g., shad). The *River Alive!* exhibit will be opening at the Independence Seaport Museum in November 2018.

Rhonda Manning reported that PADEP's, Deputy Secretary for Water programs is leaving. Kevin Hess has been assigned to the STAC and is a member of PADEP's Coastal Resources Program.

Kim Cole reported that DNREC recently completed all components of the biochar project analysis and the preliminary results will be presented at the RAE conference this year. A paper was recently submitted to an online journal on ocean acidification research priorities. If accepted, this paper will help outline goals and gaps for ocean acidification research & monitoring. DNREC is looking to use drones for

tidal wetland DEMs. DNERR assisted with QA/QC of surface elevation data and writing R script to analyze data. A recent coastal states organizational meeting with Brian Frazer and Grace Robiou from EPA covered coastal management programs and NEPs.

Alison Rogerson provided DNREC updates on the Wetland Monitoring Assessment Program. DNREC is wrapping up and locking in contracts for a 10-year update from 2007 of wetland maps. This will be done through a partnership with Virginia Tech for an update on wetland acres, losses, and sources. DNREC is analyzing more than 100 locations to assess wetland conditions that border into Maryland (C&D canal). DNREC will be conducting wetland assessments in the Brandywine watershed next summer. DNREC continues to work with Danielle Kreeger and other PDE staff on living shorelines work and the living shorelines committee in Delaware to provide more advanced training for professionals at workshops. DNREC also joined an agreement to expand oyster shell recycling in Delaware.

Michelle Price-Fay provided EPAR3 updates and informed meeting participants that Catherine Libertz is the new Director of the Water Protection Division. EPA is going through a national realignment, though EPA staff are not completely sure what this looks like and details have not been shared externally (more information to come at a later date). EPAR3 met with United by Blue to look at ways to modify and expand the trash summit. EPA would like to work more with the water departments and the NEPs on this event and will be reaching out in the near future. Irene Purdy informed meeting participants that the realignment shouldn't have too much impact on the organization structure at EPAR2.

Evelyn Huertas provided the Region 2 update about RA Lopez's participation on the EPA Environmental Justice and Community Revitalization Council (EJCRC). He is the Lead for the EJCRC's Community Driven Solutions workgroup. Sue Killam asked if it would be possible to gain RA Lopez's participation in the Summit especially as there is an environmental justice focus. Evelyn and Irene agreed to coordinate with Jen to explore this opportunity.

Dave Bushek reported that Rutgers University Haskin Shellfish Lab is getting ready for the oyster stock assessment taking place on Feb 12 and 13. The lab is starting to look at changes in rainfall patterns across the system to review excessive rainfall and how that affects the oyster population and dynamics in the Delaware Bay. The last major event was in 2011 and resulted in high mortality. This year, there was an average of about 5% up to 30% this fall mostly due to higher freshwater flow rather than storms. There's some regulatory conflict between the development of intertidal oyster aquaculture and migratory birds.

Daphne Munroe and Dave Bushek played a YouTube video demonstrating amphipods horseshoe crabs moving alongside and under oyster racks during the full moon this past May. Daphne explained how this is reviewing whether or not the horseshoe crabs can move through these oyster farm arrays. From what's been caught on video, the horseshoe crabs don't seem to have any trouble moving around the farms. There is a conservation measure that's required of all farms to produce racks that are high enough for horseshoe crabs to move beneath them. Daphne also looked at placing racks in tanks to see how the horseshoe crabs would move around if they could successfully crawl over the racks. Dave explained how the physical structure of the racks don't necessarily deter shorebirds, but they will stay a short distance away if they see people close by. The red knots will also only approach if there's already a flock, but usually stay away if there are only a few birds nearby. The Haskin Lab is also trying to identify what measures work with the farm right now functioning as an artificial reef with several species of fish using it as habitat.

Greg Breese provided USFWS updates on shorebirds, noting that red knot populations continue to hold steady along with horseshoe crab populations. USFWS put out a report for public comment on the black rail to see if it should be listed under the Endangered Species Act. USFWS is conducting some research on the salt marsh sparrow right now. There is a movement across several Fish & Wildlife agency offices to collaborate on getting people out hunting and fishing. There is a grants program through USFWS underway and is administered under NFWF.

Jen Adkins informed meeting participants how the Riverkeeper Network reached out a few weeks ago on the channel deepening memo to see if there's been any data collected recently that would result in a memo update. Jen asked the STAC and the EIC what the process is for these types of requests (i.e., other organizations or members of the public looking for input specifically from the STAC to update or revise a document). Several EIC members recommended that these issues be addressed with the EIC which can then bring any scientific questions to the STAC to check in on capacity to make updates. Danielle Kreeger explained how there are some new models on salinity and volume, but nothing that would result in large updates to the current memo. Danielle noted how it's important to keep in mind that STAC participation is volunteer, but it's still helpful to have a list of top priorities and requests if STAC would like to spend time on writing some briefs.

Danielle Kreeger noted how there is normally another STAC meeting in the Winter (December or January), and asked how soon the STAC wanted to meet again. Since there are no large topics on the agenda for an upcoming meeting, there could be time for a robust roundtable discussion from STAC members. STAC members recommended to make a decision on the date of the next STAC meeting based on the results of the monitoring workshop and evaluate what input is needed from the STAC on next steps for the Monitoring Assessment Report.

Jen Adkins informed meeting participants that the next EIC meeting will take place on Thursday, December 6th as a joint meeting with the PDE Board of Directors. Sue Kilham and Jen Adkins asked if there were any further edits to the minutes from the last STAC and EIC meetings. No additional edits were offered beyond those sent earlier by email, and the meeting minutes accepted contingent on fixing minor edits that were received.

Adjourn at 2:50PM.