



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

Minutes
March 28, 2007
Partnership for the Delaware Estuary - Wilmington, DE

Members or Alternates Attending:

Ken Anderson II – PADEP
Greg Breese – USFWS
Dr. Gary Buchanan – NJDEP
Lance Butler – PWD
Tom Fikslin - DRBC
Dr. Jack Gallagher - Univ. of Delaware
Simeon Hahn – NOAA
Jawed Hameedi - NOAA
Dr. Bob Hoke – DuPont
Dr. Desmond Kahn - DNREC
Dr. Sue Kilham – Drexel University

Dr. John Kraueter – Rutgers University
Dr. Danielle Kreeger – PDE
Dr. Dave Russell – EPA Region 3
Dr. Jonathan Sharp – Univ. of Delaware
Dan Soeder - USGS
Dr. David Velinsky, Academy of Nat. Sci.

Also Attending:

Amie Howell – EPA R3
Krista Laudenbach-Nelson – PDE
Martha Maxwell-Doyle – PDE

I. Welcome & Introductions (Daniel Soeder, STAC Chair)

Dan Soeder officially opened the meeting at 9:42 a.m. and welcomed all in attendance. Introductions were then made.

1. Mr. Soeder reviewed the scheduled agenda. He then asked if there were any comments or changes requested for the minutes from the January 4, 2007, STAC meeting, which had been circulated in draft form for review prior to this meeting. After a period of review during the meeting, no further edits were requested.
2. With no further discussion, Dr. Kraeuter moved that the minutes from 1/4/07 be accepted; and Mr. Breese seconded this motion. The STAC voted to accept the minutes with no opposition.

II. PDE Updates and Strategic Planning (Martha Maxwell-Doyle, Deputy Director)

1. Ms. Maxwell-Doyle noted that PDE is nearing the end of its strategic planning process and a draft will be provided to the Estuary Implementation Committee (EIC) at the next meeting of that group on April 11th. Copies will be provided to everyone on the STAC as soon as possible.
2. Ms. Maxwell-Doyle also reported on the current federal budget situation, based on information obtained at the mid-March national meeting of the National Estuary Programs (NEP) in Washington, D.C. Currently, we are functioning under a continuing resolution for EPA, with the NEP being treated as an earmark program. Looking toward fiscal year 2008, which will begin in October 2007, each NEP is facing a projected cut from the current funding

of \$500,000 to 388,000, which would represent a 22% cut. This would necessitate tough choices, which will need to be discussed at the April EIC meeting. Since PDE has diversified its funding base over the years, in comparison to other NEP's, PDE is hoping to be able to weather the cut without losing key staff. Science will remain a high priority no matter the outcome.

3. Dr. Sharp observed that the currently, there is minimal visibility of the NEP's within national programs at EPA and elsewhere. He suggested that the heavy local involvement that the NEP's generate, should be elevated within EPA Headquarters, as a key asset of the programs.

4. Dr. Kreeger noted that the STAC start-up fund provided by William Penn, as part of the strategic planning process, will be exhausted early this year. While there may not be continued funding available, science is now seen as a core strength of PDE, as reflected in our many recent products and activities (science conferences, white paper, peer review) and in the strategic plan. The future of the STAC is secure.

III. Report on PDE Science Initiatives and Opportunities

1. State of the Basin/Estuary Reports. Dr. Kreeger provided an update of the status of the State of the Basin/Estuary Reports. Forward progress continues to be slow with this DRBC-led effort that involves PDE and the four lead universities (University of Delaware, Penn State University, Rutgers University, Cornell University). All of the available and relevant data have been collected for the lead indicators, and current efforts are focusing on graphical depiction and interpretation of the information. The main organization of the report has been returned to the earlier outline that contains an estuary-focused chapter. This is expected to facilitate extraction of a State of the Estuary summary that can be repackaged for PDE products after the main report is completed. The 2007 State of the Sound Report for Puget Sound is being used as an example of what we're aiming for.

2. PDE has furnished the data and interpretation with regard to the four indicators that we agreed to take the lead on (tidal wetlands, tidal wetland buffers, fish passage, horseshoe crabs). The next PDE task is expected to be the synthesis of data and data interpretations provided for other indicators for the estuary region; hence, the timing of the estuary synthesis will depend on when this information is received by PDE. Based on current information, we expect to receive a first draft in mid-April. Once PDE has a first draft of the estuary chapter, we would like the STAC to review this piece on behalf of PDE and coordinated through PDE.

3. Dr. Sharp suggested that we take a fresh look at the data, including more recent data, and avoid regurgitating old summaries of other summaries, etc. He suggested the STAC can take this on. Dr. Kreeger suggested that PDE (and the STAC) lead the region in future discussions regarding ecosystem-based management, monitoring and restoration, and that future reports like the State of the Estuary Report could directly link effective indicators to the key distinguishing features of our system.

4. Dr. Kraeuter suggested also that future State of the Estuary Reports not only identify status and trends, but point arrows in the direction of goals that we would like to attain. Dr. Kahn noted that this is a nice goal, but system complexity will lead to different opinions about what are appropriate and attainable goals. Mr. Butler noted that for some living resources such as shad, indicators can be directly linked with goals (e.g., targets for abundance and catch statistics). Dr. Kreeger noted that some environmental targets might not be resource-

specific, but might be operational; e.g., convincing the states to adopt comparable monitoring strategies so that indicators can be assessed as “apples-apples” (e.g., macroinvertebrates are assessed by location in NJ but by stream reach in DE). Dr. Soeder agreed that an important role of the NEP is to facilitate data collectors to adopt uniform methods as related to monitoring, assessment, and indicators.

4. Science conference report, statistics and products. Dr. Kreeger thanked the STAC for their tireless efforts to help plan the program, invite speakers, moderate sessions, synthesize information, and give presentations at the 2007 Delaware Estuary Science Conference. By all measures, the conference was a huge success, with more presentations (>100), more sponsorship (\$>55,000), and more participants (~275) than the two-part 2005 conference. This was in part due to the addition of the Environmental Summit, and synergistic activities such as the Tuesday press conference arranged by the National Fish and Wildlife Foundation. The conference was budgeted at more than \$100,000, but the registration income, healthy sponsorship, and lower-than-expected food costs at the hotel, resulted in a net surplus of funds that will be set aside for the 3rd conference slated for 2009.

5. In the future, there is always room to improve the program. There is an interest in having more overlap between the Science Conference and Summit, such as shared morning presentations to the whole group on topics of board interest. There was some concern about the small screen at the Grand Hotel in Cape May and other minor issues with regard to whether students were able to attend; but overall, the venue and timing is well liked. The January date, combined with the location which is out of commuting range for most, contributes to the retreat atmosphere that has characterized the two meetings in Cape May. Dr. Sharp noted that no other date would be better for students, so stay with the January timing. Some STAC members noted that in 2005, the half of the conference held in Newark did not have the same energy as the Cape May half because few participants stayed overnight. Other locations and venues were discussed, but on balance, the STAC felt that the Cape May location is one venue that offers the following two key attributes: 1) facilities of the size needed to accommodate 300 people, with food and rooms for posters, breakouts, etc.; 2) retreat atmosphere away from the main commutable locations.

6. Regional restoration initiatives. Dr. Kreeger provided an update of PDE plans to study the feasibility of regional restoration planning in the watershed. While there is little support for doing “a plan,” there appears to be strong interest in developing watershed- and estuary-based perspectives on restoration, which could highlight the importance of particular restoration activities and resources that are warranted in different sub-regions of the system. It is widely acknowledged that much restoration (and conservation) is conducted ad hoc in reaction to particular incidents, mitigations, or funding opportunities, and with little follow-up assessment. It is increasingly acknowledged that proactive, coordinated restoration could, in theory, lead to improved cost-benefit outcomes for natural resources. Concepts such as “restoration up front” need to be considered, as well as ecological trajectories related to land use and climate change. If developed, PDE would like a regional restoration initiative to link to our system’s conceptual framework, so that conservation and restoration needs and opportunities in particular subregions are linked to the key natural resource features in those areas.

7. Currently, PDE is considering developing a Regional Restoration Strategy, which will preliminarily examine the feasibility of regional restoration coordination and planning in our area. We would like to establish a Restoration Workgroup, perhaps affiliated with the STAC, to help PDE with this strategy development. In addition, a restoration workshop is being planned

by PDE for the summer or early fall to discuss these topics and to bring in national experts to present on case studies and lessons learned elsewhere. Funding (\$6,000) will be provided for this workshop by DuPont through the National Fish and Wildlife Foundation.

8. Mr. Soeder suggested that the restoration workshop should focus on technical elements and try to infuse some science into the decision process regarding how projects get prioritized.

Dr. Kreeger agreed, and noted that ecological matrices, natural capital valuation of ecosystem services, and other science topics are definitely envisioned to be part of the eventual strategy and would be the basis of any PDE led restoration prioritization. However, she added that at the outset, PDE and the STAC should remain cautious with regard to prioritization because of the potential for alienating groups or trustees who may fear loss of control of project selection, etc. The approach being considered by PDE is to develop information products, decision trees, and project directories that would add value to existing information and facilitate improved benefit-cost outcomes, but unless asked, we would not attempt to select projects for other groups. And the STAC and its affiliated restoration workgroup is envisioned to provide only technical information that informs this planning and prioritization effort; other groups would decide how this science-based information gets used.

9. A discussion ensued regarding prioritization. Mr. Hahn suggested that prioritization should not be seen as problematic, and he suggested the STAC could in fact get more involved in this.

Drs. Kraeuter and Velinsky suggested staying away from trying to prioritize or weigh in on small projects, which will happen with or without a restoration strategy. But they did agree that regional planning products would provide scientific information that many of the decision-makers don't currently have and they felt these products would in fact be used by those groups who decide. Mr. Breese said that there is in fact a great deal of prioritization already going on, within particular agencies. Mr. Hahn noted that prioritization is defined and applied differently at different scales; i.e., it makes sense that the Estuary Program work to prioritize at the watershed and basin scale; whereas, local restoration groups will have a different scale for their prioritization. The group concluded this discussion by noting that a tiered approach would be useful, enabling different groups at different levels to obtain helpful information regarding prioritization.

10. Mr. Soeder asked if the restoration workshop planning should be put on the agenda for the next STAC meeting. Dr. Kreeger said that this should be added, pending timing.

11. National Water Quality Monitoring Network Pilot. Dr. Hameedi announced that the Delaware River Estuary Basin has been selected as one of the three nationwide pilots for the National Water Quality Monitoring Network. This nationwide network is expected to "address and integrate watershed, coastal waters, and ocean monitoring, based on common criteria and standards. The network would provide information on water quality that, when interpreted with other information such as economic and land use data, would provide relevant scientific information to assist resource management and decision making." More information on the Network can be found online at http://acwi.gov/monitoring/network/ceq_proposal.html.

12. The Network has been included in the President's plan and budget, in four phases. Phase 1 was to design the network, Phase 2 is to initiate pilot studies (underway), Phase 3 demonstration, and Phase 4 would be a nationwide implementation. The pilots are being asked to assess the current monitoring infrastructure, assess what would be needed to implement the network, and to provide costs associated with implementation. No funding is available for the pilots to perform this assignment; however, there is potential for funding for demonstration during Phase 3. Fifteen different entities submitted proposals to be pilots, and

DE Bay, San Francisco Bay, and Lake Michigan were selected.

13. Dr. Kreeger noted that the network is not focused solely on water quality monitoring per se, but includes the linkages between water quality on other major system attributes such as atmospheric deposition, groundwater, wetlands and beaches, and biological communities. Dr. Hameedi said the network is designed for connectivity between the watershed and ocean, the different ecosystem attributes, and using data management and consistency standards. It straddles NOAA, USGS, EPA and other federal agencies, and links ocean observing (i.e., IOOS) and watershed monitoring (i.e., stream gages).

14. Dr. Kreeger spoke about the DE pilot proposal. The DE pilot is being led by a steering group that evolved from an earlier proposal to elevate the Delaware Watershed to Ocean Observing System (DEWOOS). The steering group is comprised of DRBC (Bob Tudor is the lead point person), USGS (Eric Vowinkel), PDE (Kreeger), folks from the universities such as Dr. Sharp and Dr. Scott Glenn at Rutgers, and about ten others. Going forward, some national network refinement workgroups are planned related to elements such as wetlands, beaches, biological linkages, etc. The pilot team will be reaching out to STAC members and other experts to serve on subgroups for the pilot team to help address specific needs. Dr. Hameedi noted that the pilot report will be due in the fall, and so the timeline is ambitious.

15. Dr. Kahn asked if this monitoring network might help us advance concepts regarding ecosystem-based monitoring. Drs. Sharp and Kreeger responded that this is in fact seen as an excellent opportunity to make those crucial linkages, between for example, water quality and oyster reefs (two-way interactions). Dr. Hameedi suggested that interested STAC members should look at the US Ocean Action Plan if they have not done so. Agencies are trying to identify how much contribution is needed from the different leaders, such as NOAA and USGS. He expressed optimism that there will be some level of support to move this forward.

16. A discussion followed regarding the interrelationship between this effort and that discussed previously (DEWOOS), and the potential links to regional IOOS initiatives, which are still being advanced as well (e.g., Mid-Atlantic Coastal Ocean Observing Regional Association). The problem with DEWOOS was that it was never designed for a specific funding program; rather, it was a concept proposal that was used to frame the dialogue and it had not gained traction within MACOORA. DEWOOS is now seen as being addressed best by the Network pilot, and this will continue to evolve.

17. Delaware Estuary Benthic Inventory (DEBI) Workshop. Ms. Laudenbach-Nelson (PDE Watershed Restoration Coordinator) noted that 41 people attended the workshop, which was jointly funded by PDE, DNREC Coastal Programs and NJ Coastal Programs. The workshop began with a series of presentations related to the DE Bay substrate mapping, PDE interests in broadening this effort to include assessments and mapping of bottom communities (i.e., DEBI), and representatives from the Narragansett EPA laboratory spoke about the new EPA RARE grant that is expected to sample and describe bottom communities in data-poor areas of the estuary in 2008. The presentations were followed by breakout groups which focused on stakeholder interests. Six main questions were posed to all participants to identify how improved, comprehensive understanding and maps of bottom conditions and communities might provide information of use for managers; e.g., for spill response planning, benthic assessments, fisheries production modeling, etc.

18. Mr. Soeder asked if there is any possibility of expanding the benthic surveying into the

tidal estuary above the DE/PA line, and Ms. Laudenbach-Nelson said that representatives from PA were present and did indeed state their interest in looking into ways to do this.

19. Workshop proceedings are being prepared and next steps are being considered with the states, regarding whether and how to potentially implement DEBI. Expertise from the STAC will be sought out to help move this forward, particularly with regard to the RARE project which has been funded.

20. Delaware Estuary Information Gateway (DEIG). Ms. Laudenbach-Nelson reported that the base structure for the web-based information gateway has been erected on our website, following the main elements of the conceptual framework brochure that we produced last fall (e.g., subregions divisions, signature resources, habitats, issues by subregion). An intern will be hired soon to begin adding information to this skeleton, which will include fact sheets, databases, reports, etc. PDE has also been in discussions with USGS NBII (Ms. Gabrielle Canonico) and geospatial database specialists from Penn State to investigate options and funding for developing an interactive, GIS framework and mapping tool for the gateway module. Ms. Laudenbach-Nelson also noted that much of the available data is now geospatially referenced, but discussed the other limits to the datasets and needs for linkages and metadata.

21. PDE on-the-ground restoration science projects (update). Ms. Laudenbach-Nelson gave an update on the status of two on-the-ground restoration science projects PDE is leading this year. The first is a freshwater mussel restoration project based in the Brandywine River and adjacent tributaries. This project is expected to lay the groundwork for the restoration of species which have been extirpated, and to build population biomass that would improve habitat quality and benefit water quality. The PDE-led project includes partners U.S. Fish and Wildlife Service, Cheyney University and Drexel University for Phase I, which is being funded by ConicoPhillips. The Brandywine Conservancy, Academy of Natural Sciences, and USGS are also interested in participating if further funding becomes available to move toward Phase II (propagation and outplanting). Subcontracts, permitting issues, and acquisition of PA state mussel databases are current foci for this project, which should move to the field by summer.

22. Ms. Laudenbach-Nelson also discussed the DE Estuary Living Shoreline Initiative (DELSI), which PDE is conducting in partnership with the Rutgers Haskin Shellfish Research Laboratory (Dr. Dave Bushek, PI). This project will deploy a variety of natural substrates, such as COIR fiber biologs, into intertidal zones along eroding marsh shorelines. Mussel seed are expected to recruit onto the fiber products, and in interaction with marsh grass, establish live armoring that helps absorb energy and facilitate vertical accretion of the marsh horizon. The project is also designed in two phases, Phase 1 (funded by NFWF for 2007-08) will examine the suitability of different substrates for attracting mussel (and oyster) recruits, and monitor success of the communities. Phase 2 (contingent on new funding) would involve hatchery propagation and seeding, with additional monitoring (e.g. fish use) over longer time scales following treatment.

IV. Advocacy Discussion

1. Mr. Soeder noted that the topic of advocacy was put on the agenda in response to some email exchanges among STAC members who questioned how the STAC and PDE should approach advocacy. The questions to be addressed and clarified are whether PDE is an advocacy organization, and whether the STAC can ever be part of PDE advocacy.

2. Dr. Kreeger explained that while PDE is a non-profit environmental organization, we differ from other non-profit NGO's because we administer the Estuary Program and we strive to fill the important niche of a watershed-based, objective organization that facilitates and works toward broad-based protection, conservation and management actions as part of our CCMP. In effect, we attempt to bring together representatives from diverse sectors sitting on different sides of the table to produce synergistic outcomes on behalf of the resource. Continuing with this metaphor, rather than sitting on one side of the table, PDE attempts to "be" the table. As a result, PDE takes a very measured approach to advocacy, whereas many other non-profit environmental organizations are active in this area. Our system is complex and rich with environmental organizations that play that role, and PDE seeks to play the role of third party that has the capability to provide objective input, usually upon request by our steering bodies such as the EIC. Nevertheless, as a non-profit, we are not encumbered to limit ourselves in messaging when we feel the resource can be best protected, enhanced or managed by taking a position on matters where there is a substantial body of evidence to support a position. We feel it weakens us as an organization if we say we will never "advocate" for anything, and many of our supporters (including some scientists) feel do not do enough in this area. This is our view of how PDE approaches advocacy.

3. Dr. Kreeger clarified, however, that the STAC is not the same as PDE. The STAC will never advocate. The STAC Charter does allow for development of position papers, which would summarize the body of evidence, and where it feels it is appropriate, the STAC might analyze data, and then offer best scientific assessment of a particular issue or question, which may or may not be used to inform policy or other processes. But in general, STAC positions would be in response to PDE or EIC requests, and to date no such products have been developed. Even if the STAC was asked to analyze an issue, PDE would convey the message carefully without attributing particular comments to individuals, and offering any caveats that the STAC would feel are necessary, such as noting disclaimers that the "STAC position" does not necessarily reflect the views of all STAC members, etc. Dr. Kreeger encouraged STAC members to look over the clause in the charter if there are any questions.

4. Dr. Sharp noted that public perception often misunderstands the nature of scientific data and the messaging that often goes with it. For example, the scientific data on climate change is clear, and there may be disagreement on the uncertainty and model outcomes, but data is data. The public may misconstrue the messages that accompany the data depending on how the information is conveyed and we (the STAC) need to remain careful in only speaking about the data to avoid losing credibility. He added that we should not avoid controversial issues, however.

5. Mr. Breese added that PDE products (especially those by the science director) need to be careful in whether and how to attribute scientific support for statements, and the public's perception of how the message is crafted. It may be implied that the STAC supports a particular position if either of the two spokespeople for the STAC (the Chair or Science Advisor) make comments for PDE, even if the STAC is not cited. Drs. Kraeuter and Sharp recommended that Dr. Kreeger stick to the technical, science messages – and let others at PDE (e.g., Deputy Director who is the policy lead) place the science in perspective of issues.

6. The STAC discussed the value of pro/con positions papers in Estuary News. Most STAC members supported this approach so long as the opposing views are balanced. Dr. Kraeuter noted his frustration as a journal editor in seeing articles by eminent scientists opposed by individuals who have very little or no knowledge of the issue or science but who simply take an opposing view.

7. Mr. Breese suggested that PDE make it clear to the STAC when requesting review, as to how review comments will be used. For example, if we ask for constructive suggestions but not peer review, we should refrain from noting that the STAC "blessed" something. Dr. Kreeger responded to say that the null default is to never associate the STAC with anything we produce, unless the STAC has been specifically told that it is formal peer review and the STAC would be acknowledged accordingly. To date, nothing has qualified, but potentially the 2007 State of the Estuary Report might.

8. Mr. Soeder closed the conversation by suggesting that the newsletter not avoid controversial issues, but science statements must be carefully scrutinized.

V. Selection of 2007 STAC Project(s)

1. Dr. Kreeger reported that the majority of STAC members reviewed and ranked the three proposals for 2007 funding (a fourth project was not advanced based on early input). There were also good comments received and a lot of thought was invested in the review process. Considering that the total amount of funds is pretty small (\$15,000), most STAC members who responded recommended that only one project be funded rather than dividing the funding between two projects.

2. The benthic survey project scored best overall, with the tidal wetlands monitoring project a close second, and the shorebird project was third. There was support for the scientific need for all three projects. However, there was stronger support for Delaware Estuary specific projects, and for those that would be of use across the estuary region. Hence, the shorebird project, which would have widespread relevancy but which might be funded by national programs, was seen as being lower priority, as compared to the benthic data archiving project which is local and has limited funding options. The wetland monitoring received strong support, but was based in DE.

3. Dr. Kahn moved that we fund only one project and it be the benthic data project. Mr. Anderson seconded the motion. Mr. Soeder called a vote on the motion. Sixteen STAC members voted in favor, and one was opposed (Mr. Breese). The motion was carried and the benthic project will be funded by PDE during FY 2007.

VI. Discussion of Ecosystem-Based Management and Restoration

1. In the interests of time, Mr. Soeder suggested deferring this discussion topic, which was on the agenda, until a future STAC meeting, and all agreed.

2. Mr. Soeder and Mr. Hahn discussed future meetings and workshops related to this topic.

VII. STAC Membership and 2007 Elections

1. Dr. Kreeger reminded STAC members that this is the final meeting of the first STAC year, and prior to the next meeting we will need to hold an election to allow for partial turnover of elected seats. Seven positions are up for reelection, and additional nominations are being solicited prior to April 15th. Elected members should provide complimentary expertise, and strive to achieve geographical balance as well as cross-sector representation, as denoted in the Charter. We have received one new nomination already, and so we are guaranteed a competitive election assuming all seven incumbents decide to be on the ballot.

2. Dr. Kreeger described the model for elections that has been accepted by PDE leadership. Following the close of nominations (4/15), STAC members will be sent a ballot with names of all candidates, including incumbents and new nominees. CV's will be provided for any new nominees. STAC members will then be given until the end of April to select their top seven names, casting their ballots with either Kathy Klein or Danielle Kreeger. Ballots will be treated as confidential. The top seven vote-getters will be decided by the ballots received by April 30th, as tallied by PDE. This list will then be sent to the EIC for consideration and approval before May 15th. Contingent upon EIC approval, the STAC will be informed of election results as early in May as possible. Any turnover will be reflected at the next STAC meeting, which will start the second year of the STAC (i.e., 5th meeting).

[Update 6/12/07: The EIC requested that EPA be added as an additional standing body on the STAC, and that Dave Russell be converted from an elected representative to the standing representative for EPA. Since Dr. Russell was one of the seven whose seats were up for election, only six seats needed to be filled. The Charter for the STAC is being updated to reflect this change, and the membership list will reflect this change and the election results.]

3. The STAC Chair is an annual appointment, and the next STAC Chair will be elected at the start of the next STAC meeting from the pool of new and returning STAC members. Nominations will be accepted for this at any time (treated confidentially).

4. Dr. Sharp suggested that incumbents should consider staying on the ballot because we have only been operational for one year, and there has not been enough time to really hit our stride yet. He suggested that real turnover not occur until the second year has elapsed, when we can get a better assessment of the long-term direction of the STAC. He expressed confidence that there is a lot of potential for the STAC in the future even though we have mainly devoted ourselves to tasks such as the science conference planning to date. He noted that even when the STAC existed at the beginning of the Estuary Program, it did not have the diverse organizational representation that the current STAC has (e.g. from NOAA, USGS, etc.)

VIII. EIC Challenge Question and Plans for Fall Meeting

1. The STAC addressed the interrelationship with the EIC. There has been a continuing desire from the STAC to elevate science information and needs within the EIC, and to ask if the EIC has any specific challenges for the STAC to help with. Dr. Kreeger reported that this interest was brought up at the last EIC meeting. In response, EIC Member Mr. Kevin Donnelly (DNREC) offered the following challenge question to the STAC: "What are the top three science and management actions that could be taken that would lead to the most positive and direct (on-the-ground) environmental improvement in the Estuary?"

2. The STAC then discussed the pros and cons of listing specific responses, since there is such a wide spectrum of possible projects and actions as related to fish, habitats, etc. What level should this be addressed to? Dr. Kraeuter suggested that rather than targeting a resource or habitat, that the actions speak to processes since these will lead to integrative outcomes. Dr. Gallagher suggested that "resiliency" be a target, since it also forces integration. Dr. Buchanan suggested we need to be clear about what we propose, being clear that it would address a science need but staying away from management actions and decisions which are outside of the bounds of science per se. Dr. Sharp agreed, saying that the phrase "actions" in the question is misleading because it speaks more to the decision process rather than the science needed to inform actions. Dr. Kahn suggested that the question needs some word-

smithing. Dr. Kreeger suggested that PDE convey to the EIC that different STAC members interpreted the challenge question differently, and that the STAC felt they really want to address the question but that there is a need to focus more on issues and science needs rather than "actions" which are more in the management realm. There is opportunity to work back and forth with the EIC to crystallize this discussion.

3. Dr. Kreeger suggested that the STAC should give recommendations to the EIC, such as to work together to study whether ecosystem-based management is appropriate and possible here in our system. Rather than waiting for a mandate from the EIC, the STAC might propose to elevate discussion topics. Several STAC members (e.g., Drs. Gallagher and Sharp) voiced support for this idea of initiating discussions rather than waiting. Dr. Sharp also suggested that we advocate for the use of scientific information in making management decisions.

4. The fall joint meeting of the EIC and STAC should elevate this discussion, focusing on ecosystem-based approaches and the role of the STAC in identifying key science needs and actions that may contribute to the best management outcomes.

5. The STAC felt that there is a pressing need to look at the scientific aspects of many issues that are confronting the Delaware Estuary and watershed. Climate change is one, noting the recent spate of extremes in the hydrological cycle. Sea level rise, shifts in flora and fauna, potentially increasingly oscillatory weather patterns. Dr. Sharp suggested there is potentially a major change in ecosystem function in the estuary, and there is a role for the STAC to focus the discussion. Dr. Kreeger also observed that with the recent paradigm shift regarding how climate change is perceived across the country, there is an opportunity to build on this interest to address changing conditions. This could lead to specific types of responses such as tidal wetland condition preservation that could help address changing conditions. Dr. Kreeger added that Dr. Sommerfield's data on sediment budgets raised important questions about how channel deepening might affect marshes, and Dr. Kraeuter added that this is also potentially important for salt balance.

6. Additional issues and perspectives were discussed, and Mr. Anderson said that all these issues should be considered together rather than issue-by-issue, resource-by-resource. Dr. Velinsky asked whether a workshop might be organized to focus the discussion on climate change, and use this as a way to think about the system holistically. Dr. Russell asked whether climate change was addressed in the white paper, and Dr. Kreeger noted that it is in there but the focus has amplified over the last year. The STAC recommended that the climate change workshop be considered as a STAC-initiated event, but with invitations to EIC members and others. Further discussions will be held related to this idea. Climate change can serve as a case study topic to focus the discussion on the need and value for ecosystem-based approaches to environmental management in our system.

Action Item: Drs. Velinsky and Kreeger will investigate the feasibility of setting up a Climate Change Workshop, possibly as a Town Square event jointly convened by the Academy of Natural Sciences and PDE.

IX. Future Meetings

The next meeting was scheduled for June 14th, 2007 at the PDE offices in Wilmington.

X. Adjourn. Mr. Soeder formally adjourned the meeting of the STAC at 2:45 p.m
