



Science and Technical Advisory Committee

Partnership for the Delaware Estuary:

A National Estuary Program

www.DelawareEstuary.org

Joint Meeting of the STAC & Monitoring Advisory Committee

Cusano Environmental Center

John Heinz National Wildlife Refuge- Tinicum, PA

December 05, 2008

Note: acronym definitions are provided at the end of these minutes

Participants:

Jennifer Adkins - PDE	Danielle Kreeger – PDE (STAC)
Allison Allen – NOAA (STAC)	John S. Kushwara- EPA Region 2
Thomas Belton- NJ DEP	Ken Najjar- DRBC
Gregory Breese - US FWS (EIC & STAC)	Angela Padeletti - PDE
Gary Buchanan- NJ DEP (STAC)	Irene Purdy – EPA Region 2 (EIC)
David Burke- PA DEP (STAC)	Karen Reavy- DRBC
Priscilla Cole – PDE	Jessica Ritter Sanchez- DRBC
Barbara Conlin- U.S. ACOE- Philadelphia	Dave Russell- US EPA Region 3 (STAC)
Bob Connell- NJ DEP	Ed Santoro- DRBC
Jim Eisenhardt- Duffield	Jon Sharp – UD CMES (STAC)
Thomas Fikslin- DRBC (STAC)	Tony Shaw- PA DEP
Dorina Frizzera- NJ DEP	Dan Soeder – USGS (STAC & EIC)
Jack Gallagher- UD CMES (STAC)	Deb Szaro- EPA Region 2
Jeff Gebert – US ACE (STAC)	Bob Tudor - DRBC (EIC)
Jack Gibs- USGS	David Velinsky- ANSP (STAC)
Bob Hoke - Dupont (STAC)	Eric Vowinkel – NJ USGS
Andrew Homsey- UD WRA	Laura Whalen - PDE
Amie Howell – EPA Region 3 (EIC)	David Wolanski- DNREC
Desmond Kahn - DE FWL (STAC)	John Yagecic- DRBC
Gerald Kauffman- UD Water Resources Agency	Faith Zerba- Delaware Riverkeeper Network
John Kennel – DNREC	
Sue Kilham – Drexel University (STAC)	

I. Call to Order & Introductions - Dan Soeder, and Jim Eisenhardt- Facilitator

1. Welcome and introductions, passed around sign-in sheet
2. Brief overview of agenda- Pass out SOE and SOB, Management Questions
3. One goal is to present the outcomes of this STAC/MAC meeting at the PDE Science Conference in January 2009.

4. Ultimate goal is to match indicators to management goals
5. Four indicator groups (Land Use, Water Quality, Water Quantity, and Living Resources) could be developed into subcommittees in the future.

II. Overview of STAC and MAC - Danielle Kreeger, PDE and Bob Tudor, DRBC

1. Danielle presented background of STAC and PDE:
 - a. Two new initiatives by PDE are climate change and regional restoration
 - b. The next State of the Estuary Report will be slated for 2011 (technical version, public piece thereafter), to be led by the STAC
 - c. Today's discussion should be general and form the beginning stages a "next generation" set of indicators to strengthen future reports. Then we can get additional input at the Science Conference in January.
2. Ed Santoro discussed the future focus of the MAC:
 - a. Emerging contaminants
 - b. Water quality modeling
 - c. Monitoring five year cycle for next report in 2010 or 2011.

III. Executive Director's Message – Adkins

Thank you to everyone in STAC and MAC who participated in developing the State of the Estuary Report

IV. Management Questions & Needs - Bob Tudor

[Note: see STAC "Secret Garden" Website for the file with Bob's management questions:
<http://www.delawareestuary.org/scienceandresearch/STAC/materials.asp>]

1. Bob discussed Results Based Management
2. Showed a spreadsheet of indicators from other estuaries in the country- use this as a benchmark
3. National Water Quality Monitoring Network- high level people saying what are the right questions to ask (is the clean water act doing the right thing, etc.?) and what should we do.
4. Review of '7 Things a Good Indicator Should Do' document
5. The organizational set-up is 'Estuary Program > Steering Committee > Management Group > Monitoring Group
6. Management Goals boil down to: Protect Public Health and Water Supplies and Maintain Ecological Conditions

V. Indicator Selection

The group first discussed ways to categorize indicators, recognizing that some transcend different bins. Thoughts on the four indicator categories used in the 2008 reports (Land Use, Water Quality, Water Quantity, and Living Resources) included:

1. Jon Sharp- these are not the best categories because they cannot be weighed the same (not four equal boxes)
2. Greg Breese- the goals should match the indicators, so start with goals as boxes and then put indicators in goal boxes

3. Climate change should also be considered as a 5th category. Danielle- Climate Ready Pilot Study will have an adaptation plan focusing on responses to climate change drivers (not drivers themselves) that are non-linear. What indicators and monitoring will we need to watch for early warning signs that we're approaching a tipping point or for indicators; e.g. risk of wetland blowouts or crash of oyster populations or other living resources.
4. Danielle Kreeger- functional metrics are needed to inform about ecological processes that link the different structural metrics. Develop theses on our wish list.
5. Dan Soeder- we need to understand systems better before we can focus on the indicators
6. Greg Breese- start with goals on first page of the report, and objectives are items to do to accomplish goals (focused on CCMP).
7. Jon Sharp- Action items or human activity indicators should be focused on a watershed scale, and environmental condition indicators should be focused on the estuary scale.
8. Where would you put landscape? In human activity group.
9. Public report should have less indicators than technical reports.

VI. Breakout session I: Indicator Selection

What indicators from the SOE and SOB are worth keeping, what is their value (high, medium, or low), which should be added, should they be in a technical or public report, and what management goals do they meet? Ignore feasibility and monitoring constraints for now, stick to scientific need.

[Note: refer also to Indicators Excel Spreadsheet]

Breakout groups: Water Quantity, Water Quality, Living Resources, and Land Use were topic areas. Participants self-selected into these groups, which were each facilitated. They were asked to discuss the current list of indicators in the Excel spreadsheet, which consisted of indicators that were used in the 2008 reports plus others that were identified in report preparation but not pursued for various reasons. Each group came up with a revised indicator "wish list" to strengthen future reporting capability. Notes from breakout groups were to be compiled into a revised Excel spreadsheet after the workshop. Example notes from breakout group discussions are provided below:

1. Population Trends- census data-by watershed - link to land/water use
2. Land Use/Geomorphology- % impervious, scale - forest vs. ag vs. urban
3. Erosion/Sediment- storm sampling, episodic
4. Channel Modification/Dams- depth, sediment, COE, volume dredged
5. Stream Stabilization and Restoration- stream miles restored, thresholds, bathymetry, dam inventory
6. Freshwater Inputs
 - a. Total river inputs- USGS- data exist, need to be compiled
 - b. Storm runoff/floods- recurrence interval (precip trends)
 - c. Groundwater base flow- data exist (USGS) (precip trends)
 - d. Water Use Patterns - consumptive vs. returned - data exist (DRBC) – discharges are location specific)
 - e. Automated monitors at head of tide
 - f. Flow from Chesapeake to Delaware via canal- link to water quality and living resources
 - g. Need flow measurement on C&D Canal?
 - h. Add QW to some tide gauge platforms

7. Sea Level Rise
 - a. Freshwater/saltwater line- DRBC
 - b. Storm surge + inundation- recurrence- NOAA
 - c. Changes in shoreline, tide range, habitat- (land elevations, waves HF radar, NOAA, State Coastal Programs)

The groups discussed indicators that crossover the different categories, such as dams and stream restoration which fall under different groups, as well as land use.

Some groups also thought about new types of indicators that might assess functional processes and properties that exist among structural indicators. Measurements of processing rates for key ecosystem services and ratios are needed to work toward an ecosystem model and ecosystem-based management and reporting.

Missing elements that should be developed might include the effects of climate on:

1. Freshwater input
2. Fresh/salt interface
3. Sea level
4. Ecological flows
5. Flooding/inundation
6. Groundwater input/flow
7. Fluvial vs. tidal, recurrence interval - flood/drought
8. Aquifer safe yield
9. Precipitation and linkages to hydrologic cycle
10. Storm surge
11. Sea level-related: shoreline change, tidal range, habitat changes
12. Hydrologic impairment (dams)
13. Geomorphology- erosion, sediment, floodplain reconnection, channel modification, stream stabilization and restoration
14. Water conservation/reuse

Lunch

Joint Press Conference - DRBC and PDE: 2008 State of the Basin and 2008 State of the Estuary Reports

1. Jen Adkins opening remarks – this is a celebration of the completion of these two reports. Speaking mainly about the 2008 State of the Delaware Estuary Report.
 - a. The collaboration that went into both of these reports, which were prepared together for the most part, has helped to increase knowledge about the estuary system, not just regarding a particular resource or location but the entire system, and ultimately this will help improve management. This collaboration among all the partners and scientists is essential for the Partnership for the Delaware Estuary.
 - b. The report highlighted some positive trends and also some negative. It also showed that we still have a long way to go in terms of being able to assess the system, as pointed out in the many ‘Actions and Needs’ sections. Addressing these actions and needs is the basis for this workshop today.

2. Bob Tudor – Speaking mainly regarding the 2008 DRBC State of the Basin Report. Governors, etc. from three or four states and several federal agencies set high level goals for where we want to be in the future in terms of protecting the resource of the DE Bay & Estuary system. These reports help us measure how we are doing in reaching those goals.
 - a. Indicators help us report back to the public, scientists, and managers. They also help us determine whether we are measuring the right things and compare measurements across several agencies, etc.
 - b. We need a more integrated systems approach to managing the resource, which is the goal of the two reports.
 - c. The reports show where we are lacking as well, where we have no current measurement tools, and where we don't have the capacity to measure certain indicators.
 - d. The reports look at new stressors that are coming to the estuary, such as climate change.
 - e. Through these efforts, we learned how to engage local land grants and universities to help and get them involved in the future work.

3. Jerry Kauffman
 - a. Henry Hudson came to mouth of bay but couldn't sail up the river because it was only about 5 ft. deep, so he went up to New York.
 - b. By World War II, the Delaware River was a dead river, with no dissolved oxygen.
 - c. Since the 1970's with improvements in sewage treatment, we have begun a new history of progress in water quality.
 - d. Jerry also discussed the pivotal role of Clean Water legislation, and the current status regarding fishable and swimmable waters.

VII. Breakout session II: Monitoring Needs for Selected Indicators – Over lunch, facilitators organized the indicator suggestions provided in the morning. Using flip charts, facilitators then challenged the breakout groups to begin to examine general monitoring needs to support reporting for the selected indicators - what monitoring programs already exist, and are they adequate? Below are excerpts of discussions from these breakouts.

[Refer to Excel indicators worksheet for revised indicators list]

1. Water Quantity Group
 - a. A lot of indicators already have data and monitoring programs, but all the data need to be compiled in a way that would facilitate better reporting.
 - b. A lot of these indicators link to other categories such as land use and water quality, so if those categories are being monitored it would help water quantity.
 - c. There is a need to improve measurement of sediment inputs and regional sediment budgets to determine whether they are sufficient to supply sediment where it is needed (each tidal marshes). Where would sediment subsidies for tidal marshes fall in the four categories? Land use habitat? Hydrology?

2. Land Use

- a. A similar discussion as water quantity, the data are available but needs to be compiled in a more useful way.
- b. One component that is lacking is good quality aerial photography because most of the data comes from this but the photos are outdated and not high enough resolution.
- c. Getting the population census and land use data in sync would be critical across all states.

3 Living Resources

- a. Monitoring exists for most indicators except freshwater mussels, but is the monitoring adequate?

4. Water Quality

- a. Dissolved oxygen, nutrient concentration and balance, temperature, DOC, PC, PN, PP, contaminants, turbidity, and chlorophyll-a were determined to be key metrics needed.

VIII. Next Steps

The entire group discussed results from the breakouts and next steps.

1. This is the start of working through the indicators and associated monitoring needs, and there is a lot more work to do.
2. Ecosystem-Based Management and Monitoring – what additional monitoring to do we need and how do we move forward with an ecosystem-based monitoring strategy?
 - a. Des Khan – we need to continue monitoring parts of the ecosystem, how do you monitor the entire ecosystem?
 - b. Jon Sharp – as an example, the Chesapeake Bay decided to focus on living resources. We are trying to get input from the technical community to figure out ecosystem management. We need to draw more on the tech. community now so we don't try to figure things out in the last minute for the SOE and SOB reports. The STAC and MAC are not being effective, and we need to draw upon the technical community more.
 - c. Sue Kilham - Ecosystem management is very difficult to accomplish especially when you do not have the all the needed components being monitored and new technology has not been applied yet to monitoring.
 - d. Danielle Kreeger - There is a disconnect between the main channel of the Delaware River and Bay, and flanking tidal marshes. Marshes are relatively unstudied at this point.
 - e. Sue Kilham - Jon Sharp's post doc showed that silicate in the river at Trenton is removed from before it reaches the Ben Franklin Bridge because marshes are soaking it up. This needs to be studied and monitored.
 - f. Bob Tudor – to work toward an ecosystem approach that considers physical-chemical-biological linkages and functional processes along with standard indicators, perhaps we should identify and pursue three actionable needs that cross-cut the areas; such as:
 - i. sediment budget as it affects contaminants, marshes and biota,
 - ii. food web dynamics and an ecosystem model,
 - iii. ecological flows.

The group consensus was that these were all good ideas and should be taken up further by the STAC and MAC in the future .

3. Action Items:

- a. Ecosystem Model - Indicators will come out of this model if the management goals are established. As a group, we need to assess what has been done in other estuaries or watersheds and begin applying those lessons learned here. We also need a clear idea of what this group wants out of any Ecosystem Model project.
- b. Minutes and the Excel indicators spreadsheet from today will be compiled by PDE and sent out to STAC and MAC for comment.
- c. PDE and the STAC will also form a panel for the Science Conference where we can discuss the State of the Estuary/Basin Reports, summarize the key management questions discussed today, and present ideas from today's workshop on next generation indicators and monitoring needs. The three actionable items should also be presented at the panel and used to stimulate discussion.
- d. The STAC and MAC decided to meet again in March 2009 to talk more about the next generation indicators list, debrief and review participant input from the Science Conference, and begin focusing on concrete monitoring needs and potentially developing an ecosystem model.

IX. Upcoming Events

1. Delaware Estuary Science and Environmental Summit - Cape May, NJ - January 11-14, 2009

X. Wrap-up

1. Approval of STAC minutes from 9/16/08
 - a) Dan Soeder- Move to pass minutes
 - b) Des Khan moved, 2nd by Jon Sharp
 - c) Minutes were approved
2. Adjourned at 3:40

Acronym List and Definitions

ACES: Alliance for Comprehensive Ecosystem Solutions
CCMP: Comprehensive Conservation Management Plan
CMES: College of Marine and Earth Sciences (University of Delaware)
DEBI: Delaware Estuary Benthic Inventory
DEWOOS: Delaware Estuary Watershed to Ocean Observing System
DEWWG: Delaware Estuary Wetland Work Group
DNREC: Department of Natural Resources and Environmental Control (Delaware)
DRBC: Delaware River Basin Commission
EPA: Environmental Protection Agency (US)
EIC: Estuary Implementation Committee
MAC: Monitoring Advisory Committee
NEP: National Estuary Program

NJDEP: New Jersey Department of the Environment
NOAA: National Oceanic and Atmospheric Administration
NPS: National Park Service
NVCS: Natural Vegetation Classification System
NWQMN: National Water Quality Monitoring Network
PADEP: Pennsylvania Department of the Environment
PA CZM: Pennsylvania Coastal Zone Management program
PDE: Partnership for the Delaware Estuary
PSEG: Public Service Electric & Gas (New Jersey)
PWD: Philadelphia Water Department
RARE: Regional Applied Research Effort
RRI: Regional Restoration Initiative
RRWG: Regional Restoration Work Group
SOE: State of the Estuary
STAC: Scientific and Technical Advisory Committee
USFWS: U.S. Fish and Wildlife Service
USGS: U.S. Geological Survey
