



Delaware River Basin Commission

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Steven J. Tambini, P.E.
Executive Director

Minutes
Water Quality Advisory Committee
November 3, 2021

Members & Alternates:

NYS DEC

Jason Fagel

EPA

Greg Voigt

NJDEP

Frank Klapinski

Environmental

Maya van Rossum (DRN)

Regulated Community Industrial

Kimberly Long (Exelon)

National Park Service

Peter Sharpe

DNREC

David Wolanski

PADEP

Tom Barron

Academia/Science

John Jackson (Stroud)

Local Watershed Organizations

Not Present

Regulated Community Municipal

Jay Cruz (PWD)

Other Attendees:

Steve Tambini (DRBC)

John Yagecic (DRBC)

Namsoo Suk (DRBC)

Ron MacGillivray (DRBC)

Jake Bransky (DRBC)

Elaine Panuccio (DRBC)

Sarah Beganskas (DRBC)

Amy Shallcross (DRBC)

Beth Brown (DRBC)

Kevin Pregent (DRBC)

Elba Deck (DRBC)

Li Zheng (DRBC)

Patti Hausler (DRBC)

Tom Amidon (DRBC)

Vincent DePaul (USGS)

Kelly Anderson (PWD)

Paula Kulis (PWD)

Phil Duzinski (PWD)

Sean McKelvey (PWD)

Kinman Leung (PWD)

Alex Ridyard (PWD)

Brent Gaylord (EPA)

Emily Nering (EPA)

Denise Hakowski (EPA)

Gary Walters (PADEP)

David Burke (PADEP)

Matt Kundrat (PADEP)

Brian Chalfant (PADEP)

Steve Unger (PADEP)

Will Brogan (PADEP)

Bill Brown (PADEP)

Matt Shank (PADEP)

Ben Lorson (PAFBC)

Biswarup Guha (NJDEP)

Helen Pang (NJDEP)

Don Hamilton (NPS)

Marco Alebus (NJDEP)

Leslie McGeorge (retired from NJDEP)

Sara Evans (Office of Senator Katie Muth PA44)

Ellen Kohler (Environmental Finance Center UMD)

Bob Chant (Rutgers)

Bart Ruitter (Chemours)

Meg McGuire (Delaware Currents)

Preston Luitweiler (WRADRB)

Scott Hinz (LimnoTech)

Vic Bierman (LimnoTech)

Andy Thuman (HDR)

Chris Main (DNREC)

Frank Borsuk (EPA)	Ian McMullen (DNREC)
Tim Wool (EPA)	Laura Lockard (DNREC)
Gregory Wacik (USACE)	Dave Walsh (Woods Hole Group)
Irene Fitzgerald (DELCORA)	Brenda Gotanda (Manko, Gold, Katcher & Fox)
Charles Hurst (DELCORA)	Eileen Althouse (CDM Smith)
Colleen Walters (River Network)	Dwayne Myers (CDM Smith)
Melanie Murphy (PWD)	Steve Jandoli (American Littoral Society)
Kurt Cheng (PDE)	Doug O'Malley (Environment New Jersey)
Carol Collier (ANS)	Greg Cavallo (Cavallo Environmental Services)
Erik Silldorff (DRN)	Abby Jones (Penn Future)
Carl DuPoldt (DCVA & CRC)	Eileen Murphy (NJ Audubon)
	Randall Detra

Welcome and Call to Order

The meeting was called to order by the Chair, Tom Barron of PADEP, at approximately 1:05 PM.

Review of WQAC Minutes from April 15, 2021

Draft minutes from the meeting on April 15, 2021 were provided by email previously. John Jackson moved to approve the minutes. Peter Sharpe seconded the motion. There were no objections and the motion passed. The final minutes are available on the DRBC web site at <https://www.nj.gov/drbc/library/documents/WQAC/041521/minutes.pdf>

Aquatic Life Use Project Status

Dr. Namsuk Suk introduced the overall status of the Aquatic Life Use Project. He reviewed the studies called for in Resolution 2017-4. Of these required studies, a literature review on DO needs of Delaware Estuary sensitive species was completed by the Academy of Natural Sciences of Drexel University, and ichthyoplankton surveys were completed by PSEG and augmented by DRBC. A conceptual model for DO needs of individual fish species is being developed by DRBC staff. Development of the Delaware Estuary Eutrophication model continues and would be the subject of most of the remainder of the meeting. In addition, DRBC is developing an affordability and financial capability assessment using current guidance. Dr. Suk presented a conceptual depiction of the how the different work elements fit together in support of an “analysis of attainability.” He presented expected timelines and identified team members involved with different work elements. Dr. Suk’s presentation is available on the DRBC web site at https://www.nj.gov/drbc/library/documents/WQAC/110321/Suk_AquaticLifeDesUse_Update.pdf

Eutrophication Model and Model Expert Panel

Dr. Vic Bierman presented the overall status of the Delaware Estuary Eutrophication model development and deliberations of the Model Expert Panel. Dr. Bierman introduced the model and modelling approach and highlighted key sources and sinks associated with dissolved oxygen (DO). Dr. Bierman reviewed the model state variables. Dr. Bierman described key accomplishments including light extinction, reaeration, loading inputs, development of 2D and

3D models, and calibration for global kinetics. DRBC staff members followed, with detailed discussions of specific model components.

- Tom Amidon described the derivation of the light extinction sub-model and demonstrated model performance.
- Dr. Li Zheng discussed the reaeration formulation and mass transfer coefficient. Reaeration rate at the water surface represents a significant contribution to DO gain in the tidal river. Vertical resolution model testing revealed the need for a more accurate reaeration formulation. A methodology described by Zappa et al. (2007) estimates the mass transfer coefficient using turbulent energy dissipation rate at the air-water interface. This methodology was successfully implemented in the model.
- Tom Amidon described the model external loadings from all sources for ammonia-nitrogen and carbon.
- Dr. Li Zheng presented calibration results for the 2018-2019 model calibration period, including longitudinal plots for multiple variables including ammonia, nitrate, total phosphorus, dissolved organic carbon, and dissolved oxygen.
- Tom Amidon presented the phytoplankton conceptual model and showed model-data comparison longitudinal plots. The phytoplankton conceptual model includes three diatom dominated phytoplankton groups representing spring marine, summer freshwater, and summer marine groups. Amidon noted that while spatial and seasonal trends were reasonably well captured, some transient blooms in the urban estuary were missed. Amidon suggested that missed blooms might be attributable to tributary inputs and noted that missed blooms did not occur during low DO periods.
- Dr. Zheng presented temporal model-data comparisons for key variables. Dr. Zheng also presented a longitudinal profile plot of water column DO gains and losses. This plot illustrates the importance of nitrification as a DO loss in the urban estuary and of reaeration as a DO gain.
- Dr. Namsuk Suk summarized the model calibration status, indicating that global kinetics were nearing final calibration and that refinement of benthic fluxes was anticipated to better capture DO and inorganic nutrients. Dr. Suk indicated that approximately two months of remaining effort is anticipated. Dr. Suk indicated that modeling so far suggests that low dissolved oxygen in the urban estuary is driven by primarily nitrification and secondarily sediment oxygen demand (SOD). Low flows and high temperatures exacerbate low DO, but photosynthesis from phytoplankton tempers low DO events.
- Dr. Bierman outline the remaining path forward for model development, which includes calibration of benthic fluxes oxygen and nutrients, incorporation of 2012 loadings with as-needed calibration, and development of baseline and future scenarios.

The presentation on model calibration is available on the DRBC web site at https://www.nj.gov/drbc/library/documents/WQAC/110321/Bierman_ExpertPanel_EutroModel_Update.pdf

Preston Luitweiler asked if there was any data yet on the success or failure of the Savannah River Estuary artificial reaeration project. DRBC staff indicated that they would follow-up on reviewing that project.

Adjournment

Peter Sharpe moved to adjourn and Tom Barron seconded the motion. The meeting was adjourned at approximately 3:08 PM.