



# DELAWARE CENTER FOR THE INLAND BAYS

*Scientific and Technical  
Advisory Committee*

## SCIENTIFIC & TECHNICAL ADVISORY COMMITTEE

### Meeting Notes

**Date & Time** - April 10, 2026 -- 9:00 a.m. to 12:00 p.m.

**Location** - Virtual and 901 Pilottown Road, Lewes

Call to order, Welcome, Introductions – Ashley Norton, Vice Chair

**Announcements** - Meghan Noe Fellows, Center Updates

Meghan Introduced the following new Center employees joining the Science and Restoration Team and the Administrative staff.

1. Meghan Frady will serve as Science Technician who will lead the Oyster Program.
2. Ally Szabo will serve as Restoration Technician where she will focus on the carbon storage potential of salt marshes within the Inland Bays. She will also work on community reforestation projects through the installation of “mini forests”.
3. Milan McWilliams, Development Coordinator, will work on digital marketing, event planning, and development for the Center.

Meghan also announced the upcoming Water Family Fest and Native Plant Sale on May 2, 2026 and the Green Screen Film Festival on April 22nd featuring environmental films about reforestation.

### **Old Business**

State of the Bays (SOB) 2026 Subcommittee Report - Meghan Noe Fellows provided an update on State of the Bays 2026 subcommittee progress. She reported the subcommittee moving into finalizing metrics and starting to prepare writeups for the final document, an electronic publication like the Inland Bays Journal.

They are gathering lightning talks from experts to explain esoteric topics for public, with Andrew Wozniak submitting the first talk on eutrophication. The subcommittee is working on quality control requirements with the USEPA to ensure technical report will have proper documentation

## ***New Business***

### **PFAS Fate in Coastal Rivers and Wetlands: Current Research in Kent County Coastal Rivers and Wetlands - Natalie O'Hern, PhD student in the Water Science & Policy Program, University of Delaware**

Natalie O'Hern studied 26 sites across three watersheds with different suspected sources - Dover Air Force Base, Delaware Fire School, and municipal wastewater treatment plant. She found the highest concentrations at the site draining from Dover Air Force Base with PFOS at 203 ng/L and sum concentration around 760 ng/L, above EPA drinking water standard but below chronic aquatic life standard. She observed that Dover Air Force Base sites are enriched in sulfonic acids indicating military-grade AFFF, while fire school sites were enriched in carboxylic acids (PFOA, PFNA).

Water concentrations explain very little about sediment concentrations due to factors like salinity, dissolved organic carbon, and depositional dynamics. She developed spatial stream network models that account for flow connectivity between sites, improving concentration estimates at unsampled locations.

She found an unexplained source of carboxylic acids in St. Jones Reserve Marsh groundwater, with concentrations almost double that of tidal creek.

#### ***Conclusions***

1. PFAS are mobile in surface waters with river flow as major transfer pathway downstream;
2. Concentrations in Kent County similar to other AFFF-impacted watersheds;
3. Type and amount of PFAS can provide information about point sources; and
4. Spatial stream network models show promise for reducing monitoring burden.

#### ***Questions***

Meghan Noe Fellows asked about natural sources of PFAS/processes that breakdown PFAS. Natalie indicated that PFAS are completely anthropogenic with no natural sources, and that the carbon-fluorine bond is extremely difficult to break with almost no microbial processing.

Mark Casey asked online about how headgroup and functional group changes affect PFAS movement in different saltwater concentrations. Natalie confirmed that this will be subject of future research with extensive geochemistry characterization at all sites.

### **Update on DNREC PFAS Program – Dr. Ashley Norton, Department of Natural Resources and Environmental Control**

Dr. Norton provided an overview of PFAS resources and ongoing projects at Delaware DNREC. She provided the links to the comprehensive DNREC PFAS website with training materials, strategic framework for contaminants of emerging concern, and the 2026 PFAS implementation plan.

She summarized the 2022 statewide PFAS survey in surface waters covering multiple watersheds including Inland Bays area. She described the statewide public drinking water survey of 140 sites with only 2 above health advisory levels, including Bethany Crest Manufacturing Home Community where the treatment system is adequate. She outlined biosolids studies at 5 wastewater treatment facilities with Phase 2 focusing on groundwater monitoring around the plants with December and April 2026 sampling rounds. She described planned domestic well sampling down-gradient of biosolids application sites in Milton area and

mentioned that pesticide monitoring wells in agricultural areas are being sampled for PFAS in collaboration with Department of Agriculture. She noted that two separate statewide domestic well sampling efforts are being planned by DNREC and Department of Public Health.

### **Hydrodynamic Transport Of Marine Debris In The Ocean And Estuaries, Dr. Tobias Kukulka, SMSP, University of Delaware**

Dr. Kukulka presented research on hydrodynamic transport processes of marine debris, focusing on microplastics. He explained that microplastics are the most abundant and persistent form of marine debris, resistant to biodegradation, and lightweight allowing easy transport by winds and currents.

He demonstrated through turbulence-resolving simulations that wind and wave mixing deeply submerges buoyant plastics, not just trapping them at the surface. He showed that surface concentrations decrease as wind increases due to vertical mixing, with observations matching model predictions. He estimated global ocean concentrations are about 5 times larger when accounting for full water column versus just surface measurements.

Dr. Kukulka presented Delaware Bay measurements showing concentrations of 1-5 pieces per cubic meter, exceeding open ocean garbage patch concentrations. He found higher concentrations in upper Delaware Bay potentially due to estuarine turbidity trapping and additional sources. He demonstrated through GPS drifters and satellite imagery that converging currents aggregate buoyant material into hotspots. He explained that aggregation facilitates particle-particle interactions affecting predator-prey dynamics, nutrient access, and pollutant exposure. He showed exposure to surface-trapped particles can be 2-3 orders of magnitude higher than neutrally buoyant particles for surface organisms.

#### *Conclusions*

1. Microplastics are not just a surface problem but extend throughout water column due to vertical mixing;
2. Converging currents create hotspots with much higher concentrations than background;
3. Spatial patterns of aggregation are critical for understanding organism exposure; and
4. Hydrodynamic modeling framework can rationally assess marine debris impact on environment.

#### *Questions*

Meghan Noe Fellows asked about potential for Delaware Bay garbage patch entering Inland Bays through inlet. *Dr. Kukulka* suggested coastal plume could transport microplastics and strong currents might generate eddies that trap material. He expressed interest in studying Inland Bays circulation further.

?? asked about nanoplastics and whether microplastics are biggest component. Dr. Kukulka confirmed that plastics fragment from larger pieces through sunlight and mechanical breakdown, with distribution across different scales.

### **Salt Water Intrusion in the Inland Bays, Rachel McQuiggan Delaware Geological Survey**

Rachel explained project phases of the Salt Water Intrusion project including data gap assessment, vulnerability study, and planned installation of new monitoring wells. She clarified saltwater intrusion as a specific process of denser saltwater intruding at the bottom of freshwater aquifers versus salinization from surface sources like storm surge or road salt. She

described the freshwater-saltwater interface as dynamic “seesaw” balance affected by sea level rise, pumping, drought, and tides.

She presented a trend analysis showing increasing salinity in surficial and Manokin aquifer wells in coastal Sussex County, though still below EPA 250 mg/L threshold.

She applied GALDIT-P vulnerability assessment method incorporating groundwater occurrence, aquifer hydraulic conductivity, water level, distance to shore, existing impact, thickness, and pumping intensity. She used USGS 2022 aerial electromagnetic survey of Delaware Bay to map subsurface resistivity and fill gaps in salinity data. She identified pumping and groundwater levels as the most important factors, with high vulnerability around Lewes area.

She indicated that the Delaware Geological Survey is planning to install well clusters in vulnerable areas including potentially near Center for Inland Bays facilities.

### *Conclusions*

1. Coastal Sussex County shows highest vulnerability to saltwater intrusion;
2. Pumping intensity and groundwater levels are primary drivers;
3. New monitoring wells will be installed in 2026 to target vulnerable areas; and
4. Long-term dedicated monitoring needed beyond existing purveyor data.

### *Questions*

?? asked about zooming into hotspots to look at population density and drinking wells. Rachel explained that they are considering where people use water versus where development is happening, and balancing need for monitoring access with targeting vulnerable areas.

?? asked about coordination with water purveyors and municipalities. Rachel confirmed that DNREC collects quarterly or semi-annual data from purveyors and they monitor some observation wells, but need dedicated monitoring wells for long-term consistency.

Meghan Noe Fellows noted that the area around the Center facilities is one of most vulnerable locations and may be location for well cluster installation.

### ***Round Robin Updates***

Organizations provided brief updates on activities and announcements.

Kelly Sommers indicated that the EPA and HHS is now taking actions on microplastics including listing on draft CCL6 for first time as potential drinking water regulation, and new Systematic Targeting of Micro Plastics (STOMP) program looking at human organ exposure. She offered to support any future microplastics work in Inland Bays based upon experience with Chesapeake Bay and Delaware River monitoring.

Rachel McQuiggan announced that Peter McLaughlin is the new Delaware Geological Survey director and state geologist after David Winch retirement. She also explained temporary issues accessing water level data on website due to backend updates, with improved web app coming soon as one-stop shop for water levels, water quality, and real-time data.

Allison Rogerson announced that the Wetlands Stewardship Act (Bill 709) was officially proposed by Senator Stephanie Hansen after 2 years of drafting, going to Senate Environment, Energy, and Transportation Committee for review, and would expand DNREC authority to regulate activities in freshwater wetlands.

**Next Meeting - Friday July 31, 2026 – Virtual Only**

**Adjourn 11:30 a.m.**

***Attendance Members***

<b>Hense</b>	<b>Zina</b>
<b>Main</b>	<b>Christopher</b>
<b>Somers</b>	<b>Kelly</b>
<b>Tulou</b>	<b>Christophe</b>
<b>Bott</b>	<b>Michael</b>
<b>Homsey</b>	<b>Andrew</b>
<b>Norton</b>	<b>Ashley</b>
<b>Rogerson</b>	<b>Alison</b>
<b>Watson</b>	<b>Richard</b>
<b>Whereat</b>	<b>Edward</b>
<b>Yacano</b>	<b>Mollie</b>
<b>Regular Guests</b>	
<b>Coverdale</b>	<b>Ben</b>
<b>Casey</b>	<b>Mark</b>
<b>Soriano</b>	<b>Catie</b>
<b>Thompson</b>	<b>Valerie</b>
<b>Walls</b>	<b>Brooke</b>
<b>McQuiggan</b>	<b>Rachel</b>
<b>Livern</b>	<b>Mariah</b>
<b>DiDonato</b>	<b>Eva</b>
<b>O'Hern</b>	<b>Natalie</b>
<b>Boubolis</b>	<b>Sarah</b>
<b>Martin</b>	<b>Katherine</b>
<b>Kukulka</b>	<b>Tobias</b>
<b>Stennett</b>	<b>Jahala</b>
<b>Mackey</b>	<b>Megan</b>
<b>Jacoby</b>	<b>Danielle</b>
<b>Jahan</b>	<b>Kousar</b>
<b>Lockard</b>	<b>Laura</b>
<b>Rasnid</b>	<b>Mohammad</b>
<b>Staff</b>	
<b>Noe Fellows</b>	<b>Meghan</b>
<b>Collins</b>	<b>Bob</b>
<b>Perez Perez</b>	<b>Nivette</b>
<b>Hoffman</b>	<b>Taylor</b>
<b>Frady</b>	<b>Megan</b>
<b>Szabo</b>	<b>Ally</b>

<b>McWilliams</b>	<b>Milan</b>
<b>Ochs</b>	<b>Bryan</b>
<b>Kunst</b>	<b>Mary</b>
<b>Magaragal</b>	<b>Clare</b>

***Presentations***