

23rd Annual Meeting

**HUDSON-DELAWARE CHAPTER
OF SETAC
APRIL 26-27, 2007**



Rivers at Risk: Stressors and Solutions

**Prallsville Mills
Stockton, New Jersey**

SETAC
Hudson-Delaware Regional Chapter
2007 Annual Meeting
at the Prallsville Mills
Rivers at Risk: Stressors and Solutions



The 2005 Annual Meeting of the Hudson-Delaware Chapter of SETAC is being held April 26 – 27th, 2007 at the beautiful historic Prallsville Mills in Stockton, NJ. The agenda for this year’s meeting is slightly different than previous years and will focus on our major regional river systems. We'll start off on Thursday with a morning of platform sessions from our membership on varied areas of environmental toxicology, chemistry and biology. The afternoon will consist of three concurrent meeting sessions, each of which will be discuss current issues with three major river systems in our region: the Delaware and Schuylkill River System, Newark Bay Complex and Hudson River System. Invited speakers include professionals, academia, government and industry to present a variety of perspectives. These sessions will conclude with meeting participants reconvening in a joint session to review the major points of each discussion. These discussions will be followed by an evening of relaxation and entertainment in the company of our colleagues, including our poster social, Volleyball classic and catered dinner with live entertainment at the Lambertville Station. With the annual Shad Festival occurring over the weekend following the meeting, meeting participants who remain for the social activities will also be treated to a traditional shad haul conducted by the Lewis Family Fishery. The Lewis Fishery is the oldest on the Delaware River, and member Steve Meserve will join us for dinner to talk about the fishery’s 120-year history.

Friday’s agenda will include seven short courses covering DNA Biomarkers, Environmental Sampling in Aquatic Ecosystems, The Science of the Job Interview, Groundwater-Surface Water Exchange, Handling Non-Detects for Data Analysis, the Use of Freshwater Benthic Community Analysis in Freshwater Stream Assessments, and Data Collection, Mapping, and Data Management in Aquatic Ecosystems. A plenary session will be held mid-morning for discussions on atmospheric deposition and legacy sediments. Lunch will include a special treat as conservation photographer Alison M. Jones joins us to present some of her stunning work and talk about the role of photography in conservation. Friday afternoon will conclude with our Business Meeting and student poster award presentations.

To say the least, everyone will be getting a great value for the mere \$95/person (\$40/student) HDC-SETAC will be charging for early registration. Registration includes all short courses, presentations, posters, breakfast, and two lunches. Thursday night dinner will be an additional nominal fee of \$15/person. This meeting is one that definitely should not be missed! We look forward to seeing you there.

The Program Committee

<i>Meeting Chairs</i>	Amanda Maxemchuk / Chris Nally
<i>Plenary Chairs</i>	Ron MacGillivray / Sean Bugel
<i>Major River Session Chairs</i>	Carolyn Bentivegna / Richard Henry / Ron MacGillivray
<i>Social Chair / Catering</i>	Peter Brussock / Don Nazario
<i>Dinner Speaker</i>	Ron MacGillivray
<i>Keynote Speaker</i>	Ken Hayes
<i>Poster Chairs</i>	Amanda Maxemchuk / Chuck Shorten
<i>Registration</i>	Larry Lyons
<i>Website</i>	Sean Bugel / Jon Doi

**Hudson Delaware Chapter
SETAC 2007 Annual Meeting Program**

Time	Thursday April 26, 2007
	<i>Thursday Morning - Presentations/Short Course/Activities</i>
8:00-10:00	<i>Registration Open/Breakfast</i>
8:45-9:05	Sediment Data Quality for Use in Ecological Risk Assessment Nancy C. Rothman, Ph.D and Susan D. Chapnick
9:05-9:25	Source Apportionment of PCBs in the Delaware River Estuary Songyan Du, Thomas Belton and Lisa A. Totten
9:25-9:45	Atmospheric PCB Sources to The Delaware River Andy L. Sandy, Songyan Du and Lisa A. Totten
9:45-10:05	Behavior and Condition Responses of Young-of-the-Year Bluefish (<i>Pomatomus saltatrix</i>) to Contaminants Accumulated Via Experimental Trophic Transfer Allison C. Candelmo, Ashok Deshpande and Judith S. Weis
10:05-10:20	Metal Contaminant Levels And Their Effects On Birds Breeding In The Hackensack Meadowlands Nellie Tsipoura, Joanna Burger, Ross Feltes, David Mizrahi and Jan Yacabucci
10:20-10:40	<i>Break</i>
10:40-11:00	Mapping Aquatic Ecosystems Ben A. LePage
11:00-11:20	Natural Recovery and Uncertainty in a PCB-Contaminated Groundwater/Surface Water System Pradeep Mugunthan and David Glaser
11:20-11:40	Adding Method 6800 to the Hexavalent Chromium Analysis Toolbox Mark Bruce PhD, Albert Vicinie III and William Reinheimer
11:40-12:00	Applying AVGWLF to Estimate Soil and Streambank Erosion in Selected Basins Within the NY/NJ Harbor Watershed Gabriela R. Muñoz, Marta Panero and Sandra Valle
12:00-1:00	<i>Lunch</i>
	<i>Thursday Afternoon - Major Rivers Sessions</i>
1:00-2:40	<i>River System: Delaware & Schuylkill Rivers</i> Amanda DeSantis , DuPont CRG - Assessing Historical and Current Multi-Stressor Impacts on Environmental Conditions of the Delaware River Estuary Namsoo Suk , Delaware River Basin Commission (DRBC) - Linkage between Land-Based Contaminated Sites and a PCB TMDL in the Delaware River Watershed Paula Conolly , Philadelphia Water Department - The Schuylkill Action Network Strategic Plan 2007-2010
1:00-2:40	<i>River System: Newark Bay Complex</i> Keith Cooper , Rutgers University – Sources of Chemicals of Concern (COCs) in the Raritan Bay Complex Ed Garvey , Malcolm Pirnie, Inc. – A Conceptual Model of Contamination in the Lower Passaic River and Newark Bay Dennis Suszkowski , Hudson River Foundation – Comprehensive Ecosystem Restoration Efforts in the NY/NJ Harbor Estuary
1:00-2:40	<i>River System: Hudson River</i> Due to the sensitivity of Hudson River issues, organizing speakers and presentations for this session has been challenging. Therefore, the program as of this printing on April 18 th , 2007 is still uncertain. Please, continue to check our website for updates.
2:30-3:00	<i>Break</i>
3:00-4:00	Major Rivers: Joint Discussion of Key Points

**Hudson Delaware Chapter
SETAC 2007 Annual Meeting Program (continued)**

	Thursday Evening – Social Activities
4:00-5:00	Volley Ball Classic
4:30-6:00	<i>Poster Social</i>
6:30-7:30	Event: Shad Haul, Lewis Family Fishery
7:30	Dinner: Lambertville Station hors d'oeuvres start at 7:00 p.m. Speaker: Steve Meserve, Lewis Fishery - Stewardship Through Stubbornness – 120 seasons of the Lewis Fishery

Time	Friday April 27, 2007
	<i>Friday Morning - Presentations/Short Course/Activities</i>
7:30-8:30	<i>Registration Open/Breakfast</i>
	<i>Short Courses</i>
8:00-9:20	Introduction to DNA Biomarkers Carolyn S. Bentivegna, Seton Hall University Lori White, Rutgers University
8:00-9:20	Environmental Sampling in Aquatic Ecosystems George Molnar, CDM, Inc.
8:00-9:20	The Science of the Interview from Both Sides of the Desk Ken Hayes, Aqua Survey, Inc. Steve Brown, Rohm and Haas
8:00-9:20	Ground Water-Surface Water Exchange I Peter Brussock, Environmental Liability Management (ELM), Inc.
9:20-9:30	<i>Break</i>
	<i>Plenary Session</i>
9:30-10:15	Lisa Totten, Rutgers University - Atmospheric Deposition
10:15-11:00	Dorothy Merritts and Robert Walter, Franklin and Marshall College – The Legacy of Water-powered Milling and Sources of Suspended Sediment in Modern Streams
11:00 -12:00	<i>Poster Session</i>
12:00-1:00	<i>Lunch</i>
	Keynote Speaker: Alison M. Jones, Wildlife Photographer
	<i>Friday Afternoon - Short Courses/Activities</i>
1:00-2:20	Handling Non-Detects for Data Analysis Amanda Maxemchuk, CDM, Inc.
1:00-2:20.	Use of Benthic Community Analysis in Freshwater Stream Assessments Scott Douglas, NJDOT
1:00-2:20	Data Collection, Mapping, and Data Management in Aquatic Ecosystems Ben LePage and Barry Baker, URS Corporation
1:00-2:20	Ground Water-Surface Water Exchange II Peter Brussock, ELM
2:30-2:45	<i>Business Meeting</i>
2:45-3:00	<i>Student Awards</i>
3:00	<i>Meeting Adjourn</i>

EXHIBITORS

HDC-SETAC welcomes exhibitors, provided that the exhibit pertains directly to environmental toxicology and chemistry. HDC-SETAC reserves the right to refuse any exhibit. A fee of \$200 will be charged for each exhibit. Because of space limitations, the exhibitor must receive approval for the exhibit before the meeting. However, an area will be available for display of brochures or literature fee-of charge. Call Larry Lyons at 856-848-3429 by April 21 to reserve a space.

SUBMITTED PRESENTATIONS FROM HDC SETAC MEMBERS

Thursday Morning, April 26th, 2007

Sediment Data Quality for Use in Ecological Risk Assessment

Nancy C. Rothman, Ph.D and Susan D. Chapnick
New Environmental Horizons, Inc.

Sediment samples pose special analytical difficulties. High percent moisture (low percent solids) content of sediments often makes it difficult to achieve contaminant detection levels low enough to meet risk-based Data Quality Objectives. When sample-specific detection limits are calculated, the required dry-weight conversion raises the level of detection in non-detected compounds. These raised detection levels often do not meet the low-level (risk-based) concentrations needed for human health and ecological risk assessments. This study examines the use of freeze-drying as a viable tool in producing usable data for risk decisions through increasing the percent solids of the sediments prior to extraction and analysis; thereby, decreasing the achievable levels of detection in this media. Real-world sediment samples, representing a “clean” urban reference site and a “contaminated” site were prepared in duplicate. The percent solids in the natural sediment samples ranged from 13 to 27%. The percent solids after freeze-drying ranged from 54 to 73%. Additionally, a standard reference material (SRM) for the compounds of interest was re-constituted to match the sediment percent solids and then freeze-dried and analyzed to observe the effects of freeze-drying on the accuracy of the measurements. Results of the SRM and real-world sediment samples showed acceptable comparability of detected results between freeze-dried and non-freeze dried sediments for most SVOCs and TAL metals, based on the relative percent differences of the paired results.

Source Apportionment of PCBs in the Delaware River Estuary

Songyan Du¹, Thomas Belton² and Lisa A. Totten¹

¹Rutgers University, New Brunswick, NJ

²New Jersey Department of Environmental Protection, Trenton, NJ

The purpose of this project was to analyze ambient water column data on PCB concentrations in the Delaware River via Positive Matrix Factorization (PMF) in order to identify contributing PCB sources to the River. The PMF program indicated that 6 factors (co-varying congener patterns) can be resolved. Factor 2 contains significant amounts of PCB 11 and is prominent under high flow conditions. We conclude that this factor represents wastewater effluents and combined sewer overflow (CSO) inputs to the River. Factor 3 is very similar to the congener profile in the dissolved phase of the Delaware at Trenton. Factor 5 contains PCBs 206, 208, and 209, which are produced inadvertently at the DuPont Edgemoor facility near Wilmington, DE. The composition of factor 5 is also found to be highly correlated to the average PCB profile in the surface sediments from Zones 2 to 5, which is logical since PCBs 206, 208, and 209 are high in molecular weight and are strongly associated with the sediments. Factor 6 strongly resembles unweathered Aroclor 1260 and is most prevalent just south of Trenton. We conclude that this factor represents a significant source of fresh Aroclor 1260 that is continually leaching into the River near Trenton, probably from a contaminated site. Factors 1 and 4 were difficult to identify. We hypothesize that they represent, respectively, the dissolved and particle phase background PCB contamination of the River. This analysis generally corroborates the Delaware River Basin Commission’s PCB loading estimates.

Atmospheric PCB Sources to The Delaware River

Andy L. Sandy, Songyan Du and Lisa A. Totten
Rutgers University, New Brunswick, NJ

PCB concentrations in the Delaware River range from 2 to 10 ng/L, well above the water quality criterion of 44 pg/L adopted by the Delaware River Basin Commission (DRBC) and adjoining states. These elevated concentrations have led to fish consumption advisories. As a result, a total maximum daily load (TMDL) for PCBs of 380 mg/day was developed for Zones 2-5 of the Delaware River. Data from seven sites of the New Jersey Atmospheric Deposition Network (NJADN) were used to calculate atmospheric deposition loads of PCBs to the River that exceed the TMDL by more than an order of magnitude. Gas-phase PCB homolog

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concentration at both Camden and New Brunswick showed a statically significant decreases over time with half-lives of approximately 6 years. Because of the impact of atmospheric deposition to the Delaware River, the atmospheric PCB data from Camden were modeled via the Potential Source Contribution Function (PSCF) to identify source regions. The results demonstrate that PCBs generally originate within the urban zone of Philadelphia and Camden.

Behavior and Condition Responses of Young-of-the-Year Bluefish (*Pomatomus saltatrix*) to Contaminants Accumulated Via Experimental Trophic Transfer

Allison C. Candello¹, Ashok Deshpande² and Judith S. Weis¹

¹Rutgers University, Newark, NJ and ²National Oceanic and Atmospheric Administration, Highlands, NJ

Newly recruited young-of-the-year (YOY) bluefish, *Pomatomus saltatrix*, from relatively pristine Great Bay were fed daily to satiation for four months with menhaden and mummichog from Great Bay (control treatment) and Hackensack River (exposed treatment). Amount of prey consumed and consumption rates for the exposed fish was significantly less than that for the control fish. Exposed fish displayed a significant decrease in the swimming activity compared to the control fish during the non-feeding periods. There was no statistical difference in the condition index, but both the length and weight of the control fish were significantly larger. PCB concentrations in exposed YOY bluefish were greater than the field-caught specimens. PCB fingerprints in the exposed fish were nearly identical in the individual YOY bluefish. These fingerprints matched most closely to that of mummichog probably because this was the sole prey species used during the last month of the feeding experiment. PCB concentrations in menhaden and mummichog found in the bluefish guts were higher than the field-caught specimens. As certain PCB congeners can exert adverse neurotoxic, endocrine, or immunological effects, prey with higher PCB body burdens may become less agile and thus easier to capture. If YOY bluefish are preferentially foraging on such prey species due to higher capture success, greater amounts of PCBs can be trophically transferred. Decreased feeding, activity level and growth in the exposed YOY bluefish observed in the present study can have detrimental effects on migration fitness and recruitment success in feral populations exposed to similarly contaminated regimes.

Metal Contaminant Levels And Their Effects On Birds Breeding In The Hackensack Meadowlands

Nellie Tsipoura¹, Joanna Burger², Ross Feltes³, David Mizrahi¹ and Jan Yacabucci¹

¹New Jersey Audubon Society; ²Rutgers University; ³New Jersey Meadowlands Commission

We investigated contaminant levels in eggs, blood, and feathers of Red-winged Blackbirds (*Agelaius phoeniceus*), Marsh Wrens (*Cistothorus palustris*), and Tree Swallows (*Tachycineta bicolor*), all intermediate trophic level bird species. In addition, we monitored nesting success and chick growth to ascertain how contaminant concentrations relate to these biological parameters. We searched for nests of blackbirds and wrens and monitored each nest from the day it was found until the young fledged or the nest failed. Similarly, we monitored a small number of swallow nest boxes. We collected one egg from each nest, and right before fledging we collected feathers and blood samples from each chick. At the same time, we weighed the chicks and took body measurements. We analyzed tissues for arsenic, cadmium, chromium, mercury, and lead.

Lead was relatively high in feathers, and even higher in blood for all three species, reaching levels at which negative effects are anticipated. In wrens there was a negative relationship between blood lead level and chick weight. Mercury, while below levels considered biologically harmful, was higher in the eggs and feathers of Meadowlands birds than those documented in other studies of passerines. Furthermore, unhatched eggs from wrens had higher mercury levels than randomly collected eggs. Chromium levels were high in eggs and in blood, but lower in feathers, compared to those reported in the literature. Cadmium and arsenic occurred at levels that are not considered biologically harmful. Levels of metal contaminants in tree swallows were lower than those reported previously from the Meadowlands District.

Mapping Aquatic Ecosystems
Ben A. LePage, PhD
URS Corporation, Fort Washington, PA

The inability to visualize the three-dimensional space occupied by most aquatic ecosystems is probably the single most important contributor to the physical and logistic challenge of collecting suitable environmental data. In the past, the bathymetric profile of a water body was generated by integrating water depth data collected manually across several transects using a measured pole. This approach is not only time consuming, but the limited data that are collected must be interpolated over a large area. The resulting bathymetric profile is generally simple and small-scale features are lost. Electronic approaches to mapping aquatic ecosystems allow the user to survey large geographic areas at a level of detail that considerably surpasses the manual method. The electronic data lend themselves well to data synthesis and manipulation, which allows for better analysis, interpretation, and visualization of the data and the creation of more reliable site models. The resulting two- and three-dimensional maps provide a level of detail that improves site characterization and environmental interpretation. Examples of bathymetry and sediment thickness profiling are presented and discussed.

Natural Recovery and Uncertainty in a PCB-Contaminated Groundwater/Surface Water System
Pradeep Mugunthan and David Glaser
Quantitative Environmental Analysis, LLC

To design an effective remediation plan for a contaminated site, it is critical to understand the rate of natural recovery and the benefits of active remediation must be measured against what is expected if no remediation is conducted. Now, nature is complex and uncertain; our understanding of the rate of natural recovery is often confounded by natural variation in environmental conditions. Furthermore, effective decision-making relies not only on best estimates, but on an assessment of uncertainty. We present here a statistical evaluation of the rate of natural recovery and the associated uncertainty, with flow as a covariate, for polychlorinated biphenyl (PCB) concentrations in a series of springs emerging from underneath a landfill.

Neal's Landfill, a waste-disposal site in Bloomington, Indiana, received a mix of wastes for many years, including capacitors containing PCBs. Groundwater flows through karst terrain beneath the landfill and then emerges via several springs that feed nearby streams. Remediation work has been performed at the landfill and in the receiving streams to address PCB sources to the surface water system. This work also included construction of a Spring Treatment Facility in 1990 to treat the spring waters entering the stream under base flow conditions. These actions have resulted in a significant reduction in PCB concentrations in the system since the early 1980s. The work presented here was undertaken to support decision-making concerning possible additional remedial actions.

To quantify the rate of natural recovery in the springs, a multiplicative power model linking PCB concentrations with flow and time was developed. The parameters of the model were estimated using conditional maximum likelihood methods. Uncertainty was quantified using a bootstrap analysis. The rate of decline in the springs was found to be significantly above zero; thus, it is likely that natural recovery is occurring. The estimated rate of recovery in spring PCB concentrations, as well as its uncertainty bounds, have been incorporated into a set of linked mechanistic PCB fate and transport and bioaccumulation models to project the benefits of remediation alternatives under consideration.

Adding Method 6800 to the Hexavalent Chromium Analysis Toolbox
Mark Bruce PhD¹, Albert Vicinie III² and William Reinheimer²
¹Severn Trent Laboratories, Inc., North Canton, OH
²Severn Trent Laboratories, Inc., Pittsburgh, PA

Accurate site characterization of hexavalent chromium contamination is needed to assess risk and direct cleanup responses. Colorimetric analysis with EPA Method 7196A is the most common. An alkaline digestion (Method 3060A) is used to prepare solid samples for analysis. Ion chromatographic analysis

(Method 7199) diminishes the colorimetric interferences experienced by Method 7196A, but can still produce low biased results on reducing or highly absorptive matrices. Speciated isotope dilution analysis (Method 6800) monitors hexavalent chromium losses and transformations and then mathematically compensates to produce more accurate results in difficult matrices.

A tiered analytical approach is recommended to produce the most accurate data for the lowest cost. Start with the low cost Method 7196A analysis, and if accuracy (matrix spike recovery) is unacceptable, analyze by Method 7199. If accuracy is still unacceptable, analyze by Method 6800.

Method 6800 has recently become available as an analytical option. It is designed to produce more accurate data in difficult matrices than 7196A and 7199. Isotopically labeled Cr(VI) and Cr(III) species are added to each sample aliquot at the beginning of the sample preparation process. Method 3060A is used for solid samples. Chromium species losses and transformations are monitored via chromium isotopes 50, 52 and 53 from ion chromatographic separation with ICP-Mass spec detection. The calculated Cr(VI) result uses the additional data from the isotopically labeled internal standards of Cr(VI) and Cr(III) to mathematically compensate for moderate species losses and transformations. Method 6800 Quality Assurance includes common practices such as method blank and laboratory control sample. It adds criteria such as mass bias correction and isotope ratio evaluation, but eliminates initial and continuing calibration.

Adding Method 6800 to the analytical toolbox provides a means to improve data accuracy when Method 7196A and 7199 can't meet measurement quality objectives for hexavalent chromium in difficult matrices.

Applying AVGWLF to Estimate Soil and Streambank Erosion in Selected Basins within the NY/NJ Harbor Watershed

Gabriela R. Muñoz, Marta Panero and Sandra Valle
New York Academy of Sciences

The GWLF (Generalized Watershed Loading Function) model is used to estimate soil erosion in selected basins within the NY/NJ Harbor Watershed. Estimates are developed for sediments associated to soil erosion, which are carried by surface runoff from different land uses such as cropland, urban land, and quarries. The AVGWLF program, developed at Pennsylvania State University, provides an interface between GIS data layers and the GWLF model. In addition, AVGWLF includes a routine to estimate streambank erosion based on soil properties, climate, and other spatial data. AVGWLF was recently calibrated, and GIS data layers were developed for the NE region, including NY.

These estimates are part of the research being conducted by the Harbor Project of the NY Academy of Sciences (NYAS), focusing on sources of sediments and particles to the NY/NJ Harbor. We applied the AVGWLF program to selected basins within the Harbor Watershed in order to estimate the relative contribution of suspended solids to the Watershed from soil erosion and streambank erosion. Identifying the main primary sources of sediments reaching the Harbor is a first step to developing a strategy to reduce suspended solids loads.

For the past seven years, the NYAS Harbor Project has identified regional opportunities for pollution prevention at the source for five contaminants (mercury, cadmium, PCBs, dioxins, and PAHs). Most of these contaminants are particle-reactive and may thus be transported to the Harbor attached to soil, sediment and other particles. Curbing suspended solids loads to the Harbor offers additional opportunities to intercept loadings of contaminants, as well as addressing direct problems caused by these particles.

MAJOR RIVERS SESSIONS

Thursday Afternoon, April 26th, 2007

Major Rivers Session 1: The Delaware and Schuylkill Rivers

Assessing Historical and Current Multi-Stressor Impacts on Environmental Conditions of the Delaware River Estuary, *Amanda DeSantis, DuPont; Timothy J. Iannuzzi, BBL Sciences; Judi Durda, Integral Consulting; and Ralph G. Stahl, DuPont* – Understanding the historical impacts of human and industrial development on urban rivers and their watersheds has become an important endeavor by the public and private sectors in the U.S. and elsewhere. Such assessments typically focus on identifying and then linking the suite of physical, chemical and biological stressors to current environmental conditions, and, where feasible, placing perspective on those stressors that have had, or may currently have, impacts on the rivers and watersheds. This approach and the information it provides helps scientists and decision-makers to ascertain what might be done to mitigate, remediate, restore, or otherwise improve conditions in the future – whether those include improvements to water quality, habitats, human use of the waterway, etc. Such an approach is currently being applied to the industrialized portion of the Delaware River Estuary. As part of this work, a historical and current impact assessment has been conducted, based on the synthesis of more than 200 years worth of data and several decades of studies for the Estuary, and the first phase of a multi-stressor risk characterization. Results from these efforts will be presented along with suggestions for future work.

Linkage between Land-Based Contaminated Sites and an Estuarine TMDL: A Modeling Case Study of PCBs in the Delaware River Watershed, *Dr. Namsoo Suk, Delaware River Basin Commission (DRBC)* - The Delaware River Estuary is listed as impaired due to elevated levels of PCBs in fish tissue. A Stage 1 total maximum daily load (TMDL) was developed using an integrated mass balance model for hydrodynamics, organic carbon dynamics, and PCB transport and fate. Under current conditions, the principal external sources of PCB loadings are the following, in order of decreasing importance: non-point source runoff, point discharges, Delaware River at Trenton, Schuylkill River, runoff from contaminated sites, the sum of all other tributary inputs, atmospheric wet and dry deposition and CSOs. Runoff from contaminated sites may rank even higher in specific portions of the Estuary or in the tidal portions of tributaries where many of these sites are located.

Current water column concentrations of PCBs in the Delaware are approximately 500 times higher than the applicable water quality standard and substantial reductions will be required in external PCB loadings. Furthermore, external PCB loadings from each individual source category, including runoff from land-based contaminated sites, are substantially higher than the TMDL for the entire estuary and each source category will require substantial reduction.

The Schuylkill Action Network Strategic Plan 2007-2010, *Paula Conolly, Philadelphia Water Department* – The Schuylkill River is a smorgasbord of environmental problems. We have abandoned mine drainage, agriculture, urban and suburban runoff, industrial contamination, and explosive development. While no one entity caused all of the problems faced by the watershed, no one entity can solve them. That's where the Schuylkill Action Network comes in. In its fourth year, the SAN includes almost 200 members from over 80 government agencies, non-profits, and universities. All of these groups are unified through the SAN to improve water quality in the region. SAN brings together organizations that may not normally be in the same room together and encourages them to look beyond their individual perspectives to focus on the big picture. The SAN encourages groups to identify projects that are not only beneficial to them and their local programs, but to improving the Schuylkill watershed as a whole. With funding from EPA in the amount of \$1.1 million -- along with an equivalent match from SAN partners -- SAN members have removed more than 50% of metals two major abandoned mine discharges and installed over 25,500 ft of streambank fencing at priority farms in the region. In the coming year, the SAN will develop a comprehensive monitoring strategy as well as identify a plan for sustainable financing for the region. With the efforts of SAN partners, the future looks promising for the Schuylkill. In what was possibly the first sighting in a century in the Schuylkill River, a river otter was spotted in 2006 in the fish ladder at Philadelphia's Fairmount Dam. Despite all of the stresses facing the Schuylkill watershed, SAN partners view the river otter as a sign of hope for the river's future.

Major Rivers Session 2: The Newark Bay Complex

Sources for Chemicals of Concern (COCs) in the Raritan Bay Complex, Dr. Keith Cooper, Rutgers University – The drainage basin of the NY/NJ Harbor Estuary encompasses about 16,300 square miles. The NY/NJ Harbor estuary is a complex series of rivers draining into Raritan Bay and the Atlantic Ocean. The quality of the harbor and associated estuaries is affected by the land use practices throughout this region. Non-point sources of pollution are sources of contaminants and particulates that accumulate over a broad area and enter the surface waters. Atmospheric deposition is a significant pathway of non-point sources in the New York region. Airborne mercury, nutrients, soot, and particulates result in an ongoing pollutant source entering into surface waters. The urbanized areas with their impermeable paved surfaces lead to runoff that contributes to oils, greases, metals, litter, and small particulates entering into surface waters. Historically, the NY/NJ Harbor estuary has been the site of heavy industry, large population growth, and extensive harbor related activities. There is a chemical legacy from both historic (80 Lister Avenue, GE Superfund sites), as well as current activities (shipping, manufacturing, sewage treatment, landfills), in and around the harbor. COCs for the wildlife would include the following: PCBs, chlorinated dioxins and furans, petroleum products, heavy metals and endocrine disrupting compounds (bisphenol A, steroids) based on historic and current inputs into these rivers and bays. Harbor sediments are contaminant reservoirs, which can function as sinks of contaminants, which results in chronic slow releases. Contaminated sediment that can result in COCs entering the foodweb can be a considerable threat to ecosystem wildlife. There is evidence that a number of COCs are decreasing, while others are remaining constant or are on the increase.

A Conceptual Model of Contamination in the Lower Passaic River and Newark Bay, Edward A. Garvey, Solomon Gbondo-Tugbawa, Juliana Atmadja, Shane McDonald, AmyMarie Accardi-Dey, and Erika Zamek, Malcolm Pirnie, Inc. – Newark Bay and the Passaic River form an important component of the NY-NJ harbor complex. Currently Newark Bay is one of the largest shipping centers on the east coast and undergoes routine dredging to maintain its channels for ocean-going traffic. The Passaic River has served as a center for industry since the American Revolution. It has also served as a means for conveyance for the disposal of industrial and municipal wastes for nearly the same period. The river was extensively channelized for navigation during the first half of the 20th century; however, maintenance dredging was largely deferred over the latter decades of the century. The extensive dredging of the river followed by years of deferred maintenance have created a unique setting for the trapping of sediments in the Lower Passaic. The coincidence of the navigational and industrial events has resulted in a uniquely large inventory of highly contaminated sediments. Newark Bay, at the mouth of the Passaic, is the main recipient of contaminated sediments from the Passaic, while also receiving contaminants from other sources. In support of the jointly sponsored remedial investigation (US EPA, US ACE-NY and NJ DOT) for the Lower Passaic River Restoration Project, Malcolm Pirnie, Inc. conducted an extensive geochemical evaluation of the historical data relating to contamination in the Lower Passaic River. Malcolm Pirnie also assists in the US EPA in its oversight of the Newark Bay investigation. The information gathered from these efforts has enabled the construction of a conceptual site model for the two water bodies. In this evaluation, we examined the vertical and horizontal extent of contamination in the Lower Passaic River as well as evidence to identify contamination source areas. Evaluation of data from both water bodies demonstrates the nature of tidal mixing and contaminant transport in each. Recent investigations of the Passaic River have provided additional information on the history of contamination, showing the decline over time for various contaminants, including 2,3,7,8-TCDD, PCBs, mercury, PAHs, and lead. Dated core evidence shows these contaminants to be declining at different rates, reflecting potentially different sources and release histories. Recent data from Newark Bay document the importance of the Passaic sources as well as the presence of other contaminant sources. The complete geochemical report and other information can be found at <http://www.ourpassaic.org> with additional information available at <http://www.ournewarkbay.org>.

Comprehensive Ecosystem Restoration Efforts in the NY/NJ Harbor Estuary, Dennis Suszkowski, Hudson River Foundation – Hudson River Foundation is leading a collaborative effort to develop a scientific basis for a comprehensive ecosystem restoration plan for the HRE. This Comprehensive Restoration Plan (CRP) is part of the federal Hudson Raritan Estuary (HRE) ecosystem restoration study and is being sponsored by

the U.S. Army Corps of Engineers and the Port Authority of New York and New Jersey. The Hudson River Foundation, working with a group of top estuarine scientists, has identified a set of ten important ecosystem attributes for the NY/NJ Harbor Estuary, specifying the desired conditions and amounts for each, called Target Ecosystem Characteristics or TECs. The goal is to create a mosaic of important habitats and conditions that provide new and increased benefits to the estuary.

Major Rivers Session 3: The Hudson River

Due to the sensitivity of Hudson River issues, organizing speakers and presentations for this session has been challenging. Therefore, the program as of this printing on April 18th, 2007 is still uncertain. Please, continue to check our website at <http://www.setac.org> for updates.

SHORT COURSES

Friday, April 27th, 2007

INTRODUCTION TO DNA BIOMARKERS

Instructors: Dr. Carolyn S. Bentivegna, Seton Hall University and Dr. Lori White, Rutgers University
Time: 8:00 – 9:20 am

What are DNA biomarkers and how are they used to address environmental problems? This course will provide basics on the theory and practice of common DNA technologies: including PCR, rtPCR, RAPD, microsatellites and microarray. Application and relevance to environmental studies will be emphasized. This course will make you more comfortable with understanding molecular biological endpoints and what they mean.

ENVIRONMENTAL SAMPLING IN AQUATIC ECOSYSTEMS

Instructor: George Molnar, CDM, Inc.
Time: 8:00 – 9:20 am

The collection and analysis of sediment and surface water samples are central to most investigations involving environmental contaminants. Since these samples are typically submitted for various analysis (big bucks) and the data may be used to develop remedial goals (even bigger bucks), it is important that they be representative, and collected in a consistent and scientifically defensible manner. Investigators should have a general knowledge of the methods and equipment available, and understand which are capable of collecting samples consistent with analytical requirements, are applicable to site-specific conditions and contaminants, and will result in the generation of data that meets project objectives. Several factors must be considered when collecting sediment and surface water samples, including site characteristics, study design, analyses planned, contaminants expected, equipment contamination, and other logistical issues. The major goal of this course is to familiarize participants with techniques and equipment commonly used to collect sediment and surface water samples. In addition, study design, analytical issues, sample location selection, and equipment decontamination will be addressed. Sampling equipment will be available to give the participants a practical knowledge of techniques discussed in the class.

THE SCIENCE OF THE INTERVIEW FROM BOTH SIDES OF THE DESK

Instructors: Ken Hayes, Aqua Survey, Inc. and Dr. Steve Brown, Rohm and Haas
Time: 8:00 – 9:20 am

Interviews are most often a high stakes, high risk endeavor for both the individual interested in bettering their lot in life and the organization in need of the right professional. A new employer can offer greater remuneration, more independence and an exciting vibrant workplace. A good hire can bring new skills, vitality and a uniquely different perspective. However a mismatch in either direction can spell lawsuits, lost opportunities and stress. Dr. Steve Brown (Rohm Haas) and Ken Hayes (Aqua Survey, Inc.) will discuss how to prepare for interviewing from both sides of the desk. Topics covered will include: how to dress, what documents/papers to bring with you, what not to say, what legally not to ask and revealing questions for both the interviewer and the interviewee. A practice interviews and a question & answer session will follow the formal presentation.

GROUNDWATER – SURFACE WATER EXCHANGE I AND II

Instructor: Dr. Peter Brussock, Environmental Liability Management (ELM), Inc.
Times: 8:00 – 9:20 am and 1:00 – 2:20 pm

Ground water and surface water are typically evaluated separately. However, there is a growing recognition of the importance of understanding the exchange between these bodies and the occurrence of a transition zone where the physical, chemical and biological conditions fluctuate and change dynamically at times. In this transition zone, natural attenuation of pollutants is often enhanced and communities are stratified horizontally and vertically in response to the gradients of conditions along a continuum. This two-part short SETAC Hudson - Delaware Chapter 2007 Annual Meeting

course will review the dynamics of the exchange of ground water and surface water in non-tidal and tidal, flood stage and baseflow conditions, and along stream profiles. Based on these fundamentals, the design of investigations and sampling methods for these transition zones will be presented in relation to developing data to support risk management decisions related to contaminated ground water, sediment, pore water and surface water.

HANDLING NON-DETECTS FOR DATA ANALYSIS

Instructor: Amanda Maxemchuk, CDM, Inc.

Time: 1:00 – 2:20 pm

Environmental datasets often contain censored data, or data which are below method detection limits, for chemicals concentrations being analyzed. How non-detects are handled during data analysis can significantly affect data interpretation and conclusions. This short course will cover the different methods for handling non-detects during data analysis, the implications for conclusions, and the best methods for handling non-detects for datasets of different sizes and percentages of censored data.

USE OF BENTHIC COMMUNITY ANALYSIS IN FRESHWATER STREAM ASSESSMENTS

Instructor: Scott Douglas, New Jersey Department of Transportation (NJDOT)

Time: 1:00 – 2:20 pm

This class will focus on the use of benthic invertebrate community analysis as a tool for the evaluation of impacts in freshwater lotic ecosystems. A brief overview of sampling methods and taxonomic analysis will be followed by a discussion of how to interpret the data and relate it to chemical and toxicological data. Confounding issues such as habitat loss, land use patterns and the use of reference sites will also be discussed. Several case studies will be used to illustrate points. As time permits, sample preparation and taxonomy will be demonstrated.

DATA COLLECTION, MAPPING AND DATA MANAGEMENT IN AQUATIC ECOSYSTEMS

Instructors: Dr. Ben LePage and Barry Baker, URS Corporation

Time: 1:00 – 2:20 pm

The collection of environmental data in aquatic ecosystems can often pose significant physical and logistic challenges. The end result of collecting samples under less than ideal conditions is the data are often limited and sometime compromised, which can significantly impact subsequent site characterizations, environmental interpretations and work plans. Increased availability of data for the pre-planning stage, advances in systems for field data collection, and their integration into data management packages provides a powerful tool that facilitates not only the planning and collection of the data, but also, both the synthesis and manipulation of these data. This approach ultimately allows for better analysis, interpretation, and visualization of the data and the creation of more reliable site models. A review of existing and emerging data collection techniques, such as real-time 3D visualization and remote cellular access, as well as approaches to integrating these data into a comprehensive data management and visualization system is presented and discussed.

PLENARY SESSION
Friday Morning, April 27th, 2007

Atmospheric Deposition, Dr. Lisa Totten, Rutgers University - Recent efforts to establish TMDLs (Total Maximum Daily Loads) for PCBs in the tidal Delaware and Hudson Rivers have vastly expanded our understanding of the loadings and losses in these systems. While the importance of the atmosphere as a sink for PCBs (via air-water exchange and volatilization) is relatively well understood, the atmosphere as a source of PCBs is becoming an important issue in achieving the 1,000- to 10,000-fold reductions in PCBs loads required by the TMDLs. Neither of these systems can meet current PCB water quality standards due to atmospheric inputs alone. Recent evidence also suggests that gas-phase PCBs are more bioavailable to phytoplankton than PCBs in the water column which are sorbed to suspended matter. Thus efforts in the Delaware River Basin have begun to focus on tracking down sources of atmospheric PCBs.

The Legacy of Water-powered Milling and Sources of Suspended Sediment in Modern Streams, Dorothy Merritts and Robert Walter, Franklin and Marshall College - Beginning in the late 17th Century, generations of residents of the mid-Atlantic region unwittingly participated in what we refer to as “The Great Sediment Experiment”: Rapidly denuding a forested landscape with a thick residual soil; eroding large amounts of soil from the cleared land by straight-row tilling; storing much of that soil in stream corridors behind tens of thousands of mill dams; then increasing storm water runoff through suburbanization; and finally flushing sediment out at high rates as dams breached and channels became deeply entrenched into the thick legacy sediments. From the 17th to 19th Centuries, while upland erosion rates were far greater than long-term geologic rates, fine-grained sediment accumulated behind 1-5 m high dams that provided hydraulic power for more than 34,000 mills in the mid-Atlantic region. Historic maps and our cesium-137 and lead-210 dating indicate that slack water reservoirs in southern Pennsylvania and northern Maryland filled to capacity in less than 150 years. Entire streams were converted to ponds and backwater swamps, burying pre-settlement floodplains and wetlands. Our field work and radiocarbon dating in the Piedmont indicate that pre-settlement streams had low, stable bank heights for up to ten thousand years prior to European settlement, and modern “floodplains” often are reservoir fill terraces. Today, entrenched streams with steep, eroding banks resemble arroyos in the arid American southwest. Over the past ~100 years, breaching or removal of defunct mill dams has caused widespread channel entrenchment and high suspended sediment loads, even in un-urbanized and forested areas.

SPECIAL INVITED GUESTS

Thursday Dinner Speaker, Steve Meserve of the Lewis Fishery ***Stewardship Through Stubbornness – 120 seasons of the Lewis Fishery***

It all started with “Poppy” Lewis in 1888, and now the fifth generation of the Lewis family is fishing the same waters in the same way that he did. This fishery could have gone the way of all the others on the non-tidal Delaware River, but because one man would not quit today there are still American shad in the river. And with the shad is a tradition of fishing and working with the river and those who want to keep it alive for generations to come.

About Steve Meserve

At age 45 Steve Meserve has been fishing for shad with the Lewis fishery for over 30 years. He first helped by lending a hand with whatever task was available (loading needles for mending, helping to wrap fish, etc.). He became an official crew member at 14. Steve went to college in Virginia and got his degree in Arts Management but took every opportunity he could to come back in the spring to fish. After a short life working at a college as a resident director and at a music store in Virginia, the pull of the river and fishing was too great and Steve moved back to New Jersey. While there was fishing each spring the “real” jobs were theatre technician (where he met his future wife Sue), Computer Systems tester at Unisys and then Computer programming at Chubb and Son where he is today. Steve took over the day to day operations of the fishery from his grandfather in 1996 and continues to run it with the help of his wife Sue and the rest of the crew.

Friday Lunch Keynote Speaker Alison M. Jones ***Photography as a Tool for Conservation***

Photography as a Tool for Conservation displays a wide range of photographs that Alison Jones has taken during her 22 visits Africa since 1985. The slide presentation is followed by what is always a lively discussion on the power of a photograph to change the awareness of conservation issues, and which kinds of photos most effectively convey the need for conservation and development projects: the beautiful ones that inspire, or the gory ones that carry the message of destruction and devastation.

Using Africa’s wildlife and ecosystems as a model, Ms. Jones will discuss indigenous cultures and their effects on ecological concerns. Community-based conservation (C-B-C) is a paradigm she has supported and watched become today’s most successful solution to saving the earth’s wilderness.

About Alison M. Jones

As a conservation photographer, Alison Jones has traveled Africa, Europe and the Americas for 20 years documenting endangered cultures, wildlife and ecosystems and working with community-based conservation. In 2006 she embarked on a long-term documentary project on river basins of Ethiopia, Argentina, Canada and the US. For this 501c3 project, titled *No Water No Life*, she and her team of scientists and photographers are investigating usage, quality and availability of fresh water resources, to be published in adult, young adult and children’s books, scientific journals, popular magazines and a website with podcasts from the field and blogs. The progress and methodology of this project will also be transformed into experientially-based educational curriculums for schools and nature centers.

When not on dusty savannahs or atop icy glaciers, Ms. Jones shares her vision and experiences by publishing her images, lecturing and teaching. She sells her photos as stock, portfolio and fine arts images and is a travel consultant for regions she knows well. To further her conservation work with The Mara Conservancy (Kenya) and Nech Sar N.P. (Ethiopia), she is currently enrolled as a CERC certificate student at Columbia University.

Her publication credits include O (Oprah), BBC Wildlife, Esquire, Gourmet, Photographer's Forum, books, annual reports, calendars and other media. Nonprofits clients include Direct Relief, LightHawk, TechnoServe, The Mara Conservancy, AmeriCares and Save the Children.

Alison is a Fellow of the International League of Conservation Photographers, a Board Director of North American Nature Photography and a member of American Society of Media Photographers, TechnoServe (a nonprofit for rural enterprise solutions in developing nations), WINGS WorldQuest Benefit Committee, and The Explorers Club. She has an honorary Masters degree in photography from Brooks Institute.

POSTER ABSTRACTS

To allow viewing by participants throughout the meeting, it is recommended that posters be displayed as early on Thursday as possible. Student posters enrolled in the Student Poster Competition must be placed on display by 8:00 am on Friday morning latest for discussion with selected judges. Authors should be present during as much of the poster session as possible.

Poster 1

Using Modeled and Measured Pore Water Concentrations to Assess Ecological Risks at the Sediment/Water Interface

Russell Short¹ and Steven S. Brown²

¹CH2M Hill and ²Rohm and Haas Company

An environmental investigation was performed at a former azo dye facility located on the Passaic River in Paterson, New Jersey to evaluate transmission of Contaminants of Potential Concern (COPCs) from site groundwater to Passaic River sediment pore water. COPCs associated with the facility included volatile organic compounds and aromatic amines. Groundwater monitoring and fate and transport modeling suggested that aromatic amines in the overburden might discharge to the river at the ground water/surface water interface. Historical groundwater COPC concentrations were used together with BIOSCREEN, a one-dimensional solute transport model, to simulate the migration of COPCs through the overburden and into sediment pore water. Modeled pore water concentrations were used to conduct a screening-level ecological risk assessment (SERA) for aquatic receptors. The ECOTOX database was used to identify acute toxicity values for the COPCs, which were divided by 100 to estimate No Observed Effect Concentrations (NOECs). Lowest estimated NOECs were used to calculate Hazard Quotients (HQs) for each COPC. In the SERA all HQs were less than 1 and no unacceptable risks were identified. NJDEP requested laboratory analysis of pore water samples to confirm modeling results. Pore water samples were collected from a horizon 6-12 inches into the sediments using the Trident Probe®. A membrane was placed on the bottom to prevent draw down of surface water. Nine pore water samples were analyzed for 10 aromatic amines. Measured concentrations were less than modeled concentrations in 84 out of 90 analyses. There were 50 non-detects (detection limit = 1.1 µg/L) and 10 compounds were identified below detection limits. HQs were recalculated based on the highest measured pore water concentration (HQ_{max}). Three HQs increased and 5 decreased compared to those derived from modeled results. All HQ_{max} were < 1 (highest = 0.51).

Poster 2

Bicarbonate Ion-Excess Driven Sublethal Toxicity in Mysids (*Americamysis bahia*): Implications for a Toxicity Reduction Evaluation (TRE) for an Industrial Wastewater Treatment Facility

James D. Horne¹, Susan C. Bunch¹, Kenneth Kromka², and Steven S. Brown³

¹PBS&J, ²Rohm and Haas Texas, Inc., and ³Rohm and Haas Company

A biologically-treated industrial wastewater has exhibited recurring lethal toxicity and persistent sublethal toxicity to the mysid (*Americamysis bahia*) in chronic WET tests. Standard, EPA-recommended TIE methods revealed that zinc was the primary cause of lethal toxicity. Effluent chemistry and facility operations logs showed that zinc maxima were correlated with process unit turnarounds. Equipment wash-out and contaminated wastewater handling practices were revised and zinc concentrations in the final effluent were reduced to levels below the chronic lethal and/or sublethal threshold for mysids. Despite improvement in chronic test survival rates, mysids continue to exhibit impaired growth, as shown by end-of-test dry weight comparisons with control group responses. Ion-pattern analysis suggests that sublethal toxicity may be a result of an unusually-high bicarbonate concentration (> 2600 mg/L, or more than twice the excess-bicarbonate IC₂₅ reported by Pillard, et.al, 1998). Data from chronic toxicity studies of an industrial wastewater are presented. Chemical speciation data (Visual MINTEQ), together with toxicity test results, is used in a Principal Components Analysis framework to develop predictive models for sublethal toxicity based on the ionic composition of the effluent. The data show the importance of considering the cause for, not just the presence of, sublethal toxicity in reasonable potential (RP) determinations.

Poster 3 – Competing Graduate Student Poster
Exposure to the Gasoline Additive Methyl Tert-Butyl Ether Results in
Abnormal Embryonic Vascular Development in Zebrafish (*Danio rerio*)

Josephine A. Bonventre¹, Sean M. Bugel², and Keith R. Cooper, PhD³

¹Joint Graduate Program in Toxicology, Rutgers University, New Brunswick, NJ

²Department of Environmental Sciences, Rutgers University, New Brunswick, NJ

³Department of Biochemistry & Microbiology, Rutgers University, New Brunswick, NJ

Methyl *tert*-butyl ether (MTBE) is an anti-knocking agent and oxygenate that was introduced into gasoline in the 1980s in effort to increase burning efficiency and decrease polluting emissions. MTBE is an organic solvent that is both highly volatile and relatively soluble in water. Ground water and surface water contamination is a primary concern from of an MTBE containing gasoline. Previous work from our laboratory demonstrated that MTBE inhibited vascular development in Japanese medaka (*Oryzias latipes*). To further examine the effect of MTBE on vascular development, we used the zebrafish model, specifically a transgenic (Fli1-GFP) that expresses enhanced green fluorescent protein (EGFP) in vascular endothelial cells. Fli1-EGFP embryos were exposed to varying concentrations of MTBE (5, 10, 20 and 40mM), and monitored for lesions, vascular aberrations, and mortality during early embryogenesis up until hatching. At the doses studies, the highest concentration resulted in 100% mortality by 120 hours post fertilization. Mortality decreased to 10%, 5% and 25% with decreasing MTBE concentration and 5% mortality in controls. Normal development was impaired in all treatments, showing a dose-response relationship for reduced growth and various lesions, including reduced vascular development, reduced blood circulation, brain hemorrhages, pericardial edema, and abnormal vasculature. Therefore, acute low dose exposure to MTBE can compromise fish health. Sub-lethal effects such as impaired vascular development would be detrimental to fish survival in the wild.

Poster 4 – Competing Graduate Student Poster

Effects of PCB 153 on the Fish Immune and Nervous Systems: Evidence for Underestimated Risk
Estimates for the Noncoplanar Congeners

J.E. Duffy¹, S. Kennedy² and J.T. Zelikoff¹

¹New York University School of Medicine, Department of Environmental Medicine, Tuxedo, NY

²The University of Colorado at Boulder, Department of Integrative Physiology, Boulder, CO

Polychlorinated biphenyls (PCBs) exist in the environment as a mixture of coplanar and noncoplanar congeners. Toxic equivalency factors (TEFs), calculated to determine the potential toxic risk for populations exposed to PCBs and other aryl hydrocarbon receptor (AhR) agonists, may be imperfect in that not all PCB congeners, specifically noncoplanar congeners, have a strong affinity for the AhR. Given that noncoplanar PCB congeners may produce toxicity by mechanisms independent of AhR activation, risk, predicted by TEFs alone, may be underestimated. To this end, the ability of an environmentally abundant noncoplanar PCB congener to induce toxicity in the immune and/or nervous systems of bluegill sunfish was evaluated. Fish, exposed via i.p. injection to noncoplanar PCB 153 (5.0 or 50.0 µg/g BW) and sacrificed after 1, 3 or 7 d, were examined for immune dysfunction and nervous system alterations. Results demonstrated that exposure of bluegill to PCB 153 caused significant elevations in oxyradical production and suppressed T- and B-lymphocyte proliferation at 3 d post-injection. At this same post-exposure time point, whole brain neurotransmitter levels were decreased, while levels of tryptophan hydroxylase (the enzyme involved in serotonin synthesis) were increased in the hypothalamus of PCB 153-exposed fish. By demonstrating that noncoplanar PCB 153 alters the homeostasis of critical physiological systems in the bluegill sunfish, strong evidence is provided which indicate that the use of TEFs alone may underestimate the actual threat to PCB-exposed populations. Moreover, this study highlights the necessity of examining non-AhR-mediated pathways of PCB-induced toxicity. Hudson River Foundation Graduate Fellowship and USACEHR No. DAMD 17-99-9011.

Poster 5
**Polybrominated Diphenyl Ether Concentrations in Diamondback Terrapins
of Barnegat Bay, New Jersey**

Emily R. Davis¹, Harold W. Avery¹, Jennifer M. Keller², Walter F. Bien¹,
and James R. Spotila¹

¹Drexel University, Philadelphia, PA

²National Institute of Standards and Technology, Hollings Marine Lab, Charleston, SC

Estuaries function as contaminant sinks because their fine-grained sediments have characteristically high adsorptive capacities for organic compounds. The diamondback terrapin, *Malaclemys terrapin*, an estuarine turtle, utilizes both aquatic and upland habitats during its life cycle in North American estuaries. A group of persistent organic contaminants of emerging importance is polybrominated diphenyl ethers (PBDEs). PBDEs are brominated flame retardants commonly used in making electronics, furniture upholstery, and other consumer products. PBDEs are ubiquitous in aquatic and terrestrial ecosystems, yet their effects on wildlife have not been studied in depth. However, in laboratory experiments, PBDEs have been shown to cause a disruption in thyroid hormones. Our study will determine whether PBDEs affect different stages of the life cycle of the diamondback terrapin, by studying 1) reproductive output of adult females in relation to body contaminant concentrations, 2) hatching success of eggs from nests laid in contaminated sediments, 3) the frequency of hatchling deformities, and 4) delays in embryo development. We will also determine whether maternal transport of PBDEs occurs from mother to embryo by analyzing blood for PBDEs from gravid (i.e., egg-bearing) females and their offspring. During 2006, we collected paired blood and fat samples from adult males and females, as well as whole eggs from a dead female. We analyzed these samples for PBDE concentrations. Early findings indicate the presence of PBDEs in all samples. We also found a unique contamination profile of PBDE congeners in terrapins compared to those reported for other wildlife. PBDEs were also found in mussels, a known food for terrapins. We will use the findings from our 2006 samples to conduct further studies of PBDE contamination in adult and neonate terrapins, estuarine sediments, and prey organisms used by terrapins in Barnegat Bay.

Poster 6 – Competing Graduate Student Poster
**Frogs at Risk: Evidence of Endocrine Disruption in Wild New Jersey Frogs Captured from
Agricultural Ponds**

Marisol M. Gutierrez¹, Thomas Ledoux², Keith Cooper¹, and Mark G. Robson³

¹Rutgers University, Joint Graduate Program in Toxicology, Piscataway, NJ; ²New Jersey Department of
Environmental Protection, Division of Science, Research and Technology, Trenton, NJ

³Rutgers University, School of Environmental and Biological Sciences, New Brunswick, NJ

Atrazine is one of the most commonly used herbicides in the United States. This pesticide is routinely found in surface waters where amphibians are non-target species in a unique position for exposure. The literature suggests that low environmentally relevant doses of atrazine have the ability to alter reproductive processes, causing retarded gonadal development (gonadal dysgenesis) and testicular oogenesis (hermaphroditism) in amphibians. To determine whether atrazine poses a risk to frog populations in New Jersey, 391 adult and juvenile green frogs (*Rana clamitans melanota*) and bullfrogs (*Rana catesbeiana*) were collected across nine pond sites during the 2003, 2004 and 2005 breeding seasons in Burlington County, NJ. These sites were evaluated for water levels of atrazine and related compounds. Several pesticide residues were detected in pond waters in addition to atrazine. Resident frogs were assessed for signs of endocrine disruption by gross and histological examination. Both testicular dysgenesis and oogenesis were observed in the male captures and differentially displayed by the two species; bullfrogs experienced retarded testicular development, while the green frogs underwent egg development within testicular tissue (with the highest incidence found at the highest atrazine-impacted site). Additionally, hematocrit and testicular-to-kidney weight ratio, as well as renal sperm and brain metacercaria incidence, displayed statistically significant differences between sites. This work was supported by the NIEHS training grant in Toxicology ES07148 and NJ DEP contracts SR02-95, SR04-59 and SR05-046.

Poster 7 – Competing Graduate Student Poster

Bioreactor Landfill Leachate: Initial Assessment of Bacterial Diversity and Toxicity to *Danio rerio*

Jennifer Loudon¹, Keith Cooper², Uta Krogman¹, Beth Ravit¹, and Donna Fennell¹

¹Department of Environmental Sciences, Rutgers University, New Brunswick, NJ

²Department of Biochemistry and Microbiology, Rutgers University, New Brunswick, NJ

Landfill leachate typically contains high ammonia concentrations. Excess landfill leachate is sent to wastewater treatment plants for final treatment and disposal. Wastewater treatment plants that receive influent from landfills face the challenge of removing excess ammonia from this source. The additional nitrogen loading may be problematic for wastewater treatment plants which must remove nitrogen species by biological nitrification/denitrification processes. Our project is examining nitrogen biotransformation processes and leachate toxicity in a bioreactor landfill. Leachate from the Burlington County Resource Recovery Center in Bordentown, NJ was analyzed for ammonia concentration as well as toxicity to *Danio rerio*. Solutions containing 0.5%, 1%, 2%, 4%, 8%, 16% and 32% leachate by volume were assayed for toxicity and ammonia molarity. An embryo-larval assay illustrated 100% mortality for embryos exposed to the 32% and 16% solutions over an exposure period of 24 hours as well as for the 8% solution after 72 hours exposure. During the 72 hour exposure the most common malformations for the 0.5%, 1%, 2% and 4% solutions included truncated tail, slowed motility, small yolk sacs, reduced heartbeat, and spinal curvature. While leachate is a complex mixture of contaminants, the overall toxicity may be influenced by high ammonia concentrations. We also examined the bacterial community profile in the leachate as part of our initial efforts to characterize bacterial nitrogen transformation processes in the landfill. Bacterial 16S rRNA genes were compared using denaturing gradient gel electrophoresis following polymerase chain reaction. Significant phylogenetic diversity was observed and is being further investigated.

Poster 8 – Competing Graduate Student Poster

An Integrated Biomarker Approach for Assessing Chemical Exposure and Effects in Estuarine Fish from New Jersey Waters

Sean M. Bugel¹ and Keith R. Cooper²

¹Department of Environmental Sciences, Rutgers University, New Brunswick, NJ

²Department of Microbiology & Biochemistry, Rutgers University, New Brunswick, NJ

The major findings from a field biomonitoring study of approximately 400 mummichogs (*Fundulus heteroclitus*) and 61 White Perch (*Morone americana*) samples from New Jersey are presented. mummichogs were collected from Newark Bay, Piles Creek, Union Beach, Sandy Hook and Tuckerton. White Perch were collected from the Passaic River, Hackensack River, Delaware River and Tuckerton. Field sites were selected to represent a contaminant gradient with elevated concentrations in Newark Bay to the reference location at Tuckerton. The studies were designed to examine a suite of biomarkers in these fish and determine which if any correlated with anthropogenic inputs. Complex mixtures of compounds present in the NY-NJ Harbor Estuary may or may not cause pathoneumoniac (specific) lesions. Biomarkers investigated including classical toxicological evaluations (histopathology, organ to body weight ratios), biochemical endpoints (CYP1A1, metallothionein, vitellogenin) and chemical analysis (bile fluorescence) for specific polycyclic aromatic hydrocarbons (PAHs). The major findings for CYP1A1, vitellogenin, PAH bile fluorescence and histopathology are presented. These biomarkers were the most reliable for establishing exposure and biological effects. Fluorescence effectively measured and identified compounds in bile. Naphthalene was the most abundant PAH, followed by pyrene and benzo[a]pyrene. Certain sites had a significant increase in CYP1A1 expression. Vitellogenin data showed differences between sites and between genders in mummichogs. Hepatic lesions included extensive nematode damage, a number of preneoplastic bile ducts, hyperplasia and neoplastic lesions (hepatocarcinomas). Due to the complicated nature of multichemical exposures it is important to use a battery of endpoints when assessing the health of a fish population.

Poster 9 – Competing Graduate Student Poster
Evaluation of Genetic Diversity in Wild Chironomid Populations Using RAPD and Hemoglobin Protein as Molecular Biomarkers

Virendrasinh N. Jadeja¹, Carolyn S. Bentivegna¹, Sean M. Bugel², and
Innocent Njoku Jr.¹

¹Seton Hall University, South Orange, NJ

² Department of Environmental Sciences, Rutgers University, New Brunswick, NJ

Loss of genetic diversity is detrimental to the survival of populations in urban environments. There are a variety of molecular techniques available today for determining interspecies and intraspecies genetic diversity. One such technique developed is Randomly Amplified Polymorphic DNA (RAPD). RAPD is a non-specific DNA fingerprinting approach to assess genetic diversity at the individual level. Variation among individuals is based on the differences and similarities of polymorphic bands in the DNA fingerprint. Hemoglobin belongs to a multigene family that may also be used to detect diversity but at the protein level. This study compared RAPD with SDS PAGE of hemoglobin protein as biomarkers of genetic diversity. Chironomids, larvae of midge fly, were obtained from Kearny Marsh located in the New Jersey Meadowlands. Field sites known to contain heavy metal contamination were capped or uncapped with AquaBlok™, an aggregated, clay-based technology. Chironomids were collected from Hester-Dendys placed in capped or uncapped sites for one month. Collections were made seasonally, May, August and November. Genetic diversity of individuals was evaluated by multivariate data analysis using bands generated by RAPD or SDS-PAGE of hemoglobin. Results indicated that diversity was more influenced by the presence of AquaBlok™ than collection date. Both markers, RAPD and hemoglobin, showed increased levels of diversity on the AquaBlok™ plots indicating that capping caused higher levels of competition between species as well as a healthier environment. Hemoglobin profiles showed increased diversity for one particular species, *Chironomus riparius*, on the uncapped plot. This indicated that expression levels of the protein were more variable as a result of environmental stressors for this species. Both SDS-PAGE and RAPD are a simple, yet effective approach to study genetic diversity in chironomids.

Poster 10 – Competing Graduate Student Poster

Occurrence of Estrogens in Solid Wastes and their Leaching Properties

Gangadhar Andaluri, Rominder P.S. Suri, Hongxiang Fu, and Magdalena Mona Velicu
Villanova University, Villanova, PA

Presence of pharmaceutically active compounds (PACs) in the environment has been reported by many scientists and is of growing concern due to their adverse effects on ecology and human beings. Estrogen hormones are an important category of PACs. They are naturally produced in the bodies and synthetically created for use in birth control pills and hormone replacement therapy. They are also widely used as growth promoters in livestock. Due to the hydrophobic nature of estrogen hormones they have high tendency of sorption on to solid phase. Presence of several estrogen hormones was examined in solid wastes, such as final dewatered sludge, animal wastes (chicken and cow manure) and mushroom compost. 17 α -estradiol, 17 β -estradiol, 17 α -dihydroequilin, and estrone were detected in the dewatered sludge and animal wastes at concentrations ranging from 6 to 462 ng/g of dry solid. 17 α -estradiol, 17 β -estradiol, and estrone were also detected in mushroom compost at concentrations ranging from 4 to 28 ng/g of dry solid. The land application of these solid wastes could imply the potential point source estrogen pollution, influencing both surface and ground waters. Leaching experiments were simulated in the laboratory by mixing known amounts of solid wastes with Milli-Q water. About 18% to 48% of the estrogen hormone leaching was observed from cow manure and 10% to 100% leaching was observed from chicken manure. Leaching of estrogen hormones from dewatered sludge and mushroom compost was significantly low compared to that from animal wastes.

Poster 11

Revisiting Pesticide and PCB Concentrations in New York and New Jersey Dredged Materials

Elisabeth S. Barrows¹ and Carole S. Peven McCarthy²

¹ Battelle, Stony Brook, NY and ²Battelle, Duxbury, MA

Maintenance and new work dredging of navigation channels, berthing piers, and anchorage areas in the Port of New York and New Jersey is necessary for safe clearance throughout the harbor and water-dependent facilities. To determine the suitability of dredged material proposed for placement at the Historic Area Remediation Site (HARS), composite sediment samples representing the dredging project are analyzed for organic compounds and metals. Analyses are performed according to Guidance for Performing Tests on Dredged Material Proposed for Ocean Disposal, or the Regional Testing Manual (RTM), which identifies the specific analytes of concern and required detection limits, and quality control sample types, frequency, and acceptance criteria.

How well does the list of chlorinated pesticides and PCBs identified in the RTM correlate with actual analytes found in field collected samples? Results of over 100 sediment analyses from approximately 20 dredged material evaluations conducted from 1997 to 2006 were examined for frequency of occurrence and abundance of pesticides and PCBs. All of the 15 target chlorinated pesticides were detected in the sample sets examined, with 4,4'-DDE and 2,4'-DDD being the most commonly detected in 60% and 42% of the sediments, respectively. Aldrin, endosulfan I, heptachlor, and heptachlor epoxide were rarely detected in 1-2% of sediments. Among the PCBs, all congeners were detected in the sample sets examined. PCB 184 was detected in only 3% of the samples and at the lowest concentration of all congeners. The remaining PCB congeners occurred at concentrations greater than their detection limits in 29-46% of the samples.

Poster 12

Expanding the Scope of Restoration Opportunities for the Passaic River-Newark Bay Complex

Carl Alderson¹, Benjamin Shorr², Reyhan Mehran³, Eli Reinharz⁴, Thomas Brosnan⁴, Lisa Rosman³

National Oceanic and Atmospheric Administration

¹NOAA Fisheries - Restoration Center, Highlands, NJ; ²OR&R/Assessment and Restoration Division, Seattle, WA; ³OR&R/Assessment and Restoration Division, New York City, NY; ⁴OR&R/Assessment and Restoration Division, Silver Springs, MD

To date, efforts of Federal and State Natural Resources Damage Trustees in the Lower Passaic River have focused on recovering for resource injuries resulting from multiple sources of multiple contaminants linked to the river's heavy industrial past. Efforts by members of the Trustees and State and Federal agency partners are underway to identify all possible opportunities for natural resources restoration within the 17-mile Lower Passaic River Study Area (PRSA) that extends from Newark to the Dundee Dam and includes a large portion of the Saddle River watershed. A broader suite of restoration opportunities can be provided by extending the geographic scope of the investigation to encompass portions of the Hackensack River, Newark Bay, the Kill Van Kull and the Arthur Kill waterways (NB/KVK/AK); areas also affected by Passaic sources of contamination. We report on a draft preliminary study conducted by the Trustees of the opportunities found within these waterways. We compare these opportunities with those identified in the Lower Passaic River Restoration Project: Preliminary Draft Restoration Opportunities Report. Six criteria were assigned an ordinal scale for the purpose of measuring maximum difference between sites. Sites are assessed for habitat type, proximity to the affected resources, size, connectivity, complexity and existing land use. Results of the comparison demonstrate that the opportunities downstream of the 17-mile area are similar to those in the PRSA in terms of habitat types present, proximity to affected resources and existing land use, but are dissimilar in terms of size, connectivity, complexity and order of dominance of habitat types. Riparian edge dominates the assortment of habitat type found within the PRSA, while the NB/KVK/AK Study Area is dominated by intertidal wetlands and fringe marshes. Existing uses are dominated by parklands and industrial brownfields in both complexes. The restoration opportunities in the NB/KVK/AK Study Area are larger in size than those found in the PRSA and are more often connected to functioning habitats than their counterparts within the PRSA. Additional statistical analyses will be discussed.

Poster 13

NOAA's Delaware Estuary Watershed Database and Mapping Project

Diane Wehner¹, Simeon Hahn¹, Ben Shorr¹, Jill Bodnar², and Craig Woolcott¹

¹National Oceanic and Atmospheric Administration and ²Genwest Systems, Inc.

The Delaware Estuary Watershed is a critical component of the economic well being of the region, supporting industry, fishing, transportation, natural resources, and recreation and is home to millions of people. Estuarine habitats and resources have been impacted and degraded by human activities. Several local, regional, and governmental organizations are involved in efforts to improve the region's ecological health and support the revitalization and redevelopment of coastal communities along the Delaware River and Estuary. The National Oceanic and Atmospheric Administration's (NOAA's) Office of Response and Restoration (OR&R) has developed a database and mapping project for the Delaware Estuary to provide an integrated assessment tool for coastal resource managers and communities. The Delaware Estuary Watershed Database and Mapping Project, includes a webguide which provides background on the Delaware Estuary, including information on habitat, resources, potential contaminant sources, restoration opportunities and projects, and references and links to additional information. The watershed project also provides a standard database structure for contaminant data and a mapping component (GIS and internet mapping) which provides spatial context for evaluating and communicating the complexity of challenges and opportunities within the Delaware Estuary.

The Delaware Estuary Watershed Database and Mapping Project is a product of a 2006 Interagency Agreement (IAG) between NOAA and the US Environmental Protection Agency (EPA). This collaborative effort, called the Upper Delaware Estuary (Urban Corridor) Regional Cleanup and Restoration Planning Initiative, is intended to support the EPA Land Revitalization Program and land revitalization efforts at the regional, federal, state and local levels. This initiative will help in the redevelopment and revitalization of estuarine and coastal zone communities in the Delaware Estuary by providing information on coastal habitats, natural resources, sources of contamination, and identifying restoration opportunities that are critical in maintaining a healthy estuary.

Poster 14

Investigating the Correlation of Polychlorinated Biphenyls with Several Variables in Camden, NJ

Dawn M. Kaczorowski, Andy L. Sandy, Steven J. Wall, and Lisa Totten, PhD

Rutgers University, New Brunswick, NJ

The sampling and analysis of polychlorinated biphenyls (PCBs) in the atmosphere of Camden, NJ has been ongoing since 1999. Previous studies have shown that PCB levels in an urban region such as this are influenced by both nearby industrial sources and seasonal variations due to temperature. Meteorological data (e.g. wind direction, wind speed, relative humidity) as well as hourly ozone levels for days coinciding with sample collection were obtained. All data was combined with particulate and gas phase PCB concentrations for years 1999 through 2002. Using statistical analysis software, the presence of correlations between PCB concentrations and several variables was investigated in order to further characterize the behavior of this class of compounds in an urban environment.

Poster 15 – Competing Graduate Student Poster Generation and Stability of Water Dispersible Colloids Induced by Soil Amendments

Francis Jordan¹ and Nancy Cavallaro²

¹Rutgers University and ²United States Department of Agriculture

Due to the high production rates needed to satisfy growing populations, one environmentally accepted method of sludge and industrial by-products disposal is to add it to the soil. This study characterized water dispersible colloids (WDC) that were capable of transporting heavy metals. Heavy metals, size, and electrical charge of the WDC were determined. In the control and treated agronomic soils studied (COR & SA), the WDC are the largest heavy metals sink before and after the amendments. After amendments, dissolved

organic carbon (DOC) concentration increased, possibly contributing to the observed increase in WDC particle median size and z potential. Relative abundance of minerals in SA was observed. Higher metals concentrations in the WDC were found, posing a risk for colloid mediated transport under the conditions considered.

Poster 16

Recent Regulatory Development on Evaluation of Non-Detects

Nai-chia Luke, PhD and Christine Julias
Camp, Dresser & McKee Inc

Abstract not available at time of publication.

2007 STUDENT POSTER COMPETITION

The Hudson-Delaware Chapter (HDC) of the Society of Environmental Toxicology and Chemistry is pleased to once again sponsor student research awards. The purpose of these awards is to both recognize outstanding young scholars and to encourage active participation in SETAC and the HDC. Up to six cash prizes are offered:

1. Graduate 1st place: \$400
2. Graduate 2nd place: \$250
3. Graduate 3rd place: \$150
4. Undergraduate 1st place: \$250
5. Undergraduate 2nd place: \$150
6. Undergraduate 3rd place: \$75

Prizes will be awarded at the close of the meeting on Friday and will be based on three reviews performed by unbiased peers during the meeting. The HDC Board of Directors will also review all posters and reserves the right, based on scientific merit, to reject any and all materials submitted.

Eligibility:

- All students must be currently enrolled in an environmental toxicology or chemistry-related undergraduate or graduate program with the following exception: those within one year of graduation may also compete, if the work being evaluated was completed while a student.
- Students and/or their faculty advisors must be HDC members, or must apply for membership at the time of award application. The academic program must be located in the general HDC area (NY/NJ/PA/DE).
- To be considered for any award, a research poster relevant to environmental toxicology and chemistry must be presented at the annual HDC meeting.
- Posters should be displayed throughout the 2-day meeting and remain on display through final judging early Friday afternoon. Recognizing that this may not be possible for Friday-only attendees, posters must be displayed (at a minimum) from 8:00 am through completion of judging on Friday.

The HDC- SETAC Officers and Current Board of Directors

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HDC-SETAC is a professional society for environmental scientists, engineers and related disciplines concerned with environmental quality located in eastern Pennsylvania, New Jersey, Delaware, and southeaster New York. HDC-SETAC is a regional chapter of SETAC, a scientific non-profit organization of about 5000 members from 50 U.S. states, 13 Canadian provinces, and more than 70 countries worldwide. HDC-SETAC was founded in 1984, making it one of the first established regional chapters within SETAC in North America. HDC-SETAC is all about environmental scientists and students of our region. All meetings and workshops are designed to educate attendees about current issues and topics of the Hudson / Delaware region.

HDC-SETAC is managed by a 13 member Board of Directors which is elected by the voting membership-at-large each spring. Each board member serves a term of three years, and may serve more than one term. Board members must be members in good standing in both HDC-SETAC and SETAC, and must be committed to following the goals and By-laws of HDC-SETAC. Please consider participating as a board member or officer. Your contributions are necessary for our continued vitality.

DIRECTIONS AND ACCOMODATIONS

Directions to the Prallsville Mills

Route 29, Stockton, NJ
29 miles north of Trenton
Phone: (609) 397-3586; Fax: (609) 397-3913
<http://home2.netcarrier.com/~drms/>

Directions from New York — 95 South

Take 95 South, Take Lambertville/Trenton Exit (last exit in New Jersey). Follow signs to the right for Lambertville—Route 29 North. Continue along Route 29 (for approximately 20 minutes) as you come up to the town of Lambertville you will come to a traffic light—Nicolo's Pizza Restaurant will be on your right. Make a left at this light and then a right hand turn at the first light—this is still Route 29. Take this through to the end of town. Continue on Route 29, you will come to the small town of Stockton—you will pass The Stockton Inn on your right—the Prallsville Mill is on Route 29 approximately a mile or so past the town of Stockton.

Directions from New York — 78 West

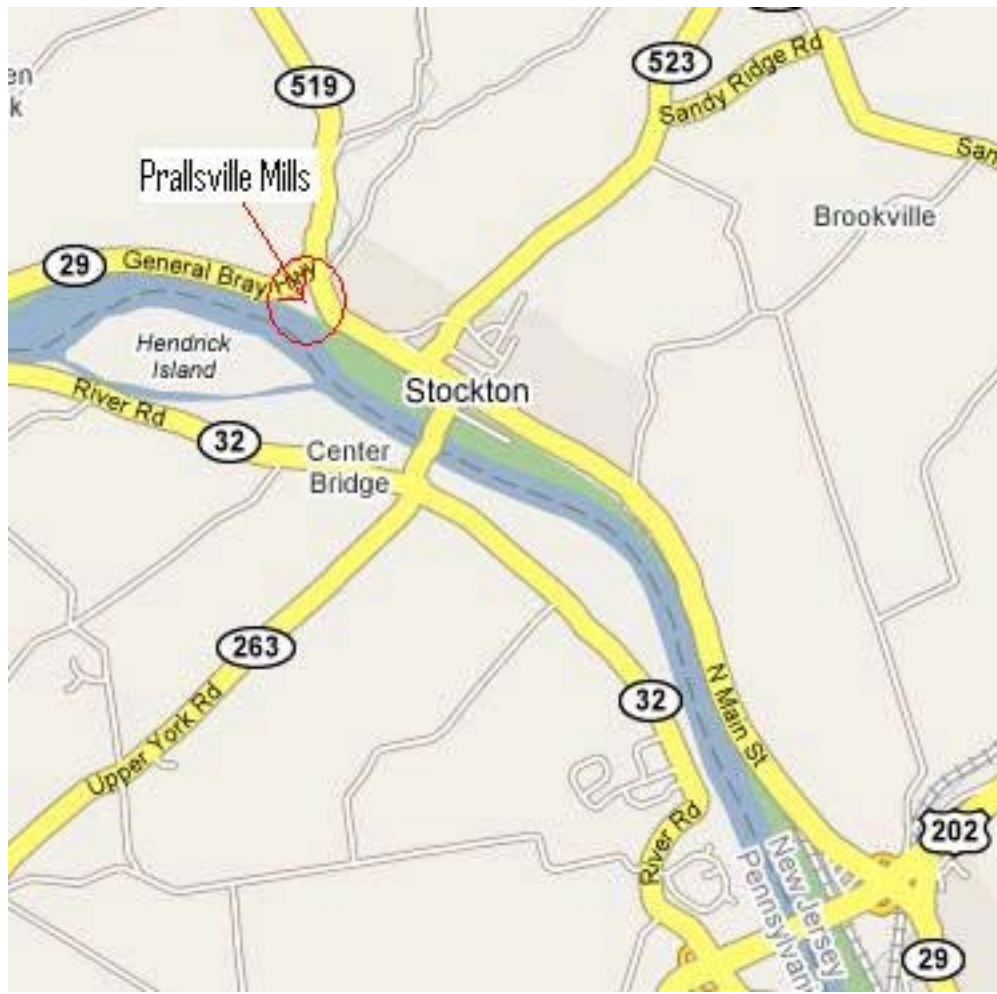
Take 78 West to I 287 South—follow signs for Somerville, exit onto Route 202 South toward Flemington. At the Flemington Circle continue around circle and follow signs for 202 South Lambertville. Watch for Lambertville/Stockton Exit. This will bring you to Route 29. Make a right—take 29 North approximately 2 1/2 miles to the town of Stockton. You will pass the Stockton Inn on your right and The Prallsville Mill is approximately a mile past the Stockton Inn.

Directions from Philadelphia

Take 95 North—In approximately 30 minutes you will pass New Hope/Yardley Exit (last exit in PA) Continue On 95 North across the Scudder Falls Bridge and you will see exit for Lambertville. Follow signs for Lambertville—Route 29 North. Continue along Route 29 (for approximately 20 minutes) as you come up to the town of Lambertville you will come to a traffic light—Nicolo's Pizza Restaurant will be on your right. Make a left at this light and then a right hand turn at the first light—this is still Route 29. Take this through to the end of town. Continue on Route 29, you will come to the small town of Stockton—you will pass The Stockton Inn on your right—the Prallsville Mill is on Route 29 approximately a mile or so past the town of Stockton.

Directions from Princeton

Take Route 206 North to Rocky Hill (4 mi) at light turn left onto Route 518 to Lambertville and Make a right on Route 29 North. As you come up to the town of Lambertville you will come to a traffic light—Nicolo's Pizza Restaurant will be on your right. Make a left at this light and then a right hand turn at the first light—this is still Route 29. Take this through to the end of town. Continue on Route 29, you will come to the small town of Stockton—you will pass The Stockton Inn on your right—the Prallsville Mill is on Route 29 approximately a mile or so past the town of Stockton.



ACCOMMODATIONS

Woolverton Inn Bed & Breakfast

6 Woolverton Road
Stockton, NJ 08559
Phone: (888) 264-6648
Website: <http://www.WoolvertonInn.com>

Stockton Inn

1 Main St. Stockton, NJ 08559
Phone: (609) 397-1250
Fax: (609) 397-8948
Email: info@stocktoninn.com

The Bridgestreet House Bed & Breakfast

75 Bridge Street
Lambertville NJ 08530
Phone: (800) 897-2503 or (609) 397-2503
Fax: (609) 397-4993
Email: bridgestinn@comcast.net

Inn at Lambertville Station

11 Bridge Street
Lambertville, NJ 08530
Phone: (609) 397-4400
Email: info@lambertvillstation.com
Website: <http://www.lambertvillestation.com>

Best Western New Hope

2426 Lower York Road
New Hope, PA 18938
Phone: (215) 862-5221
Email: 39085@hotel.bestwestern.com
Website: <http://www.bnnewhope.com>

Logan Inn

10 Ferry St. New Hope, PA
Phone: 215-862-2300
Website: <http://ww.loganinn.com>

Centre Bridge Inn

Rte's 32 & 263 Centre Bridge, PA
Phone: 215-862-2048
Website:
<http://www.bbchannel.com/bbc/p204996.asp>

Golden Plough Inn

41 Peddlers Village, Lahaska, PA
215-794-4004
Website:
<http://www.bestinns.net/usa/pa/gp.html>

Hampton Inn - Flemington

4 Royal Road, Flemington, NJ
908-284-9427

Ramada Inn - Flemington

250 Highway 202, Flemington, NJ
(908) 782-7472

Meeting Registration Form

Send completed form and payment to:
 Larry A. Lyons, Treasurer, HDC-SETAC
 P.O. Box 506, Thorofare, NJ 08086
 FAX: 856-384-1367

Name: _____

Association: _____

Address: _____

Telephone: _____ Fax: _____ E-mail: _____

Fees: Two-day registration fee entitles the registrant to participate in all activities, including presentations, short courses, social activities, breakfast, lunch and dinner. If you are planning to register for one-day, please indicate which day you will be attending; ___ Thursday ___ Friday.

Attendance	Regular Fee		Student Fee	Thursday Dinner	Total \$ Enclosed
	Member	Non-member			
Early registration fee:	\$95.00	\$110.00	\$40.00	\$15	
# registering early:					
Early registration total:					
Late registration fees:	\$115.00	\$130.00	\$50.00	\$15	
# registering late:					
Late registration totals:					

Thursday dinner will be at the Lambertville Station and will include food, a dinner presentation and live entertainment from local artists

Early registration is on or before April 23, 2007.

Registration can be done on-line using a credit card: www.hdcsetac.org

Make checks payable to: HDC-SETAC

Short Courses Because activities and short courses can accommodate only limited numbers, participation will be on a first-registered/first-reserved basis.

Friday Morning Short Courses (8:00-9:20)	#	Friday Afternoon Short Courses (1:00-2:20)	#
Introduction to DNA Biomarkers		Handling Non-Detects for Data Analysis	
Environmental Sampling in Aquatic Ecosystems		Use of Benthic Community Analysis in Freshwater Stream Assessments	
The Science of the Interview from Both Sides of the Desk		Data Collection, Mapping and Data Management in Aquatic Ecosystems	
Groundwater – Surface Water Interactions I		Groundwater – Surface Water Interactions II	

If you have any questions about the meeting, please feel free to contact the meeting chairs at: Amanda Maxemchuk at 7325-590-4664, maxemchuka@cdm.com or Chris Nally at 610-434-9015, cyberceria@aol.com.

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