



PATRICK CENTER FOR ENVIRONMENTAL RESEARCH

2011 ACTIVITY REPORT

THE ACADEMY
OF NATURAL SCIENCES
of DREXEL UNIVERSITY

INTRODUCTION

On October 26, 2011, the Academy of Natural Sciences joined with Drexel University. In addition to the many potential interactions with existing Drexel faculty, is the creation of a new department within Drexel, the Department of Biodiversity, Earth and Environmental Sciences (BEES), which will accept its first students in the fall of 2012. The new department will bring Academy and Drexel scientists together with a focus on the natural and environmental sciences. This exciting new collaboration will bring many new opportunities in 2012. We look to a bright future for the Patrick Center and its interaction, collaboration and growth with Drexel University and the new BEES department.

PATRICK CENTER STAFF (2011)

ADMINISTRATION

Dr. David J. Velinsky; PCER Director & VP for Environmental Science
Kristen Marie Kepics; Science Administrator
Andrew Schneider; Assistant Science Administrator
Kimberly Ellis; Office Manager

ASIA CENTER

Dr. Clyde Goulden (Director)
Tuya Goulden

CENTER FOR ENVIRONMENTAL POLICY

Roland Wall, MS (Director)
Erin Johnson, MPH
Sara Steele

ENVIRONMENTAL BIOGEOCHEMISTRY

Dr. David Velinsky (Section Leader)
Dr. Tracy Quirk, Ruth Patrick Scholar
Paul Kiry, MS
Mike Schafer
Linda Zaoudeh
Paula Zelanko, MS

FISHERIES

Dr. Richard J. Horwitz (Section Leader & Ruth Patrick Chair in Environmental Science)
David Keller, MS
Andrea Kreit
Paul Overbeck

FRANCIS BOYER CHAIR

Dr. Ruth Patrick

MACROINVERTEBRATES

Dr. Raymond W. Bouchard, Jr.
Brett Marshall, MS

PHYCOLOGY

Dr. Donald F. Charles (Section Leader)
Frank Acker, MS
Patrick Boylan
Dr. Mihaela Enache
Dr. Eduardo Morales
Pat Palmer
Dr. Ling Ren
Dr. Barbara (Babs) Rinkel
Judie Marie Roszek

PROJECT SUPPORT

Roger L. Thomas (Section Leader)
Robin Davis
Sylvan Klein
Dr. Danielle Kreeger
Melanie Mills, MS
Will Whalon

WATERSHED AND SYSTEMS ECOLOGY

Dr. Jerry Mead (Section Leader)
Frank Anderson, MES
Michelle Branin, MS

ASSOCIATES, RESEARCH INTERNS, AND VOLUNTEERS**RESEARCH INTERNS**

Sarah Feder (Center for Environmental Policy)
Seth Koren (Fisheries)
Stephanie Leach (Watershed Ecology)
Andrew Miano (Phycology)
Megan Nyquist (Environmental Biogeochemistry)
Julia Schafer (Environmental Biogeochemistry)
Alexandra Tarbous (Environmental Biogeochemistry)
Brian Wartel (Watershed Ecology)
Victoria Unger (Environmental Biogeochemistry)

RESEARCH ASSOCIATES

Dr. Jeffery Ashley, Philadelphia University
Dr. Jonathan Fingerhut, St. Joseph's University
Dr. Christopher Sommerfield, University of Delaware

VOLUNTEERS

Meg Christie
Linda Coddington
Elena Colon
Bill Frezel
Tuya Goulden
Roland Harper
Joe Hyland
Selah Lynch
Kate Rack
David Schogel
Tina Stonefield

HIGHLIGHTS

INTERDEPARTMENTAL HAPPENINGS

- **Researchers in the Patrick Center** initiated a comprehensive ecological study of the potential impacts from Marcellus Shale gas drilling in the Upper Susquehanna and Delaware River Basins.
- **Senior Staff** worked on the development of the curriculum for the new department at Drexel University (Biodiversity, Earth and Environmental Sciences).
- **David Velinsky** and **Roland Wall** were part of a panel at a US Senate staff meeting hosted by Senator Sherrod Brown of Ohio as well as meeting with staff from Senator Bob Casey's office.
- **Don Charles** and the Phycology section, with help from **Marina Potapova** and the Diatom Herbarium staff, created a new web page of Diatom Taxa Names with documentation and synonym lists. This effort was supported by US Geological Survey and the US Environmental Protection Agency to help solve problems of widespread inconsistency in taxonomy used in federally funded projects.
- **Ling Ren, Mihaela Enache** and **David Velinsky** received funding for ecosystem studies within the Barnegat Bay (NJ) as part of a large science/management initiative to clean up the bay.
- **Tracy Quirk** was promoted to an Assistant Scientist and will lead the Wetlands Ecology section in 2012.
- **Patrick Center staff** participated in 20 Science Live sessions.

ASIA CENTER

- **Clyde Goulden** and his team continued their NSF-funded research in Mongolia, interviewing nomadic herders about their perceptions of recent environment changes and the impacts of potential climate changes on the steppe grazing pastures of the nomads.
- **Clyde Goulden** participated in the International Long Term Ecological Research (LTER) meetings in Sapporo, Japan representing the Academy and the Mongolian LTER program.
- **Clyde Goulden** visited the Geographic Institute of the Chinese Academy of Sciences in Beijing, China to present a seminar on the Mongolia research and, at the request of Drs. Julie Mostov and Donna Murasko of Drexel University, invited Chinese scientists to visit Drexel and the Academy to discuss a graduate and undergraduate student exchange program.
- **Clyde** and **Tuya Goulden** met with exhibit planners for the Academy's bicentennial exhibit to help develop a component of the new exhibit.

CENTER FOR ENVIRONMENTAL POLICY

- The Center for Environmental Policy sponsored 31 public programs in 2011 with over 4500 participants. Prominent speakers included: Dr. Christopher Magadza, co-recipient of the 2007 Nobel Peace Prize; Dr. Jack Horner, author and paleontologist; Dr. Tim Flannery, author and climate advocate; Judy Wicks, author and activist; Michael Krancer, Secretary of the Pennsylvania Department of Environmental Protection; Philadelphia Mayor Michael Nutter; three of the city's Deputy Mayors, Director of the Mayor's Office of Sustainability; and several City Councilpersons and PA legislators.
- Profitable Pathways to Sustainability: Produced six Leadership Series meetings with speakers representing Johnson & Johnson, IKEA, Drexel University, Case Western Reserve, SAP, Viridity Energy.
- Held two Steering Committee retreats to set a vision for Profitable Pathways to Sustainability.
- Cultivated \$25,000 in sponsorship support.
- Engaged with 100 corporations as potential participants.
- See list of Town Square events and forums below.

ENVIRONMENTAL BIOGEOCHEMISTRY

- **Paul Kiry**, **Paula Zelanko** and summer interns completed water quality analyses for monitoring studies in NY, NJ, and PA and DRBC.
- **Tracy Quirk** and **David Velinsky**, along with other PCER staff, initiated field sampling trips to various tidal marsh systems in Delaware Bay and Barnegat Bay (NJ) to collect monitoring data for studies on climate change impacts to tidal wetlands.

- **Tracy Quirk** received funding from the US Fish and Wildlife Service to work on tidal marshes in Massachusetts, Long Island and NJ.
- **Paula Zelanko, David Velinsky and Nate Rice** (CSBE) analyzed Osprey feathers collected between 1860 to the present from birds frequenting Delaware Bay to assess ecosystem changes in the Delaware River estuary. The results of the study were published in the Proceedings of The Academy of Natural Sciences.

FISHERIES

- **Rich Horwitz, Roger Thomas and many PCER Staff** completed two large environmental monitoring surveys on the Holston River (TN Eastman) and the Sabine River (TX Eastman).
- **Rich Horwitz** and members of the Marcellus stream team were interviewed by Ms. Susan Phillips of WHYY for NPR broadcast on Marcellus Shale drilling.
- **Rich Horwitz** and **Paul Overbeck** were filmed for a segment of a TV show on electrofishing in streams.
- Under the guidance of **Rich Horwitz** and **David Keller**, the Fisheries group completed work on age structure of the federally endangered Rio Grande Silvery Minnow. This research was presented to managers at the US Bureau of Land Management, as well as at the annual meeting of the American Water Resources Association.
- **Rich Horwitz** was a panel member at the Northeast Natural History Conference in Albany, NY discussing the potential impacts of Marcellus Shale drilling.

PHYCOLOGY

- The Phycology section's US EPA National Lake Assessment has expanded their scope to include more sites and samples.
- Members of Phycology Section, led by **Babs Rinkel**, completed analyses of over 1,000 algal samples for the US EPA's National River and Stream Assessment. They are also helping analyze data for a report to Congress to determine what percentages of the nation's rivers are in good, fair, or poor condition using key indicators of ecological and human health.
- **Ling Ren** continued her research project in China in collaboration with staff at the Zhejiang Ocean University. The project is entitled "Biodiversity in Coastal East China Sea: Temporal and Spatial Changes and Impacts of Human Activities".
- **Mihaela Enache** and **Ling Ren** received funding for ecological studies in Barnegat Bay (NJ).
- Helped biologists from the State of Montana assess the effects of non-point nutrient sources on the Yellowstone River.
- Recommended changes to the New Jersey statewide nutrient criteria (phosphorus and nitrogen) for rivers and streams.
- Developed new algal indicator approaches for monitoring.

WATERSHED AND SYSTEMS ECOLOGY

- **Jerry Mead, David Velinsky** and **Tracy Quirk** completed a study on the impacts of land use and climate change on Tinicum Marsh, a Delaware River tidal freshwater wetland.
- **Jerry Mead, David Velinsky** and **Richard Horwitz** are developing guidelines for managing the impacts of hydraulic fracturing on surface waters.
- With help from Curator **Tanya Livshultz** of Botany (CSBE), **Jerry Mead** and **Michelle Brannin** submitted a proposal focusing on the climatic factors selecting for diversification of milkweeds in Africa.

PROJECT SUPPORT

- **Roger Thomas** and **Danielle Kreeger** led a field team that discovered several species of freshwater mussels (at least one considered by PA to have been locally extirpated) on the Delaware River between Trenton NJ and Philadelphia, PA.

FIELD WORK (TOTAL DAYS IN THE FIELD = 166)

Fisheries – High Lonesome Ranch Stream Restoration (CO); Delaware River and associated tributaries Toxics in Fish Study (NJ); Bridle Shiner Studies in Delaware River and tributaries (PA, NJ, NY); Holston River Impingement Study (TN) and Marcellus Shale Study (PA).

Environmental Biogeochemistry – Tidal wetlands in the Delaware Estuary: Sediment Coring (NJ, PA, DE); Tinicum Marsh Monitoring (PA); Barnegat Bay, Parker River (MA), Chautauqua Lake Watershed Water Quality (NY); Long Island Sound (NY), Holston River (TN).

Watershed Ecology – High Lonesome Ranch Restoration (CO); Black River (NY), Chautauqua Lake Watershed Water Quality (NY), numerous streams in the Susquehanna River Basin (PA).

Project Support – Oyster Population Health Assessment (TX); Delaware and Barnegat Bays Sediment Coring; Delaware River Freshwater Mussel Studies; Tinicum Nutrient Flux Study; Northern PA Marcellus Gas Drilling Monitoring Studies.

OUTREACH

Patrick Center Scientists maintain memberships on a number of local and regional resource management committees such as:

- 1) Toxics Advisory Committee, Delaware River Basin Commission

- 2) Science and Technical Advisory Committee (STAC), Delaware Estuary Program
- 3) Diatom Taxonomic Consistency Workgroup, United States Geological Survey
- 4) Fish Technical Advisory Committee, PA Biodiversity Program
- 5) Board of Directors, Partnership for the Delaware Estuary
- 6) North American Benthological Society's Science and Policy Committee

Patrick Center staff either has participated in, or moderated, various forums, workshops and classes including those hosted by the Center for Environmental Policy's Town Square, Pennypack Farm and Education Center and Delaware River Keeper.

They have also participated in various advisory roles for high school, undergraduate and graduate students including students from the University of Pennsylvania, Temple University and Drexel University.

Public outreach activities:

Academy Membership Night

Bicentennial Exhibit Planning

Earth Day at the Academy (part of the Philadelphia Science Festival)

Interviews and Articles in local newspapers (see attached articles related to Marcellus Shale and rare freshwater mussels found in the Delaware River)

Environmental education for Radnor Township students at Camp Canadensis

Youth Fishing Day at FDR Park with Youth Anglers Association

Adult Education Course for ANS: Electrofishing

Science Live

PROPOSALS & GRANTS *(Italic is source: Submitted)*

ENVIRONMENTAL BIOGEOCHEMISTRY

- *Delaware River Basin Commission: Water Quality Monitoring Project: Upper Delaware Studies.*
- *Philadelphia Water Department: Dissolved Oxygen Dynamics in the upper tidal Delaware River.*
- *NOAA Sea Grant (NJ): Tidal Marsh Sedimentation Changes in Contrasting Wetlands*
- *Pennsylvania DEP Coastal Zone Management Program: Nutrient Sequestration in Vegetation and Soils of a Pennsylvania Urban Tidal Freshwater Marsh.*
- *Philadelphia Water Department: Water Quality Studies with CNP and Diatom Taxonomy.*
- *US EPA R2 National Estuary Programs: Site-specific Intensive Monitoring of Coastal Wetlands of Delaware and Barnegat Bays".*
- *Barnegat Bay Partnership: Site-specific Intensive Monitoring of West Creek, Barnegat Bay, NJ.*
- *US Fish and Wildlife Service: Effect of Open Water Associated with Open Water Marsh Management (OMWM) on Accretion: A Regional GIS Analysis.*

FISHERIES

- *Tennessee Eastman Corporation: Monongahela River Study.*
- *NOAA Coastal Zone Management Program: Telemetry of flathead catfish in the Delaware River.*
- *New Jersey Department of Environmental Protection: QA Analysis and routine monitoring of contaminants in fish.*
- *Costwald Foundation: Climate Change Studies in Mongolia.*
- *High Lonesome Ranch Group: Assessment and Bioinventory of High Lonesome Ranch.*

PHYCOLOGY

- *USGS National Water Quality Assessment Program: Algae sample analysis and diatom taxonomy guide.*
- *US EPA: National River and Stream Assessment: Diatom and Soft Algae data interpretation.*
- *Maine Department of Environmental Protection: Algae sample analysis and calculation of metrics.*
- *Montana Department of Environmental Quality: Algae sample analysis and data interpretation.*
- *Virginia Department of Environmental Quality: Algae sample analysis.*
- *Delaware River Basin Commission: Algae sample analysis.*
- *Delaware Department of Natural Resources and Environmental Control: Algae sample analysis.*
- *New Jersey Department of Environmental Protection: Northern NJ streams - diatom analysis and nutrient criteria development; NJ Lake Studies.*
- *New York Department of Environmental Conservation: Onondaga Lake, NY Historical Studies – sediment core analysis.*
- *New Jersey Department of Environmental Protection: Phytoplankton and sediment diatom analysis.*
- *US EPA: National Wetland Condition Assessment; Algae sample analysis.*
- *USGS Science Centers: Louisiana, Missouri, Wisconsin, Wyoming; Algae sample analysis.*

PROJECT SUPPORT

- *Union Carbide/DOW, Seadrift Coke and Cotswold Foundation: San Antonio Bay Oyster Population Health Assessment.*
- *Philadelphia Water Department: Year 5 of the Chemical and Biological Testing of Algal Samples from Philadelphia Area Rivers and Streams.*
- *Philadelphia Water Department: Dissolved Oxygen Dynamics in the Upper Tidal Delaware River.*

WATERSHED AND SYSTEMS ECOLOGY

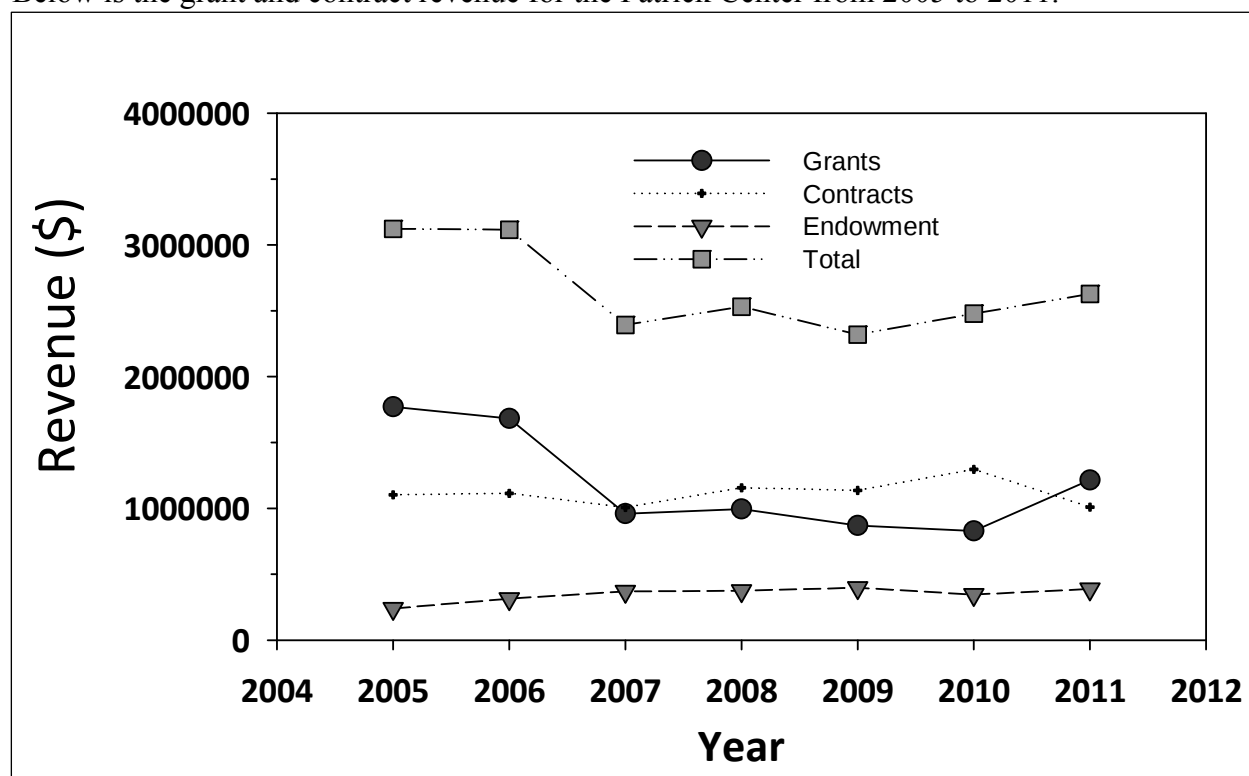
- *National Science Foundation: Climate change and endangered and threatened salmonids in north central Mongolia.*

- *National Science Foundation*: Diversification of milkweeds and increased pollen transfer efficiency.
- *William Penn Foundation*: Potential impacts of mining natural gas from the Marcellus Shale formation: Guidelines for management.
- *New Jersey Department of Environmental Protection*: Barnegat Bay diatom assessment.
- *National Science Foundation*: Stream ecosystem services provided by old growth, temperate forests in Chile.

See list at the end of the report for details about specific proposals.

GRANT AND CONTRACT REVENUE

Below is the grant and contract revenue for the Patrick Center from 2005 to 2011.



GRADUATE/UNDERGRADUATE STUDENTS MENTORED-

Ms. Margaret Christies (MS completed 2011, University of Pennsylvania): Dr. Donald Charles
 Mr. Brian Laub (Ph.D. completed 2011; University of Maryland): Dr. Donald Charles
 Ms. Stephanie Leach (MS expected 2012, University of Pennsylvania): Dr. Jerry Mead
 Mr. Steven Pearson (Ph.D expected 2012, Drexel University): Dr. David Velinsky
 Ms. Kelly Summers (MS, completed 2011, University of Delaware): Dr. Richard Horwitz
 Ms. Viktoria Unger (MS, expected 2013, Drexel University): Dr. Tracy Quirk

PUBLICATIONS (11)

Acs, E., L. Ector, K.T. Kiss, C. Cserhádi, E.A. Morales, & Z. Levkov. 2011. Morphological observations on *Amphora micrometra* Giffen from the Bolivian Altiplano, South America and its transfer to the genus *Halamphora*. *Diatom Research* 26: 199-212.

Cejudo-Figueiras, C., E.A. Morales, C.E. Wetzel, S. Blanco, L. Hoffmann, & L. Ector. 2011. Analysis of the type of *Fragilaria construens* var. *subsalina* (*Bacillariophyceae*) and description of two morphologically related taxa from Europe and the United States. *Phycologia* 50: 67-77.

Enache, D.M., A. Paterson, & B.F. Cumming. 2011. Changes in diatom assemblages from 40 reference lakes in the Experimental Lakes Area (northwestern Ontario, Canada): Assessing the probable role of climatic change. *Journal of Paleolimnology* 46: 1-15.

Johansen, J.R., K. Řeháková, & F. Acker. 2011. *Tapinothrix ozarkiana* sp. nov., with notes on distribution for the genus in North America. *Fottea* 11(1):141-148.

Lieb, D.A., R.W. Bouchard, R.F. Carline, T.R. Nuttall, J.R. Wallace and C.L. Burkholder. 2011. Conservation and Management of Crayfishes: Lessons from Pennsylvania. *Fisheries*, 36:10, 489-507

Livshultz, T., J.V. Mead, and M.T. Brannin. (2011). Climate niches of milkweeds with plesiomorphic traits (*Secamonoideae*; *Apocynaceae*) and the milkweed sister group link ancient African climates and floral evolution. *American Journal of Botany* 98(12): 1966–1977.

Morales, E.A., L. Ector, E. Fernández, M.H. Novais, D. Hlubikova, P.B. Hamilton, S. Blanco, M.L. Vis, & J.P. Kociolek. 2011. The genus *Achnantheidium* Kützing (*Achnanthes*, *Bacillariophyceae*) in Bolivian streams: a report of taxa found in recent investigations. *Algological Studies* 136/137: 89-130.

Taylor, J.C., E.A. Morales, & L. Ector. 2011. *Achnantheidium standeri* Cholnoky and *Achnantheidium taiaensis* (J.R. Carter et Denny) two new combinations of morphologically similar *Achnantheidium* species from Africa. *Algological Studies* 136/137: 151-166.

Velinsky, D.J., G.R. Riedel, J.T. Ashley and J. Cornwell 2011. A contamination history of the Anacostia River, Washington, D.C. *Environmental Assessment and Monitoring* 183(1): 307-328.

Weston, N.B., M.A. Vile, S.C. Neubauer and D.J. Velinsky. 2011. Accelerated microbial organic matter mineralization following salt-water intrusion into tidal freshwater marsh soils. *Biogeochemistry* 102 (1-3):135-151

Wojtal, A.Z., L. Ector, B. Van de Vijver, E.A. Morales, S. Blanco, J. Piatek, & A. Smieja. 2011. Morphology and distribution of the *Achnantheidium minutissimum* complex (*Bacillariophyceae*) in southern Poland. *Algological Studies* 136/137: 211-238.

PRESENTATIONS (27)

Anderson, F. and J. Mead. 2011. Potential Impacts of Mining Natural Gas from the Marcellus Shale formation. North American Benthological Society meeting. Providence, Rhode Island.

Branin, M. and J. Mead. 2011. Developing general models of aquatic invertebrate metabolism. North American Benthological Society meeting in Rhode Island. Providence, Rhode Island.

Charles, D.F. 2011. A Biological Condition Gradient approach for using diatoms to assess nutrient conditions: New Jersey streams. EPA Region II Regional Technical Advisory Group meeting, 5-6 April, 2011, New York, NY.

Charles, D.F., F.A. Acker, P.A. Bukaveckas, C.W. Boylen, & S.A. Nierzwicki-Bauer. 2011. Changes in phytoplankton assemblages in 30 Adirondack mountain lakes in response to decreasing acidic deposition. Northeast Natural History Conference, April 6-9, 2011, Albany, NY.

Charles, D.F., 2011. Using diatoms to develop nutrient criteria options for New Jersey streams. Invited presentation to the New Jersey Science Advisory Board, Water Quality and Quantity Committee. Rutgers University, New Brunswick, NJ. June 5, 2011.

Charles, D.F. 2011. Resources for diatom research at the Phycology Section, Patrick Center, ANSP. 21st North American Diatom Symposium, Flathead Lake Biological Station, Polson, MT 14-18, September 2011.

Elsey-Quirk, T., A. Smyth, M. Piehler, B.P. Horton, J. Mead and D.J. Velinsky. 2011. Denitrification in an urban tidal freshwater wetland of the Delaware. Presented at the 2011 Delaware Estuary Science Conference, Cape May, NJ. Partnership for the Delaware Estuary.

Elsey-Quirk, T., Velinsky, D.J., Kreeger, D.A., Maxwell-Doyle, M, and Padaletti, A. 2011. Initiation of intensive long-term wetland monitoring in the Delaware Estuary and Barnegat Bay, Mid-Atlantic, USA. Coastal and Estuarine Research Federation, November 6 –10, 2011.

Elsey-Quirk, T., A. Smyth, M. Piehler, B. Horton, J. Mead, and D.J. Velinsky. 2011. Denitrification in an Urban Tidal Freshwater Wetland of the Delaware. Oral presentation, Society of Wetland Scientists South and Mid-Atlantic Chapters, March 7-8, 2011.

Elsey-Quirk, T., A. Smyth, M. Piehler, B. Horton, J. Mead, and D.J. Velinsky. 2011. Denitrification in an Urban Tidal Freshwater Wetland of the Delaware. Oral presentation, Partnership for Delaware Estuary Science Summit, January 31 – February 2, 2011.

Elsey-Quirk, T., D. J. Velinsky, D. Kreeger, M. Maxwell-Doyle, and A. Padaletti. 2011. Initiation of intensive long-term monitoring in wetlands of Delaware and Barnegat bays. Poster presentation, Partnership for Delaware Estuary Science Summit, January 31 – February 2, 2011.

Horwitz, R.J., D.J. Velinsky, and J. Mead. 2011. Potential Environmental Impacts of gas drilling in the Marcellus Formation. Northeast Natural History Symposium, Albany NY, April, 2011.

Horwitz, R.J., D.S. Platania, R. Dudley, Keller, P. Overbeck, and A. Kreit. 2011. Aging of the Rio Grande Silvery Minnow (*Hybognathus amarus*). To US Bureau of Reclamation, Albuquerque, NM.

Horwitz, R.J., D.S. Platania, R. Dudley, Keller, P. Overbeck, and A. Kreit. 2011. Aging of the Rio Grande Silvery Minnow (*Hybognathus amarus*). Annual Meeting of American Water Resources Association, Albuquerque, NM (November 2011).

Kreeger, D., R. Thomas, and E. Powell. 2011. Spatial and temporal variability in oyster food quality in the Delaware Estuary. Proceedings of the 4th Delaware Estuary Science & Environmental Summit. P. Cole and D. Kreeger (Eds.) Partnership for the Delaware Estuary. http://delawareestuary.org/science_reports_partnership.asp.

Kreeger, D., R. Thomas, and E. Powell, J. Morson, and J. Gius. 2011. Spatial and Temporal Variability in Oyster Food Quantity and Quality in the Delaware Estuary. Presentation at the biennial meeting of the Coastal and Estuarine Research Federation. Daytona Beach, FL. November 2011.

Mead, J. 2011. Potential Impacts of Mining Natural Gas from the Marcellus Shale formation. Plenary presentation for EPA's mid-Atlantic section meeting in Cape May.

Mead, J. 2011. Water scarcity and economic growth in the Delaware River Basin. Special Session of the North American Benthological Society meeting. Providence, Rhode Island..

Ren, L. 2011. Baseline characterization of phytoplankton and harmful algal blooms in Barnegat Bay. NJDEP Barnegat Bay research meeting at Rutgers University (EcoComplex building), September 29, 2011.

Sommerfield, C.K. and D.J. Velinsky. 2011. Understanding tidal marsh accretion in Delaware Estuary. Presented at the 2011 Delaware Estuary Science Conference, Cape May, NJ. Partnership for the Delaware Estuary.

Thomas, R. L., J. V. Mead, R. J. Horwitz, M. Brannin, S. Klein, and J. Babcock-Stiner. 2011. Land cover and geomorphology of two drainages in western New York State. North American Benthological Society meeting. Providence, Rhode Island.

Thomas, R., and Kreeger, D. 2011. Recruitment and growth of spat oysters (*Crassostrea virginica*) in San Antonio Bay, TX following prolonged disturbance events. Presentation at the biennial meeting of the Coastal and Estuarine Research Federation. Daytona Beach, FL. November 2011.

Occurrence of freshwater mussels (Unionidae) in surveyed streams of southeastern Pennsylvania, 2000-2010. 2011. Thomas, R. L., D. Kreeger, S. Klein, A. Padeletti, Z. Ruge, M.

Gray, and C. Gatenby. Proceedings of the 4th Delaware Estuary Science & Environmental Summit. Cape May, NJ.

Rinkel, B.E. 2011. A study of soft-algae assemblages and their correspondence with diatom indicator species within U.S. rivers and streams: Preliminary findings. Phycological Society of America, Seattle, WA. July 2011.

Velinsky, D.J. 2011. University of Pennsylvania, Perelman School of Medicine/Center for Excellence in Environmental Toxicology. Presentation on Marcellus Shale Drilling and Ecological Impacts.

Velinsky, D.J., D. Charles, C.K. Sommerfield, R. Greene, and T. Fikslin. 2011. Tidal marshes in the Delaware Estuary: Historical Reconstruction of chemical loadings. Presented at the 2011 Delaware Estuary Science Conference, Cape May, NJ. Partnership for the Delaware Estuary, (www.delawareestuary.org/news_pde_science_conference_presentations.asp)

Zelanko, P., N.H. Rice and D.J. Velinsky. 2011. Using carbon and nitrogen stable isotopes of Osrey (*Pandion haliaetus*) to infer historic ecosystem characteristics within the Delaware Bay. Presented at the 2011 Delaware Estuary Science Conference, Cape May, NJ. Partnership for the Delaware Estuary (www.delawareestuary.org/news_pde_science_conference_presentations.asp)

TECHNICAL REPORTS (16)

Charles, D.F. & M. A. Christie. 2011. Potential influence of algal species composition, and other factors, on primary productivity in the Yellowstone River, August and September 2007. PCER Report No. 11-01. Prepared for the Montana Department of Environmental Quality. 38 pp. plus appendices.

Charles, D.F., P. Boylan, & A.P. Tuccillo. 2011. Diatom datasets for development of indicators of stream nutrient condition and water quality impairment in EPA Region III. Patrick Center Report No. 11-07. Submitted to US EPA Region III, Philadelphia, PA. 16 pp plus data files on CD.

Enache, D.M., D.F. Charles, & T. Belton. 2011. Paleolimnological study of New Jersey Lakes: TP and TN transfer functions based on a regional dataset and quantitative reconstructions of nutrients in top and bottom core sediment samples from 15 lakes. Report submitted to NJDEP.

Enache, D.M., & M. Potapova. 2011. Wistar Morris 2011 Progress Report - Reconstruction of the historical ranges of diatom species from lake sediment data as a novel approach to microbial biogeography. February 8, 2011.

Horwitz, R.J., J. Mead, M. Brannin, and J. Babcock-Stiner 2011. Chautauqua Lake and Watershed Pre-Implementation Studies. ANSP and Bergmann Associates (Report 2011-05). Draft and Final submitted to Chautauqua County Planning and Economic Development Department.

Horwitz, R.J., D. Keller, A. Kreit, and P. Overbeck 2011. Routine monitoring of PCBs in the Housatonic River. Submitted to General Electric. Final Report.

Horwitz, R.J., D. S. Platania, R. Dudley, Keller, P. Overbeck, and A. Kreit 2011. Aging of the Rio Grande Silvery Minnow (*Hybognathus amarus*). Submitted to US Bureau of Reclamation. Final Report.

Horwitz, R.J. 2011. Assessment of Fish assemblage of the Holston River with respect to vulnerability to entrainment. Submitted to Tennessee Eastman. Final Report.

Horwitz, R.J. 2011. Assessment of the North Branch Susquehanna River with respect to potential impacts of the Procter and Gamble Plant. Final Report.

Horwitz, R.J. and D.J. Velinsky. 2011. Ecological Status of East Park Reservoir (Philadelphia, PA). Submitted to National Audubon Society.

Kreeger, D and R. Thomas. 2011. 2009-2010 San Antonio Bay Oyster Population Health Assessment. Patrick Center for Environmental Research, ANSP, Philadelphia, PA. Report No. 11-02. 92 pp.

Quirk, T., Velinsky, D.J., and Adamowicz, S. 2011. Interim Report submitted to Mr. Ward Feurt, United States Fish and Wildlife Service, "The Effect of Open Marsh Water Management (OMWM) on Flooding and Accretion in Coastal Wetlands" PCER Report #11-09.

Quirk, T. and D. J. Velinsky. 2011. Year-end Report submitted to Ms. Martha Maxwell-Doyle, Barnegat Bay Partnership and Dr. Danielle Kreeger, Partnership for the Delaware Estuary. "Site-Specific Intensive Monitoring of Representative Wetlands in the Delaware Estuary and Barnegat Bay, New Jersey, Year 1" PCER Report #11-11.

Rinkel, B.E. 2011. Progress Report – A preliminary study of the connections between known diatom indicator species for rivers and streams, particularly eutrophic waters, and the soft algae present. Prepared for the Cotswold Foundation. February 2011.

Rinkel, B.E. 2011. A preliminary study of the connections between known diatom indicator species for rivers and streams, particularly eutrophic waters, and the soft algae present. Prepared for the Cotswold Foundation. June 2011.

Rinkel, B.E. 2011. A continuation study into the connections between known diatom indicator species for rivers and streams, particularly eutrophic waters, and the soft algae present. Prepared for the Cotswold Foundation. October 2011.

TOWN SQUARE AND CENTER FOR ENVIRONMENTAL POLICY FORUMS

Public Programs - 2011

Jan 20, 2011	Urban Sustainability Forum - Healthy Homes in Toxic Times
Jan 31, 2011	Hiding in Plain Sight - Finding the City's New Green Space
Feb 17, 2011	Green from the Start - Sustainability Education for the Next Generation
Feb 24, 2011	Shopping for Electricity in the New Energy Landscape
Mar 08, 2011	International Women's Day: Facing the Challenges of our Local and Global Food Economy
Mar 10, 2011	"Making the Business Case for Sustainability", Peter Graf, Chief Sustainability Officer, SAP
Mar 14, 2011	Energy Audits: Your Buildings Return on Investments
Mar 17, 2011	Launch of "Next Great City" Agenda for City Council - Butterfly Gallery
Mar 17, 2011	Philadelphia City Council Candidates Forum: At Large Candidates
Mar 22, 2011	Impacts of Marcellus Drilling on Agriculture
Mar 31, 2011	Third Annual Mid Atlantic Clean Tech Conference
Apr 03, 2011	EPA Brownfields Conference - Environmental Justice Panel
Apr 06, 2011	Philadelphia City Council Candidates Forum: Districts 1 - 5
Apr 19, 2011	Tim Flannery – “Here on Earth”
Apr 21, 2011	Philadelphia City Council Candidates Forum: Districts 6-10
Apr 28, 2011	Innovative Agriculture for the 21st Century
May 12, 2011	Profitable Pathways Executive Leadership Forum: Drexel's Sustainability Commitment and Challenge
May 17, 2011	Dinosaurs: How to Get Rid of Some Old Ones and Make Some New Ones May 17, 2011
May 19, 2011	Urban Sustainability Forum: We Are Our Water May 19, 2011
May 23, 2011	Local Food - Safe Food: Bringing it to Market
May 26, 2011	Lake Kariba, Zimbabwe: Fifty years on.
Jun 08, 2011	Drilling for Natural Gas in the Marcellus

	Shale: What it Means for Pennsylvania
Jun 13, 2011	Recycle Your Condo or Co-op!
Jun 14, 2011	Urban Smart Grid Innovation
Jun 16, 2011	State of the City: Greenworks at Age Two
September 15, 2011	Urban Sustainability Forum: Attracting Sustainable Business to Philadelphia
October 11, 2011	Greater Philadelphia's Clean Energy Opportunities from a Regional, National and Global Perspective
October 17, 2011	Fitting Condos and Co-ops in to Greenworks Philadelphia
October 20, 2011	Why Public Transportation is Crucial for Philadelphia
October 26, 2011	This Little Piggy Went to Market
November 15, 2011	Philadelphia's Reading Viaduct - an Elevated Park Connecting Neighborhoods
November 17, 2011	The Delaware River & Bay: Rebirth of a Natural Treasure
November 30, 2011	Retrofitting Our Future

Proposal Submitted in FY2011

PI	Science Group	Award Decision	Title	Funding Source	Requested Amount
Mead, Jerry	PCER	N	Beyond Baselines: Developing Management Guidelines and Increasing Public Engagement on the Enviromental Impacts of Marcellus Drilling	Colcom foundation	\$25,317
Velinsky	PCER	N	Anacostia PAHs Fingerprinting: Sources of Sediment Contaminantion in an Urban Tidal River	DC DOE	\$99,155
Mead, Jerry	PCER	N	A pilot study: Structure, function, and services of old growth, temperate streams in northern Patagonia, Chile	NSF	\$30,445
DJV -Quirk	PCER	Y	Wetland Monitoring EPA R2 2013-15	PDE	\$84,000
DJV	PCER	N	Globally Significant Carbon Sequestration by Anthropogenic Erosion: A Soils to Sea Integration of Carbon and Mineral fluxes	NSF	\$341,000
Charles	PCER	Y	Adirondack Lakes Acidification 2010	RPI	\$29,600
Charles	PCER	Y	Onondaga Lakes 2011	NYSERDA	\$73,500
Charles	PCER	Y	NJNY Lakes 2011	NJDEP	\$70,000
Charles	PCER	N	FL USGS 2011	USGS	\$15,000
Velinsky/Mead	PCER	Y	Developing Management Guidelines to Minimize the Environmental Impacts of Mining Gas from Marcellus Shale	W Penn Foundation	\$75,000
Charles	PCER	N	Ozarks	USGS	\$9,129
Charles	PCER	Y	Missouri USGS	USGS	\$3,507
Horwitz	PCER	N	SAIC, USACE General Services	Corps of Engineers	
Charles	PCER	Y	VA DEQ yr 5	VA DEQ	\$24,000
Charles	PCER	Y	LA USGS 2011	USGS	\$10,875
Velinsky, Quirk	PCER	Y	The Influence of Estuary Geomorphology on Accretion of Coastal Wetlands: a potential for priority planning for New Jersey coastal areas vulnerable to sea level rise	NJ Sea Grant	\$116,731
Charles	PCER	N	Indiana USGS 2011	USGS	\$7,497
Charles/Velinsky	PCER	N	NEON scoping - 500 samples pre-proposal estimate	NEON	\$174,831
Charles	PCER	Y	Montana DEQ 2 years periphyton/phytoplankton 2011	MT DEQ	\$40,140
Velinsky/Charles	PCER	Y	Phila Water Dept Year 5	PWD	\$18,000
Horwitz	PCER	Y	Near-field Studies of the South Fork Holston River, as relevant to the potential for fish impingement.	Eastman	\$18,000
Quirk/Velinsky	PCER	Y	Intensive Fixed Station Monitoring at Dividing Creek in the Delaware Estuary	PDE	\$11,383
Enache	PCER	Y	NJ BB Diatom Calibration 2012	NJ DEP	\$100,000
Ren	PCER	Y	NJ BB Phytoplankton 2012	NJ DEP	\$100,000
Charles	PCER	N	Freshwater Benthic Diatom Taxonomy Services Rhode Island Department of Environmental Management	RI DEM	\$50,000
Velinsky	PCER	Y	2011-12 Barnegat Bay: Discretionary Proposals in Support of Region 2 STAG Funding	PDE	\$100,000
Charles/Potapova	PCER	Y	NAWQA Coop III year 5 modification	NAWQA	\$100,000
Thomas	PCER	Y	October 2011 San Antonio Bay Oyster Population Health Assessment	DOW, Seadrift Coke LP.	\$26,640
Keller, Horwitz	PCER		Seasonal Home Range and Movement of Flathead Catfish	PA CZM	\$50,000
Velinsky	PCER	Y	Sediment Oxygen Demand Studies in the tidal freshwater Delaware River	PWD	\$61,222

Note: Total Proposal \$\$ = \$1.8million