

Rebecca L. Hays

Eastern University
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Education:

Ph.D., Oceanography, University of Delaware, Lewes, DE

- Dissertation topic – Vegetation Patterns and Nutrient Cycling in Delaware Bay Salt Marshes: Great Marsh (Lewes) and Webbs Marsh (South Bowers), Delaware
- Degree awarded January 9, 2010

M.S., Marine Studies - Oceanography, University of Delaware, Lewes, DE

- Thesis topic – Attenuation of Nutrient Fluxes During Groundwater Seepage Across a Sandy Beachface at Cape Henlopen, Delaware
- Degree awarded January 7, 2006

B.S., Biology with concentrations in Ecology and Marine Biology, Millersville University of Pennsylvania, Millersville, PA, 2003

- Minors in Chemistry and Geography

Research Interests:

Ecosystem Change Analysis, *Phragmites australis*, Salt Marsh Ecology, Nutrient Cycling, Geographic Information Systems (GIS), Estuarine and Coastal Ocean Ecology and Processes, Groundwater Seepage, Landscape Ecology, Watershed Hydrology, Biogeochemistry, Stable Isotopes, Salt Marsh Plant Physiology, Remote Sensing of Coastal Systems, Ecohydrology

Professional Affiliations:

- American Scientific Affiliation
- Coastal and Estuarine Research Federation
- Pennsylvania Academy of Science

Professional History:

Assistant Professor of Biology, Eastern University, St. Davids, PA, 2012-present.

- Taught courses including Introductory Biology, General Biology 2, Vertebrate Zoology, Ornithology, Marine Biology, Environmental Issues, Environmental Regulations and Policy, Geology, Senior Thesis Literature Review, Senior Thesis Directed Research, and Introduction to Faith, Reason, and Justice
- Revised curriculum for BIOL 105 (previously BIOL 205), BIOL 152 labs, BIOL 206, and BIOL 350B
- Developed curriculum for BIOL 230A, BIOL 320, BIOL 320 labs, BIOL 350B labs, BIOL 420, BIOL 425, BIOL 426, and GEOL 200
- Participated in Eastern student recruitment events and met with prospective students
- Faculty Advisor for Earthkeepers (2012-2014)
- Led biology student information sessions about internships and graduate programs
- Advised Biology, Environmental Science, and INST150 students

- Attended Biology Department, Natural Science Division, College of Arts and Sciences, and University Faculty meetings
- Assisted in revision of the Environmental Studies major and minor to the Environmental Science major and minor
- Represented Eastern University at Au Sable Council Meeting in Sept. 2012
- Served on Eastern's Institutional Review Board, 2013-present

Interim Chair of Biology, Eastern University, St. Davids, PA, January-May 2014.

- Processed orders for departmental needs
- Provided guidance to two adjunct professors
- Managed student concerns within the department
- Represented the department at Department Chair meetings
- Assisted in advising the department chair's students while she was on sabbatical

Visiting Assistant Professor of Biology, Eastern University, St. Davids, PA, 2011-2012.

- Taught courses including General Biology, Ornithology, Environmental Issues, and Senior Thesis Literature Review
- Developed and/or adapted curriculum for BIOL 205, 206, 320, and 425
- Participated in Biology major recruitment events
- Faculty Advisor for Earthkeepers (2011-2012)
- Spoke with students interested in internships and graduate programs
- Attended Biology Department, Natural Science Division, College of Arts and Sciences, and University Faculty meetings
- Participated in the New Faculty Seminar

Postdoctoral Researcher, University of Delaware, Lewes, DE and Stroud Water Research Center, Avondale, PA, 2010-2011.

- Project title - Diatom-Bound Nitrogen Isotopes as a Diagenetically Stable Proxy for Southern Ocean Nutrient Utilization and Early Pliocene Climatic Warmth
- Method development for isolating diatoms from marine sediment samples
- Analyzing diatom and bulk sediment samples for C and N content and $d^{13}C$ and $d^{15}N$
- Data analysis and manuscript preparation
- Supervised one undergraduate intern

Research Assistant, University of Delaware, Lewes, DE, 2003-2009.

- Collected, prepared, and analyzed baseflow, storm water, groundwater, marsh, and estuarine samples for particulate, dissolved nutrients, chlorophyll *a*, and carbon for a variety of studies using a flow-through analysis system, CHN analyzer, and manual techniques.
- Maintained YSI DataSondes for a dissolved oxygen study
- Prepared standards and reagents and serviced field-based nutrient autoanalyzer (Greenspan Aqualab®)

- Analyzed a time series of aerial photographs in ArcView GIS to determine the spread of *Phragmites australis* in the Great Marsh, Delaware
- Completed vegetation mapping of an experimental marsh adjacent to Murderkill Estuary, Delaware
- Assisted five undergraduate interns with their research projects
- Responsible for daily lab management and ordering of all laboratory supplies Fall 2006 - August 2009

Laboratory Instructor, University of Delaware Parallel Program, Georgetown, DE, 2004-2005

- Principles of Biology, 2 lab sections in Fall 2004, 1 lab section in Spring 2005
- Lesson planning, teaching, lab set up/clean up, and grading

Lab Assistant, Millersville University, Millersville, PA, 2002-2003.

- Responsible for set-up and clean up of ecology lab courses

Summer Intern, Delaware County Conservation District, Media, PA, 2000.

- Public Outreach – organized listings of approved construction companies, helped with NPDES permitting questions
- Inspected construction sites for compliance with permits

Publications:

Ullman, W.J., A.K. Aufdenkampe, R.L. Hays, and S. Dix, 2013. Nutrient Exchange between a Salt Marsh and the Murderkill Estuary, Kent County, Delaware. Part C. Report Submitted to the Kent County Department of Public Works, Dover, Delaware. 47 p.

Billups, K., Aufdenkampe, A., and Hays, R. 2013. Late Miocene through early Pleistocene nutrient utilization and export production in the Antarctic Zone of the Southern Ocean. *Global and Planetary Change* 100: 353-361.

Hays, R.L. 2009. Study Revealing Contaminants Caught in 'Webb' of Salt Marsh. *Estuary News* 20: 14-15.

Hays, R.L. 2009. Vegetation Patterns and Nutrient Cycling in Delaware Bay Salt Marshes: Great Marsh (Lewes) and Webbs Marsh (South Bowers), Delaware. Ph.D. Dissertation. College of Earth, Ocean, and Environment, University of Delaware, Lewes, Delaware.

Hays, R.L. and W.J. Ullman. 2007. Dissolved nutrient fluxes through a sandy estuarine beachface (Cape Henlopen, Delaware, USA): Contributions from upland groundwater discharge, seawater, and diagenesis. *Estuaries and Coasts* 30: 710-724. (erratum *Estuaries and Coasts* 31: 606)

Hays, R.L. and W.J. Ullman. 2007. Direct determination of total and fresh groundwater discharge and nutrient loads from a sandy beachface at low tide (Cape Henlopen, Delaware). *Limnology and Oceanography* 52: 240-247.

Hays, R.L. 2005. Groundwater Discharge and Associated Nutrient Fluxes to the Delaware Bay at Cape Henlopen, Delaware. M.S. Thesis. College of Marine Studies, University of Delaware, Lewes, Delaware.

Published Abstracts of Presentations at National/International Meetings:

- Hays, R.L., A.K. Aufdenkampe, and K. Billups. Southern Ocean Nutrient Utilization and Productivity during the Late Miocene Through Early Pleistocene. Abstract for American Geophysical Union Meeting, San Francisco, CA, December 2011.
- Hays, R.L. 2007. A decade of distributional changes of *Phragmites australis* in the Great Marsh, Lewes, DE (1992-2002). Abstract for Estuarine Research Federation Meeting, Providence, RI, November 2007.
- Hays, R.L. and W.J. Ullman. 2007. A decade of distributional changes of *Phragmites australis* in the Great Marsh, Lewes, DE (1992-2002). Abstract for Benthic Ecology Meeting. Atlanta, GA, March 2007.
- Hays, R.L. and W.J. Ullman. 2006. Groundwater Discharge and Attenuation of Nitrogen and Phosphorus Loads by Sandy Beach Sediments at Cape Henlopen, Delaware (USA). Abstract for ASLO/AGU/TOS 2006 Ocean Sciences Meeting, Honolulu, Hawaii. February 2006.
- Hays, R.L. and W.J. Ullman. 2005. Groundwater seepage and associated nutrient fluxes at Cape Henlopen, Delaware. Abstract for Estuarine Research Federation Meeting, Norfolk, VA, October 2005.
- Hays, R.L. and W.J. Ullman. 2005. Groundwater seepage and associated nutrient fluxes at Cape Henlopen, Delaware. Abstract for the Benthic Ecology Meeting, Williamsburg, VA, April 2005.
- Hays, R.L. and W.J. Ullman. 2005. Attenuation of nutrient fluxes during groundwater seepage across a beachface at Cape Henlopen, Delaware. Abstract for ASLO 2005 Aquatic Sciences Meeting, Salt Lake City, Utah, February 2005.

Published Abstracts of Presentations at Regional Meetings:

- Fuhr, K., Isley, B., Suryajay, A., and Hays, R. 2015. Mapping the Fluctuations of *Phragmites australis* populations in the Great Marsh, Lewes, Delaware: An Application of ArcGIS. Abstract for Saint Joseph's University Sigma Xi Student Research Symposium 2015, Philadelphia, PA, April 2015.
- Kulfan, T., Goodwin, S., and Hays, R. 2014. Tracking Human Alteration of Rural Communities in Foster, RI and Ephrata, PA. Abstract for Saint Joseph's University Sigma Xi Student Research Symposium 2014, Philadelphia, PA, April 2014.
- Martin, A., Sioma, D, Underwood, S, and Hays, R. 2013. Mapping the changing human and natural landscapes of Eastern University from 1937-2010. Abstract for Saint Joseph's University Sigma Xi Student Research Symposium 2013, Philadelphia, PA, April 2013.
- Hays, R.L., Aufdenkampe, A.K., and K. Billups. 2011. A Streamlined Method for Determination of $\delta^{15}\text{N}$ of Diatom-bound Organic Matter: Application to the Pliocene Southern Ocean. Abstract for the Geological Society of America Northeastern/North-Central Joint Meeting 2011, Pittsburgh, PA, March 2011.
- Hays, R.L. 2009. Eulerian sampling of marsh effluents for the determination of nutrient exchange between the Murderkill Estuary and adjacent salt marshes. Abstract for The Delaware Estuary Science and Environmental Summit 2009, Cape May, NJ, January 2009.
- Aufdenkampe, A.K., W.J. Ullman, and R.L. Hays. 2009. The role of a salt marsh in processing estuarine carbon and nitrogen: A complete species and isotope seasonal balance. Abstract for The Delaware Estuary Science and Environmental Summit 2009, Cape May, NJ, January 2009.

Hays, R.L. 2008. Vegetation and Chemical Surveys of the Murderkill River. Abstract for College of Marine and Earth Studies Graduate Student Symposium, Lewes, DE, May 2008.

Hays, R.L. and W.J. Ullman. 2005. Attenuation of nitrogen fluxes during groundwater seepage across a beachface at Cape Henlopen, Delaware. Abstract for Delaware Estuary Science Conference, Cape May, NJ, January 2005.

Hays, R.L. 2004. Attenuation of nutrient fluxes during groundwater seepage across a beachface at Cape Henlopen, Delaware. Abstract for the College of Marine Studies Graduate Student Symposium, Lewes, DE, November 2004.

Other Presentations:

Laakso, M., Hays, R., and Lawton, J. 2014. Presentation on Student Research at Eastern University Spring Faculty Development Workshop.

Hays, R.L. 2007. A decade of distributional changes of *Phragmites australis* in the Great Marsh, Lewes, DE (1992-2002). Delaware Space Grant Meeting, Newark, DE. November 2007. Invited Poster.

Hays, R.L. 2007. Murderkill River Vegetation Mapping. Presentation for the Kent County (DE) Murderkill Project Committee. July, 2007.

Hays, R.L. 2006. Remote Sensing of the Response of Salt Marsh Vegetation Patterns to Fresh Groundwater Discharge. Delaware Space Grant Meeting, Newark, DE, November 2006. Invited Poster.

Hays, R.L. 2005. Groundwater Discharge and Associated Nutrient Fluxes to the Delaware Bay at Cape Henlopen, Delaware. Biology Department Seminar Series, Millersville University of Pennsylvania. November 2005. Invited presentation.

Fellowships:

NASA Delaware Space Grant Fellowship. September 2006 – August 2007

NASA Delaware Space Grant Fellowship. September 2007 – August 2008

University of Delaware University Dissertation Fellows Award. September 2008 - May 2009.

Awards:

Outstanding Student Poster Award, Delaware Estuary Science & Environmental Summit - 2009

American Geophysical Union Travel Grant - 2006

University of Delaware Office of Graduate Studies Travel Grant – 2005, 2007

University of Delaware Office of Women's Affairs Travel Grant – 2005, 2007

UD College of Marine and Earth Studies Oceanography Program Travel Grant – 2005, 2006, 2007

Estuarine Research Federation Travel Grant - 2005

Grants:

Provost Summer Research Stipend, Eastern University, 2014.

Service:

University of Delaware (UD) Coast Day – 2003, 2004, 2005, 2006, 2007, 2008

Assisted undergraduate researchers in the laboratory and field – 2003, 2006, 2007, 2008, 2011

UD College of Marine and Earth Studies Student Recruitment Weekend volunteer and student organizer – 2004, 2005, 2006, 2007

UD College of Marine and Earth Studies Holiday Party organizer – 2004, 2005, 2006, 2007

ERF Meeting student worker – 2005, 2007

UD College of Marine and Earth Studies Graduate Student Symposium volunteer – 2006, 2008

Science Fair Judge, Laurel Senior High School, Laurel, DE – 2008, 2009

Faculty Advisor for Earthkeepers, Eastern University – 2011-2014

Institutional Review Board, Eastern University – 2013-present

Workshops:

New Faculty Institute Conference, Council for Christian Colleges and Universities, Eastern University, June 2013.

Preparing your National Science Foundation Proposal: A workshop for faculty and postdoctoral fellows in the physical and natural sciences. Villanova University, May 2014.

Vernier Summer Institute. Philadelphia, PA. July 2014.

Additional Training:

Blackboard Basic Training (FDC1). Eastern University. June 2014. Received Eastern's Basic Blackboard Certification.

Teaching in the Online Classroom (FDC2). Eastern University. July-August 2014. Received a Professional Development Certification and Eastern's Adobe Connect Certification.