

BSCI 389: Entomology Department Research
“Active Research Experience: Wetland Restoration at the Jackson Lane Preserve”
Spring, 2025

Prepared January 21, 2025 (subject to change)

"This sounds simple: do we not already sing our love for and obligation to the land of the free and the home of the brave? Yes, but just what and whom do we love? Certainly not the soil, which we are sending helter-skelter down river. Certainly not the waters, which we assume have no function except to turn turbines, float barges, and carry off sewage. Certainly not the plants, of which we exterminate whole communities without batting an eye. Certainly not the animals, of which we have already extirpated many of the largest and most beautiful species. A land ethic of course cannot prevent the alteration, management, and use of these 'resources,' but it does affirm their right to continued existence, and, at least in spots, their continued existence in a natural state. In short, a land ethic changes the role of Homo sapiens from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such." - Aldo Leopold (1949)



Cell 2 at Jackson Lane Preserve after restoration in 2003. From 1980 to 2002, this location was cultivated for corn production.

Course Description

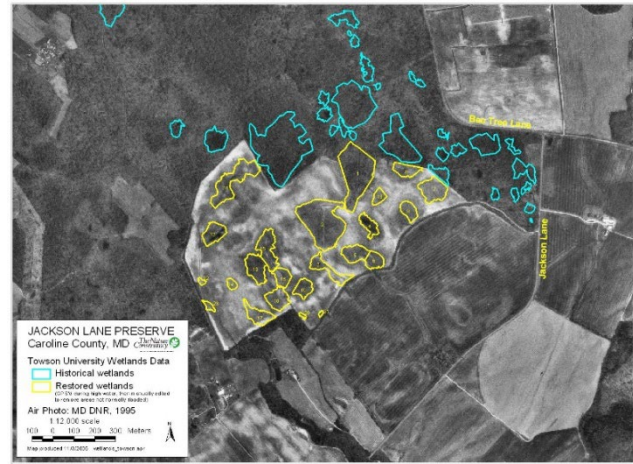
When Europeans first settled on the Eastern Shore of Maryland, they encountered a pre-Columbian landscape of the eastern deciduous forest dotted with shallow, freshwater wetlands. To convert the land for crops, they had to cut down the trees and drain the water off the land. Little of this former habitat remains on the Eastern Shore, yet we now realize the value of seasonal wetlands, called Delmarva bays, for their ecosystem services, such as floodwater retention following storms, nutrient and pollutant retention, habitat for endangered wildlife and plants, and carbon sequestration to mitigate greenhouse gas emissions. Here is an opportunity for undergraduates to actively experience the restoration of Delmarva bays at the Nature Conservancy's Jackson Lane Preserve, and to determine the change that occurred over 22 years, from tilled corn fields to a young forest, dotted with created, restored, and preserved wetlands. Here, we return to the philosophy of Aldo Leopold for the need to a "land ethic," to utilize the land for needed agriculture while co-existing with nature.

During Spring Semester, 2025, and through research credits in BSCI 389, Dr. Bill Lamp is assembling a team of undergraduates to collaborate towards the design and implementation of a 2025 research project to evaluate the change in the macroinvertebrate communities 22 years after wetland restoration. Similar studies were completed just after restoration (2004-2006,

Culler et al. 2014) and again 9 years after restoration (2012, Spadaphora et al. 2016). The class can be taken as either a one or two credit course.

For one credit of BSCI 389, the class will meet on Monday afternoons for a 50-minutes to:

- Read and discover the history of conservation, preservation, and restoration in the US,
- Learn the background on the Jackson Lane Preserve including the restoration process and previous research by the Lamp Lab,
- Understand the wetland ecosystem structure and function as well as the role of macroinvertebrates in the food web, and
- Collaborate to develop a research proposal to evaluate change in the macroinvertebrate community through time after restoration.



Aerial photo from 1995 of the Jackson Lane Preserve. Blue denotes borders of natural wetlands, whereas yellow denotes created wetlands after 2003.

Guest speakers and open discussions will complement Dr. Lamp’s lectures. All Monday meetings will employ a seminar-style format to encourage discussion.

For the optional second credit for the course, a lab/field trip portion is available (although attendance of field trips is encouraged for all students registered for the course). For 7 selected weeks, a 2-hour lab allows exposure to family level identification of wetland macroinvertebrates, as well as an overview of the ecological roles and life histories of key groups. In addition, each student will follow succession in a “hay infusion”, documenting the community change in a quart jar, powered by decomposing vegetation. Field trips (one during each month of March, April, and possibly May) will use the research protocol defined in our proposal to collect macroinvertebrates as well as data on the physical and chemical conditions of the wetlands. The course concludes with an evaluation of our experience and planning for research that will occur during June, July, and August.



Top, the natural bay called JLL. Bottom, Veronica Yurchak collecting macroinvertebrates from JLL, June 2012.

Delmarva Bays

Delmarva bays are unique wetlands on the Atlantic coastal plain, especially on the Delmarva Peninsula. Thought to be remnants of an extensive sand dune system that developed during the Pleistocene Era, 2.6M-11,700 years ago, they once numbered in the thousands, perhaps over 10,000. They have been largely drained or filled for agriculture and development, leaving them uncommon and often on protected land. They are usually seasonal, filling in the late fall/winter and drying in the summer, following the height of the water table. They are often acidic and bog-like, and are relatively dystrophic. Unusual plants and animals inhabit the bays, and because they are often fishless, invertebrates tend to be the major predators in the ecosystem. A visit to a Delmarva bay is a memorable experience, feeling like a discovery of a hidden freshwater habitat.



Isopods like this one are very common in the natural bays and an indicator of restoration in new wetlands.

Instructor

Dr. Bill Lamp (he, him, his), Professor, Department of Entomology, lamp@umd.edu

Teaching Assistant

Shane Windsor, Faculty Research Assistant and Data Manager, Lamp Lab.
windsor@umd.edu

Learning Outcomes

After successfully completing this course you will be able to:

1. Understand the historical context of conservation, preservation, and restoration of wildlife and plants, leading to current efforts in ecological restoration in the US.
2. Relate wetland ecosystem structure and function to restoration efforts.
3. Describe the history of the Jackson Lane Preserve through lectures, guest speakers, and reading original research articles.
4. Apply collaboration skills towards the development of a research proposal on the evaluation of wetland restoration practices.
5. (with two credits) Execute a wetland restoration research project, including sampling and identifying invertebrates, as well as collecting associated physical and chemical data.

Credit and Location

Students can register for either 1 or 2 credits. One credit is for students with limited time in their schedules but can fit the 50-minute lecture in their schedule. Two credits are for students with the ability to add the 2-hour lab sessions to their schedule, along with the 2-3 full day field trips to Jackson Lane Preserve. While the field trips are scheduled based on weather and student schedules, the lectures and lab sessions are held in PLS 1161, the Entomology Teaching Lab:

Lectures on Mondays, 2:00-2:50

Lab sessions on Mondays, 3:00-5:00

Prerequisite

Permission of the instructor. Please complete the separate questionnaire to request permission. Submit it to Dr. Bill Lamp at lamp@umd.edu.



Required Resources

Boots and Safety for Field Trips. IF YOU HAVE BARE FEET, OR ONLY WEAR FLIP-FLOPS, YOU WILL NOT BE ALLOWED TO ENTER THE WATER. Generally, hip boots or waders are best when collecting specimens in these wetlands during field trips. They may be purchased online or locally at Walmart, Dick's, Bass Pro Shop, and other sporting goods stores. Old tennis shoes, Keene's, or other water shoes are acceptable along the edge of wetlands, but not practical for collecting away from the shoreline. During the first lab, we will discuss the need for boots and options for purchase.

The field trip sites are generally safe places to collect invertebrates. We will inform you about safety. Also, it is not safe to expose open wounds to freshwaters. If you have an open cut, you should not get into the water. If you are cut during a field trip, inform the TA immediately for care. The TA will have a first aid kit available in case of minor injuries.

Website. The course website is accessed through <https://elms.umd.edu>. The site includes the syllabus, course schedule, handouts, lecture materials, assignments, pictures from field trips, and other information. Use the "Modules" tab to find lecture notes, resources, assignments, field trip and lab information, etc.

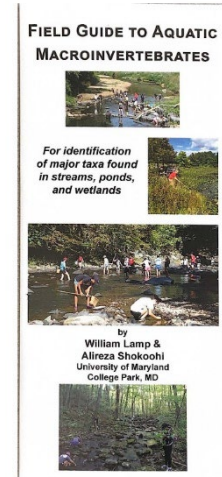


Sampling of newly created wetlands at Jackson Lane Preserve, 2004.

Texts. The only required text for purchase is: “Wild by Design - The Rise of Ecological Restoration”, by Laura J. Martin, 2022. During January, 2025, the price on amazon is \$23 for paperback or \$22 on Kindle. The “Field Guide to Aquatic Macroinvertebrates” will be provided during the first lab and will be useful to identify the higher taxa of what we collect. Other texts will be made available for your use during the class. Articles related to restoration will be provided to you via the website.

Grading

Grades are determined by attendance, engagement, and participation in the course as determined by the TA and Dr. Lamp. Mid-semester grades will be provided unofficially.



Inclement Weather

In case of emergency closure of the College Park campus on a Monday afternoon, lecture and lab will be cancelled. Missed lectures may be replaced by online assignments as described in an email to each of you. A missed lab may be rescheduled for a Monday after Spring Break.

General Reference Books

- Batzer, D.P., and R.R. Sharitz (eds). 2006. *Ecology of Freshwater and Estuarine Wetlands*. University of California Press, Berkeley, CA.
- Bronmark, C., and L.A. Hansson. 1998. *The Biology of Lakes and Ponds: Biology of Habitats*. Oxford University Press Inc., New York.
- Brigham, A.R., W.U. Brigham, and A. Gnilka (eds). 1982. *Aquatic Insects and Oligochaetes of North and South Carolina*. Midwest Aquatic Enterprises, Mahomet, Illinois.
- Closs, G., B. Downes, and A. Boulton. 2004. *Freshwater Ecology*. Blackwell Scientific Publ., UK.
- Colburn, E.A. 2004. *Vernal Pools: Natural History and Conservation*. McDonald & Woodward Publishing Company, Blacksburg, VA.
- Cole, G.A. 1994. *Textbook of Limnology*, 4th ed. Waveland Press, Prospect Heights, Illinois.

- Dodds, W.K., and M.R. Whiles. 2010. *Freshwater Ecology: Concepts and Environmental Applications of Limnology* (2nd ed.). New York, NY: Academic Press.
- Holland, M.M., E.R. Blood, and L.R. Shaffer (eds.). 2003. *Achieving Sustainable Freshwater Systems: A Web of Connections*. Island Press, Washington, D.C.
- Hooks, D.D. (ed.). 1988. *The Ecology and Management of Wetlands: Ecology of Wetlands* (Vol. 1). Timber Press, Portland, OR.
- Keddy, P.A. 2000. *Wetland Ecology Principles and Conservation: Cambridge Studies in Ecology*. Cambridge University Press, New York.
- Lancaster, J., and B.J. Downes. 2013. *Aquatic Entomology*. Oxford Press, UK.
- Mackie, G. 2004. *Applied Aquatic Ecosystem Concepts* (2nd ed.). Kendall/Hunt Publishing Company, Dubuque, IA.
- Maitland, P.S. 1990. *Biology of Fresh Waters*, 2nd edition. Chapman and Hall, New York.
- McCafferty, W.P. 1983. *Aquatic Entomology*. Jones and Bartlett Pubs., Sudbury, Massachusetts.
- Peckarsky, B.L., P.R. Fraissinet, M.A. Penton, and D.J. Conklin, Jr. 1990. *Freshwater Macroinvertebrates of Northeastern North America*. Cornell University Press, Ithaca, New York.
- Pielou, E.C. 1998. *Fresh Water*. University of Chicago Press, Chicago.
- Rydin, H., and J. Jeglum. 2006. *The Biology of Peatlands: Biology of Habitats*. Oxford University Press Inc., New York.
- Silk, N., and K. Ciruna (eds.). 2004. *A Practitioner's Guide to Freshwater Biodiversity Conservation*. Washington, DC: Island Press, Washington, D.C.
- Thorp, J.H., and A.P. Covich (eds.). 1991. *Ecology and Classification of North American Freshwater Invertebrates*. Academic Press, New York.
- Thorp, J.H., and D.C. Rogers. 2011. *Field Guide to Freshwater Invertebrates of North America*. Academic Press, New York.
- Van der Valk, A.G. 2006. *The Biology of Freshwater Wetlands: Biology of Habitats*. New York, NY: Oxford University Press Inc.
- Voshell, J.R., Jr. 2002. *A Guide to Common Freshwater Invertebrates of North America*. McDonald & Woodward Publishing Company, Granville, OH.
- Ward, J.V. 1992. *Aquatic Insect Ecology. I. Biology and Habitat*. John Wiley, New York.
- Wetzel, R.G. 2001. *Limnology: Lake and River Ecosystems* (3rd ed.). San Diego, CA: Academic Press.
- Williams, D.D., and B.W. Feltmate. 1992. *Aquatic Insects*. CAB International, Wallingford, United Kingdom.
- Williams, D.D. 2006. *The Biology of Temporary Waters*. Oxford University Press Inc., New York.