

**Option in Environmental Studies**  
**Why do environmental studies in the**  
**Department of Geography at**  
**Millersville University of Pennsylvania?**



**Why in a geography department?**

Many are surprised that colleges offer Geography as a major and that the discipline has an environmental emphasis. In short, geographic traditions have emphasized *People, Places, and Environments*. What is particularly valuable about studying the environment in a geography department is the breadth of environmental courses covered, and the emphasis on relationships that occur between sectors of the environment. For example, we might look at interrelationships between topography, soils, climate, ecology, and human activities to derive a holistic view of the environment. Of course, we also add the geographical and regional approach to our studies of people, places and environments. Highly valued geographical skills such as map interpretation, computer mapping, and geographical information systems greatly enhance job opportunities for students. Students also have a chance to couple their interest in the environment with other geographic topics such as international studies, urban and regional planning, transportation, issues in globalization, and geographic techniques. In addition to Environmental Studies, the Geography Department offers curricular options in Geospatial Applications and Global Studies.

**Professors**

Geography department professors at MU are dedicated professionals who are passionate about the environment and working with students to explore possibilities for our future. They have dedicated much of their early career to doing intensive study and research in their respective specialties to learn the underpinnings of effective environmental management so to share their experiences with the next generation--their students. They also seek to advance knowledge in their specialties through continuing research and publication. Example MU Geography research includes relationships between weather, land use, Lancaster stream water quality and the environmental health of the Chesapeake Bay; air pollution and visibility impairment in the Grand Canyon; and assessment of gender, land tenure insecurity and forest cover change in El Salvador.

Faculty efforts focus on education. Unlike some institutions, MU's number one priority is education, and our professors are the ones actually teaching in the classroom. All our professors have Ph.D.s and have been trained at highly respected institutions in their specialties. Our newest faculty member, Jessica Kelly, has completed all the coursework for a Ph.D., and is presently finishing her doctoral dissertation.

The program is known for both its breadth and depth. Environmental specialties of faculty include Climatology, Air Quality, Biogeography and Ecology, Water Resources Management, Energy Issues, Environmental Ethics, Environmental Policy, Environmental Techniques, and Environmental Impact Assessment.

**Courses**

The MU Geography/Environmental Studies curriculum includes courses which are synthetic in nature and lay a foundation for the understanding and critical analysis of key environmental problems and their management. They incorporate student participation, hands-on activities, and both online and outdoor field experiences.

Introductory courses include studies of the physical and biological operations of our world, and how humans interact with each other and their environment to shape unique places. The foundation environmental course is *Geography 202: Resources and the Environment*. The course first explores concepts of sustainability, environmental ethics, resource consumption, and human population growth. Human use and management of the natural resource base are then critically examined, including for soil, land, water, forest, wildlife, air and climate components. Students do an environmental evaluation for a site of their choosing using online environmental data bases and site visits, and apply management techniques learned in class. Beyond the introductory level, students select various environmental topics for in-depth study, including climate change, ecology, energy, water resources, environmental policy, and environmental impact assessment. A listing of curricular requirements with course options is found at

[http://www.millersville.edu/~advisement/majors/ba\\_geog\\_env\\_drq.pdf](http://www.millersville.edu/~advisement/majors/ba_geog_env_drq.pdf).

### **Field work and travel**

Field work is common in the environmental studies classes. In addition to the site-specific example above, students perform:

- ecological inventories of specific contrasting environments;
- analysis of community characteristics of various forest environments;
- physical, chemical, and biological assessments of stream water quality;
- wetland determination;
- analysis of human modifications to environment on local micrometeorology;
- site visits to hydroelectric and nuclear power plant facilities.

Many of the field projects have been performed in service learning projects to the local community, including Pfizer Pharmaceuticals (stream restoration project), Lancaster County Conservancy (biotic evaluations of newly acquired lands), and several elementary schools (analysis of school stream on Environment Day).



Students gain experience using field equipment such as soil augers, psychrometers, anemometers, GPS units, LaMotte water quality test kits, kick-nets for stream macroinvertebrate collection, water quality probes, and Stroud Stream Ecology Leaf Pack Kits. In addition, students gain experience using a wide variety of environmental data resources.

Other field opportunities are available as part of other courses in related programs, student research, and various travel-related programs at or affiliated with MU. For example, College Study Tours offers a travel study on the ecology and conservation of Costa Rica. The Council on International Educational Exchange offers two Sustainability and Environment Programs—one in Australia and one Costa Rica. These courses are accepted for credit at MU. The PA State System of Higher Education routinely offers study abroad. Recent student trips have been to China and South Africa. Some trips also offer work experiences abroad.

### **Hands-on exercises and activities**

Hands on exercises are a key component of learning in the environmental program, as students apply the techniques they learn while further developing their analytic and critical thinking skills. A few examples include:

- Habitat fragmentation impacts on song bird population and wood turtle dispersal
- Using GIS for mapping and analyzing distributions for reserve design
- Island Biogeography: How park size and condition affect the number of species protected
- Greenhouse gas emissions inventories: Calculating the climate impact of Millersville University
- Protecting our water supply: Meeting groundwater recharge regulations in a suburban development project
- Designing energy-efficient buildings with climate in mind
- Determining air pollution dispersal to protect an environmentally sensitive area
- Using National Wildlife Service Habitat Evaluation Procedures to measure the wildlife impact of a construction project
- Using the mass-balance approach to calculate water pollution from power plant cooling operations
- Using geographic, economic, political, and social criteria to evaluate current and proposed environmental policy
- Actively participating in the environmental policy formation process by attending local and state meetings
- Managing a fishery to reveal the challenges presented by common property resources

### **Techniques**

High-demand technical skills are emphasized throughout the environmental curriculum. These include:

- Basics of computer use: word processing, spreadsheet data analysis and graphing, using the World Wide Web skillfully and for specific applications.
- Exposure to and use of environmental models (air, water, habitat, climate).
- Geographic skills: cartography, computer mapping, geographic information systems, and remote sensing.

### **Co-ops and Internships**

All environmental geography students are required to either do environmental research or take an environmental co-op. Past student coops have been with the PA Department of Environmental Protection, individual county conservancies, private environmental consulting firms, nature centers, state parks, PA Agricultural Preserve Board, Lancaster Farmland Trust, Lancaster Planning Commission, Fort Indiantown Gap (endangered species management), Land Studies (stream restoration) and the Nature Conservancy, among other agencies.

## **Research**

Students may also elect to do environmental research under the advisement of a faculty member. Recent student projects have focused on impact of Lancaster land use on the health of the Chesapeake Bay, on the progress of clean up of the Chesapeake Bay, and consumer attitudes and the use of PET and paper bags.

## **Environmental minors**

All geography majors are required to take a minor, many of which are environmental in nature. This provides further options for developing specialties. Choices include Environmental Hazards and Emergency Management, Environmental Policy & Regulation, Industrial & Environmental Health, Land Use, Quantitative Methods in Environmental Science, and Water Resources. Other good choices include Biology; Geology; Meteorology; Oceanography; Earth Science; Criminology (park management); Government & Political Affairs; International Studies; and Print Media Studies (environmental journalism).

## **Environmentally-related MU initiatives**

Today is a great time to study environmental issues at MU. MU is presently in the midst of a study of the campus environment, examining its own ecological footprint. Under the directive of the university president, campus environmental professionals and students will be working together toward creating a sustainable campus. The experience should provide students hands-on opportunities to apply their gained knowledge and skills in helping design a working model of sustainability.

Similarly, the geography department is presently completing a campus greenhouse gas emission inventory, and will use the information to propose effective mitigation strategies to reduce the university's climate impact. Local communities have shown an interest in having faculty and students apply these assessments to their areas.

Millersville University houses the MU Center for Environmental Sciences. The Center provides environmental outreach for the local and regional communities, providing environmental research services, speakers for community events and school activities, and community environmental education programs. For example, it hosted the conference *Environmental Stewardship for Home, Farm, Business, and Community*. Other environmental conferences are held on campus regularly, including the *Native Plants Conference*.

Millersville University also hosts an environmentally related, National Science Foundation funded, Research Experiences for Undergraduates program entitled *Watersheds: From River to Estuary: A Summer Research Experience for Undergraduates*. This program provides full-time fully paid summer student research experiences. Example research positions have included:

- The value and importance of floodplain restoration and Legacy Sediment removal
- Secondary Production on Freshwater Sponge Communities in Southeastern Pennsylvania
- An Historical Perspective on the Aquatic Fauna of Pennsylvania
- Streamside restoration: Impact of the meadow mouse *Microtus pennsylvanicus*, on tree sapling survival and proximal effects on avian community structure and diversity
- Impact of Land Use and Precipitation Events on Stream Nitrate Concentrations, Lancaster, Pennsylvania



## **Student activities**

Millersville University is home to a variety of student clubs, some with environmental themes. The following groups promote academic travel, outdoor fun events, and/or environmental service activities. Join one or more; they are open to all students.

- Local chapter of American Meteorological Society
- Conestoga Club
- Priority
- Geography Club
- Geology Club (with extensive US travel funded by MU)
- Gamma Theta Upsilon Geography Honor Society



**Accompanying General Education program**

One aspect of academic training at Millersville University is the development of academic expertise in the major and minor fields. MU also requires completion of a general education program that is focused on development of critical thinking skills in a wide variety of disciplines. Students complete a number of courses in the humanities, social sciences, and natural sciences that not only introduce the concepts of the disciplines, but further the development of critical thinking, writing, and public speaking. These essential skills support the academic and professional growth of environmental professionals who will need to make reasoned judgments and communicate well in both public and academic settings.

**Educational value**

Millersville University has been identified by a number of sources as an educational value. It has been

- consistently ranked in the **top ten among public universities** in the entire northern part of the United States by U.S. News & World Report
- **rated as a best buy** in the past by Money magazine
- nationally ranked in the **top 100 public universities** by Kiplinger's
- listed in **How to Get an Ivy League Education at a State University**
- consistently surpasses the other 13 State Universities in state benchmarks



**So where do our environmental geography students end up after graduation?**

**In a wide variety of careers! Examples:**

Brandywine Conservancy  
 Environmental Resources Management  
 International Technologies Corporation  
 Land Studies, Inc.  
 KCI Technologies, Inc.  
 Maui Forest Bird Recovery Project  
 Michael Baker Jr., Inc.  
 Lancaster County Agriculture Preserve Board  
 The Nature Conservancy  
 Office of the Federal Environmental Executive  
 PA Department of Conservation and Natural Resources  
 Purofirst of Conestoga Valley  
 Skelly & Loy, Inc.  
 The Center for Watershed Protection  
 The Wetlands Institute  
 Tru Green Chem Lawn  
 US Environmental, Inc.  
 US Dept. of Agriculture, Wildlife Services  
 Wisconsin Dept. of Natural Resources

GIS Technician  
 Ecologist  
 Scientist  
 Stream Restoration Specialist  
 Environmental Planner  
 Biologist/GIS Specialist  
 Floodplain Cartographer  
 Farmland Preservation Specialist  
 Conservation Information Assistant  
 Environmental Policy Analyst  
 Park Ranger  
 Water Mitigation Technician  
 Environmental Specialist  
 Environmental Analyst  
 Environmental Educator  
 Lawn Specialist  
 Environmental Health and Safety Coordinator  
 Wildlife Technician  
 Lake Water Quality Assessment Specialist

