Master of Science in Environmental Science and Policy

The University of Wisconsin-Green Bay's Environmental Science and Policy program is appropriate for students with interests in the scientific and/or public policy aspects of complex environmental problems. It provides a course of study that prepares its graduates for positions in scientific, technical and administrative organizations and agencies. The program's core focuses on identification and analysis of environmental issues and on developing interdisciplinary approaches and solutions to problems. The program offers three areas of emphasis: Ecosystems Studies, Environmental Technology and Analysis, and Environmental Policy and Administration.

Although the areas of emphasis seek to integrate the sciences with policy and administration, students choose to specialize in one area depending on future career interests. Each area of emphasis has a practical orientation that involves the student in real world problems and issues rather than presenting theoretical knowledge alone. Each area of emphasis allows for and encourages student flexibility in designing a particular program of study around a core of required courses. A personal program of study, as described below, may also be developed.

The program fits the needs of both part-time and full-time students. Many graduate courses are offered once weekly in the evening or at other times convenient for working individuals. Students benefit from the mix of perspectives and experiences held by participants in courses. Full-time students gain from the practical knowledge of the working professionals, who are in turn challenged by the current theoretical knowledge of those with recent undergraduate degrees. Students like the small class sizes and the close association with faculty. Fully prepared students usually complete the program in two years. Part-time students normally complete the program in three to five years.

The program features faculty that are widely published in the professional literature, active in externally funded research, and committed to excellence in teaching. The faculty associated with the program firmly believe that environmental policy must be based on good science but also that science is ineffective without sound policy decisions. Close ties exist with national, state and local agencies, providing students with opportunities to become engaged with and contribute to meaningful scientific research and policy formulation.

The University offers modern and well-equipped facilities that support research and study in environmental science and policy areas. Office and laboratory computers throughout campus enable access to advanced geographic information system (GIS), statistical and modeling software tools. Field sites available for research include five University-managed natural areas and a permanent UW-Green Bay forest research site in northern Wisconsin (Wabikon Forest Dynamics Plot) managed by the U.S. Forest Service as part of the Smithsonian Institution's Global Earth Observatory Network. UW-Green Bay researchers have established successful ongoing collaborations with regional government agencies and conservation organizations including the U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. National Parks Service, U.S. Environmental Protection Agency, Wisconsin Department of Natural Resources, The Nature Conservancy, Green Bay Metropolitan Sewerage District, as well as regional businesses and industries. The library collection is strong in all areas of environmental studies, but is particularly so in environmental policy and administration. The library provides easy access to most pertinent journals in science and public policy and administration. Interlibrary loans are easily available from UW-Madison and elsewhere when sources are not available locally.

Admission Requirements

Each student's prior academic background is evaluated by a program admissions committee when he or she applies. Admission to the Environmental Science and Policy graduate program requires a student to have completed the equivalent of a basic undergraduate course in statistics and submitted current GRE general test scores. Students with a background in both policy and science will be given preference in admission decisions.

Each area of emphasis requires different skills and preparation; therefore, additional prerequisites vary. Courses appropriate to the area of emphasis or needed to meet requisites of specific courses that a student wishes to incorporate into a plan of study will also be required as described below.

Applicants who do not meet these requirements may be admitted if their academic record, letters of reference, and GRE scores indicate potential for successful completion of the program. However, these students will have additional requirements placed upon them as part of their academic plan to make up any deficiencies.

Steps Toward the Degree

- The candidate is admitted to the ES&P graduate program.
- The student submits an *Official Declaration of Master's Degree* (GR-1 Form) to the Office of Graduate Studies no later than the end of the semester in which the first six graduate credits are completed. This confirms the student's area of emphasis in the program. If possible, he or she selects a major professor/thesis adviser.
- During the first or second semester after being admitted to the ES&P program the student selects a major professor/thesis adviser and starts to develop a thesis proposal.
- On or before the successful completion of twenty-one credits of course work, the student completes a thesis proposal. The proposal is reviewed by the thesis committee and, if approved, submitted to the Office of Graduate Studies, by the major professor, using the *Approval of Thesis or Project Proposal* (GR-2 Form).
- The student may then register for thesis credit (ENV S&P 799) and work on the thesis project.

- When the project and thesis document is nearly complete, the student schedules the thesis defense by completing the *Request for Thesis Defense/ Project Presentation* (GR-3 Form). For graduation in the fall and spring semesters, the thesis defense must be held before the last day of final exams in a given semester.
- The student files an *Application for Graduation* with the Registrar's Office through the Student Information System (SIS). The application must be completed and submitted to the Office of the Registrar prior to November 1 for fall semester graduates, and April 1 for spring and summer semester graduates.
- The scheduled thesis defense meeting takes place. Upon satisfactory completion of the thesis defense, the major professor files the *Approval of Thesis Defense or Project Presentation* (GR-4 Form) with the Office of Graduate Studies. The student then has 20 calendar days after the last day of final exams to submit their final thesis/project document to the Office of Graduate Studies and 42 calendar days after the last day of final exams for all other graduation requirements to be completed and verified.
- The final format of the thesis report is reviewed through the Office of Graduate Studies. Student submits to the Office of Graduate Studies the required number of thesis copies for final approval and deposition in University library.
- Degree is awarded and graduate receives diploma.

Thesis Requirement

Graduate Committee

It is important for Environmental Science and Policy students to select a thesis committee as early as possible. The program chair or an adviser for the student's degree program normally assists in this process. A thesis committee comprised of at least three members must be approved by the program chair. One member is requested by the student to act as the major professor, or chair, of the committee. That person must be a graduate faculty member of the student's degree program. Thesis committees must include at least two University of Wisconsin-Green Bay faculty members. Students are encouraged, but not required, to ask a person from outside the University to serve on their committees as the third member.

The thesis committee is responsible for supervising the student's program of study and should:

- guide the student in appropriate selection of graduate courses and specialization studies to ensure that the student is aware of all relevant materials necessary to completely understand the chosen field of study;
- determine whether the student has accumulated and demonstrated sufficient ability to engage in analytic processes of problem solving;
- make certain that the student's project is consistent with the degree, confronts the interdisciplinary relationships of the subject area, and focuses on problem solving methods.

If during the student's course of study, he or she wishes to change committee members or adviser, the student must explain why the change is necessary or desirable. If the change is acceptable to both outgoing and incoming professors, the student must notify the Office of Graduate Studies in writing.

Thesis Proposal

The thesis proposal is a formal document that provides an overview of the planned study. It must include an explanation of the research problem, issue, or situation to be addressed, its relevance or application, and the methods and resources that will be used in completing the project.

On or before the successful completion of twenty-one credits of course work, the student prepares the proposal, using the *Guidelines for Preparing the Proposal* provided by the Office of Graduate Studies. A copy of the *Guidelines* and *Approval of Thesis or Project Proposal* (GR-2 Form) are available on the Office of Graduate Studies website www.uwgb.edu/graduate . Once approved, a copy of the approved proposal and the signed GR-2 Form are sent to the Associate Provost for Academic Affairs/Director of Graduate Studies for final approval and inclusion in the student's official file.

Registration for Thesis Credit

Students may only register for thesis credits with an approved proposal on file. Enrollment for thesis credits may be for one to six credits per term and may be spread over several terms as appropriate. A student must be registered for a minimum of one thesis credit during the term in which a thesis defense is scheduled.

Thesis Document Preparation

The thesis is a formal document and must be prepared to conform to UW-Green Bay library requirements and graduate program standards. In preparing the thesis document, students should carefully follow the *Style and Format Requirements for the Master's of Science Thesis*. Copies of the guidelines and a copy of the completed *Approval of Thesis or Project Proposal* (GR-2 Form) are mailed to students along with notice of proposal approval. It is the student's responsibility to prepare and present the final document in an acceptable format. Several writers' guides and style manuals are commercially available. To prepare the professional project report, students should carefully follow the guidelines provided by respective course instructors.

Thesis Defense

The thesis defense is an open event attended by the candidate's graduate committee and other interested individuals. The defense permits the committee to ascertain whether the student has adequately understood and seriously attempted to solve a significant problem.

To schedule the thesis defense, the student must file the *Request for Thesis Defense/Project Presentation* (GR-3 Form) with the Office of Graduate Studies at least one week in advance of the proposed date. The thesis defense should be scheduled during one of the academic terms unless other specific arrangements are acceptable to all parties.

Prior to the thesis defense, the Office of Graduate Studies will provide *Approval of Thesis Defense or Project Presentation* (GR-4 Form) to the major professor. After a satisfactory defense, the major professor and committee members sign the form and return it to the Office of Graduate Studies. A dissenting signature must be accompanied by an explanation from the dissenting member. A candidate is considered to have passed his or her thesis defense only after all issues have been resolved and the completed GR-4 Form is returned to the Office of Graduate Studies.

Thesis Report Deposition

1. Upon satisfactory completion of the thesis defense, the candidate is required to supply two copies of his or her thesis, including two copies of any audio/visual components and one additional copy of a title page and abstract, to the Office of Graduate Studies. After the major professor signs the document, the Director of Graduate Studies reviews and signs it or returns the document for revision. Two copies of the final document are forwarded with a binding fee ($12 per copy, but subject to change), collected from the student, to the UW-Green Bay library as a permanent record of the student's scholarly or creative activity. If the candidate wishes, additional copies provided by the student may be bound at the same per copy fee, payable to UW-Green Bay. Diplomas are not awarded until all degree requirements are met. This includes certification by the Director of Graduate Studies that the thesis conforms to all UW-Green Bay library requirements and graduate program standard thesis defense meeting takes place. Upon satisfactory completion of the thesis defense, the major professor files the *Approval of Thesis Defense or Project Presentation* (GR-4 Form) with the Office of Graduate Studies. The student then has 20 calendar days after the last day of final exams to submit their final thesis/project document to the Office of Graduate Studies and 42 calendar days after the last day of final exams for all other graduation requirements to be completed and verified.
2. The final format of the thesis report is reviewed through the Office of Graduate Studies. Student submits to the Office of Graduate Studies the required number of thesis copies for final approval and deposition in University library.
3. Degree is awarded and graduate receives diploma.

One of the primary goals of the University of Wisconsin-Green Bay graduate program is to prepare highly skilled and imaginative individuals for management and policy-making positions in government, nonprofit organizations and the private sector. Individuals with such career objectives will focus on environmental policy course work. Another objective of the University of Wisconsin-Green Bay graduate program is to prepare technically competent and creative individuals for positions in the public or private sectors. Individuals with such career objectives will focus on environmental science course work. Students will be prepared to deal with a variety of environmental problems or to pursue further graduate work in similar or related areas.

Ecosystems Studies

- Students who select Ecosystems Studies may address problems of general features of ecosystems such as nutrient regeneration, productivity, or trophic relationships. They can also focus on specific questions such as endangered species, predation and competition. Natural, managed and disturbed ecosystems are examined in classroom and field activities. Studies on aquatic systems take advantage of the University's location on Green Bay, participation in the University of Wisconsin Sea Grant Program, and the Cofrin Center for Biodiversity. The University's proximity to large areas of northern forests and the Door Peninsula provides convenient locations for the study of diverse ecosystems.

Environmental Technology and Analysis

- Students who select this area of emphasis may study concepts of:
    - environmental modeling and remediation;
    - municipal, industrial, and agricultural waste transformation, utilization and disposal;
    - alternative energy systems and energy efficiency; or
    - chemical, biological and geological aspects of ground or surface water systems
- Emphasis is on evaluating alternative technologies and strategies for effective planning and policy implementation for the future. Principles and techniques of quantitative and qualitative analysis are applied to problems of supply, distribution and utilization of natural resources and to the optimization of treatment and management costs in the context of public agencies, consulting firms and industries.

  The Ecosystems Studies and Environmental Technology and Analysis areas of emphasis prepare students to:

    - design and conduct scientific investigations;
    - collect, evaluate, and interpret data;
    - make responsible decisions to implement appropriate technologies and strategies to solve environmental problems; and
    - effectively communicate the results of environmental studies to other scientists, decision makers and the general public.
    - Graduates typically work as scientists, environmental specialists, or project managers with industry, commercial laboratories, engineering firms, or government agencies, where their work involves analysis, research, consulting, compliance, or enforcement.

Environmental Policy and Administration

- Students who select Environmental Policy and Administration study the characteristics and operation of government institutions; organizational policy, design and evaluation; and substantive policies in regulation, environmental protection, science and technology, and energy and natural resources. Courses emphasize environmental problem analysis and planning, policy analysis and formulation, environmental law and implementation, program evaluation, statistical analysis and the application of social science research methods to environmental issues. Studies benefit from interaction with the Center for Public Affairs and the Cofrin Center for Biodiversity.

  The Environmental Policy and Administration area of emphasis prepares students to:

  - identify and analyze policy-relevant problems of major importance;
  - collect, assess, and interpret policy-relevant data;
  - design, evaluate, and implement strategies and programs for addressing such problems; and
  - effectively communicate the results of policy analyses and evaluations to diverse audiences, including environmental scientists, policy makers, and the general public.
- Graduates typically enter governmental agencies at the national, state or local level, or nonprofit organizations, where their work involves policy analysis, planning, or administration. Some prefer positions in legislative bodies, environmental organizations, or industry where administrative or analytical work is combined with politics, public relations, education or advocacy.

Degree Requirements

Students who are adequately prepared when they enter the program may earn the degree by satisfactorily completing a minimum of 28 credits of course work, plus a 6-credit thesis. Those who lack appropriate prerequisites may need to take additional courses to strengthen their backgrounds. Credits earned in undergraduate courses cannot be applied toward the graduate degree.

Credit requirements are determined by the student's chosen area of emphasis. All students must complete 18 credits of *General Core Requirements*, with remaining credits obtained from approved electives listed within each of the three official emphases, or from the development of an individual program plan with the assistance and approval of their graduate thesis committees, the ES&P Program Chair, and the Associate Provost for Academic Affairs and Director of Graduate Studies.

During the first or second semester, students should select a thesis adviser, form a committee and start to develop a thesis proposal with the committee's assistance. By the time students complete 21 credits, they should have completed their thesis proposals. Approval of the thesis proposal places the student in candidacy for the degree. Successful defense of the written thesis and completion of all courses in the student's program plan result in awarding of the degree.

General Core Requirements

All students matriculated into the Environmental Science and Policy program are required to successfully complete the following set of required core courses (12 credits) and a 6-credit thesis.

General Core Courses (4 credits)		4
ENV S&P 701	Perspectives in Environmental Science and Policy	
ENV S&P 763	Global Environmental Change & Sustainability	
Choose one of the following repeatable courses - complete 2 credits		2
ENV S&P 715	Seminar in Ecology and Evolution	
or ENV S&P 795	SPECIAL TOPICS	
Environmental Science		3
ENV S&P 740	Ecology and Management of Ecosystems	
or ENV S&P 767	Environmental Technology and Analysis	
Public Policy		3
ENV S&P 713	Environmental & Natural Resource Economics	
or ENV S&P 752	Environmental Policy and Administration	
Thesis - complete 6 credits		6
ENV S&P 799	Thesis	
Area of Emphasis		16
Select at least 16 credits unduplicated by the program core.		
Total Credits		34

Area of Emphasis Requirements

In addition to the general core requirements described above, students will select a program of study from one of the areas of emphasis described below. A fourth option is to develop a “personal program of study” more fitting to the career interest of the student.

Area of emphasis courses (credits are unduplicated by the program core):

- Ecosystems Studies, 16 credits
- Environmental Technology and Analysis, 16 credits
- Environmental Policy and Administration, 16 credits
- Personal Program of Study, 16 credits minimum

Some undergraduate courses are cross-listed as graduate courses and require only graduate status to enroll. It is strongly recommended that a student speak with the professor assigned to the course prior to enrolling to ensure that the student is adequately prepared to succeed in the course.

Personal programs of study must conform to Environmental Science and Policy program guidelines and be approved in advance by the student’s graduate thesis committee, the Environmental Science and Policy program chair, and the Associate Provost for Academic Affairs and Director of Graduate Studies. These programs must include the entire 18-credit program core requirements, at least one 3-4 credit quantitative course ENV S&P 755 or ENV S&P 760 and include a minimum of 34 total credits.

It is possible, even necessary depending on area requirements, that students will include one or two four-credit statistics courses in their academic program. In those cases, only seven credits would be needed in one semester which could be satisfied by ENV S&P 715 or ENV S&P 795, or an independent study or internship. If a regular course is selected, the academic program would include a total of 36 credits.

Ecosystems Studies (16 credits minimum)

Emphasis Prerequisites

Students who pursue the Ecosystems Studies area of emphasis are expected to have completed biology courses beyond introductory courses, typically the equivalent to a minor or major in biology (taken elsewhere or prior to entrance). These courses should include an ecology course.

Required Quantitative Course		4
ENV S&P 755	Environmental Data Analysis	
Choose one of the following required ecology courses:		3
ENV SCI 605	Aquatic Ecology	
ENV SCI 669	Conservation Biology	
ENV S&P 740	Ecology and Management of Ecosystems	
ENV S&P 743	Landscape Ecology	
ENV S&P 749	Wetland Ecology and Management	
Additional Courses - complete 9 credits		9
Choose any combination from the courses listed here or above.		
Biology:		
BIOLOGY 510	Plant Taxonomy	
BIOLOGY 511	Plant Physiology	
BIOLOGY 512	Mycology	
BIOLOGY 520	Field Botany	
BIOLOGY 542	Ornithology	
BIOLOGY 543	Mammalogy	
BIOLOGY 553	Invertebrate Biology	
BIOLOGY 555	Entomology	
BIOLOGY 602	Advanced Microbiology	
Environmental Science:		
ENV SCI 520	The Soil Environment	
ENV SCI 530	Hydrology	
ENV SCI 654	Remote Sensing and GIS	
Environmental Policy and Planning:		
PU EN AF 522	Environmental Planning	
PU EN AF 578	Environmental Law	
PU EN AF 580	Global Environmental Politics and Policy	

PU EN AF 615	Public and Nonprofit Budgeting
ENV S&P 713	Environmental & Natural Resource Economics
ENV S&P 752	Environmental Policy and Administration
Math and Statistics:	
ENV S&P 760	Social Research Methods
MATH 630	Design of Experiments
MATH 631	Multivariate Statistical Analysis
MATH 667	Applied Regression Analysis
Seminar and Special Topics (1-2 credits):	
ENV S&P 715	Seminar in Ecology and Evolution
ENV S&P 795	SPECIAL TOPICS
Total Credits	16

Environmental Technology and Analysis (16 credits minimum)

Required Quantitative Course		4
ENV S&P 755	Environmental Data Analysis	
Additional Courses - 12 credits		12
Choose any combination of the following courses listed below:		
Chemistry:		
CHEM 520	Thermodynamics and Kinetics	
CHEM 522	Therymodynamics and Kinetics Laboratory	
CHEM 530	Biochemistry	
CHEM 531	Biochemistry Laboratory	
CHEM 602	Advanced Organic Chemistry	
CHEM 603	Advanced Organic Chemistry Laboratory	
CHEM 613	Instrumental Analysis	
Environmental Science:		
ENV SCI 505	Environmental Systems	
ENV SCI 518	Pollution Control	
ENV SCI 520	The Soil Environment	
ENV SCI 523	Pollution Prevention	
ENV SCI 530	Hydrology	
ENV SCI 535	Water and Waste Water Treatment	
ENV SCI 615	Solar and Alternate Energy Systems	
ENV SCI 632	Hydrogeology	
ENV SCI 634	Environmental Chemistry	
ENV SCI 635	Environmental Chemistry Laboratory	
ENV SCI 654	Remote Sensing and GIS	
ENV SCI 660	Resource Management Strategy	
ENV S&P 724	Hazardous and Toxic Materials	
ENV S&P 733	Ground Water: Resources and Regulations	
ENV S&P 740	Ecology and Management of Ecosystems	
ENV S&P 767	Environmental Technology and Analysis	
Environmental Policy and Planning:		
PU EN AF 551	Water Resources Policy and Management	
PU EN AF 578	Environmental Law	
PU EN AF 580	Global Environmental Politics and Policy	
PU EN AF 615	Public and Nonprofit Budgeting	
ENV S&P 713	Environmental & Natural Resource Economics	
ENV S&P 752	Environmental Policy and Administration	
Math and Statistics:		
ENV S&P 760	Social Research Methods	

MATH 630	Design of Experiments
MATH 631	Multivariate Statistical Analysis
MATH 667	Applied Regression Analysis
Seminar and Special Topics:	
ENV S&P 715	Seminar in Ecology and Evolution
ENV S&P 795	SPECIAL TOPICS
Total Credits	16

Environmental Policy and Administration (16-18 credits minimum)

Emphasis Prerequisites

Students who pursue Environmental Policy and Administration come from a variety of undergraduate backgrounds such as economics, engineering, environmental planning, environmental policy, political science, public administration, sociology, or more traditional science disciplines. The appropriate undergraduate course preparation is dictated by the prerequisites for the courses to be included in a program of study and the thesis topic area. It would normally be expected that students would have the equivalent of one year of undergraduate course work in political science, public administration, or economics.

Required Courses - complete 6 credits:		9
ENV S&P 713	Environmental & Natural Resource Economics	
ENV S&P 752	Environmental Policy and Administration	
ENV S&P 760	Social Research Methods	
Administrative Organizations and Processes - complete 3 credits:		3
MANAGMNT 753	Organizational Theory and Behavior	
POL SCI 610	Intergovernmental Relations	
PU EN AF 514	Administrative Law	
PU EN AF 578	Environmental Law	
PU EN AF 615	Public and Nonprofit Budgeting	
Public Policy - choose 3 credits:		3
ECON 612	Economics of Sustainability	
ENV S&P 713	Environmental & Natural Resource Economics	
POL SCI 516	Congress: Politics and Policy	
PU EN AF 506	Regulatory Policy and Administration	
PU EN AF 522	Environmental Planning	
PU EN AF 551	Water Resources Policy and Management	
PU EN AF 578	Environmental Law	
PU EN AF 580	Global Environmental Politics and Policy	
PU EN AF 608	Public Policy Analysis	
Additional Courses		3
Select any combination from the courses listed here or above.		
Research Methods:		
ENV S&P 755	Environmental Data Analysis	
MATH 630	Design of Experiments	
MATH 631	Multivariate Statistical Analysis	
MATH 667	Applied Regression Analysis	
PU EN AF 653	Cost Benefit Analysis	
Environmental Science:		
ENV S&P 724	Hazardous and Toxic Materials	
ENV S&P 733	Ground Water: Resources and Regulations	
ENV S&P 740	Ecology and Management of Ecosystems	
ENV S&P 743	Landscape Ecology	
ENV S&P 767	Environmental Technology and Analysis	
ENV SCI 505	Environmental Systems	
ENV SCI 518	Pollution Control	
ENV SCI 523	Pollution Prevention	

ENV SCI 634	Environmental Chemistry
ENV SCI 635	Environmental Chemistry Laboratory
ENV SCI 660	Resource Management Strategy
Environmental Planning and Geographic Information Systems:	
PU EN AF 650	Advanced Geographic Information Systems
Seminar and Special Topics:	
ENV S&P 715	Seminar in Ecology and Evolution
ENV S&P 795	SPECIAL TOPICS
Total Credits	18

Faculty

Blaney, Dallas, Assistant Professor, Public and Environmental Affairs (Political Science). B.A. (2001) History, University of Colorado-Boulder; M.A. (2004), Ph.D. (2010) Political Science, Colorado State University.

Fields of interest: global environmental governance, global water politics, international political economy.

Caglar, Atife, Associate Professor, Natural and Applied Sciences (Mathematics). B.S. (1989), M.S. (1993) University of Ataturk (Turkey); M.S. (1998), Ph.D. (2002) University of Pittsburgh.

Fields of interest: numerical analysis, numerical solution of partial differential equations, computational fluid dynamics, industrial modeling, large-scale scientific computing.

Chen, Franklin, Associate Professor, Natural and Applied Sciences (Chemistry). B.A. (1970) National Taiwan University (Taiwan); Ph.D. (1977) Princeton University.

Fields of interest: organic contaminant remediation; rock erosion effects (tidal wave and bubble implosion effects on rock surfaces); mesoporous materials with gas phase contaminant adsorption properties; polymeric electrolytes with potential industrial applications; sonochemistry that may enhance catalytic ability.

Currier, Ryan, Assistant Professor, Natural and Applied Sciences (Geoscience). B.S. Geoscience, Michigan State University; M.A. and Ph.D. Magma Dynamics, Johns Hopkins University.

Fields of interest: transport phenomena of magma; magmatic ore formation; Antarctic geology.

Davis, Gregory J., Professor, Natural and Applied Sciences (Mathematics). B.S. (1981) UW-Green Bay; M.A. (1985), Ph.D. (1987) Northwestern.

Fields of interest: dynamical systems; mathematical modeling of biological and physical systems; cliff swallow-house sparrow species dynamics.

Dornbush, Mathew, Associate Professor, Natural and Applied Sciences (Biology). B.A. (1998) Augustana College; M.S. (2001), Ph.D. (2005) Iowa State University.

Fields of interest: soil ecology; plant-soil microbial interactions; soil microbial ecology; ecosystem carbon cycling; plant ecology; invasive species; restoration ecology.

Draney, Michael L., Professor, Natural and Applied Sciences (Biology). B.S. (1989) New Mexico State University; M.S. (1992), Ph.D. (1997) Univ. of Georgia.

Fields of interest: inventory, monitoring and assessment techniques for terrestrial and wetland invertebrates, taxonomy, and conservation of spiders and ground-dwelling arthropods.

Estevez, Jorge, Assistant Professor, Natural and Applied Sciences (Physics). B.S. (1999) Auburn University; M.S. (2002), Ph.D. (2009) University of Minnesota.

Fields of interest: computational chemical physics and molecular modeling; chemical reactions and molecular interactions relevant to the environment, industry, and human health; pollution prevention and remediation; renewable energy; alternative fuels; recycling; energy conservation; material science, biophysics.

Fermanich, Kevin J., Professor, Natural and Applied Sciences (Geoscience). B.S. (1985) UW-Stevens Point; M.S. (1988), Ph.D. (1995) UW-Madison.

Fields of interest: nonpoint pollution; soil management; watershed management, groundwater, contaminant fate and transport; vadose zone processes; community environmental monitoring.

Forsythe, Patrick S., Assistant Professor, Natural and Applied Sciences (Biology). B.S. (2000), M.S. (2003) Eastern Illinois University, Ph.D. (2010) Michigan State University.

Fields of interest: fisheries biology and ecology with emphasis on ecosystems of the Great Lakes region; mating systems and early life history dynamics of fishes; behavioral ecology and species interactions; population/community ecology; landscape ecology; conservation biology; dynamic evolutionary processes that lead to adaptation.

Furlong, Scott R., Professor, Public and Environmental Affairs (Political Science). B.A. (1985) St. Lawrence University; M.P.A. (1987), Ph.D. (1992) The American University.

Fields of interest: regulatory policy; environmental policy; legislative politics; administrative law; public policy and administration; research methods and interest group influence on the administrative rulemaking process.

Helpap, David, Assistant Professor, Public and Environmental Affairs (Political Science). B.S. (2006) Political Science, University of Wisconsin-Green Bay; M.A. (2008), Ph.D. (2012) Political Science, University of Wisconsin-Milwaukee.

Fields of interest: state and local government; urban politics; brownfield redevelopment; public management and budgeting; public policy

Howe, Robert W., Barbara Hauxhurst Cofrin Professor, Natural and Applied Sciences (Biology); Director, Cofrin Center for Biodiversity. B.S. (1974) Notre Dame; M.S. (1977), Ph.D. (1981) UW-Madison.

Fields of interest: terrestrial ecology and conservation biology; ecological indicators; bird population dynamics; population monitoring; landscape ecology; conservation design residential development; disease ecology; black bear ecology; evolutionary ecology.

Katers, John F., Professor, Natural and Applied Sciences (Engineering). B.S. (1991), M.S. (1993) UW-Green Bay; Ph.D. (1996) Marquette.

Fields of interest: waste management; recycling, pollution prevention, renewable energy, water and waste water treatment.

Luczaj, John, Associate Professor, Natural and Applied Sciences (Geoscience). B.S. (1993) University of Wisconsin-Oshkosh; M.S. (1995) University of Kansas; Ph.D. (2000) Johns Hopkins University.

Fields of interest: fluid inclusion in minerals; water-rock interaction in sedimentary rock; groundwater contamination; karst geology and hydrogeology; stratigraphy of Paleozoic sedimentary rocks.

Lyon, John M., Associate Professor, Natural and Applied Sciences (Chemistry). B.S. (1977) Lehigh; Ph.D. (1983) Rutgers.

Fields of interest: transition metal chemistry; catalytic hydrodeclorination reactions; reactions of transition metals in high oxidation states as oxygenation catalysts; photochemical energy conversion systems.

Marker, James C., Associate Professor, Human Biology (Exercise Physiology). B.S. (1979) Weber State University; M.S. (1981) Utah State University; Ph.D. (1985) Brigham Young University; Post-Doctoral Fellow (1985-88) Washington State University of Medicine.

Fields of interest: exercise physiology/endocrinology; the role/response of hormones during exercise; metabolic responses to exercise and exercise training; adaptions to exercise training in the elderly; the role of the sympathoadrenal system and glucose counter-regulatory system during exercise; exercise/muscle physiology; exercise testing and prescription; kinesiology.

Meinhardt, Daniel J., Associate Professor, Human Biology (Biology). B.S. (1992) Southern Illinois University; Ph.D. (2002) University of Kansas.

Fields of interest: evolution and development of invertebrates; the role of development in evolutionary explanation; history and philosophy of evolutionary biology.

Meyer, Steven J., Associate Professor, Natural and Applied Sciences (Geoscience). B.S. (1983) Northern Illinois; M.S. (1986), Ph.D. (1990) University of Nebraska.

Fields of interest: climate change; the effects of climate change on natural resources; climate related decision making; long-range climate outlooks and their uses; science education.

Parrillo, Adam J., Assistant Professor, Urban and Regional Studies (Geography). B.S. (2000), M.A. (2003), Ph.D. (2009) University of Cincinnati.

Fields of interest: applications of geographic information systems; urban economic and social development, popular media and society, neoliberalism in society, development in lesser developed regions.

Phoenix, Laurel, Associate Professor, Public and Environmental Affairs (Planning). B.S. (1992), M.S. (1994) Colorado at Boulder; Ph.D. (2001) SUNY College of Environmental Science and Forestry.

Fields of interest: water resources management; drinking water quality; anti-environmentalism; water and waste water infrastructure; rural environmental planning.

Raheem, Enayetur, Assistant Professor, Natural and Applied Sciences (Statistics). BSc (1998), MSc (1999) Applied Statistics, University of Dhaka (Bangladesh); MSc (2005) Statistics, McMaster University (Canada); Ph.D. (2012) Statistics, University of Windsor (Canada).

Fields of interest: predictive modeling; Bayesian and MCMC methods; application of statistical methods in public health and epidemiology; spatial analysis of environmental and health data; high-dimensional data analysis; statistical genetics; meta analysis.

Stoll, John R., Professor, Public and Environmental Affairs (Economics). B.S. (1973) UW-Green Bay; M.S. (1977), Ph.D. (1980) Kentucky.

Fields of interest: natural resource and environmental economics; quantitative methods; nonmarket valuation methodology; economics of recreation and leisure; cost-benefit analysis, regional economics, fisheries economics, value of nonconsumptive resource usage.

Terry, Patricia A., Professor, Natural and Applied Sciences (Engineering). B.S. (1989), M.S. (1991) Texas-Austin; Ph.D. (1995) University of Colorado-Boulder.

Fields of interest: general water remediation; environmental separations; ion exchange processes; removal of heavy metals, chromates, phosphates, and nitrates from water.

Wheat, Elizabeth, Assistant Professor, Public and Environmental Affairs (Political Science). B.A. (2002) Psychology, Alma College; M.P.A. (2004) Comparative Environmental Policy, Indiana University; Ph.D. (2013) Political Science, Western Michigan University.

Fields of interest: environmental law, environmental justice, civil rights, wildlife smuggling, international organizations.

Wolf, Amy, Associate Professor, Natural and Applied Sciences (Ecology). B.S. (1989), M.S. (1993) UW-Green Bay; Ph.D. (1998) University of California-Davis.

Fields of interest: conservation biology, plant-animal interactions, restoration ecology, plant population ecology, ornithology; pollination ecology of rare plants, butterfly conservation and monitoring, population genetics of rare plants, invasive wetland plants, conservation of native bees.

Zorn, Michael E., Professor, Natural and Applied Sciences (Chemistry). B.S. (1993) UW-Green Bay; Ph.D. (1997) UW-Madison.

Fields of interest: development of photocatalytic and catalytic methods for degradation of environmentally relevant compounds; development of enhancement of experimental methods (including sensors) for the analysis of environmental samples.

Emeriti Faculty

Day, Harold Jack, Professor, Natural and Applied Sciences (Engineering). B.S. (1952), M.S. (1953), Ph.D. (1963) UW-Madison.

Fields of interest: water resources, fluid mechanics, hydrology and related applications of engineering to society and technology; regional water quality and associated land management and flood plain management; resource management.

Harris, Hallet J., Professor, Natural and Applied Sciences (Biology). B.A. (1961) Coe College; M.S. (1965), Ph.D. (1966) Iowa State.

Fields of interest: animal and wetland ecology; management of coastal areas; wildlife management; ecological risk assessment.

Kraft, Michael E., Herbert Fisk Johnson Professor, Public and Environmental Affairs (Political Science). B.A. (1966) UC-Riverside; M.A. (1967), Ph.D. (1973) Yale.

Fields of interest: American politics and government; public policy analysis; Congress; environmental policy and politics in the U.S.; sustainable communities; politics of nuclear waste disposal; business and environmental policy; environmental information disclosure.

Moran, Joseph M., Professor, Natural and Applied Sciences (Earth Science). B.A. (1965), M.S. (1967) Boston College; Ph.D. (1972) UW-Madison.

Fields of interest: nature of climatic change, air pollution meteorology; applications of paleoclimatic reconstruction techniques to Glacial-age evidence; environmental implications of current climatic changes; quaternary climatology; geology.

Niedzwiedz, William R., Professor, Public and Environmental Affairs (Geography). B.S. (1969), M.S. (1972) Massachusetts; Ph.D. (1981) Virginia Polytechnic.

Fields of interest: geographic information systems; aerial photo interpretation; coastal management; conservation design of landscapes; environmental impact.

Sager, Paul E., Professor, Natural and Applied Sciences (Biology). B.S. (1959) Michigan; M.S. (1963), Ph.D. (1967) UW-Madison.

Fields of interest: ecology of aquatic communities including nutrient studies in the phytoplankton of freshwater lakes; eutrophication of lakes; ecological effects of nutrient enrichment and water quality deterioration; limnology.

Scheberle, Denise L., Professor, Public and Environmental Affairs (Political Science). B.S. (1982), M.P.A. (1984) University of Wyoming; Ph.D. (1991) Colorado State University.

Fields of interest: environmental policy and law; policy implementation and formation; federal-state relationships in environmental programs; public administration; intergovernmental relations; public policy.

Stieglitz, Ronald D., Professor, Natural and Applied Sciences (Earth Science-Geology). B.S. (1963) UW-Milwaukee; M.S. (1967), Ph.D. (1970) Illinois.

Fields of interest: environmental geology; stratigraphic analysis; sedimentary geology; applications of geology to land use problems; ground water resources.

Wenger, Robert B., Professor, Natural and Applied Sciences (Mathematics). B.S. (1958) Eastern Mennonite; M.A. (1962) Pennsylvania State; Ph.D. (1969) Pittsburgh.

Fields of interest: application of mathematical models to environmental problems such as solid waste management and water quality management; ecosystem risk assessment and graph-theoretic approaches to the study of ecosystem stressors.

Adjunct Faculty

Katz, Chris, Adjunct Assistant Professor, (Veterinary Medicine). B.S. (1977), D.V.M. (1981) Iowa State.

Fields of interest: Black Bear research, wildlife and exotic pet medicine, wildlife anesthetization for research.

Medland, Vicki, Associate Director, Cofrin Center for Biodiversity (Biology). B.S. (1984) UW-Madison; M.S. (1989) New Mexico State University; Ph.D. (1997) University of Georgia.

Fields of interest: wetland ecology, evolutionary and behavioral ecology of aquatic invertebrate and zooplankton.

Reed, Tara, Adjunct Associate Professor, Natural and Applied Sciences (Biology). B.A. (1980) Whitworth; M.S. (1995) Oregon State; Ph.D. (1999) UW-Madison.

Fields of interest: impacts of anthropogenic activities and exotic invasions on aquatic ecosystem; changes in the Green Bay ecosystem following zebra mussel invasion; evaluating the changes in macroinvertebrate community structure downstream following dam removal.

Robertson, Dale, Adjunct Associate Professor, U.S. Geological Survey (Hydrology). B.S. (1981) St. Norbert College; M.S. (1984), Ph.D. (1989) UW-Madison.

Fields of interest: physical limnology; water-quality modeling; influence of environmental factors, watershed management strategies, and in-lake management alternatives on the water quality rivers and lakes; ice as climatic indicators; effects of artificial destratification; regional loading estimates; meteorological and lake physical measurements; air-water interactions.

Robinson, Patrick, Co-Director & Environmental Studies Specialist, UWEX Environmental Resources Center; Affiliate Cofrin Center for Biodiversity. B.S. (1994), M.S. (1996) UW-Green Bay; Ph.D. (2011) UW-Madison

Fields of interest: fresh water estuaries, wetlands, integration of social science into ecological research and management.

Yingst, R. Aileen, Director, Wisconsin Space Grant Consortium (Earth Science-Geology). A.B. (1991) Dartmouth College; M.S. (1995), Ph.D. (1998) Brown University.

Fields of interest: volcanology, geomorphology, planetary geology, spectroscopy, other remote sensing applications, and sedimentary clast morphology.

Courses

ENV S&P 701. Perspectives in Environmental Science and Policy. 1 Credit.
Introduces new Environmental Science & Policy graduate students to program requirements, expectations, resources, and faculty members.
P: gr st.

ENV S&P 708. Public Policy Analysis. 3 Credits.
A survey of public policy analysis methods and their role in the policymaking process, primarily in American government. Topics include: approaches to the study of public policy, policy formulation and adoption, methods for assessment of policy alternatives, ethics and policy analysis, policy implementation and evaluation, and the utilization of policy analysis in decision making.
P: gr st.
Fall Even.

ENV S&P 713. Environmental & Natural Resource Economics. 3 Credits.
Addresses public policy issues related to energy and other natural resources from the perspective of environmental economics. Topics include fossil energy, nuclear energy, solar and other alternative sources of energy; natural resources ranging from soil, water and minerals to wildlife, forests and parks.
P: gr st; REC: Pu En Af 608 and Env S&P 752.
Fall Even.

ENV S&P 715. Seminar in Ecology and Evolution. 1 Credit.
This graduate course provides a forum for discussion of contemporary ideas in ecology and evolution. Students and faculty discuss weekly readings in an informal atmosphere. Topics are chosen from the current scientific literature; examples from recent semesters include ecosystem stability, competition and coexistence, group selection, trophic dynamics, and complex species interactions.
P: gr st.
Fall and Spring.

ENV S&P 724. Hazardous and Toxic Materials. 3 Credits.
The handling, processing, and disposal of materials which have physical, chemical, and biological properties that present hazards to human, animal, and plant life; procedures for worker safety and for compliance with regulations. The metals and nonmetals, carcinogens, radioactive materials, and pathogenic human, animal, and plant wastes.
P: gr st.
Spring Odd.

ENV S&P 733. Ground Water: Resources and Regulations. 3 Credits.
An overview of the geology, properties, flow, and pollution of ground water systems. Techniques of aquifer characterization and water quality monitoring are introduced and evaluated. Regulatory and policy approaches to moderate use and ensure adequate high quality supplies of this valuable resource in the future are also reviewed.
P: gr st.
Fall Even.

ENV S&P 740. Ecology and Management of Ecosystems. 3 Credits.
This course addresses our current scientific understanding of ecosystems, and the application of this knowledge for the sustainable management of both human dominated and natural ecosystems and the biodiversity that they support.
P: gr st.
Spring Even.

ENV S&P 743. Landscape Ecology. 3 Credits.
Landscape ecology emphasizes spatial patterning and focuses on ecological dynamics over large regions. Concepts and methods will be studied through lectures, readings, discussions, and practical applications. Prior experience with specific computer programs not required.
P: gr st; REC: prior cse in ecological studies and statistics.
Spring Odd.

ENV S&P 749. Wetland Ecology and Management. 3 Credits.
Ecological processes and characteristics of wetlands such as primary productivity, hydrology, decomposition and nutrient dynamics are studied. Wetland classification and delineation systems are examined and applied in the field. Management practices and potential as well as current approaches to values assessment are addressed.
P: gr st.
Fall Even.

ENV S&P 752. Environmental Policy and Administration. 3 Credits.
The political and institutional aspects of environmental policy-making and implementation, including issues in environmental policy analysis. Emphasis is on national policy processes in the United States, but attention is given also to global and state and local environmental problems and public policy.
P: gr st.
Fall Odd.

ENV S&P 755. Environmental Data Analysis. 4 Credits.
This course emphasizes the principles of data analysis using the SAS (Statistical Analysis System) software package. It employs primarily environmental examples to illustrate procedures for elementary statistical analysis, regression analysis, analysis of variance and nonparametric analysis.
P: intro stats cse and grad st.
Fall Only.

ENV S&P 760. Social Research Methods. 3 Credits.
Theory and methods of research in the social sciences. Topics include the philosophy of science, research designs, data collection and program evaluation. Emphasis is on applied research.
P: gr st.
Fall Only.

ENV S&P 763. Global Environmental Change & Sustainability. 3 Credits.
Capstone course of the program in Environmental Science and Policy. This course provides an overview of contemporary topics in global environmental change from the local to global scale, with emphasis placed on scientific evidence, policy approaches, public attitudes, and sustainable solutions. Both policy and scientific aspects of the topics are addressed.
P: major in Ms Env Sci and grad earned cr > or = 12.
Spring.

ENV S&P 765. Environmental Modeling and Analysis. 4 Credits.
How and where mathematical models are used in real life environmental applications. Focus on discrete, continuous, and stochastic models. Students will create models and use them to analyze and interpret systems.
P: gr st and intro to stats, alg and trig.
Spring Even.

ENV S&P 767. Environmental Technology and Analysis. 3 Credits.
This course addresses our current scientific understanding of environmental remediation, waste transformation, utilization and disposal, as well as the chemical, biological and geological aspects of ground or surface water systems. Emphasis is on evaluating alternative technologies and strategies for generating ecologically sustainable systems.
P: enrollment in ES&P graduate program or instructor approval
Spring Odd.

ENV S&P 771. BEHAVIORAL TOXICOLOGY. 3 Credits.
P: gr st.

ENV S&P 775. ECOLOGY OF FOOD PRODUCTION. 3 Credits.
P: gr st.

ENV S&P 776. BIOCLIMATOLOGY. 3 Credits.
P: gr st.

ENV S&P 783. VARIABLE CONTENT. 1-4 Credits.
P: gr st.

ENV S&P 795. SPECIAL TOPICS. 1-3 Credits.
P: gr st.

ENV S&P 797. Internship. 1-6 Credits.
P: gr st.
Fall and Spring.

ENV S&P 798. Independent Study. 1-3 Credits.
P: gr st.
Fall and Spring.

ENV S&P 799. Thesis. 1-6 Credits.
P: gr st and thesis proposal on file.
Fall and Spring.