**Director**
L. David Smith, Professor of Biological Sciences

**Visiting Assistant Professor**
Ninian R. Stein

**Lecturer**
Julianne H. Busa

**Program Coordinator**
Anne Wibiralske

**Spatial Analysis Lab Coordinator**
Jon Caris

**Members of the Program Committee**
Elisabeth Armstrong, Associate Professor of the Study of Women and Gender
Donald Baumer, Professor of Government
Jesse Bellemare, Assistant Professor of Biological Sciences
Elliot Fratkin, Professor of Anthropology
Andrew Guswa, Professor of Engineering
Virginia Hayssen, Professor of Biological Sciences
Danielle Ignace, Assistant Professor of Biological Sciences
Leslie King, Associate Professor of Sociology
Robert Newton, Professor of Geosciences
Paulette Peckol, Professor of Biological Sciences
Jeffry Ramsey, Associate Professor of Philosophy
Amy Larson Rhodes, Associate Professor of Geosciences
Susan Stratton Sayre, Assistant Professor of Economics
L. David Smith, Professor of Biological Sciences
Gregory White, Professor of Government

**ENV 100 Environment and Sustainability: Notes from the Field**
This one-credit lecture series will introduce students to theory and practice in fields related to the environment and sustainability. Students will gain insight into how their liberal arts education and associated intellectual capacities are applied in a variety of contexts. Speakers, including distinguished alumnae, will be drawn from the Five Colleges, the Pioneer Valley, and beyond. This course can be repeated for credit. This course will end the week before Thanksgiving. Graded S/U only. (E) 1 credit
Paul Wetzel
Offered Fall 2013

**ENV 101 Environmental Integration I: Perspectives**
This course examines how humans have changed Earth's biosphere, atmosphere, hydrosphere and lithosphere, particularly over the last century, and the social, scientific, and political
challenges posed by these environmental alterations. We will reflect on how differing
worldviews have influenced our past actions and may determine our future trajectory. Readings
and discussions will examine scientific evidence, policies designed to improve the environment,
and national and international responses to the environmental crises that confront humanity.
Students will investigate strategies for mitigating damage, conserving resources, and restoring
natural function of the Earth. Enrollment limited to 60. \{H\} \{N\} \{S\} 4 credits
Amy Larson Rhodes, Ninian Stein
Offered Fall 2013

**ENV 150 Modeling Our World: An Introduction to Geographic Information Systems**
Same as GEO 150. A geographic information system (GIS) manages location-based (spatial)
information and provides the tools to display and analyze it. GIS provides the capabilities to link
databases and maps and to overlay, query, and visualize those databases in order to analyze and
solve problems in many diverse fields. This course provides an introduction to the fundamental
elements of GIS and connects course activities to GIS applications in landscape architecture,
urban and regional planning, archeology, flood management, sociology, coastal studies,
environmental health, oceanography, economics, disaster management, cultural anthropology,
and art history. Enrollment limited to 20. \{N\} 4 credits.
Jack Loveless
Offered Fall 2013

**ENV 201 Environmental Integration II: Collecting and Analyzing Information**
While focusing on topical environmental issues, students will learn how to gather, analyze and
present data using methods from the natural and social sciences. Data will be drawn from
multiple sources, including laboratory experiments, fieldwork, databases, archival sources,
surveys, and interviews. Emphasis will be on quantitative analysis. Environmental topics will
vary in scale from the local to the global. ENV 202 must be taken concurrently. Prerequisite: one
semester of statistics. ENV 101 is recommended. Enrollment limited to 18. Q \{N\} \{S\} 4 credits
Julianne Busa, Offered Fall 2013
Ninian R. Stein, Offered Spring 2014

**ENV 202 Environmental Integration II: Collecting and Analyzing Information Laboratory**
In this laboratory complement to ENV 201, students will use a variety of methods to gather and
analyze different types of environmental data (e.g., quantitative, qualitative, spatial). Enrollment
limited to 18. Q \{N\} \{S\} 1 credit
Julianne Busa, Offered Fall 2013
Ninian R. Stein, Offered Spring 2014

**ENV 222 Globalization, Food, and Environment**
Globalization has drastically altered the way that we interact with food, and we experience these
changes every time we sit down to eat. This interdisciplinary course will examine a myriad of
interrelated issues: the history and implementation of globalization; concepts of the “global
environment;” historical distributions of food and agriculture; and the environmental and social
effects arising from the global restructuring of our food system. Mirroring the topics of the
course, students will research a particular food, tracing its movements around the globe and
examining the political, social, and environmental impacts of their chosen food’s production and consumption. (E) {N} {S} 4 credits
Julianne Busa
Offered Spring 2014 (pending CAP approval)

ENV 311 Environmental Integration III: Interpreting and Communicating Information
This course focuses on the interpretation and communication of environmental issues and solutions from multi- and interdisciplinary perspectives. Using contemporaneous environmental topics as a foundation, this course introduces students to written, oral, visual, and quantitative communication for a variety of audiences and intents. Students will develop the ability to interpret environmental information from multiple sources, to synthesize that information for their own understanding, and to communicate that knowledge in ways appropriate to the particular objective and audience. A series of projects enable students to communicate an environmental issue of their own choosing to a diversity of audiences. ENV 101 and ENV 201/202 are strongly recommended. Enrollment limited to 25. {N} {S} 4 credits
Susan Stratton Sayre
Offered Fall 2013

ENV 312 Environmental Integration: IV: Sustainable Solutions
This course engages the class in a semester-long design and/or analysis project. Students will work in ad hoc teams using a variety of skills and knowledge to address a current issue or question related to environmental sustainability for our local community. The specific projects will vary from year to year. Students will gain direct experience with the range and complexity of activities required to address a real-world environmental project. Student work will be assessed via progress reports (written and oral), reflective essays, and a final report. Prerequisites: ENV 101, Statistics, ENV 201/202, ENV 311. ENV 311 may be taken concurrently. Enrollment limited to 16. {N} {S} 4 credits
L. David Smith, Offered Fall 2013
Ninian R. Stein, Offered Spring 2014

ENV 320 Environmental Justice
Environmental justice is the idea that all peoples should share equally in access to environmental goods and in exposure to environmental harms. Around the world, poor communities and communities of color are disproportionately impacted by environmental negatives from industry, waste disposal, and other sources. Through investigation of the history, theories, and causations of environmental justices, this class will critically analyze global and local environmental justice activism through discussion, lectures, a semester-long research project, and one mandatory field trip. Prerequisites: ENV 101 and an upper-level course in environmental science or social science, or permission of the instructor. Enrollment limited to 35. (E) {S} 4 credits
Ninian R. Stein
Offered Fall 2013

ENV 400 Special Studies
Admission by permission of the instructor. Special Studies are open only to qualified juniors and seniors, and in appropriate cases, to sophomores. 1-4 credits
Offered both semesters each year
The Major


The Environmental Science and Policy (ES&P) major is designed for students with interests in the environment and sustainability and a commitment to scientifically based problem solving and policy analysis. The objectives of the major are to prepare students to transcend disciplinary boundaries; combine analytical and communication skills with a well-rounded understanding of the environment; and translate this knowledge into meaningful action and innovative solutions. Four integration courses form the intellectual and organizational core of the major. Each course brings together frameworks, proficiencies, and knowledge from natural and social sciences in an explicitly integrative fashion to explore and analyze important environmental topics at local, regional, national and global levels. Additional introductory courses provide breadth in the natural and social sciences, humanities and statistics and introduce students to fundamental aspects of disciplines important to understanding human-environment interactions. Students gain depth of knowledge by choosing a coherent sequence of electives with a clear environmental focus. Students are strongly encouraged to engage in environmentally oriented internships, independent research or study away opportunities.

Prospective majors should consult with an ES&P faculty adviser in choosing their courses. In their first semesters, students are encouraged to enroll in one of the introductory courses (see list) and an appropriate integration course (ENV 101) as well as statistics.

Requirements: The ES&P major requires 14 courses. These include:

1. four environmental integration courses (ENV 101, ENV 201/202, ENV 311, ENV 312);
2. three introductory courses in the natural sciences from different areas (BIO, GEO, CHM, PHY/EGR), two of which must include labs (see list);
3. two introductory courses in the category of social sciences, humanities and policy from different departments (see list);
4. one course in statistics; and
5. four electives that create a coherent sequence with a clear environmental focus. No more than 1 elective can be at the 100-level and at least one must be at the 300-level. ENV 100 may not be used as an elective. One semester of independent study (ENV 400) or credit toward an Honor's thesis (ENV 430d) may be substituted for 1 elective, but neither may count as the 300-level elective.

One course fulfilling the major requirements may be taken S/U; ENV 201/202, ENV 311, and ENV 312 may not be taken S/U.
Environmental Integration Courses

All majors must complete the four environmental integration courses:

- ENV 101 Environmental Integration I: Perspectives
- ENV 201 Environmental Integration II: Collecting and Analyzing Information
- ENV 202 Environmental Integration II: Collecting and Analyzing Information Laboratory
- ENV 311 Environmental Integration III: Interpreting and Communicating Information
- ENV 312 Environmental Integration: IV: Sustainable Solutions

Introductory Courses

Natural Sciences
All majors must take one course in three of the following four natural science areas. Two of these courses must include a laboratory or field component (designated by L). Students with Advanced Placement credit (4 or 5) in an area may substitute an appropriate upper-level course in consultation with an ES&P adviser and in accordance with guidelines of the home department.

Biological Sciences
- BIO 154 Biodiversity, Ecology and Conservation
- BIO 155 Biodiversity, Ecology, and Conservation Laboratory (L)
- BIO 180y Biogeochemical Cycling in the Avery Brook Watershed (L)§

Chemistry
- CHM 108 Environmental Chemistry
- CHM 111 Chemistry I: General Chemistry (L)
- CHM 118 Advanced General Chemistry (L)

Geosciences
- FYS 134 Geology in the Field (L)
- GEO 101 Introduction to Earth Processes and History
- GEO 102 Exploring the Local Geologic Landscape (L)†
- GEO 105 Natural Disasters: Confronting and Coping
- GEO 106 Extraordinary Events in the History of Earth, Life and Climate
- GEO 108 Oceanography: An Introduction to the Marine Environment (L)
- GEO 180y Biogeochemical Cycling in the Avery Brook Watershed (L)§

Physics and Engineering
- EGR 100 Engineering for Everyone
- PHY 117 Introductory Physics I (L)
- PHY 118 Introductory Physics II (L)

§ BIO/GEO 180y is a yearlong laboratory that may be used to satisfy both laboratory requirements for the introductory natural sciences
† GEO 102 counts only as a lab course. To fulfill the GEO requirement for the major, GEO 102 must accompany a GEO lecture course.

**Social Sciences, Humanities and Policy**
All majors must take two courses from the social science, humanities and policy category listed below. The courses must be from different departments. Students with Advanced Placement credit (4 or 5) in an area may substitute an appropriate upper-level course in consultation with an ES&P adviser and in accordance with guidelines from the home department.

- ANT 130  Introduction to Cultural Anthropology
- ANT 241  Anthropology of Development
- ECO 150  Introductory Microeconomics
- GOV 200  American Government
- GOV 207  Politics of Public Policy
- GOV 241  International Politics
- PHI 238  Environmental Ethics
- PPL 220  Public Policy Analysis
- SOC 101  Introduction to Sociology
- SWG 150  Introduction to the Study of Women and Gender

**Statistics**
Majors must take one course in statistics (e.g., ECO 220, MTH 190/PSY 190, GOV 190, MTH 241, MTH 245 or SOC 201).

Students with Advanced Placement credit (4 or 5) in Statistics may substitute an appropriate upper-level statistics course in consultation with an ES&P adviser and in accordance with guidelines from the home department.

**Electives for the Environmental Focus**
Majors should choose their elective courses in consultation with the major adviser to create a coherent sequence with a clear environmental focus; the focus may be specific to a discipline, topic, or location. No more than 1 elective can be at the 100-level; at least one must be at the 300-level. ENV 100 may not be used as an elective. Electives and the environmental focus can be identified at the time the major is declared, but not later than the end of the add/drop period of the first semester of junior year. Subsequent changes require approval of the major adviser. Electives can include, but are not limited to, the approved list below. Other relevant courses offered at Smith, within the Five College Consortium, or in study abroad programs may be used to satisfy the electives requirement of the major with consultation and approval of the major adviser. One semester of independent study (ENV 400) or credit toward an Honor's thesis (ENV 430d) may be substituted for one elective, but neither may count as the 300-level elective. ENV 400 must be taken for 3 or 4 credits to be used as an elective. Internships, study abroad, or Praxis experiences are encouraged.

**Biological Sciences**
- BIO 103  Economic Botany: Plants and Human Affairs
- BIO 260  Invertebrate Diversity
2013-14  Environmental Science and Policy

BIO 264  Plant Diversity and Evolution
BIO 268  Marine Ecology
BIO 272  Vertebrate Biology
BIO 364  Plant Ecology
BIO 366  Biogeography
BIO 390  Seminar: Topics in Environmental Biology

Chemistry
CHM 346  Environmental Analytical Chemistry

Environmental Science and Policy
ENV 150  Modeling Our World: An Introduction to Geographic Information Systems
ENV 222  Globalization, Food, and Environment (pending CAP approval)
ENV 320  Environmental Justice

Environmental Concentration
ENX 301  Environmental Capstone

Geosciences
GEO 231  Invertebrate Paleontology and the History of Life
GEO 232  Sedimentary Geology
GEO 251  Geomorphology
GEO 301  Aqueous Geochemistry
GEO 309  Groundwater Geology

Physics and Engineering
EGR 312  Atmospheric Processes
EGR 315  Ecohydrology
EGR 325  Electric Energy Systems
EGR 330  Engineering and Global Development
EGR 346  Hydrosystems Engineering
EGR 388  Photovoltaic and Fuel Cell System Design

Social Sciences, Humanities and Policy
ANT 230  Africa: Peoples, Environment, and Development Issues
ANT 236  Economy, Ecology, and Society
ANT 241  Anthropology of Development
EAS 220  Colloquium: Environment and Society in Contemporary China
ECO 213  The World Food System
ECO 224  Environmental Economics
ECO 324  Seminar: Economics of the Environment and Natural Resources
ENG 118  Colloquia in Writing: Water: Science and Politics
ENG 135  Introduction to Creative Nonfiction: Writing about the Environment
GOV 242  International Political Economy
GOV 254  Colloquium: Politics of the Global Environment
GOV 306  Seminar in American Government: Politics and the Environment
2013-14 Environmental Science and Policy

LSS 250 Studio: Landscape and Narrative
PHI 238 Environmental Ethics
PHI 304 Colloquium in Applied Ethics: Sustainability and Ethics
SOC 232 World Population
SOC 233 Environment and Society
SOC 333 Seminar: Social Justice, the Environment and the Corporation
SWG 230 Feminisms and the Fate of the Planet

ENV 400 Special Studies
Admission by permission of the instructor. Special Studies are open only to qualified juniors and seniors, and in appropriate cases, to sophomores. Students are encouraged to contact the instructor in advance of the semester they intend to do ENV 400. 1-4 credits
Offered Fall 2013, Spring 2014

Honors
Students with a strong academic background who wish to conduct independent and original work on an environmental topic are encouraged to pursue an honors project. Please consult the director of honors for specific requirements and application procedures.

Director: Virginia Hayssen

ENV 430D Honors Project
8 credits, full-year course. Offered every year.

Study Abroad
Students may elect to take courses for the major outside Smith College by participating in an environmentally oriented, off-campus program. Relevant Smith approved programs include, but are not limited to, Arava Institute for Environmental Studies, Danish Institute for Study Abroad, Duke University’s Organization for Tropical Studies, The School for Field Studies, The School for International Training, SEA Semester, the Maritime Studies Program of Williams College and Mystic Seaport, and the University of Maine Semester by the Sea. Courses from other study away programs may also be eligible for credit with approval of the major adviser. Study away courses will generally count as 200-level electives but specific courses in specific programs could be authorized to count as 300-level electives with approval of the major adviser.

Study Abroad Adviser: Your major adviser for Environmental Science and Policy

The Minor

Advisers: Advisers for the major also serve as advisers for the minor.
The minor consists of six courses chosen with the guidance and approval of an ES&P adviser. Interested students are urged to meet with the Director, Coordinator and/or an ES&P adviser early in their academic planning.

Requirements: Six courses including ENV 101, two courses from the natural science category (must not be in the same area), one course from the social science, humanities and policy category, plus two electives in consultation with the minor adviser. For three of the six courses, two must be 200-level or higher; normally the third should be above the 100-level. ENV 100 may not be used as an elective. ENV 201/202 and ENV 311 may count as electives toward the minor, but do not fulfill either the natural science or the social science, humanities and policy requirements. A course in statistics (e.g. MTH 241 or the equivalent) and Geographic Information Systems (e.g. ENV 150/GEO 150) are recommended. Appropriate Smith courses not listed below, Five College courses, or courses taken at other institutions and through summer and/or semester-away programs may be counted toward the minor with pre-approval of the adviser. Students must satisfy the prerequisites for all courses included in their minor program. No more than three of the six courses may be taken at other institutions. No more than one course may be taken S/U; ENV 101 may not be taken S/U.

Natural Sciences
All minors must take one course in two of the following four natural science areas.

Biological Sciences
BIO 154  Biodiversity, Ecology and Conservation
BIO 268  Marine Ecology
BIO 364  Plant Ecology
BIO 390  Topics in Environmental Biology

Chemistry
CHM 108  Environmental Chemistry
CHM 346  Environmental Analytical Chemistry
GEO 301  Aqueous Geochemistry†

Geosciences
EGR 315  Ecohydrology†
GEO 101  Introduction to Earth Processes and History
GEO 105  Natural Disasters: Confronting and Coping
GEO 106  Extraordinary Events in the History of Earth, Life and Climate
GEO 108  Oceanography: An Introduction to the Marine Environment
GEO 301  Aqueous Geochemistry†
GEO 309  Groundwater Geology

Physics and Engineering
EGR 100  Engineering for Everyone*
EGR 312  Atmospheric Processes
EGR 315  Ecohydrology†
† EGR 315 and GEO 301 may be used to fulfill a natural science requirement in either of two categories.

* EGR 100 has several rotating themes; approval is granted for years when the focus is on energy and sustainability.

Social Sciences, Humanities and Policy
All minors must take one course in the social sciences, humanities and policy category.

- ANT 230 Africa: Peoples, Environment, and Development Issues
- ANT 236 Economy, Ecology, and Society
- ANT 241 Anthropology of Development
- ECO 224 Environmental Economics
- GOV 242 International Political Economy
- GOV 254 Colloquium: Politics of the Global Environment
- SOC 233 Environment and Society
- SOC 332 Seminar: Environment and Society

Electives
All minors must take two elective courses. Electives may include: ENV 201/202, ENV 311, courses listed above for minors in the natural sciences and social sciences, humanities and policy categories, and courses listed under electives for the environmental focus for the major. Other relevant courses offered at Smith, within the Five College Consortium, or in study abroad programs may be used to satisfy the electives requirement of the minor with consultation and approval of the major adviser.