

<b>Fiscal Unit/Academic Org</b>	Sch of Enviro&Natural Res - D1173
<b>Administering College/Academic Group</b>	Food, Agric & Environ Science
<b>Co-administering College/Academic Group</b>	
<b>Semester Conversion Designation</b>	New Program/Plan
<b>Proposed Program/Plan Name</b>	Environmental Science Minor
<b>Type of Program/Plan</b>	Undergraduate minor
<b>Program/Plan Code Abbreviation</b>	ENVSCI
<b>Proposed Degree Title</b>	Environmental Science Minor

### Credit Hour Explanation

Program credit hour requirements		A) Number of credit hours in current program (Quarter credit hours)	B) Calculated result for 2/3rds of current (Semester credit hours)	C) Number of credit hours required for proposed program (Semester credit hours)	D) Change in credit hours
Total minimum credit hours required for completion of program				15	
Required credit hours offered by the unit	Minimum			12	
	Maximum			15	
Required credit hours offered outside of the unit	Minimum			0	
	Maximum			3	
Required prerequisite credit hours not included above	Minimum			0	
	Maximum			10	

### Program Learning Goals

Note: these are required for all undergraduate degree programs and majors now, and will be required for all graduate and professional degree programs in 2012. Nonetheless, all programs are encouraged to complete these now.

- Program Learning Goals**
- Students will gain an introduction to the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, and to identify and analyze environmental problems both natural and human-made.
  - Students will gain an understanding of principles, concepts, and methodologies needed to evaluate the relative risks associated with environmental problems, and to examine alternative solutions for their resolution and/or prevention.
  - Students will be introduced to some of the most important contemporary environmental issues.

### Assessment

Assessment plan includes student learning goals, how those goals are evaluated, and how the information collected is used to improve student learning. An assessment plan is required for undergraduate majors and degrees. Graduate and professional degree programs are encouraged to complete this now, but will not be required to do so until 2012.

Is this a degree program (undergraduate, graduate, or professional) or major proposal? No

### Program Specializations/Sub-Plans

If you do not specify a program specialization/sub-plan it will be assumed you are submitting this program for all program specializations/sub-plans.

## Pre-Major

Does this Program have a Pre-Major? No

## Attachments

- SENRcoverLetterFinal.pdf: SENR cover letter  
*(Letter from Program-offering Unit. Owner: Hitzhusen, Gregory Ernest)*
- ES-MNcourseList.doc: Environmental Science minor course list  
*(List of Semester Courses. Owner: Hitzhusen, Gregory Ernest)*
- MinorsTransPlan.docx: ENR minors transition plan  
*(Transition Policy. Owner: Hitzhusen, Gregory Ernest)*
- ENVSCI-MNexpandedRationale\_final.docx: Environmental Science Minor rationale  
*(Program Rationale Statement. Owner: Hitzhusen, Gregory Ernest)*
- ENVSCI\_minor\_final.doc: Environmental Science minor semester advising shee  
*(Semester Advising Sheet(s). Owner: Hitzhusen, Gregory Ernest)*
- MinorsChangesReq.docx: summary of revisions to ENR minors  
*(Other Supporting Documentation. Owner: Hitzhusen, Gregory Ernest)*

## Comments

- Program/Plan Code Abbreviation should be:  
"ENVSCI-MN"  
Transition plan has been attached as word file.  
Expanded rationale and semester advising sheet has been revised to better address the target audience and how the minor fits with other minors.  
  
A summary of revisions in response to Science subcommittee requests is attached as: MinorsChangesReq.doc. *(by Hitzhusen, Gregory Ernest on 06/05/2011 07:04 PM)*
- Feedback will come in e-mail from Jim Fredal (chair CCI Sciences Subcommittee). *(by Vankeerbergen, Bernadette Chantal on 02/15/2011 04:47 PM)*

### Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Hitzhusen, Gregory Ernest	11/26/2010 11:43 PM	Submitted for Approval
Revision Requested	Hitzhusen, Gregory Ernest	12/10/2010 02:41 PM	Unit Approval
Submitted	Hitzhusen, Gregory Ernest	12/12/2010 03:04 PM	Submitted for Approval
Approved	Hitzhusen, Gregory Ernest	12/12/2010 03:04 PM	Unit Approval
Revision Requested	Pfister, Jill Ann	12/29/2010 11:54 AM	SubCollege Approval
Submitted	Hitzhusen, Gregory Ernest	12/31/2010 12:30 PM	Submitted for Approval
Approved	Hitzhusen, Gregory Ernest	12/31/2010 12:31 PM	Unit Approval
Approved	Pfister, Jill Ann	01/14/2011 05:12 PM	SubCollege Approval
Approved	Pfister, Jill Ann	01/14/2011 05:12 PM	College Approval
Revision Requested	Vankeerbergen, Bernadette Chantal	02/15/2011 04:47 PM	ASCCAO Approval
Submitted	Hitzhusen, Gregory Ernest	06/05/2011 07:04 PM	Submitted for Approval
Approved	Hitzhusen, Gregory Ernest	06/05/2011 07:04 PM	Unit Approval
Approved	Pfister, Jill Ann	06/06/2011 06:34 AM	SubCollege Approval
Approved	Pfister, Jill Ann	06/06/2011 06:35 AM	College Approval
Pending Approval	Hanlin, Deborah Kay Vankeerbergen, Bernadette Chantal Meyers, Catherine Anne Jenkins, Mary Ellen Bigler Nolen, Dawn	06/06/2011 06:35 AM	ASCCAO Approval



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To: The Office of Academic Affairs

From: Ron Hendrick, Professor and Director

Date: November 23, 2010

Re: School of Environment and Natural Resources Semester Program Proposals

The faculty and staff of the School of Environment and Natural Resources (SENR) have completed a thorough review and revision of our undergraduate and graduate curricula in preparation for the conversion to semesters, and the SENR faculty has voted to recommend that the Office of Academic Affairs approve the attached semester curriculum proposals. In addition to the work of several curricular sub-committees within the School, the SENR Academic Affairs Committee reviewed and approved all semester conversion plans for undergraduate programs, and the SENR Graduate Studies Committee reviewed and approved plans for the MS, PhD, and MENR graduate programs. SENR faculty approved these semester plans by unanimous vote (25 in favor, 0 opposed, 0 abstentions) on April 16, 2010; subsequent minor revisions and updates to the plans have been approved by SENR curriculum committees as appropriate.

The following outline details the SENR programs proposed for semester: A) conversion, B) new approval, C) deactivation, and D) termination.

**A. Existing SENR programs to be converted to semesters include:**

(Note: Rural Sociology programs included below became part of SENR in 2010; program degree codes are in parentheses following program titles; specialization three-letter codes are in parentheses following specializations.)

**Four Undergraduate Majors:**

- 1) Environmental Science (ENVSCI-BS): *modified from four to five specializations representing existing focal areas in the major, including Ecosystem Restoration (ECR), Water Science (WTR), Environmental Molecular Science (EMS), Soil Resources and Environmental Sustainability (SOI), and Environmental Science Education (ESE).*
- 2) Forestry, Fisheries, and Wildlife (FFW-BS): *converted as **semester equivalent**, with appropriate revisions to maintain certification and double-certification options uniquely available (compared with other programs nationally) to students in this major, including Society of American Foresters (SAF) accreditation and The Wildlife Society (TWS) and American Fisheries Society (AFS) certifications. Three-letter specialization codes for FFW specializations (FAS, FOR, FWM, UFW, WFS, WPV, WLS) are detailed in the comment field of the FFW-BS program request.*
- 3) Environmental Policy and Decision Making (ENVPDM-BS): *modified in title (previously Environmental Policy and Management (EPM)) and designating three specializations based on existing focal areas in the major: Climate Change (CCP), International Issues (IIP), and Water Conservation (WCP).*
- 4) Natural Resource Management (NATRESM-BS): *modified in title (previously Parks, Recreation & Tourism (PRT)) and designating three specializations based on existing and emerging focal areas (made possible by the addition of Rural Sociology faculty to SENR in 2010) in the major: Parks and Recreation Management (PRM), Natural Resource Administration and Management (NRA), and Sustainable Agriculture (SAG), with additional focus-area options (non-transcript) aligned with employment opportunities and existing programs in the School: Forestry, Fisheries, Wildlife, Soil and Water, Visitor Services, and Zoo Science and Management.*

**Two Undergraduate Minors:**

- 1) Soil Resources (SOILSCI-MN): *converted as **semester equivalent**.*
- 2) Rural Sociology (RURLSOC-MN): *converted as **semester equivalent**.*

### **Two Graduate Degree Programs:**

- 1) Master of Science (ENVNATR-MS): converted as **semester equivalent**
- 2) Doctor of Philosophy (ENVNATR-PH): converted as **semester equivalent**

The Environment and Natural Resources Graduate Program awards both MS and PhD degrees in seven areas of specialty (all converted as **semester equivalents**):

- Ecological Restoration (ERS)
- Ecosystem Science (ECS)
- Environmental Social Sciences (ESS)
- Rural Sociology (RS)
- Fisheries and Wildlife Science (FWS)
- Forest Science (FS)
- Soil Science (SSC)

### **Three Graduate Minors (all converted as semester equivalents):**

- 1) Environment and Natural Resources (ENVNATR-GM)
- 2) Soil Science (SOILSCI-GM)
- 3) Rural Sociology (RURLSOC-GM)

### **One Professional Degree Program (converted as semester equivalent):**

- 1) Master of Environment and Natural Resources (ENVNAT-MEN)

**Three Combined Programs** (all combined programs will be converted as **semester equivalents**, and impose no additional requirements or provisions beyond the requirements of the combined degrees. As such, and abiding all college and university rules of the degree-granting partners, forms for **these combined degrees are not included in these SENR semester electronic program proposals**):

- 1) Combined BS/MS
- 2) Combined BS/MENR
- 3) Dual Degree Program with the John Glenn School of Public Affairs: MS/MAPPM (Master of Arts in Public Policy and Management) or MS/MPA (Master of Public Administration)

### **B. New SENR semester programs proposed for approval by OAA:**

Four undergraduate minors have been developed for semesters. Three minors correspond with existing majors in the School; these three minors collectively replace the Natural Resources Management minor. The fourth minor, Sustainable Agriculture, has been developed through the collaboration of Rural Sociology and Soils faculty, together with colleagues from across the College of Food, Agricultural and Environmental Sciences.

### **Undergraduate Minors:**

- 1) Environmental Science (ENVSCI-MN)
- 2) Forestry, Fisheries & Wildlife (FFW-MN)
- 3) Society and Environmental Issues (SOCENV-MN)
- 4) Sustainable Agriculture (SUSTAGR-MN)

### **C. SENR programs to be deactivated:**

Each listed below is an old program name that has been replaced by current programs listed above, either through revised titles (1-3), or being subsumed as a specialization into the ENR MS and PhD (4-9). With the exception of Rural Sociology, which joined SENR in 2010, each of these changes were effected three or more years ago.

- 1) Fisheries and Wildlife Management (FWMGT-BS)
- 2) Forestry and Urban Forestry (FORUF-BS)
- 3) Human Dimensions in Natural Resources (HDNR-BS)
- 4) Natural Resources (NATRES-PH)
- 5) Natural Resources (NATRES-MS)
- 6) Rural Sociology (RURLSOC-MS)
- 7) Rural Sociology (RURLSOC-PH)

- 8) Soil Science (SOILSCI-PH)
- 9) Soil Science (SOILSCI-MS)

**D. SENR programs to be terminated:**

1) Natural Resources Management Minor (NATRESM-MN): this minor is being terminated because of its broad scope and is being replaced by the more specific new minors listed above that correspond to existing majors.

SENR faculty and staff have worked tirelessly to develop these plans, engaging in a thorough and collegial process. Two faculty retreats devoted significant time to semester conversion plans, and all faculty meetings beginning in the fall of 2009 included updates and discussion about semester conversion planning. Dr. Greg Hitzhusen was appointed by the School as a point person to facilitate Q2S planning, participated in regular UCAT Q2S workshops with colleagues from across the university, and established a Carmen site to share and organize Q2S working documents and resources. In addition to the committees mentioned above, several new committees led the curriculum development process, including four faculty working groups formed within each of the majors, and a core curriculum committee of a dozen faculty representing all of the specializations across the four undergraduate majors and including myself and the chairs of the Grad Studies Committee and Academic Affairs Committee. These groups reviewed all recent SENR curriculum revisions, researched semester programs of peer institutions, and generated creative proposals of how to improve and better integrate our multi-disciplinary curriculum. Curriculum mapping revealed gaps and overlap in our curriculum; to match our semester courses to our learning goals, at least nine new courses have been proposed, several others have been merged, and at least 75 courses will be discontinued. As a previous director of a Natural Resources program that underwent semester conversion at the University of Georgia, I provided guidance to revise SENR's curricular offerings around our core strengths, guided by learning outcome goals and encouraging options beyond existing structures and traditions. Several SENR faculty and staff participated in the College of Food, Agricultural, and Environmental Sciences bi-weekly Q2S Implementation Committee meetings starting in November 2009, sharing planning ideas with Q2S point people from across the College.

We also based our semester curriculum development on several faculty-led research efforts. Our social science faculty created a survey of environmental curriculum interests and career goals for CFAES, SENR and OSU undergraduate student samples, and results from over 1300 respondents (published results now *in press*) informed our vision of student interests, needs, and knowledge about the environmental topics addressed in SENR programs. We also completed phone interviews with SENR alumni and stakeholders to examine curricular elements most valuable to graduates and employers. And I conducted exit interviews of SENR students to better understand their experience in SENR programs. These measures and the efforts mentioned above collectively led the faculty to propose an expanded core of courses to help SENR students better integrate natural and social science elements of the curriculum, and to modify the majors as described above. The core curriculum committee will remain intact to monitor the quality and success of the semester curriculum, and make revisions as appropriate into the future.

This proposed curriculum represents welcome changes that increase the efficiency and complementarity of SENR programs, maximizing the expertise of our faculty and improving opportunities for SENR students to prepare for graduate education and succeed in their professional careers. I have also attached a commentary detailing SENR's preliminary assessment plans for semester programs. These program proposals reflect the outstanding collaborative efforts of SENR faculty to prepare for the semester transition. I heartily recommend approval of these plans, and appreciate OAA's ongoing efforts to strengthen our curriculum in OSU's transition to semesters.



Ronald L. Hendrick, Ph.D.  
Director, SENR

## Summary of ENR Minor Programs Revisions

Summarized below, **in red type**, are the revisions to ENR minors in response to the requests of the Science subcommittee of the Arts and Sciences CCI. All of the changes indicated below have been made within the minor program proposals in the PACER system, and resubmitted.

Subject: FW: Semester Conversion Proposal for FAES Minors  
Date: Tue, 01 Mar 2011 11:18:00 -0500  
From: Jill Pfister <pfister.1@osu.edu>

Two common changes that we need to make on all of the minor sheets include the following.

1. Please include a statement that reads "At least six credits must be at the 3000 level or above" and be sure the minor is set up that way. **Done.**
2. Guideline #4 at the bottom, which is common across the college, should read "A maximum of one course may overlap between the minor and the GE (Writing and Communication, Foreign Language, Literature, Visual and Performing Arts, Culture and Ideas, Historical Study, Quantitative Reasoning, Data Analysis, Natural Science, Social Science, Cross-Disciplinary Seminar, Service-Learning, Education Abroad). Please be sure this statement is revised to reflect the above statement. **Done.**

**From:** James Fredal [mailto:james.fredal@gmail.com]  
**Sent:** Friday, March 04, 2011 11:41 AM  
**To:** Jill Pfister  
**Cc:** Vankeerbergen, Bernadette  
**Subject:** FAES Semester Conversion Proposals

Date: March 4, 2011

Jill:

We are requesting a few changes and corrections on the minors before we send them forward to the full CCI.

### **Forestry, Fisheries and Wildlife:**

- This minor had a number of extraneous documents that should be removed. **Done.**
- The proposal will need a transition plan for students who are finishing the old Natural Resources minor to clarify what their options are (this will apply to Environmental Science and Society and Environmental Issues as well). The material on the hyperlink is not available, and whatever transition plan is devised should be copied directly into the proposal. **ENR minors transition plan has been uploaded to proposal.**
- On the PACER form, the minimum required credit hours outside the unit should be

filled in as "0." **Done.**

- All references to GEC should be changed to GE. **Done.**
- All courses should be listed with appropriate credit hours. **Done.**
- Finally, there was a question about the advising sheet. The second paragraph states that "One course is required within each focus areaŠ" and then "Two additional courses are required within each focus areaŠ" This seems to suggest that students take courses in all three focus areas, but the list suggest that in fact students take all three elective courses within one chose focus area. So, while we understood the intent of that paragraph, the language was initially confusing and could probably be reworded (or even eliminated) to clarify that students merely need to select three courses within one focus area. **Text was revised to eliminate confusion as suggested.**

### **Sustainable Agriculture:**

- Extraneous documents should also be removed from this proposal. **Done.**
- References to the GEC changed to GE. **Done.**
- The program learning goals on the PACER form need to match those listed later under "expected learning outcomes." Also, some of the PACER goals seemed rather general, referring alternately to "several aspects," of sustainable agriculture, "various goals of sustainability," "deeper dimensions of sustainability," and "various dimensions of sustainable agriculture." These goals should probably be made more specific to the content of the minor, or could be eliminated altogether, since learning goals are not a requirement for minor proposals. In other cases, the language might be revised. For example, "planning and executing the student farm," might be "developing and executing plans for the student farm," etc. **Learning goals have been revised to be more specific and to be consistent, as requested.**
- Finally, quarter numbers should be replaced by semester numbers on the advising sheet, and credit hours should be clear for all courses. **Done.**

#### **1) Soil Science Minor**

- On the PACER form, under the Credit Hour Explanation, on the third line, column A should list 23 credit hours; column C should list 16 credit hours. **Done.**
- The proposal needs a specific transition plan. **ENR minors transition plan has been uploaded to proposal.**
- Documents extraneous to the proposal (from the website) should be removed. **Done.**
- The proposal should provide two discrete advising sheets (one for quarters, one for semesters) using the same format to facilitate comparison. **I think this was already done – the quarter advising sheet only differs in format due to final graphics there that will not be finalized for semester version until fall of 2011; thus, done.**
- On the advising sheet, guideline #4 refers to the GEC (should be GE) and the categories should align with the GE categories (categories on the advising sheet currently reflect GEC-R requirements). This point is the case for most FAES advising sheets. **Done.**

#### **2) Rural Sociology Minor**



- On the PACER form, under the Credit Hour Explanation, the next to the last line should be filled in with zeroes. **Done.**
- The proposal needs a specific transition plan. **ENR minors transition plan has been uploaded to proposal.**
- Documents extraneous to the proposal (from the website) should be removed. **Done.**
- Several courses, including the required Rurl Soc/ENR 5500, are at the 5000-level or above. This number was designated for undergrad/graduate courses and seems quite advanced for courses (including the entry level course) in the minor. There are no rules limiting the upper range of course numbers for ASC minors, but the committee wanted to query this numbering scheme. **Minor sheet has been revised in online proposal: of the two required courses for the minor, one is 3000-level, and the other, ENR 5500, is intended more as a capstone for the minor. Students may choose from a range of courses from 2000-level and above to fill in the remaining two courses required for the minor.**
- On the last page, guideline #4 refers to the GEC (should be GE) and the categories should align with the GE categories (current categories reflect GEC-R requirements). This point is the case for most FAES advising sheets. **Done.**

### 3) **Society and Environmental Issues Minor (new)**

- On the PACER form, under the Credit Hour Explanation, a 4-hour prerequisite is listed, but is not explained anywhere else on the proposal. If this is a course prerequisite, it might just be noted on the advising sheet. If it is a prerequisite for the minor, it should be listed on the advising sheet and explained in the proposal. **Done, and comment added to clarify.**
- The learning goals on the PACER form and the learning outcomes inside the proposal should match. **Done.**
- The proposal needs letters of concurrence from 3 departments: Geography, Earth Sciences, and Comparative Studies. **Concurrence received from Comparative Studies (6/2/11), and currently pending from Geography and Earth Sciences (request sent 6/2/2011).**
- Documents extraneous to the proposal (from the website) should be removed. **Done.**
- The proposal could use an expanded rationale that explains who the target audience is for the minor (especially among ASC students), and how the minor fits in with their other minors. **Done.**
- Add credit hours for all courses on the advising sheets. **Done.**
- On the last page, guideline #4 refers to GEC (should be GE) and the categories should align with the GE categories (current categories reflect GEC-R requirements). This point is the case for most FAES advising sheets. **Done.**

### 4) **Environmental Science Minor (new)**

- On the PACER form, under the Credit Hour Explanation: Minimum prerequisite hours are listed as 3 and maximum prerequisite hours are listed as 40? Are these numbers correct? If so, a note should be added to the semester advising sheet,

prerequisite courses should be added to the course listing and an explanation should be added to the proposal. **Credit Hours are now revised in proposal. The 40 hours was due to a single course with several high level prerequisites that have been removed from that course's semester conversion proposal.**

- Documents extraneous to the proposal (from the website) should be removed. **Done.**
- Learning “goals” on the PACER form and the learning “outcomes” listed in the proposal should match. **Done.**
- Several courses for this minor are at the 5000-level or above. This number was designated for undergrad/graduate courses and seems quite advanced for courses in the minor. There are no rules limiting the upper range of course numbers for ASC minors, but the committee wanted to query this numbering scheme. Yes, this minor is intended to include these higher level courses. **Most of the courses within the minor are below the 5000 level; in the list of *required electives*, where students will choose **one** course, options range from 3000-5000 level, with the 5000-level courses being ones whose prerequisites would be met earlier in the minor. This simply reflects the course sequences in ENR, and that this is a minor in a specific applied science.**
- Letters of concurrence should probably be secured from Geography & Earth Sciences. **As indicated in an earlier reply, because SENR already offers the Environmental Science major, and this minor simply conforms to the existing major, concurrence should not be needed.**
- The proposal should include an expanded rationale that explains who the target audience is (especially for ASC students) and how minor fits with other minors. **Done.**

Thanks.

Jim Fredal

Cc: Bernadette Vankeerbergen

## **Environmental Science Minor (ENVSCI-MN)**

The minor in Environmental Science (ENVSCI-MN) is based on the core courses of the Environmental Science major (ENVSCI-BS) in SENR.

The minor in environmental science provides students with an opportunity to analyze interactions between the physical, chemical, and biological components of the environment with relation to human and ecological health, and to understand many of the most important issues confronting the world today. Environmental issues such as global climate change, safe water quality, wetland reconstruction, environmental sustainability, ecosystem habitat restoration, biological diversity, hazardous contaminant pollution of soil and water, carbon sequestration, and food security are challenging areas of critical importance in environmental science. The Environmental Science minor introduces students to the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them. The ES minor will be useful to students majoring in pure and applied physical sciences including Agricultural Sciences, Earth Sciences, Biological Sciences, and providing a complement to social science programs.

A total of 15 semester hours are required.

### **Expected learning outcomes:**

- 1) Students will gain an introduction to the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, and to identify and analyze environmental problems both natural and human-made.
- 2) Students will gain an understanding of principles, concepts, and methodologies needed to evaluate the relative risks associated with environmental problems, and to examine alternative solutions for their resolution and/or prevention.
- 3) Students will be introduced to some of the most important contemporary environmental issues.

### **Assessment of outcomes:**

Student learning outcomes in the Environmental Science Minor will be assessed in several ways:

- 1) Classroom assignments: The courses in the minor are selected from existing courses in the ENR Environmental Science major (ENVSCI-BS), and a primary measure of success in the minor is student success in the assignments in these courses. The *required* course in the minor, ENR 2100 (Introduction to Environmental Science), provides the basic background and introduction to environmental science, and course assignments are designed to assess student understanding of the

fundamental principles, concepts, and methodologies of environmental science. Assignments in the *introductory coursework* selections assess student success in gaining a deeper understanding of basic component fields of environmental science; assignments in the *controlled electives* of the minor assess student understanding of a range of additional subjects and contemporary environmental problems.

- 2) Student evaluation of instruction: students in the minor will complete course and program evaluations throughout the program, and results from these evaluations are incorporated into program and course revision.

### **Recruitment, advising and administration, resources, expenses and letters of concurrence:**

The minor is based on the coursework already offered within the Environmental Science major in SENR. In preparation for the semester conversion, ENR faculty surveyed students across the university; results revealed a high level of interest in the topic of environmental science. The ENVSCI minor matches this interest and demand, and recruitment through normal announcement and advising networks will suffice to populate the minor; special announcements of new curricular opportunities available in semesters will add to these efforts.

Administration of the minor within the School of Environment and Natural Resources will not impose additional administrative burden. All courses in the minor are currently fully supported by ENR as components of the ENVSCI-BS major, and can be serviced with existing faculty and teaching capacity. This minor will not incur additional expenses beyond anticipated teaching and administration budgets. Letters of concurrence have not been sought from other units because this minor simply draws from the existing ENR environmental science major.

## Undergraduate Minor in Environmental Science Course List

A total of 15 semester hours are required.

### **Required Environment and Natural Resources Courses (3 hr):**

ENR 201/2100 Introduction to Environmental Science (3 semester hr)

### **Controlled Electives: Introductory Coursework (choose at least two):**

ENR 300.01/3000 Introduction to Soil Science (3 semester hr)

ENR 319/3300 Introduction to Forestry, Fish, and Wildlife (3 semester hr)

ENR 3400 or 3500 Social Science: Individual or Community Level (3 sem hr)

EEOB 503.01 Introduction to Ecology (3 sem hr)

### **Controlled Electives: Ecosystem Science (add courses to meet the 15 hr minimum requirement):**

ENR 322/3322 Forest Ecosystems (3 sem hr)

ENR 442/4260 Soil Management (3 sem hr)

ENR 618/5222 Ecological Engineering Science (3 sem hr)

ENR 622/5280 Stream Ecology (4 sem hr)

ENR 626/5345 Methods in Aquatic Ecology (4 sem hr)

ENR 656/5220 Ecosystems of the World (2 sem hr)

ENR 662/5362 Wildlife Ecology Methods (3 sem hr)

ENR 665/5263 Biology of Soil Ecosystems (3 sem hr)

ENR 675/5273 Environmental Fate of Contaminants in Soil & Water (3 sem hr)

ENR 5279 Urban Soil & Ecosystem Services: Assessment & Restoration (3 hr)

ENR 720/5265 Characterization of Soil in the Field and Laboratory (2 sem hr)

ENR 725/5250.01 Wetland Ecology & Management (3 sem hr)

ENR 740/5266 Field Soil Investigation: Chemistry, Fertility, and Biology (3 sem hr)

ENR 760/5225 Ecosystem Modeling (3 sem hr)

## **Undergraduate Minor in Environmental Science**

The minor in environmental science provides students with an opportunity to analyze interactions between the physical, chemical, and biological components of the environment with relation to human and ecological health, and to understand many of the most important issues confronting the world today. Environmental issues such as global climate change, safe water quality, wetland reconstruction, environmental sustainability, ecosystem habitat restoration, biological diversity, hazardous contaminant pollution of soil and water, carbon sequestration, and food security are challenging areas of critical importance in environmental science. The Environmental Science minor introduces students to the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them. The ES minor will be useful to students majoring in pure and applied physical sciences including Agricultural Sciences, Earth Sciences, Biological Sciences, and providing a complement to social science programs.

A total of 15 units are required for this minor.

### **Required Environment and Natural Resources Courses (3 units):**

ENR 2100: Introduction to Environmental Science (3 units)

### **Required Electives: Introductory Coursework (choose at least two courses):**

EEOB 503.01: Introduction to Ecology (3 units)

ENR 3000: Introduction to Soil Science (3 units)

ENR 3300: Introduction to Forestry, Fish, and Wildlife (3 units)

ENR 3400: Psychology of Environmental Problems (3 units) or ENR 3500: Communities and the Environment (3 units)

### **Required Electives: Ecosystem Science (3 units)**

ENR 3322: Forest Ecosystems (3 units)

ENR 4260: Soil Management (3 units)

ENR 5222: Ecological Engineering Science (3 units)

ENR 5280: Stream Ecology (3 units)

ENR 5345: Methods in Aquatic Ecology (3 units)

ENR 5220: Ecosystems of the World (3 units)

ENR 5362: Wildlife Ecology Methods (3 units)

ENR 5263: Biology of Soil Ecosystems (3 units)

ENR 5273: Environmental Fate of Contaminants in Soil & Water (3 units)

ENR 5279: Urban Soil and Ecosystem Services: Assessment and Restoration (3 units)

ENR 5265: Characterization of Soil in the Field and Laboratory (3 units)

ENR 5250.01: Wetland Ecology & Management (3 units)

ENR 5266: Field Soil Investigation: Chemistry, Fertility, and Biology (3 units)

ENR 5225: Ecosystem Modeling (3 units)

1. The minor is not available to student majoring in Environmental Policy and Decision Making; Environmental Science; Natural Resources Management; Forestry, Fisheries and Wildlife.
2. A minimum overall GPA for courses comprising the minor shall be 2.00.
3. A minor should be declared at the time a student accumulates 60 hours.
4. A maximum of one course may overlap between the minor and the GE (Writing and Communication, Foreign Language, Literature, Visual and Performing Arts, Culture and Ideas, Historical Study, Quantitative Reasoning, Data Analysis, Natural Science, Social Science, Cross-Disciplinary Seminar, Service-Learning, Education Abroad).
5. Courses taken on a pass/non pass basis may not be applied to the minor.
6. At least six credits must be at the 3000 level or above.

## **School of Environment and Natural Resources** **Transition Plan for ENR Minors**

This transition plan covers all existing ENR minors, including:

**Soil Science Minor** (converted)

**Rural Sociology Minor** (converted)

**Natural Resources Management** (terminated\*)

\*The NRM minor is being replaced in semesters by three more specific minors (each corresponding with and derived from the four existing majors in ENR):

- **Forestry, Fisheries and Wildlife Minor** (FFW major)
- **Society and Environmental Issues Minor** (EPDM and NRM majors)
- **Environmental Science Minor** (ES major)

Students in all ENR minors may complete the minor as it was offered in quarters, simply by completing the semester equivalents of the courses they would have completed to meet the requirements of the minor under quarters. Each minor includes a sufficient selection of converting courses to make completion possible; any courses not converted to semesters will simply be unavailable as options starting in Autumn of 2012. There will be no attempt to create bridge courses.

Current students in ENR minors will be contacted before the start of the Autumn 2011 quarter with a list of available semester courses to complete their minor; any courses that will be terminated in semesters will be highlighted with encouragement for interested students to take them in 2011-2012.

Students in the **Natural Resources Management** (NRM) Minor (currently, the minor has 35 students: 21 in FAES, 2 in ASC, 3 in BIO, 1 in BUS, 1 in ENG, 1 in HUM, and 6 in SBS) will have the option of either completing the NRM Minor with semester equivalent courses, or changing their minor to one of the more specific new minors that are replacing the NRM minor. Because these new minors require fewer overall credits than the NRM minor, this may mean that some students working toward an NRM Minor will already have met the requirements of one of the new minors once semesters begin.

Enrollment in the NRM Minor will no longer be allowed starting Summer Term, 2012.