



### Proposal to the Senate Educational Policy Committee

**PROPOSAL TITLE:** Revision of the Bachelor of Science in Natural Resources and Environmental Sciences in the Department of Natural Resources and Environmental Sciences, College of Agriculture, Consumer and Environmental Sciences.

**SPONSOR:** Anton G. Endress, Professor and Undergraduate Coordinator, Department of NRES, 244-1679, [aendress@illinois.edu](mailto:aendress@illinois.edu)

**COLLEGE CONTACT:** F. William Simmons, Assistant Dean, College of Agricultural, Consumer and Environmental Sciences, 333-3380, [fsimmons@uiuc.edu](mailto:fsimmons@uiuc.edu)

**BRIEF DESCRIPTION:** The NRES baccalaureate degree and its concentrations have been under intense review during the last 18 months. On November 17, 2008, the NRES faculty approved the attached revision of the NRES degree. On March 2, 2009, the Courses and Curriculum Committee of the College of Agricultural, Consumer and Environmental Sciences approved the revised curriculum.

The revised NRES baccalaureate is designed for students interested in careers managing natural and environmental resources or in pursuing advanced education in one of its disciplinary areas. It offers an integrative and application-oriented curriculum from which its graduates will have the capacity to solve novel, ill-defined problems in complex, real-world settings. The specific changes include: (1) a reduction in the total number of hours from 130 to 126, (2) an increase in the number of alternative courses that may be used to fulfill curriculum requirements, (3) more open elective capacity, (4) discontinuing the Forest Science and the Soil and Water Science concentrations, (5) renaming the Human Dimension concentration to Human Dimensions of the Environment and revising its content, (6) renaming the Resource Ecology concentration to Resource Conservation and Restoration Ecology concentration and revising its content, (7) revising the content of the Fish and Wildlife Conservation concentration, and (8) organizing a new Global Change and Landscape Dynamics concentration.

These considerations generated an application-oriented and science-based curriculum in which:

1. The number and/or level of courses required at the Concentration level have been increased, while the number of courses required of all NRES majors has been reduced.
2. There are more elective hours and many individual required courses have been replaced by a focused group of choice courses, thus adding flexibility to the curriculum and enhancing self-directed student learning.
3. Names of the Concentrations better reflect their content focus and are more communicative to a general audience.

4. Subject matter content is integrated within an interdisciplinary framework and applied within a systematic and often experiential context to better prepare our graduates for their future careers.

**JUSTIFICATION:** The NRES curriculum and its proposed revision reflect (a) the changing academic and professional interests of recently admitted majors, (b) the diversity of the department's faculty and programs and their evolution following the merger of four academic units a decade ago, (c) an effort to better organize and portray our undergraduate program, and (d) recent enrollment histories. Several factors motivated the departmental review and contributed to the proposed revision of the NRES baccalaureate curriculum:

1. Across the last decade, the NRES faculty has become smaller overall (particularly in forestry, soils, and horticulture) while simultaneously increasing capacity in fish and wildlife biology. This change in faculty coincides with an NRES undergraduate enrollment decline (down 27% since 2000). Freshmen enrollments in the Forest Science and Soil and Water Science Concentrations are averaging respectively 3.0 and 2.3 individuals per year across the last four years; 1 student enrolled in each of these Concentrations in Fall 2008. Recent departmental surveys of employers, former students, and prospective students identified a need for more readily understood concentration names, expanded marketing and better communication products, and a broadened curriculum that better prepares students for their professional futures.
2. Communicating our unique and distinctive degree and the comparative advantage it affords to potential majors (whether across campus, community college, or high school) is essential to our long-term vision of excellence. Employing common and more readily understood names for concentrations and programs is an important element of this effort, thus "Resource Ecology" became "Resource Conservation and Restoration Ecology," and "Human Dimensions" became "Human Dimensions of the Environment," names used by colleges and universities elsewhere. Similarly the name of our new concentration ("Global Change and Landscape Dynamics") is an amalgam of similarly named programs at comparable institutions. Beyond names that reflect the Concentration, the proposed curriculum enjoys course flexibility to enable students to explore new horizons or pursue personal or professional interests in depth.
3. NRES faculty are actively engaged in research and teaching regarding large-scale processes involving global change, invasion biology, energy, sustainable resource management, habitat fragmentation, etc. Yet our information gathering process encountered several individuals outside the department, frequently parents and prospective employers, who were generally unaware of the scope of these activities. Prospective students are certainly environmentally conscious and are often thinking in global terms. To generate awareness and recruit additional students, the new Global Change and Landscape Dynamics Concentration was organized.
4. Employers of our graduates increasingly call attention to deficiencies in some content and skills areas, most notably herbaceous plant identification, field skills, and collaborative experiences. Our response is the development of three new courses having important field and other hands-on components and a renewed emphasis on the development of a new set of field courses so students have more choice. The three new courses are NRES 340: Environmental Social Science Research Methods, NRES 415: Native Plant ID and Floristics, and NRES 465: Landscape Ecology.
5. While some career paths are relatively stable or have a well-defined disciplinary basis, for example Certified Professional Wetland Scientist, Certified Professional Soil Scientist, or the Society of American Forestry's-certified Forest Science option, others require different combinations of disciplinary contents and skills. An important benefit of this curriculum's structure is its flexibility, enabling a student's capacity to pursue, or not, a collection of courses that will lead to certification.

The revised NRES baccalaureate offers an integrative, science-based, and application-oriented curriculum from which its graduates will have the capacity to solve novel, ill-defined problems in complex, real-world settings. The proposed concentrations and their organizational focus are:

Fish and Wildlife Conservation (revision of content)

*Applied ecology and additional training to conserve, restore, and manage fish and wildlife resources*

Global Change and Landscape Dynamics (newly organized)

*Patterns and processes occurring across spatially defined human-dominated landscapes to promote ecosystem sustainability and integrity*

Human Dimensions of the Environment (formerly Human Dimensions)

*Science of human-environment interactions emphasizing aspects of economics, psychology, and sociology and their policy and management implications*

Resource Conservation and Restoration Ecology (formerly Resource Ecology)

*Principles and practices underlying the restoration and management of soil, watershed, wetland, forest, and grassland ecosystems*

The Forest Science and Soil and Water Science Concentrations are discontinued.

#### **BUDGETARY AND STAFF IMPLICATIONS:**

a. Additional staff and dollars needed

As part of a Memorandum of Understanding with the former Illinois Natural History Survey, NRES provides stipends to faculty affiliates in exchange for selected course instruction. This arrangement has ensured availability of IB 461 for former and current students and will be utilized for this and other courses in the future when appropriate and necessary.

b. Internal reallocations (e.g., change in class size, teaching loads, student-faculty ratio, etc.)

The department currently has unmet instructional capacity. A 35% increase in the number of NRES majors will return the department to the 2000 enrollment level (245 majors) without undue negative impact on overall student-faculty ratios, class sizes, or teaching loads. Furthermore, some courses previously required of *all* NRES undergraduates, e.g. NRES 302: Dendrology and NRES 419: Env and Plant Ecosystems among several, are now required in only *some* of the concentrations. This will generate a shift in the distribution of instructional load among departmental faculty.

c. Effect on course enrollment in other units and explanations of discussions with representatives of those departments

NRES students are heavy users of course substitution petitions as a result of a relatively inflexible curriculum having many individual course requirements, frequent schedule overlaps, and few alternative options. The result has been numerous course substitutions to meet hour and subject area requirements. The revised curriculum is designed to minimize these historical difficulties. Although the hour requirement is slightly reduced, the curriculum requires far fewer specific courses for the major and concentration, substituting instead a focused menu of appropriate courses. These choice courses represent those most relevant and most often taken by our undergraduates as course substitutions. Consequently we expect no effect on course enrollments in other units.

- d. Impact on the University Library (*A letter of acknowledgement from the University Librarian must be included for all new program proposals.*)
  
- e. Impact on computer use, laboratory use, equipment, etc.

NRES is among several departments campus-wide that impose an undergraduate tuition differential. The differential applied reflects some of the additional costs borne by the department for laboratory and field study expenses. Additionally many NRES courses charge lab fees or field trip fees for partial cost recovery of instruction in those courses. The revised NRES curriculum includes three new courses that will utilize existing laboratory facilities and/or assess a field trip fee to support class travel to field locations.

**DESIRED EFFECTIVE DATE:** Fall 2009

STATEMENT FOR PROGRAMS OF STUDY CATALOG:

## Natural Resources and Environmental Sciences

Natural Resources and Environmental Sciences

Head of Department: Bruce Branham

Department Address: W-503 Turner Hall, 1102 South Goodwin Avenue, Urbana,  
(217) 333-2770

[www.nres.uiuc.edu](http://www.nres.uiuc.edu)

Major in Natural Resources and Environmental Sciences

Minor in Quantitative Methods in Natural Resources and Environmental Sciences

### Major in Natural Resources and Environmental Sciences

#### For the Degree of Bachelor of Science with a Major in Natural Resources and Environmental Sciences

Designed for students interested in careers leading the conservation, protection, and management of natural and environmental resources or in pursuing advanced education in one of its many disciplinary areas, the NRES baccalaureate provides a science-based, application-oriented education. The NRES major is distinguished by its integration of a comprehensive physical, life, and social sciences background with coursework providing the management, decision-making, and analytical knowledge and skills required to solve the world's most pressing problems.

Students in the NRES major begin their studies with a set of core courses that provide the background for more focused substantive study at the upper level. The NRES core introduces students to the range of physical, life, and social science content most relevant to their future professions and equips them with tools essential for the discovery, analysis, and application of knowledge important for successful environmental management. NRES students then build upon the core by completing one of four upper-level Concentrations. Courses in the Concentrations involve focused attention to the theories, data, and analytical tools of a particular set of natural resource and environmental science areas, helping students develop the necessary understanding of the complexities underlying resources management. All students in the major are required to complete a combination of field courses and at least one project-oriented

capstone course.

All the Concentrations prepare students for graduate study as well as for multiple career paths throughout the public and private sectors. Because of its orientation toward integrative application of disciplinary knowledge, the NRES major prepares students for a wide range of careers involving the conservation, protection, and management of natural resources. Many occur within business or government agencies that provide services related to environmental and natural resource management. Other careers are found within social, professional, and advocacy institutions that focus on human impacts and environmental sustainability. The major also prepares students for teaching, research, or other professional activities.

Graduates from the NRES major go on to pursue careers in the direction of environmental education centers; ecological management and restoration; enforcement of laws and regulations; environmental advocacy; environmental consulting; forest and environmental economics; land use analysis and management; law; local, state, and federal government; management of parks, forests and rangelands; plant physiology; policy development and implementation; resource planning and policy analysis; social and environmental impact analysis; soil conservation, science, and testing; technical sales; watershed management; and wildlife conservation and management.

General Education Requirements

Fish and Wildlife Conservation Concentration

Global Change and Landscape Dynamics Concentration

Human Dimensions of the Environment Concentration

Resource Conservation and Restoration Ecology Concentration

Appendices available for  
review in the Senate Office.