

# Forest, Range, and Wildlife Sciences

**Department Head:** To be appointed

**Location:** Natural Resources 206

**Phone:** (435) 797-3219

**FAX:** (435) 797-3796

**E-mail:** lbarr@cc.usu.edu

**WWW:** <http://www.cnr.usu.edu/frws>

## Undergraduate Advisors:

Maureen A. Wagner, Natural Resources 120, (435) 797-2448,  
maureen@cc.usu.edu

Stephanie W. Hamblin, Natural Resources 120,  
(435) 797-2473, stephanie.hamblin@usu.edu

**Degrees offered:** Bachelor of Science (BS) in Conservation and Restoration Ecology; BS, Master of Science (MS), and Doctor of Philosophy (PhD) in Forestry; BS in Rangeland Resources; BS in Wildlife Science; MS and PhD in Ecology; MS and PhD in Range Science; and MS and PhD in Wildlife Biology

**Graduate specializations:** *MS, PhD in Ecology*—Conservation Biology, Wildlife Ecology; *MS, PhD in Wildlife Biology*—Conservation Biology, Problem Wildlife Management, Wildlife Management

## Undergraduate Programs

### Objectives

The Department of Forest, Range, and Wildlife Sciences (FRWS) offers four undergraduate degrees: Conservation and Restoration Ecology, Forestry, Rangeland Resources, and Wildlife Science. These degree programs offer broad educational opportunities for students interested in the analysis and management of forest and rangeland ecosystems and their associated wildlife populations. The department's philosophy of education is to promote a broad interdisciplinary approach to natural resources analysis, management, and science.

### Requirements

**Admission Requirements.** Admission requirements for the Department of Forest, Range, and Wildlife Sciences are the same as those described for the College of Natural Resources on pages 115-116.

**Graduation Requirements.** All *General Science Foundation Courses*, *Departmental Common Courses*, and all courses listed as major subject courses must be taken on an *A-B-C-D-F* basis. A grade of *C-* or better is required for all Forest, Range, and Wildlife Sciences courses used to meet the requirements for a major or minor in the department. The grade point average for all courses taught by the College of Natural Resources must be 2.5 or higher.

In addition to completing the University Studies course requirements, all students earning an undergraduate degree in the Department of Forest, Range, and Wildlife Sciences must complete the *General Science Foundation Courses* and the *Departmental Common Courses*, as listed below. Some of these courses may be used toward the University Studies requirements, as indicated by the University Studies designations listed in parentheses following the course numbers.

**General Science Foundation Courses (34 credits).** BIOL 1210, 1220 (BLS); CHEM 1210, 1220 (BPS), 1230; MATH 1050 (QL), 1100 (QL); SOIL 3000; STAT 2000 (QI) or 3000 (QI); NR 2220.

**Departmental Common Courses (36 credits).** ENVS 3000, 4000 (DSS); FRWS 2000, 2010, 3600, 3610, 3700, 3710, 3800, 3810, 3850, 3900.

The first two years of study in the Department of Forest, Range, and Wildlife Sciences are designed to provide students with a sound background in the natural sciences, an introduction to the field of natural resources management, and an introduction to their respective major. The last two years are designed to provide an advanced understanding of natural resource management and science, depth concentration in the major, and experience with the integration of scientific and management concepts across a diversity of disciplines and management scenarios. Students are expected to enroll for 15 or more credits of coursework per semester.

**Bachelor of Science in Conservation and Restoration Ecology.** Students in the Conservation and Restoration Ecology major must meet the course requirements for University Studies, as well as complete the *General Science Foundation Courses* and the *Departmental Common Courses* listed above. They must also complete 27 credits of *Professional Coursework*, including FRWS 4600 and 4700, and a 21-credit specialization. This specialization is designed by the student in consultation with a faculty advisor to meet specific goals and career objectives and must be approved by the FRWS department head.

**Bachelor of Science in Forestry.** Students in the Forestry major must meet the course requirements for University Studies, as well as complete the *General Science Foundation Courses* and the *Departmental Common Courses* listed above. They must also complete 19 credits of *Professional Coursework*, including: AWER 3700, 4930; ENVS 3300; FRWS 5350, 5700, 5710; and an option in *either* soils/watershed (AWER 4490 and SOIL 5130) *or* Remote Sensing/Geographic Information Systems (AWER 5930 and FRWS 5750).

**Bachelor of Science in Rangeland Resources.** Students in the Rangeland Resources major must meet the course requirements for University Studies, as well as complete the *General Science Foundation Courses* and the *Departmental Common Courses* listed above. They must also complete 22 credits of *Professional Coursework*, including: ADVS 2080 or 2090; AWER 3700; BIOL 3400, 4400 (QI); FRWS 4000; SOIL 5130; and an upper-division range economics course approved by the FRWS department head.

**Bachelor of Science in Wildlife Science.** Students in the Wildlife Science major must meet the course requirements for University Studies, as well as complete the *General Science Foundation Courses* and the *Departmental Common Courses* listed above. They must also complete 21 credits of *Professional Coursework*, including: BIOL 5250 (CI), 5560 or 5570, 5580; FRWS 3300, 4500, 4600, 4880.

### ***Career Opportunities***

Graduates in Forest, Range, and Wildlife Sciences (FRWS) qualify for a broad range of career opportunities specific to their major. The Bachelor of Science degrees in Forestry, Rangeland Resources, and Wildlife Science are designed to meet the U.S. Office of Personnel Management (OPM) requirements for professional, permanent, full-time jobs with the Forest Service, Fish and Wildlife Service, Bureau of Land Management, National Park Service, or other federal natural resources agencies. The Bachelor of Science in Conservation and Restoration Ecology is designed to meet OPM requirements for Ecologist, but is flexible and intended to meet the needs of nongovernmental careers as well, such as the Nature Conservancy or private natural resource consulting firms, as well as state and county restoration and management agencies. Graduates in all degree programs receive a solid background in biological and quantitative sciences, as well as the communication skills needed to succeed in many career paths.

### ***Financial Assistance***

The main opportunities for undergraduates to find financial support through grants, work-study, and loans are listed on pages 22-26 in the *Financial Aid and Scholarship Information* section. In addition, more than 30 scholarships are available for eligible students in the College of Natural Resources. Some students may be able to find paid internships with private or governmental organizations, or work for a faculty member on a research project. Interested persons should contact the college's Academic Service Center for more information on financial assistance for undergraduate students.

### ***Additional Information***

The undergraduate program may be tailored to individual student needs with the help of a faculty advisor. For additional information about the degree requirements, course sequencing, and departmental specialization options and their related coursework, as well as updated information describing current programs and courses offered by the Department of Forest, Range, and Wildlife Sciences, visit the Forest, Range, and Wildlife Sciences main office, Natural Resources 206, or visit:

<http://www.cnr.usu.edu/frws>.

## ***Graduate Programs***

### ***Admission Requirements***

The Department of Forest, Range, and Wildlife Sciences offers opportunities for graduate study through MS and PhD degree programs in Ecology, Forestry, Range Science, and Wildlife Biology. The department also offers opportunities to participate in a college-wide Master of Natural Resources (MNR) degree program administered through the College of Natural Resources. The MNR is described more fully on page 278.

The programs of instruction and research leading to graduate degrees in the department are available only to students meeting

high scholastic standards who are accepted for study by the departmental faculty. Students desiring entrance to these graduate programs should contact the department head for information concerning eligibility.

USU School of Graduate Studies general admission requirements are described on pages 90-91. Applicants for graduate study in the department should have a bachelor's degree from an accredited college or university, a cumulative GPA of at least 3.0 (out of 4.0), and GRE scores (quantitative and verbal) above the 40th percentile. Foreign students should submit a TOEFL score of at least 550. Exceptions to these standards will be considered on a case-by-case basis. Written statements of interest help match applicants with faculty advisors. A faculty member must agree to serve as the major professor in order for an applicant to be accepted for study. Prospective students are encouraged to contact faculty members early in the application process to investigate mutual interests, projects, and prospects for financial support.

A natural resources baccalaureate degree is not required for admission to the department, although a sound background in the natural sciences is strongly recommended. Students lacking the requisite background will work with their supervisory committee to address deficiencies.

### ***Degree Programs***

The MS degree is offered for students motivated toward a management or administrative career in natural resources management. The MS may be obtained through either a Plan A (research thesis) or Plan B (nonthesis) program, as described on page 95. The **Plan A** option requires a thesis based on original research conducted by the student. The **Plan B** option is recommended for professional forestry, rangeland, or wildlife managers who do not desire research training. The PhD degree is intended for students seeking a natural resources research or academic career. Comprehensive exams (both oral and written) are required in the doctoral program.

The minimum requirement for an MS degree is 30 credits, including at least 24 credits in residency and 6 credits of thesis research. The minimum requirement for a PhD degree is 60 approved graduate credits in addition to an MS degree, or 90 approved graduate credits with no MS degree. At least one year (a minimum of 32 credits), including a minimum of two consecutive semesters, of full-time registration must be in residence at USU.

With committee approval, graduate credit may be transferred from accredited graduate schools, provided the minimum residency requirement (including thesis and dissertation credit) at USU is met. Transfer credit, which must not have been used for any other degree, will be shown on official USU transcripts at completion of the degree.

### ***Research***

Cooperation with other departments and research centers of the University, as well as with government collaborators, permits strong graduate programs in all aspects of forest, range, and wildlife-related sciences. Particular mention should be made of the USU Ecology Center, in which the Forest, Range, and Wildlife Sciences Department is very active; the Utah Agricultural Experiment Station, which has a full program in both applied and basic research; the Utah Cooperative Fisheries and Wildlife Research Unit; the Predator Ecology and Behavior Field Station; the Jack H. Berryman Institute; the U.S. Forest Service Rocky Mountain Forest and Range Experiment Station; and the USDA Agricultural Research Service.

### **Financial Assistance**

General aspects of financial support for graduate students at Utah State University are listed on pages 89-90 in the *Graduate Financial Assistance* section. This includes important information on the University-wide policies and terms of reference for research and teaching assistantships, graduate tuition obligations and benefits, Western Regional Graduate Programs, and competitive University-wide fellowships and scholarships. The College of Natural Resources also offers a limited number of Quinney Doctoral Fellowships for incoming doctoral students.

Graduate research assistantships may be available on a competitive basis to both MS and PhD students through major professors having contracts, grants, or other awards from the University, private sector, or government agencies. These assistantships vary in the amount of support offered, but they commonly offer a stipend to help cover living expenses and operating funds to carry out the research. Other benefits may include assistance with tuition and student health insurance, as well as opportunities to travel.

The department also has a few graduate teaching assistantships for students who help with teaching, grading, or recitation in large courses. These typically pay only a modest supplement on a semester basis, however, and are not sufficient to cover living expenses. Domestic PhD students on a research assistantship in some departmental degree programs are required to hold at least one teaching assistantship during their program, to obtain experience in classroom (mainly undergraduate) instruction. MS students may also hold teaching assistantships, contingent upon availability of funds. Acceptance to pursue graduate study does not guarantee the student financial assistance.

### **Additional Information**

For more information about graduate programs and departmental faculty and their research emphasis areas, as well as updated information describing current programs and courses offered by the Department of Forest, Range, and Wildlife Sciences, visit the Forest, Range, and Wildlife Sciences main office, Natural Resources 206, or visit <http://www.cnr.usu.edu/frws>.

## **Forest, Range, and Wildlife Sciences Faculty**

### **Professors**

*John A. Bissonette*, Leader, Utah Cooperative Fish and Wildlife Research Unit, landscape ecology, terrestrial vertebrate ecology

*F. E. "Fee" Busby*, Dean of College of Natural Resources, effects of livestock grazing

*Martyn M. Caldwell*, Director Ecology Center, plant physiological ecology

*Michael R. Conover*, animal behavior, wildlife damage management

*Raymond D. Dueser*, conservation ecology

*James N. Long*, forest ecology, silviculture

*John C. Malechek*, rangeland management

*Terry A. Messmer*, fisheries and wildlife extension specialist, wild ungulate and waterfowl management, wetlands ecology, private land management, conservation communication

*Frederick D. Provenza*, range animal production

*Neil E. West*, rangeland desertification/condition/trend

*Michael L. Wolfe*, wildlife ecology and management

### **Research Professors**

*Michael M. Jaeger*, behavioral ecology

*Frederick F. Knowlton*, Predator Ecology and Behavior Project, predator ecology, behavior and management

*Jesse A. Logan*, forest insect ecology, disturbance ecology, dynamical systems analysis

*Leila McReynolds Shultz*, plant taxonomy and geography

### **Adjunct Professors**

*Barbara H. Allen-Diaz*, plant community ecology

*Gary E. Belovsky*, population ecology

*James E. Bowns*, range ecology

*John W. Connelly*, upland game ecology, conservation, management

*Norbert V. DeByle*, forest ecology

*Douglas A. Johnson*, plant ecophysiology

*Jerran T. Flinders*, range science and wildlife ecology

*Scott R. Winterstein*, wildlife population dynamics and management

### **Professors Emeriti**

*Thadis W. Box*, range management

*Theodore W. Daniel*, silviculture

*John A. Kadlec*, wetlands ecology, wildlife management

*Ronald M. Lanner*, forest genetics, dendrology

*Frederic H. Wagner*, wildlife ecology, natural resources policy

*John P. Workman*, range economics

### **Associate Professors**

*Frederick A. Baker*, forest pathology, computer applications

*Roger E. Banner*, range extension specialist

*Christopher A. Call*, vegetation manipulation/management

*Thomas C. Edwards, Jr.*, Utah Cooperative Fish and Wildlife Research Unit, spatial ecology, habitat modelling, biostatistics

*Michael J. Jenkins*, disturbance ecology and management, insects, fire, snow avalanches

*Michael R. Kuhns*, forestry extension specialist, urban forestry, tree physiology

*R. Douglas Ramsey*, remote sensing, geographic information systems, landscape ecology, spatial analysis

*Eugene W. Schupp*, plant population ecology and restoration ecology

*Helga Van Miegroet*, forest soils and biogeochemistry

### **Research Associate Professors**

*Eric M. Gese*, Predator Ecology and Behavior Field Station, predator behavior and ecology

*John A. Shivik*, predator ecology

### **Adjunct Associate Professors**

*Dale L. Bartos*, range ecology

*Mark W. Brunson*, social and psychological aspects of forest and rangeland management

*David C. Chojnacky*, forest mensuration

*D. Layne Coppock*, animal production systems/technology transfer and international pastoral development

*John L. Crane Jr.*, environmental resource management

*Thomas A. Jones*, native grass breeding

*Bruce A. Kimball*, range ecology

*Niki S. Nicholas*, biogeochemistry

*Kenneth C. Olson*, grazing livestock nutrition

*James A. Pfister*, poisonous range plants  
*Michael H. Ralphs*, poisonous plants/grazing management  
*Robert H. Schmidt*, wildlife policy, wildlife damage management

**Associate Professors Emeriti**

*Brien E. (Ben) Norton*, grazing ecology, international range management  
*Gar W. Workman*, wildlife ecology and management

**Assistant Professors**

*Karen H. Beard*, community ecology, ecosystem ecology, conservation biology  
*Karen E. Mock*, conservation genetics and applied molecular ecology  
*Daniel K. Rosenberg*, population, conservation, and landscape ecology  
*Ronald J. Ryel*, plant physiological ecology

**Research Assistant Professors**

*Barbara J. Bentz*, forest entomology  
*Thomas J. DeLiberto*, Predator Ecology and Behavior Field Station, veterinary medicine of wild species  
*Jennifer A. Gervais*, ecotoxicology, population dynamics

**Temporary Research Assistant Professor**

*Juan J. Villalba*, foraging behavior

**Adjunct Assistant Professors**

*Larry M. Conner*, wildlife ecologist, wildlife damage management, mammalogist  
*Mary M. Conner*, quantitative ecology and estimation of population parameters  
*Charles G. Johnson, Jr.*, plant and community ecology  
*Kyran E. Kunkel*, carnivores, predator/prey ecology, mammal restoration ecology  
*Chris L. Lauver*, range ecology  
*Nicole L. McCoy*, natural resource economics  
*Thomas A. Monaco*, research ecologist  
*Dale L. Nolte*, foraging behavior  
*William C. Pitt*, Acting Station Leader and wildlife research biologist, Predator Ecology and Behavior Field Station  
*Johanna M. Ward*, population dynamics, avian ecology, conservation biology

**Assistant Professor Emeritus**

*Barrie K. Gilbert*, wildlife ethology, behavioral ecology

**Adjunct Instructors**

*Jon Keith Schnare*, timber harvest planning and logging methods  
*David Torell*, collaborative processes, natural resources issues management, volunteer management, fundraising  
*Katherine S. Voth*, wildland/urban interface, fire fuels management, student internships

## *Course Descriptions*

Forest, Range, and Wildlife Sciences (FRWS), pages 399-402