

# Fisheries & Wildlife Sciences (FW)

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## **FW 221 Conservation of Natural Resources** (3 credit hours)

This course examines the importance of natural resources and their role in the progress of human civilization. Physical, biological and ecological principles are described that underlie sustainability of natural resources, particularly as these relate to the consequence of human impacts as resources are used to meet societal needs. The course emphasizes renewable natural resources, the importance of habitat, and a broadly-international context. The course has an optimistic perspective that life on Earth can and will be better in the future if we learn and practice good resource management today.

*GEP Global Knowledge, GEP Interdisciplinary Perspectives, GEP Natural Sciences*

*Typically offered in Fall and Spring*

## **FW 293 Independent Study in Fisheries, Wildlife, and Conservation Biology** (1-6 credit hours)

Independent Study for Fisheries, Wildlife, and Conservation Biology students at the freshman and sophomore level developed under the direction of a faculty member. Individualized/Independent Study and Research courses require a "Course Agreement for Students Enrolled in Non-Standard Courses" be completed by the student and faculty member prior to registration by the department.

*Typically offered in Summer only*

## **FW 294 Independent Study in Fisheries, Wildlife, and Conservation Biology** (1-6 credit hours)

Independent Study for Fisheries, Wildlife, and Conservation Biology students at the freshman and sophomore level developed under the direction of a faculty member. Individualized/Independent Study and Research courses require a "Course Agreement for Students Enrolled in Non-Standard Courses" be completed by the student and faculty member prior to registration by the department.

*Typically offered in Summer only*

## **FW 295 Special Topics in Fisheries, Wildlife, and Conservation Biology** (1-4 credit hours)

Offered as needed to present materials not normally available in regular course offerings or for offering of new courses on a trial basis.

*Typically offered in Fall, Spring, and Summer*

## **FW 311 Piedmont Wildlife Ecology and Management** (3 credit hours)

This 3-week course will involve relationships of wildlife and habitat, the use of GIS and GPS, use of new technology (PIT tags, radio telemetry), and field identification of habitats and animals. This course is taught off-campus at Hill Forest. It is a 3 week residential camps with side trips and overnight trips. Class meets all day for 3 weeks. Additional charge for room and board. Students must provide their own transportation to Hill Forest. Junior standing in one of the following: FOM, NRE, SFW, SFF, SZO, ESC.

*Typically offered in Summer only*

## **FW 312 Fisheries Techniques and Management** (1 credit hours)

Field exercises in aquatic environments emphasizing assessment of habitat, fish, invertebrates, plants, and ecological relationships to form the basis of describing and solving management dilemmas. Taught off-campus at Hill Forest. 5 day residential camp. Local travel required to various aquatic ecosystems. Additional charges for room and board.

Corequisite: FW 311 and FW 313

*Typically offered in Summer only*

## **FW 313 Mountain Wildlife Ecology and Management** (1 credit hours)

Visit different mountain communities along an elevation gradient from 2,000 to 6,000 feet and observe changes in plant and animal communities. Discuss wildlife and fisheries management issues, interact with agency personnel responsible for managing mountain fisheries and wildlife. One-week field trip to the North Carolina mountains. Additional charges for room and board.

Corequisite: FW 311 and FW 312

*Typically offered in Summer only*

## **FW 314 Coastal Ecology and Management** (1 credit hours)

Hands-on study of the fishery and wildlife resources associated with North Carolina coastal plain habitats. These habitats will include estuarine, ocean, longleaf pine savanna, pocosin, and Carolina bays. Common techniques and concepts used in terrestrial, marine, and estuarine ecology and management will be taught. Field identification of habitats, animals, and plants. Use of multiple sampling gear including bottom trawl, beam trawl, beach seine, gill nets, and coverboards. Use of water quality measurement equipment. This course meets all day for 1 week off-campus at CMAST in Morehead City, NC. Additional charge for room and board and boat rental. Students must provide their own transportation to CMAST.

Prerequisite: BIO 181

*Typically offered in Summer only*

## **FW 333 Conservation Biology in Practice** (3 credit hours)

An introductory course designed to focus on the scientific fundamentals of conservation biology, including population dynamics, extinction and its causes, metapopulations, modeling, population viability analysis, the design and management of protected areas, rare species management, and captive breeding and release programs. Students will participate in active learning exercises, projects, and debates. Projects will require students to make their own arrangements for transportation to field locations within Wake County.

Prerequisite: FW 221 or PB 360 or BIO 360 or FOR 260

*Typically offered in Fall only*

## **FW 353 Wildlife Management** (3 credit hours)

Historical development of Wildlife Management from anecdotal, observational practices to modern, scientific approaches used around the world. Principles of population analysis, management, protection and conservation of animals, particularly those of conservation, aesthetic, sport or food values in urban, rural and wilderness areas. Ethics of hunting and trapping. Contradictory objectives challenging modern wildlife managers.

R: Sophomore Standing

*Typically offered in Fall only*

**FW 373 Vertebrate Natural History** (3 credit hours)

This course provides an introduction to the natural history of vertebrates, including fish, amphibians, reptiles, birds, and mammals. The emphasis is on systematics, identification, and natural history of each vertebrate group.

Prerequisite: BIO 360 or PB 360

*Typically offered in Spring only*

**FW 402/FW 502 Genetics for Wildlife Management** (3 credit hours)

Broadly, this course details how genetic tools are used in wildlife management. Genetics can be applied in many scenarios in wildlife management from abundance estimation and connectivity to species identification and hybridization. This course will provide information on the theoretical underpinnings of how evolutionary processes contribute to observed genetic variation, and how measuring that variation has broad application across wildlife management.

*Typically offered in Fall and Spring*

**FW 403 Urban Wildlife Management** (3 credit hours)

Issues facing wildlife in urbanizing landscapes and the general courses of action to minimize the negative effects of urbanization on native wildlife. Large-scale planning and zoning for roads, developments and open space; meso-scale planning and landscaping of new neighborhoods and other developments; and small-scale landscaping for backyard habitats. Coexistence between wildlife and humans in urban environments and management of wildlife damage to human property.

Prerequisite: Junior standing.

*Typically offered in Fall only*

**FW 404 Wildlife Habitat Management** (3 credit hours)

Relationships between forest and wildlife management and the effects of silvicultural systems on wildlife. Species-habitat requirements, forest wildlife management techniques, and forest-wildlife policies and economics.

Prerequisite: Junior standing

*Typically offered in Fall only*

**FW 405 Tropical Wildlife Ecology** (3 credit hours)

This course provides an overview of tropical wildlife ecology and management, sustainable land use, and local culture. The course addresses the challenges of natural resource conservation in a developing country and the sustainable approaches that may be used to conserve natural resources there. Various methods to sample wildlife will be employed during the visit to a tropical country (Ecuador, Nicaragua, etc.), but emphasis will be on the use of mist nets in long-term bird monitoring program. Expenses associated with this course are the responsibility of the student. Requires instructor approval. Students register for this course through the Study Abroad Office.

*Typically offered in Spring only*

*This course is offered alternate even years*

**FW 411/FW 511 Human Dimensions of Wildlife and Fisheries** (3 credit hours)

Study of human interactions with wildlife and fisheries, including principles important for understanding and addressing wildlife management and conservation challenges. Discussions of wildlife at the urban fringe, human attitudes towards hunting and fishing, and the public trust approach to wildlife management are included.

Restriction: Juniors and Seniors Only

*Typically offered in Spring only*

**FW 413/FW 513 Herpetology** (4 credit hours)

This course focuses on the biology and classification of reptiles and amphibians of the world with an emphasis on reptiles and amphibians of North Carolina. This course uses lectures, field trips, and laboratory work to explore the biology of reptiles and amphibians. Lectures cover classification, ecology, physiology, evolution, behavior, and conservation aspects. Lab covers species identification and survey techniques.

Restriction: Junior or Senior Standing

*Typically offered in Spring only*

**FW 415 Professional Development in Fisheries, Wildlife, and Conservation Biology** (1 credit hours)

This course provides guidance for students in the fall semester of their senior year in preparation for graduate school or a career in the field of Fisheries, Wildlife, and Conservation Biology. Junior or Senior standing.

*Typically offered in Fall only*

**FW 444/FW 544 Mammalogy** (3 credit hours)

The biology of mammals: evolution, functional morphology, reproduction, behavior, ecology, population biology, classification and identification. One weekend field trip planned. One independent field research project is required. Graduate students will prepare a full written report of their research projects, which will not be required of the undergraduates.

Prerequisite: PB 360 or BIO 360 or FOR 260

*Typically offered in Fall only*

**FW 445 Human Dimensions of Conservation Biology in the Bahamas** (3 credit hours)

This course examines the fundamental concepts, problems, and methods regarding human dimensions of conservation biology in The Bahamas. Combining lecture, lab, and fieldwork, students directly experience the process of science, with students conducting semester-long, group research projects tackling important unanswered questions involving conservation biology in The Bahamas. Gaining first-hand experience at the interface of basic and applied sciences, students will spend eight weeks on campus and two weeks in the largely undeveloped Andros Island in The Bahamas, home to the third largest coral reef in the world and over 1.5 million acres of national parks.

Prerequisite: One 200-level or higher course in BIO, ES, ET, FOR, FW, NR, PB, PRT, or ZO.

*Typically offered in Summer only*

**FW 453 Principles of Wildlife Science** (4 credit hours)

Principles and applications of population dynamics and biology to the management of terrestrial vertebrates. Predicting population levels, composition and growth rates with and without management constraints. Strategies for wildlife conservation, utilization, and enhancement. Laboratories stress the collection and analysis of data, and often meet in outdoor environments.

Prerequisite: FW 353 and ST 311

*Typically offered in Spring only*

**FW 460/FW 560 International Wildlife Management and Conservation** (3 credit hours)

An international perspective on wildlife management and conservation through investigation and comparison of historical events, policies, international conservation organizations and transfrontier conservation areas. Fundamental principles necessary in managing the African savanna ecosystem, protected areas and game ranches. Identifying global biomes, zoogeography and the impacts of ecotourism. Cannot receive credit for both FW 460/560.

Prerequisite: Junior standing and above.

*Typically offered in Spring only*

**FW 465/FW 565 African Ecology and Conservation** (4 credit hours)

This course provides an international perspective on desert ecology, the African savanna ecosystem, African wildlife ecology and management. In addition, the management of a large national park of international importance, conservation of predators and their conflict with humans, and international tourism are discussed. Various sampling techniques are practiced during field work. A combination of lectures, field lectures, field work, field excursions, data analyses and home work form an integral part of the course.

Prerequisite: One 200-level or higher course in ES, ET FOR, FW, NR, PB, PRT, or ZO

*Typically offered in Summer only*

**FW 492 External Learning Experience** (1-6 credit hours)

A learning experience in agriculture and life sciences within an academic framework that utilizes facilities and resources which are external to the campus. Contact and arrangements with prospective employers must be initiated by student and approved by a faculty adviser, the prospective employer, the departmental teaching coordinator and the academic dean prior to the experience.

Prerequisite: Sophomore standing

*Typically offered in Fall and Spring*

**FW 493 Independent Study in Fisheries, Wildlife, and Conservation Biology** (1-6 credit hours)

Independent Study for Fisheries, Wildlife, and Conservation Biology students at the advanced level developed under the direction of a faculty member. Individualized/Independent Study and Research courses require a "Course Agreement for Students Enrolled in Non-Standard Courses" be completed by the student and faculty member prior to registration by the department.

*Typically offered in Fall, Spring, and Summer*

**FW 494 Independent Study in Fisheries, Wildlife, and Conservation Biology** (1-6 credit hours)

Independent Study for Fisheries, Wildlife, and Conservation Biology students at the advanced level developed under the direction of a faculty member. Individualized/Independent Study and Research courses require a "Course Agreement for Students Enrolled in Non-Standard Courses" be completed by the student and faculty member prior to registration by the department.

*Typically offered in Summer only*

**FW 495 Special Topics in Fisheries and Wildlife Science** (1-4 credit hours)

Offered as needed to present materials not normally available in regular course offerings or for offering of new courses on a trial basis.

*Typically offered in Fall, Spring, and Summer*

**FW 502/FW 402 Genetics for Wildlife Management** (3 credit hours)

Broadly, this course details how genetic tools are used in wildlife management. Genetics can be applied in many scenarios in wildlife management from abundance estimation and connectivity to species identification and hybridization. This course will provide information on the theoretical underpinnings of how evolutionary processes contribute to observed genetic variation, and how measuring that variation has broad application across wildlife management.

*Typically offered in Fall and Spring*

**FW 511/FW 411 Human Dimensions of Wildlife and Fisheries** (3 credit hours)

Study of human interactions with wildlife and fisheries, including principles important for understanding and addressing wildlife management and conservation challenges. Discussions of wildlife at the urban fringe, human attitudes towards hunting and fishing, and the public trust approach to wildlife management are included.

Restriction: Juniors and Seniors Only

*Typically offered in Spring only*

**FW 513/FW 413 Herpetology** (4 credit hours)

This course focuses on the biology and classification of reptiles and amphibians of the world with an emphasis on reptiles and amphibians of North Carolina. This course uses lectures, field trips, and laboratory work to explore the biology of reptiles and amphibians. Lectures cover classification, ecology, physiology, evolution, behavior, and conservation aspects. Lab covers species identification and survey techniques.

Restriction: Junior or Senior Standing

*Typically offered in Spring only*

**FW 515/AEC 515 Fish Physiology** (3 credit hours)

The biology of fishes: physiology, anatomy, endocrinology, behavior and genetics. Designed especially for graduate students in fisheries. Several trips to research laboratories taken.

*Typically offered in Fall only*

*This course is offered alternate odd years*

**FW 544/FW 444 Mammalogy** (3 credit hours)

The biology of mammals: evolution, functional morphology, reproduction, behavior, ecology, population biology, classification and identification. One weekend field trip planned. One independent field research project is required. Graduate students will prepare a full written report of their research projects, which will not be required of the undergraduates.

Prerequisite: PB 360 or BIO 360 or FOR 260

*Typically offered in Fall only*

**FW 553 Principles Of Wildlife Science** (3 credit hours)

The principles of wildlife management and their application studied in the laboratory and in the field.

Prerequisite: BO 360 or ZO 260

*Typically offered in Spring only*

**FW 560/FW 460 International Wildlife Management and Conservation** (3 credit hours)

An international perspective on wildlife management and conservation through investigation and comparison of historical events, policies, international conservation organizations and transfrontier conservation areas. Fundamental principles necessary in managing the African savannah ecosystem, protected areas and game ranches. Identifying global biomes, zoogeography and the impacts of ecotourism. Cannot receive credit for both FW 460/560.

Prerequisite: Junior standing and above.

*Typically offered in Spring only*

**FW 565/FW 465 African Ecology and Conservation** (4 credit hours)

This course provides an international perspective on desert ecology, the African savanna ecosystem, African wildlife ecology and management. In addition, the management of a large national park of international importance, conservation of predators and their conflict with humans, and international tourism are discussed. Various sampling techniques are practiced during field work. A combination of lectures, field lectures, field work, field excursions, data analyses and home work form an integral part of the course.

Prerequisite: One 200-level or higher course in ES, ET FOR, FW, NR, PB, PRT, or ZO

*Typically offered in Summer only*

**FW 595 Special Topics in Fisheries and Wildlife Sciences** (1-4 credit hours)

Special topics in various aspects fisheries and wildlife sciences are developed under the direction of a graduate faculty member. Also used to test and develop new courses.

*Typically offered in Fall, Spring, and Summer*

**FW 602 Seminar In Wildlife Management** (1 credit hours)

Current topics and issues in wildlife biology and management. Students select and research topics, give seminars and lead group discussions.

*Typically offered in Fall only*

*This course is offered alternate years*

**FW 610 Special Topics in Fisheries and Wildlife Sciences** (1-6 credit hours)

Special topics in various aspects of fisheries and wildlife science are developed under the direction of a graduate faculty member. Also used to develop new courses.

*Typically offered in Fall, Spring, and Summer*

**FW 685 Master's Supervised Teaching** (1-3 credit hours)

Teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student upon completion of the assignment.

Prerequisite: Master's student

*Typically offered in Summer only*

**FW 693 Master's Supervised Research** (1-9 credit hours)

Instruction in research and research under the mentorship of a member of the Graduate Faculty.

Prerequisite: Master's student

*Typically offered in Fall, Spring, and Summer*

**FW 695 Master's Thesis Research** (1-9 credit hours)

Thesis research.

Prerequisite: Master's student

*Typically offered in Fall, Spring, and Summer*

**FW 696 Summer Thesis Research** (1 credit hours)

For graduate students whose programs of work specify no formal course work during a summer session and who will be devoting full time to thesis research.

Prerequisite: Master's student

*Typically offered in Summer only*

**FW 720 Epidemiology of Wildlife Diseases** (3 credit hours)

Concepts related to infectious disease outbreaks in free-ranging species of wildlife. Numerous examples of wildlife diseases will be used to illustrate factors affecting host-agent-environment interactions in fish, amphibians, birds, and both aquatic and terrestrial mammals. Enrollment in the Fisheries and Wildlife graduate program or Masters of Veterinary Public Health program; clinical residents or veterinary students at the College of Veterinary Medicine.

**FW 730 Ethics in Fisheries and Wildlife Sciences** (2 credit hours)

Students will explore historical and current thinking concerning the search for truth about natural systems, and the complex ethics scientists and practitioners who operate in the public sector must consider. Standards of professional and ethical behavior specific to Fisheries and Wildlife Sciences will be addressed. Faculty will introduce topics and guide discussions; students will give seminars and lead some discussions. For doctoral students in Fisheries and Wildlife Sciences.

*Typically offered in Fall only*

**FW 801 Issues in Fisheries and Wildlife Sciences Doctoral Seminar** (2 credit hours)

Current topics and issues in Fisheries and Wildlife Sciences Research. Students select and research topics, give seminars on Ph.D. proposals, and lead group discussions. For doctoral students in Fisheries and Wildlife Sciences.

*Typically offered in Spring only*

**FW 802 Seminar in Fisheries and Wildlife** (1 credit hours)

Current topics and issues in fisheries and wildlife biology and management. Students select and research topics, give seminars, and lead group discussions. For doctoral students in Fisheries and Wildlife Sciences.

*Typically offered in Fall only*

**FW 810 Special Topics in Fisheries and Wildlife** (1-6 credit hours)

Individual students or groups of students, under direction of a faculty member, will explore topics of special interest not covered by existing courses. Format may consist of readings and independent study, problems or research not related to dissertation. Also used to develop and test new 800-level courses. For doctoral students in Fisheries and Wildlife Sciences.

*Typically offered in Spring and Summer*

**FW 885 Doctoral Supervised Teaching** (1-3 credit hours)

Teaching experience under the mentorship of faculty who assist the student in planning for the teaching assignment, observe and provide feedback to the student during the teaching assignment, and evaluate the student upon completion of the assignment. For doctoral students in Fisheries and Wildlife Sciences.

*Typically offered in Fall and Spring*

**FW 893 Doctoral Supervised Research** (1-9 credit hours)

Instruction in research and research under the mentorship of a member of the Graduate Faculty. For doctoral students in Fisheries and Wildlife Sciences.

*Typically offered in Fall, Spring, and Summer*

**FW 895 Doctoral Dissertation Research** (1-9 credit hours)

Dissertation Research. For doctoral students in Fisheries and Wildlife Sciences.

*Typically offered in Fall, Spring, and Summer*

**FW 896 Summer Doctoral Dissertation Research** (1 credit hours)

Summer Dissertation Research. For doctoral students in Fisheries and Wildlife Sciences.

*Typically offered in Summer only*