DEPARTMENT OF WILDLIFE AND FISHERIES SCIENCES

wfsc.tamu.edu

Head: David Caldwell

Graduate Advisor: L. Hutchins

Graduate programs of study and research lead to the MS and PhD degrees in Wildlife and Fisheries Sciences. These programs prepare students for careers with academic institutions, governmental agencies and private business/industry. Studies in environmental conservation and education are available to those students interested in preparing themselves for public service in a number of fields other than research and management. The non-thesis Master of Wildlife Science and Master of Natural Resource Development degree programs are designed to give students broad academic training combined with practical experience, to develop problem-solving and management skills. The MS (thesis option) and PhD degrees require a strong background in the basic and applied agricultural and life sciences, particularly as they relate to whole-organism biological systems. The latter two degrees involve intensive research, and the resulting thesis or dissertation must demonstrate a superior knowledge and understanding of the subject area.

Graduate study in the Department of Wildlife and Fisheries Sciences normally requires some breadth in several disciplines, which differ among courses of study and are dependent on candidate background. The academic program of study is tailored to the background and educational goals of each degree candidate in consultation with his or her Graduate Advisory Committee. There are no foreign language requirements for any of the department’s graduate degree programs, unless set by the student’s Advisory Committee or the University.

Research activities in the department involve vertebrates, invertebrates, plants and natural-resource systems, and span the broad fields of wildlife ecology and management, fisheries ecology and management, aquaculture, biodiversity and systematics, conservation education/museum science and the human dimensions of wildlife and fisheries resource management. Research in these fields is supported by disciplinary expertise in aut- and synecology, evolutionary biology, resource sociology, animal behavior, physiology, animal diseases and parasitology, bioenergetics, nutrition, genetics, and systems analysis and modeling. Although much of the research program is without geographic bounds, the more site-specific aspects of the program focus on Texas, Mexico and the neotropics.

Facilities for research and graduate education include over forty laboratories with modern and sophisticated scientific instrumentation; an NSF-sponsored Center for Biosystematics and Biodiversity; the Biodiversity Research and Teaching Collections, which is among the largest collections of animals and genetic tissues in the New World; the Marine Mammal Research Facilities at Galveston; and an Aquacultural Research and Teaching Facility (laboratory and ponds) devoted to study of fish and invertebrate production for food and sport fishing. Field studies may be conducted at the Texas A&M University System’s off-campus research and extension centers. Texas A&M is a member of the Archbold Tropical Research Center on the Caribbean island of Dominica. Graduate students are eligible to apply for usage of laboratory and field facilities at both of these locations.

Some faculty members in the Department of Wildlife and Fisheries Sciences have appointments on the intercollegiate faculties of Genetics, Ecology, Nutrition and Toxicology; graduate students are eligible to seek degrees in those areas. The department also encourages interdisciplinary research efforts with other departments, and within the Institutes of Marine Life Sciences and Renewable Natural Resources.

The Department of Wildlife and Fisheries Sciences has a residency requirement for all MS and PhD students. Master of Science students must complete, on the campus at College Station, 9 credit hours during one semester. Students who enter the doctoral degree programs with baccalaureate degrees must spend four semesters, of 9 hours each, on the campus at College Station. Students who hold master’s degrees when they enter doctoral degree programs must spend two semesters, of 9 hours each, in resident study on the campus. A semester may be fall, spring, a 10-week summer semester, or two 5-week summer terms. Full-time staff members of the University or of closely affiliated organizations stationed on the campus at College Station may fulfill residency requirements by completion of less-than-full course loads. Any exception to these rules must be approved in writing by the department head and the Office of Graduate and Professional Studies.

Faculty

Barboza, Peregrine S, Professor
Wildlife & Fisheries Sciences
PHD, University of New England, 1991

Bixler, Richard P, Lecturer
Wildlife & Fisheries Sciences
PHD, Colorado State University, 2014

Conway, Kevin W, Associate Professor
Wildlife & Fisheries Sciences
PHD, Sain Louis University, 2010

Dewitt, Thomas J, Associate Professor
Wildlife & Fisheries Sciences
PHD, State University of New York - Binghamton, 1996

Dronen Jr, Norman O, Professor
Wildlife & Fisheries Sciences
PHD, New Mexico State University, 1974

Fitzgerald, Lee A, Professor
Wildlife & Fisheries Sciences
PHD, University of New Mexico, 1993

Fujiwara, Masami, Associate Professor
Wildlife & Fisheries Sciences
PHD, Massachusetts Inst of Technology, 2002

Gatlin III, Delbert M, Professor
Wildlife & Fisheries Sciences
PHD, Mississippi State University, 1983

Grant, William E, Professor
Wildlife & Fisheries Sciences
PHD, Colorado State University, 1974

Grace, Jacquelyn K, Assistant Professor
Wildlife & Fisheries Sciences
PHD, Wake Forest University, 2014

Head and the Office of Graduate and Professional Studies.
Huntley, Jerry W, Assistant Lecturer
Wildlife & Fisheries Sciences
PHD, Texas A&M University, 2017

Hurtado Clavijo, Luis A, Associate Professor
Wildlife & Fisheries Sciences
PHD, Rutgers, 2002

Klassen, Jessica A, Lecturer
Wildlife & Fisheries Sciences
PHD, Florida Atlantic University, 2016

Lacher Jr, Thomas E, Professor
Wildlife & Fisheries Sciences
PHD, University of Pittsburgh, 1980

Light, Jessica E, Associate Professor
Wildlife & Fisheries Sciences
PHD, Louisiana State University, 2005

Masser, Michael P, Professor
Wildlife & Fisheries Sciences
PHD, Texas A&M University, 1986

Mateos, Mariana, Associate Professor
Wildlife & Fisheries Sciences
PHD, Rutgers, 2002

Mora-Zacarias, Miguel A, Professor
Wildlife & Fisheries Sciences
PHD, University of California, Davis, 1990

Morrison, Mike L, Professor
Wildlife & Fisheries Sciences
PHD, Oregon State University, 1982

Perkin, Joshua S, Assistant Professor
Wildlife & Fisheries Sciences
PHD, Kansas State University, 2012

Roelke, Daniel L, Professor
Wildlife & Fisheries Sciences
PHD, Texas A&M University, 1997

Silvy, Nova J, Professor
Wildlife & Fisheries Sciences
PHD, Southern Illinois University, 1975

Voelker, Gary A, Professor
Wildlife & Fisheries Sciences
PHD, University of Washington, 1998

Winemiller, Kirk O, Professor
Wildlife & Fisheries Sciences
PHD, University of Texas, 1987

Yorzinski, Jessica L, Assistant Professor
Wildlife & Fisheries Sciences
PHD, University of California Davis, 2012

Masters

• Master of Natural Resources Development in Natural Resources Development (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/wildlife-fisheries-sciences/mnrd)

• Master of Science in Wildlife and Fisheries Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/wildlife-fisheries-sciences/ms)

• Master of Wildlife Science in Wildlife Science (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/wildlife-fisheries-sciences/mwsc)

Doctoral

• Doctor of Philosophy in Wildlife and Fisheries Sciences (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/wildlife-fisheries-sciences/phd)

Certificates

• Military Land Sustainability Certificate (http://catalog.tamu.edu/graduate/colleges-schools-interdisciplinary/agriculture-life-sciences/wildlife-fisheries-sciences/military-land-sustainability-certificate)

Courses

WFSC 602 Field Herpetology
Credit 1. 3 Lab Hours.
Field work involving collection and preservation of herpetological specimens; natural history, ecological relations.
Prerequisites: Graduate classification.

WFSC 603 History of Ecological Thought and Conservation Practice
Credits 3. 3 Lecture Hours.
Survey of the philosophical roots and evolution of ecological thought and conservation practice; emphasis on theoretical foundations, seminal concepts, classic papers, and historic trends.
Prerequisites: Course in general ecology and graduate classification or instructor approval.

WFSC 604 Ecological Modeling
Credits 3. 3 Lecture Hours.
Philosophical basis, theoretical framework, and practical application of systems analysis and simulation within the context of ecology and natural resource management; emphasis placed on development, evaluation and use of simulation models by students.
Prerequisite: Approval of instructor.

WFSC 605 Community Ecology
Credits 3. 3 Lecture Hours.
Overview and in-depth knowledge of community ecology; historical development; current issues, methodologies, and practical applications in natural resource management, biological conservation, agriculture, and human health; practice critical thinking, communication skills, and professionalism.
Prerequisite: Graduate classification.

WFSC 609 Wildlife Research Methods
Credits 3. 3 Lecture Hours.
Research methods for ecology and conservation; become familiar with the philosophy of natural science and develop skill in study design, grantsmanship, presentation techniques, critical evaluation of others’ work, and publication in refereed journals.
Prerequisites: Courses in general ecology and statistics and graduate classification or approval of instructor.
WFSC 610 Evolutionary Ecology  
Credits 3. 3 Lecture Hours.  
Survey the development of paradigms in evolutionary ecology; incorporates phylogenies into comparative analysis and macroecology; evaluates the roles of historical and local processes in determining species diversity.  
Prerequisite: Graduate classification.  

WFSC 611 Estuarine Ecology  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Principles governing the relationships of estuarine organisms to their environment; productivity, adaptations to environment, community structure and factors affecting the distribution and abundance of biota.  
Prerequisite: Invertebrate zoology and ichthyology or approval of instructor.  

WFSC 613 Animal Ecology  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Concepts of animal ecology which emerge at various levels or organization; the ecosystem, the community, the population and the individual; laboratories emphasis on the quantitative analysis of field data and the simulation of population dynamics.  
Prerequisite: Graduate classification or approval of instructor.  

WFSC 614 Down River: Biology of Gulf Coastal Fishes  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Understanding the biological complexity of Gulf Coast river systems while gaining hands-on experience in field and museum ichthyological techniques; sampling of the Guadalupe and San Antonio rivers; participation in lectures, museum preparation and archiving specimens at the Biodiversity Research and Teaching Collections (BRTC).  
Prerequisite: Graduate classification.  

WFSC 618 Wildlife Study Design and Analysis  
Credits 3. 3 Lecture Hours.  
Fundamental and advanced aspects of study design applicable to terrestrial animals; analysis and review of the scientific literature related to study design; and the development of study design for written and oral presentations.  
Prerequisite: Graduate classification or approval of instructor.  

WFSC 619 Wildlife Restoration  
Credits 3. 2 Lecture Hours. 3 Lab Hours.  
Study of the fundamentals of the restoration of animal populations and the resources they require; factors that control the distribution and abundances of animals in relation to restoration; and how restoration plans for wildlife are developed.  
Prerequisite: Graduate classification or approval of instructor.  

WFSC 620 Vertebrate Ethology  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Mechanisms and control of vertebrate behavior in an ecological context, as shaped by natural selection; classical and current theories regarding the genetic basis, development, specialized sensory systems and organization of responses in changing environment; laboratory emphasizes observational skills and quantitative analysis of behavior occurring in natural settings.  

WFSC 622 Behavioral Ecology  
Credits 3. 3 Lecture Hours.  
Integration of animal behavior with ecological and evolutionary principles; includes mating, predation, foraging ecology, social behavior, game theory and behavioral genetics; emphasis on quantification of behavior and strategy modeling.  
Prerequisites: Undergraduate ecology course; graduate classification.  

WFSC 623 Aquaculture  
Credits 4. 3 Lecture Hours. 3 Lab Hours.  
Principle of fish production for stock enhancement and human food. Species of fish used for production, cross-breeding and selection; feeds and feeding of fish and nutritional and environmental requirements for optimum productivity; effects of fish production on land and water uses as related to conservation.  
Prerequisite: Graduate classification or approval of instructor.  

WFSC 624 Dynamics of Populations  
Credits 4. 3 Lecture Hours. 2 Lab Hours.  
Principles, models and methods for analysis of population dynamics; analysis of contemporary research emphasizing theory and its uses in evaluation and management of animal populations. Laboratory emphasizes mathematical, statistical and computer modeling of population phenomena.  

WFSC 627 Ecological Risk Assessment  
Credits 3. 3 Lecture Hours.  
Approaches used to identify, evaluate and manage ecological risks of chemicals on aquatic and terrestrial environments; emphasis on methods useful to assess effects of contaminants on ecosystems; testing techniques, site assessment and monitoring procedures, regulatory requirements and field and laboratory techniques. Only one of the following can be applied to the requirements for a degree: WFSC 627 and WFSC 639.  

WFSC 628 Wetland Ecology and Pollution  
Credits 3. 3 Lecture Hours.  
Wetlands as ecological systems that are prime habitats for wildlife and fish; geomorphology, hydrology, limnology, plant and animal communities, and humans use and management; wetlands as ultimate reservoirs of environmental pollutants; distribution, fate and effects of environmental pollutants on aquatic and terrestrial wildlife.  
Prerequisite: Graduate classification or approval of instructor.  

WFSC 630 Ecology and Society  
Credits 3. 3 Lecture Hours.  
Study and compare human and natural ecosystems using diversity, interrelations, cycles, and energy as the conceptual organization; central themes of the course are sustainability, stewardship and science.  
Prerequisite: Graduate classification or approval of instructor.  

WFSC 632 Ethology  
Credits 3. 3 Lecture Hours.  
Survey of the control, ontogeny, function and natural selection of behavior in a variety of vertebrate and invertebrate species; interaction between the organism and its environment with regard to the mechanisms and adaptive significance of behavior; evolution of anti-predator, feeding, reproductive and cooperative traits.  
Prerequisites: BIOL 112 or equivalent; graduate classification.  

WFSC 633/GENE 633 Conservation Genetics  
Credits 3. 3 Lecture Hours.  
Genetic concepts and techniques relevant to management and conservation of biological diversity, research and conservation strategies within a conservation genetics framework.  
Prerequisite: Introductory courses in genetics and ecology or biological conservation.  
Cross Listing: GENE 633/WFSC 633.
Concurrent registration in WFSC 636 is strongly encouraged.

Prerequisite: Graduate classification or approval of instructor.

WFSC 636 Wildlife Habitat Management
Credits 3. 3 Lecture Hours.
Designed to acquaint with major land use practices on lands that produce wildlife, how these influences wildlife production and alterations or manipulations of habitat used to achieve specific wildlife management goals.
Prerequisite: Graduate classification or approval of instructor.

WFSC 638 Techniques of Wildlife Management
Credits 3. 2 Lecture Hours. 3 Lab Hours.
Techniques available to directly and indirectly manipulate wild animal populations to achieve balance between socioeconomic and aesthetic values.
Prerequisite: Graduate classification or approval of instructor.

WFSC 639 Wildlife Ecotoxicology
Credits 3. 3 Lecture Hours.
Distribution, fate, and effects of environmental pollutants on wildlife behavior and reproduction. Global distribution of pollutants and effects on near and remote ecosystems. Field studies, biomarkers, stable isotope and various techniques for evaluating pollutant hazards on wildlife. Only one of the following will satisfy the requirements for a degree: WFSC 627 and WFSC 639.
Prerequisites: Courses in CHEM and BICH and graduate classification or approval of instructor.

WFSC 640 Human Dimensions of Wildlife and Fisheries Management
Credits 3. 3 Lecture Hours.
Theory and applications for considering human dimensions in an integrated approach to wildlife and fisheries management; a social science perspective with emphasis to diversity of human values, role of constituency groups, wildlife and fisheries policy development, conflict management, management decision-making, research methods and management case studies.

WFSC 641 Sustainable Military Land Management
Credits 3. 3 Lecture Hours.
Overview of the Department of Defense (DOD) lands within a temporal, geographic, and environmental context and perspective; major policies/laws impacting military land use and areas critical to mission sustainment; management strategies important to sustaining installations and ranges.
Prerequisite: Graduate classification or approval of instructor.

WFSC 642 Field Military Land Management
Credits 1. 0 Lecture Hours. 2 Lab Hours.
Review of land management practices and challenges on military and adjacent private lands through field visits of select military installations; field trips required during Spring Semester.
Prerequisite: Graduate classification or approval of instructor; previous or concurrent registration in WFSC 636 is strongly encouraged.

WFSC 644 Wildlife and Natural Resource Policy
Credits 3. 3 Lecture Hours.
Review formation and implementation of major natural resource laws and policies that impact land uses; overview of natural resource laws/policies followed by presentations of a selected case study; current natural resource management (including forestry, air, water, wildlife, climate change and energy) programs and institutions analyzed and related to current natural resource policy challenges.

WFSC 646 Quantitative Phylogenetics
Credits 3. 2 Lecture Hours. 1 Lab Hour.
Designed to provide the theory and tools required for inference of phylogenetic (evolutionary) relationships among biological taxa using various types of comparative data including morphological characters, biochemical and molecular characters, and DNA sequences; hands-on analysis of data using contemporary tools.
Prerequisites: ENTO 601 or approval of instructor.
Cross Listing: ENTO 606 and GENE 606.

WFSC 647/NFSC 651 Nutritional Biochemistry of Fishes
Credits 3. 3 Lecture Hours.
Principles of nutritional biochemistry including nutrient metabolism and biochemical energetics with special emphasis on finfish and shell fish.
Prerequisite: BICH 410 or equivalent.
Cross Listing: NFSC 651/WFSC 647.

WFSC 648/GENE 648 Molecular Evolution
Credits 3. 2 Lecture Hours. 1 Lab Hour.
Theory and tools used in the analysis of molecular evolutionary patterns of DNA and protein sequences; format combines lecture presentations by instructor discussion of relevant scientific literature, computer exercises, preparation of research proposal or independent research project, and practice in peer-review process.
Prerequisite: Basic courses in general Genetics and Evolution.
Cross Listing: GENE 648/WFSC 648.

WFSC 649 Principles of Fisheries Management
Credits 4. 3 Lecture Hours. 3 Lab Hours.
Basic knowledge of ichthyology, biology of fishes and limnology related to applied aspects of freshwater and marine fishery science; management techniques applicable to streams, ponds, reservoirs, estuaries and the oceans.
Prerequisite: Graduate classification.

WFSC 654 Amazon Field School
Credits 4. 4 Lecture Hours.
Investigation of social and ecological complexities of biodiversity conservation in tropical ecosystems; biological and social science approaches to evaluate causes, consequences and solutions to biodiversity loss through ecology, culture and governance.
Cross Listing: RPTS 654 and VTM 604.

WFSC 655/RPTS 655 Applied Biodiversity Science I
Credits 3. 3 Lecture Hours.
Applied Biodiversity Science. Students will study in the areas of Conservation genetics, metapopulations, landscape ecology, and ecosystem management.
Prerequisite(s): Graduate classification.
Cross Listing: RPTS 655/WFSC 655.
**WFSC 670 Excel Biometry**  
**Credits 3. 3 Lecture Hours.**  
Rational and mathematics behind upper level biometrical methods; construct spreadsheets and analyze a common data set; topics include multiple regressions, principle components analysis, multivariate analysis of variance and others.  
**Prerequisites:** Graduate classification; STAT 651 or equivalent.

**WFSC 681 Seminar**  
**Credit 1. 1 Lecture Hour.**  
Important current developments in wildlife or fisheries fields with special reference to literature. Students may register up to but no more than two sections of this course in the same semester.

**WFSC 684 Professional Internship**  
**Credits 1 to 16. 1 to 16 Other Hours.**  
On-the-job training in fields of wildlife and fisheries sciences.  
**Prerequisite:** Graduate classification in Wildlife and Fisheries Sciences.

**WFSC 685 Directed Studies**  
**Credits 1 to 6. 1 to 6 Other Hours.**  
Individual study and research on selected problem approved by instructor and graduate advisor. Credit adjusted in accordance with requirements of each individual case.  
**Prerequisite:** Approved proposal.

**WFSC 689 Special Topics in...**  
**Credits 1 to 4. 1 to 4 Lecture Hours. 0 to 4 Lab Hours.**  
Special topics in wildlife ecology, fisheries ecology, vertebrate systematics, evolutionary biology of vertebrates and conservation education. May be repeated for credit.

**WFSC 691 Research**  
**Credits 1 to 23. 1 to 23 Other Hours.**  
Original research on selected wildlife and/or fisheries problem to be used in thesis or dissertation.