The University of Memphis Department of Biological Sciences Ecological Research Center

Historical Review and View for the Future

Inception

- South Campus was deeded to the University in 1967
- Provided office and research space
- Research focused on both aquatic and terrestrial habitats
- Ecological Research Center established within the University in 1973

Objectives

- To meet the need for information relating to ecology (locally, regionally, nationally and world-wide)
- To provide an academic unit within the University that would foster its goals of discovery and dissemination of critical knowledge to the community of Memphis, the state of Tennessee and the nation.
- To prepare diverse graduate and undergraduate students for successful careers in ecology and related fields

Facilities and Collections

- Offices, classrooms, labs and field space
- The University of Memphis Museum of Zoology mammal collection, containing specimens from the United States and Mexico
- A fish collection containing representative fishes of the Mid-South and Mexico.
- Offices of the **USF&WS Wildlife and Habitat Management** and the **USGS Water Resources Division**
- Research and teaching activities are integrated with facilities at Ellington Biology and Life Sciences Buildings.
- Activities of the ERC are closely coupled with those of The **Edward J. Meeman Biological Station** (MBS)
- A newly constructed aquaculture research building provides 4,000 ft^2 of wet lab space for aquaculture research

Aquaculture Facilities

Research Concentrations

- Wildlife Ecology
- Conservation
- Physiological Ecology
- Behavioral Ecology
- Aquaculture
- Reproductive Biology
- Ecological Genetics
- Biogeography
- Systematics

Faculty

Dr. Randall Bayer, rbayer@memphis.edu plant systematics, evolution and phylogeny; Chair

Dr. Melvin Beck, mbeck@memphis.edu ecological genetics

Dr. Michael Ferkin, mhferkin@memphis.edu physiological ecology, behavior

Dr. David Freeman, dfreemn1@memphis.edu neuroendocrinology, biological rhythms

Dr. Michael Kennedy, mlkenndy@memphis.edu wildlife ecology, mammalogy

Dr. Charles Lessman, clessman@memphis.edu developmental biology

Dr. Jennifer Mandel, jmandel@memphis.edu, ecological and evolutionary genetics

Dr. Duane D. McKenna, dmckenna@memphis.edu, systematic entomology

Dr. Matthew Parris, mparris@memphis.edu evolutionary ecology

Dr. Reza Pezeshki, pezeshki@memphis.edu physiological ecology, wetlands

Dr. Bill Simco, bsimco@memphis.edu aquaculture

Dr. Tit-Yee Wong, tywong@memphis.edu microbial ecology

Examples of Past Research

- Hormonal/environmental control of reproduction, stress physiology and water quality in aquaculture
- Assessments of rare and endangered plants and animals on a proposed coal gasification site
- Survey of significant biota within the surroundings of a sewage treatment plant
- Development of a checklist for mammals
- Streams surveys at a regional national park
- Survey of mammals within the Cumberland River Drainage Basin in Tennessee

Examples of Current Research

Wildlife Ecology and Conservation Biology

- Role and impact of “mesopredators” (raccoons and opposums) and their impact on nesting Northern bobwhites
- Improving management practices for food resources of migratory waterfowl and shorebirds
- Investigating restoration of canebrake habitat to the Mid-South
- Evaluating the role of macrophytes in cycling of nutrients and contaminants in aquatic systems
- Monitoring deer populations (collaboration with TWRA and USFWS)
- Identification and distribution of mammalian biodiversity in TN
- Understanding landscape level effects on biodiversity
- Evaluating effects of urbanization ecosystems

Examples of Current Research

Physiological Ecology

- Understanding physiological effects of natural and anthropogenic factors on plant survival, productivity and distribution
- Evaluating effects of salt water intrusion on plant systems in the Gulf of Mexico
- Identifying environmental influences on nest emergence in hatchling turtles and embryological development in vertebrates
- Identifying environmental influences on digestion and feeding in snakes and crocodilians
- Identifying cues used by birds to time reproduction
- Determining environmental influences on regulation of the seasonal cycles in mammals
- Assessing the influence of predators on behavior of elk
- Determining factors that limit growth and reproduction of channel catfish

Examples of Current Research
Theoretical, Behavioral and Evolutionary Ecology

- Dynamics of mating strategies in small mammals
- Role of hybridization in survival of amphibians, and response of bottomland tree species to changes in flooding regimes
- Impact of chromosomal integrity and ploidy on organisms and natural populations
- Role of enzymes and blood proteins in the population dynamics of boll weevils, kangaroo rats, crayfish, fish and amphibian populations

Publications

- Journal of Wildlife Management
- Wildlife Society Bulletin
- Journal of Mammalogy
- Ecology
- Animal Behavior
- Genetica
- Systematic Zoology
- Journal of Parasitology
- Auk
- Ethology
- Heredity
- Copeia
- Physiological Zoology
- General and Comparative Endocrinology
- Aquaculture
- Transactions of the American Fisheries Society
- Canadian Journal of Fisheries and Aquatic Sciences

Post-Graduate Placement

ERC graduates occupy professional positions throughout the world as:

- Directors of Federal research and extension programs
- State and Federal Fisheries and Wildlife Biologists
- Researchers and Managers at museums, zoos, and international programs
- University Professors

Teaching

- Students study plants and animals in laboratory and field environments
- Field courses and extended field trips to parts of US, Mexico, Trinidad and Belize
- Gives students first hand knowledge of ecological principles learned in classes
- Summer courses include:
  - Field Techniques in Vertebrate Ecology
  - River and Stream Ecology
  - Local Flora of Tennessee

What has worked?

- Historically, two strong concentrations:
  - Ecology and Molecular Biology
  - Grown from 1° teaching to nationally recognized research department
  - More than 300 students and several million dollars in grants administered
- Recently, ecology core remained strong with added emphasis on:
  - conservation biology and evolutionary ecology

What is the Challenge?

- To continue **to be recognized** at the national and global level
- To keep ourselves and our students **in the mainstream** of a competitive workplace
- To **anticipate changes** will occur in the environment and accept them as driving forces for new research
- To **be seen as leaders** in the evolution of the new frontier – Urban Ecology