

## WILDLIFE DAMAGE MANAGEMENT CLASS AND CURRICULUM AT THE UNIVERSITY OF GEORGIA

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**Abstract:** The Warnell School of Forest Resources at the University of Georgia offers a course in wildlife damage management. The 3-credit hour course is taught at the undergraduate/graduate level. Enrollment is restricted to 10 students. The course is offered in spring semester every year and co-taught by a wildlife faculty member and the State Director of USDA – Wildlife Services (WS), who holds adjunct faculty status. The course consists of 2 hours of classroom lecture and a minimum of 3 hours laboratory time each week. Lectures cover basic principles of wildlife damage control. Lab time is devoted to field exercises related to wildlife damage management activities conducted by Wildlife Services. During spring semesters in 2002 and 2003 students participated in Canada goose and feral duck removal utilizing alph-chloralose, use of explosives for beaver damage control, deer collections at three residential communities, predator trapping and management, pigeon removal with rocket nets, double-crested cormorant collection and food habits analysis, interactive media training, an on-line discussion group with high school students regarding urban deer management, a visit to an aquaculture facility, and the presentation of three 30-minute lessons to a local elementary school science club. In this paper, we will discuss the course philosophy and course outline, review the wildlife curriculum at the University of Georgia, present some results of lab exercises and discuss the course evaluation.

**Key words:** beaver, Canada goose removal, classroom training, damage management class, double-crested cormorant, field exercise, media training, pigeons, predator control, urban deer management

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### GRADUATE PROGRAM

The Daniel B. Warnell School of Forest Resources (WSFR) at the University of Georgia (UGA) offers graduate (M.F.R., M.S. and Ph.D.) and undergraduate (B.S.) degrees in forest resources with a major in wildlife. The Graduate Program offers three degree options: the Master of Forest Resources (non-thesis), Master of Science, and Doctor of Philosophy. Students major in Wildlife Ecology and Management. There are approximately 137 students enrolled in graduate programs at WSFR of

which approximately 35 are majoring in wildlife ecology and management. During 2002-2003, the school had 49 faculty. This included in the wildlife program, seven full-time faculty, three faculty with joint appointments and several adjunct faculty.

Between 1961 and 2000, graduate students in WSFR completed over 600 theses and dissertations. Those on wildlife topics number approximately 185 (31%). The top six topics were: deer (mainly white-tailed deer (*Odocoileus virginianus*)) (N=21;

24%), songbirds (N=21; 11%), small mammals (N=11; 6%), wildlife/timber habitat relationships (N=11; 6%), radiation or pesticides (N=10; 5%), and quail (N=7; 4%). The remaining volumes span over 33 additional topics. Some theses and dissertations are clearly related to damage management such as "Evaluation of relocation and euthanasia methods for urban deer management" (Schwartz 1997). Others are less clear but applicable. Topics include: white-tailed deer (*Odocoileus virginianus*) behavior and communication; predator ecology including bobcat (*Felis rufus*), and bear (*Ursus americanus*); red fox (*Vulpes vulpes*); pocket gophers (*Geomys pinetis*); and feral swine (*Sus scrofa*). Current topics under investigation include bat ecology, songbird response to agriculture practices, food plots and deer, nest predator impacts on northern bobwhite (*Colinus virginianus*), deer ecology, and pine plantation management.

A conservative estimate of theses and dissertations on topics directly related to wildlife damage management is 6% (N=11). A more liberal estimate is 14% (N=26). Clearly the potential exists for increased research in this area which is dependant on competition and available funds for assistantships and research projects. None of the approximately 185 wildlife theses or dissertations focused specifically on habitat modification, exclusion or repellents as related to wildlife damage mitigation. There have been some studies done by undergraduate students for senior thesis projects dealing with wildlife damage and repellents. However, records of these projects are often anecdotal and not compiled in any systematic manner.

#### **UNDERGRADUATE PROGRAM**

The undergraduate curriculum at the Warnell School of Forest Resources is a two-tier professional program. Under-

graduates are admitted into the University of Georgia and must apply for a separate admission decision into the Warnell School. The undergraduate program is a 2-year professional program for juniors and seniors. Students may major in one of five areas – Fisheries and Aquaculture, Forest Environmental Resources, Forestry, Wildlife, and Dual Forestry and Wildlife. Currently, overall school enrollment is at 203 students and 122 students are in the professional program. There are approximately 47 wildlife majors (38.5%). Forestry, with 52 majors (42.6%) is the largest program. Traditionally, fisheries and aquaculture (9 majors, 7.3%) and forest environmental resources (14 majors, 11.4%) have the fewest number of undergraduate majors.

During the first two years of the undergraduate program, students complete the required University Core Curriculum (known as the Reagent's Core). The core consists of 60 semester credit hours in six core areas that include: essential skills; institutional electives; humanities/fine arts; science, mathematics and technology; social sciences; and courses related to the program of study which includes 18 credit hours specified by the major program. Students apply for admission in the forestry professional program during their sophomore year. Admission requires a minimum grade point average (GPA) of 2.5 on a 4.0 scale. Students with less than the required minimum can be admitted if there is space available and the student provides evidence that they will do well in the professional program.

The professional program in wildlife requires 63-66 additional credit hours and all graduates meet the requirements for certification as an Associate Wildlife Biologist as defined by The Wildlife Society (TWS). Seventeen credit hours of course work in forestry courses such as:

dendrology, soils and hydrology, silviculture, forest economics and management, and forest policy are required. Additionally, wildlife majors complete 16 hours in forestry/wildlife courses such as: field methods, forest ecology, introduction to fisheries and wildlife, biometrics and spatial analysis (GIS). The remaining 31-33 credit hours are completed with wildlife courses such as: vertebrate natural history, wildlife habitat management, wildlife management techniques, applied population dynamics and a senior management project or senior research thesis. Students also choose two courses from ornithology, mammalogy or wildlife physiology and nutrition and one "free" elective. One possible elective is the wildlife damage management course.

Wildlife damage management is taught as a dual listed course carrying credit for both graduate (FORS 6900/6900L) and undergraduate students (FORS 4900/4900L). The course carries 3-semester hours credit and meets for 2 hours of lecture and 3 hours of laboratory time each week. The course is taught every spring semester. The university catalog description states the course will cover the "theory and practice of assessing and controlling damage done by wild and feral vertebrate animals, especially mammals and birds". The format includes

lectures and applied, "hands-on" laboratory work using "real-world" examples.

Enrollment is limited to 10 students to maximize quality of instruction and field experiences and for logistical reasons. Enrollment figures were 8 students in both spring 2002 (3 undergraduate and 5 graduate students) and spring 2003 (5 undergraduate and 3 graduate students). The limit was not reached because of the already restricted general curriculum, overall enrollment in WSFR and the course reputation, which will be discussed later in this paper.

The course has two instructors with an approximately equal split of time and duties (Table 1). The same instructors taught the course in both 2002 and 2003. Prior to the senior author's arrival at UGA, Hall and the former wildlife specialist taught the course. Activities include approximately 30 total hours of classroom instruction during the semester and 45-60 hours of lab and field time. Many lab exercises continue beyond dark and beyond the allotted time slot. The course includes a 4-day field trip to South Georgia. Actual lab activities are somewhat planned in advance but depend on the nature of work being conducted by the state office of USDA Wildlife Services. Students in the course are integrated into actual wildlife damage management activities by the State Director (Doug Hall).

**Table 1. General division of duties as split between 2 instructors teaching the wildlife damage management class at the Warnell School of Forest Resources, University of Georgia.**

Doug Hall	Mike Mengak
Classroom Lectures and Lab	Classroom Lecture
Deer	House and Urban Wildlife
Beaver	History of Wildlife Damage
Pigeons	Economics of Wildlife Damage
Ducks/Geese	Middle School Presentations
Predators	Deer Dilemma Exercise
Media Training	Class Administration
Aquaculture	Tests, lab reports, grades, etc.
Other topics	

## CLASS ACTIVITIES

Students participate in a wide variety of real world field activities that provide opportunities to resolve human-wildlife conflicts and expose them to actual situations experienced by WS personnel. They receive instruction in the safe and practical use of many wildlife damage management tools and technologies. Along the way, students receive a review and reinforcement of techniques learned in other classes (e.g., wildlife management techniques class and wildlife diseases). Students who have never utilized firearms are introduced to basic gun handling and the entire class reviews gun safety through a skeet shooting activity. Basic hunting techniques, ethics, field dressing and simple necropsy are also covered. Two previously naive students from the 2002 class have purchased a shotgun and hunting license as a result of class activities.

### White-tailed Deer

During 2002 and 2003, the damage class participated in several deer management programs, which took place at residential communities and on state owned property. At residential communities, an employee of the community accompanies the collection vehicle to advise on shot safety and to handle any potential conflicts with residents. Students ride along with WS personnel to observe spotlight collection techniques and to process all collected deer. Wildlife Services personnel remove deer by shooting according to GA Department of Natural Resources and WS guidelines. Students gather information about the collection process including number of deer seen, number of shots taken, and number of shots not taken for safety reasons. They also collect biological information on the deer including weight, sex, age, antler points, fetal measurements, and corpea lutea counts. Students age the deer by tooth wear and

replacement (Dimmick and Pelton 1994). Fetus are aged and conception and parturition dates estimated using a fetal age scale (Hamilton et. al. 1985).

Students assisted in collecting 182 deer (34 deer – Jan. 2002; 120 deer – Feb. 2002; 28 deer – Feb. 2003). An estimated 7,500 pounds of venison were donated to local charities for their food bank programs as a result of our collections. Students write a detailed laboratory report on the collection activities and are graded as part of the course requirements. Lab reports are submitted in manuscript format according to guidelines for *Journal of Wildlife Management*. Students struggle though the initial lab reports, but develop valuable writing and editing skills as the class progresses.

### Beaver

Students assisted in trapping nuisance beaver from private land. Activities in this exercise included setting snare and conibear traps, hand removal of dams and observation of dam removal using binary explosives. They discuss other options such as the Clemson beaver pond leveler and three-log drains, and collect basic biological information on captured animals such as sex and age determination, reproductive evaluation of placental scars and corpa lutea counts. Students prepare a written lab report covering the exercise.

### Waterfowl

Students have assisted in capturing and relocating ducks and geese from residential and municipal recreation area ponds. Birds are sedated with the orally active drug alpha-chloralose under the supervision of the state WS director. Here, students gain valuable hands-on sex and age determination as well as banding techniques, wing clipping, cage design and safe boat

handling. Again, a formal lab report is required.

### **Other Birds**

Students have assisted in removal of crows from a pecan orchard in South Georgia using shotguns. Students heard a presentation on West Nile Virus and blood samples were collected for a West Nile Virus study. Pigeons have been collected from the CSX rail yard in North Atlanta using rocket nets. Students observed safe gun handling practices while collecting crows and the operation of a rocket net along with procedures for blood collection.

While on an extended field trip, students collected over 135 double-crested cormorants from Walter F. George Lake near Ft. Gaines, GA. Students used shotguns to collect birds and dead birds were examined for age and sex determination and food items in the crop were tallied to evaluate impact of foraging by cormorants at catfish aquaculture facilities. Another detailed laboratory report was required.

### **Predators**

As part of a multi-year project in South Georgia between WS, UGA, Tall Timbers Research Station, and Auburn University, students in the damage management class assisted in collecting predators from two quail plantations. Techniques included using foothold, conibear and cage traps. Animals collected included bobcat, raccoon (*Procyon lotor*), coyote, (*Canis latrans*), opossum (*Didelphis virginiana*), and feral hog (shot not trapped). Biological data (blood sample, weight, sex, age, reproduction condition, number of fetuses) were collected on all captured animals and a formal lab report was submitted for a grade.

### **Other Activities**

All students received 3 hours of media training by a WS Legislative and Public Affairs Media Specialist. Activities included a presentation on how to respond to media requests for information and practice interviews in front of a video camera. Students reviewed and critiqued their performances with the media specialist.

All students presented three 30-minute programs to 5<sup>th</sup> grade science club students at a local elementary school. Topics included identification of mammals using skulls and pelts, alligators (using two live "baby" alligators) and deer biology, including a discussion of damage, age criteria from jaws, antler characteristics and hunting.

Graduate students also served as experts in the USDA's Living with Wildlife - Deer Dilemma program "Deer, Oh Deer!" Students received inquiries from middle and high school students in Georgia and Colorado by email, researched an answer and responded by email.

### **Lectures**

Lectures for this course cover background information on the animals and issues encountered in the lab exercises. Additional lectures include identification of predator sign in livestock depredation, birds and airport issues, fencing and repellents for deer and other species, wildlife depredation and endangered species conflicts. The operation of USDA APHIS and WS and county agent issues are reviewed. Homeowner issues (such as moles, chipmunks [*Tamias striatus*] and other "less glamorous" species) are covered in lectures. Emphasis is placed on utilizing a variety of non-lethal techniques to resolve human-wildlife conflicts when practical. The definition of wildlife damage management is stressed as "human wildlife conflict resolution" and we continually work to "strike a balance between human interests

and the needs of wildlife in real world situations.

### **COURSE EVALUATION**

The WSFR uses a 5.0 scale for course and teacher evaluations (5 = highest; 1 = lowest). Students are asked to respond to 8 questions covering such standard items as knowledge and enthusiasm of instructors, organization of class and lab material, practicality of the course, workload, course value to their career and overall education, and overall evaluation of the course. Evaluation scores for Spring 2002 ranged from 3.4 to 4.8 with tests and workload receiving a low score reflecting the heavy workload including field time and time devoted to report writing. However, the overall course evaluation was 4.8 out of a possible 5.0. Students comments included "hands-on", "best labs ever", "large amounts of time required", and "awesome!" Based on reputation and student comments from the Spring 2002 course, the Spring 2003 course was over-enrolled with 12 students – four of whom dropped the course because of other workload issues. All students spoke informally to the instructors about the high value of the course to their education. Students who were not able to get into the class expressed their disappointment and their strong desire to take the course.

### **SUMMARY**

During the Wildlife Damage Management class at the University of Georgia, students received practical and applied instruction in actual wildlife damage management problems. Techniques included collecting data on weight, sex, age, and reproductive status of selected birds and mammals. Capture methods included drugs (alpha-chloralose), trapping (snare, foothold, conibear, and cage traps), shooting, and rocket nets. Students gained experience in presenting information to live

audiences and in working with the media. Students collected field data, summarized and analyzed their data and presented written laboratory reports in manuscript format. Students were exposed to conflict resolution, safe gun handling, daytime and nighttime collection and fieldwork. For some, it was their first exposure to dealing with live animals, collecting animals and field dressing animals.

Having two instructors is expensive but the benefits to the students and the overall wildlife curriculum far outweigh the costs. There is pressure to increase enrollment but this is not feasible from a safety and logistical perspective. The small class insures safety and allows hands-on learning and close personal interaction among the students and with the instructors. The WS State Director adds an invaluable experiential component to the course. For many students, this course is their first exposure to human-wildlife conflicts, techniques to minimize conflicts, firearms, hunting, trapping and dead animals. It is a very valuable learning experience.

Other states in the southeast and mid-Atlantic regions should strongly consider co-operative agreements to locate the WS State Director (or an assistant) on campus at the Land Grant University. Such an agreement, with adjunct faculty status when appropriate, will add a significant measure to the overall wildlife curriculum if the state director assists in teaching the wildlife damage course. This in no way diminishes the current courses taught by faculty, but instead allows access to techniques and species (migratory birds) that are not otherwise available to non-WS personnel.

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