February 1991

Wildlife Damage Education and College Curricula

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EDUCATIONAL OPPORTUNITIES AT THE UNIVERSITY OF NEBRASKA-LINCOLN

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Proc. East. Wildl. Damage Control Conf. 5:153-154. 1992.

University students, particularly those enrolled in natural resources programs, make up one of the smallest, yet potentially most important and influential audiences for wildlife damage professionals. Considering that these students will be tomorrow's natural resources technicians, biologists, and administrators, I feel that it is critical that we provide them factual information about wildlife damage to increase their awareness of potential problems and solutions, and increase their ability to make well-informed decisions.

An important aspect of education is accurate audience identification and association. This is not an easy task, however, as today's audience is collectively a moving target. Once primarily rural and agriculturally oriented, it is now increasingly urban. Although I teach in mid-America at one of the nations most prestigious agricultural colleges, 80 to 90% of the students in my wildlife damage courses have urban backgrounds. With this changing environment, individual attitudes have changed, which makes our efforts all the more challenging andessential. We can have animpactonattitudesaboutwildlife and wildlife damage management (TimmandSchemnitz 1988), but the use of different media and educational strategies will be required to get the message across.

The University of Nebraska-Lincoln offers a Bachelor of Science degree in Natural Resources with a major in Fisheries and W ildlife that is administered by the Department of Forestry, Fisheries, and Wildlife (FFW). Three of the 7 fish and wildlife faculty (myself, R. M. Case, and R. J. Johnson) share an interest in wildlife damage management, and conduct associated teaching, research, and extension activities. The department was recognized as a national leader in wildlife damage management during a 1989 Cooperative State Research Service (CSRS) Review. ,

COURSE OFFERINGS

Wildlife Damage Management (FFW 348)

FFW has offered a 3-credit course, entitled "Wildlife Damage Management" every spring semester since 1985. It is a junior-level course designed to cover the fundamentals of prevention and control of damage caused by vertebrate species, principally mammals and birds. It provides an opportunity for discussion of the philosophical, environmental, and sociological aspects of wildlife damage management. The book *Prevention and Control of WildlifeDamage* by R. M. Timm is used as a text. It was produced by the University of NebraskaNebraskaCooperative Extension (NCE) in 1983 and is currently being revised by me, R. M. Timm, and G. L. Larson. Other readings are assigned from NCE NebGuides and Circulars, *The Wildlife Society Bulletin,* and proceedings of the Eastern Wildlife Damage Control Conferences, Great Plains Wildlife Damage Control Workshops (GPWDCW), and Vertebrate Pest Conferences. During 1989, students participated in the Ninth GPWDCW in Ft. Collins, Colorado and in 1991 they assisted in hosting the Tenth GPWDCW in Lincoln, Nebraska. The course has received high marks in student evaluations and has fre-quently been referred to as "one of the most useful courses offered on campus." Average enrollment since 1985 has been 20 students.

Internship in Forestry, Fisheries, and Wildlife (FFW 486/ 896)

In 1990, C. S. Brown, State Animal Damage Control Director, and I developed a Cooperative Education program between the Nebraska office of the United States Department of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control (ADC) and FFW. In this program, 1 student per year is employed by ADC for 2, 3-month periods, during which time he/she may earn 3-6 semester-hours of credit. These internships are excellentopportunitiesforstudents to gain experience in fieldwork, administration, policy, and public education. Internships were identified as a priority issue by FFW in 1989. Upon satisfactory performance and completion of the degree, the student is provided a noncompetitive hiring status with ADC for 4 months. T. D. Halstead was the first student in FFW to undertake this internship during 1990-91, and he is now serving as an Assistant District Director for ADC in Phoenix, Arizona. A second internship has been established with K.1. King for 1992-93.

Independent Study in Forestry, Fisheries, and Wildlife (FFW 486/896)

Independent Study offers students an opportunity to earn 1-5 semester hours of credit while exploring a subject in natural resources that interests them, be it field or lab research, literature review, assistance with established projects or other worthwhile experiences. Since 1980, more than 12 students have completed wildlife damage-related projects on subjects such as: (1) impacts of predators on waterfowl; (2) life history studies on beaver *(Castor canadensis),* coyote *(Cams latrans),* red fox *(Vulpes vulpes),* and pocket gopher *(Geomys bursarius);* (3) rodenticide testing; (4) cottontail rabbit *(Sylvilagusfloridanus)* and prairie dog *(Cynomys Itidovicianus)* exclusion; (5) landowner attitudes; and (6) agency policy.

Graduate Studies

FFW offers a Master of Science degree in Fisheries and Wildlife. Successful completion requires satisfactory coursework, proficiency in oral and written communication, and computer and statistical applications, and completion of a

scientific project. To date, 15 students in FFW have completed wildlife damage-related projects and published theses on a variety of subjects including impacts of coyotes on livestock, predators on waterfowl, tree squirrels (Sciurus spp.) on power transformers, pocket gophers on forages, and small mammals on emerging field crops; activities and life history of pocket gophers; grazing management and barrier fences forprairie dog control; lines for excluding house sparrows (Passerdo»wsticus); repellents for small mammals; and many more. Currently 4 graduate students are nearing completion of their projects, including lines for excluding house sparrows, behavioral ecology of pocket gophers, and habitat selection of white-tailed deer *(Odocoileus* virginianus) and subsequent impacts on agricultural crops.

Future Additions

I am interested in developing 2 new courses that cover perceived deficiencies in our current wildlife damage managementcurriculum. First, I wish to include a techniques labby 1993 that would be offered concurrently with FFW 348, the lecture course. This lab would provide opportunities for "hands-on" instruction of wildlife damage control methods and materials, computer applications, field trips, and other activi

ties. Second, I would like to develop a graduate-level reading course or seminar by 1993 that would focus on current issues wildlife damage management. Subjects would include losophy, public policy, regulations, animal rights/welfare economic analysis, public education, current events, and ers. Open discussions would provide for an exchange of' in sufficient depth and rigor to fully challenge our grad students. Iamcurrentlyexaminingthepossibilityofestablis a Wildlife Damage Management Emphasis in our c Fisheries and Wildlife major. The inclusion of existing proposed wildlife damage courses along with courses " population dynamics; integrated pest management; pesticides policy; agronomy, horticulture, and/or animal sciences; communications would provide sufficient direction in an education cational program to justify Emphasis status. We hope this would be an attractive option for students interested in a career in wildlife damage management.

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SYNOPSIS OF A COURSE ON THE PRINCIPLES OF WILDLIFE DAMAGE MANAGEMENT

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Proc. East. Wildl. Damage Control Conf. 5:155-156. 1992.

Five courses were offered by Utah State University's Program in Wildlife Damage Management (WDM) in 1991: (1) Principles of WDM, (2) WDM Techniques, (3) WildlifeLivestock Relationships, (4) WDM Policy, and (5) Urban Wildlife Management. Principles of WDM was the introductory course in this series. It was an upper-division course; most students were in the Colleges of Agriculture and Natural Resources. In this paper, I provide a synopsis of this course hoping such information will be useful to other people designing a course on this topic.

Rather than using a textbook for Principles of WDM, students were required to read papers from the scientific literature. I also encouraged students to obtain a copy of *Prevention and Control of Wildlife Damage* as a reference book. Grades were based on mid-term and final exams, **and an oral and** written research proposal.

Each research proposal focused on a WDM problem of the student's choice. Students conducted a literature search to identify the pertinent literature and to determine what was already known about the problem. Students had to use their ingenuity to determine additional information that was needed before problem resolution was possible, and to design a critical experiment to obtain that information. Students presented their proposals both orally to the class and in writing. The paper conformed to the style of the *Journal of Wildlife Management.* These proposals were edited as if submitted for publication. If not satisfactory, they had to be rewritten and resubmitted until they were satisfactory.

Lecture topics were broken into 4 broad subject areas: (1) history and philosophy of WDM and its relationship to the discipline of wildlife management, (2) WDM problems, (3) potential solutions to WDM problems, and (4) human dimensions. These topics are discussed below.

History and Philosophy of WDM and its Relationship to the Discipline of Wildlife Management

This section began by examining different definitions of wildlife management and WDM. I argued that the goal of wildlife management is to increase the net value of the wildlife resource for society, and that all wildlife species have both positive and negative values. Thegoals of wildlife management and WDM are identical, increasing the value of the wildlife resource. However, the means used are different. WDM accomplishes this by reducing negative wildlife values, while the rest of the wildlife discipline achieves this by enhancing positive values.

I lectured on current values of the wildlife resource for society and the role WDM plays in satisfying those values. We then considered how the values of the wildlife resource have evolved through the early agrarian era, Roman era, Dark Ages, American colonial period (Conover and Conover 1987), the settlement of this country, and during the Twentieth Century.

We next had a class discussion in which we predicted the future direction of WDM and wildlife management. The class read Wagner (1989) as a point of departure for this discussion.

I next lectured on unreliable information in WDM and the need for critical analysis of WDM literature. Common pitfalls in experimental design were identified. Readings for these topics included Platt (1964), Romesburg (1981), and Fitzwater (1990).

WDM Problems

This section was used to identify the types of WDM problems. Lecture material and class readings included topics on predation on humans (Carbyn 1989), wildlife-vehicular collisions, wildlife as reservoirs or vectors of diseases, nuisance problems (Barrett 1991, Fitzwater 1988), forestry damage (Borrecco and Black 1990), agricultural damage, predation on fish (Conniff 1991), livestock predation (O'Gara, et al.1983), and predation on high-value wildlife species. In each case, I provided data on the magnitude of the problem, resources and wildlife species involved, the reasons damage occurred, and steps taken to alleviate the problem.

Solutions of WDM Problems

This section covered attempts to reduce predation on livestock by suppressing predator populations and by targeting individual predators causing problems (Wagner 1988). We also discussed the current U. S. Department of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control predator control program (U. S. Government Accounting Office 1990)

We then examined the use of nonlethal techniques, including use of fear-provoking stimuli such as propane cannons and predator models (Koehler et al. 1990), chemical repellents and conditioned food aversions (Conover 1984), exclusionary devices (i.e., fences and netting), cultural methods (Bullard 1988), habitat modification, and lure crops (Sullivan and Sullivan 1982). We discussed advantages and disadvantages of each technique and the conditions under which they were likely to work. We also examined an integrated approach to WDM (Dolbeer 1990).

Human Dimensions

The last section of the course dealt with human perceptions of wildlife (Kellert 1980). We then examined societal conflicts regarding wildlife management and WDM. Wecoveredanimal rights and animal care issues (Schmidt 1989,1990), as well as local versus national interests. We examined how hunters, nonconsumptive users of wildlife, environmentalists, ranchers, farmers, and city dwellers want the wildlife resource managed. Discussions then proceeded to conflict resolution and how government deals with the diverse opinions of our citizens. Finally, each studentwasaskedtodevelopapersonalphilosophy of WDM.

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