

## **Attitudes of Students in a Wildlife Damage Management Class Towards Nuisance Wildlife Control**

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**ABSTRACT** Students majoring in wildlife management at the University of Georgia have the option of enrolling in our Wildlife Damage Management course. Students participate in a variety of field activities associated with the laboratory portion of the class while also attending twice-weekly lectures on wildlife damage topics. Each spring at the beginning of the semester, students participate in a short survey to assess their opinions on various topics related to wildlife damage management. The same students participate in the same survey at the end of the semester. We have been collecting pre- and post-course data since 1994. Significantly more students agreed with a variety of coyote (*Canis latrans*) control activities in the post-class survey except when asked about paying farmers and ranchers for livestock losses. They disagreed with this practice and did not change their view. Students generally agreed with the practice of using poison to control selected species except eagles but there were fewer significant attitude shifts pre- and post-class. As expected, students scored high on knowledge questions related to coyotes. The statement that producers had the right to protect property saw a significant change in attitude (> percentage agreed post-class).

**KEY WORDS** classroom training, damage management class, human dimensions, lethal control, nuisance wildlife management, predator control

Numerous studies have investigated public attitudes or opinions on wildlife damage management practices. Kellert (1976, 1980) presented some of the earliest work on perceptions of animals by Americans. His typology remains a benchmark for classifying public attitudes toward many aspects of wildlife management as well as other conservation areas. Kellert (1976) stated that in the decade prior to his study, American attitudes toward wildlife shifted from a practical view (utilitarian) and a fear or indifference view (negativistic) became less prevalent while viewing wildlife from a natural (naturalistic) or ecosystem/species interdependence (ecologicistic) view increased. Kellert and Berry (1987) found that many differences in attitude and knowledge about wildlife are strongly affected by gender. As one example, females expressed stronger emotional attachment for

individual animals like domestic pets while males were more likely to accept exploitation of animals as in hunting or farming. Later, Yore and Boyer (1997) concluded that college students having direct experience with other living things (e.g., pets or bird-watching hobby) showed more concern for another species (stronger attitudes on the ecological, humanistic, moralistic, and naturalistic scales of Kellert [1976]). However, Louv (2005) warns of a shift away from nature by an entire generation of children.

An analysis of public attitudes on predator control (Arthur et al. 1977) and specifically coyote control (Arthur 1981) serve as early benchmarks for a specific area of wildlife damage management. More recent studies of public attitudes focus on furbearer trapping (Andelt et al. 1999), feral cat (*Felis catus*) management (Ash and

Adams 2003), predator management to enhance avian recruitment (Messmer et al. 1999), coyote (*Canis latrans*) depredation (Mitchell et al. 2004), lethal control techniques (Reiter et al. 1999), cougars (*Puma concolor*) (Riley and Decker 2000), and cougar and black bear (*Urus americanus*) management (Teel et al. 2002).

Recent papers by Hutchins (2008a, b) addressed issues related to the necessity of wildlife population control. Timm and Schemnitz (1988) reported on the attitudes of students enrolled in university wildlife damage management classes and concluded that persons are more supportive of the need to conduct lethal wildlife control once presented with factual information. In this paper, we report the attitudes of college students enrolled in a university wildlife damage management class. We used the same survey instrument as Timm and Schemnitz (1988) and surveyed our students pre- and post-class from 1994–2008.

#### STUDY CONTEXT

The Daniel B. Warnell School of Forestry and Natural Resources (Warnell) at the University of Georgia (UGA) offers graduate (MFR, MNR, MS, and PhD) and undergraduate (BSFR) degrees in forest resources with a major in wildlife management. The undergraduate curriculum at the Warnell School is a two-tier professional program. Undergraduates 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. The professional program in wildlife requires a minimum 63 credit hours and all graduates meet the requirements for certification as an Associate Wildlife Biologist as defined by The Wildlife Society (TWS). Students take 21 credit hours of restricted electives in categories such as animal taxonomy (e.g.,

mammalogy), habitat management, population management, wildlife biology, field experience/studies, and zoology, botany, ecology. We offer the Wildlife Damage Management (WILD 4900/6900) course every spring semester for either undergraduate or graduate credit. This course fulfills the requirement for a restricted elective in population management. A full-time faculty member teaches the class with significant assistance from the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services (WS) state office located in Athens, GA approximately 3 miles (4.8 km) from campus. The state director and biologists at WS assist in conducting most of the field exercises for the laboratory portion of the class (Mengak and Hall 2003).

#### METHODS

We used the same survey instrument that Timm and Schemnitz (1988) used in their study. We administered the attitude survey to students on the first day of the semester along with the introductory course material and course syllabus. We administered the post-class survey during the last week of regularly scheduled classes or at the time of the final exam. Students were not required to complete the survey but nearly all students completed a pre-class survey. Fewer students completed the post-class survey because some were absent from class on the day it was distributed. The survey was conducted from 1994–2008 with the exception of 2001 when the class was not offered.

Students in our course were seniors or graduate students (very few juniors) majoring in wildlife management at the University of Georgia. The class (WILD 4900/6900) is a one-semester, 3-credit elective course in the wildlife curriculum. Enrollment is limited to  $\leq 15$  students per semester and offered in the spring semester.

The course format is to meet twice per week for a one-hour lecture and once per week for a field lab. We lecture from handouts and reading material as well as the text *Resolving Human-Wildlife Conflicts* by Conover (2002).

Students were asked to respond to 4-point categorical scale items (1 = "Strongly Disagree," 2 = "Disagree," 3 = "Agree," 4 = "Strongly Agree") measuring their level of agreement or disagreement with a given statement. Response data were coded and entered into Excel 2003, and imported to SPSS 16.0 (SPSS 2008) for analysis. Responses were collapsed into a binomial response variable (1 = "Disagreed," 2 = "Agreed") by combining "Strongly Disagree" with "Disagree" and "Strongly Agree" with "Agree." We then compared pre- and post-course responses for each item across all years by constructing 2x2 contingency tables and used Pearson's Chi-square ( $\alpha=0.05$ ) to test for significance.

## RESULTS

The first five questions in the survey provided demographic data on students enrolled in the Wildlife Damage Course. One hundred thirty-nine students completed the pre-class survey from 1994–2008 while 75% of the students enrolled in the class completed the post-class survey. Most students were undergraduates (72%) and most were wildlife majors (79%) (Table 1). Other majors included forestry, ecology, and

agriculture. When asked if they have ever lived in a city or town, on a farm or ranch, or in the country, the most frequent response (N=64) was living in two of the three locations with most students (69%) living in both a city/town and in the country (Table 2).

Students were asked to choose between three criteria as most important when evaluating wildlife damage control techniques and then choose from the remaining two criteria as the second most important. The criteria were cost (including labor and material), specificity (does technique kill only target animals or species or are additional individuals or species likely to be affected), and humaneness (is pain/suffering inflicted on the target animal). In the pre-class survey, 90 of 131 respondents (68.7%) chose specificity as the most important criteria followed by cost (16.8 %) and humaneness (14.5%). Cost (43 respondents out of 121; 35.5%) and humaneness (44 respondents out of 121) were equally chosen as the second most important consideration. The results were nearly identical on the post-class survey with 61 of 97 respondents (62.9%) choosing specificity as the most important criteria and 18.5% of the respondents choosing either cost or humaneness as the most important criteria. However, on the post-class survey 41.7% chose humaneness as the second most important criteria for deciding on a damage control technique.

Table 1. Summary of students (N=138) completing pre- and post-class survey in the University of Georgia's Wildlife Damage Management class, 1994–2008.

Attribute	Percent
Number of Pre-class surveys	100
Number of Post-class surveys	74.8
Number of Graduate students completing the survey	27.9
Number of Undergraduate students completing the survey	72.1
Number of Wildlife majors completing the survey	79.4
Number of other majors completing the survey	21.6
Number of students from Georgia	81.0

Table 2. Self-reported place of residence of students completing attitude survey in the University of Georgia's Wildlife Damage Management class, 1994–2008.

Where have you lived?	No.	Percent
Number answering this questions	139	100
In a city/town	37	26.6
On a farm/ranch	21	15.1
In the country	4	2.9
Three of the three choices	13	9.4
Two of the three choices	64	
- city/town AND farm/ranch	14	21.2
- city/town AND in the country	44	68.8
- farm/ranch AND in the country	6	9.4

The first damage scenario presented to the students proposed a situation in which ranchers suffer substantial economic loss due to coyotes killing sheep. We asked students their reaction to 10 management options. Options 1–4 were to kill as many coyotes as possible, kill only known problem animals, relocate coyotes, or pay ranchers for their losses. Prior to the class, students agreed with removing as many coyotes as possible (63.4%) or targeting specific individuals known to kill livestock (77.3%). These proportions changed significantly in the post-class survey (Table 3). Most students did not favor options for relocating coyotes (70.4 % disagree) or paying ranchers for their loss (90.0% disagree) but only the relocation option changed significantly pre- and post-class (Table 3).

The survey presented three options for using poisons to control coyote depredation. Prior to the class, students agreed with options for using poisons that kill in less than one minute (56.1%) and poisons that are thought to not cause pain or distress (61.9%) but not with poisons that require a few hours to kill (22.1%). Post-course results were significantly different for all three options (Table 3).

Finally, students were asked to evaluate statements about aerial gunning, leghold trapping, and killing pups at the den. Prior to class, students strongly favored aerial

gunning (69.5%) and leghold trapping (70.1%) but opposed locating dens and killing pups (47.1%). Post-class results were similar with more students changing their position on locating dens and killing pups (63.3% agree post-class). Differences between pre- and post-class responses were significant for all three scenarios (Table 3).

The survey instrument we used (Timm and Schemnitz 1988) had a single question about allowing farmers to kill golden eagles (*Aquila chrysaetos*) if the eagles are killing sheep. While golden eagles are not present in Georgia, we retained the question in our survey. Students disagreed with this practice before the class (84.5%) less so after the class (56.4%;  $\chi^2 = 24.719$ , d.f. =1,  $P < 0.001$ ).

The next series of scenarios collected information on the students' attitudes regarding use of poisons to kill problem animals even if such use would result in killing a small number of nontarget and non-endangered animals. Students were asked to agree or disagree with the use of poisons for control of eight species or species groups. Students agreed with the practice of using poisons to control squirrels (*Scuirus* sp.) (59.7%), rabbits (*Sylvilagus* sp.) (55.2%), and raccoons (*Procyon lotor*) (67.3%) before the class and their level of agreement did not change post-class (Table 4). More students in the post-class survey (65.4%) than in the pre-class survey (52.6%) agreed

Table 3. Responses of students (percent) in the University of Georgia's Wildlife Damage Management class to questions related to coyote control activities to reduce economic loss to sheep/livestock operations. Data were analyzed with a Chi-square test.

Scenario	Pre-class		Post-class		P value
	Agree	Dis-agree	Agree	Dis-agree	
Shoot/trap as many coyotes as possible	63.4	36.6	82.0	18.0	0.001
Whenever possible, hunt only individual coyote known to have killed livestock	77.3	22.7	88.1	11.9	0.029
Capture and relocate coyotes away for sheep operations	29.6	70.4	11.8	88.1	0.001
Avoid killing coyotes but pay ranchers for loss	18.0	82.0	10.0	90.0	0.073
Use poisons to kill coyote in $\leq$ one minute	56.1	43.9	92.1	8.0	0.001
Use poisons that kill in a few hours	22.1	78.0	50.5	49.5	0.001
Use poisons that are thought not to cause pain/distress	61.9	38.1	88.0	12.0	0.001
Shoot coyotes from airplanes/helicopters	69.5	30.5	94.0	6.0	0.001
Trap coyotes with steel foothold traps	70.1	29.9	96.1	4.0	0.001
Locate coyote dens and kill pups	47.1	52.9	63.3	36.6	0.011

with using poisons to control foxes (no species specified in the question) (Table 4). However, the results for non-game species were different.

In the pre-class survey, 71.2% of the students agreed with using poisons to control blackbirds (*Icteridae*) compared to 91.2% in the post-class survey and this difference was significant (Table 4). Students disagreed with the use of poisons to control eagles (species not specified in this question), although the proportion agreeing increased from 13.7% pre-class to 26.8% post-class ( $P = 0.01$ ; Table 4). More students ( $P=0.011$ ) approved of the use of poisons to control rats (*Rattus* sp.) in the post-class survey than in the pre-class survey (Table 4). Post-class, students agreed more (57.4%) with the use of poisons to control bats (no species specified in the question) than they did pre-class (41.8%;  $P = 0.015$ ) even though students are likely aware that bats cause little damage to agricultural land or livestock (Table 4).

Not surprisingly, 100% of the students in this class felt that it should be legal to hunt wildlife (Table 5). Before the class, 87.8% of the students felt a farmer or rancher has

the right to kill depredating animals and this changed little in the post-class survey (88.1%). Before the class, only 47.1% of the students felt that a farmer or rancher should have the right to kill animals of the same species to prevent future losses from predations while 61.0% agreed with this position after the class (Table 5). This change in attitude was significant ( $P = 0.030$ ; Table 5).

Prior to the class, nearly 95% of the students knew that coyotes were not an endangered species and this increased slightly (98%) post-class. However, 2% of the students agreed with the statement that coyotes were an endangered species in North America. Similarly, 94.5% of the students disagreed with the statement that coyotes are found only west of the Mississippi River and 99% disagreed with this statement after taking the class. After taking the class, more students (99%) agreed with the statement that coyotes are numerous in North America than agreed pre-class (89%; Table 5). Post-class, fewer students (79.3%) agreed with the statement that coyotes help to control rodent populations than agreed with this statement

Table 4. Responses of students (percent) in the University of Georgia's Wildlife Damage Management class to questions related to the general use of poisons to protect agricultural land and livestock from damage caused by various species of wildlife. Data were analyzed with a Chi-square test.

Species potentially causing damage	Pre-class		Post-class		P value
	Agree	Disagree	Agree	Disagree	
Squirrels	59.7	40.3	60.4	39.6	0.917
Rabbits	55.2	44.8	58.0	42.0	0.6
Foxes	52.6	47.6	65.4	34.7	0.044
Raccoons	67.3	32.3	67.6	32.3	0.953
Blackbirds	71.2	28.8	91.2	8.0	0.001
Eagles	13.7	86.3	26.8	73.3	0.010
Rats	86.4	13.6	96.0	4.0	0.011
Bats	41.8	58.2	57.4	42.5	0.015

pre-class (86.4%) but the difference was not significant (Table 5). Finally, by a wide margin, students agreed with the statement that coyotes sometimes kill sheep and there was no difference pre- and post-class (Table 5).

Prior to the class, most (62.5%) students felt that the federal government should spend more money to control coyotes with the goal of reducing livestock losses while 27% felt the government should spend the same and 10.5% felt the government should spend less. Post-class results indicated that 63% of the students felt the federal government should spend more money to control coyotes with the goal of reducing livestock losses while the relative proportion of students wanting to spend the same or less changed to 12% and 25%, respectively.

## DISCUSSION

We did not collect detailed demographic information on students in this class. However, observations by the instructors (MTM and DIH) revealed that students are not representative of the University of Georgia or the Warnell School as a whole. For example, gender data from 2002–2008 indicate that the class (N=69) consisted of 81.2% male students compared to 69% male undergraduate enrollment in the Warnell school from 2007–2009. Kellert and Berry (1987) found that women have stronger

emotional ties to individual domestic animals, are more likely to oppose hunting and trapping, have lower knowledge scores and higher negative feelings towards wildlife than men do. Women in the wildlife damage management class do not share these attitudes. One-hundred percent of the respondents in our survey support legal hunting of wildlife and 96% of the post-class respondents agree with leghold trapping to control coyotes (Table 3). Nationally, only 12–15% of the U.S. public participates in hunting; most enjoy being outdoors but 51% said they did not enjoy hunting (Reiter et al. 1999). As noted by others (Hutchins 2008a, b, Yore and Boyer 1997) education is critical to forming positive attitudes about damage management issues.

Direct comparisons to other studies are not easy due to differences in the type of survey instrument used and population characteristics, however we can make broad comparisons. Timm and Schemnitz (1988) found that students favored killing as many coyotes as possible (>60% post-class agreement) and hunting only individuals preying on sheep (>90% post-class agreement) while we found 82% and 88% post-class agreement with these activities, respectively. Kellert (1979) reported that 38% and 71% respectively, of the public agreed with these options while Reiter et al.

Table 5. Responses of students (percent) in the University of Georgia's Wildlife Damage Management class to questions related to the general activities related to wildlife and wildlife damage management issues. Data were analyzed with a Chi-square test.

Issue or Statement	Pre-class		Post-class		P value
	Agree	Disagree	Agree	Disagree	
It should be legal to hunt wildlife	100.0		100.0		N/A
A farmer/rancher has the right to kill a depredating animal	87.8	12.3	88.1	11.9	0.928
A farmer/rancher should have the right to kill other individuals of the same species	47.1	52.9	61.0	39.0	0.030
Coyotes are an endangered species in N. Am.	5.1	94.8	2.0	98.0	0.199
Coyotes are numerous in North America	89.0	11.0	99.0	1.0	0.002
Coyotes are found only west of the Miss. R.	4.5	94.5	1.0	99.0	0.113
Coyotes help keep rodent populations under control	86.4	13.6	79.3	20.8	0.132
Coyotes sometimes kill sheep	95.5	4.5	97.1	3.0	0.533

(1999) found 60% and > 50% agreement, respectively.

There is seemingly little support for the practice of compensating producers for the loss of wildlife due to predation. By a wide margin, students in Nebraska (93%) and New Mexico (96%) and this study (90%) opposed the practice (Timm and Schemnitz 1988). The public shares this view as well (Kellert 1979, Reiter et al. 1999). Our students and those in the Timm and Schemnitz (1988) study supported aerial gunning and leghold trapping for controlling coyotes but had mixed responses to locating dens and killing pups (Table 3). We found (Table 3) that students support the use of poisons to kill coyotes similar to findings in Timm and Schemnitz (1988).

The public generally disagrees with the use of poison to control wildlife, except in the case of rat control, in which case they support the use of toxicants (Kellert 1979, Reiter et al. 1999). The public may believe that trapping and slow-acting poisons are inhumane (Arthur et al. 1977). Students in both our study and the earlier study (Timm and Schemnitz 1988)—except in the case of poisoning eagles—usually supported the use of poisons to kill a variety of species (Table 4).

The public generally supports lethal control activities (Koval and Mertig 2004, Reiter et al. 1999). Public perceptions of a species are strongly linked to support for lethal control activities. For example, the public generally understands that coyotes kill sheep, rate the coyote as one of the least-liked wild animals (Arthur et al. 1977) and support lethal control less for charismatic predators (Messmer et al. 1999). In our study, rats may elicit similar feelings while students may hold eagles and bats in higher regard. Stakeholders wanting to see a decrease in cougars held negative attitudes toward cougars or dread cougars (Riley and Decker 2000). Control of free-ranging domestic cats (a charismatic species) was opposed even though respondents understood the cat's exotic status and role as a predator on native mammals and birds (Ash and Adams 2003).

The objective of our class is to present students with information on issues related to nuisance wildlife control. Through lectures and hands-on field experience students gain a basic understanding of wildlife damage management (WDM) and are prepared to work as county agents, wildlife specialists with USDA wildlife services, state game departments or private

nuisance control operators. We did not start with a goal of changing opinion, only providing accurate information. Students in the WDM class at the University of Georgia are not markedly different from their peers at other institutions (Timm and Schemnitz 1988) even though 1–2 decades separate our surveys. Also, recent surveys show that the public generally supports wildlife management and specifically wildlife damage management. Education is critical to getting the public to understand and support WDM activities. Training future biologists in the broad area of WDM enhances a professional's ability to communicate with the public in an area that will receive increased scrutiny and importance as society continues to urbanize.

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