

2007

# Evolution of the field of wildlife damage management in the United States and future challenges

James E. Miller

*Mississippi State University*

Follow this and additional works at: <https://digitalcommons.unl.edu/hwi>



Part of the [Environmental Health and Protection Commons](#)

---

Miller, James E., "Evolution of the field of wildlife damage management in the United States and future challenges" (2007).

*Human–Wildlife Interactions*. 117.

<https://digitalcommons.unl.edu/hwi/117>

This Article is brought to you for free and open access by the Wildlife Damage Management, Internet Center for at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Human–Wildlife Interactions by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

**EDITOR'S NOTE:** The field of human-wildlife conflicts is so new that many of its founders are still active. One of them is James E. Miller, who has worked as a wildlife professional for over 40 years. He gained experience as a field biologist, extension forester/wildlife specialist, National Program Leader, and educator/professor. He served as president of The Wildlife Society. Throughout his career, he has been active in and supportive of the field of wildlife damage management.



## Evolution of the field of wildlife damage management in the United States and future challenges

**JAMES E. MILLER**, Professor Emeritus, Department of Wildlife and Fisheries, Mississippi State University, Box 9690, Mississippi State, MS 39762, USA [jmiller@ext.msstate.edu](mailto:jmiller@ext.msstate.edu)

**Abstract:** Through the early twentieth century, people in rural areas of North America either dealt with problems caused by wildlife by killing the problem species, eliminating its habitat, changing crops or husbandry practices, tolerating the damage, or moving to a new area devoid of such problem animals. However, many of these solutions are impractical today with the increase in human populations, the increased expansion of development into previously rural landscapes, the increased fragmentation of land ownership, and the increasing movement of people into metropolitan areas. Because of current local, state, and federal ordinances and regulations, along with the impacts of animal rights and activist groups on public sensitivities, there are more rigid constraints on the tools, techniques, and capabilities that an individual or community in urban or rural areas can utilize to address a wildlife damage problem. The great majority of individuals today care about the humane treatment of animals and are sensitive to some of the claims, whether correct or not, made by animal activists, but they are much more likely to expect someone else to handle their problems as a community service or for a fee. This paper provides highlights of a historical perspective on the evolution of wildlife damage management in the United States, insight about the development of the Berryman Institute, and some future challenges for the profession.

**Key words:** challenges, evolution, federal programs, human–wildlife conflicts, policy, The Wildlife Society, wildlife damage management

**THE ISSUE** of managing wildlife individuals and populations that directly or indirectly create human–wildlife conflicts has been around since the dawn of mankind. Archeological evidence suggests such conflicts existed during prehistory, and numerous references to them also appear in the Bible and other historical documents. In the words of Jack H. Berryman:

Wildlife damage management is one of the most complex aspects of wildlife management ... If you visit Jamestown, the site of the first European settlement on Virginia's eastern shore, you will find a Powhatan Village and in the center of this is a curious platform. The purpose of this tower was for a villager to use to frighten away the blackbirds and protect the Indian corn and other crops. From pre-settlement and colonization through the westward expansion and the establishment of agriculture, there has been a diversity of problems with damage caused by wildlife—from Indian corn fields to protection of the

Kennedy Space Center from bird conflicts, and from wolves (*Canis lupus*) on the prairies to moles (*Talpidae*) in suburbia. Concurrently, with the increasing human population, diversification of interests, and the sophistication of resource management, the problems of managing wildlife damage have grown increasingly complex (Berryman 1992).

As an old-timer who grew up in the rural southeastern United States in the 1940s, I can remember when we had animal damage problems with red fox (*Vulpes vulpes*), mink (*Mustela vison*), striped skunk (*Mephitis mephitis*), and opossum (*Didelphis marsupialis*) in the hen house. If prevention techniques we knew about did not work or the damage exceeded our tolerance, we simply killed or trapped the offending animals. To our knowledge, there were few laws or regulations regarding problem animals and their removal. I suspect this was a common situation in many parts of the nation during the throes of World War II, which left

many families with very limited resources. It was extremely important to protect and utilize what meager resources we had available or could produce ourselves. We had no idea what wildlife damage management (WDM) was, but we learned from our early experiences of hunting, trapping, fishing, and farming how to handle most, if not all, of the wildlife damage problems we encountered.

Much has changed since the 1940s, mostly for the better. In general, wildlife populations are better off today, primarily due to increased knowledge and management by trained wildlife professionals. However, some wildlife species, such as northern bobwhite (*Colinus virginianus*) and eastern cottontail rabbits (*Sylvilagus floridanus*), as well as some other small nongame species, have declined primarily because of changing land use and habitat loss. For larger birds and mammals, such as white-tailed deer (*Odocoileus virginianus*), elk (*Cervus canadensis*), pronghorn (*Antilocapra americana*), wild turkey (*Meleagris gallopavo*), and Canada geese (*Branta canadensis*), we now have growing numbers and significantly improved habitats. The demographic changes that have occurred along with an improved economic situation for most Americans have progressively caused major shifts in where most people now live. It is no secret that today and in the future, the vast majority of people will live in urban/suburban municipalities and communities rather than on farms.

These and many other changes that have occurred over the years—what Aldo Leopold (1949) defined as the problems of “landlessness”—have caused a major impact in the way most people perceive what we call WDM. How most people feel about WDM is largely dependent on whether they have experienced the damage problem directly or indirectly. If they have not personally experienced wildlife damage, it is unlikely that they understand the magnitude of the problem or the frustrations experienced by those who actually have the problem. It is easy to observe a television clip of someone with a Canada goose problem and to declare that they should consider some nonlethal control methods. What the camera and news clips do not show, however, is that the landowner may have already tried nonlethal methods with poor results. Similarly, it is easier to make a judgment that a nuisance alligator in a backyard in Florida should be removed, than a Canada goose with

10 goslings in a backyard in Philadelphia. The alligator is perceived as a human health or safety problem and is ugly. The Canada goose and goslings, however, are perceived as cute and cuddly, even though the droppings may present a health hazard to the community. Also, the adult goose may pose a threat to children who might approach the goslings.

These examples are a few among many that could be used to review the different perceptions about WDM and the problems associated with wildlife damage. Unfortunately, it has become common knowledge that some animal rights organizations will always oppose lethal removal of animals and encourage the public to oppose it too because they do not believe in killing animals for any reason; they are either ignorant of the magnitude of the problem or simply do not care because the problem is not theirs. Most people who work in the area of WDM, especially in urban and suburban areas, have come to expect that most people will want the animal causing the problem removed, but they do not want it killed. Often people’s tolerance for wildlife damage or threats to their health and safety decreases dramatically based on the extensiveness of the damage or when threats increase and nonlethal or alternative methods attempted have been ineffective. This real-world scenario reflects at least a part of the complexity of WDM programs and issues that those working in WDM must learn to address effectively, and it sets the stage for a look at the evolution of the profession.

Without sufficient time and references to go back to the beginning of conflicts between man and wildlife, it is probably appropriate to start with the evolution of WDM around the time that the first federal program began.

### Federal programs, 1885–1939

It was not until 1885 that the first appropriation from Congress was received for use to prevent and control wildlife damage (Hawthorne et al. 1999). Five thousand dollars was provided to C. Hart Merriam to analyze the extensive data collected on bird distribution, migration, and damage. The analysis was to be conducted by an ornithological office that was part of the Entomology Division of the U.S. Department of Agriculture (USDA). As a result of this funding, the Division of Economic Ornithology and Mammalogy was established in 1886 with Dr. Merriam as its chief. One of its stated purposes was “to educate farmers about

**How most people feel about WDM is largely dependent on whether they have experienced the damage . . . .**

birds and mammals affecting their interests so that destruction of useful species might be prevented" (Hawthorne et al. 1999).

Around 1890, the title of this division was changed to the Division of Ornithology and Mammalogy, and the study of life histories, economic status, and means of control of "noxious" mammals became a major part of the division's work. In 1896, the Division was renamed Biological Survey, and in 1905 the name was changed again to the U.S. Bureau of Biological Survey, which remained the same throughout its early history in the USDA. The first publication by this agency dealt with the introduction of the house sparrow (*Passer domesticus*) into the United States, though other studies ranged from field investigations of blackbirds, jackrabbits, and ground squirrels to predator-livestock problems.

In 1907, Congress made an attempt to abolish the bureau's appropriation. However, partly due to the efforts of President Theodore Roosevelt, who was a friend of Merriam's, the funds were restored. In 1913, as agricultural interests became more demanding, additional attention was focused on problem wildlife. For example, direct control work began under a small administrative allotment of funds to control plague-bearing rodents in California's national forests. The following year, the President of New Mexico State College of Agriculture and Mechanical Arts and the U.S. Secretary of Agriculture signed the first of what are now hundreds of cooperative agreements relating to wildlife damage. Congress made the first appropriations, specifically for federal predator control operations, in 1915 with the allocation of \$125,000 to the Bureau of Biological Survey to control wolf and coyote (*Canis latrans*) damage to livestock. These appropriations increased during World War I in response to the increased need for beef and lamb (Cain et al. 1972).

The Convention with Great Britain for the Protection of Migratory Birds in 1916 and the 1918 Migratory Bird Treaty Act authorized the taking of migratory birds that were injurious to agriculture and other interests (DiSilvestro 1985). In 1920, a laboratory for experimentation with toxicants called the Eradication Methods Laboratory was established in Albuquerque, New Mexico. In 1921, the laboratory was moved to Denver, Colorado, and in 1928 it was renamed the Control Methods Research Laboratory. In 1922, predator and rodent control programs were initiated in Arkansas, Indiana, Louisiana, Oklahoma, Minnesota, Washington, and Wisconsin. Between 1925 and 1930, there were several name changes within the program, and in 1931, with a number of bills introduced

in both houses of the 71<sup>st</sup> Congress and full Congressional hearings, a bill was passed and signed by the President with no time limit prescribed. It became known as the National Animal Damage Control Act of March 2, 1931 (Public Law 776). This Act provides the legal authority under which the federal government is authorized to conduct animal damage control activities and to enter into cooperative agreements with state governments and local entities. In 1939, the U.S. Bureau of Biological Survey of the USDA and the U.S. Bureau of Fisheries in the U.S. Department of Commerce were transferred to the U.S. Department of the Interior (USDI) to create the U.S. Fish and Wildlife Service (USFWS). A reorganization plan Number 11.4(f). Title 5. Section 133 transferred animal damage control to USDI's new U.S. Branch of Predator and Rodent Control. This reorganization was part of President Franklin Roosevelt's effort to consolidate within the U. S. Department of the Interior all federal activities dealing primarily with wildlife and freshwater fisheries, presenting the USFWS with a dual mandate of both controlling and enhancing certain wildlife species under specific situations (DiSilvestro 1985).

In addition to the federal operational programs on wildlife damage conducted during this period, there were also technical and educational assistance programs in wildlife damage control being provided to private landowners by state wildlife agencies and state Cooperative Extension Service (CES) specialists and agents. The CES and state agencies later developed effective Cooperative Agreements with the federal Branch of Predator and Rodent Control to assist in efforts to alleviate wildlife damage to private landowners.

### **Federal and other programs, 1940–1960**

As reported by DiSilvestro (1985), the federal animal damage control program operated in relative obscurity during the 1940s and 1950s with little public opposition during and after World War II. During this period, the program incorporated research, technical assistance, and both lethal and nonlethal operational control activities. The type of assistance provided depended on ownership of the property, location, institution, and resources being protected. During this period, many returning GIs from World War II utilized the GI Bill to attend college. As a result, an increased cadre of wildlife biologists graduated and became available in the 1950s for employment by state and federal wildlife and natural resources agencies. During the 1940s, some new techniques, tools, and toxicants were developed and were readily adopted for use in the federal



branch of predator and rodent control. The “Humane Coyote Getter” became operational throughout the West during 1942. In 1945, the chemicals Compound 1080 and thallium sulfate were tested for use in the program. By 1948, these techniques and toxicants, in addition to the use of aircraft, were being used in the federal operational predator control programs throughout the West.

Concurrently, other agencies were increasingly conducting technical and educational assistance programs related to wildlife damage; unlike the federal operational programs, most of their programs were directed to assist private farmers, landowners, and rural communities with educational assistance. For example, state CES, which employed wildlife professionals as specialists, generally expected them to provide educational programs on wildlife damage prevention and control through their county delivery system to private agricultural producers, other landowners, and to rural communities. However, in many states, the federal program and other agencies conducting wildlife damage control programs had cooperative agreements and memoranda of understanding in place. These professionals shared existing techniques and methodologies, jointly developed educational and technical assistance programs, and worked cooperatively to help resolve wildlife damage problems in urban and rural communities across the United States.

### **Federal and other programs, 1961–1985**

Although these programs continued and expanded marginally over the next few years, in 1963, U.S. Secretary of the Interior Stewart Udall appointed the Advisory Board on Wildlife Management to investigate the federal animal damage control program. This board published a report in 1964, titled “Predator and Rodent Control in the United States” (Leopold et al. 1964), best known as the Leopold Report, and named for the chairman of the advisory board, A. Starker Leopold. The Leopold Report was extremely critical of the federal animal damage control program and charged it with indiscriminate, nonselective, and excessive predator control. It reinforced its findings with 2 basic premises:

- (1) All native animals are resources of inherent interest and value to the people of the United States. Basic policy, therefore, should be one of husbandry of all forms of wildlife; and (2) at the same time, local population control is an essential part of a management policy, where a species is causing significant damage to other

resources or crops or where it endangers human health or safety. Control should be limited to the troublesome species, preferably to the troublesome individuals, and in any event to the localities where substantial damage or danger exists. These basic premises reflect the principles of both conservation and preservation (Leopold et al. 1964).

On June 16, 1964, in response to the Leopold Report, Secretary Udall announced acceptance of the report as a general guidepost for USDI policy. Later that year, the U.S. Branch of Predator and Rodent Control was renamed the U.S. Division of Wildlife Services with new responsibilities, including wildlife enhancement and pesticide monitoring, both of which were protection (as opposed to control-

### ***The Leopold Report was extremely critical of the federal animal damage control program . . .***

oriented) functions. Jack H. Berryman was appointed to head this new Division of Wildlife Services (DWS), and a U.S. Department of the Interior news release emphasized that he had been an associate professor and extension wildlife specialist at Utah State University and that he had recently served as the immediate past president of The Wildlife Society (TWS). Both moves reflected the importance of public opinion and approval (Feldman 1996). The 1969 Animal Damage Policy Manual developed by the DWS incorporated recommendations made in the Leopold Report. Professionally trained wildlife personnel were added to the DWS, in-service training for longtime employees was required, nearly all predator control practices were reduced, and regulation and supervision of toxicant uses were tightened (Wagner 1988).

The changes in DWS implemented between 1965 and 1969 were not just cosmetic; they significantly altered the agency’s guiding philosophy. In a USFWS memo dated August 24, 1965, then USFWS director John Gottschalk stated:

This has been no simple reorganization or policy redirection. What has really been at stake is a fundamental change in the conservation movement—a change in the way we view and deal with animals that become troublesome. We are not dealing simply with a change in a Federal Bureau, but a change in public attitudes among cooperators and cooperating agencies—

in attitudes that touch emotions and pocketbooks (Gottschalk 1965).

Although the program had been controversial within the Congress since its inception, this period and conflict was probably the most critical crisis the program had ever faced. Had it not been for the professionalism and experience of both Jack H. Berryman and John Gottschalk, both ultimately recipients of the prestigious Aldo Leopold Award, the DWS program may well have been eliminated by Congress.

In April 1967, DWS translated its philosophy into a new policy titled "Man and Wildlife"—the first official policy statement issued in the history of the federal animal damage control program. Secretary Udall described the policy as "a firm resolve that in protecting the interests of man, we will not jeopardize the environment in which we live" (Udall 1967). Even before the policy statement was developed, Jack H. Berryman had begun to professionalize the DWS, and by 1969, 26 of the 33 state supervisors had been replaced, and 80% of DWS personnel had college degrees—a significant increase over earlier staff within the DWS. However, regardless of all the changes in DWS between 1965 and 1969, the new policy failed because it did not receive public support. Between 1969 and 1971, a significant increase in public concern for the environment burst upon the national scene (Tober 1981). This new public awareness found expression in April 1970 with the celebration of Earth Day, demanding a more responsible approach to nature. Passage of the National Environmental Policy Act (NEPA) in 1969 and establishment of the Council on Environmental Quality (CEQ) and the Environmental Protection Agency (EPA) in 1970 were subsequently followed by an increasing number of environmental organizations being established during the 1970s.

Predator control continued to be a major focus of public attention. Lawsuits from the Defenders of Wildlife, Sierra Club, and the Humane Society of the United States demanded strict compliance with NEPA, which had been signed by President Nixon on January 1, 1970. Further political remedial action became necessary. In 1971, the U.S. Secretary of Interior and officials from CEQ developed a special task force, later to be known as the Cain Committee, to study the DWS program. Although many positive changes had been initiated by DWS since the Leopold Report, the subsequent Cain Committee (chaired by Dr. Stanley A. Cain and composed of A. Starker Leopold and 5 other members with disciplines consisting of biologists and a political scientist) moved for even more change. The Cain Report provided

15 major recommendations for changes in DWS (Cain et al. 1972). These recommended changes included the basic demands that (1) immediate action be taken to remove all toxic chemicals from registration and use for direct predator control, and (2) restrictions be extended to those toxicants used in field rodent control that might cause secondary poisoning of scavengers. The Cain Report resulted in President Nixon's signing Executive Order 11643 on February 8, 1972, banning the use of toxicants for predator control by federal agencies on public lands. The EPA responded to President Nixon's order by canceling the registrations of Compound 1080, strychnine, sodium cyanide, and thallium sulfate. In 1974, the DWS was replaced by the Office of Animal Damage Control and the Branch of Wildlife Enhancement, and responsibility for pesticide monitoring and surveillance functions were transferred to another USFWS Division. President Nixon's Executive Order was amended in 1975 to allow the use of sodium cyanide in a device called the M-44 and again in 1976 to allow the registration of sodium cyanide for predator control.

In 1978, the U.S. Secretary of the Interior appointed a policy study committee to review the federal Animal Damage Control (ADC) program. The committee's report was extremely critical of the program, finding insufficient documentation to justify the program's continued existence. This report led to a policy statement issued by U.S. Interior Secretary Cecil Andrus on November 9, 1979, that prohibited denning as a management technique and any further research on the use of Compound 1080. The policy focused on emphasizing the use of nonlethal methods for predator control. In 1980, after considerable pressure from the Western Regional Coordinating Committee (composed of 28 university research and extension personnel and various employees of USDA and USDI), which reacted adversely to Secretary Andrus's policy, Congress passed Public Law 96-528. This law directed the secretaries of agriculture and interior to assess the positive and negative impacts of transferring some or all of ADC's functions from USDI to USDA (Wagner 1988).

In 1981, the EPA held hearings on the predator control issues, while concurrently, the U.S. Secretary of the Interior rescinded former Secretary Andrus' policy that banned denning. Shortly thereafter, President Reagan signed Executive Order 12342, which revoked Executive Order 11643 and previous amendments to that Order. In 1985, 20 U.S. Senators wrote President Reagan requesting that he place the ADC program back within USDA, from which it had been removed in 1939. Several USFWS

administrators openly supported removing the program from the jurisdiction of the USFWS and returning it to USDA. Indeed, some of them publicly admitted that for the past several years they had hoped it would die through attrition.

However, aside from the federal ADC program, from 1961 to 1985 numerous other WDM technical and educational assistance programs were growing and becoming more effective in providing assistance to private landowners, managers, and community leaders. In addition, a number of state wildlife agencies established or rejuvenated their technical assistance wildlife damage efforts, and a number of private wildlife damage control businesses began to develop. Another significant development included the growth of professional training and self-study within the profession, assisted greatly by such professional meetings as the Vertebrate Pest Conference in California starting in 1962, the Great Plains Wildlife Damage Control Conference initiated in 1973, and the Eastern Wildlife Damage Management Conference beginning in 1983. These meetings cooperatively developed by State Cooperative Extension Wildlife Specialists and other state and federal agency biologists provided a significant reference and training source for professionals engaged in WDM. The new *Handbook on Prevention and Control of Wildlife Damage* (Timm 1983) incorporating the expertise of professionals working in WDM soon made its way to the desks of most federal and state agency biologists. This publication and others from conference proceedings, extension publications, occasional articles in the *Journal of Wildlife Management* and *Wildlife Society Bulletin*, and attendance at national and regional conferences provided professionals working in WDM disciplines with greater access to current research and management information than had ever been available in the past.

### **Federal and other programs, 1986–present**

In 1986, Congress passed an amendment to the Continuing Federal Budget Resolution that transferred all ADC program personnel, equipment, and funding from the USFWS to the Animal and Plant Health Inspection Service (APHIS) agency of the USDA. By April 1986, the transfer had been effected, and the U.S. Secretary of Agriculture appointed a National Animal Damage Control Advisory Committee composed of organization and academic institution professionals representing agricultural interests to provide advice on policies and issues of concern to the APHIS-ADC program. In November 1987, the agency was restructured, and the evolution of the

federal ADC program continued with an expanded effort to increase professionalism and training, improve relationships with other wildlife management agencies, improve data collection systems, monitor program impacts, and develop new control methods technology (Acord 1992; Acord et al. 1994; Berryman 1994; U.S. Department of Agriculture 1994, 1997). Some major changes since the 1990s, according to Wildlife Services Deputy Administrator William Clay, included the relocation of the National Wildlife Research Center from Denver to Fort Collins, Colorado, the cooperative establishment of the Jack H. Berryman Institute at Utah State University in 1992, and the change in name from Animal Damage Control to Wildlife Services in 1997.

Other occurrences, efforts, and programs that have contributed significantly to the evolution of WDM since 1986 include:

- Congressional action in 1988 that authorized cooperation with a wide range of public and private entities to control wildlife injurious to agriculture and to monitor horticulture, animal husbandry, and wildlife/public health and safety, including wildlife jeopardizing threatened and endangered species.
- Significant increases in urban and suburban WDM problems with overabundant populations of resident Canada geese, white-tailed deer, beaver (*Castor canadensis*), and other wildlife species, which have heightened public perceptions about the need to manage overabundant wildlife populations.
- The rapid growth of private-sector wildlife control businesses across the United States. Their growth clearly reflects both the increasing number of human–wildlife conflicts in urban areas as well as the willingness to pay by urban and suburban property owners.
- Chartering of the Wildlife Damage Management Working Group (WDMWG) within The Wildlife Society (TWS). With 265 dues-paying members representing federal and state agencies, as well as academic institutions and the private sector, the WDMWG has become the largest and most active working group within TWS. The WDMWG has influenced TWS in regard to its recognition of WDM as an integral and essential element of wildlife management.
- The addition of WDM courses to the curricula of more land grant university wildlife programs. This addition, coupled with the educational mission of the Jack H. Berryman Institute, co-located at Utah State and Mississippi State universities, has resulted in highly trained students with a significant knowledge of WDM programs and management efforts. These



students are better equipped to enter the professional workforce and support expanded WDM research and extension educational outreach programs throughout the United States.

- The acceptance of WDM as an important discipline within wildlife management.

- The expansion and professionalism of a series of regularly conducted conferences focusing on WDM. The conferences have provided for increased professional development and networking and help professionals keep current on new research and management techniques. The Vertebrate Pest Conference held in California during even-numbered years attracts a large international audience, and the Wildlife Damage Management Conference, which is sponsored by the WDMWG, meets in the East or Midwest during odd-numbered years. In addition to these regular biennial conferences, there have been special sessions, symposia, and workshops on WDM conducted at TWS Annual Conferences, the International Wildlife Management Congress, the North American Wildlife and Natural Resources Conferences, and other regional and national meetings.

- The change in the role of extension in WDM, especially since the program was transferred from the USDI back to USDA. Extension wildlife specialists and county extension personnel continue to provide research-based educational programs to assist private landowners, resource managers, and communities with WDM-related problems.

- The human dimension in wildlife management originally developed through research at Cornell University and is now a major subdiscipline within the wildlife profession and has addressed and quantified the numerous stakeholders involved in WDM programs and their attitudes. Concepts like “social carrying capacity” and “wildlife acceptance capacity” have been critical in the formulation of regulations and in the revision of operational control programs.

- Appointment of a Berryman Institute National Outreach Coordinator to expand outreach and continuing education programs for those working in the profession and for diverse public stakeholders.

- Publication of the handbook *Prevention and Control of Wildlife Damage* (Timm 1983) and the textbook *Resolving Human–Wildlife Conflicts: The Science of Wildlife Damage Management* (Conover 2002) have given structure to the field of WDM.

### Future challenges

Some WDM challenges that must be addressed if the profession is to continue to advance are randomly listed below.

1. We must continue to develop effective WDM programs that provide social, economic, and environmental benefits to wildlife resources, individuals, and society.

2. We must continue to monitor, evaluate, and be proactive in addressing changes needed in WDM based on valid research, good science, and common sense to meet the changing social, economic, and environmental needs of society.

3. We must continue to support and encourage increased cooperation and coordination among agencies, organizations, researchers, managers, and users of WDM information, education, technical assistance, and operational programs.

4. We must continue to emphasize and demonstrate that WDM is an integral and essential part of wildlife management to the wildlife profession, other agencies, organizations, societies, private landowners in both urban and rural areas, and to the public through outreach and educational programs.

5. We must continue to ensure that appropriate WDM curricula are provided within land grant universities (e.g., the Berryman Institute programs and others). In addition, we must continue to plan, conduct, and participate in quality continuing education programs—conferences, workshops, and symposia—to share current research and management technologies with the profession, scientific community, and the diverse publics and stakeholders we serve.

6. We must continue to develop new and more effective technologies for wildlife damage assessment, prevention, control, relocation, and wildlife euthanasia. We need better capabilities to understand the human dimensions of WDM within the parameters of increasingly more stringent environmental regulations. We must also recognize the decreasing public acceptance and increasing concern about the use of pesticides and a variety of other previously effective and acceptable tools and techniques.

7. We must become more knowledgeable and effective in addressing diseases and health threats transmitted and hosted by wildlife that affect humans, domestic animals, and public safety. We also need to better understand the public tolerance aspect of wildlife health and safety threats, whether it be deer-vehicle collisions, bird strikes on air travel, Lyme disease, or other human–wildlife conflicts.



8. We must scientifically address the complex issue of wildlife depredation concerning people, property, endangered and threatened species, and wildlife restoration and management concerns. We must find better ways to prevent, control, and manage depredation at a tolerable level for sustaining viable populations of predator and prey species.

9. We must remember that although wildlife resources are a public trust, over two-thirds of the wildlife habitat in the United States exists on private lands, and the majority of present and future wildlife recreation is likely to take place on private lands. Therefore, we must accept responsibility as wildlife professionals to inform and assist private landowners in effectively managing their lands to maintain and enhance wildlife habitat while keeping wildlife damage within tolerable levels and consistent with the landowner's objectives.

10. We must not become complacent or apathetic about the professional evolution in WDM and its increased current recognition and improved image. We need only to review the history to realize how difficult it is to obtain and sustain credibility among our stakeholders. We must continue to be honest, proactive, visionary, and responsive to the challenges of the future and the changes that will be necessary to ensure professional capability and credibility.

11. We need not be apologetic for what we do in implementing WDM programs. However, we must always strive to maintain and improve, when possible, our ethics and professionalism in achieving our objectives.

### Conclusions

After working over 40 years in the wildlife profession and playing a very small role in the evolution of WDM, I see that this field is now firmly entrenched in the mainstream of the wildlife profession and can provide an honorable and rewarding career. My only prediction is that WDM will continue to grow in importance and scope. Although often frustrating, always controversial, and complex, WDM is a challenging career path that provides a real and significant contribution to the long-term stewardship of wildlife resources.

Jack H. Berryman was a great personal and professional friend, a wonderful mentor, and one of my heroes in this profession. I am confident that he is looking down on the work of the Berryman Institute at Utah State and Mississippi State universities with a smile on his face. I am honored that Jack has handed on to me copies of many professional papers that he presented over the years. If you would like to learn more about Jack H. Berryman, I encourage

you to review the "Our Respects" column in the Winter 1998 issue of the *Wildlife Society Bulletin*.

### Literature cited

- Acord, B. R. 1992. Responses of the ADC program to a changing American society. Proceedings of the Vertebrate Pest Conference 15:8–11.
- Acord, B. R., C. A. Ramey, and R. W. Werge. 1994. Charting a future: process and promise. Proceedings of the Vertebrate Pest Conference 16:5–8.
- Berryman, J. H. 1992. The complexities of implementing wildlife damage management. Transactions of the North American Wildlife and Natural Resources Conference 57:41–50.
- Berryman, J. H. 1994. Blurred images: and the future of wildlife damage management. Proceedings of the Vertebrate Pest Conference 16:2–4.
- Cain, S. A., J. A. Kadlec, D. L. Allen, R. A. Cooley, M. C. Hornocker, A. S. Leopold, and F. H. Wagner. 1972. Predator control—1971, report to Council on Environmental Quality and United States Department of the Interior. University of Michigan Press, Ann Arbor, Michigan, USA.
- Conover, M. R. 2002. Resolving human–wildlife conflicts: the science of wildlife damage management. CRC Press, Boca Raton, Florida, USA.
- DiSilvestro, R. L. 1985. The federal animal damage control program. Pages 130–148 in Audubon Wildlife Report, National Audubon Society, New York, New York, USA.
- Feldman, J. W. 1996. The politics of predator control. Thesis, Utah State University, Logan, Utah, USA.
- Gottschalk, J. S. 1965. Memo, working titles, wildlife services employees, from director. U.S. Fish and Wildlife Services. National Archives, U.S. Department of the Interior, Washington, D.C., USA.
- Hawthorne, D. W., G. A. Nunnley, and V. Prothro. 1999. A history of the Wildlife Services Program. The Probe, Newsletter of the National Animal Damage Control Association, Issues 196, 197.
- Leopold, A. 1949. A sand county almanac. Oxford University Press, London, England.
- Leopold, A. S., S. A. Cain, C. M. Cottam, I. N. Gabrielson, and T. E. Kimball. 1964. Predator and rodent control in the U.S. Transactions of the North American Wildlife and Natural Resources Conference 29:27–49.
- Timm, R. M., editor. 1983. Prevention and control of wildlife damage. Great Plains Agricultural Council, Wildlife Resource Commission and Cooperative Extension Service. University of Nebraska, Lincoln, Nebraska, USA.
- Tober, J. A. 1981. Who owns wildlife. The political economy of conservation in nineteenth-century America. Greenwood Press, Westport, Connecticut, USA.
- Udall, S. 1967. Man and wildlife. Policy document news release. U. S. Department of the Interior (USFWS) National Archives, Washington, D.C., USA.
- U.S. Department of Agriculture. 1994. Animal damage control program: final environmental impact statement. Animal and Plant Health Inspection Service. Washington, D.C., USA.
- U.S. Department of Agriculture. 1997. Policy manual, USDA-APHIS-animal damage control. Animal and Plant Health Inspection Service. Washington, D.C., USA.
- Wagner, F. H. 1988. Predator control and the sheep industry: the role of science in policy formulation. Regina Books, Claremont, California, USA.
- Wildlife Society Bulletin. 1998. Our respects, Jack Holmes Berryman. *Wildlife Society Bulletin* 26:997–999.