

A Review Paper on Wildlife Damage Management

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ABSTRACT: *The USDA=APHIS-Wildlife Services (WS) program and its partners conducted a national research needs evaluation of significant wildlife–human conflict problems and related research requirements. A request for participation received responses from 36 WS State Directors, 23 WS=National Wildlife Research Center (NWRC) scientists, and 6 members of the US Secretary of Agriculture's National Wildlife Services Advisory Committee (NWSAC). The present research needs for wildlife damage control in the United States are compared to prior regional and national research needs evaluations. The aviation, forestry, agricultural, aquaculture, and cattle sectors, as well as wildlife-borne illnesses, invasive species, and overabundant animal populations, were all identified as major national concerns. This evaluation provides NWRC with useful information, as well as legislative and administrative guidance, for allocating resources to specific research projects that address the WS program's knowledge and methodological needs.*

KEYWORDS: *Animals, Economic, Management, NWRC, Wildlife.*

1. INTRODUCTION

Civilization places a great value on wildlife as a resource, yet nature and society are increasingly clashing. Wildlife harm is defined as anything that causes human injury or illness, loss of economic output, physical risk, or a decrease in quality of life or well-being. The negative economic effects of animals on civilization have been well established in recent years. According to Wywiałowski, almost 55 percent of 13,000 respondents to a study of 20,000 agricultural producers had suffered wildlife damage worth \$461 million in 1989. Agricultural producers and urban families in the United States spent \$2.55 billion and \$5.55 billion, respectively, on wildlife management in the 1990s. Messmer cited a number of studies that documented the economic losses and negative impacts of wildlife on livestock, timber, agricultural crops, fruits, nuts, and vegetables, human health and safety, vehicles and aircraft, wildlife bites, and disease transmissions, as well as the emerging conflicts and challenges of human– wildlife conflict resolution[1]–[3].

They had already established estimates of several of these issues' economic and social consequences. While the number of species and conflict situations is increasing, fall and Jackson argue that the limitations imposed on managers are also increasing, resulting in fewer choices for resolving and managing these issues. The Wildlife Society established a 'Wildlife Damage Working Group' in 1994 (currently the largest of any TWS working group), and recent volumes of the Wildlife Society Bulletin have been devoted to specific human–wildlife conflict issues, such as deer overabundance, the role of hunting, and so on, demonstrating the increased awareness and importance of this issue. Wildlife–human conflict has occurred for many years, is definitely on the rise, and will continue to exist for many years to come[4].

This situation is the result of a number of major trends that are likely to continue in the coming years:

- Increased suburban development.
- Adaptable and overabundant wildlife species.
- A shift in public attitudes toward animal welfare.
- increased media interest in wildlife issues,
- Advances in wildlife science and technology (USDA, 1998).

Therefore, there is an urgent need for effective, environmentally friendly, science-based animal damage control techniques and tactics.

Fall and Jackson (1998), Curnow (2001), and Conover (2001) provide insights and debates into the history of wildlife damage management, as well as trends, changes, and advances in the field of wildlife damage management and techniques development research. Several governmental agencies, universities, and commercial groups have been or are engaged in research to diagnose, understand, and resolve wildlife–human conflicts at the local, regional, national, and international levels. Often, these organizations' enabling acts, legislative requirements, and mission statements define their specific research directions. With the establishment of the USDA Section of Economic Ornithology in 1885, the US government became directly involved in wildlife damage management. The Animal Damage Control Act of 1931, which allowed USDA to undertake operations to control harmful animals while also placing a strong focus on research projects to develop novel control techniques at government labs (Fall and Jackson, 1998), was the enabling law for this initiative. The USDA=Animal and Plant Health Inspection Service (APHIS) = Wildlife Services (WS) program now has instructions to “provide federal leadership in controlling wildlife problems” because of this law (USDA, 1998)[5]–[7].

1.1 Operations of the Wildlife Services:

The WS operating program employs about 1200 people, who are spread throughout the country and work in every state. A WS Deputy Administrator in Washington, DC, Regional Directors for the eastern and western US, and 38 State Directors provide overall program leadership. Several State Directors oversee federal and state field workers as well as wildlife experts, and they have multi-state jurisdiction. The Animal Services operating program collaborates with other federal and state agencies, as well as county and municipal governments, to help private homes, farmers, ranchers, and others deal with wildlife damage concerns. These concerns are varied, and a survey of these State Directors to establish their views of research requirements may be used to get a sense of the most urgent wildlife–human conflict problems in their states and/or areas. One of the most essential functions of the periodic WS research needs assessment (RNA) is to identify and prioritize these problems in order to generate scientific knowledge and new or better methods to solve the most urgent wildlife challenges[8]–[10].

1.2 Research by the Wildlife Services:

The USDA WS program's research arm is the National Wildlife Research Center (NWRC), which is devoted to finding solutions to wildlife damage problems. Curnow (1996) describes

the history of the Center within the USDA and the US Department of Interior. (USDI). The NWRC's purpose is solely focused on wildlife damage control research and technique development, with a particular emphasis on approaches for use by WS operating staff. NWRC employs approximately 150 people at its headquarters in Fort Collins, Colorado, and at field stations in nine states, with expertise in wildlife biology and a variety of other specialized areas.

The NWRC's research focuses on creating socially acceptable and economically viable ways for decreasing wildlife harm effects on agriculture, human health and safety, and vulnerable and endangered species, while limiting hazards to people, animals, and the environment.

Congress, the WS program and its stakeholders, as well as the public, expect the NWRC to handle a variety of historical and conventional problems, as well as a growing number of new, developing, and varied wildlife harm conflict scenarios. Since its 1985 transfer to USDA, the WS program has utilized the RNA to select, prioritize, and commit funding to execute an integrated, interdisciplinary research program to offer scientific knowledge and solutions for wildlife harm issues.

1.3 Evaluation of research requirements:

1.3.1 Historical context:

After being transferred from the USDI–Fish and Wildlife Service to APHIS in 1985, WS embarked on a comprehensive strategic and long-term planning effort in a number of key areas (Acord et al., 1994). One such field is the development of techniques.

In 1989, APHIS established a policy to identify the local, regional, and national research requirements of the WS program as part of a plan to integrate WS program research with WS operations and stakeholder demands. A nationwide RNA survey of WS State Directors identified a matrix of specially affected resource groups and specially affected issue species groupings. In 1989, it was also decided to undertake similar nationwide evaluations every five years. In 1996 and 2001, further WS program–wide RNAs were completed. This document summarizes the 2001 RNA, prioritizes the issues that the WS program considers most significant, and compares current findings to past assessments in the United States.

Despite the fact that the WS program has a mechanism in place to identify and prioritize essential research, the NWRC does not have complete control over the areas of wildlife–human conflict research it pursues. Congress may (and has) require much of the Center's research (including the placement of its field stations). Congress, for example, has ordered NWRC to undertake research on bird damage to aquaculture and sunlowers, rat damage to Hawaii agriculture, and even the development of a specific chemical as a waterfowl reproductive inhibitor. Other Congressional mandates have led in the creation of NWRC field stations and research programs to address animal damage requirements in Mississippi, North Dakota, Hawaii, and Pennsylvania.

In addition, Congress has mandated that at least half of the Center's research effort be dedicated to the development of non-lethal control techniques.

NWRC developed a multiyear, multidisciplinary project management system in 1996 to focus on high-priority research topics identified in the 1996 RNA.

These projects last 3–5 years, have clearly defined goals and objectives, project milestones and expected outputs, and need mid-term and final project reviews, as well as yearly progress reports. Input from WS operational staff, outside scientists, and stakeholders is regularly included in project design, execution, and evaluations. The NWRC program to accomplish specific research goals within wider administrative directions as well as to create new research initiatives to address significant, developing wildlife–human conflict problems uses the RNA.

As current center projects are finished, new projects addressing different parts of the same problems, or completely new study topics, are developed to meet research needs identified in the most recent evaluation.

1.4 The RNA prioritizing process in 2001:

State Directors and NWRC scientists were asked by WS program managers in February 2001 to select their most significant research needs based on issue species and affected resources, size of the problem, and significance of study. Members of the National Wildlife Services Advisory Committee (NWSAC), an independent Federal advisory committee made up of representatives from organizations like livestock and agricultural producers, universities, animal interest groups, state agencies, and private pest control companies—all of which have an interest in USDA wildlife damage management issues—were also asked to participate. 26 WS State Directors representing 36 eastern and western states, 23 NWRC scientists, and 6 NWSAC members submitted 188 proposals to the NWRC.

Following the rewriting of each of the 188 contributions into a standard format and the removal of duplicate submissions, 103 requirements appeared. Research on wildlife species groupings, affected resource, threatened and endangered species, wildlife illness, wildlife population-models=census=economics, chemical products=registration, and documentation=information were used to categorize these various requirements. The following criteria were used to prioritize this long list of specific research needs into a shorter list of high priority areas: state, regional, or national importance; perceived value and/or magnitude of the resources impacted, damaged, or lost; perceived importance to stakeholders; current availability of existing information, methods, and/or solutions that simply need rename

To begin, only planned NWRC research that would be financed via a direct legislative allocation to APHIS=WS was included.

As a result, research to manage Brown Tree snakes on Guam, which NWRC undertakes with outside funding, is not included. Second, unlike pest management operations, the WS program, and therefore the NWRC research, is not regularly engaged with a variety of urban wildlife harm problems, such as commensal rodent control. Third, extensive product development research is identified as being necessary to solve the various avian and animal harm issues. Contraceptives, sterilants, and vaccines; non-lethal repellents like methyl anthranilate; the avian toxicant DRC-1339 (3-chloro-p-toluidine hydrochloride); toxicant ejector registrations for use in protecting natural resources; alternative rodenticides and odour and taste attractants; and live capture devices, remote trap monitors, and trap pan tension devices are all examples of such products.

1.5 The need for new talents as well as multidisciplinary research:

Because of mankind's limitless tendency to grow, occupy, and change the environment, wildlife managers of today and the future need different tactics, tools, and abilities than those who did such a fine job of conservation and management in previous decades," writes Curnow (2001). Curnow (2001) also emphasized the shifting nature of wildlife–human interactions. He stated that research priorities would be:

- Urban=suburban areas, with a critical need for management methods that are acceptable in urban settings.
- zoonotic diseases transmitted by wildlife
- Overabundant=eruptive wildlife populations.
- Human health and safety.
- Invasive species.

In order to effectively offer integrated, science-based solutions to these new and varied wildlife circumstances, he identified a number of new talents that future wildlife managers would require. The growing multidisciplinary competence of NWRC research staff over the last 20 years reflects the need for new abilities to meet the changing nature of wildlife–human conflict resolution. While the NWRC retains a number of wildlife biologists, the organization's expertise now includes animal behavior, analytical chemistry, engineering, molecular biology, reproductive physiology and immunology, psychology, physiology, economics, statistics, veterinary medicine, chemical vaccine development and registration, and information transfer. While wildlife–human conflict resolution retains part of its traditional emphasis, it is gaining many more problems that are complicated and creating many more innovative ways to address them, as this 2001 RNA attests.

2. DISCUSSION

The 13 highest priority research topics identified. The majority of these priority study topics also specify the specific resources involved potential research methodologies, essential information methods, and even desired deliverables. In general, the research needs for 2001 were focused on the following topics:

- Bird damage to agriculture and aquaculture.
- waterfowl, goose, and vulture impacts in urban=suburban situations
- Wildlife problems at airports.
- Predator affects livestock, other wildlife, and human health and safety.
- Mammal damage to forest, riparian, and agriculture resources.
- Wildlife disease transmission.

Recommendations to investigate the economics of harm caused by a range of species, create and register non-lethal chemical products, and enhance information distribution were woven across these problems. Johnston et al. (1999) recently established the importance of wildlife damage management information transmission within the WS program, and this assessment's findings emphasized it even more.

3. CONCLUSION

The author has conclude about the wildlife damage management, Anything that causes human pain or sickness, loss of economic production, physical danger, or a reduction in quality of life or well-being is considered wildlife damage. In recent years, the detrimental economic consequences of animals on civilisation have been clearly documented. Almost 55% of 13,000 respondents to a survey of 20,000 agricultural producers reported \$461 million in wildlife damage in 1989. In the 1990s, American agricultural producers and urban households spent \$2.55 billion and \$5.55 billion, respectively, on wildlife control. Messmer cited several studies that catalogued the financial damages and unfavourable effects of bird life on domesticated animals, wood products, field crops, fruits, nuts, and leafy greens, safety and environmental, vehicles and aircraft, wilderness bites, and disease transmitters, as well as evolving conflicts and challenges in human–wildlife conflict resolution.

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