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DEVELOPING A COORDINATED STATEWIDE WILDLIFE DAMAGE MANAGEMENT RESEARCH AND EXTENSION EDUCATION PROGRAM

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Dealing with the negative side of human-wildlife interactions has become an increasingly important part of wildlife management. This situation is due to a combination of factors: human population growth and urbanization, patterns of land use associated with human activities, and the increase in abundance of some wildlife species that cause problems for people. A broad consensus exists among state wildlife agency staff, state agricultural department staff, wildlife extension specialists, U.S. Department of Agriculture-Animal Damage Control agents, and state Farm Bureau officials that wildlife damage on agricultural lands has increased during the past 30 years, and white-tailed deer (*Odocoileus virginianus*) currently cause the greatest problems (Conover and Decker 1991). For example, 53% (25 of 47) of the Cornell Cooperative Extension agents who responded to a survey in 1990 indicated that the number of farmers reporting wildlife damage to crops or livestock was higher compared to 5 years earlier (Curtis and Decker 1990). Human and wildlife conflicts have also increased in importance in many suburban areas of the United States (San Julian 1987, Decker 1987). A number of different publics, including agriculturists, residential property owners, motor vehicle

operators, and the general populace experience or are affected by wildlife-damage-management problems (Sayre and Decker 1990).

Cornell University has a long history of wildlife-damage research and extension, with early work being conducted by W. J. Hamilton, Jr. and R. Eadie. During the 1970's and early 1980's, J. Caslick focused his efforts almost exclusively on damage-management problems until his retirement. Recognition of the increased demand for wildlife information, and the lack of awareness of New York residents, led to the organization of the 1st Eastern Wildlife Damage Control Conference, which was hosted by Cornell Cooperative Extension (CCE). The New York Cooperative Fish and Wildlife Research Unit (CFWRU), under the leadership of M. Richmond, has maintained a research focus on vole (*Microtus* spp.) problems in orchards, and deer damage in orchard and suburban environments. The Cornell University Human Dimensions Research Unit (HDRU), under the leadership of T. L. Brown and D. J. Decker, has focused on the socioeconomic impacts of human and wildlife conflicts from the mid-1970's to the present. After J. Caslick's

retirement, extension programming in wildlife damage management was diminished, despite a greater need for this type of education among many New York State publics.

Consequently, Cornell University has made an effort to revitalize wildlife-damage-extension programming and diversify research efforts in this arena. During the past year, programmatic bridges have been established for interagency collaboration. In this paper, we describe a program development model for implementing a coordinated, statewide wildlife-damage-management program. Although the examples provided are from New York State, the model has broader application and could be used as a framework for designing similar programs in other states.

PROGRAM GOALS

CCE is currently facilitating a coordinated, statewide program in wildlife-damage management. The long-term goals of this effort include: increasing agricultural profitability and cooperation between agencies, reducing landowner-wildlife conflicts, improvement of communication channels among agencies, and increasing citizen awareness and involvement in programming (Fig. 1).

SITUATION ANALYSIS

New wildlife-damage programs must be worked into existing wildlife-management structures and situations (Fig. 1). Several governmental agencies and institutions are responsible for dealing with wildlife-damage problems within state boundaries. A major impediment to developing effective educational, operational, and research programs can be lack of coordination among agencies, duplication of effort, and inconsistent responses among agencies to a problem.

In New York State, the Department of Environmental Conservation-Bureau of Wildlife (DEC) regulates game and furbearer harvests, and licenses private nuisance wildlife control operators. The Department of Agriculture and Markets (DAM) establishes agricultural policy and collects production statistics for several commodities. Public health and safety problems, such as rabies or Lyme disease, are addressed by the Department of Health (DOH). The U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Animal Damage Control (APHIS) provides technical and operational assistance with bird problems and predator damage to livestock. Cornell University is the Land-Grant institution in New York State. The Cornell Agricultural Experiment Station (CAES) supports wildlife damage research, and the CCE system promotes public education and outreach through campus faculty and county field staff located statewide. The CFWRU also conducts basic research that supports extension programming. Additional wildlife research (urban and national park situations) is conducted by the State University of New York-College of Environmental Science and Forestry (CESF). The professional staff associated with these agencies and organizations provide essential technical and human resources. Their ideas, enthusiasm, assistance, and interest are necessary to develop an effective wildlife-damage-management program. The CCE invited representatives from each of these agencies or institutions to serve on a statewide advisory committee. The objectives of this committee are to identify high-priority damage-management concerns, and to outline potential research and extension education strategies to address those issues.

A survey of CCE field staff was also conducted to identify important wildlife-damage issues. A questionnaire was sent to the Agricultural Program Leader in each of the county extension associations to deter-

mine high-priority problems and recent wildlife-damage trends. Respondents were asked to list the species causing the greatest damage to 11 different commodities, and the references or sources used to provide clients with control information. The majority of agents reported severe wildlife damage to urban landscapes, fruits, Christmas trees, grains, and vegetables (Curtis and Decker 1990). Deer caused the greatest impacts, affecting all 8 of the commodities most likely to be damaged. Agents identified a need for additional deer-damage-management information and urban-wildlife research and education. Much of our current applied research is targeted towards developing and evaluating techniques to reduce deer damage to ornamental shrubs or fruit trees, due to the need for this information and availability of funding.

The likelihood of audience acceptance and adoption of new concepts or methods for wildlife control has also been evaluated. The HDRU has profiled the perceptions and opinions of several publics who are stakeholders in wildlife-management decisions. This increases the effectiveness of educational outreach by allowing CCE to target programs toward specific audiences.

A variety of professionals are available in New York to provide advice or assistance to abate wildlife damage. CAES and CFWRU currently support an extension specialist on campus, and a research specialist in the Hudson Valley, who devote all of their time to wildlife-damage extension and research. In addition, other CCE, HDRU, and CFWRU staff devote a portion of their efforts to programming in wildlife damage management. The New York APHIS program has 2 professionals who provide technical and/or operational assistance to landowners. DEC offers management advice for game or furbearer species that cause property losses through 9 regional offices.

Also, DEC maintains a list of licensed nuisance-wildlife-control persons who can assist homeowners with pest problems. CESF is actively involved with urban wildlife research, and DOH offers wildlife-related health services to the public through their county offices and the Rabies Laboratory in Albany.

In the past, disagreement concerning the best approach for predator management in New York led to a lack of cooperation among some agencies. This has been recognized by the professionals involved as an undesirable, and potentially counterproductive situation. It has also become evident that effort must be targeted towards improving and maintaining the working relationships and communication between various state and federal agencies. Agencies involved with wildlife-damage-management efforts are well-intentioned, and attempt to be responsive to the needs of their clients. Minimal staff and monetary resources are available to meet the wide spectrum of damage-management needs in New York, and the public can best be served through collaboration and joint programming. A coordinated approach to wildlife-damage management provides for the development of mutually-advantageous relationships, with shared goals and common program objectives.

Existing CCE Statewide Program Planning Committees and Interdepartmental Commodity Committees establish the long-term vision for Cornell University's extension and research efforts. It is also important for members of the wildlife-damage program to develop mutually-advantageous relationships with other professionals and planning committees within the Cooperative Extension System. Working with these established groups improves communication with other University departments, and allows the wildlife damage program to keep

abreast of emerging issues, or target new programs to meet changing needs.

PROGRAM RESPONSES

Research

Past, ongoing, and new applied research projects by the CFWRU, CAES, CESF, and DOH provide the biological data base necessary to address important questions raised by extension field staff, professionals from other agencies, and commodity groups. The current wildlife research focus of the CFWRU and CAES is deer-damage management in suburban and agricultural settings (Fig. 1). Researchers are currently evaluating the effectiveness of chemical repellents and different electric fence designs for deterring whitetails.

The HDRU and DEC are exploring possibilities for increased input from local policy-makers into the wildlife management decision-making process. HDRU researchers, supported by APHIS, are evaluating a task force approach to involve agricultural and other stakeholders in setting deer herd population objectives for specific management units. Attitudes and perceptions of people involved in this effort are being evaluated through participant observations, surveys, and interviews.

CCE and the Cornell University Department of Fruit and Vegetable Science are cooperating on meadow vole (*Microtus pennsylvanicus*) research in apple orchards. Various groundcover-management systems are being evaluated for reducing vole damage to young fruit trees. Opportunities for this joint research project were developed at Interdepartmental Fruit Committee meetings, and other wildlife damage issues are high on the research priority list of fruit specialists.

The CFWRU has initiated a new project to examine the effects of deer browsing on the growth and future yield of young apple trees. As a greater proportion of producers switch to dwarf or semi-dwarf rootstocks and tree training systems, more of the fruit production zone is within the reach of deer, and the potential for economic losses increases. This study is designed to determine the long-term impacts from various deer foraging intensities.

The CESF is examining the behavior and survival of translocated nuisance raccoons (*Procyon lotor*) in urban areas, and deer management in national parks. Results from the raccoon study are of immediate concern to both DEC and DOH due to the outbreak of raccoon rabies in southern New York during summer 1990. Pet vaccination restrictions and regulations for transporting nuisance wildlife species are being modified in counties affected by the rabies epidemic. The CFWRU has also documented the seasonal prevalence of *Baylisascaris procyonis* in urban-suburban raccoon populations. This ascarid raccoon parasite has produced eosinophilic meningoencephalitis in humans.

Extension

CCE established a Wildlife Damage Management Advisory Committee (WDMAC) to facilitate information exchange and feedback among agencies, and to discuss opportunities for collaborative programming. The committee meets twice annually, and members present updates concerning current research or extension activities. Membership includes CCE faculty, field staff, and commodity specialists; and representatives from each of the federal or state agencies that are responsible for some aspect of wildlife-damage-management. Results of the county agent survey were presented to the committee, and members ranked the research and extension needs

from highest to lowest priority. Input received from the WDMAC is important for long-term research and CCE program planning. The WDMAC discussed the role of member agencies and institutions in state-wide damage-management issues or concerns. The responsibilities of each group were outlined, and the procedures for processing requests for information or technical assistance were reviewed. The goal was to reduce duplication of effort among agencies and route public concerns to the appropriate group as quickly and efficiently as possible. Primary audiences for program efforts are CCE field staff, homeowners, and agriculturists.

By having CCE commodity and state-wide planning committee members serve on the WDMAC, damage-management issues can be incorporated into the agendas of other groups. These linkages not only support extension programming, but also nontraditional sources of grant funds may be identified for joint research efforts, such as the vole study mentioned earlier. Staff from the wildlife-damage program also participate in workshops and seminars held for specific commodity groups. This allows direct information transfer between university staff and clients who need damage-prevention advice.

The DEC, DAM, APHIS, and CCE cooperated on the planning and implementation of four public educational meetings focusing on coyotes (*Canis latrans*). Legislation affecting coyote management in northern New York was introduced during 1990, and the public meetings provided citizens with an opportunity to have input into the decision-making process. Many people who attended these meetings said they were glad to have a chance to express their views, and they learned a great deal about coyotes. The CCE county agents facilitated the meetings, which included a question and answer session with a panel of coyote experts.

CCE has facilitated communication and networking among farmer organizations, agencies, institutions, and others interested in wildlife management in New York. CCE, HDRU, and DEC implemented a new Deer Management Task Force approach during 1990, to bring agriculturists, sporting groups, and other stakeholders together to decide on target deer population levels for specific areas. County agents facilitated these meetings and identified potential task force members.

CCE will host the 5th Eastern Wildlife Damage Control Conference in October 1991. Members of the WDMAC serve on the core program planning committee for this conference, and this increases cooperation and communication among the state and federal agencies. The conference will also promote awareness of the revitalized CCE wildlife-damage program both within New York, and throughout the eastern United States.

Communication

Wildlife professionals can benefit by sharing approaches for handling specific situations, and minimizing the overlap in responsibility among agencies. Land-Grant Universities are uniquely suited for facilitating the coordination of extension education and research programs in damage management. Often, linkages already exist between university staff and members of other state or federal agencies involved with wildlife-damage programming.

A quarterly newsletter, "Wildlife Damage News," is produced by CCE and distributed to all WDMAC members and the 57 CCE County Associations. The response to the newsletter has been outstanding, and we have generated an additional 150 paid subscriptions from private individuals throughout New York. Articles are submit-

ted by professionals of the WDMAC member agencies and CCE staff. Newsletter topics include the management of nuisance wildlife, the availability of instructional materials, upcoming meetings or short-courses, health alerts, and the review of current research articles concerning wildlife-damage topics. We plan to evaluate the impacts of this publication, and additional information needs of the readership.

A computer bulletin board was established on CENET (CCE electronic-information network) to facilitate information transfer. Electronic copies of newsletter articles are stored in the bulletin board, and can be rapidly down-loaded in any of the 57 county CCE offices. Other state or federal agencies, and private individuals also have CENET accounts, and can access information in the wildlife-damage bulletin board. CENET also supports an electronic-mail service so that messages can be sent to computers in other agencies or institutions within New York, or nationwide. This helps reduce the amount of "phone tag" and increases efficiency when scheduling meetings. Also, if an urgent issue arises, a message can be distributed statewide in a matter of a few minutes.

CCE and CFWRU staff developed a new informational brochure to increase awareness of the revitalized Wildlife Damage Management Program. The brochure describes the agencies and institutions cooperating in program development, functions of the WDMAC, the research base, and the educational outreach role of extension. In addition, answers to frequently asked questions about wildlife damage are included in the brochure as a way to demonstrate the scope of the program. Copies were distributed to each of the CCE county offices, and are disseminated at workshops and trade shows throughout New York.

CCE wildlife-damage program staff have prepared several consumer and agricultural news articles describing new wildlife-control techniques, highlighting research results, and listing sources for additional information. These articles regularly appear in the CCE county newsletters, and are sometimes used by local newspapers or other publications.

EVALUATION

The revitalized CCE Wildlife Damage Management Program has been in existence for just over a year. It's still too early to determine the effects of most activities, but we plan to evaluate the newsletter and electronic-information network use during 1991 (Fig. 1). A broad program evaluation will be conducted before the end of the next 4-year plan-of-work period (1992-1995) for the National Cooperative Extension System. At this point in time, we would like to highlight our perceptions concerning the success of several program components.

Establishment of the WDMAC is one of the key components of this planning model. Agencies and institutions are currently cooperating on projects where they have common interests. Meeting twice annually enhances personal interactions that otherwise might not occur. The WDMAC also provides guidance for long-term extension education and research programs.

Working with various statewide planning and commodity committees has helped identify major wildlife-damage issues. The primary drawback is that each commodity group views its concerns as the most important, and it is not possible to address all the issues that have been raised. The WDMAC has made tough choices concerning which problems should receive immediate attention. Also, the lack of funding to support research and extension programming for some com-

modities, presents a barrier to achieving broad project goals.

The task force approach for addressing controversial wildlife-management issues has been successful. County agents provide invaluable credibility and local experience. People who are involved in the task forces learn that there are several different viewpoints for determining wildlife-management objectives. Through logical, organized discussions, the group often can come to a consensus concerning the best action plan, even though individual task force members will not be completely satisfied. We would encourage the Cooperative Extension Systems in other states to experiment with this technique. It is an educational approach with merit for both technical information transfer and community decision-making.

Planning for the 5th Eastern Wildlife Damage Control Conference has promoted a sense of "group ownership" in the program. Although the conference will enhance program identity, a great deal of time is required for organization and implementation. It would be difficult to organize and conduct a similar event during the first 18 months of program development with support staff and faculty who have had no previous conference planning experience.

The wildlife-damage newsletter has been extremely valuable for increasing program awareness. The newsletter has also strengthened linkages between DEC and CCE, especially in the area of nuisance-wildlife control. Articles submitted by staff members from cooperating agencies have enhanced public understanding of the variety of issues and problems damage-management professionals face, and provided citizens with the names of key agency contacts for additional information. Income from paid subscriptions for private individuals currently covers most of our production and mailing

costs. Although it takes several hours to write and lay out each quarterly issue, we have found it is well worth the time invested.

SUMMARY

CCE is facilitating the coordination of effective, statewide wildlife-damage-management programming in New York. Our goals are to: 1) increase communication among agencies and institutions responsible for wildlife damage management and incorporate their ideas into the program-planning process; 2) increase the potential for inter-agency cooperation during program implementation, and 3) develop a coordinated extension and research response to address high priority wildlife-damage problems.

Land-Grant Universities are uniquely suited for facilitating the development of statewide wildlife-damage programs. The Cooperative Extension System provides a mechanism for assessing local or regional issues, and a linkage with stakeholders in each county. Also, county agents have established credibility with local constituents, and can effectively deliver program materials. Cooperative Extension often has existing contacts with other agencies or institutions interested in collaborative programming on wildlife-damage topics.

Minimal staff and funding are available to meet the wide spectrum of damage-management needs in New York. Cooperative, interagency efforts to tackle high-priority concerns may enhance the public image and support of those agencies involved, and provide for the most efficient use of limited resources. Collaborative projects to address shared goals and objectives can lead to the development of mutually-advantageous working relationships. Each agency or organization possesses valuable technical and human resources

that can support extension education and applied research efforts.

We recommend the following steps for Cooperative Extension Systems in other states that plan to develop similar programs:

1. Form a WDMAC to enhance inter-agency communication and provide long-term program guidance.
2. Network WDMAC members with other existing planning committees to keep abreast of emerging issues.
3. Utilize the task force approach to set local wildlife management objectives, where appropriate.
4. Organize a regional meeting or workshop to increase program awareness outside of state boundaries, and form a core in-state damage-management workgroup.
5. Produce a newsletter to provide WDMAC members with a forum for communicating among agencies and other stakeholder groups.
6. Establish an electronic communications network to speed information transfer.

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A WILDLIFE DAMAGE PROGRAM PLANNING MODEL

Program

Cornell Cooperative Extension facilitates a coordinated, statewide, wildlife damage management program with input from other agencies, institutions, and stakeholders

Goals

1. Increased agricultural profitability
2. Reduced landowner/wildlife conflicts
3. Increased cooperation among agencies and institutions
4. Involve stakeholders in the decision-making process
5. Improved communication channels among agencies
6. Greater citizen awareness of programs, available resources

Situation Analysis

1. Agencies, institutions responsible for wildlife damage decisions
2. Assessment of research and educational needs
3. Assessment of stakeholder perceptions, values, behavior
4. Resources available
5. Past experiences of individuals involved
6. Established communication channels

Program Responses

Research

1. Deer repellent research
2. Deer fencing studies
3. DMU Task Force project
4. Vole ground cover study
5. Apple tree growth/yield/study
6. Urban raccoon research

Extension

1. WDM Advisory Committee
2. Commodity committees
3. Commodity workshops and seminars
4. Coyote educational meetings
5. DMU Task Force implementation
6. 5th Eastern Wildl. Damage Control Conf.

Communication

1. Wildlife Damage News
2. CENET bulletin board
3. WDM Program brochure
4. CCE News Service articles

Evaluation

1. Survey of the newsletter readership planned for spring 1991
2. CENET provides user logs for the wildlife damage bulletin board

Fig. 1. Components of the Cornell University statewide wildlife damage management research and extension education program model.