

Developing the first regional IPM training manual for wildlife control operators in the Northeast (progress report)

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The New York State manual, *Best practices for wildlife control operators*, was published in June 2004.

Type of grant:

Training practitioners to use IPM techniques

The creation of this regional version of the manual was funded by the Northeast IPM Center through its Regional IPM Publications Fund. This manual will be published by NRAES in 2005.

Project location:

The regional manual is applicable from Maine through North Carolina, west up to (but not including) the Plains States.

Abstract:

The American public places a high value on wildlife, yet at the same time, "nuisance" wildlife may cause formidable and expensive problems. They may damage property, threaten human health and safety, or endanger native species and habitats. National estimates of the cost of wildlife damage to agriculture range up to \$1.5 billion dollars annually, with equal costs associated with accidents caused by collisions between wildlife and cars or planes. Wildlife can spread diseases to people, livestock, or pets. Nearly all segments of society are vulnerable to wildlife damage.

Traditionally, government agencies handled many of these conflicts. Public demand for wildlife control services has increased but government support for on-site assistance has not kept pace. Consequently, the commercial pest control industry is filling this need. Several state wildlife agencies are facing increasing public pressure to strengthen their oversight of this rapidly expanding industry. More than three-quarters of the Northeastern states lack training programs for wildlife control operators (WCOs), while half either lack regulations or are in the process of developing regulations for this industry.

The goal of this project was to develop and distribute a comprehensive, scientifically-based training manual (based on the New York curriculum) that could serve as the foundation for educational and regulatory programs throughout the region, while also enhancing professionalism within the industry. The New York State manual was reviewed for suitability for use throughout the region by state wildlife agencies and wildlife control associations. It is

currently under revision and has been accepted for publication by NRAES, the Natural Resource, Agriculture, and Engineering Service, a publishing consortium of Northeastern universities. After another technical review conducted by the publisher, the manual will be published in 2005.

Background and justification:

Scope of the problem

National surveys show that Americans care deeply about the treatment of wildlife (Schmidt 1993). We spend over \$100 billion/year on activities such as hunting, fishing, and observing or photographing wildlife (GAO 2001). Yet at the same time, some “nuisance” animals cause formidable and expensive problems. They may damage property or threaten human health or safety. Agricultural losses in the U.S. due to wildlife damage are estimated at \$660 million to over \$1.5 billion dollars annually, with over half of all farmers and ranchers reporting wildlife-related damage each year (GAO 2001). Nearly all segments of society are vulnerable to wildlife damage. Contrary to popular belief, Curtis et al. (1995) found that in New York State, more than 90% of wildlife complaints came from urban areas.

Nuisance wildlife also pose risks to public health and safety. They spread diseases to humans, livestock, pets, and other wildlife species. Addressing this issue can be costly. The General Accounting Office reports that an increase in the incidence of rabies among raccoons, coyote, and foxes has added over \$450 million in national public health and animal control expenses. Beavers, squirrels, woodchucks, and other species damage roads, bridges, dams, and electrical utilities, sometimes causing unsafe driving conditions or power failures. Each year, more than a million accidents are caused by collisions between deer and cars in the U.S., averaging 200 human deaths and over \$1 billion of damage. Approximately 6,000 planes collided with birds in the U.S. in 2000. Worldwide, bird strikes cause more than \$1 billion of damage each year, affecting both commercial and military aircraft (GAO 2001).

Traditionally, government agencies handled many of these wildlife conflicts by providing technical advice and educational materials or capturing and removing problem animals. Most wildlife conflicts were handled by the state fish and wildlife agency, the federal USDA-APHIS-Wildlife Services program staff, or Cooperative Extension Service agents (San Julian 1987). Public demand for wildlife control services has increased but government support for on-site assistance has not kept pace (Curtis et al. 1995). Consequently, the commercial pest control industry is filling this void. In New York State, for example, the number of licensed wildlife control operators (WCOs) quadrupled from 1986–1993 (Curtis et al. 1995).

Current status of educational and regulatory programs in the Northeast

Currently, several state wildlife agencies are facing increasing public pressure to strengthen their oversight of this rapidly expanding industry (Julien 2001b, Hadidian 2001). Half of the states in the Northeast region lack regulations for the wildlife control industry, while more than three-quarters currently have no training program or training materials for WCOs (T. Julien, president, NWCOA, pers. comm., D. Lafountain, region 7 director, NWCOA, pers. comm., and J. Pickel, region 8 director, NWCOA, pers. comm.). At least four states are developing or revising their regulations; three are developing training materials.

A formal training and testing program has been used in Connecticut since 1993. Applicants receive a booklet (Conn. DEP 1999) that describes the state agency’s policies and procedures and includes a series of wildlife fact sheets. This is supplemented by a training workshop during which nuisance wildlife control techniques are discussed and certain tools are demonstrated.

New York published its comprehensive manual, *Best practices for nuisance wildlife control operators*, in June 2004 (NYS DEC 2004). The manual describes the IPM decision-making model; a broad array of tools, techniques, and resources; and management strategies for approximately two-dozen species most commonly encountered in nuisance situations in New York State. It

also addresses legal, safety, and ethical issues related to wildlife control activities (see the attached table of contents). The online version is available at <http://www.nwco.net>.

At the same time, a test bank of 350 questions was developed and validated under the supervision of an educational psychologist. The questions in the test bank are directly linked to the learning objectives in the manual. This test bank is used to develop the state certification exam, which was first administered in the summer of 2004.

Considerations for training curricula

In proposing a model program for oversight of the nuisance wildlife control industry, Barnes (1997) recommended that state wildlife agencies require applicants to receive training before issuing a WCO license. A training curriculum should provide the basic framework for handling wildlife damage situations including details on dealing with the most frequent problem species (Braband and Clark 1992, Curtis et al. 1995). The National Animal Damage Control Association recently adopted a position statement that advocated the development of training curricula promoting consumer protection, humane treatment of animals, and effective and practical solutions to wildlife damage situations (Conover 2002). Within the nuisance wildlife control industry, opinions vary on the value of formal training for licensing or certification (Julien 2001a, Toth 1994, Daniotti 1996, Vantassel 2002).

Wildlife damage conflicts and their proposed solutions often raise complex ecological, financial, or social issues. Ethical questions are raised by such potentially controversial topics as the definition of “humane” (Braband and Clark 1992), the justification for lethal controls (Clark 2002), euthanasia (Schmidt 2000, Clark 2002), and animal relocation (Curtis et al. 1995). To promote an IPM approach to solving wildlife damage problems, a training curriculum must also address these ethical concerns, as well as legal considerations and safety issues (Schmidt 1993, Patrick 1995).

Wildlife control operators are diverse in terms of their academic backgrounds. A large proportion has a high school degree (Barnes 1995), but many are also college educated with degrees in wildlife biology or related fields. Curtis et al. (2003) suggest that academic backgrounds be considered when choosing an appropriate reading level, tone, and writing style for this audience. The length and technical difficulty of the material should also influence these choices. For example, the New York State Department of Environmental Conservation chose an 8th–10th grade reading level and an engaging, informal writing style for its 250-page manual, which covers many topics and includes a great deal of technical information (Curtis et al. 2003).

Stakeholder interest

While developing a WCO training curriculum for the New York State Department of Environmental Conservation, the authors were contacted by representatives from 12 states (Alabama, Arkansas, California, Maryland, Massachusetts, New Hampshire, New Jersey, Pennsylvania, Rhode Island, Vermont, Virginia, and West Virginia). In most cases the inquiry came from the state wildlife agency, although local industry associations and university Extension faculty also requested copies for review and inquired about the possibility of adoption of the manual by their state. Representatives of the National Wildlife Control Operators Association have presented the New York manual at several national and international wildlife damage management meetings, reporting similar interest (T. Julien, president, NWCOA, pers. comm., D. Lafountain, region 7 director, NWCOA, pers. comm.)

During the 2002 Northeastern Fish and Wildlife Conference, seven of the Northeast region’s state wildlife agencies (NH, MA, VT, RI, PA, MD, and NJ) expressed strong support for the development of a regional training curriculum for wildlife control operators.

This project also addresses three of the priorities developed by the Community IPM Working Group for the Northeastern Pest Management Center (Community IPM Working Group 2003). Specifically, they identified the need for outreach on wildlife pest management and on structural pest management in community settings such as residences, public buildings, and schools (wildlife such as mice, rats, raccoons, squirrels, and birds often invade such structures). These stakeholders also called for outreach to “multipliers,” which in the case of

this project, refers to Extension educators, wildlife agency staff, and volunteer teachers from wildlife control associations. Curtis (1997) identified research needs for the wildlife damage management field, listing nine wildlife species as top priorities. The proposed manual offers management strategies for seven of these “top priority” species (Canada geese, beaver, raccoon, gulls, deer, bear, and coyote).

Currently, there is no training curriculum that addresses these stakeholder needs for the Northeast region. We propose to develop and distribute a comprehensive, scientifically-based training manual (based on the New York curriculum) that could serve as the foundation for educational and regulatory programs throughout the region, while also enhancing professionalism within the industry.

Objectives:

1. Teach wildlife control operators in the Northeast the integrated pest management (IPM) approach to wildlife damage management, promoting best practices to enhance the professional standards of the wildlife control industry.
2. Strengthen interstate collaboration among wildlife agencies and stakeholders.
3. Provide a comprehensive, scientifically-based, peer-reviewed training manual that satisfies a stakeholder-identified need, filling an important gap that would otherwise likely be addressed by each state individually.

Procedures:

1. *Teach wildlife control operators in the Northeast the integrated pest management (IPM) approach to wildlife damage management, promoting best practices to enhance the professional standards of the wildlife control industry.*

The IPM decision-making model used in the New York curriculum supports the use of both lethal and nonlethal techniques, focusing on best practices, which Curtis et al. (2003) defined as effective methods for solving a nuisance wildlife problem that minimize risks to the environment and human health while maintaining tolerable standards for quality of life. When applied to wildlife pest situations, the IPM model must balance many factors including concerns about human safety; the humane treatment of wildlife; practicality; landowner rights; the protection of wildlife populations and habitats; and ethical, legal, financial, and aesthetic issues. In this manual, the discussion of each control option addresses its advantages and disadvantages and suggests situations in which its use may be most appropriate; for example, killing methods are grouped into “preferred” and “acceptable” methods for each of the species described. Wildlife control operators are trained to use the IPM decision-making strategy and encouraged to use best practices whenever feasible. The regional version will follow the same philosophical approach. (The New York State Department of Environmental Conservation has granted permission for this adaptation.)

To generalize from the New York version and best ensure that the regional curriculum meets the diverse needs of wildlife control agencies throughout the region, we sent the New York manual to each state’s wildlife agency and wildlife control association for review. They were asked to evaluate its usefulness for their state, identifying any missing information or sections that needed revision. Each state was invited to contribute resources that would improve the manual, such as photographs, illustrations, quotations, and citations for the resource section.

The New York State manual was transferred into a manuscript format to facilitate the review process, with line numbers for reference. Manuscripts were distributed at the 60th annual Northeast Fish and Wildlife Conference in April 2004, during an open forum in which we invited participants to discuss their needs for educational materials for this audience. (Both print and compact disk versions were distributed.) The session was attended by about a dozen high-ranking members of state wildlife agencies, including some bureau chiefs, and a regional director of NWCOA, the National Wildlife Control Operators Association. Additional copies were distributed to anyone who expressed interest in reviewing the manuscript.

Reviewers were asked to submit their comments electronically, using a simple Excel spreadsheet that had a separate worksheet for each chapter. Each worksheet had three columns, for the line number of the section under discussion, the reviewer's comment, and the reviewer's initials. Comments that were received in other forms were entered into the spreadsheet by the project leader. The spreadsheets were then sorted by line number to facilitate the discussion of the reviewers' comments.

2. Strengthen interstate collaboration among wildlife agencies and stakeholders.

The New York State manual received an extensive review by over 70 organizations and individuals representing a broad array of stakeholders, including: wildlife biologists from state and federal agencies and professional associations; wildlife control operators; university faculty and Extension wildlife specialists; veterinarians; animal welfare and animal rights advocates; pest management professionals; fur-trappers; wildlife rehabilitators; and staff from the NYS Department of Health, NYS Department of Environmental Conservation, and NYS Department of Agriculture and Markets. Although most of the reviewers were New York State residents, several live in other Northeastern states or in other parts of the nation. The production of that publication has already focused attention on this issue and generated excitement about possible interstate collaboration.

Before revisions were begun on the regional version, another round of review was conducted. The manuscript was given to twenty-six reviewers, two from each state in the Northeast (representing the state's wildlife agency and wildlife control industry association). The equal representation of stakeholder and state agency was intended to strengthen the stakeholders' role in the development of this publication, which we hoped would contribute to its success and also strengthen the relationship between the wildlife agencies and wildlife control operators.

Many aspects of wildlife control require hands-on activities and field experience. There is a potential role for Cooperative Extension educators and private industry organizations such as the National Wildlife Control Operators Association (NWCOA) to offer periodic short-courses and workshops to strengthen the educational value of a state's training program. With state agency approval of course content, these educational events could supplement the regional training curriculum. Such a collaborative training approach has existed in Connecticut for nearly a decade between the Connecticut Department of Environmental Protection and the Connecticut state chapter of the National Wildlife Control Operators Association. The New York State Department of Environmental Conservation hopes to implement a similar model with Cornell Cooperative Extension educators and the New York State Wildlife Management Association, an affiliate of NWCOA.

The format of the regional training manual may promote future collaborations among these state agencies. For example, learning objectives guide the reader to the most important information in each chapter. These objectives could form the basis of a regional certification exam, following the New York State model. The validation process used in New York created an opportunity to strengthen the relationship between the state agency and WCOs. Over 80 WCOs volunteered to "test the test," demonstrating their interest in promoting increased professionalism within their industry through the use of best practices. The state's trade

association encouraged its members to participate and then reported the results, expressing strong support for the state agency's training and licensing program.

- 3. Provide a comprehensive, scientifically-based, peer-reviewed training manual that satisfies a stakeholder-identified need, filling an important gap that would otherwise likely be addressed by each state individually.*

Ten states in the region have yet to develop training specifically for this industry (T. Julien, president, NWCOA, pers. comm., D. Lafountain, region 7 director, NWCOA, pers. comm., and J. Pickel, region 8 director, NWCOA, pers. comm.). Six need to develop regulations, a time-consuming and often controversial process. If either need forced a state to produce training materials in a hurry, the result would not likely be as comprehensive or carefully reviewed as this regional publication.

As described in the previous point, the New York State manual was subject to a rigorous technical review. It is among the few training publications that addresses the scientific theories of wildlife damage management, not focusing solely on state regulations and agency policies, and is one of the most comprehensive manuals in the nation. The manual was developed by a project team including eight NYS Department of Environmental Conservation wildlife biologists and three Cornell University staff members over a period of two years. Consequently, the New York State manual provided a strong foundation for the regional curriculum.

By adapting this publication for regional use and then offering to produce and distribute the result, we could offer significant resource savings to those states that wish to adopt the regional manual. They could then devote their efforts to other aspects of their wildlife control programs that also need attention.

Results to date:

We received comments from 10 reviewers, representing 3 state wildlife agencies, 3 chapters of wildlife control associations, and 4 animal welfare organizations. Currently, the manuscript is under revision.

NRAES expects to send the manuscript out for a national review in February, following its standard protocol, which is similar to that of a peer-reviewed journal. NRAES will choose among potential reviewers suggested by the authors; none of them were involved in the creation of the New York publication. Copyediting and revisions are planned for spring 2005 and will be followed by the design and printing of the new regional version. Marketing and distribution will be conducted by NRAES, based on ideas presented by the authors.

Although the regional manual is still in progress, given its strong connection to the New York version, the response to that publication is instructive. The manual received the 2004 "Innovative Outreach Award" from the New York chapter of ANREP, the Association of Natural Resources Extension Professionals.

The results of the validation process and the first six months of the administration of the licensing exam in New York are also interesting. Months before the exam was first offered, the entire test bank was validated under the supervision of an educational psychologist, Dr. William Altman of Broome Community College. At the same time, the effectiveness of the manual as a teaching tool was also assessed.

The New York State Wildlife Management Association, which is affiliated with the National Wildlife Control Operators Association, strongly supported this effort, publishing information in each newsletter sent to its members during this process. The group encouraged its members to volunteer and helped secure volunteers for the control group.

Over 170 volunteers participated in the validation effort. Among the WCOs, the percentage who passed rose from 39% on the pre-test to 88% on the post-test, after two weeks of studying

the manual. The non-WCO sample showed a similar increase, from 39% to 89%. The average point gain was 12 points. Since the manual is over 250 pages and contains technical material, this increase in such a short time period shows the strong educational value of the manual.

A full item analysis was conducted to ensure that the questions were fair (this is a standard protocol in the field of educational measurement). If the percentage of people who chose the correct answer for a particular question was too close to that predicted by chance, the question was either revised or deleted. Of a test bank of almost 350 questions, only 8 fell into this category. We also received many comments on the exam, which led to the revision of about another 20 questions.

In addition, we asked the participants to fill out a survey. On a scale of 1-5, with "5" meaning "strongly agree," this is how they answered three crucial questions:

Was the test fair?	4.2 (statewide average)
Did the manual teach you new information?	4.4
Will the manual be useful in your business?	4.5

The NYS Wildlife Management Association continues to promote the manual, which is mentioned in each issue of its newsletter. In the December 2004 newsletter, readers are urged to "use [the website], it's free and has tons of information."

As previously mentioned, every WCO in New York State has received a copy of the manual. To renew their licenses, each had to pass the certification exam. Of the approximately 800 people who took the exam, nearly 80% passed, which required a grade of 80 or higher. This suggests that we were highly successful in teaching IPM principles to wildlife control operators in New York, and bodes well for the potential educational value of the regional manual.

The credibility of the state's training manual and licensing exam will likely prove beneficial to WCOs as the public becomes aware of this new process. The emphasis on best practices and the humane treatment of wildlife will resonate with the public.

Local Extension offices are using the manual to support many kinds of programming, including hotlines and the Master Gardener program. Even those with expertise in wildlife biology have found it a useful reference. The authors have encouraged Extension educators to develop hands-on workshops to complement the manual, and several are considering the opportunity.

Literature cited:

- Barnes, T. G. 1995. A survey comparison of pest control and nuisance wildlife control operators in Kentucky. *Proc. East. Wildl. Damage Control Conf.* 6:39-48.
- Barnes, T. G. 1997. State agency oversight of the nuisance wildlife control industry. *Wildlife Society Bulletin* 25(1):185-188.
- Braband, L. A., and K. D. Clark. 1992. Perspectives on wildlife nuisance control: results of a wildlife damage control firm's customer survey. *Proc. East. Wildl. Damage Control Conf.* 5:34-37.
- Clark, K. 2002. Regulatory actions on the horizon. *Wildlife Control Technology* 9(3):20-24, 48.
- Community IPM Working Group. (2003, October 16). Priorities developed by the working group. Retrieved November 10, 2003, from http://NEPMC.org/cwg/community/Priorities_oct03.html
- Connecticut Dept. of Environmental Conservation. 1999. Nuisance wildlife control operator policies and procedures booklet. Wildlife Division, Hartford, CT.
- Conover, M. R. 2002. Position statement: development of training curricula for the private wildlife control industry. *The Probe* 224:1, 4.

- Curtis, P. D. 1997. Top-priority species, damage issues, and research priorities in Nuisance Wildlife in the Northeastern States: Current Issues and Future Trends Workshop Transactions. Retrieved November 10, 2003, from http://northeastipm.org/partners/NE_WDM_Research_Priorities.doc
- Curtis, P. D., J. Shultz, L. A. Braband, G. Batcheller, and L.T. Berchielli. 2003. Best practices for nuisance wildlife control operators: A training manual. New York State Department of Environmental Conservation and Cornell Cooperative Extension. Ithaca, NY.
- Curtis, P. D., M. E. Richmond, P. A. Wellner, and B. Tullar. 1995. Characteristics of the private nuisance wildlife control industry in New York. Proc. East. Wildl. Damage Control Conf. 6:49-57.
- Daniotti, R. 1996. Certification or licensing? Wildlife Control Technology 3(3):4-5.
- Hadidian, J. 2001, Nov/Dec. Oversight of the wildlife control industry: regulatory and statutory standards as recommendations to the states. The Probe 219: 1, 4.
- Hygstrom, S.E., R. M. Timm, and G.E. Larson, eds. 1994. Prevention and control of wildlife damage. University of Nebraska Cooperative Extension. Lincoln, NE.
- Julien, T. 2001a. From the president: the importance of ethics. NWCOA News June/July 2001:1.
- Julien, T. 2001b, Nov./Dec. Oversight of the wildlife control industry. The Probe 219: 1, 5.
- New York State Department of Environmental Conservation. 2004. Best practices for nuisance wildlife control operators: A training manual. New York State Department of Environmental Conservation and Cornell Cooperative Extension. Ithaca, NY.
- Patrick, W. 1995. Ethical considerations. Wildlife Control Technology 2(6):50.
- San Julian, G. J. 1987. The future of wildlife damage control in an urban environment. Proc. East. Wildl. Damage Control Conf. 3:229-233.
- Schmidt, R. 1993. A professional code of ethics for wildlife damage management. Animal Damage Control 1(5):8.
- Schmidt, R. H. 2000. An update on AVMA's euthanasia guidelines. The Probe 212:1, 4.
- Toth, S. 1994. A call for professional certification. Wildlife Control Technology 1(3):4.
- U.S. General Accounting Office. (2001, November). Wildlife Services program: Information on activities to manage wildlife damage. (Publication No. GAO-02-138). Washington, D.C.: GAO.
- Vantassel, S. 2002. Becoming a certified wildlife control professional. Wildlife Control Technology 9(1):15-16, 44-45.

Attachments:

The following table of contents from the New York State manual is a good guide to the topics covered in the regional publication.

Best practices for nuisance wildlife control operators: A training manual

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