

A PRACTITIONERS' GUIDE

Community-Based Deer Management



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Why a Practitioners' Guide to Community-Based Deer Management?

Community-based deer management in the Northeast continues to present deer managers with challenges and opportunities. Community-based management typically involves collaboration of public wildlife management agencies with entities such as local governments, interest groups, nongovernmental organizations, and residents (Chase et al. 2000, Schusler 1999). Whereas traditional deer management generally is the result of commission- or legislature-driven policies that are translated into regulations applied broadly across the landscape, community-based management calls for collaboration to formulate locale-specific decision-making strategies and management tactics.

Deer-human interactions have become quite common in the Northeast. Unfortunately, some interactions (e.g., deer-car collisions) may create a range of negative impacts that exceed the acceptance capacity of communities. Managing deer as a valuable resource, rather than as a pest, frequently leads deer managers and communities to collaborate in decision making and management implementation. But such collaboration needs guidance to work. Managers seek proven approaches to engage stakeholders in decision-making processes that result in positive outcomes.

An earlier practitioners' guide, *Human-Wildlife Conflict Management* (Decker et al. 2002), described citizen involvement in decision making. However, specific insights about key dimensions of successful community-based deer management were not included in that guide, nor were analytic descriptions of actual cases. Such grounded insights are needed as more managers find themselves facing for the first time, or perhaps yet again, the daunting task of guiding constructive stakeholder involvement in community-based deer management.

Experience that helps address this need is growing among deer managers in the Northeast. Recent collaborative work among managers in the region has focused on documenting, analyzing, and synthesizing their collective experience.



JIM CHRISTENSEN

This practitioners' guide is intended to communicate their insights to other front-line managers who are practicing community-based deer management.

As field experience grows in community-based deer management, the quest for "secrets to success" shifts into higher gear. In community-based deer management, the risks seem great, the stakes often high. The promise of discovering a sure-fire recipe for success is alluring, but it is also unlikely to be fulfilled. A more realistic expectation would be to identify broadly applicable insights about key dimensions of successful programs. Such insights might be expected to come from a combination of relevant theory of human behavior and practical experience of managers.

A common sight. Across the Northeast communities and wildlife agencies are collaborating to address residents' concerns and maintain deer as a valued community resource.

We approach the revelation of these key dimensions from two directions. First, we draw from the public issues literature that has developed to guide public issues education and provide some general assertions that are relevant for deer managers. Second, we present a synthesis of findings from our own research specific to community-based natural resource management, including the results of collaborative inquiry with deer managers who are experienced in community-based deer management across the Northeast. This guide relies heavily on perspectives growing out of the experiences of these veteran deer managers and new understandings discovered collectively through their interactions and critical analyses.

Our Purpose

The underlying motivation for this practitioners' guide is:

To enable the continued management of white-tailed deer as a resource, rather than as a pest, by articulating key dimensions of success when engaging in community-based management.

This also is the underlying goal for a project, the MA/NY Deer Study, funded by the Northeast Wildlife Damage Management Research & Outreach Cooperative (NWDMROC). During the development stage of that study, the germ of the idea for this guide emerged. Thus, this practitioners' guide draws from cases across the Northeast (including CT, MA, MD, ME, NJ, NY, PA, and VA), contributing to a regional understanding of approaches used to achieve collaborative decision making for community-based deer management. It also complements past efforts to communicate research findings to front-line wildlife management practitioners, in

particular the recent publication referred to earlier: *Human–Wildlife Conflict Management: A Practitioners' Guide* (Decker et al. 2002).

We have three objectives:

1. To share a variety of approaches to community-based deer management that have been used in the northeastern U.S.
2. To present key dimensions of community-based deer management that should receive special attention by deer managers.
3. To facilitate planning of community-based approaches that promote successful deer resource management, and to avoid the devaluation of deer to pests.

Organization of the Guide

This guide is divided into four parts. Part 1 discusses the concept of public-issue evolution, presenting a model with utility for community-based deer management. Part 2 presents what we believe are 10 key dimensions of community-based management. This discussion draws from literature on public policy education, as well as from the specific experiences of northeastern deer managers and prior research by the Human Dimensions Research Unit (HDRU) at Cornell University. Part 3 summarizes the six approaches, or models, that managers in the Northeast have experienced in community-based deer management. In part 4, we provide more detail about the models of community-based deer management that have developed. Part 4 also highlights how key dimensions of community-based deer management were expressed in 10 actual cases in states from Maine to Maryland. We then synthesize the information presented throughout the guide, we draw conclusions, and we discuss implications for management.

Understanding the Management Context

The Issue-Evolution Model— Bringing Organization to Chaos

Policy analysts, public issues educators, and political scientists have long been interested in understanding and describing the process whereby a problem becomes a bona fide public issue. This is also of interest to wildlife managers, who regularly deal with practical aspects of wildlife issues at the community level.

Grappling with controversy is a challenge for every profession involved in public issues, and wildlife management is no exception. Wildlife managers and others who find themselves in community controversies about deer typically can benefit by knowing the answers to three questions:

- Where are we in the public or political life of this issue?
- How far do we have to go to reach a decision about objectives or management actions?
- How do we know whether we are making progress?

To answer these questions, policy analysts have described the evolution of public issues. Several models help explain the process of public-issue evolution and related efforts to resolve such issues (Dale and Hahn 1994). In a recent practitioners' guide to human-wildlife conflict management (Decker et al. 2002), a model developed by Hahn (1990) illustrates the issue-evolution process (Figure 1). Using the model as a template, stages in the evolution of a wildlife damage issue can be identified. These stages, adapted for our purposes with respect to community-based deer management, are described in the following pages.

Stages in the Evolution of Community-based Deer Management Issues

- **Concern.** During the concern stage, individuals or groups of stakeholders identify undesirable impacts of deer in their community. The con-

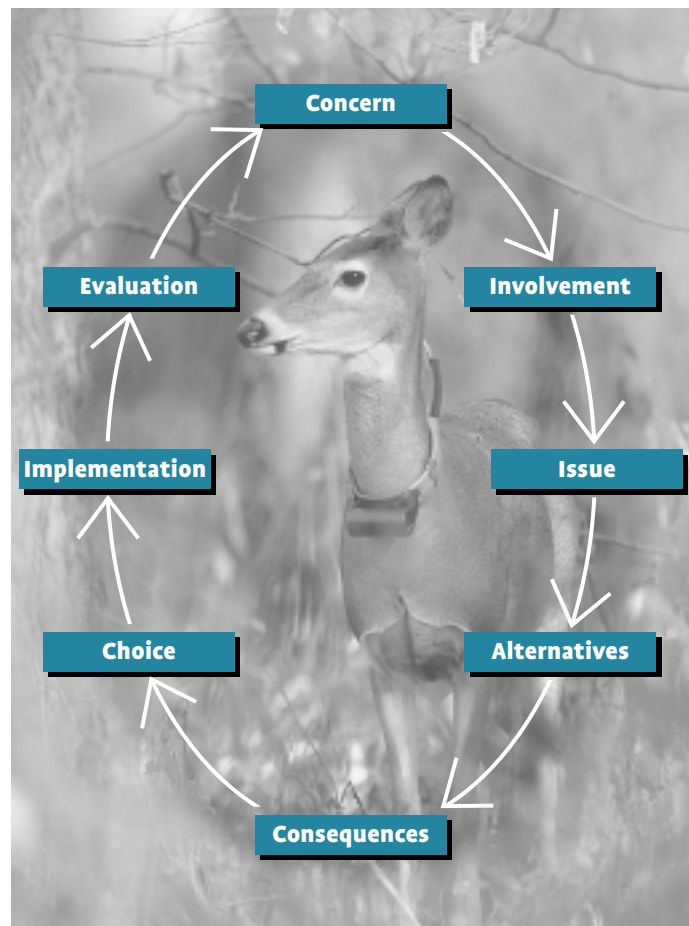


Figure 1 Stages in Hahn's (1990) issue-evolution model

cerns typically emerge as topics of discussion among friends and neighbors. Recognition often develops that the concerns are not harbored simply by one or a few individuals.

- **Involvement.** In the involvement stage, some people with concerns about deer seek support from one another and inform officials of their concerns. Groups of people in a neighborhood may meet to assess the extent and nature of their problems with deer. Wildlife managers and elected officials may start receiving complaints from residents of the community. Letters to the editor may show up in the local newspaper as the concern becomes increasingly public. At this early stage, differing views about the nature of the concerns and even possible remedies are voiced. The potential for controversy starts to become apparent. Involvement also leads to the realization that a quick fix does not exist and sets the stage for issue definition, which is the next stage in the process.
- **Issue.** In the issue stage, general agreement forms among a critical mass of community residents about the nature of the primary impacts of deer on the community. This does not mean that all members of the community agree with the prevailing perspective. Agreement about the existence and nature of the deer problem must be sufficient to propel the issue toward resolution. If interest in the problem is not widespread or is held by those with little voice in the community, the issue may dissipate, regardless of whether the actual impacts of concern are mitigated. Education and informative communication can be critical at this stage to minimize the probability of a rift among stakeholder groups in the community. The value of common community goals—which are essential for guiding discussion, analysis, and decisions—also becomes evident at this early stage.
- **Alternatives.** Typically in community-based deer management issues, some people quickly jump to suggesting different actions (e.g., various hunting protocols, trapping and moving deer, fertility control, or poisoning). These alternatives often cause controversy, making the alternatives stage of issue evolution one of the more contentious, and therefore challenging, for deer managers. If goals have not been established previously, their necessity should become clear to community members in this stage. Education and communication can have an important positive effect at this point, helping people to understand the efficacy and feasibility of various actions. It's important that the information is perceived by recipients as coming from unbiased sources.
- **Consequences.** All proposed alternative actions have consequences that should be evaluated carefully from multiple perspectives. Initially, alternative actions should be assessed for efficacy in addressing the impacts of concern in the community, with both effectiveness and cost taken into consideration. Then, identification of who benefits and who suffers from each alternative action needs to be evaluated. In most communities dealing with deer management issues, different stakeholders will arrive at different conclusions about benefits and costs of alternative courses of action.
- **Choice.** In this stage, stakeholders deliberate about which alternatives to adopt for their community. Individuals or groups may find it difficult to come to agreement. Initially, it may seem easier to let final decisions fall on wildlife managers; but experience has shown that if stakeholders themselves resolve differences and settle on a set of acceptable actions for deer management in their community, resulting agreements tend to be more sustainable.
- **Implementation.** In the implementation stage, a management program—usually a set of management actions—is put into place. In community-based deer management, the responsibility for implementing these actions may be distributed among a number of entities in a partnership. Alternatively, it may fall on the wildlife agency or the land manager alone. Empowering the community with responsibility for implementation, but with guidance and help from the wildlife agency, leads to community ownership of management.
- **Evaluation.** The effects of management actions are assessed during the evaluation stage. Evaluation is not an afterthought; it is a pre-planned, vital component for assessing progress, and a key to fine-tuning and adjustment. In community-based deer management, community members should be involved in evaluation and in any subsequent decisions

about modifying or even continuing the management program. This involvement should include agreement on acceptable metrics for assessing progress in terms of changes in important effects from deer, a baseline for which should be established prior to management.

The stage-to-stage progression of public issues depicted in the Hahn model does not reflect precisely the way in which many public issues emerge and grow. Hahn readily acknowledges this, and warns us to keep in mind that, “A model is a lie that helps us see the truth” (A. Hahn pers. comm.). The primary and most useful truths of issue evolution in communities with deer problems are these:

- Community deer issues seldom spring forth fully mature; they typically develop over time. The rate of development may vary greatly, however, which has implications for timing of interventions and amount of attention to give a particular issue.
- Not every member of a community will be at the same place in understanding an issue at a given moment. This presents both a challenge and an opportunity to anyone trying to guide a process to seek resolution of a wildlife issue. The challenge is in slowing the rush for decisions. The opportunity lies in the readiness of members of the community to learn more about the relevant biological and socio-economic dimensions of the issue.
- Capacity to deal with an issue varies greatly from one community to another, but typically a skillful intervention by some party can help a community build the capacity necessary to resolve public issues. Education, informative communication, and deliberation that promote social learning by and about community members can be used as tools to build community capacity.

Community-based deer management thus occurs within a cycle of issue evolution, and wildlife managers can be well-poised to engage stakeholders in decision making at various stages of the cycle. Educating stakeholders about public issues is an important part of community-based deer management but may be challenging because some stakeholders are

quite firm in their beliefs and suspicious of hidden agendas on the part of agencies and others active in an issue. In the next section we refer to ideas about the public issues education process presented by Dale and Hahn (1994) to relate important elements of collaborative decision making.

Checklist of Essential Elements for a Successful Public Issues Education (PIE) Process

Insights from Cooperative Extension Literature^{*}

In their review of the literature pertaining to public issues education, Dale and Hahn (1994) recognized the improbability of any model of issue evolution perfectly matching the situation

Box 1

Checklist of Essential Elements for a Successful PIE Process

1. Inclusion of multiple perspectives.
2. A structured process for making community decisions.
3. Universally acceptable ground rules.
4. Shared understandings among stakeholders.
5. A shared, comprehensive information base.
6. Disclosure of stakeholder goals.
7. Belief within a community that generally acceptable solutions are worth seeking.
8. An understanding that community-based deer management will be an ongoing process, not a one-time event.
9. Commitment to systematic evaluation of the decision-making process and subsequent management program.

Adapted from “Public Issues Education,” edited by Duane D. Dale and Alan J. Hahn (1994)

a community faces. These educators identified what they called “essential elements” of any constructive attempt to address a public issue, many of which are relevant to community-based deer management. The nine essential elements (Box 1) are adapted here for the deer management context.

^{*} This subsection draws heavily from “Public Issues Education,” edited by Duane D. Dale and Alan J. Hahn (1994), especially page 13. This 54-page publication was a product of the National Public Policy Education Committee, Public Issues Education Materials Task Force, and was published by the University of Wisconsin–Extension, Cooperative Extension.

- **Inclusion of multiple perspectives.** Deer problems evolve into public issues because a controversy develops over the problem. The root of controversy usually is a clash of values and the differing perspectives that arise from these values. Addressing the perceived needs of only one stakeholder group in a situation where a deer problem has risen to become a community concern will rarely result in resolution of the issue. What is needed to resolve community-based wildlife management issues is a process that includes multiple perspectives, encourages constructive interaction among people with diverse viewpoints, and leads to new understandings and acceptable solutions.
- **A structured process for making community decisions.** Step-by-step decision-making processes that logically move a community from problem definition toward a mutually acceptable solution seem to be an essential element of successful problem resolution. An agreed upon, structured sequence of activity facilitates collective understanding of what is going on. Such a process imparts confidence in the effort and willingness to participate without injunction.
- **Universally acceptable ground rules.** Stakeholders should establish firm ground rules to guide their interactions in addressing a deer issue. Ground rules can be simple agreements about how people will interact. These can be as simple as respecting one another's point of view, agreeing to disagree without being disagreeable, deciding that decisions will be made based on consensus (or some other rule), and agreeing that decisions can reflect both scientific fact and stakeholders' values. In certain situations, it may be necessary to develop fairly complex ground rules to govern the process and ensure that all parties are treated fairly.
- **Shared understandings among stakeholders.** Reaching shared understandings of a community-based deer management situation typically requires stakeholders to expand their perspectives beyond personal viewpoints. This is a natural outcome of dialogue and deliberation, and can be aided and abetted by expert facilitation.
- **A shared, comprehensive information base.** Recent articulations of the wildlife management process (e.g., Decker et al. 2002) underscore the importance of an information base that includes biological and human dimensions information and insights. Such an information base is developed from scientific research, systematic evaluation, and professional experience. However, stakeholders' values, experiences, and local knowledge also are components of an information base. A robust information base is useful only to the extent that it is shared among those seeking solutions to community-based deer issues.
- **Disclosure of stakeholder goals.** A good starting point in community-based deer management is acknowledging that differences in initial goals may exist, and disclosing them in the spirit of collaboration. A potentially harmful move would be to oversimplify such differences. Facilitators should avoid this contrivance because the consequences almost certainly will be negative.
- **Belief within a community that generally acceptable goals and solutions are worth seeking.** Finding solutions with which most stakeholders will be content is not an easy task. In most local deer management controversies, quick and easy solutions are not in the offing. However, solutions can be found, and community commitment to finding generally acceptable solutions is a requisite for success. This may require creativity and inventiveness, tinkering with the details, or developing packages of actions. The vital ingredient in this recipe is a willingness to look at consequences from multiple viewpoints.
- **An understanding that community-based deer management is an ongoing process, not a one-time event.** This guide focuses on the process leading to a decision to undertake some management action. Professional wildlife managers and community members need to recognize from the outset that decision making is likely to be an ongoing activity.



That is, even with a course set for management actions, the need persists for evaluation of progress and for fine-tuning. Treating decision making as an ongoing process is part and parcel of an adaptive impact management approach (Riley et al. 2002) to community-based deer management. Engagement in community-based, collaborative decision making involves continuous learning at the community level.

- Commitment to systematic evaluation of the decision-making process and subsequent management program.** As described above, the process of community-based deer management, and of capacity building to enable that activity, is an ongoing process. Adopting an evaluative approach to community-based deer management is vital to (1) practicing adaptive impact management, (2) developing communities' capacity for sustained involvement, and (3) increasing knowledge of community-based management for the benefit of the profession.

Capacity Building for Community-based Deer Management

The term “capacity building” in the context of community-based management has recently appeared in the wildlife management literature (Raik 2002). Capacity building has been cited as both a *process* and an *outcome* in reference to community-based wildlife management decision-making processes (Lauber and Knuth 2000). However, no specific definition has been given for capacity building insofar as it is focused on stakeholders with respect to wildlife management.

Inherent in a community-based approach to deer management is the presence of multiple stakeholders. Often, each stakeholder is willing and able, in varying degrees, to participate in some aspect(s) of the fact-finding, analytic, decision-making, and perhaps even implementation facets of a management program. The wildlife manager typically finds that the collection of

Success in community-based deer management hinges on building the capacity of stakeholders to understand their local issues and participate in decision making processes.

stakeholders in a community manifests several capacity needs, each fulfilled to varying degrees depending on the community.

Capacity building for community-based deer management can be conceptualized as occurring in three categories: institutional, community, and individual (Raik 2002).

Institutional capacity is developed within an organization or set of organizations (e.g., state or federal wildlife management agency, local government, nongovernmental organizations, and other formally constituted groups). Institutional capacity may include people and their expertise, funding or in-kind services, and materials. This kind of capacity also may include vital organizational elements such as partnerships and programming.

Community capacity is developed among individuals and informal groups that are bounded geographically (e.g., neighborhood, town, or region). These are social networks that are not defined by a formal institution but that instead flow from day-to-day contacts that individuals in a community maintain with one another. In a community-based deer management scenario, such a network could be a group of concerned citizens (e.g., a neighborhood ad hoc group) with shared interests who build relationships with one another, or individuals representing differing interests who convene informally to identify a common goal. Community capacity may include productive, mutually supportive relationships, a sense of common purpose, and an understanding of shared values and history.

Individual capacity is gained by individual citizens from education and experience. It comprises a variety of qualities that a person may express in a collaborative management process. These individual traits include leadership skills, analytical skills, technical skills, and various kinds of knowledge about the human and biological dimensions of a wildlife issue. Individual capacity may rely on institutional and community capacity (and indeed all three capacity categories are interdependent), but they are cultivated on an individual basis.

Increased capacity at institutional, community, and individual levels can contribute to empowerment, which leads to sustained and meaningful action (Rappaport 1981). Empowerment, the process of gaining a sense of democratic participation in one's community or a sense of ownership about and influence over important events and outcomes in one's own life (Rappaport 1987), is critical to sustaining action related to wildlife management by individuals, institutions, and communities.

Community-based wildlife management presents an opportunity for wildlife managers to work collaboratively with communities to manage impacts of human-wildlife interactions at acceptable levels. Experienced managers have learned first-hand that community involvement also presents a challenge, as it often requires an investment of time and energy to build the capacity of individuals, communities, and institutions to understand adequately and respond reasonably to a given wildlife situation. Success in community-based deer management hinges on the capacity of community members to understand their local issues and participate in decision-making processes.

Building Blocks for Success: Key Dimensions of Community-based Deer Management

A panel of experienced deer managers (veterans) in the northeastern U.S. was recruited to help us identify key dimensions of community-based deer management (see Methods for more details of the process). We first worked with these veterans individually to prepare descriptions of their experiences with community-based deer management. Narratives of

their primary cases were written based on our interviews with them. We then convened the panel in a workshop retreat setting in late summer of 2002 to analyze their cases of community-based suburban deer management. This collaborative effort resulted in identification of a set of key dimensions of community-based approaches that might be considered building blocks for success.

Box 2 Methods for Identifying Key Dimensions of Community-based Deer Management

Practitioner Profiles

Practitioner profiles are stories about practice. They are practitioners' accounts of their own practice in a specific case (Forester 1999). With respect to our use of profiles for understanding practice in wildlife management, these stories are the kinds of experiences that wildlife managers share with one another in meetings, on the telephone, in the hallway, or on breaks. Telling and listening to stories provides an opportunity for learning (Healey 1997), in that managers are able to relate their own experiences to the story being told and then use the lessons learned from that story when engaging in similar future situations (Forester 1999).

Completed practitioner profiles can be used as tools for critical reflection on the work of deer managers from across the northeastern U.S. Capturing the experiences of individual practitioners provides an opportunity not only to learn about each particular individual and his or her case, but also to learn lessons about the practice that are common to all cases.

We conducted practitioner profile interviews of 10 veteran deer managers via telephone. Interviews were semi-structured and focused on a particular community-based deer management case in which the manager had been involved directly. The interviews included questions regarding sequence of events, the manager's involvement in the case, and the manager's reflections on his or her practice. We, along with

the deer managers, then edited the transcribed interview to create a narrative of the case that progressed logically from beginning to end.

Program Logic Models

Program logic models are visual depictions of the theory or action of a program (Kellogg Foundation 1998). They have been used in a variety of programmatic contexts, including management (Kellogg Foundation 1998), education (Mayeske 1994), and development (U.S. Agency for International Development 1971). Six program logic models were created from the 10 practitioner profiles. Each has three major components: inputs, activities, and outcomes (both short-term and long-term). Inputs are the resources, contributions, and investments that are applied in response to the situation. Activities are the actions, methods, and services that address the problem. Outcomes are the results and benefits for individuals, groups, agencies, and communities in the short and the long term. Program logic models derived from the practitioner profiles were reviewed by the deer managers for accuracy.

Workshop

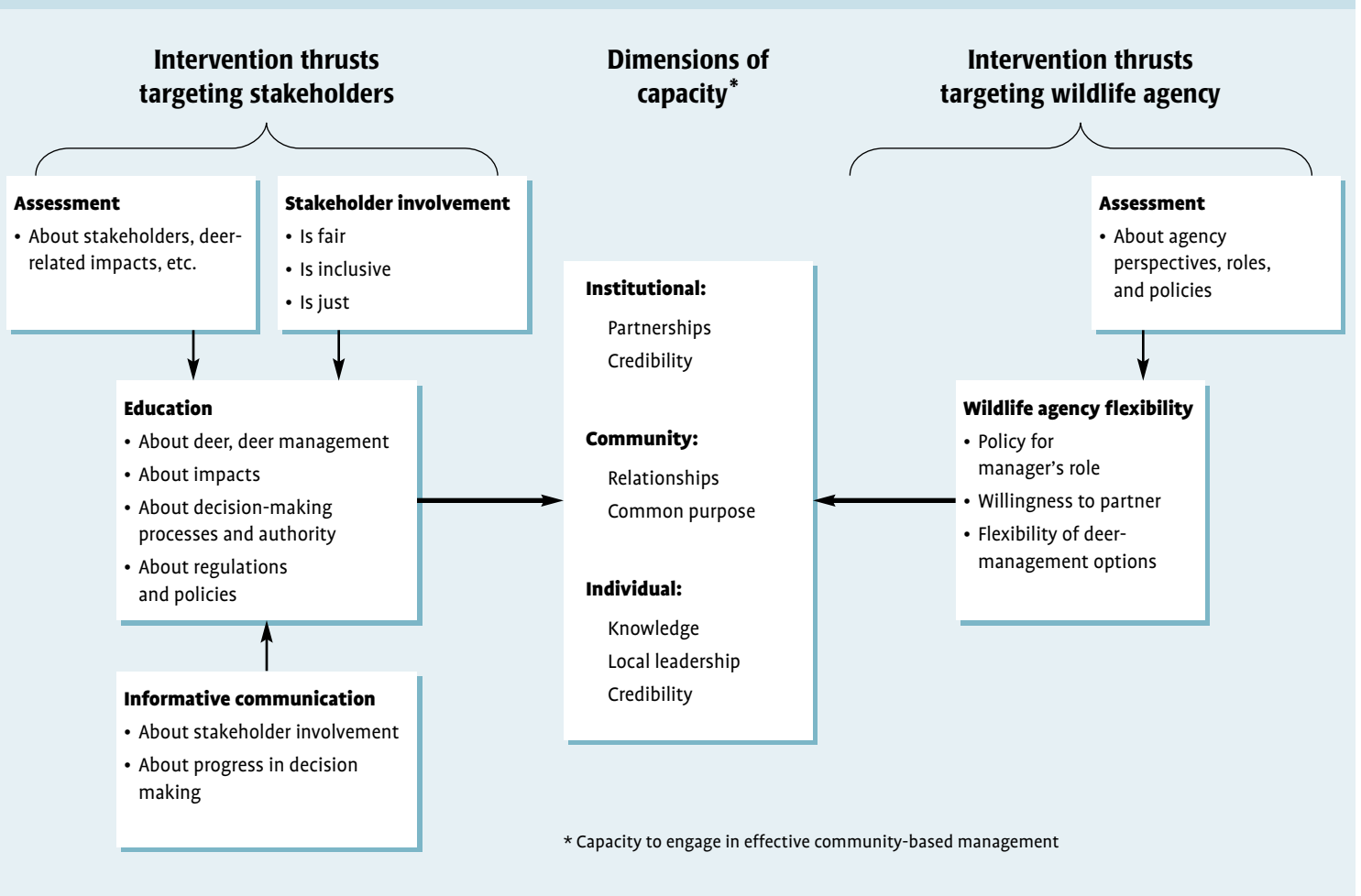
All 10 veteran wildlife managers participated in a workshop to analyze collectively the program logic models. Also in attendance were representatives from the New York State Department of Environmental Conservation, the Massachusetts Division of Fish and Wildlife, Cornell University,

and the University of Massachusetts at Amherst. These individuals served as a study guidance team. The workshop was held September 3–5, 2002, in the Finger Lakes region of New York. The purpose of the workshop was to have the group analyze the practitioner profiles and logic models to reveal capacity-building elements of interventions used in community-based deer management across the region. We believed it was important to include the managers in this preliminary analysis because their participation ensured the validity and accuracy of our interpretation of the intent of their programs. Furthermore, we believed they would benefit from interacting with and learning from one another.

The workshop consisted of three main activities. First, each wildlife manager summarized his practice profile and briefly described the logic model that represented his case. Nominal group technique (Moore 1987) then was used to identify the key dimensions that contribute to a community's readiness to engage in community-based deer management. This round-robin brainstorming session ensured that the full set of possible key dimensions was identified. Managers then ranked the dimensions.

Finally, managers conducted a preliminary analysis of the six logic models using the previously identified dimensions. They broke out into small groups and described how each dimension was expressed in each program logic model.

Figure 2 Dimensions of agency-driven interventions in community-based deer management



HDRU staff have studied community-based natural resource management, with a focus on deer management, for over a decade. This research has revealed some important factors that contribute to effective community-based deer management. The dimensions presented here are the result of a synthesis of what the expert panel identified and what has been revealed in previous HDRU studies. These dimensions are restricted to the *process* of decision making in community-based deer management. They do not include dimensions related to the *implementation* of management actions. That is, they are elements that are important in the process of getting to the point at which management actions can be implemented.

In identifying the key dimensions, three questions were addressed:

1. Does the dimension accelerate the community's readiness to engage in collaborative decision making?
2. Is it appropriate for the wildlife agency to try to affect the dimension?
3. How can the agency affect the dimension, either directly or indirectly, through partners?

We identified five enabling conditions and five intervention thrusts as key dimensions for community-based deer management.

Enabling Conditions

Community-based deer management can be enhanced by the existence or development of certain enabling conditions. These conditions represent characteristics of stakeholder groups or process convenors that contribute to commu-

nity readiness for collaborative decision making. They can be encouraged by interventions, and they often result in improving the effectiveness and efficiency of a community's involvement in decision-making processes.

The five enabling conditions identified are:

- Adequate knowledge (among stakeholders and managers)
- Essential working relationships: partnerships and informal networks
- Effective local leadership
- Sufficient credibility
- Agency/community commitment to common purpose

Intervention Thrusts to Achieve Enabling Conditions

Working with our panel of veteran deer managers, we also identified five important means for achieving the enabling conditions. These intervention thrusts are directed either toward stakeholders or toward the wildlife agency (Figure 2).

The five intervention thrusts identified are:

- Stakeholder involvement
- Education and learning
- Informative communication
- Wildlife agency flexibility
- Inventory/Assessment

Adequate Knowledge Among Stakeholders and Managers

Adequate knowledge is evidenced as awareness and understanding of key topics relevant to the deer issue. Key topics include deer biology; deer management options; impacts of deer-human interactions; differing values held by various community stakeholders; the decision-making process; decision-making authority; and rules, regulations, laws, and policies that are relevant to the situation. Knowledge deficiencies may be present among both stakeholders and deer managers. Processes that integrate expert and local knowledge are necessary in collaborative decision making to address the full range of knowledge deficiencies.

Adequate knowledge was an important dimension of the decision-making process in each case described by the veteran deer managers. The degree to which different kinds of knowledge contributed to the effectiveness and efficiency of the decision-making process varied among cases. It seems that integration of expert knowledge and local knowledge were important for those who participated in decision making.

Expert knowledge is gained through deliberate, systematic effort. It typically is considered by decision makers to be more valid than local knowledge, and therefore has more influence in decision making (Fischer 2000). Expert knowledge about deer biology, deer management techniques and policies, and decision-making processes was important in all deer management cases described by the panel. Deer managers, often in partnership with individuals from other organizations, provided much of the expert knowledge needed, or drove research processes that resulted in desired expert knowledge.

Local knowledge is the “popular, or folk knowledge that...remains in the informal sector, usually unwritten and preserved in oral traditions rather than texts” (Brush and Stabinsky 1996:4). Local knowledge does not stem from professional inquiry, and it is associated inherently with, and interpreted within, the specific culture in which it was produced (Fischer 2000). Local knowledge about geography, history of land use, the local deer herd, and deer-related impacts was important in each of the deer management cases described.

An integration of both expert and local knowledge seemed to contribute to the overall effectiveness of and satisfaction with decision-making processes.

Presumably, stakeholders perceive the deer manager as impartial, unbiased, and willing to treat the full spectrum of knowledge fairly and without prejudice. The manager should strive to live up to that presumption.



“[People] come to the table with a modicum of knowledge. Some of them do know, but the vast majority of groups spend a lot of time learning a lot of new stuff. I think that it helps your credibility if you come in and participate in a non-threatening way, as an

information source to help them solve their problem.”

ROBERT LUND, NEW JERSEY DIVISION OF FISH AND WILDLIFE

Essential Working Relationships: Partnerships and Informal Networks

Essential working relationships are the networks, partnerships, and individual relationships that contribute to understanding and collaboration among community members. Essential working relationships may exist or need to be developed among citizens' groups, government agencies, or other organizations (e.g., relationships between deer biologists and local government officials, or partnerships between nongovernmental organizations and wildlife agencies). Trust is an essential trait in effective working relationships.

Working relationships have been identified as important for effective community-based decision-making processes in numerous natural resources issues (e.g., McCool and Guthrie 2001,

Schusler et al. 2003, Shindler and Cheek 1999). Relationships are important in collaborative efforts to address complex issues because they facilitate the process of social learning

and contribute to the development of trust.

Relationships between agencies and communities can have effects far beyond the current deer issue. Wondelleck and Yaffee (2000) identify agency-community relationships as contributing to community development in general when agency employees bring expertise and resources to communities. Collaborative relationships also can facilitate learning about science and learning about conflict management. Such learning can be beneficial to communities for many reasons.

Informal relationships and networks also are important for facilitating the flow of information in a community and building consensus (Wondelleck and Yaffee 2000). In the deer management cases reviewed, decision making was deemed more efficient when deer managers either had pre-existing relationships, or developed new working relationships, with town officials or other local leaders.



"Looking back, I would say that our relationship with the local sportsmen's club and with the Management Committee is a good one, a partnership."

HOWARD KILPATRICK, CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

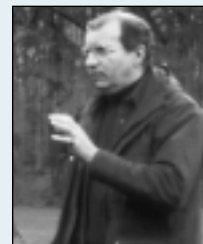
One must be sensitive to the possibility that partnering can be misconstrued as some stakeholders building power groups to suppress minority views. Care must be given to how all stakeholders perceive the relationships being formed. Polarization of positions—which is the very condition that partnering is intended to avert—must be avoided.

Effective Local Leadership

Effective local leadership can be either formal (e.g., an elected official in local government or an appointed official in law enforcement) or informal (e.g., a local opinion leader), but it must contribute to initial and sustained action in a community.

Leadership, both formal and informal, is important for effective collaborative processes. Leaders often have a knack for keeping projects alive despite what appears to be a lack of resources or political support. In the community-based deer management cases examined, both formal and informal leadership were critical for sustaining the decision-making process.

Formal leaders, such as town officials or agency staff, can motivate change and foster stakeholder trust and support (Wondelleck and Yaffee 2000). Cooperation of local leaders is im-



"People who have participated in many more of these processes than I have said to me that it's amazing to see who comes forth and starts to be leaders. . . . most often it's someone who's almost obscure."

JOHN HAUBER, NEW YORK STATE DEPARTMENT
OF ENVIRONMENTAL CONSERVATION

"So we recognized that the police chief was the power broker, and it was critical from a public safety standpoint of view to get the chief on our side."

ROBERT DEBLINGER, MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE



portant especially in controversial or complex environments because they lend credibility to efforts to address public issues. Where community trust of the agency is lacking, wildlife agen-

cies may need to invest in building the capacity of local leaders to engage the community in productive dialogue about deer management.

Informal leaders who volunteer to participate in decision making also are crucial for effective collaborative processes. These individuals often are well-respected by some members of the community, and therefore exert influence. Informal leaders often make personal connections with people, and, rather than directing their followers as traditional leaders do, they ask good questions and draw out people's thinking so they can find their own direction (Belenky et al. 1997).

Sufficient Credibility

Sufficient credibility is the perceived competence, reliability, integrity, and trustworthiness that contributes to collaborative decision making. It is important for the effectiveness of an agency, an elected body, an organization, or an individual engaged in community-based deer management.

Decision-making processes and outcomes must be perceived as credible. In the suburban deer management cases examined here, credibility of the decision-making processes and outcomes were increased by third-party facilitation, stakeholder involvement, and open sharing of information.

Processes that are conducted by a trusted and independent entity, such as a competent and objective facilitator, usually are perceived as credible. "The facilitator generally adopts a neutral position in the change process and is much more concerned about the process... than the specific outcomes" (Green and Haines 2002:14). Although a facilitator was not used in all the cases we examined, most managers acknowledged the utility of having a third-party facilitator.

Stakeholder involvement that includes people representing the full range of affected interests, as well as open and transparent sharing of infor-

mation, also enhances the credibility of community-based decision-making processes (Green and Haines 2002). Cases of suburban deer management that included broad stakeholder involvement and participation were viewed as being fair and just. This lent credibility to the process, as well as the decision outcome. In addition, experts were perceived as credible sources of information if their statements were based on scientific information or personal experience. One must be mindful that what constitutes an expert is not universally recognized. The stakeholders must generally agree on what constitutes acceptable personal experience and expertise relevant to the issue at hand.

Commitment to Common Purpose

Commitment to common purpose is broad recognition of a community deer issue and dedication of wildlife management agencies, community leaders, and all affected stakeholders to take steps to address the issue. It does not imply a commitment to a common solution, or a common set of activities to address the deer issue.

A sense of common purpose can facilitate decision-making processes, especially if a compromise or consensus is needed (Cordova 1997). Successful partnerships "highlight common interests or find ways to bridge compatible yet disparate interests" (Wondelleck and Yaffee 2000:73). The self-reinforcing interaction between collaboration and common purpose is an important benefit of collaborative decision-making processes.

"Certainly, I would suggest a viable facilitator at these meetings. We didn't have that option except on a few occasions."

ROBERT LUND, NEW JERSEY DIVISION OF FISH AND WILDLIFE

"One factor that has contributed to the success of the Deer Management Work Group approach is that it is made up of government agencies at the county, state, and federal level. The members generally agree unanimously on recommendations because it's all based on science and on using the whole array of available methods."

ROB GIBBS, MONTGOMERY COUNTY DEPARTMENT OF PARKS AND PLANNING



"One important thing we did was to try to achieve a consensus from the village residents that they would accept the results of this process.... We tried to get a sense from the public that this was a meaningful activity to carry out."

MARK LOWERY, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

In the experiences of our veteran deer managers, common purpose was difficult to come by in suburban deer issues. In most instances, the controversial nature of the deer issue resulted in disagreement over what to do. However, general agreement about the nature of impacts and objectives often was possible. If a community cannot agree that a problem exists (negative impacts are occurring), there is little chance that intervention by a deer manager will be useful in moving the community toward problem resolution.

Stakeholder Involvement

Stakeholder involvement is the process of engaging affected stakeholders to provide breadth of input for decisions, participation in making decisions, or help in implementing actions. Citizen committees and coalitions, focus groups, public meetings, public hearings, and public comment periods are just a few of the myriad ways of involving stakeholders. Research and management experience suggest a set of best practices for stakeholder involvement that include creating a fair, just, and inclusive process. Stakeholder involvement contributes to increased knowledge of the decision-making process. It also contributes to understanding the full spectrum of deer-related impacts of concern to stakeholders in the community.

A focus of activity in each case of community-based deer management reported by the veterans was stakeholder involvement, although each case had its own approach to both the extent and nature of stakeholder engagement. It seems that this aspect is a differentiating trait of various approaches to community-based management, and the set of cases embodies the full range of involvement possibilities described in Decker and Chase (1997): expert authority/consultative, receptive, inquisitive, transactional, and co-managerial.

It also is clear from the case descriptions that the objectives for stakeholder engagement varied by case. Three primary objectives for stakeholder

involvement (Decker et al. 2002) were evident, as explained below.

Improving information about stakeholders In all cases, managers and their stakeholder partners sought better understanding of the deer-related problems being experienced in the community. Managers typically sought information about community interest in deer-related issues and support for taking action to address community concerns. Where possible, they looked for indications of *which* stakeholders supported or opposed management in principle, *how many* were in each camp, and *why* they held such views.

The approach taken to improve information about stakeholders varied greatly across the cases. In some, input from a few informants, combined with previous experience in deer management, seemed to suffice. In other cases, much time and energy were invested to gain from stakeholders detailed, precise insights about their beliefs and attitudes with respect to the case. Considerations in this regard can be reviewed in Decker et al. (2002).



“At one meeting, I was one of several people urging [the committee] to make the deer study committee as diverse as possible. I advised them not to set up a committee that could be criticized for excluding some group.”

DAVE RIEHLMAN, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

“Right off the bat, if a town has a problem they should form a small committee that can gather the information and hold detailed discussions with state biologists.”

GERALD LAVIGNE, MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE



Improving the judgment on which decisions are made This objective may rely less on agency-led inquiry and more on stakeholder deliberation. The cases representing veteran managers' experiences in the Northeast indicate that stake-

holder involvement processes are a useful way to identify important impacts of deer-people interactions within a community. Stakeholder involvement processes also are useful to establish criteria by which community members can evaluate the appropriateness of various management actions.

Improving the social environment in which management occurs

Deer-management veterans are mindful of the importance of public discourse to community-based deer management efforts, and they understand the influence they can have on such discourse through their actions or lack thereof. In several instances, managers relate the value of public engagement for the purpose of creating or maintaining an environment conducive to constructive dialogue.

Education and Learning

Education is the process of organizing and providing information, stimulating thought, and facilitating understanding that encourages learning. These activities, successfully executed, also encourage new experiences that contribute to learning. Education (and associated learning) may be aided by printed materials, electronic media-based material, formal presentations, informal conversations, interactive discussions, demonstrations, or critical analysis. Education also can be geared toward development of effective local leadership by creating the opportunity for people to learn about the need for leadership, study examples of local leadership, and explore their own potential for leadership in community-based deer management issues.

Education was an important component of the decision-making process in all of the cases described. Deer managers conducted both instrumental and communicative education. The purpose of instrumental education was to transfer knowledge from one person to another, while that of communicative education was to clarify relationships among pieces of information or people. Generally, in instrumental education, learners spend time memorizing or understanding facts or concepts; in communicative education, learners often make comparisons, seek out patterns, and draw inferences (Habermas 1978).

Deer managers engaged in educational activities that ranged from formal presentations for large groups to ad hoc, one-on-one conversations. In most cases, managers tried to educate the public, deer committee members, or town officials about the technical aspects of suburban deer management by using a variety of educational tools to transmit their messages—brochures, slide shows, and drawings are examples.

Stakeholders, deer committee members, and the public often spent time educating themselves about suburban deer management by talk-



"I've often said that my best ally in wildlife management is an educated public. An overriding goal is education. If I go into a community, as long as they leave there with more knowledge than they had before, I consider it a success."

PHIL WEST, VIRGINIA DEPARTMENT OF GAME AND INLAND FISHERIES

"Another thing we do as part of our education program is we put on workshops for homeowners to teach them different methods that are available to them to reduce deer damage in their yards."

ROB GIBBS, MONTGOMERY COUNTY DEPARTMENT OF PARKS AND PLANNING

ing with deer managers and other experts, collecting information, and networking with people in other communities facing similar issues. Learning-by-doing, which is an activity that stakeholders often regard as important to their sense of success, was common. To some extent, stakeholders have to personalize the education process—simply distributing facts may not be sufficient to stimulate learning in stakeholder groups.

It is not uncommon for stakeholders to seek technical expertise from people with viewpoints or values different from those held by wildlife managers. Wildlife managers cannot control this community-education process, but they can provide guidance to stakeholders with respect to what resources they might tap for expertise.

Informative Communication

Informative communication is the process of providing information and increasing awareness. A variety of channels (e.g., newspaper articles, public meetings, brochures, and internet sites) can be used to increase knowledge and awareness of a deer management issue and the steps being taken to address the issue. If handled skillfully, informative communication can contribute to the credibility of the overall community effort directed toward resolving a deer management issue.

Communication has been identified as a vital ingredient of any effective collaborative process. Problems may arise if communication is not occurring where and when necessary. Even when

communication mechanisms exist, they may not be transmitting messages effectively or accurately (Wondelleck and Yaffee 2000).

Communication can take many forms and flows in many directions. In the deer management cases studied, communication among deer managers facilitated learning and adaptation as similar problems were addressed in different communi-

ties. Deer managers also communicated with stakeholders to initiate, build, and reinforce relationships. This type of communication—performative communication—is used to demonstrate a particular trait or maintain a relationship. Communication also occurred among residents of different towns facing deer issues. Communication among peer groups is very effective because it carries an inherent degree of believability sometimes absent in expert–layperson interactions. Persuasive communication is a factor in suburban deer management as groups work to convey their perspective on the issue (Shanahan et al. 2001).



“That first year, more than 80 television, radio, newspaper, and public presentations were given. We wanted to communicate to the public what we were doing. The second year, we continued with the public relations, but not as

extensively as the first year.”

HERBERT FROST, NATIONAL PARK SERVICE

“When we put out the press releases for the June meeting, that usually generates at least one article in the local papers. We also try to keep in contact with the media people who show an interest in writing about it. We have a couple of local public cable TV networks and our own Park cable TV program that will run stories on deer issues several times a year.”

ROB GIBBS, MONTGOMERY COUNTY DEPARTMENT OF PARKS AND PLANNING

Wildlife Agency Flexibility

Wildlife agency flexibility is the degree to which an agency’s policies, statutory authority, operating strategies, and willingness to do things differently allow it to partner with other organizations, engage the full spectrum of stakeholders in a community deer management issue, and play a variety of roles in the decision-making process. The extent of an agency’s flexibility for addressing deer issues can affect the nature of working relationships it has with other groups.

Effective community-based collaborative decision making requires a great deal of flexibility on the part of the deer manager and the wildlife management agency. Being able to adapt to local conditions and needs is important for ensuring satisfactory outcomes that are relevant to the local deer issue. Policies and procedures must be in place to guide, but not to prescribe, the interactions of managers with stakeholders (Wondelleck and Yaffee 2002). For instance, to ensure that the decision-making process is meeting the needs of the community, it is essential to define the problem in terms of impacts (e.g., deer–vehicle accidents or crop damage). Defining impacts will guide the development of management objectives. Then methods for achieving those objectives can be selected (Decker et al. 2002). In many instances, wildlife agencies may need to articulate clearly the limits within which the community can work. It may be useful to establish operating parameters for matters such as sharing of authority, upper and lower limits on change in deer population, or legal and administrative constraints. It is important that everyone understands these kinds of operating constraints at the beginning of a community process.

In the deer-management cases reported, criteria for success were not always well defined, or were defined differently by different stakeholder groups in a community. This situation, when it occurred, made planning a decision-making process difficult and resulted in a cyclical process of research and debate that seldom resulted in satisfactory outcomes. Wondelleck and Yaffee (2002) advocate an approach to collaboration that includes a commitment to committee recommendations. In the case of deer manage-

“Too often practitioners, whether they’re biologists or citizen-participation specialists, react to a problem by holding a meeting, without ever designing an entire process. They do not think about how information is going to flow, and they may end up with a series of disjoint activities that don’t mesh together.”

MARK LOWERY, NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

“If I had it to do over again, the first thing I would have done differently...was to spend more time with the deer committee, reinforcing what our role is and what their role is.”

GERALD LAVIGNE, MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

ment, wildlife agencies cannot delegate their statutory authority to collaborative groups. However, agencies should take seriously the products of these groups’ discussions and articulate the degree of commitment to implementing the groups’ recommendations. In any case, the role of the agency and its expectations for the decision-making process should be understood by all involved (Decker et al. 2002).

Inventory/Assessment

Assessment is the information-gathering and evaluation process that helps define the character of the deer-management issue. Assessments of the stakeholders (e.g., their number; their beliefs, values and opinions; and their communication habits), impacts of deer-human interactions, ecological landscape, political structure, deer biology, and cultural environment all contribute to the specific form of stakeholder involvement, education, and informative communication that is best suited to the context. Similarly, assessments of the wildlife agency (e.g., its [1] policies for the manager’s role, [2] potential for partnering, and [3] flexibility in considering deer management options) help define what steps the agency can take to influence a community’s readiness for collaborative decision making.

We have identified two types of assessment that are important for community-based collaborative deer management. Assessment of stakeholder characteristics such as their beliefs, attitudes, experiences with deer, and understanding of the

situation is an important assessment activity for wildlife managers insofar as it provides a clear picture of the local situation. Understanding the situation is an initial step to designing any stakeholder engagement process (Decker et al. 2002). Assessment of likely outcomes, stumbling blocks, and other aspects of the process can be very helpful in anticipating points where greater input is needed.

Deer managers also must pay attention to their own situation and be clear about where they, as individuals and as representatives of the wildlife agency, stand regarding community-based deer management. Assessing the utility of agency policies, opportunities for partnering, and the role the manager will play, as well as explaining this role to stakeholders,

“We quickly began to realize the dynamics of the community had changed over a 10-year period and we had not reassessed public opinion nor had information been disseminated to the community. We really didn’t have our fingers on the pulse of the community.”

PHIL WEST, VIRGINIA DEPARTMENT OF GAME AND INLAND FISHERIES

“I always make a point to do a field survey of the particular location. If you can talk about specific properties and locations, it increases your credibility tremendously.”

GERALD LAVIGNE, MAINE DEPARTMENT OF INLAND FISHERIES AND WILDLIFE

lends credibility to wildlife managers and agencies (Wondelleck and Yaffee 2000). An explanation of the agency’s perspective on community-based deer management will come from deliberate assessment of the agency’s situation.

Often, biological information relative to the local deer issue is inadequate in some respect. Assessment of the local deer population may be necessary to support decision-making needs.

Diversity of Approaches

Introduction to Models of Stakeholder Involvement in Community-Based Deer Management

We and the 10 veteran deer managers identified six approaches, or models, evident in the community-based deer-management cases they reported. We found decision-making aspects of community-based management to be a principal trait differentiating the models. With this in mind, we answered the following questions for each case:

- Who makes the decisions?
- How are decisions made?

The six models of community-based deer management are:

- Community vote
- Environmental impact statement (EIS)/public consultation

- Agency partnership
- Homeowners' association
- Citizen action
- Citizen–agency partnership

Table 1 (*right*) characterizes these models of community-based deer management, highlighting how they differ with respect to who makes decisions and how decisions are made. In some cases, a single model is reflected in more than one case (e.g., the Community Vote model is reflected in both the Bedford and Monhegan cases).

Tables 2a and 2b (*below*) indicate the capacity-building dimensions that were most influential in each of the six approaches. In Part 4 you will find detailed information about how the key dimensions of community-based deer management are expressed in each model.

Table 2a Key dimensions of 10 community-based deer management cases

Models	Cases	Most important enabling conditions in each case ("X")				
		Adequate knowledge	Essential working relationships	Effective local leadership	Sufficient credibility	Commitment to common purpose
Community vote	Bedford, MA	X			X	
	Monhegan, ME	X			X	
EIS/public consultation	Gettysburg, PA	X	X			
Agency partnership	Montgomery County, MD		X			X
Homeowners' association	Mumford Cove, CT		X	X		
	Governor's Land, VA		X	X		
Citizen action	Irondequoit, NY	X		X	X	
	North Haven, NY	X		X	X	
	Cayuga Heights, NY	X		X	X	
Citizen–agency partnership	Union County, NJ		X	X	X	

Table 1 A comparison of deer management models on several key decision-making dimensions

<i>Model type</i>	<i>Examples Location (veteran)</i>	<i>Who makes decisions about firearms discharge?</i>	<i>Who makes decisions about lethal control of deer?</i>	<i>How are deer management decisions made?</i>
Community vote	Bedford Township (Deblinger)	Town selectmen	State wildlife agency and Town selectmen	By popular vote at town meeting
	Monhegan Island (Lavigne)	Town selectmen	State wildlife agency and Town selectmen	By popular vote at town meeting
EIS/public consultation	Gettysburg NMP (Frost)	Federal land manager (Gettysburg NMP)	Federal land manager (Gettysburg NMP in this case)	EIS process, plus other forms of citizen participation with local and national stakeholders (including local and state government)
Agency partnership	Montgomery County (Gibbs)	Director, Montgomery County Parks	State wildlife agency and county parks administrators	By park director, with input from a multi-agency deer management work group (county, state, and federal stakeholders)
Homeowners' association	Mumford Cove (Kilpatrick)	Homeowners' association and individual homeowners	State wildlife agency and homeowners' association	By vote of the governing board of a homeowners' association
	Governor's Land (West)	Homeowners' association and individual homeowners	State wildlife agency and homeowners' association	By vote of the governing board of a homeowners' association
Citizen action	Irondequoit CTF (Hauber)	Homeowner's association	State wildlife agency and city, town, and county governments	By approval of county legislature, considering recommendations from a CTF and coordination with city and town officials
	North Haven CTF (Lowery)	Town government	State wildlife agency and village board	By vote of a village board, with consideration of recommendations made by a CTF
	Cayuga Heights (Riehlman)	Village trustees	State wildlife agency and village trustees	By vote of village trustees, with consideration of recommendations made by a village deer committee
Citizen-agency partnership	Union County Parks (Lund)	Board of freeholders (for county parks)	State wildlife agency and board of freeholders	By vote of board of freeholders, with consideration of CTF recommendations

Table 2b Key dimensions of 10 community-based deer management cases

<i>Models</i>	<i>Cases</i>	<i>Most important interventions in each case ("X")</i>				
		<i>Stakeholder involvement</i>	<i>Education and learning</i>	<i>Informative communication</i>	<i>Wildlife agency flexibility</i>	<i>Inventory/assessment</i>
Community vote	Bedford, MA		X			X
	Monhegan, ME		X			X
EIS/public consultation	Gettysburg, PA			X		X
Agency partnership	Montgomery County, MD		X		X	
Homeowners' association	Mumford Cove, CT		X			X
	Governor's Land, VA		X			X
Citizen action	Irondequoit, NY	X			X	
	North Haven, NY	X			X	
	Cayuga Heights, NY	X			X	
Citizen-agency partnership	Union County, NJ					

Management Models with Case Study Illustrations

This final section of the guide provides greater detail about models of community-based deer management and how the 10 key dimensions of community-based deer management (described in Part 2) are expressed in those models. All 10 of the cases described by deer managers are identified with respect to one of the six deer-management models and then summarized. Each subsection of Part 4 includes the following elements:

1. A definition of the deer management model.
2. A table that summarizes how all key dimensions were expressed in each model.
3. A summary of the case or cases exhibiting the model.
4. A description of the subset of key dimensions that were most important for each particular case.



JIM CHRISTENSEN

Community Vote

The community vote approach is characterized by a referendum of some sort in the community. This approach to community-based deer management is common in states with a political structure that emphasizes local decision-making. Within this model, the state wildlife management agency usually responds to a call for assistance from individuals or groups of people in a community. As they respond to the community's request for assistance, wildlife agency personnel can play important roles in knowledge creation, information transfer, and relationship building. However, a town vote is necessary to approve local deer management actions. Local decision-making authority resides in a body of elected town leaders, who use the results of town votes to decide whether their community will implement a given deer management proposal. This model was reflected in two cases—those of Bedford, Massachusetts and Monhegan, Maine.

Community Vote in Bedford, Massachusetts

Case description

Bedford is a fairly affluent suburban community just outside of Boston, Massachusetts. The town has evolved over the years from rural to suburban, and consists of a mixture of public and private land. Much of the residential area previously was farmland, and the town still maintains a good deal of green space. Hunting is prohibited in Bedford, but is permissible in surrounding towns.

The Division of Fisheries and Wildlife (DFW) received a complaint from a strawberry farmer who was suffering crop damage from local deer. In response, the DFW's deer manager looked into deer-vehicle accident statistics for Bedford and concluded that Bedford had become a refuge for deer during hunting season because surrounding towns were open to hunting. Thus,

Bedford had high numbers of deer–vehicle accidents. The deer manager inferred that Bedford residents probably were upset about negative deer-related impacts that they were experiencing. In addition, the environmental police officer for Bedford had been receiving complaints about deer in the town.

The DFW is an advocate of hunting as a deer-management tool. From previous experience elsewhere in Massachusetts, the deer manager knew that opening the town to hunting would require a town vote. The deer manager solicited support from the Bedford police chief to lend credibility to a proposal to open Bedford for deer hunting. The police chief recognized that there was a possible deer issue in the community, and he arranged for the deer manager to meet with the town selectmen (elected officials). At this meeting, the deer manager, with the support of the environmental police officer, presented a case for opening the town to some form of hunting. The selectmen decided that before the issue was put to a town vote, there should be an informational public meeting on the issue.

At a public meeting in 1993, the deer manager presented the case for opening the town to hunting and described several hunting options (archery, shotgun, and muzzle-loading seasons). In attendance at the public meeting were various stakeholders, including hunters, animal rights activists, and parents concerned about child safety.

Before a town vote can occur on an issue in Bedford, the issue has to be put on the town warrant (agenda). In most cases, if the selectmen do not endorse the proposed agenda item, it will not pass the town vote. The proposal was not endorsed by the selectmen or the police chief, and it did not pass the town vote.

A year later, with expressed concerns about deer continuing, the deer manager made a second public presentation proposing to open Bedford to hunting. Despite being endorsed by both the police chief and the selectmen, the proposal did not pass the town vote.

Issue Evolution

The deer management issue in Bedford evolved to the choice stage in issue evolution. Citizen concern about deer had been expressed to state and local authorities. The town’s selectmen ensured

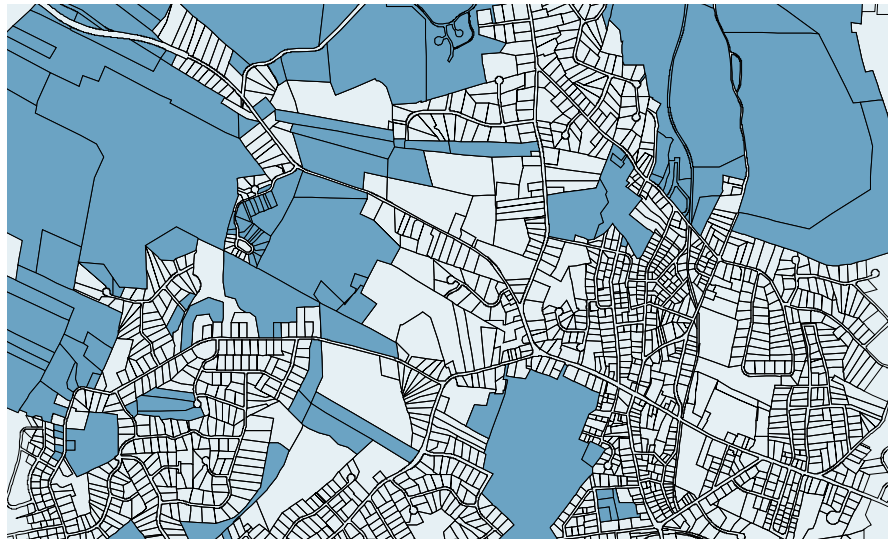
Table 3 How key dimensions of community-based deer management were important in the community vote model

<i>Enabling Conditions</i>	<i>How the dimension was important</i>
Adequate Knowledge	Wildlife managers' knowledge regarding the local deer situation enabled them to make informed recommendations to the town. Town officials and residents relied upon managers' knowledge of deer, deer management options, and deer impacts to make an informed vote on the issue.
Essential Working Relationships	Working relationships among wildlife agency staff, town officials, and town residents played an important role in what was discussed at town meetings and which proposals were put on the warrant for a town vote.
Effective Local Leadership	Local leaders such as town officials and the police chief acted as opinion leaders and influenced the outcome of the town vote.
Sufficient Credibility	Wildlife managers sought support from local leaders to build their credibility in the community. They maintained credibility in the community by basing their educational efforts on local experience and scientific facts.
Commitment to Common Purpose	The community's commitment to a common purpose was gauged by the results of a town vote. A management proposal that failed at the town vote was dropped and no further action was taken. A proposal that passed at town vote was regarded as having strong community commitment and the proposal was implemented.
<i>Intervention Thrusts</i>	<i>How the dimension was important</i>
Stakeholder Involvement	Stakeholders were directly involved in the decision-making process. Local residents participated in town meetings and voted on whether the town should accept or reject management proposals. To be placed on the town warrant for a vote, deer management proposals had to be recommended by a town resident or elected town officials.
Education and Learning	Wildlife managers made public presentations about deer, deer management, and deer impacts in an effort to help townspeople learn about their deer management situation. Managers learned about the local situation by interacting with local residents and local committees.
Informative Communication	Individuals with strong opinions about local deer management were able to express their opinions at town meetings and through letters to the editor that appeared in local newspapers.
Wildlife Agency Flexibility	Wildlife managers were explicit in articulating the regulations under which management must take place, their position on the issue, and their expectations for the decision-making process (i.e., the agencies were clear about areas on which they had little flexibility). However, they showed flexibility with regard to methods that could be used to address community deer management objectives.
Inventory/Assessment	Wildlife managers assessed the types and severity of negative deer-related impacts being experienced in the town.

that the community had opportunities to learn about the situation and to vote on whether to allow hunting in Bedford. The vote of the citizens, by not allowing the option of hunting of deer, essentially ended development of the issue. However, if the problem of negative deer impacts on stakeholders in the community



The suburban challenge. The Town of Bedford, Massachusetts (bottom left, detailed subsection bottom right) contains a mix of residential and commercial areas, with large areas of designated open space (shown in solid blue). Forested open space, abundant landscape plantings, and hunting restrictions create conditions for deer population increase.



COURTESY OF TOWN OF BEDFORD, MA

continues, the issue will not evaporate. The community’s response resulted in no action and may have reflected discomfort with the options available for deer control more than lack of appreciation that deer were creating a problem for some people. If the problem becomes more severe and more broadly felt, or if an alternative solution other than hunting is identified, then one can expect renewed interest, and another cycle of issue evolution may emerge.

Key Dimensions

The case of Bedford is a good example of how the dimensions of adequate knowledge, sufficient credibility, education and learning, and assessment contribute to collaborative decision making.

Adequate Knowledge

The Massachusetts DFW worked to increase the selectmen’s and the public’s knowledge about deer biology, deer management options,

and local rules and regulations. The DFW made presentations to the selectmen and to the public regarding deer population dynamics, and provided information about alternative deer management strategies. Within the limits of the established deer hunting season, the DFW was flexible as to the implements that could be used for hunting and the dates of the hunt. Increased knowledge on the part of the selectmen and the public contributed to their ability to make an informed decision.

Sufficient Credibility

The DFW took several steps to ensure that it was perceived as a credible source of information: (1) it based its educational efforts on scientific studies, (2) it provided information on a diverse array of deer management options, and (3) it sought the support of local officials who were known to be opinion leaders in the town. These efforts were meant to ensure that the DFW and its staff were seen as credible entities.

Education and Learning

Education played a major role in the Bedford case, as in many other cases described by managers. The DFW managers put a great deal of effort into educating town officials and the public through brochures and presentations. Townspeople needed to become familiar with deer biology and deer management options to make an informed choice at the Town Vote.

Inventory/Assessment

Assessment was a large part of the Bedford case. The DFW conducted an assessment of the impacts experienced by the original complainant, the strawberry farmer. Agricultural damage thus was identified as a significant impact. The DFW also checked deer road-kill records to get a sense of other impacts on the community. An assessment of the local laws and regulations regarding hunting was conducted, providing the DFW with an idea of the political environment in which the issue was situated. In addition, the DFW assessed its own preparedness to engage in the case: it adhered to its role as a technical advisor and remained somewhat flexible with regard to deer management options (i.e., types of hunting implements and timing of hunting season).

Community Vote in Monhegan, Maine

Case Description

Monhegan is a 600-acre island 10 miles off the coast of Maine. The landscape is fairly rugged, with high cliffs and spruce forest. It has a year-round population of about 100 people, largely artists and fishermen. The summer population increases to between 700 and 800. Originally,



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A Monhegan Island deer feeds on corn treated with a chemical to kill deer ticks. Tick eradication efforts in the early 1990s were unsuccessful.

deer did not exist on Monhegan. In the 1950s, islanders petitioned the Department of Inland Fisheries and Wildlife (DIFW) to introduce deer to the island, which it did. Hunting is permissible on Monhegan, but very few islanders have ever bought hunting licenses.

In the late 1980s, Monhegan residents began to contract Lyme disease. A research group at the Maine Medical Center conducted a study of the ecology of Lyme disease on the island and identified Norway rats and deer as tick vectors. Moreover, it was accepted widely that the high deer density on the island (>100 deer/square mile) worsened the incidence of Lyme disease and other negative impacts. Monhegan residents began complaining to the DIFW about deer because of Lyme disease.

In the early 1990s the DIFW began a study to determine whether deer ticks could be eliminated by feeding treated corn to the deer. This



DANA LEATH

Deer gather on a shoreline of Peaks Island, Portland Maine. Deer are able swimmers and have colonized many coastal islands in Maine.

study was conducted for three years with no definitive results.

As complaints increased and people began talking seriously about reducing the deer population, the DIFW held public meetings to discuss the issues and possible solutions. A deer committee that consisted of a wide variety of Monhegan residents was established to study the issue and make recommendations for a solution. Several town meetings were held, and most of the public deliberation about courses of action occurred at these meetings. Townspeople considered various methods of reducing deer, such as immuno-contraception, trap-and-transfer, and use of sharpshooters. The DIFW recommended that the deer population be reduced to 15 deer/square mile and then be maintained at that density.

In 1997, townspeople voted to extirpate the deer population from Monhegan at the town's expense. The deer committee then submitted a letter to the DIFW, asking for suggestions on how best to accomplish this extirpation. This approach was unusual and was only agreed to by the DIFW because Monhegan Island is far enough offshore to prohibit re-colonization by deer. In cooperation with town residents, the DIFW decided that it would be best to use a combination of local hunters and hired sharp-

shooters. In the winters of 1997 and 1998, hunters and sharpshooters eliminated deer from Monhegan Island.

Since the deer extirpation was completed, Maine medical researchers have monitored human health and tick incidence on Monhegan Island. After a lag of two to three years, the tick population has crashed and there have been no new human cases of Lyme disease on the island.

Issue Evolution

The issue of deer management on Monhegan Island evolved through nearly a complete cycle by the time the case was captured in our study. Articulation of concerns, involvement of the community, agreement that the issue was important, and review of alternatives and consequences for dealing with the deer issue were explored. Community choice was expressed in the form of a vote, resulting in implementation of the deer eradication effort over the course of two years. The evaluation stage is evident in the ongoing monitoring of human health and tick populations on Monhegan Island.

Key Dimensions

The case of Monhegan Island is a good example of how the dimensions of adequate knowledge, sufficient credibility, education and learning, and assessment contribute to collaborative decision making.

Adequate Knowledge

The DIFW used education and informative communication to increase the level of knowledge that the Monhegan deer committee and the public at large had available about deer biology and deer management options. The DIFW provided information to the committee and the residents during deliberations regarding deer management on the island. It also contributed to people's knowledge of the impacts the deer were having on the island's ecosystem and the town residents.

Sufficient Credibility

The DIFW took several steps to ensure its credibility during the decision-making process on Monhegan Island: it conducted an assessment of the local situation, it remained flexible in

Environmental Impact Statement (EIS)/Public Consultation

The EIS/public consultation approach involves public engagement associated with an environmental impact statement process to guide decision making about deer management on federal land. The process is focused on achievement of fundamental management objectives on the unit of land over which a manager has jurisdiction. The hallmark of this model is an effort by area managers to evaluate deer management alternatives in light of how those actions are likely to impede or facilitate achievement of fundamental objectives. This model is illustrated by the case of Gettysburg, Pennsylvania.

The single case we observed focused on deer management in a national park, where managers argued that deer were impeding achievement of the historic and cultural preservation purposes for which the park was established. However, the EIS/public consultation approach could be practiced on other units of federal land if those lands have clearly described objectives that are not being met because of deer-related impacts (e.g., the managers of a national wildlife refuge might employ this approach if deer are perceived as impeding the conservation purposes for which a particular wildlife refuge was established).

Public Consultation in Gettysburg, Pennsylvania

Case Description

Gettysburg National Military Park (NMP) in Pennsylvania is a unit of the National Park Service (NPS). A single park superintendent oversees management of this park along with the adjacent Eisenhower National Historic Site. Combined, the two sites cover about 6,000 acres. About half the area is agricultural land, the other half is in historic woodlots that existed in 1863 at the time of the battle. The park contains some private in-holdings, and the Borough of Gettysburg itself is surrounded by the park on three sides. Lands adjacent to the park include residential subdivisions and agricultural lands. Deer hunting is not permitted in the park.

terms of deer management options, and it refrained from using agency personnel as hunters. By assessing the local situation, including physical landscape, political structure, deer impacts, and cultural characteristics of the town, the DIFW was able to engage quickly in conversation regarding deer management. It had a good understanding of the local people and places, and therefore was seen as a credible agency that had done its homework. The DIFW also remained flexible in terms of the final deer management decision. Although it originally had advocated a deer-reduction strategy that would have brought the deer population to 15 deer/square mile, it agreed with the town's decision to extirpate the deer completely. And finally, in selecting individuals to conduct the hunt, the DIFW refrained from using its own personnel for fear of adverse public reaction. These actions contributed to the DIFW's and the wildlife biologist's credibility.

Education and Learning

The DIFW learned about local-level politics and the importance of partnerships in community-based deer management. In this case, agency staff were not prepared for the community's decision to extirpate the deer from Monhegan Island. However, upon learning about the local situation and the impacts residents were feeling from deer, the DIFW agreed that this decision was acceptable. Agency managers learned that local people have knowledge that is complementary to their own, and that this knowledge is invaluable in local-level decision making regarding deer.

Inventory/Assessment

Assessment played a major role in this case, influencing many key dimensions of community readiness. The DIFW's assessment of the local situation contributed to its credibility, to its own understanding of the local context, and to the way in which it defined its role in the decision-making process. Assessment was a main tool that the DIFW used to enhance its credibility. Although a government agency and an "outsider" to the island community, the DIFW was able to engage in meaningful dialogue with the Monhegan townspeople, in part due to its thorough assessment of the local situation.

Table 4 How key dimensions of community-based deer management were important in the EIS/Public consultation model

Enabling Conditions	How the dimension was important
Adequate Knowledge	The agency's knowledge about its land management objectives and about deer-related impacts on federal land enabled it to take action. Local residents' knowledge about park objectives enabled them to form opinions about deer management options.
Essential Working Relationships	The agency engaged other affected agencies and local residents during the EIS process. A committee of affected agencies was formed to address issues and share information.
Effective Local Leadership	The agency took on a leadership role to ensure that its land-management objectives were being met.
Sufficient Credibility	The agency followed the procedure for public consultation put forth in the EIS process to ensure the credibility of its deer management decision.
Commitment to Common Purpose	The agency made efforts to instill a sense of common purpose among stakeholders in the area (e.g., it held meetings and provided information).
Intervention Thrusts	How the dimension was important
Stakeholder Involvement	The agency held public hearings and solicited input from the public as prescribed by the EIS process.
Education and Learning	The agency made presentations to the public and met with smaller groups to educate people about deer, deer management, and the park's objectives.
Informative Communication	The agency communicated its actions to the public through TV, radio, newspaper, and public presentations.
Wildlife Agency Flexibility	The agency had clear objectives for land management, and it took action regarding deer to meet those objectives (i.e., the agency made it clear that they were inflexible with regard to the fundamental objectives for deer management in the park). However, they showed flexibility with regard to methods that could be used to address the park's deer management objectives.
Inventory/Assessment	The agency monitored the physical impacts from deer on the park, evaluated deer management options and their implications, and assessed the public's attitude toward the park in the EIS process.

By the 1980s, NPS staff were very concerned that deer were preventing the park from meeting its management objectives of growing historic crops on the battlefield and maintaining the historic woodlots in perpetuity. In 1987 the NPS commissioned the Pennsylvania Cooperative Fish and Wildlife Research Unit (Pennsylvania State University) to determine the population status, movements, and impacts of deer in the park. The study, completed in 1992, found that the deer density (350/square mile of woodland)

greatly exceeded the level that would allow maintenance of historic crop lands and woodlots.

Based on the findings of the deer population study, park administrators concluded that some type of deer reduction program was needed. In 1993, the park initiated an EIS process, the purpose of which was to allow the park to achieve its cultural resource objectives by reducing the number of deer in the park.

Five alternatives were evaluated fully in the EIS process. The first was a no-action alternative. The second was deer population management through capture and transfer (option #2a) or direct population reduction through shooting (option #2b). The third alternative was contraception. The fourth was to work with the Pennsylvania Game Commission (PGC) to get a special regulation enacted for areas adjacent to the park so that more deer could be killed in those areas. The fifth (and preferred) alternative was a combination of direct reduction through shooting (option #2b) and working with the PGC (option #4). A variety of public-involvement mechanisms were used, including scoping sessions (to identify issues and alternatives), a 60-day public comment period, and an open public meeting.

A record of decision was signed in May 1995. The selected alternative was direct reduction of deer within the park through shooting. The program was implemented in fall 1995. The NPS used a system of drivers and shooters positioned in tree stands during the first year, while it employed less intensive means in subsequent years. The program was successful in reducing deer density, but it also raised heated public debate about a range of issues such as the humane treatment of deer, public safety, and the behavior of park staff.

In the second year of program implementation, a group of adjacent residents filed a lawsuit to stop deer removal, but the suit was dismissed. Another lawsuit was filed (by a broader coalition of animal welfare interests) in the third year of implementation. That suit prevented continued program implementation for almost two years, but the park eventually won the suit and a subsequent appeal, so program implementation continued.

In the second year of implementation, the NPS created a Deer Safety Committee, which was composed of the superintendent of the park, the

chair of the park's advisory commission, the chief ranger, the chief of police of the Borough of Gettysburg, the chief of police of Cumberland Township, the state game warden, and the park wildlife biologist. The committee deals with all questions and concerns raised about deer program safety. Members initially met once a month; they now meet just once a year or as necessary. Two years of intense communication and intense conflict have been followed by relatively smooth program implementation.

Issue Evolution

The deer management issue in Gettysburg National Military Park evolved through the implementation stage following EIS procedures that ensured public input and involvement. The process followed by the NPS encouraged stakeholder involvement in identification of management alternatives and analysis of likely consequences through three scoping meetings prior to drafting the EIS. After the scoping meetings, the park identified five management alternatives it felt would best meet its stated goals and brought those to the public for comment. The public then was able to identify which alternative it preferred. Not all stakeholders in the issue agreed that the problem warranted any action by the NPS, let alone shooting deer in a culling operation. However, following established law and protocols, the park moved forward to implementation. Those opposed to the deer management effort twice responded with litigation. These lawsuits were handled in court, with outcomes favorable to the park's implementation of the deer control program. Our case study description does not include an evaluation of whether goals for reducing the negative impacts of deer on crops, trees, and other plants in the park's historic woodlots were achieved.

Key Dimensions

The case of Gettysburg is a good example of how the dimensions of adequate knowledge, essential working relationships, informative communica-



COURTESY OF NATIONAL PARK SERVICE

tion, and assessment contribute to collaborative decision making.

Adequate Knowledge

The NPS contributed to the increased knowledge of adjacent landowners and the public at large. During the EIS process, the NPS provided stakeholders with information regarding the impacts the deer were having on park lands, including the effects those impacts had on the park's ability to meet its nationally-mandated objectives. It also put quite a bit of effort into public relations and wrote several press releases. It made many television, radio, newspaper, and public presentations to communicate and increase the public's awareness of NPS actions.

Essential Working Relationships

The NPS engaged in several partnerships during the deer-management decision-making process. It first partnered with Pennsylvania State University in commissioning a study of the population status, movements, habitat use, and impacts of white-tailed deer in the park. The information gathered during this study helped to inform park personnel on steps the NPS could take regarding deer management. The NPS partnered with

By the 1980s, staff at Gettysburg National Military Park were concerned that deer were preventing them from maintaining historic crop fields on battlefield sites like the one shown here, on historic Spangler Farm.

Penn State a second time in administering the public scoping sessions. They then partnered with the state wildlife management agency (PGC) in an effort to coordinate the deer-management strategy of both agencies. This partnership was mutually beneficial in that the NPS was able to implement deer management on its land with the support of PGC, and PGC benefited from the park's deer harvest because it occurred adjacent to some private and state-owned lands that also were heavily impacted by deer. The NPS also partnered with others by participating in the Deer Safety Committee, which was made up of representatives of the NPS, the Gettysburg police, the Cumberland Township police, the PGC, and others. This partnership was beneficial in that it streamlined communication and contributed to transparent deer management in the park.

Informative Communication

The NPS made use of various communication outlets to increase public awareness of its activities. It held press conferences; made public presentations; held scoping sessions and public meetings; and communicated through local TV, radio, and newspaper. These forms of communication were especially important in this case because the land on which the deer lived is federally owned. As such, the Park Service has the responsibility to communicate its management actions to stakeholders across the nation. As a result of these communication efforts, the NPS received comments and input from the public regarding decisions about the local deer herd.

Inventory/Assessment

In this case, two formal assessments of the deer situation in the park were conducted: the Pennsylvania State University study and the EIS process. The university study was an in-depth assessment of the deer biology and the ecological and cultural impacts in the park. The EIS process was an assessment and evaluation of several different deer management options. Both assessments provided valuable information that contributed to making a good management decision.

Agency Partnership

In the agency partnership approach, a deer committee comprised of government agency staff, representatives of nongovernment organizations, and county residents is vested with authority to develop a plan for deer management in county parks. County residents are informed about the proceedings of the deer committee and are offered opportunities to review and comment on draft management plans. The deer committee annually submits a deer management plan to the director of parks for approval and implementation. A hallmark of this approach is ongoing communication and coordinated decision making by the county parks agency and the state wildlife management agency. Interagency coordination allows the state agency to make changes in state regulations as necessary to implement proposed deer management actions in county parks. It also allows the state agency to coordinate deer management actions on public and private lands throughout the county. This model is illustrated in the case of Montgomery County, Maryland.

Agency Partnership in Montgomery County, Maryland

Case Description

Montgomery County, Maryland is northwest of Washington, DC. The county consists of two incorporated cities and a few incorporated towns, but most of the 900,000 residents live in unincorporated areas of the county. During the 1990's, about one-third of the county's land area was in agricultural uses (e.g., nurseries, sod farms, hay production, row crops). Tree nurseries are the largest agricultural industry in the county.

Leading up to 1993, many farmers had been complaining to the Montgomery County Council about crop damage from the local deer herd. In response, the Council initiated a task force to study the deer issue and make recommendations. The task force was made up of representatives of both governmental and nongovernmental organizations that had a stake in the deer issue, as well as county residents.

In its 1994 report, the task force identified deer-vehicle accidents, crop damage, landscape damage, and Lyme disease as the main deer-related impacts experienced by county residents.

It also developed a list of 11 possible deer management options to address the impacts. The task force recommended creating a committee of professional staff from several municipal, county, and state organizations to collaborate in a cooperative planning process to address the deer impacts. This group became known as the Deer Management Work Group (DMWG).

The DMWG compiles data on the deer issue and recommends actions to address concerns. It first wrote a comprehensive management plan based on the task force report. The goal of the draft management plan was to reduce deer-human conflicts by maintaining a deer population that was compatible with human priorities and land uses. The objectives were to (1) reduce, on a county-wide basis, the number of deer-vehicle collisions; (2) reduce depredation on agricultural crops and ornamental shrubs; (3) reduce negative impacts of deer on the natural community and preserve natural diversity; and (4) develop a county-wide educational program to provide residents with information on deer, deer problems, and how to minimize or prevent deer conflicts. The draft management plan then assessed the feasibility of the 11 management alternatives proposed in the original task force report.

After the management plan was drafted, the DMWG held a public meeting to allow citizens to voice their opinions and suggest revisions to the plan. A final version of the deer management plan, one that maintained the goal and objectives indicated above, then was sent to the director of parks for approval. Upon approval, the plan was implemented.



Deer are common in the parks of Montgomery County, Maryland.

Table 5 How key dimensions of community-based deer management were important in the agency partnership model

<i>Enabling Conditions</i>	<i>How the dimension was important</i>
Adequate Knowledge	Having knowledge of deer biology, deer impacts, and the local landscape enabled the interagency partnership to make management recommendations that focused on reducing deer impacts, not on reducing deer numbers per se.
Essential Working Relationships	Commitment to the decisions and recommendations of an interagency work group allowed the county to effectively implement deer management actions in county parks and allowed the state wildlife agency to facilitate coordinated deer management actions on public and private land in the county.
Effective Local Leadership	Leadership from the county park agency played an important part in the success of this model. Leadership from local residents and non-government organizations played a less important role in this model.
Sufficient Credibility	County government maintained credibility by: (1) convening a diverse group of county residents as a task force to identify deer management concerns, (2) by regularly seeking public input about deer management in county parks, and (3) by basing decisions on the best available scientific information.
Commitment to Common Purpose	The represented agencies of the interagency partnership were formally committed to a common purpose regarding local deer management.
<i>Intervention Thrusts</i>	<i>How the dimension was important</i>
Stakeholder Involvement	The interagency partnership solicited input from county residents about deer management options through a series of public meetings each year.
Education and Learning	The interagency partnership presented information to residents about the frequency and location of various deer-related impacts. The interagency partnership also conducted workshops for homeowners who wanted to manage deer on their property.
Informative Communication	The interagency partnership publicized its activities through local newspapers and television programs.
Wildlife Agency Flexibility	The interagency partnership used various management techniques, and it evaluated the feasibility of management actions on a case-by-case basis for different areas of the county. The interagency partnership was flexible with regard to the means used to achieve management goals in different locations.
Inventory/Assessment	The interagency partnership monitored deer-related impacts and residents' attitudes toward deer and deer management.

In subsequent years, the DMWG has followed a similar pattern of public participation by holding a yearly public meeting. The meeting usually begins with an educational presentation about a specific issue related to deer management (e.g., Lyme disease). If the management action plan for the year involves lethal techniques, follow-up meetings are held in the communities where management actions will occur.



Information and education efforts were extensive in the Montgomery County case. Partner organizations, like the Montgomery Parks Foundation, used newspaper articles, newsletters, workshops, and cable television programs to inform, educate, and involve local residents in deer management decisions.

Residents are given an opportunity to comment on and evaluate the action plan given the past year's experience, and a final version is then sent to the director of parks for approval.

Issue Evolution

The deer management issue in Montgomery County is instructive with respect to the difference between the issue evolution cycle in theory and the ongoing nature of deer management in reality. In Montgomery County, farmers initiated public activity to gain recognition of negative deer impacts as a public issue. Elected officials empanelled a task force that investigated public concerns and presented objectives for management action. Efforts of the task force helped improve general understanding of several negative impacts of deer, not just crop damage. The task force was institutionalized as the DMWG, an entity which then approached the community of stakeholders to develop a management plan for deer. The plan presented alternatives and consequences that were reviewed publicly and commented upon. The DMWG then selected and implemented its actions. However, in recognition that deer management is an ongoing process, not a one-time action, the DMWG routinely re-engages with the local communities when additional actions are contemplated. Community input is solicited, and agreement is sought prior to implementation of additional actions.

Key Dimensions

The case of Montgomery County is a good example of how the dimensions of essential working relationships, commitment to common purpose, education and learning, and wildlife agency flexibility contribute to collaborative decision making.

Essential Working Relationships

The model of deer management used in Montgomery County relies heavily on essential work-

ing relationships. The management body, the DMWG, is itself a partnership among several entities, including the Maryland Department of Natural Resources and the Montgomery County Department of Parks and Planning. This partnership of paid professionals from several government agencies is a key component of the success of the community-based deer management program in Montgomery County.

Commitment to Common Purpose

The DMWG is made up of individuals who represent several agencies at state and county levels. The effectiveness of the DMWG is attributable in part to the sense of common purpose among members. Also, the DMWG makes a concerted effort to be aware of the public's needs through meetings, hearings, and solicitation of public comment. This effort helps develop a commitment to common purpose among the members of the DMWG and the public.

Education and Learning

The DMWG holds a public meeting each June in Montgomery County. This meeting consists of an educational component and a comment component. The educational component includes a presentation about deer and deer management, made either by a DMWG member or an external expert. The remaining portion of the meeting is dedicated to questions and comments from the public. In addition to the yearly county-wide meeting, the DMWG also holds public meetings in the specific location of deer management activity. The purpose of these efforts is to educate the public about deer management and learn from residents about the deer-related impacts they are experiencing.

Wildlife Agency Flexibility

The DMWG drafts a deer management action plan each year. In this plan, it addresses the negative impacts from deer that residents have identified, and then explores various means for affecting those impacts. The DMWG is explicit about its desire to reduce negative impacts through various management techniques, and it evaluates the feasibility of any management activity on a case-by-case basis.

Homeowners' Association

The homeowners' association approach involves a state wildlife management agency interacting with a local homeowners' association, usually in response to a formal call for assistance from official representatives of such an association. Within this model, the state wildlife agency provides information, expertise, and may provide assistance with management interventions. The hallmark of this approach is that the homeowners' association assumes substantial management responsibilities, which may include problem assessment, evaluation of potential management interventions, and implementation of management interventions. This model is reflected in the cases of Mumford Cove, Connecticut, and Governor's Land, Virginia.

Homeowners' Association in Mumford Cove, Connecticut

Case Description

The community of Mumford Cove is located on the Connecticut coast, not far from the border of Rhode Island. The town is located on a peninsula and consists mainly of affluent residential developments. Deer hunting had not been permitted in Mumford Cove for many years prior to the issue described below.

Beginning in 1991, individual residents began contacting the Connecticut Department of Environmental Protection (DEP), expressing concerns about Lyme disease and deer damage to shrubs and gardens. The DEP gave residents suggestions about how they might reduce deer damage and decided that it would be good to study the local deer population and learn about its movements. The DEP contacted the president of the Mumford Cove Homeowners' Association (MCHA) and proposed conducting a study of deer movements in the area. The MCHA was receptive to the idea and the study was initiated in March 1995.

The study ran from 1995 to 2001. However, before completion of the study several residents expressed interest in implementing lethal deer management. They felt that even before completion of the study, something needed to be done to reduce the negative impacts of deer. In 1996, an individual from outside the community heard

Table 6 How key dimensions of community-based deer management were important in the homeowners' association model

<i>Enabling Conditions</i>	<i>How the dimension was important</i>
Adequate Knowledge	Knowledge generated through previous research about deer biology, deer impacts, and deer management options allowed the wildlife management agency to make informed recommendations to the community regarding deer management.
Essential Working Relationships	A close working relationship between the wildlife management agency and the homeowners' associations ensured that legal, biological, and social needs regarding deer were met. Wildlife agency partnerships with other groups contributed to successful implementation of deer management actions.
Effective Local Leadership	Local leaders within the homeowners' association were important for sustaining the momentum necessary for the community to follow through with implementation of decisions.
Sufficient Credibility	Each wildlife management agency based their recommendations on scientific research to enhance their credibility as a source of information. Both agencies clarified the role they were willing to play in the decision-making process and each operated within that role throughout their interactions with the community.
Commitment to Common Purpose	Implementation of management decisions was facilitated by an expression of common purpose by each homeowners' association, and by the willingness of each wildlife management agency to provide support and assistance to help achieve the goals established by the homeowners' association.
<i>Intervention Thrusts</i>	<i>How the dimension was important</i>
Stakeholder Involvement	Committees within the homeowners' association facilitated involvement of their members in decision making. The respective wildlife management agencies supported this internal stakeholder involvement and facilitated efforts to involve a few key external stakeholders (e.g., adjacent landowners, bow hunters).
Education and Learning	The wildlife management agencies engaged in a variety of activities that helped each homeowners' association learn about their situation and understand the effects of their management interventions.
Informative Communication	Both wildlife agencies provided a range of information regarding suburban deer management.
Wildlife Agency Flexibility	Both agencies showed an openness to various deer management options.
Inventory/Assessment	Both wildlife agencies met with the homeowners' association to gather information about the nature and extent of deer-related impacts. One agency conducted extensive assessment of deer movements and numbers before and after hunting was used as a management tool.

about the proposal for lethal deer management and contacted the Humane Society of the United States (HSUS) to inquire about birth control. The HSUS contacted the MCHA about initiating an immuno-contraception study. The MCHA was receptive to the idea, but it would not pay for the study. The person who originally contacted

the HSUS offered to fund the study, and it was initiated in 1997, concurrent with the deer movement study.

In 1999, Mumford Cove formed a tick committee to address the issue of ticks in the area. All but one member of the committee agreed that the town needed to implement some form of lethal deer management. However, because members could not come to consensus, the committee decided to put the issue to an association member vote. The members of the association voted on



Hunters were placed at pre-determined, fixed locations in Mumford Cove. Homeowners signed waivers that permitted hunting in close proximity to homes.

the following action alternatives: (1) eliminate the no-hunting ordinance, (2) implement a hunt in cooperation with the DEP, (3) continue the immuno-contraception study, or (4) begin a new tick control study. The vote resulted in decisions to eliminate the no-hunting ordinance, initiate a hunt, and terminate the immuno-contraception study. The Mumford Cove Wildlife Management Committee (MCWMC) was formed to coordinate the details of the hunt.

The MCWMC and the DEP held a series of meetings between July and November of 1999 to design a hunt for the area. They decided on hunter density, the days of the hunt, the weapons to be used, and other issues related to implementing a hunt. The MCWMC and the DEP then selected hunters, and the first hunt occurred in 2000. In 2001, the hunt area was

expanded to include the adjacent community of Groton Long Point.

The DEP still is involved in helping with the hunt, but it is looking to step back and give full implementation responsibility to the MCWMC.

Issue Evolution

The deer management situation in Mumford Cove is a case for which the issue-evolution cycle was enhanced after the concern phase by a study of deer distribution and movements. However, because enough members of the homeowners' association representing the community saw a need for urgent action, a decision was made to proceed with implementation of an experimental immuno-contraception option prior to completion of the deer movement study. Soon this, too, was deemed insufficient, so an alternative action was put before the community by a citizen's committee, approved (choice phase) by vote of the association membership, and implemented. The situation had not yet been evaluated for success prior to conclusion of our inquiry about the case. Evolution of the case mirrors the model of issue evolution quite closely. The case also illustrates the action orientation typical of most communities.

Key Dimensions

The case of Mumford Cove is a good example of how the dimensions of essential working relationships, effective local leadership, education and learning, and assessment contribute to collaborative decision making.

Essential Working Relationships

In this case, the DEP partnered with several entities for various purposes. Initially, the DEP partnered with the MCHA to conduct research on the local deer herd. With the MCHA's consent, the DEP studied deer movements in the town. The DEP also partnered with the University of New Hampshire and HSUS to conduct a study on the effects of immuno-contraception on reproductive rate and deer activity. The relationships built during these studies set a precedent for future activities and ultimately affected the DEP's credibility with the townspeople of Mumford Cove (see below). After the decision was made to implement some form of deer harvest,



HOWARD KILPATRICK

Mumford Cove hunters were identified through a two-stage screening process, which involved a shooting proficiency test and an interview conducted by a community committee. This process gave the community control over decisions about who would be allowed to hunt.

the DEP partnered with the MCWMC to design a hunt that would meet the community's needs and the DEP's standards.

Effective Local Leadership

Some local leadership was present in the community at the time the deer issue became salient, but other forms of leadership developed during the decision-making and implementation processes. For instance, the community of Mumford Cove took a leadership role in forming several committees to study the deer issue: first the tick committee, later the MCWMC. The chairman of the MCWMC was characterized as a particularly powerful figure. However, the DEP took steps to help develop local leadership. For example, in selecting hunters who would participate in the hunt, the DEP encouraged the local sportsmen's club and the MCWMC to step up and take responsibility for coordinating the effort. This provided an opportunity for local people to act as leaders, which also contributed to their sense of ownership of the process. Subsequent to the first hunt, the DEP has stepped away from the administration of the hunt and has passed that responsibility on to local people. Again, this is an example of how the DEP was able to create a situation in which local leadership could develop.

Education and Learning

The DEP values research, and it bases its management decisions on research results. In this case, the DEP undertook a deer movement study and collaborated in an immuno-contraception study intended to provide data upon which informed decisions could be made. These research projects also aided the DEP's efforts to educate the public on deer management practices that would be most effective for local needs.

Inventory/Assessment

Upon being contacted by local residents, the DEP undertook studies to learn more about the local deer population and the local human population. Agency managers spoke with residents experiencing negative deer-related impacts and the local homeowners' association to learn about the political, cultural, and economic nature of the community. These efforts influenced the role that the DEP took in subsequent interactions with the community.

Homeowners' Association in Governor's Land, Virginia

Case Description

Governor's Land is an affluent, gated community located on the coastal plain of Virginia. The area is moderately developed, and many of the town residents are retirees.

In 1993, Governor's Land staff approached the Virginia Department of Game and Inland Fisheries (DGIF) to voice concerns about deer-related landscape damage, deer-car collisions, and

town employees act as agents in the third year, professional sharpshooters were hired. The town implemented sharpshooting for three years and then did not harvest any deer for several years.

In 2001, the town again contacted the DGIF with concerns about deer-related impacts, expressed interest in using employees as sharpshooters, and was granted a permit to do so.

By this time, the original WMC had dissolved, and new residents had moved into Governor's Land. Several homeowners now were opposed to

lethal deer management. A series of educational meetings was held, and the community finally decided to hire professional archers to harvest deer.

Issue Evolution

The deer-management situation in Governor's Land demonstrates the difference between multiple full cycles of issue evolution with a gap between cycles, and continuous action choice-implementation-evaluation subcycles that are needed for most management issues (an adaptive approach). That is, deer management likely

needs continuous attention (except where deer are effectively extirpated, as on Monhegan Island). A hiatus in attention to management can result in issues reappearing, as was the case in Governor's Land, and reveals some inherent inefficiency.

Key Dimensions

The case of Governor's Land is a good example of how the dimensions of essential working relationships, effective local leadership, education and learning, and assessment contribute to collaborative decision making.

Essential Working Relationships

The DGIF partnered with the homeowners' association and the local wildlife management



Lyme disease in the community. The DGIF provided information about deer biology and explained which deer management options were legally and ecologically feasible. The DGIF also recommended that a committee be formed to study the issue.

The Wildlife Management Committee (WMC), made up of Governor's Land staff and residents, studied the local deer situation and, after a series of committee and public meetings, recommended lethal deer management using community employees as shooters. This proposal was accepted by the community and was implemented with almost no controversy.

During the first and second years of the regulated hunt, few deer were taken. Rather than have

committee to provide information regarding deer biology and deer management options that would help inform the committee's decisions. This partnership benefited both the DGIF and the community, in that each brought a certain degree of decision-making authority and expertise. The DGIF also engaged in a partnership with several large landowners in the Williamsburg area to create the Williamsburg Urban Deer Management Program. This partnership facilitates communication of deer management activities across the area and learning from other landowners' experiences.

Effective Local Leadership

The DGIF relied upon local leadership to sustain momentum in the decision-making process. Members of the local homeowners' association took a leadership role in contacting the DGIF and voicing their concerns. They also participated in researching the issue, weighing alternative solutions, and implementing the management decision.

Education and Learning

The deer manager made efforts to educate the public about deer biology and management through presentations and distribution of publications. Education is seen by DGIF as an end in itself—if the community better understands deer management as a result of a community-based process, then the process is characterized as successful.

Inventory/Assessment

Two rounds of decision making occurred. Initially, great care was taken to assess the local situation and then to communicate and collaborate with the homeowners' association as it proceeded toward decision making about a management action. After a period of time, negative deer-related impacts began to increase, and the DGIF decided to implement the same management action that had been decided the first time around. However, the make-up of the homeowners' association had changed in the intervening years, and the earlier management action no longer was acceptable. The DGIF learned that it is important to conduct ongoing monitoring and assessment of communities' needs, expectations, and desires.

Citizen Action

The citizen action approach involves a group of stakeholders, both private and public, who collect information, deliberate, and make decisions. Wildlife agency staff may be members of the group, but they act primarily as technical advisors and usually refrain from voting. The hallmark of this approach is the formation of a grassroots citizen group supported by professionals who bring various kinds of technical expertise to the group. These citizen groups vary with respect to decision-making power. Some are regarded as an advisory committee with authority to make decisions for their community. Others function primarily as working groups without a direct connection to local decision makers. This model is illustrated by the cases of Irondequoit, North Haven, and Cayuga Heights, New York.

Citizen Action in Irondequoit, New York

Case Description

The town of Irondequoit is northeast of Rochester in Monroe County, New York, on the shore of Lake Ontario. The northern half of the township is a series of ridges and valleys, some of which are administered by the Monroe County Parks Department (MCPD) as Durand Eastman Park. The southern portion of the township largely consists of commercial and residential development. When the state legislature opened Monroe County to deer hunting in 1945, it excluded the town of Irondequoit from the law because deer were absent and the town was considered too urbanized for safe hunting.

In the early 1970s, staff in the New York State Department of Environmental Conservation (DEC) received a petition from area landowners asking the agency to intervene to reduce car–deer accidents, landscape damage, and damage to plants in Durand Eastman Park. Together with the Monroe County Sportsmen's Federation and other concerned citizens, DEC staff put together a legislative request to the state legislature to open the town to deer hunting. The legislature accepted that proposal, and in 1976 it changed the law to allow archery hunting in the town. Two years later, the town council added discharge of a bow and arrow to its discharge prohibition ordinance, so hunting was again curtailed after 1978.

Table 7 How key dimensions of community-based deer management were important in the citizen action model

Enabling Conditions	How the dimension was important
Adequate Knowledge	Citizen groups created an integrated knowledge base with assistance from various technical advisors. Increased knowledge helped each citizen's group make informed deer management recommendations.
Essential Working Relationships	Members of each citizen's group built working relationships with one another, with wildlife managers, with county Cooperative Extension personnel, with local decision makers, and with outside experts. It would not have been possible to implement the recommendations from each citizen's group without these working relationships.
Effective Local Leadership	Each citizen's group functioned as a unit for a lengthy period of time (i.e., 1–3 years), and various local leaders emerged as the decision-making process developed over that time. Emergence of new leaders over time gave each group the momentum necessary to function over a long time period.
Sufficient Credibility	The wildlife agency maintained credibility by working in partnership with citizens' groups and local government officials, by serving as an information resource, and by providing technical assistance with stakeholder involvement processes and action implementation.
Commitment to Common Purpose	Each citizen's group expressed a commitment to the overall process, despite differing views on the specific management issues. This commitment to a common purpose helped make it possible to implement action recommendations.
Intervention Thrusts	How the dimension was important
Stakeholder Involvement	Carefully designed, broad-based stakeholder involvement processes lent credibility to the decisions made in each case. Involving stakeholders with a broad array of interests also contributed to community acceptance of the decision-making process.
Education and Learning	In each case, citizen groups undertook a range of actions to educate themselves and learn more about their situation. They consulted with external experts (including wildlife management agency staff) and other communities dealing with similar issues. Each citizen group based their decisions on what they learned during their own extensive fact-finding activities.
Informative Communication	Each citizen group took multiple actions to communicate their findings and recommendations with community members (e.g., open meetings, written reports, mass media reports). These efforts maintained the credibility of the citizen groups and bolstered support for recommendations from the groups and actions that followed.
Wildlife Agency Flexibility	The wildlife agency was explicit in articulating its expectations and priorities for deer management in each case. The agency advocated for specific actions in some cases, but remained open to other means of reducing negative deer impacts.
Inventory/Assessment	The wildlife agency, citizen group members, and other individuals engaged in information-gathering activities to assess the nature and degree of negative deer impacts. Topics for inventory/assessment included: deer movements, deer population estimation, and number and location of deer-car collisions.

Residents continued to complain to their town board about deer-related problems. Under public pressure, the town board revised its discharge ordinance to allow bow hunting of deer, provided

this was done under a DEC deer damage permit (which allows landowners to take deer out of season). From 1983 to 1988, a small number of deer were removed using these damage permits.

In 1988, a local legislator became convinced that something more needed to be done. He led an effort to open the county and Durand Eastman Park to deer harvest. That effort started with a public meeting at which the legislator addressed problems and proposed a remedy. Actions required cooperation between city, county, and township government officials.

Debate about deer hunting in Monroe County led to the formation of two citizens' groups during the early 1990s. The Irondequoit Deer Action Committee (IDAC) formed to address concerns about deer-related problems in Irondequoit (e.g., deer-car collisions, plant damage, the threat of Lyme disease). The Monroe County Alliance for Wildlife Protection (MCAWP) formed to address animal welfare concerns (MCAWP was opposed to any management recommendations that involved killing deer).

In the early 1990s, IDAC (and other groups, like MCAWP) brought in experts from across the country to speak about what other communities were doing to manage deer in residential areas. IDAC made initial attempts to estimate the size of the deer population. IDAC evaluated potential management options and eventually made three recommendations to town officials—trap-and-transfer, trap-and-slaughter, and bait-and-shoot—with selective culling of deer to be done by the DEC or DEC-authorized agents.

During the same time period, the DEC had been organizing deer management task forces (citizens' task forces [CTFs] for deer management) across the state. In 1991, DEC staff established a CTF process for Deer Management Unit (DMU) 96, an area that included Irondequoit. The process was facilitated by a wildlife specialist with Cornell Cooperative Extension (CCE). DEC staff provided technical advice. The CTF was asked to recommend a deer population objective and the means for achieving that objective. The CTF was made up of the principal stakeholders affected by the deer population (e.g., homeowners, motorists, farmers, hunters, fruit growers). The 11-member CTF included one member of IDAC and one member of MCAWP.

In 1992, the CTF completed its duties and made its recommendations. First, the CTF recommended a substantial deer-population reduction. Then, they recommended two means to achieve that goal: a five-year bait-and-shoot operation (as a short-term means to population reduction) and reproductive inhibition for deer (as a long-term means of population control). The recommendations were presented by CTF participants to the community through a media-day event that involved local television, radio, and newspaper reporters. One member of the CTF (representing MCAWP) did not support the recommendations and offered a dissenting opinion at the press conference. The dissenting opinion recommended research on reproductive inhibition, without any bait-and-shoot program.

To implement the recommendations, DEC staff helped create an interagency deer management team that put the CTF recommendations into action. The deer management team consisted of city, county, and town government representatives. The county legislature passed an ordinance to allow discharge of firearms in the park. The town of Irondequoit passed legislation to allow discharge in the township. Shooting sites were created in Durand Eastman Park and in an area outside the park. This selective culling operation occurred for the next nine years.

MCAWP successfully lobbied town and city officials and the New York State legislature to obtain funding for a fertility-control research project in Irondequoit. State permits for the research were granted by DEC, and a multi-year study was initiated in 1993. Findings from the study did not support reproductive inhibition as a feasible means of deer population control in Irondequoit. Based on the study results, town officials abandoned consideration of reproductive inhibition as a means of achieving the CTF's deer-population goal.

As the deer-culling program continued, the IDAC put out a quarterly car-deer and other deer incidents report. The IDAC was able to document, through police records, that around the area of bait-and-shoot impact, incidents dropped dramatically. In the other areas, incidents continued to increase. So, in 1996, the town board was convinced to pass an ordinance that allowed a very restricted and structured archery harvest across the township. The hunt started out on a very small basis



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and increased in size as acceptability within the township increased. It remains highly structured and restricted, but it has effectively reduced the need for the more costly bait-and-shoot program.

Issue Evolution

Deer management in Irondequoit experienced three readily identifiable issue-evolution cycles. The cycles experienced in Irondequoit reflect varying degrees of stakeholder involvement, alternative consequences identification and evaluation, and action implementation. The first cycle, in the 1970s, led to management action, but was curtailed by the end of the decade. The second cycle, inevitable because negative impacts of deer still were being broadly experienced, played out during the 1980s. The outcome of the second cycle was inadequate to produce needed results, so a third cycle, with a different approach to citizen involvement, was initiated in the late 1980s. This cycle, consisting of ongoing deer management, continues today in the implementation stage. The third cycle seems to closely mirror Hahn's model. Furthermore, the Irondequoit case demonstrates how actions to affect the impacts of concern can change over time as the overall management scenario itself changes as a result of management.

Key Dimensions

The case of Irondequoit is a good example of how the dimensions of adequate knowledge, effective local leadership, sufficient credibility, stakeholder involvement, and wildlife agency flexibility contribute to collaborative decision making.

Wildlife manager John Meyers (left) addresses members of two different citizen-action committees during a site visit to Durand Eastman Park in the 1990s.

Adequate Knowledge

Throughout the development of the deer issue in Irondequoit, knowledge has been very important. Integrating knowledge about deer biology, deer management options, local and state laws, deer management regulations and policies, local deer behavior, deer impacts, and local geography proved to be essential to the development of this case. Different entities, including the DEC, the IDAC, the MCAWP, and other groups, participated in collecting and distributing information. Ensuring that relevant knowledge was held by the multiple political actors affected by deer management in Irondequoit proved to be crucial to the decision-making process.

Effective Local Leadership

Effective local leadership was a key component of collaborative decision making. Over the years, different individuals took on leadership responsibilities for different reasons. Formal local leaders included a county legislator, the county sheriff, and members of the IDAC. The DEC encouraged the formation of a CTF, which allowed local people to take on leadership roles in gathering information and making recommendations for action. In this case, both formal and informal leaders were important to the process, and the DEC was able to influence certain aspects of the situation to facilitate the development of these local leaders.

Sufficient Credibility

The DEC was able to maintain its credibility by defining its role in the decision-making process. Throughout, the DEC defined its role as that of a technical advisor that provides information and recommendations, but is not part of the decision-making body. The DEC also was flexible in terms of deer management outcomes, so long as any action was what it considered to be ecologically and legally feasible. Partnering with Cornell Cooperative Extension and relying on its expertise in facilitation also contributed to credibility. By supporting an impartial third-party facilitator, the DEC demonstrated its commitment to a fair and just process.

Stakeholder Involvement

Stakeholder involvement was an important factor in the Irondequoit case inasmuch as it contributed

to the credibility of the decision-making process. The CTF's composition was deliberately meant to reflect the full range of interests regarding deer in the community. The purpose of full representation was to ensure that the various positions people held were incorporated into decisions. Stakeholder involvement also contributed to overall satisfaction with the decision-making process.

Wildlife Agency Flexibility

At various points in the development of the deer issue in Irondequoit, the DEC articulated its role and its expectations for the process. The wildlife manager stated that the DEC's main objective was to try to accommodate the needs and desires of the community. DEC staff offered suggestions and recommendations, but remained flexible and open to what the community decided.

Citizen Action in North Haven, New York

Case Description

The village of North Haven, which is approximately three square miles in area, is an affluent residential community located on the north shore of the south fork of Long Island, in Suffolk County, New York. Most of its residences are second homes, and many of its 750 residents commute between New York City and North Haven.

Firearms discharge is banned under village code. However, during the 1980s, the village board periodically voted to create a variance allowing discharge, and thus deer hunting, in the village. Twice during the 1980s the village went through episodes that involved an increase in nuisance complaints about deer, a variance to allow deer hunting, and a decrease in deer numbers and nuisance complaints. Each time complaints dropped, the village board would prevent hunting for a year or two. The number of complaints would then rise, prompting the village board to again create a variance in town code to allow hunting. Between 1988 and 1993, no variance to the town code was created, hunting was prohibited, and the pattern of increasing complaints about deer was repeated.

In 1993, the village mayor became aware that the New York State Department of Environmental Conservation (DEC) was beginning to use citizens' task forces (CTFs) to derive deer population objectives for deer management

units. The mayor contacted a regional DEC biologist to inquire about conducting a CTF process in North Haven. DEC staff designed and proposed a CTF process that would identify an acceptable deer population level and the means by which that population goal would be achieved. The village board accepted the proposal and agreed to abide by the recommendations of the CTF.

DEC staff served multiple roles in the task force process. They identified a process facilitator, helped the mayor and the facilitator to identify task force members, served as technical experts on deer biology and deer management, and at one point advocated hunting as a management recommendation (this mixture of roles later was identified as problematic).

The CTF was composed of 11 people. They met five times to define issues, consider alternatives, and deliberate about consequences associated with various alternatives. The CTF conducted its own fact finding with help from several technical experts and data from a survey of village residents. The CTF determined that no nonlethal management alternatives would be suitable to address the concerns identified in the community. However, the CTF also concluded that regulated archery hunting was inappropriate as an alternative. The CTF came to a majority (9 to 2) decision to recommend use of DEC nuisance deer-removal permits in the village, whereby individual landowners in the village could use DEC-issued damage permits to reduce the number of deer in the village.

The recommendation stirred controversy, in part because the CTF decision was announced by DEC staff instead of a CTF member, but it finally was accepted a few months later. As agreed, the village took action to implement the CTF recommendation. The village board passed an ordinance that permitted shooting in the village pursuant to the deer permits. Two lawsuits were filed in an attempt to prevent use of the damage control permits, but both suits were dismissed. The first nuisance deer permits were issued by the DEC in 1995, and the program has continued to date.



DATA SOURCE: NEW YORK STATE GIS CLEARINGHOUSE

Issue Evolution

The village of North Haven had a history of addressing its deer issue through repeated special allowance of deer hunting in the village. During the 1980s, responding to mounting complaints about deer problems, the village would allow hunting for a period of a few years until such complaints diminished, but then would prohibit hunting until once again complaints from the community climbed to a level where local elected officials felt the need to address the deer issue. It is not apparent that this pattern of activity represented issue evolution cycles as we have presented the process here. But this changed in the early 1990s when a more thorough approach was used, wherein a citizen task force was established (involvement) to examine the community's

North Haven (shown center) is on a peninsula on the eastern end of Long Island, New York.



COURTESY OF NYSDC

The presence of a village ordinance prohibiting firearms discharge played a key role in deer management in North Haven during the 1980s and 1990s.

options (alternatives and consequences) for addressing the deer issue. These were discussed by the task force, which, after deliberation, agreed on a recommendation for deer management. The recommended approach of allowing very limited shooting under the authority of deer nuisance permits was implemented, but not without two

lawsuits, which were dismissed in court. Perhaps an important lesson from the North Haven experience, with respect to the issue-evolution cycle, is that attending to the steps of the cycle with a process that meaningfully engages the community may legitimize and establish the credibility of an outcome sufficient to withstand litigation.

Key Dimensions

The case of North Haven is a good example of how the dimensions of adequate knowledge, effective local leadership, sufficient credibility, stakeholder involvement, and wildlife agency flexibility contribute to successful collaborative decision making.

Adequate Knowledge

Once the CTF had been established, knowledge became an important part of the decision-making process. In gathering information, the CTF called on the DEC and the Humane Society of the United States (HSUS) for input. It also made a visit to Fire Island, where deer management actions had been underway for some time, to assess how that intervention was progressing. Continuing in this knowledge-building mode, the North Haven CTF engaged in conversation with members of the Irondequoit CTF to learn from its experience. The DEC, in its role as a technical advisor, provided information to the CTF regarding deer biology, deer management options, and deer impacts.

Effective Local Leadership

The most visible formal local leadership was the mayor of North Haven. He was a prominent

figure in the decision-making process and played an important role as a leader. With the creation of the CTF came the opportunity for other town residents to assume informal leadership roles. They were responsible for gathering information, deliberating, and making recommendations that the DEC and the local government would abide by. In this capacity, they were able to exercise some power and develop their leadership skills.

Sufficient Credibility

The DEC took several steps to ensure its credibility throughout the process. By proposing a decision-making process and agreeing to abide by the results of that process regardless of what they were, the DEC demonstrated its commitment to a fair and just process. This was corroborated by the fact that a third-party facilitator was sought to facilitate and mediate the process. The DEC's support of broad stakeholder involvement in the process and its decision to act as a technical advisor, rather than an advocate, also contributed to its overall credibility as an agency.

Stakeholder Involvement

It was important to have the full range of stakes represented on the task force in North Haven, especially because the local officials, the DEC, and the town residents had agreed to abide by the recommendations of the task force, regardless of what those were.

Wildlife Agency Flexibility

The DEC does not hide the fact that it is an advocate of sport hunting. This position caused some town residents to doubt the DEC's ability to facilitate a fair and unbiased decision-making process. The DEC's commitment to abide by the task force's recommendations, whatever they might be, was important for progress in decision making. The wildlife manager maintained a neutral position for most of the deliberations, but he did advocate hunting at one point in the process. In this case, his advocating hunting jeopardized his credibility with the group. Nevertheless, the flexibility demonstrated by the agency throughout the process was an important positive attribute in this case.

Citizen Action in Cayuga Heights, New York

Case Description

The Village of Cayuga Heights is about two square miles in size. It is a relatively affluent residential community located in Tompkins County, New York. Most residences in Cayuga Heights are single-family dwellings (the village contains approximately 850 single-family homes). With the exception of a small park, all parcels of land in the village are privately owned and nearly all contain an occupied building. No deer hunting occurs in the village. Discharge

as a committee to study the deer situation and develop recommendations for village trustees.

Early in its existence, the deer committee formed a close working relationship with staff from the DEC, Cornell University (CU), and Cornell Cooperative Extension (CCE). The deer committee invited a local environmental educator with the CCE to provide it with information about techniques to reduce deer damage to landscape plants. At the committee's invitation, this extension educator assisted with design and facilitation of citizen-involvement processes. Through her efforts, the deer committee came to have direct



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A research technician handles a tranquilized deer in Cayuga Heights. The deer is part of an experimental fertility control project implemented at the recommendation of a village-sanctioned deer study committee.

of firearms and bow and arrow is prohibited by a village ordinance.

Deer managers began receiving complaints about deer-related problems from Cayuga Heights residents in the mid-1990s. In 1998, a group of about a dozen village residents gathered hundreds of signatures on a petition calling for action by the New York State Department of Environmental Conservation (DEC) to address concerns about deer damage to gardens and landscape plantings. By August of 1998, the same individuals had approached their village mayor and had been officially sanctioned by the village

and repeated interactions with DEC staff and the state wildlife specialist for the CCE.

The extension educator worked with the deer committee to design a process for gathering public input. Eventually, the committee designed a process that included input from several sources: (1) two mail surveys of village property owners, (2) two studies of deer abundance and movements, (3) a committee fact-finding process, (4) two public meetings with village residents, and (5) discussions with invited technical experts on reproductive control in free-ranging deer. The deer

committee met 40 times between fall 1998 and May 2001 to gather information, define its situation, and deliberate about problems and potential responses to those problems. CCE personnel and DEC staff provided the committee with information about deer and deer management. DEC staff provided it with information about laws, statutes, and policies that would be brought into considera-



A deer movement study in Cayuga Heights improved understanding of deer and enhanced community interest in deer management. More than 600 reports of tagged deer were received, with reports submitted from 29 percent of all households in the village.

tion if deer population reduction were recommended. To facilitate the deer committee's work, the DEC provided partial funding for Cornell's Human Dimensions Research Unit (HDRU) to survey village property owners about their experiences with deer, opinions on deer management, and preferred modes of involvement in deer management decisions. Staff associated with the HDRU, the CCE, and the DEC worked closely with the committee to synthesize and interpret survey findings and communicate those findings to village residents. With assistance from a range of technical experts, village residents defined problems, proposed management alternatives, and evaluated consequences of action alternatives.

By February 2001, there seemed to be substantial agreement that the majority of homeowners

in the village were experiencing deer-related problems and desired relief from those problems, but residents were divided on how to reduce negative interactions with deer.

After two years of issue investigation and deliberation, the deer committee made a formal recommendation to the village trustees. They recommended that the village endorse experimental research that involved physical sterilization of female deer in the village. The recommendation came with an offer from an anonymous village resident to fund the experimental research. The village trustees accepted the recommendation. The DEC subsequently granted a permit necessary for the experiment to proceed. The deer sterilization experimental research was conducted in 2002 and 2003.

The management choice and implementation stages have not been reached in Cayuga Heights, even though five years have passed since some residents entered a concern stage.

Issue Evolution

The Cayuga Heights deer case followed the issue evolution cycle from the concern and involvement stages, to the issue, alternatives, and consequences stages. There it stalled. The choice and implementation stages have not yet been experienced. Instead, the community chose to pursue a deer sterilization experiment, which is a research activity, not management action. The community still is experiencing negative impacts from deer, yet unlike the community of Mumford Cove, CT, patience in waiting for results of the research project seems to persist in Cayuga Heights. Evidently, the community sees the research as a valuable effort, the results of which are expected to inform future decisions about management actions.

Key Dimensions

The case of Cayuga Heights is a good example of how the dimensions of adequate knowledge, effective local leadership, sufficient credibility, stakeholder involvement, and wildlife agency flexibility contribute to collaborative decision making.

Adequate Knowledge

The DEC took steps to increase the level of people's knowledge about deer biology, impacts,

and management. By partnering with the CCE and the CU, the DEC was able to ensure that experts were on hand to provide the deer committee with information it needed to make good decisions. An example of this is the attitude survey that the HDRU conducted in the village, the results of which indicated that there was overwhelming support for some form of action. The DEC also provided information regarding deer management regulations and policies regarding deer permits in New York State. Another example is the extensive educational effort undertaken by the CCE. This encompassed both facilitation and deer biology expertise, which enhanced the deer committee's knowledge of both the process and content of decision making about the community's deer issue.

Effective Local Leadership

Leadership was exerted by several individuals at different times. For instance, deer committee members themselves acted as leaders by volunteering to address the issue, conducting research on deer biology and management actions, and taking responsibility to develop recommendations for management actions. In addition, the extension educator provided leadership during deer committee and public meetings by facilitating discussion and keeping the group on task. This case is a good example of how different leaders can rise at various occasions and are needed in effective decision making.

Stakeholder Involvement

The DEC, along with representatives of the CCE, encouraged the deer committee to ensure that the full range of interests was represented. Broad stakeholder involvement contributed to the credibility and validity of the decision-making process, as well as to the outcome.

Wildlife Agency Flexibility

The DEC provided the deer committee, town officials, and the public with accurate information regarding the legality of various deer-management options. The DEC responded quickly to permit requests, participated in meetings upon request, and acted as a liaison to connect Cayuga Heights residents to other communities.

Citizen–Agency Partnership

The citizen–agency partnership approach involves a co-management agreement formed between a state wildlife agency and a local land-management authority (e.g., a municipality, an airport, a county park commission) for the purpose of controlling a deer population in an area where traditional hunting is not considered a viable deer management tool. If an agreement is formed, the wildlife management agency provides technical assistance and support in developing a deer management plan, designates the area in question as a special management zone, and authorizes use of approved alternative deer management techniques in the special management zone. The land-management authority assumes responsibility for documenting that deer have caused significant damage or hazards in the area, documenting that traditional hunting is not viable in the area, and implementing the alternative deer management actions. Deer managers from the state wildlife agency play an important advisory role at all stages of management, from problem assessment to implementation and evaluation of management actions. This model is illustrated by the case in Union County, New Jersey.

Citizen–Agency Partnership in Union County, New Jersey

Case Description

Union County is highly urbanized, but within the county is a 2,000-acre wooded parkland—Watchung Reservation. The six communities that surround the reservation are upper-middle class and fairly affluent. The older homes typical of the area have well-developed, mature landscaping and large backyards that border on the reservation. These communities have a long history of deer problems.

Complaints to the Union County Department of Parks and Recreation (DPR) increased dramatically during the late 1980s. In the early 1990s, park officials approached the New Jersey Division of Fish and Wildlife (DFW) seeking assistance. The DFW met with park staff and recommended a controlled hunting program in Watchung Reservation to reduce deer numbers. The DFW and park staff recognized that an extensive public involvement process might be necessary.

Table 8 How key dimensions of community-based deer management were important in the citizen-agency partnership model

<i>Enabling Conditions</i>	<i>How the dimension was important</i>
Adequate Knowledge	The deer committee's increased knowledge enabled it to make an informed recommendation for deer management.
Essential Working Relationships	The wildlife agency, the land manager, committee members, and local officials engaged in collaboration, which is essential to the implementation of a community-based deer management program.
Effective Local Leadership	The land manager provided leadership for the deer committee by facilitating dialogue, organizing the committee, and facilitating the exploration of alternatives.
Sufficient Credibility	The committee was made up of representative stakeholders and worked with input from the wildlife agency, the land manager, and other experts in order to maintain credibility. The wildlife agency served as a technical advisor and nonvoting member of the committee in order to maintain credibility.
Commitment to Common Purpose	The wildlife agency, the land manager, and local officials expressed their commitment to common purpose by entering into a formal memorandum of understanding.
<i>Intervention Thrusts</i>	<i>How the dimension was important</i>
Stakeholder Involvement	The wildlife agency and the land manager encouraged the participation of a full range of stakeholders in the deer committee.
Education and Learning	The wildlife agency and the land manager educated the committee and the public about deer impacts and deer management, and it sought out other sources of information.
Informative Communication	Media coverage of the decision-making process was high at the beginning, but it tapered off as time passed.
Wildlife Agency Flexibility	The wildlife agency articulated its initial recommendation and then left the decision up to the committee and local officials.
Inventory/Assessment	The committee sought information from the wildlife agency, the land manager, and other experts in order to assess the nature of the problem, consider alternative solutions, and assess the success of the approach being used and whether it achieved desired outcomes efficiently.

The DPR took full responsibility for setting up a subcommittee for the management of deer on the reservation. The deer management subcommittee consisted of 22 members, including representatives from the six communities that border the reservation (two from each community), the animal rights community, the State Federation of Sportsmen's Clubs, the Board of Chosen Freeholders, and a representative for the DFW. The committee met 28 times over a 15-month period. The individual who was chief of

park operations and director of the DPR provided strong leadership in those meetings.

The DPR directed the deer committee to address three objectives: (1) reduce the damage to native plants within the reservation, (2) reduce the damage to the ornamental plantings on peripheral properties, and (3) substantially reduce deer-vehicle strikes along roads, including one interstate highway.

The committee first took on the task of problem definition. After agreement was reached on the nature of the problem, it moved on to consider management alternatives. It quickly concluded that a controlled hunt was necessary. A controlled hunt was held, which removed 86 deer from the park. However, due to perceived safety concerns and possible conflicts with animal rights protesters, the staff cost to the county was excessive (\$56,000 for law enforcement officers), thus the committee began exploring other management options.

The deer subcommittee continued to meet to evaluate alternative approaches to achieve the objectives established by the park. It consulted with a range of technical experts and at times held public meetings or facilitated meetings. The committee maintained a cooperative consulting relationship with DFW staff (DFW staff had no voting power within the committee) and maintained a direct connection to the Board of Chosen Freeholders (the decision-making body for the county). The committee went on to establish a deer population density goal and recommended a five-year management plan that included annual culling of deer using selected agents. The Board of Chosen Freeholders approved the plan, and it



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has been implemented each year since that time. The annual cull takes only a few days now, and the subcommittee meets only once per year to review the program. This and other experiences in cooperative management served as models that led to New Jersey's community-based deer management program.

Issue Evolution

The deer issue in Union County has evolved through an entire cycle. In addition, after evaluation of the cost of the first option implemented (controlled hunt), the community revisited the potential action alternatives and selected a different approach (engaged selected agents to conduct a cull). This community's experience, which can be described as implementing an option → evaluation → considering a new option → implementing a new option, is consistent with how a community typically might remain engaged in deer management over time. That is, a community needs to commit to sustained management efforts, the specific elements of which may change because of changing needs or the results of evaluations of efficacy.

Key Dimensions

The case of Union County is a good example of how the dimensions of essential working relationships, effective local leadership, and sufficient credibility contribute to collaborative decision making.

Essential Working Relationships

The New Jersey DFW partnered with several entities and encouraged the development of relationships on various levels. Initially, the DFW partnered with the Union County DPR to identify the problem. After the DPR decided to establish a deer management subcommittee, the DFW worked in partnership with the many other agency representatives in that group. The DFW also encouraged broad stakeholder involvement in the decision-making process, thereby facilitating the development of relationships among all affected parties. According to the DFW's representative, this interaction led to the development of trust among the individuals involved, which also contributed to their ability to work together



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effectively. Effective media relations also may have enhanced working relationships. Media coverage of the decision-making process was high at the beginning, but it tapered off as time passed.

Effective Local Leadership

The creation of the deer management subcommittee provided an opportunity for different individuals, representing different organizations and agencies, to play leadership roles. The DFW's decision to act as a technical advisor to the group, rather than as a voting member, encouraged others to take more prominent roles and develop their leadership skills. Some individuals, such as the chief of park planning and maintenance, held formal leadership roles and were therefore able to take on leadership responsibilities easily.

Sufficient Credibility

By proposing a decision-making process and agreeing to abide by the results of that process regardless of what they were, the DFW demonstrated its commitment to a fair and just process. This was corroborated by the fact that a third-party facilitator was sought to facilitate and mediate the process. The DFW's support of broad stakeholder involvement in the process and its decision to act as a technical advisor, rather than as an advocate, also contributed to its overall credibility as an agency.

Watchung reservation is a 2,000-acre wooded parkland that provides a range of recreational opportunities, including fishing, hiking, and horseback riding.



Guide Summary

We call this document a practitioners' guide for two reasons. First, the insights provided originated from and are intended for deer management practitioners. Second, the ideas presented are indeed a guide to community-based deer management, not a sure-fire recipe book for success. We do not think the latter can be written, at least not in the near future.

As a guide to the practice of community-based deer management, we suggest that you will be served best by a few key sets of concepts and understandings:

1. Most community-based deer management issues exhibit elements of a cycle or stages of development—the public issue evolution process. The stages of issue evolution are concern, involvement, issue, alternatives, consequences, choice, implementation, and evaluation. Although not all issues evolve following the steps exactly in order, analysis of 10 cases of community-based deer management issues in the northeastern U.S. indicate that these stages indeed exist and that they sometimes seem to evolve just as the theory suggests. This is important for the practitioner to know, because each stage of issue development has different communication, information, and community deliberation needs. Addressing those needs may yield more effective and efficient community-based deer management processes.
2. Communities vary with respect to their relative capacity for dealing with community-based deer management issues in a productive and collaborative fashion. Three general kinds of capacity seem to be important for success—individual, community, and institutional. The 10 cases we studied indicate that 10 key dimensions of capacity are necessary, or at least contribute in important ways to productive community-based deer management efforts. Five of these dimensions enable community-based efforts—adequate knowledge, essential working relationships, effective local leadership, sufficient credibility, and commitment to a common purpose. Those five enabling dimensions often are achieved through five intervention thrusts—stakeholder involvement, education and learning, informative communication, wildlife agency flexibility, and assessment.
3. Context seems to dictate needed elements for an effective approach to community-based deer management. The 10 cases we examined reflected six different models for community-based deer management: community vote, EIS/public consultation, agency partnership, homeowners' association, citizen action, and citizen–agency partnership. The fact that the cases reflecting each general model themselves varied in some significant ways simply emphasizes that there is plenty of room for creativity, as well as a great need for flexibility, when addressing community-based deer management. Nevertheless, the key dimensions identified in the analyses of the cases indicate that certain design criteria exist. For example, one cannot afford to overlook some level of stakeholder input, ranging from low effort in some cases to highly structured stakeholder engagement processes in others. Again, the context dictates what is needed with respect to the intensity of effort.



4. Partnerships with individuals, groups, agencies, elected officials, and others often are key to successful, sustained deer management for most communities. The wildlife professional does not have to carry the entire burden of responsibility for every aspect of community-based deer management. And thankfully, most communities do not seem to expect that. Rather, they accept some share of responsibility for solving their problem, and they typically appreciate the advice and assistance provided by the deer manager. Nevertheless, a wildlife manager will likely encounter some situations in which community stakeholders prefer to make decisions about the management that needs to take place, but expect the wildlife agency to take sole responsibility for implementation; in this way, local stakeholders may resist assuming a share of the responsibility.

5. Perhaps the most important take-home message for the practitioner in community-based deer management is that, as daunting as deer management can sometimes seem, success often is possible. Furthermore, rewarding professional involvement is achievable for the deer management practitioner.

In closing, the authors, the deer management veterans whose experiences informed this guide, and the NEWDMROC (sponsor of this guide) hope the guide will be useful to you in your practice and wish you the best of success in managing or in guiding the management of the deer resource.

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GLOSSARY OF TERMS AND ACRONYMS



Community capacity Capacity developed within informal relationships among individuals and groups that are bounded geographically (e.g., neighborhood, town, or region). These are social networks that flow from the day-to-day contact of individuals in a community. Community capacity may include productive, mutually supportive relationships; a sense of common purpose; and an understanding of shared values and history.

Communicative education Education with the purpose of clarifying relationships among pieces of information or people. Learners often make comparisons, seek out patterns, and draw inferences.

CWD Chronic wasting disease.

Education The process of organizing and providing information, stimulating thought, and facilitating understanding that encourages learning.

HDRU Human Dimensions Research Unit.

Impacts Innumerable effects are created through interactions between humans and wildlife. Many of these effects go unnoticed by stakeholders. However, a subset of effects is recognized as being important. These important effects are impacts. Impacts are significant positive and negative effects resulting from interactions between humans and wildlife.

Individual capacity Capacity gained by individual citizens derived from education and experience. These important traits may include leadership skills, analytical skills, technical skills, and various kinds of knowledge.

Informative communication The process of providing information and increasing awareness.

Institutional capacity Capacity developed within an organization or set of organizations (e.g., state or federal wildlife management agency or a local government). Institutional capacity may include funding, materials, or organizational elements such as partnerships and programming.

Instrumental education Education with the purpose of transferring knowledge from one person to another. The learner usually spends time memorizing or understanding facts or concepts.

Local knowledge Local knowledge is the popular knowledge that does not stem from professional inquiry. It is inherently associated with, and interpreted within, the specific culture in which it was produced.

NGO Nongovernmental organization (e.g., National Wildlife Federation, The Nature Conservancy).

NWDMROC Northeast Wildlife Damage Management Research and Outreach Cooperative.

Public issue evolution The process by which a concern emerges into a bona fide issue.

Public issues education Education about public issues that takes into account, and sometimes tries to affect, the evolution of the issue.

Stakeholder (wildlife) A person or group that is affected by, or affects, a particular wildlife management issue.

Stakeholder involvement Engagement of stakeholders to help frame issues and problems; offer information and contribute knowledge about different viewpoints; understand, make, implement, or evaluate wildlife management decisions.

Community-Based Deer Management

Managing suburban deer as a valuable resource, rather than as a pest, frequently leads deer managers and communities to collaborate in decision making and management implementation. Wildlife managers and community leaders across the Northeast seek guidance on what they need to consider to make these collaborations successful. This guide synthesizes a growing body of research and field experience to describe specific key dimensions to consider when engaging in community-based deer management.

The guide begins with a discussion of public-issue evolution, presenting a model with utility for community-based deer management. Ten key dimensions of community-based suburban deer management are then described. Next, the authors describe six approaches, or models that managers in the Northeast are using to conduct community-based deer management. In the final section, the authors describe a set of 10 deer management cases, highlighting how key dimensions of community-based deer management were expressed in each case.

Wildlife management professionals, extension educators, and community leaders will find this guide a valuable resource as they work together to address deer management in their local communities.



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