A PRACTITIONERS' GUIDE

Human-Wildlife Conflict Management

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Human-Wildlife Conflict Management

Introduction

The Northeast Wildlife Damage Management Research and Outreach Cooperative was formed to advance the field of wildlife damage management in its 13 member states. One goal of the cooperative is to support professionals with information needed to practice effective wildlife damage management. *Human-Wildlife Conflict Management: A Practitioners' Guide* was developed with this purpose.

Comprehensive wildlife management integrates social and biological sciences (Decker et al. 1992). Traditionally, management decisions have relied more heavily on insight from the biological sciences than social assessments of the human dimension. The purpose of this guide is to help wildlife managers with biological backgrounds integrate human dimensions considerations into wildlife damage management. We focus on two components of the human dimension: social assessment (e.g., stakeholder beliefs and attitudes) and stakeholder engagement (e.g., citizen participation and involvement).

Members of the Human Dimensions Research Unit at Cornell University have been investigating the human behavioral aspects of wildlife damage management for over 25 years. Inquiries by researchers at Cornell and other institutions and agencies have shed light on stakeholder concerns about their interactions with white-tailed deer, beaver, Canada geese, and other wildlife (e.g., Pomerantz et al. 1986, Siemer and Decker 1991). In this guide we share insights about stakeholders with respect to wildlife damage issues. We also offer guidance for designing and implementing wildlife damage management programs. The primary audience for this guide is state and federal wildlife agency staff in the 13 member states of the Northeast Wildlife Damage Management Research and Outreach Cooperative. Our secondary audience is state extension staff in the Northeast.

This guide is organized into three parts. Part 1 presents a conceptual foundation for the practice of wildlife damage management. Part 2 summarizes key insights about human tolerance of negative interactions with wildlife. Part 3 offers practical guidance on designing, implementing, and evaluating stakeholder engagement processes in support of wildlife damage management objectives.

Wildlife Damage Management in Perspective

Human-Wildlife Conflict Management: A Practitioners' Guide is based on a certain philosophy about wildlife damage management. The four cornerstones of our philosophical foundation relate to the centrality of damage management in wildlife management, defining management in terms of impacts on people, stakeholder involvement, and wildlife management as an adaptive process. We believe these four ideas, described below, provide a solid conceptual foundation on which to build your wildlife damage management programs.

Damage Management is Central to Wildlife Management

Wildlife damage management is no different than any other focus for wildlife management—increasing net benefit for society through purposeful intervention. Interventions can take many forms—educational communication to influence beliefs and attitudes; information, training, incentives, and regulations to affect human behavior; wildlife behavior modification; and wildlife population control.

If certain wildlife populations continue to grow and conflicts between people and wildlife escalate, wildlife *damage* management may become the major venue through which benefits from public wildlife management are delivered to individuals and communities. The demands of wildlife damage management often require partnerships between state and federal agencies, nongovernmental organizations, local governments, communities, and private wildlife control professionals.

Management Focus on "Impacts"

This guide is based on the fundamental assumption that wildlife management is conducted to achieve a range of outcomes that people desire—outcomes such as the continued existence of wildlife, opportunities to utilize wildlife in sustainable ways, or relief from problems related to wildlife. We have adopted the following definition of wildlife management (Riley et al. 2002):

> Wildlife management is the guidance of decision-making processes and the implementation of practices to purposefully influence interactions among and between people, wildlife, and habitats to achieve impacts valued by stakeholders.

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Fig. 1.1 Addressing human-wildlife conflicts is central to wildlife damage management.

The term "impacts" is central to our definition of wildlife management. We think of impacts as a special subset of the many effects resulting from interactions among people, wildlife, and wildlife habitat. Interactions pertinent to wildlife damage management can be of several types (Table 1.1).

Wildlife-related effects and impacts

- **Effects.** Positive and negative outcomes of interactions among wildlife, people, and wildlife habitat.
- **Impacts.** A subset of wildlife-related effects that a stakeholder recognizes and regards as important.

Countless effects are caused by the interactions between people, wildlife, and wildlife habitat. Many go unnoticed by stakeholders. But a subset of effects are recognized by stakeholders and interpreted as being important. Effects in this subset are "impacts" (Riley et al. 2002). Stakeholders evaluate impacts as positive or negative,

Table 1.1 Interactions That May Lead to "Impacts"*

Interaction type	*Example of interaction*	*Example impacts*
Wildlife interactions with other wildlife	Predation	Reduced populations of game animals
	Displacement of native wildlife by exotics	Extirpation of native wildlife
Wildlife interactions with their environment	Deer browsing on native plants	Reduced capacity for forest regeneration
		Loss of plant species diversity
Interactions between wildlife and people	Deer browsing on crops	Reduced crop yields
	Deer browsing on ornamental landscaping plants.	Reduced enjoyment of residential property
	Deer crossing roads	Risk to motorists
Interactions among people where wildlife is the reason for the interaction	Value disputes regarding how to handle urban goose problems	Community discord
		Psychological stress

** Impacts are effects to which people ascribe high importance*

"good" or "bad." Much of wildlife damage management involves minimizing the negative ("bad") impacts associated with wildlife. The range of all possible impacts is large, so it is useful to organize impacts into a manageable number of categories (Table 1.2).

A single interaction between wildlife and people may generate both positive and negative impacts. Different stakeholders can have very different evaluations of the same interaction. Even the same individual may perceive an interaction as creating both positive and negative impacts. Whether that stakeholder evaluates the overall interaction positively or negatively depends on how he or she personally weighs the importance of each positive and negative impact.

The difference between wildlife-related effects and wildlife-related impacts can be illustrated by considering a specific interaction between people and wildlife. Consider the following: a person driving home from work observes a group of deer feeding at the edge of a cornfield. The motorist in our example might quickly recognize that this interaction produces a range of personally important effects, some positive and some negative. (e.g., enjoyment associated with seeing deer, excitement about participating in the upcoming hunting season, but also dread associated with a possible collision with a deer, costs associated with vehicle repair, the potential for personal injury, or lost work time while his vehicle is being repaired). These recognized and important effects would be considered impacts for this motorist. Other effects may be recognized by this motorist, but regarded with low importance. For instance, the motorist may recognize that deer are damaging the local farmer's corn crop, but believe that this is an unimportant effect. There may be other effects that the motorist fails to recognize at all. For example, he may be unaware that the deer he sees may be influencing the tree composition of local forests, causing the decline of some spring flowering plants he enjoys during weekend walks in the local park, etc. The unimportant and unrecognized effects are not impacts for the motorist in our example (though other stakeholders may regard them as very important impacts).

Public revelation of effects described by scientists is an important role of managers and educators, because those effects will not register with stakeholders as impacts unless they are recognized and understood. Nevertheless, while scientists, managers, or educators may explain effects, it is ultimately stakeholders who interpret the effects based on their values and determine relative importance. It is a collective effort for various stakeholders to determine which effects constitute impacts that deserve management attention.

In summary, managing to achieve human benefits—taking action to achieve more or less of the impacts people care about—is a fundamental objective of wildlife management (Riley et al. 2002). You can practice this principle by asking three questions about your own programs.

Guiding questions

- What are the impacts that concern stakeholders for this damage management issue?
- Is my management program focused on the impacts that matter most to stakeholders?
- Am I maximizing program effectiveness by investing in a suite of activities that will do the most to increase positive impacts or reduce negative impacts?

Stakeholder Involvement is Essential

Stakeholder involvement in various aspects of wildlife management can yield many benefits (Chase et al. 2000). The extent and nature of stakeholder engagement will necessarily vary

depending on the circumstances; one size doesn't fit all situations (Chase et al. 1999). Stakeholders are individuals and groups who may be affected by or can affect wildlife management decisions and programs (Decker et al. 1996:72). Stakeholders may be affected positively or negatively. Wildlife professionals tend to think first about the stakeholders who will benefit from wildlife management. But that's not the whole story. Consideration also must be given to stakeholders who could be impacted negatively by management actions. Such trade-offs are common when trying to optimize benefit from a wildlife resource across a spectrum of stakeholders. Trade-offs associated with management alternatives need to be explicitly recognized through stakeholder engagement processes. We discuss stakeholder engagement more fully in Part 3 and offer guidelines for selecting and designating roles for stakeholders.

A suite of unique impacts relates to how stakeholders interact with one another with respect to wildlife damage events. Many controversies about wildlife damage result in impacts for stakeholders. These may involve a variety of human values, and represent some of the more important and vexing impacts regularly dealt with by wildlife managers. However, stakeholders and managers are recognizing that resolution of most natural resource issues is not the sole responsibility of agencies (Pinkerton 1999). Concerns of stakeholders often become community issues, with those communities sharing ownership of the processes to mitigate or enhance the impacts. Various community-based co-management arrangements allow sharing of responsibility between state wildlife agencies, NGO's, community groups, and local government (Schusler 1999).

Table 1.2 Major Categories of Wildlife Impacts

Impact category	*Description*	*Examples*
Ecological	Effects of inter- or intraspecific interactions among wildlife, and interactions between wildlife and habitats that affect human values	Perception that a wildlife species is in peril Perceptions that a particular ecosystem is being degraded
Cultural	Effects that result from wildlife-related interactions (among wildlife and people, and between people) that influence the ideas important to a social group	Development of local hunting and trapping traditions
Health and safety	Effects on human health and safety	Health benefits associated with wildlife-related recreation Injury from diseases transmitted from wildlife to people
Psychological	Enhancement or diminishment of psychological well being for individuals, stakeholder groups, or society overall	Dread associated with perceived risk of injury from encounters with wildlife
Social	Effects associated with interactions among stakeholders	Formation of cooperative or antagonistic relationships between stakeholder groups
Economic	Monetary effects produced by interactions among people	Tax revenue generated by hunting-related expenditures

Wildlife stakeholder acceptance capacity

Understanding stakeholders' tolerance of wildlife problems is at the core of developing damage management programs. This is captured in the concept of "wildlife stakeholder acceptance capacity" (Box 1.1).

Wildlife stakeholder acceptance capacity (WSAC) is a mixture of tolerance of problems and desires for benefits from wildlife (Carpenter et al. 2000). Managers often find that a particular species may have exceeded the threshold of tolerance of some stakeholders, whereas other stakeholders would accept more interactions with the same species, in the same geographic area. Therein lie the ingredients for controversy in wildlife damage management (Figure 1.2). This phenomenon is at the center of most contemporary wildlife management issues, leading to the typical questions faced by managers and stakeholders alike.

Typical questions

- How many interactions of a certain type with a certain species is enough?
- When are there too few or too many interactions?
- How does one determine the "right" condition (magnitudes of impacts, number of animals, etc.)?
- Whose stakes matter in calculating stakeholder acceptance capacity?
- What mitigation measures are needed to modify WSAC?

These questions are often addressed in impact analyses that include some type of stakeholder engagement process. Cumulatively, these are

Box 1.1 Wildlife Stakeholder Acceptance Capacity (WSAC)

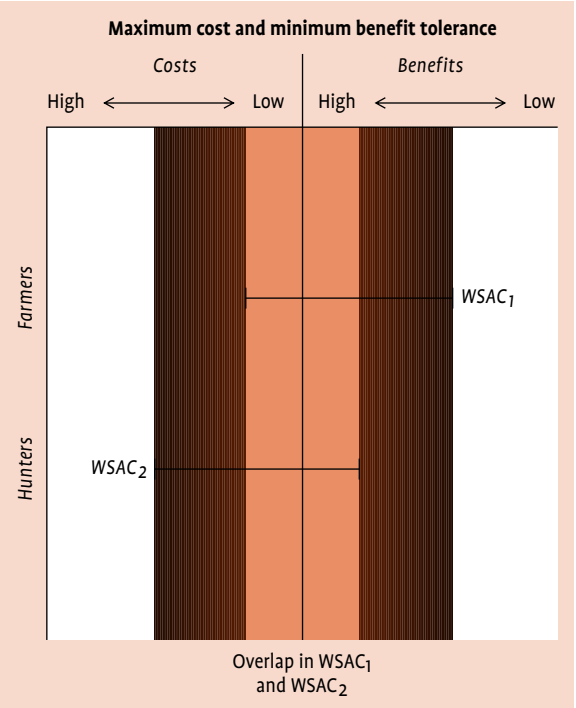
WSAC is the range of wildlife "impacts" acceptable to a given stakeholder, where the term "stakeholder" can be operationalized as an individual, group, or community (Carpenter et al. 2000).

The lower limit of WSAC is the capacity of the stakeholder to accept the absence of positive impacts of wildlife. The upper limit of WSAC is the capacity of the stakeholder to tolerate the presence of negative impacts of wildlife. A perspective relevant in wildlife damage management, Carpenter et al. (2000:10) describe WSAC as the ability of a given stakeholder group to "carry the burden" of a particular wildlife population in a specific geographic area. While this emphasizes the negative attributes of wildlife, the overall idea of WSAC is on optimizing the suite of benefits associated with a sustainable population of wildlife, including social, economic, and cultural benefits.

Several wildlife acceptance capacities, varying among stakeholder groups, can exist in the same location. Farmers who have had their crops damaged by deer, for example, may have a different acceptance capacity than deer hunters (Figure 1.2)

The role of stakeholders in determining WSAC. Wildlife is managed at levels deemed acceptable to society generally. Wildlife managers make judgments about the collective acceptance capacity in a given place and time based on their understanding of the acceptance capacities of different stakeholder groups. Determining which stakeholders are considered in those judgments, and how their interests are weighed, are two of the central challenges facing wildlife managers. Issues of scale become critical in these professional judgments. For wildlife professionals, determining the relevant scales should follow, not precede, careful articulation of effects and impacts. With an understanding of the effects that matter most to stakeholders, wildlife managers can choose the best scale (e.g., local, regional, national scale) at which to target management intervention. In some cases interventions at multiple scales will be indicated.

Key assumptions. WSAC, a mixture of tolerance of problems and desires for benefits from wildlife, is at the center of most contemporary wildlife management issues. WSAC is a function of human beliefs and attitudes (or values). Addressing these human traits is the central mission of wildlife management. Historically, wildlife professionals have placed heavy emphasis on manipulating wildlife populations. This has had the unintended consequence of elevating population manipulation to the level of primary goal or mission. In fact, population manipulation is but one of many means to achieve the mission of addressing human values impacted by wildlife.



some of the more pressing questions wildlife managers consider regularly in the Northeast and indeed across North America and worldwide.

Operationalizing WSAC differs from economic valuation approaches where "the net value of a wildlife resource can be defined as the sum of all its positive values minus the sum of its negative values" (Conover 1997:298). Wildlife managers and policy makers need to recognize a difference between objectively determined economic values of wildlife for various stakeholders and the importance of the impacts wildlife and management can have on stakeholders' "sense of well-being, or quality of life" (Conover 1997:298). Economic valuation is a necessary element in the algorithm, but Carpenter et al. (2000) argue that wildlife managers and policy makers should consider the impacts of wildlife and management on society more broadly. The stakeholder acceptance capacity idea reflects the need for weighting to balance the positive and negative aspects of human-wildlife interactions, with emphasis on maximizing net benefits from management, as opposed to minimizing conflicts.

Operationalizing the acceptance capacity concept is complicated because different stakeholders have different acceptance or tolerance capacities for the same population of animals, in the same place, at the same time (Decker and Purdy 1988). That is, the impacts of wildlife (individuals or populations) can differ for different people depending on the nature of their stake. Some stakeholders may benefit and some may be injured by the same animals. The question facing wildlife managers is, "How do we create a management program that appropriately balances these positive and negative impacts of wildlife for various stakeholders?"

Fig. 1.2 A hypothetical model of upper and lower wildlife stakeholder acceptance capacity (WSAC) for white-tailed deer held by two stakeholder groups (farmers and deer hunters). Farmers are willing to tolerate relatively low benefit levels, but they also tolerate relatively low costs of deer. Hunters are less tolerant of low benefit levels, but have a higher tolerance for deer-related problems. Between these limits is a range of cost-benefit levels (the dark-shaded area) acceptable to both stakeholder groups.

Determining WSAC through stakeholder involvement

The wildlife management community has demonstrated considerable innovation in its attempts to determine WSAC. Decker and Chase (1997) and Chase et al. (2000) described the evolution of agency efforts to seek and use stakeholder input in wildlife management decision making. Today, a variety of forms of citizen task forces and other stakeholder involvement activities are doing the weighting (involvement approaches are discussed in greater detail in Part 3). In essence, most of these stakeholder processes are attempts to have citizens representing various stakeholder perspectives weight impacts of management alternatives through deliberation.

Management: An Adaptive Process

Wildlife management necessarily must be adapting to new situations and new understandings emerg-ing from experience and the supporting biological and social sciences. A new twist on a familiar concept, adaptive impact management (AIM) urges the wildlife manager to focus on impacts and approach management as an adaptive, constantly learning and improving process (Riley et al. 2002).

A premise of AIM, the fourth cornerstone of our philosophical foundation, is that we don't know all that we would like to as managers, but we are willing to admit it and apply enough rigor to our management activities to ensure that we learn and improve through experience. Stakeholders need to understand that a management program must be sufficiently flexible over time to adapt to what is learned as the program unfolds and managers gain experience.

The practitioners of AIM (both professional managers and stakeholders engaged as partners in wildlife damage management) say, "We don't have all the answers needed for developing a management program that will fix this problem with certainty, but we'll apply what we do know, use our best judgment in those things we are less certain about, and will commit to learning from the experience of the specific strategy and tactics we employ. If we discover ways to improve the program, we will adjust it to yield greater benefits to stakeholders." Stakeholders and managers who appreciate the power of this approach embrace it.

Section Summary

Wildlife management is a set of processes and practices that purposefully influences interactions among and between people, wildlife, and habitat to achieve desired *impacts*, defined in terms of human values and objectives. The ultimate goal of wildlife damage management is to increase the net benefit of wildlife for society. This is achieved through purposeful interventions that address the effects of wildlife and wildlife management that matter most to stakeholders. Those important effects are "impacts."

Stakeholder involvement is an essential part of wildlife damage management. Wildlife professionals should consider any individual or group affected by wildlife or wildlife management as a stakeholder in management decisions. The extent and nature of stakeholder engagement will vary across issues and decisions. An idea called wildlife stakeholder acceptance capacity is one conceptual tool to help wildlife managers consider stakeholder interests and concerns identified through citizen participation processes.

To be effective, wildlife management programs must accept uncertainty and adapt to changing circumstances and new understandings developed through experience and research. Wildlife managers are encouraged to focus on impacts and approach management as a process of experimentation, learning, and improvement—an approach called adaptive impact management (AIM; Riley et al. 2002). A premise of AIM is that we don't know all we'd like to as managers, but we are willing to apply enough rigor to our management activities to ensure we learn and improve. Stakeholders need to understand the value of this approach.

Next, we turn our attention to understanding the factors that influence stakeholder acceptance of both wildlife and management actions.

Stakeholders' Tolerance of Wildlife Problems

The Northeast is inundated with wildlife nuisance and damage problems. Along with farmers and forest owners, an array of rural, suburban, and urban stakeholders now regularly contact state agencies and university extension wildlife specialists seeking relief from wildlife-related problems. Many people possess little knowledge about how to resolve such problems on their own. To make matters more challenging, people seldom accurately assess the economic or health and safety risks associated with their situation. Consequently, their reactions may not be commensurate with actual economic or health/safety implications; cases of both overreaction and underreaction are evident.

Wildlife Damage Management—A Community Focus

Negative wildlife interactions in a locale may catalyze community-level concern and eventually become controversial (Minnis and Peyton 1995). Problems with white-tailed deer, Canada geese, beaver, black bear, and other species can emerge simultaneously in many communities across the landscape. Putting out these local "brushfires" consumes considerable agency resources.

Communities with wildlife damage issues tend to

- expect immediate and undivided attention by their state wildlife agency;
- desire significant involvement in management planning and decision making; and
- want effective diminishment of their problems . . .
  - fast,
  - with little cost (i.e., time or money from the community),
  - in a one-shot solution that fixes the problem permanently,
  - with no harm to the wildlife concerned, and
  - no reduction of positive aspects of the animals' presence in their community.

It is difficult or impossible for state wildlife agencies to provide in-depth service to every community with wildlife damage concerns. Expectations of quick, no-cost, permanent solutions to wildlife damage issues are unrealistic. Communities typically must come to grips with this reality before any progress can be made. Often it takes shared responsibility among wildlife managers, individuals, and communities (through local government) to achieve an acceptable outcome. All involved should quickly accept that sustainable management decisions and outcomes typically take more time to reach than initially thought.

Wildlife managers need to identify and understand the impacts that stakeholders commonly associate with wildlife damage. The following section identifies some of those impacts, through a summary of research about how people respond to wildlife damage and to actions taken to address stakeholder concerns about such damage.

Wildlife Problem Tolerance Attitudes

During the late 1980s, Cornell's Human Dimensions Research Unit (HDRU) developed a wildlife attitudes and values scale (WAVS) to assess beliefs about the value of different types of human-wildlife interactions (Purdy and Decker 1989). This scale is useful to wildlife managers in part because it provides an indicator about wildlife problem tolerance. Many applications of the scale in stakeholder studies have indicated that people's orientation toward wildlife can be characterized using four basic sets of beliefs.

Wildlife-related beliefs

- social benefits—beliefs about the value of wildlife and appreciation of its existence;
- traditional conservation—beliefs about whether wildlife should be managed to provide benefits associated with hunting and trapping;
- communication benefits—beliefs in the importance of observing and talking about wildlife; and
- problem tolerance—beliefs about whether people should accept the risks associated with wildlife.

These findings are pertinent to wildlife damage management because they indicate that people's beliefs about whether they should accept the risks associated with wildlife is one of their basic considerations in how they relate to wildlife. A recent analysis of WAVS databases (Butler et al. 2001) shows that problem tolerance has been declining steadily among both rural and nonrural residents of New York State since the mid-1980s—a fact that, if indicative of a general trend in the Northeast, has implications for designing damage management programs (Figure 2.1).

Risk and Risk Perception

Wildlife poses various risks to people—the risk of disease transmission, the risk of physical injury, the risk of property damage. Tolerance of wildlife depends in part on how people perceive these risks (Knuth et al. 1992).

Two aspects of risk perceptions are of concern: perceptions of the probability of an undesirable outcome and the worry or dread associated with that outcome (Slovic 1987). It is useful to distinguish between these aspects of risk perceptions when working with stakeholders (Slovic 1993). Some risks—such as the risk of a bear attack—may be perceived to have low probability, but be dreaded because of the perceived consequence. Other risks—such as that of deer damage to ornamental shrubs—may be perceived as highly probable, but inspire little dread. Both aspects influence how people respond to risks.

Other generalizations about risk perception provide useful background for wildlife managers:

- *People's tolerance for a risk decreases as their perception of the probability of the risk increases.* In studies of two very different kinds of wildlife problems, the risks of cougar attacks in Montana and the risks of deer-vehicle collisions in New York State, people were more likely to favor population reductions as their perception of risks increased (Riley and Decker 2000a, Stout et al. 1993).
- *Objective risk assessments may help managers predict the likelihood of damage, but risk perceptions are what stimulate stakeholder action.* Often a discrepancy will exist between objective assessments of risk and perceived risk among individuals of a given stakeholder group (Slovic 1993). Riley and Decker (2000a) reported that many Montana residents perceived the risks of cougar attacks to be orders of magnitude higher than any reasonable objective assessment of risk (Figure 2.2). Inaccurate perceptions are worthy of management attention, in the form of educational communication, because stakeholders' perception of risk precipitates management action.

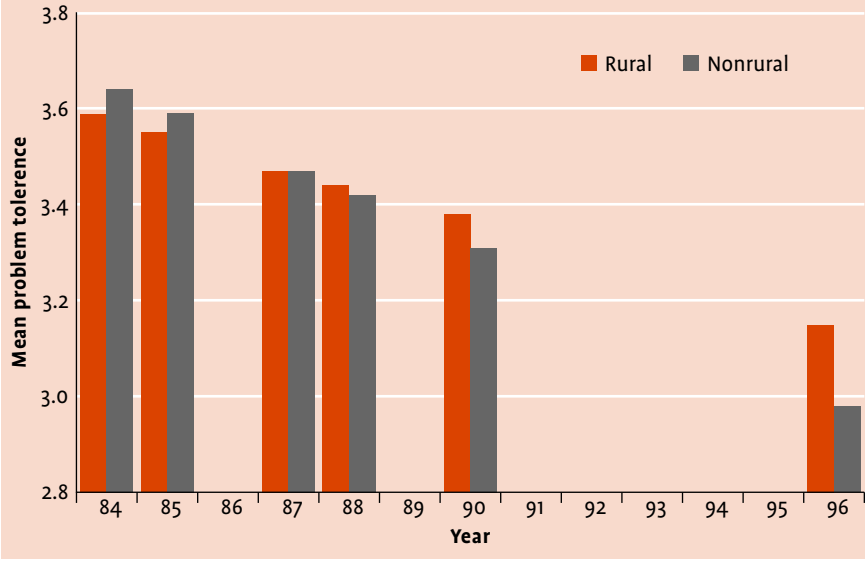


Fig. 2.1 Trend in problem tolerance (on a scale of 1 to 5) of rural and nonrural residents of New York State between 1984 and 1996 (from Butler et al. 2001).

- *People are more willing to accept risks that are assumed voluntarily.* For example, a homeowner who feeds deer may tolerate elevated risks of disease transmission, shrubbery damage, or a deer-car collision. Her neighbor may vigorously protest the same level of risk because she did not assume these risks by choice.
- *Risks with low probability, but severe consequences tend to increase dread and elevate perceived risks.* For example, people camping in wilderness areas might dread bear attacks—a low probability, high consequence event. As a result, they may come to develop a perceived risk that far exceeds the actual probability of such an attack.
- *Risks to children are less tolerable than risks to adults.* Concern about children will be expressed in any wildlife issue that involves a

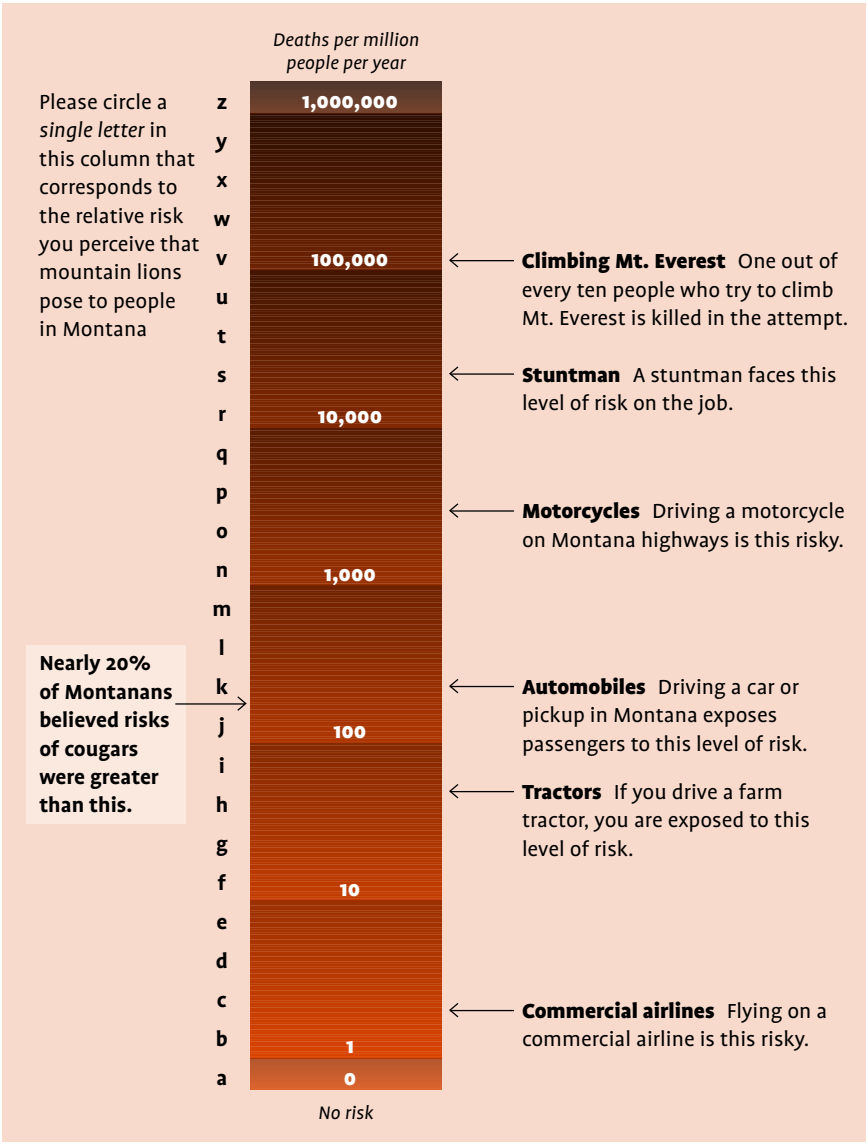


Fig. 2.2 Risk ladder used to elicit risk perceptions of cougars in Montana, 1997. Nearly 20% of respondents believed risks of cougars were greater than the risks incurred by riding in an automobile (from Riley and Decker 2000a).

threat to human health or safety. For example, in suburban areas, goose droppings can become a problem in parks and schoolyards. Fears that the droppings are a health risk often run quite high because children are among those most likely to be exposed. Risks to children may be of greater concern in part because adults recognize that children have less capacity to assess risks accurately and make informed choices about risk exposure.

- *People perceive risks to be higher if they are not distributed equitably.* In the early 1990s, New York State considered restoring moose to northern New York. Many local residents vehemently opposed the restoration because they believed that tourists, who wanted to see moose, would receive most of the benefits, whereas local residents, who lived in the area year round, would have to bear a higher risk of moose-vehicle collisions.
- *Risk perceptions decrease if benefits associated with those risks become clear.* Many farmers, for example, are willing to accept a certain level of deer damage to their crops if they also hunt deer, thereby benefiting from deer.

Fig. 2.3 Risks to children often are less tolerable than risks to adults.

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Understanding and managing risk perceptions can be a critical component of managing human-wildlife conflicts (Knuth et al. 1992). Influencing risk perceptions to gain greater tolerance may be critical when reducing damage below a certain level is impractical. The findings on risk perception summarized above suggest numerous messages that could be communicated to reduce stakeholders' risk perceptions about wildlife damage *without any change in the size of the wildlife population of concern*. These include messages about the likelihood of risks, actions that may be taken to reduce risks, and benefits associated with problem species.

Tolerance of Problem Species

Knowing the spectrum of attitudes held by the general population is useful as a backdrop for wildlife damage management, but insufficient for explaining how various stakeholders actually respond to specific damage situations. Studies of damage tolerance for *specific* species, in *specific* areas, for *specific* stakeholder groups have helped us generalize about the types of wildlife impacts that concern stakeholders. There are three broad types of impacts.

Types of wildlife damage

- *Economic impacts* occur when wildlife damage affects stakeholders' incomes. Farmers, orchardists, forest owners, and nursery owners are particularly susceptible to this type of impact.
- Wildlife cause a variety of *health and safety impacts*, real and perceived. These tend to be of three kinds—disease (e.g., Lyme disease), motor vehicle collisions (e.g., with deer and moose), and physical threat (e.g., bear attacks).
- *Negative psychological impacts* occur when wildlife disturb stakeholders' normal activities or environment. Deer damage to ornamental plants, goose feces in public areas, and excessive noise from urban crow roosts are examples. Many nuisance problems have associated costs, but the economic effect on stakeholders is less significant than the psychological impacts.

For each type of impact, key questions for managers are (1) how much of the impact will people tolerate and (2) how will stakeholders react when the impacts exceed their tolerance? Here again, studies have provided insights into these questions.

Box 2.1 Case Study: "Something's Bruin in New Hampshire"

Like their colleagues throughout the Northeast, wildlife managers in the New Hampshire Department of Fish and Game (NHF&G) are witnessing an increase in negative interactions between people and black bears. The black bear population in New Hampshire has not increased markedly in recent years. However, New Hampshire has experienced the fastest rate of human population growth in the Northeast, and new residential development is occurring in prime bear habitat.

The Department entered into an agreement with USDA Wildlife Services in 1986 that led to better monitoring of nuisance bear complaints. Monitoring efforts revealed a relatively constant level of agricultural damage complaints, but a steady increase in nonagricultural property complaints and human-bear interactions that raised human safety concerns. For example, in 2000, officials received 744 requests for assistance with bear problems. Most requests (82%) were from homeowners, campground operators, and nonagricultural businesses. Careful record keeping confirmed that a large proportion of problematic interactions involved bears attracted to garbage and bird feeders.

In 1994, NHF&G formed a Conflict Abatement Team to refine the Department's ability to address problems associated with big game, including bear. That effort led to creation of a Bear Education Team in 1995. Its goal was to foster a broad appreciation and knowledge of black bears and to promote public acceptance of responsibility for minimizing human-bear conflicts. The Team's educational campaign—"Something's Bruin in New Hampshire"—was launched in 1996. The campaign included television advertisements, publications, a web site, and a traveling slide show. The primary message of the campaign was that most negative interactions with bears were associated with human behavior. The campaign provided specific, consistent messages about how people could avoid or minimize negative encounters with bears. It also provided information on what to do if one encounters a black bear.

The program was expanded in 1999 with the addition of a toll-free bear education phone service, operated cooperatively by the Department and Wildlife Services. This enhanced information service is designed to increase public access to technical assistance by providing citizens, seasonal residents, and visitors with timely, consistent professional advice and recommendations to deal with site-specific conflicts.

Source: Calvert and Ellingwood 2001

- *People vary in their perceptions of what constitutes intolerable damage.* People suffering the same types and amounts of losses to wildlife may disagree about whether that damage is excessive. Thus, an objective field assessment of the extent of wildlife damage will *not* tell managers whether stakeholders' tolerance has been exceeded.
- *Stakeholders do not respond to all negative impacts in the same way.* Health and safety impacts (e.g., Lyme disease, wildlife-vehicle collisions) often are a greater concern than property damage, even among those who have experienced property damage. However, acceptance of lethal management methods is more closely correlated with concerns about property

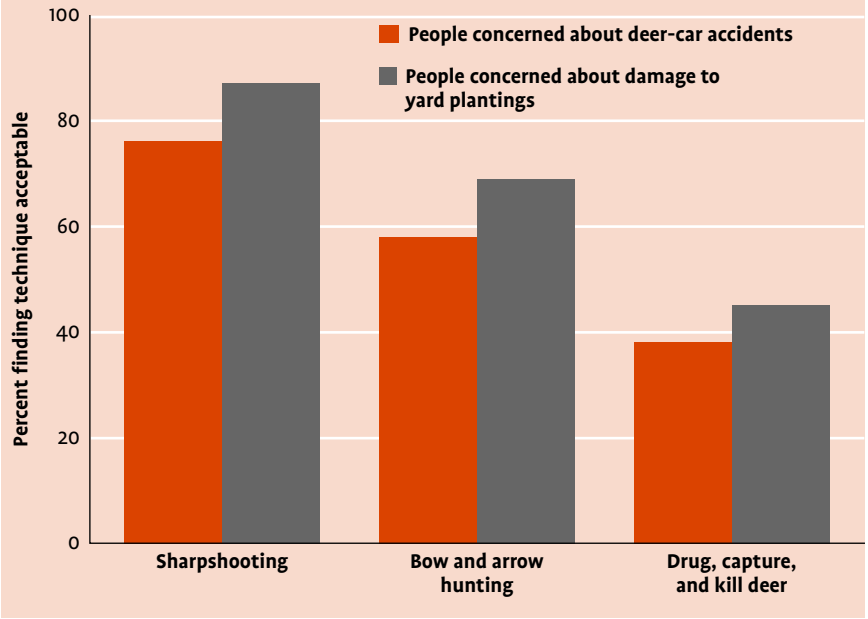


Fig. 2.4 Acceptability of lethal deer management methods in Amherst, New York, by type of deer-related concern. (Data from Loker et al. 1999)

damage than with concerns about health and safety impacts (Figure 2.4).

- *Many stakeholders will take precautions to avoid negative impacts.* Precautionary measures may include farmers applying for permits to kill nuisance deer, homeowners applying repellents to deter damage to ornamental plants, motorists driving cautiously, and people spending less time outdoors to avoid Lyme disease. All these actions involve some modification of people's behavior in response to wildlife. Costs associated with some actions may be significant (e.g., costs for both deterrents and replacement of damaged ornamental/landscaping plants).
- *History of experience greatly influences problem tolerance.* Comments such as "I'm fed up with…", "I've had it up to here with…" and "I can't stand anymore of…" are indications of intolerance based on a history of experiences with wildlife problems. Interestingly, this cuts two ways. Some stakeholders become accustomed to the extent of damage experienced and essentially learn to live with it. It does not present an "unknown" risk for them; they have learned to accommodate it.
- *Stakeholders concerned about damage who perceive a rising wildlife population are less tolerant of that damage than those who perceive a stable or declining population.* This relationship seems to hold true regardless of whether stakeholders' perceptions are correct. Wildlife managers need to understand that the best scientific estimate of risk typically is not the basis of people's tolerance. A recent surge in wildlife observations may lead people to infer damage has increased whether or not this is the case (Riley and Decker 2000b).
- *Negative impacts influence population and management preferences.* People are more likely to want a population decrease if they believe a high probability of negative impacts exists or if they personally have experienced such impacts. Similarly, people concerned about such impacts are more willing to accept lethal and invasive management actions.

Even in wildlife damage situations stakeholders tend to recognize that wildlife has positive as well as negative impacts. Positive impacts interrelate with the negative ones and influence people's tolerance overall for wildlife damage:

- *Positive interests in a species tend to increase tolerance for problems associated with the species.* Farmers who hunt are more likely to accept some crop damage. Suburban residents who like to see geese in their local parks are more willing to put up with goose feces on the grass.
- *If costs become great enough, many stakeholders will come to believe that the costs of wildlife exceed the benefits, leading to diminishment of their appreciation of these benefits.* Failure to address the breadth of negative impacts can lead to diminishment of a wildlife resource to pest status among stakeholders whose concerns are ignored.

Acceptance of Management Actions

Wildlife damage management often presents a double challenge because people associated with situations in which problems occur may disagree about how to proceed. As a result, proposed management actions become a source of controversy. Therefore, damage management re-

quires an understanding of both the impacts of wildlife and the *impacts of management actions*. While many people are most concerned with how management actions reduce the problems, effectiveness of actions at reducing wildlife damage is a secondary consideration to those not concerned about the damage in the first place. For such stakeholders, the most important impacts of management actions may be cost, safety, or the pain and suffering of animals.

Acceptance of management actions—some considerations

- Based in part on stakeholder concerns about impacts of wildlife and in part on concerns about *impacts of wildlife management actions*.
- Agreement with management outcome objectives does not necessarily indicate agreement with management actions to accomplish objectives.

It is essential to distinguish stakeholder agreement with management objectives from acceptance of management actions. Stakeholder agreement on management objectives is essential, but does not equate to agreement on acceptable actions to accomplish objectives. Agreement on ends is necessary, but not sufficient, to gain agreement on means. A community may generally agree that it is desirable to reduce ornamental plant damage and the incidence of motor vehicle accidents involving deer, but some stakeholders within the community may disagree strongly about how to achieve those ends. Some may favor driver education and the replacement of ornamental plants with species less palatable for deer. Others may favor reduction of the deer population. Among the latter group, some may support lethal control, whereas others reject that approach in favor of nonlethal methods. This basic scenario can exist for geese, beaver, or any other species.

Among stakeholders for whom reducing wildlife damage is paramount, the most cost-effective means of achieving that end is often preferred—many stakeholders will favor hunting in such cases, but others will not (Figure 2.5). Those who place higher importance on other impacts, such as minimizing the pain and suffering of wildlife, may seek different management strategies. Therefore, understanding the impacts

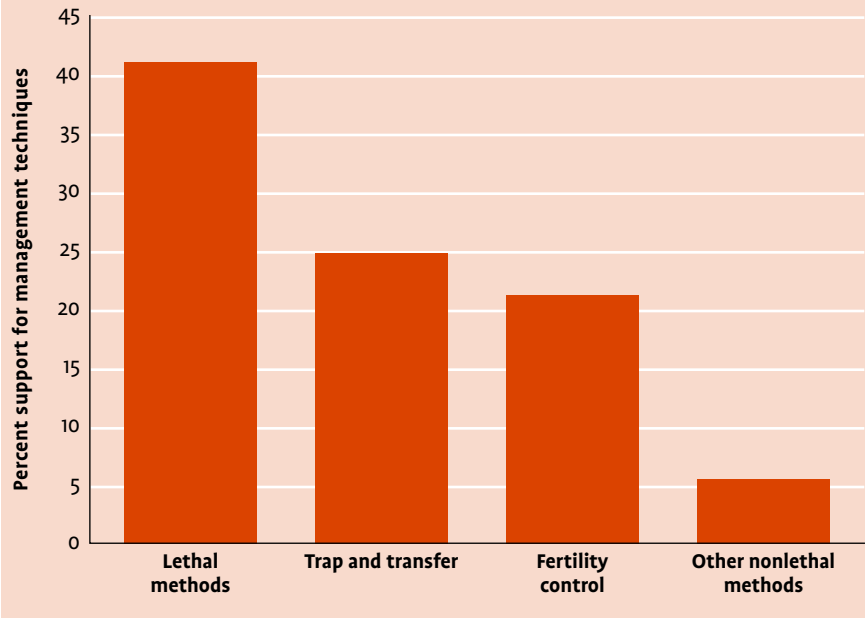


Fig. 2.5 Percent support for different types of deer management techniques among Irondequoit, New York residents who wanted a "large decrease" in the deer population. (Data from Lauber and Knuth 1998)

of management actions that are most important to different stakeholders can aid in the development of acceptable management strategies.

Economic impacts

The chief economic impact of management actions are the costs of implementation. These costs may be borne by individuals (for actions, such as wildlife deterrents, that are implemented by individuals) or by communities (for implementing more broadly targeted management actions, such as selective culling programs carried out by paid shooters). High costs, even if benefits will greatly exceed expenditures, may deter landowners from taking steps to reduce wildlife damage on their properties. Opposition to some community-wide management strategies, such as fertility control and selective culling programs, often is based partially on costs to taxpayers. Despite resistance to pay for solutions at the community level, investments of time and money in wildlife damage control typically are forthcoming if stakeholder acceptance capacity is exceeded.

COURTESY OF PAUL CURTIS

Fig. 2.6 Many landowners do not allow hunting on their properties because of concerns about hunter behavior.

Health and safety impacts

The safety of hunting and other lethal management strategies is a major concern to some stakeholders. Landowners in rural areas who believe that hunting is necessary for controlling wildlife damage may nevertheless restrict it on their properties because of safety concerns. The concentration of people in urban and suburban areas leads many stakeholders to believe that lethal management strategies are unsafe, even if they feel wildlife populations need to be reduced.

As interest in fertility control has grown, concerns have been raised about the consequences of people eating the meat of animals that have been treated with contraceptive drugs. Because contraceptive technology is still experimental, many questions remain unanswered about whether the meat of treated animals contains drug residues and, if it does, what affects this may have for people who consume it.

Other measures also raise health concerns. People may fear the health effects of using chemical repellents on vegetation to deter wildlife feeding. And even the prospects of genetically modifying plants to make them less palatable for wildlife has the potential to arouse opposition.

Nuisance impacts

In addition to economic and safety concerns, management actions may negatively affect people in other ways. Many rural landowners are concerned about behavior of hunters (e.g., littering, damaging property) they do not know using their lands (Siemer and Brown 1993, Lauber and Brown 2000). Consequently, landowners willing to allow hunting access to people they know still may prohibit hunting by strangers, thereby possibly limiting the effectiveness of hunting as a management tool.

Lethal strategies implemented in urban and suburban areas, such as selective culling programs, typically require restricting people's activities in certain areas to promote safety. For example, people need to be kept away from bait sites where deer are being shot, and roads near these sites may be closed for this reason. Although the implementation of these strategies usually is timed to interfere the least with people's activities, such restrictions annoy some.

Noise concerns also accompany some actions. Methods involving the discharge of firearms may make enough noise to bother some stakeholders. For this reason, some communities have required the use of silencers on firearms during harvest operations. Noise-making scare devices also present potential noise nuisance.

Recreational impacts

Management strategies also can have recreational impacts. Because some stakeholders are concerned about safety of hunting or other lethal means, they may be less likely to use private or public open spaces for recreation when these strategies are being implemented.

Intangible impacts

Management also may have impacts on the more intangible values people associate with wildlife. Some people may value the presence of a large wildlife population in their area, considering it a sign of ecosystem health. At the same population level that others associate with unacceptable problems, these stakeholders are satisfied. Actions that lower the population from

these levels may, therefore, decrease satisfaction for these stakeholders.

The ethics of lethal techniques and invasive, nonlethal strategies (such as contraception and surgical sterilization) often are a concern for many individuals (Box 2.2). Some stakeholders are concerned primarily with minimizing the suffering of wildlife. Others may believe that human interference with wildlife populations is an unacceptable intrusion into natural systems.

Influences on Acceptance of Management

The discussion thus far has indicated several factors that influence stakeholder acceptance of management objectives and actions. Chief among these are stakeholders' beliefs and attitudes about human-wildlife interactions. Experience and study have shown two other considerations loom large in stakeholder acceptance of management: perception of agency image/credibility and perception of the process followed to develop management strategy and tactics.

Agency credibility and image

Agency image is vital to the success of management. Stakeholder support for agency programs is closely related to the image people hold of an agency (Decker 1985). Image consists of public perception of three basic components (Figure 2.7):

- management function—or the activities an agency carries out;
- agency staff—or the characteristics of personnel who carry out these activities; and
- communication behavior—or agency efforts both to share information with and to seek information from the public.

Meaningful stakeholder involvement is central to improving any of these components. Stakeholder involvement gives the public the opportunity to shape management function. For example, it can help match impact change objectives for problem species with public tolerance. Stakeholder involvement also can improve understanding of the wants and needs among all stakeholders and help people to understand why management objectives and actions may not be perfectly in accord with their own personal desires. Because they are particularly effective at promoting this understanding, approaches to stakeholder involvement that allow people to deliberate directly with each other (such as citizen task forces) are often useful.

Stakeholder involvement improves perceptions of agency staff because interaction between the public and agency staff (1) showcases staff

Box 2.2 New Jersey's Bear Hunting Debate

Black bear hunting in New Jersey was closed statewide in 1970. Bear numbers increased in northern New Jersey during the 1990s. State wildlife officials estimated the bear population to be 1,000–1,200 in the year 2000 and predicted that the bear population could double by 2006 if unchecked.

The New Jersey Division of Fish and Wildlife received over 1,600 nuisance-bear complaints in 1999 (nearly twice the number of complaints they had received in 1998), including 29 home entries, 25 livestock kills, 40 pet attacks, and 34 incidents involving an aggressive bear. No human injuries occurred, but wildlife officials and others became increasingly concerned about the potential for such injuries.

In March 2000, the New Jersey Fish and Game Council (which sets Division policy) proposed a bear hunting season for fall of 2000 as a means to reduce the bear population and bear-human conflicts. The goal of the proposed hunt was to reduce the bear population by two-thirds within three years, starting with a harvest of 350 bears during the first season.

The hunting proposal generated strong opposition from several sources for several reasons. The Humane Society of the U.S. argued that the state's proposal would not deal specifically with problem bears. They suggested that bear population estimates were inflated and the proposed harvest was too high. They also argued that hunting was inhumane and unnecessary to protect human safety. They suggested that the Division use "negative conditioning" or other nonlethal means to reduce human-bear conflicts. Organized animal welfare groups lobbied state legislators to stop the proposed hunt.

In mid-June, 2000, New Jersey's Senate Environment Committee passed a bill to prohibit the proposed bear hunt. Some state Senators expressed a lack of confidence in the Division's bear population estimate and Governor Christie Whitman asked the Division to set a more conservative bear harvest goal (175 animals in the first season). Shortly thereafter, the New Jersey Fish and Game Council voted unanimously to approve the proposed bear hunt. However, in light of public criticism, the committee reduced the target bear harvest to 175 and they reduced the proposed hunting season length by six days. By late June, the full Senate had voted to stop the proposed bear hunt, but the bill still needed to be approved by the New Jersey Assembly and signed by the Governor before it would become law. The bill proposed to stop bear hunting for five years and allot $95,000 to research on alternative means of managing black bears.

By September 2000, 26 towns in New Jersey had adopted resolutions calling for the state to stop the bear hunt. A collective of hunt opponents (e.g., the Sierra Club, The New Jersey Animal Rights Alliance, Humane Society of the U.S.) filed suit in the Superior Court's Appellate Division, asking the judges to review the decision to allow a harvest of 175 bears. The Governor and state legislators received thousands of letters and emails protesting the hunt. Under a rising tide of protest, Governor Whitman directed the New Jersey Division of Fish and Wildlife to call off the hunt for at least one year. In its place, the Governor proposed a $1 million bear-management program that would lead to more education about living with bears, police training to deal with nuisance bears, and hiring of four new wildlife control officers to respond to nuisance bear complaints. In 2000, State wildlife officials implemented an aggressive public education program and a program that trained police and park officials to implement the state's nuisance bear response protocol.

Source: New Jersey Division of Fish and Wildlife 2000

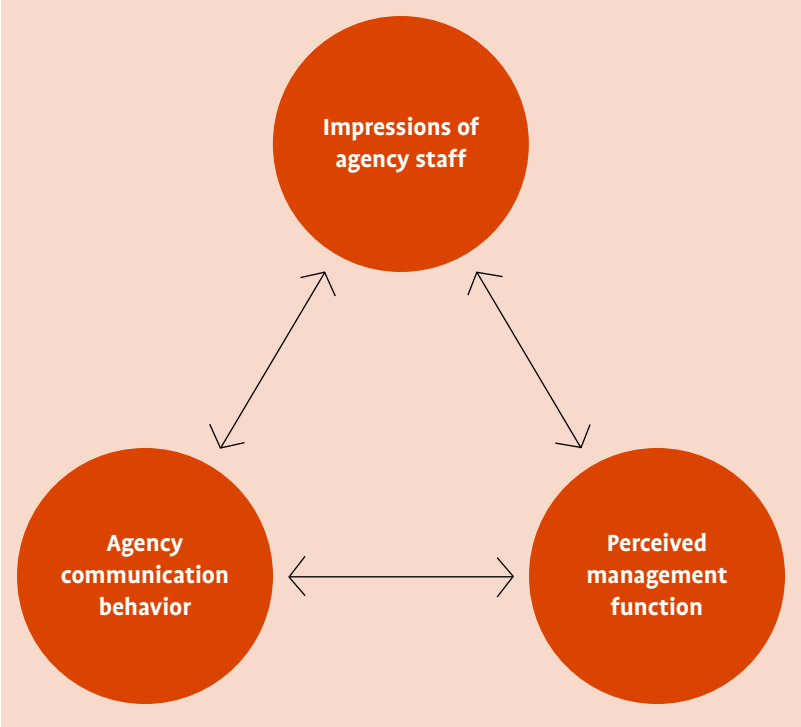


Fig. 2.7 The three components of agency image.

expertise and (2) demonstrates receptivity to stakeholder concerns. Impressions of agency staff may be most improved if the staff are not "caught in the middle," single-handedly trying to craft agreements that will meet diverse stakeholder needs. Rather, contact with agency staff is most beneficial to agency credibility and image when staff advise and consult with stakeholders, but allow them the opportunity to directly interact with each other about their needs.

Communication behavior is often the weakest component of agency image. People may approve of management function and think highly of agency staff, but still believe that communication is a problem. Communication is often a challenge because of the diversity of stakeholders and their interests relevant to each issue. Agencies are most successful in their communication if they tailor messages for particular stakeholder groups and communicate through channels these groups routinely use.

Because image is so closely related to public support, our take-home message is that effective public relations is a necessary component of effective wildlife damage management. Public relations has been equated to "performance" plus "recognition." Agencies must both (1) strive for the highest level of performance and (2) ensure that the public is aware of their good efforts. Stakeholder involvement contributes to both aspects, providing a firm foundation for management.

Process is important

Wildlife managers can be overheard lamenting the "good old days" when they apparently simply sized up a situation, unilaterally decided what was needed, and made it happen! Managers' patience for process is characteristically thin and acceptance of the value of "process" slow to come. Involving stakeholders in decision-making processes has been resisted strenuously in some quarters. Nevertheless, stakeholder involvement is occurring with greater frequency and becoming the norm in wildlife damage management (Chase et al. 2000).

Process is an important component of sound management. It is a mistake to think that people care only about the substance of management decisions and actions. If managers carefully weigh all available information and make the best decision possible under the circumstances, some assume that people will be satisfied. But this is demonstrably not true in many cases!

Rather, the *process* by which decisions are reached plays a crucial role in shaping impressions of those decisions. A satisfactory decision reached by an unsatisfactory process will leave many stakeholders unhappy. A satisfactory process, on the other hand, can increase the acceptability of a basically good decision.

Factors that influence satisfaction with decision-making processes

- adequate opportunity for stakeholders to participate in the process;
- agency receptivity to stakeholder input;
- the chance for stakeholders to have a genuine influence on the decision being reached; and
- the quality of knowledge and reasoning of agency staff.

Despite our continually improving understanding of how people perceive process, designing stakeholder involvement processes tailored to specific situations and stakeholder needs is as much art as analysis. A variety of contextual factors can shape the choice of the "best" process for a situation, including:

- how much people worry about these problems;
- stakeholders' perceptions of wildlife population size and recent trends;
- acceptable methods of management; and
- opinions about the roles stakeholders should play in management.

Considering how these factors should affect process design is a complex balancing act considered more fully in the next part of this guide.

As the complexity and community specificity of wildlife damage management issues increases, co-management approaches—those in which the responsibilities of management are broadly shared by wildlife agencies and other stakeholders—are being explored more frequently (Decker et al. 2000, Schusler et al. 2000). The role of deliberation in achieving collective purpose, relationship building and commitment to action is a key element in community-based co-management (Schusler 2001). Such interactions often involve professionally designed and executed processes.

We have come to refer to the entire complex of input, involvement, and educational communication processes needed for much contemporary wildlife damage management as "engagement." Wildlife damage managers are finding that engaging communities by way of multiple processes is required to achieve acceptable and sustainable management programs. This is especially true for co-management, where multiple partners negotiate and assume various roles and responsibilities.

Stakeholder engagement is more than a collection of management activities. Wildlife managers who embrace a philosophy of engagement naturally avoid simply talking at stakeholders, trying to impose their views on stakeholders, or overlooking important impacts. Managers who embrace stakeholder engagement gain the ability to approach wildlife damage management as a transactional, interactive, collaborative activity in communities. Stakeholder engagement does not devalue the role of the wildlife management professional. In fact, effective stakeholder engagement creates a better environment for communication between wildlife professionals and management stakeholders, and this means more opportunities for the wildlife professional's expertise and insight to be considered in community deliberation about a wildlife management issue.

Perfect versus good enough

The full range of impacts is extensive and the interaction between impacts can be complex. However, the important thing to keep in mind is that a wildlife manager doesn't need exhaustive information about every impact to make good decisions. Decision makers are often unable to reconcile the multiple conflicting desires of stakeholders or to conduct an analysis in a more critical or formal process (e.g., optimization, maximization). He or she proceeds with what may not be the "perfect" decision, but one that is "good enough." The term "satisficing" sometimes is used to describe the qualitative decision-making techniques used to select acceptable alternatives (Eilon 1995).

The question of what is good enough is generally answered by consensus or prevailing social and professional norms. Whereas satisficing is criticized for a lack of rigor, this mode of decision making often is adequate in wildlife damage management because stakeholders frequently agree that it results in an acceptable range of impacts (Fischoff et al. 1981). An acceptable alternative generally is more reasonable to identify and implement in a timely fashion than the unattainable "perfect" alternative. We address how to design a process to select a "good enough" alternative in the next part.

Section Summary

This section focused on the factors that influence stakeholder acceptance of impacts caused by both wildlife and management actions. We suggest that tolerance of wildlife actions is a function of the *impacts* of greatest concern to stakeholders. In our judgment, the majority of these concerns fall into three broad areas: economic impacts, health and safety impacts, and nuisance impacts. For each type of impact, key questions for managers are (1) how much of the impact will people tolerate and (2) how will they respond when the impacts exceed their tolerance?

Wildlife management actions often are controversial. Stakeholders can differ widely on their assessments of the most important impacts of management actions. Many people are most concerned with how actions reduce the problems particular wildlife species cause. This, however, is a secondary consideration for those not concerned about the damage in the first place. For these stakeholders, the most important impacts of management actions may be financial cost, safety, or pain and suffering of animals. Stakeholder agreement on management objectives is essential, but this achievement does not equate to agreement on acceptable actions to accomplish objectives. A well-grounded understanding of the impacts of management actions most important to different stakeholders can aid development of acceptable management strategies.

Agency image is vital to successful wildlife damage management. Stakeholder support for damage management programs is closely related to the image people hold of an agency. Image consists of three basic components: management function (the activities an agency carries out); agency staff (the characteristics of personnel who carry out management activities); and communication behavior (agency efforts to listen to and share information with the public). Improving any of these components contributes to a better overall agency image and, therefore, can help generate support for management programs. Meaningful stakeholder involvement is central to these improvements.

The process by which decisions are made is a critically important component of sound wildlife management. Managers at one time assumed that the substance of management decisions and actions were all that people cared about. Experience has proved otherwise. The *process* by which decisions are reached also plays a crucial role in shaping impressions of those decisions. A satisfactory decision reached by an unsatisfactory process will leave many stakeholders unhappy. A satisfactory process, on the other hand, can increase the acceptability of a basically good decision. Fortunately, the process characteristics that stakeholders' desire are known and within our power to achieve.

The complexity of addressing wildlife impacts can be daunting. The full range of impacts is extensive and the interactions complex. However, the important thing to keep in mind is that you don't need exhaustive information about every impact to make good decisions. You will not need perfect information, nor will you be faced with the challenge of finding a single perfect decision. Using concepts such as wildlife acceptance capacity should allow you to identify a range of management objectives and actions that will be acceptable to stakeholders. Using the concept of impact management will allow you identify suites of actions that could achieve management goals. In Part 3, we suggest a set of practical steps by which you can design wildlife damage management programs that effectively address the impacts of greatest concern to your stakeholders.

Stakeholder Engagement in Wildlife Damage Management

Engaging stakeholders (a.k.a. "citizen" participation) in management is a common goal and often a challenge for wildlife managers. We define stakeholder engagement as *involvement of stakeholders in making, understanding, implementing or evaluating wildlife management decisions.*

Stakeholder engagement simply means that wildlife managers are communicating with and involving people outside of their agency. Members of environmental organizations, homeowners, wildlife damage service providers, farmers, forest owners, hunters, and many others are all potential stakeholders. Local and state government officials are stakeholders, too.

Strategies for effective stakeholder engagement vary by context. No simple recipe can lead you to do it right. However, following a few general steps can help guide an engagement process.

Seven steps to guide design of stakeholder engagement

- understanding your situation;
- identifying stakeholders;
- setting objectives;
- selecting a stakeholder involvement approach;
- designing strategies;
- implementing your strategies; and
- conducting evaluation.

We discuss these steps generally, as a foundation on which you can build an engagement strategy to suit your specific needs.

Step 1: Understanding your Situation

One's approach to engaging stakeholders in wildlife damage management depends on how far a wildlife damage issue has developed. A useful framework for this assessment (Figure 3.1; Hahn 1990) describes eight stages through which public issues typically progress. Applying this model to wildlife damage issues can help you gauge how best to respond to stakeholders.

Stages in evolution of a wildlife damage issue

- **Concern.** During the concern stage, individuals or groups identify undesirable impacts of wildlife.
- **Involvement.** In the involvement stage, some people with concerns start to seek support from each other and begin to contact decision makers about their concerns. Residents living adjacent to a natural area may hold an informal meeting to assess how many of them have experienced a problem (i.e., negative impacts). Wildlife managers and local government officials may start to receive letters and telephone calls complaining about negative impacts and asking for relief. In this stage, stakeholders may regard a situation quite differently. Some may believe the problem is "too many animals." Others may think that people simply have failed to adapt to the wildlife species. Still others may define the problem as a general lack of tolerance for nature.
- **Issue.** In the issue stage, general agreement will form about the primary impacts. Agreement about the existence and nature of a problem is essential to progress toward resolution.
- **Alternatives.** People suggest different actions for addressing the impacts of concern (i.e., the issue) during the alternatives stage.
- **Consequences.** After potential alternative actions have been proposed, the consequences are evaluated from a variety of perspectives. How will they affect the impacts that most concern the community? How much will alternative actions cost? Will these actions themselves have undesirable impacts? Who will benefit? Who will suffer? Stakeholders likely will reach different initial conclusions about the answers to such questions.
- **Choice.** Stakeholders deliberate about what alternatives to adopt in the choice stage. Individuals or groups may come out in favor of or opposition to a variety of possibilities. Agencies must decide how to respond to stakeholders following thorough assessment of tradeoffs. Ideally, stakeholders themselves will resolve differences and settle on a set of acceptable actions.
- **Implementation.** In the implementation stage, a management action, or more likely a set of management actions, is put into effect.
- **Evaluation.** The impacts of management actions are assessed during the evaluation stage. Whether or not a formal evaluation takes place, people develop judgments about the actions taken.

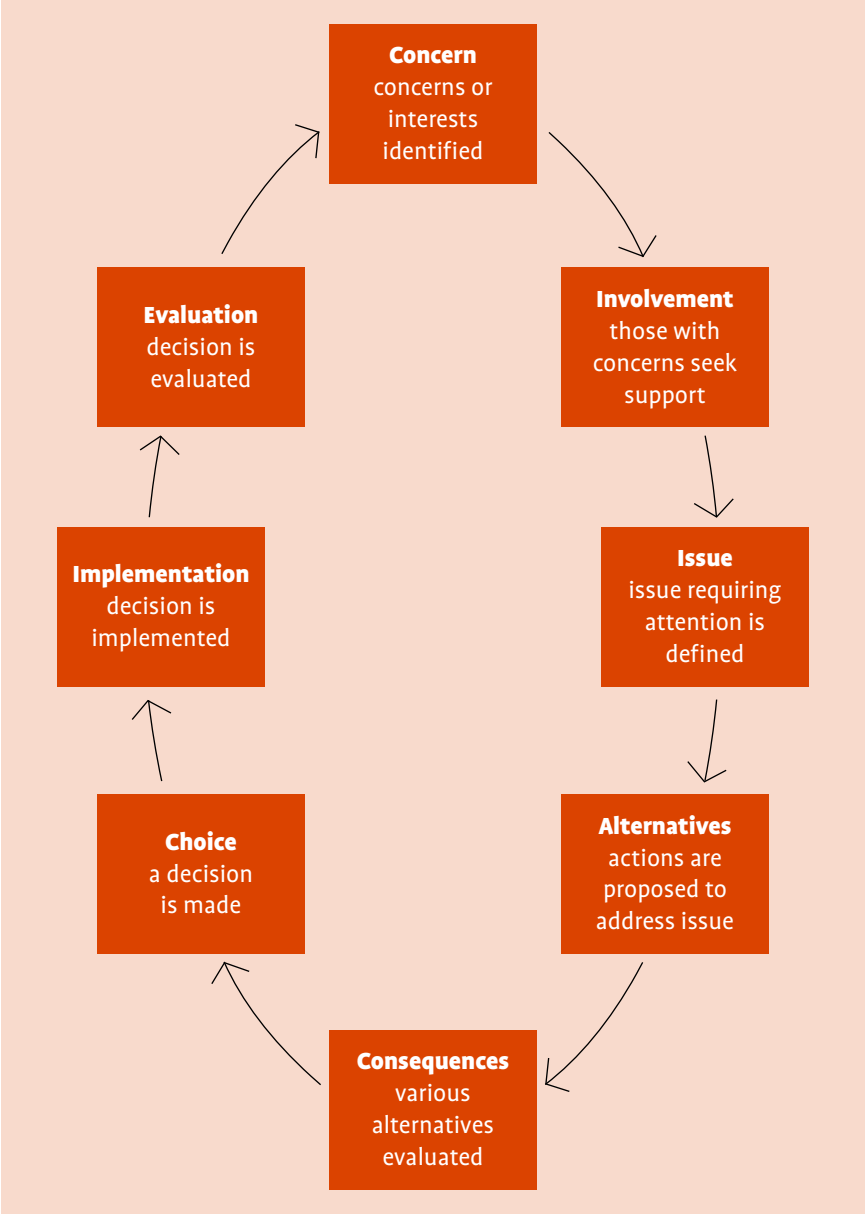


Fig. 3.1 Hahn's (1990) issue evolution model.

The issue development process is rarely as orderly as the stages might suggest. The eight stages are not distinct and linear. An issue may cycle back to earlier stages as events unfold. For example, as the consequences of deer contraception are discussed (consequences stage), new concerns may surface about contraceptive drugs being released into the food web, their impacts on nontarget wildlife, the potential for animals treated to suffer from the physiological effects of the drugs, or many other topics. The issue may cycle back to the concern stage, attract new stakeholders, get reframed, and cause stakeholders to develop new alternatives before an action is chosen.

Also, it is common for different stakeholders to be at different stages of issue evolution at any particular time. Some citizen groups may organize and become active on an issue early. Those groups may develop very clear opinions about what alternatives are worth considering and what the important consequences of those alternatives are before other stakeholders are even aware of the breadth of concerns in the community.

Understanding which stakeholders are at which stage in issue evolution is important because a response that can be helpful and appropriate at one stage may be useless or even harmful at another. For example, if all important stakeholders have a good understanding of possible alternatives, it can be very helpful for an agency to start exploring the consequences of those alternatives and informing stakeholders about them. However, if an agency begins exploring the consequences of alternatives before stakeholders' concerns are well understood by the active community, many important concerns may be missed and the public may be left with the impression that the agency is simply trying to advance its own agenda.

Being proactive about stakeholder engagement allows agencies to

- make sure all important stakeholders are at the table;
- establish positive working relationships with stakeholders;
- develop a positive public image and credibility with stakeholders; and
- begin stakeholder education early and contribute to the way an issue is defined.

Most literature stresses the importance of early and meaningful stakeholder engagement initiated by agencies. Human dimensions research, a form of stakeholder engagement, can help managers build their understanding of a situation by determining the stage to which an issue has evolved among various stakeholders in a particular community. This information can help managers develop useful stakeholder engagement strategies that correspond to community needs. For example, a study could help to distinguish whether most stakeholders are just beginning to identify negative impacts of wildlife, but have few ideas about how those impacts should be addressed

(concern stage) or whether they have consensus on the impacts of greatest concern and are forming opinions about the most appropriate management actions (alternatives stage). This knowledge should guide agency engagement with stakeholders. For example, in the concern stage, engagement may take the shape of forums for stakeholders to express their concerns, whereas in the alternatives stage stakeholder deliberation about suitable management strategies may be more appropriate.

Reliance on studies of stakeholders is growing in wildlife damage management as the value of results for management planning become more widely recognized. To get the most out of such studies, wildlife managers need a basic understanding of human dimensions research methods. Appendix A provides general background on research methods and advice for working effectively with a social scientist or human dimensions specialist in developing a study to meet your needs. The material is intended to help you become more comfortable working in partnership with social scientists.

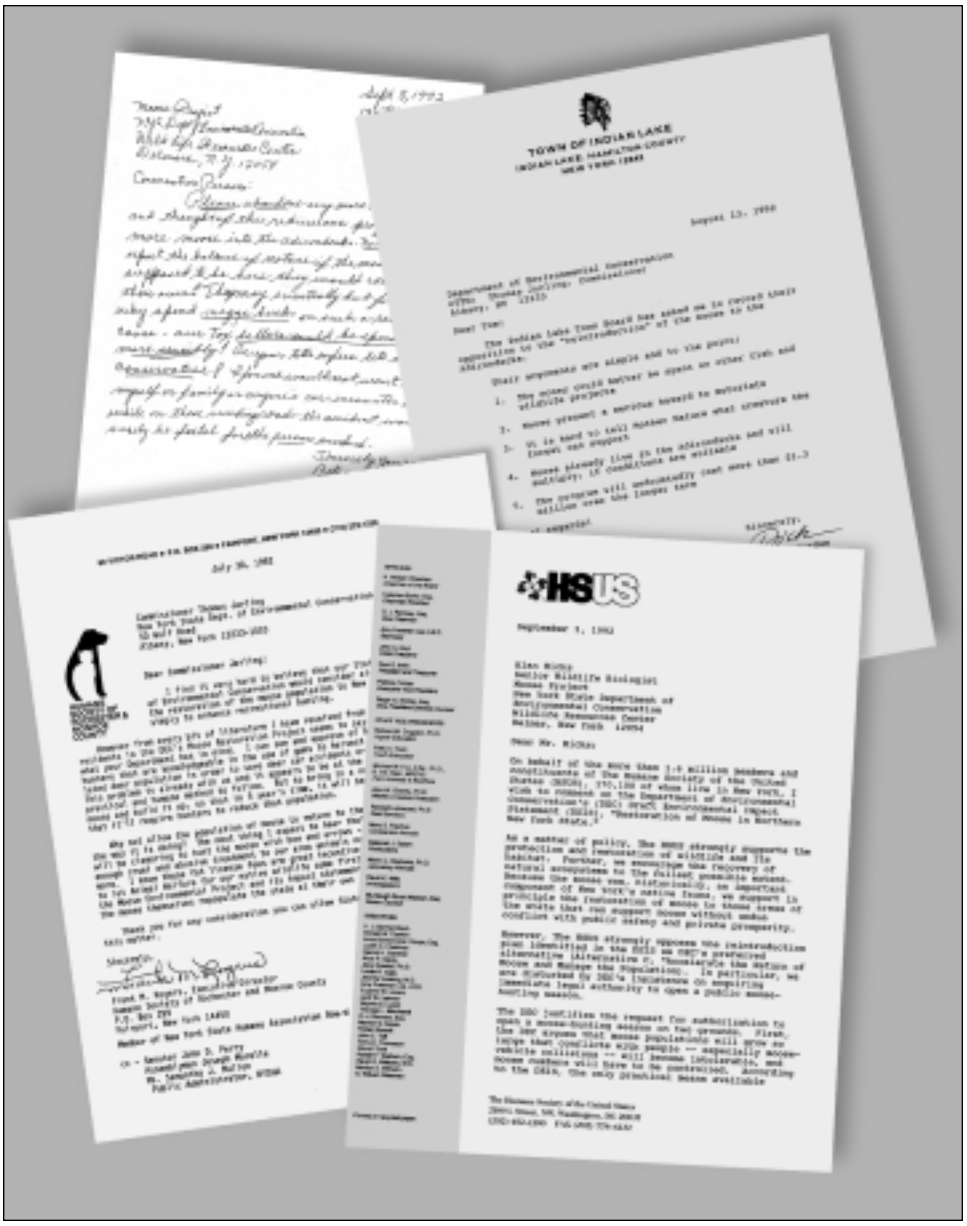


Fig. 3.2 Agencies begin to receive letters about wildlife damage issues during the involvement stage.

Step 2: Identifying Stakeholders

A stakeholder is any person who will be affected by, or will affect, wildlife management. Most wildlife management issues involve a wide variety of interested and affected people. You need to know who the stakeholders are for an issue before designing an engagement strategy. A strategy that works with some stakeholders may be inadequate with respect to others.

For example, citizen task forces (CTFs) engage stakeholders in deliberation over damage management issues. CTFs typically are asked to recommend management objectives and/or actions. Many benefits have been attributed to CTFs when a diverse range of stakeholders is represented, including:

- increased understanding of other stakeholders' views;
- consideration of management options from a broad range of perspectives;
- consensus about management recommendations; and
- high level of support for management recommendations.

However, CTFs also can fall short by failing to represent some stakes. If task forces exclude some groups—like nonhunters or humane interests—those stakeholders are likely to challenge task force recommendations. Such challenges can impede implementation of task force recommendations. Failure to represent some stakeholders on CTFs, or the tendency to overrepresent others, can derail management.

COURTESY OF MARK LOWERY

Fig. 3.3 Protests over wildlife damage management issues often attract participants from outside a community.

Guidelines for identifying stakeholders

A basic rule in identifying stakeholders is that *anyone* who is affected by or who can affect management is a valid stakeholder—hunters and antihunters; people concerned about deer-related problems and people concerned about the welfare of deer; supporters and opponents of management agencies. All people have a right to have their voice heard in decisions that affect them. Therefore, it is imperative that managers do not exclude stakeholders with whom they disagree.

Guidelines for identifying stakeholder groups can be couched as three questions:

Who is interested? The stakeholders who are most interested in an issue often are easiest to identify. Some initiate contact with agencies, requesting information or offering opinions. Recording these unsolicited contacts is a good way to identify stakeholders. Periodically, stakeholder groups organize to promote their common interests in a particular issue. These groups may include hunting clubs, wildlife damage committees of homeowner associations, or animal welfare organizations.

Who is affected? Determining who is affected or potentially affected by an issue may require both brainstorming and inquiry. People may be affected either by a wildlife species or by the actions proposed to manage that species. They may experience impacts of several kinds as discussed in Part 2 (e.g., property damage, costs required for management actions, fear of wildlife, recreational benefits, enjoyment of the presence of wildlife, etc.). Thinking broadly about the potential impacts of species and management actions is helpful in determining who might be affected.

Who can influence management? Many individuals and groups able to influence management in a community can be identified by asking "who is affected?" However, some interest groups can influence local management even though they experience no direct impacts from the wildlife population of concern or from management. For example, local wildlife damage issues in which lethal control measures are pursued may attract the interest of state or national animal welfare organizations that might attempt to influence management in numerous other ways.

Strategies for identifying stakeholders

After the various kinds of stakeholders in an issue are identified, managers need to identify individual stakeholders to participate in planned activities. During this process, it is important to draw a distinction between individuals who *reflect* various stakes and those who *represent* organized interested groups. In many cases, the best strategy is to seek individuals who *reflect* various community interests—people who share certain basic interests and concerns with others in a community but whose views can be expected to progress and evolve as they grapple with management issues as a civic responsibility. Stakeholders chosen to reflect interests are not expected to advocate exclusively for those interests. Instead, they at-

tempt to balance those interests against other interests and seek a reasonable solution.

In politically charged issues, however, choosing stakeholders to *represent* certain groups may be the realistic approach. In such cases, established organizations may have public stances on an issue. To make progress in these cases, managers need to win the support not only of individuals but of organizations. Stakeholders who represent the interests of particular groups assume the responsibility of communicating back to their organization and working with others to craft decisions their organization will support.

Identifying stakeholders to participate in stakeholder processes

- **Expert Opinion.** People knowledgeable about an issue often are in the best position to suggest stakeholders. Experts may include agency staff, Cooperative Extension staff, and local officials.
- **Nominations by Stakeholder Groups.** When seeking individuals to *represent* groups, it may be desirable to have groups nominate individuals to represent their interests. This strategy ensures the group trusts the individual and the individual has standing in the organization to generate support for management plans developed.
- **Snowball Sampling.** Snowball sampling assumes that stakeholders in a given issue know other stakeholders. Therefore, as you identify stakeholders, you can ask them to help you identify others. When contacting individuals, ask questions like: "who else should I be talking to? What other individuals, groups, or types of interests have a stake in this issue?"
- **Volunteers.** Many agencies will advertise for volunteers to participate in limited stakeholder involvement activities, such as citizen task forces. You then have the opportunity to select from among those who volunteer in an effort to balance participation.
- **Open Participation.** Certain stakeholder involvement activities typically are open to all interested stakeholders. These activities will not yield a balanced representation of stakeholders, but they ensure that everyone with strong interests in a given issue has a forum through which to participate.

Regardless of how you identify stakeholders, individuals should be willing to participate *constructively*. In some cases, stakeholders who have strongly held and conflicting opinions may nevertheless be willing to work together, listen to each other, and work to promote management objectives and actions that can satisfy community needs. In other cases, stakeholders may be so narrowly focused on their own agenda that they are unwilling to consider what other stakeholders want or to work cooperatively with them. Such differences often reflect the characteristics of individuals more than interest groups. Involvement mechanisms engaging a small number of stakeholders, such as citizen task forces, should limit participation to stakeholders who are likely to work cooperatively.

Not all stakeholders are equal

Although we strongly recommend extending opportunities for participation to a broad range of stakeholders, not all input is equal in decision making. When considering whether or not to proceed with a wildlife damage management action, managers typically have to (1) judge how to weigh input from people experiencing different types of impacts, (2) balance the wishes of residents living in the problem area with those of other citizens in the state, (3) compare the value some people place on mitigating the problem with the concerns others have about the method or outcome of the action(s), and (4) consider the merit of the wishes of a small segment of the public who know a lot about an issue compared to those of the vast majority who do not. Balancing or weighing these different types of input is not easy. The choice of how to involve different stakeholders will emphasize the perspectives of some over those of others, but this can not be avoided. As you will see in Step 4, weighing stakeholder input is a problem in every approach to stakeholder involvement, though upon whose shoulders that responsibility rests differs depending on the approach used.

Step 3: Setting Objectives

With a thorough understanding of a wildlife damage management issue and stakeholders in the issue, you can turn your attention to deciding what might be accomplished through stakeholder engagement. Setting clear objectives is one of the most frequently overlooked prerequisites for effective stakeholder involvement. To help in this process, we discuss both the roles that stakeholders can play in wildlife damage management and the objectives that may be accomplished.

Stakeholder engagement objectives

- » improving the information about people on which wildlife management decisions are based;
- » improving the judgment on which decisions are based; and
- » improving the social environment in which management occurs.

COURTESY OF PAUL CURTIS

Fig. 3.4 Citizen task forces are used to improve the quality of judgment in wildlife damage management decisions. Members of a citizen task force study deer damage in the field.

Improving Information

During several stages of the issue evolution cycle, managers may need reliable information about stakeholders' needs, desires, beliefs, values, and/or behaviors. There are numerous ways that such information can contribute to better management decisions. For example, on behalf of the New York State Department of Environmental Conservation, Brown and Decker (1979) tested the validity of wildlife managers' assumptions that deer damage had become intolerable for farmers and found that farmer tolerance for deer damage was higher than expected. Gathering information directly from stakeholders can refine managers' beliefs about stakeholders' needs and wants, thereby improving decisions.

Improving Judgment

Sometimes obtaining more information about stakeholders' perspectives does not ease decision making for wildlife managers; the added information can reveal the complexity of a situation. Many wildlife damage management scenarios are characterized by a diversity of stakeholders holding strong and contrasting viewpoints. The potential for conflict between stakeholders is often present. Even when a manager is well informed about the diversity of stakeholders' perspectives, using that information to reach a final decision is difficult. Managers are faced with the unenviable task of choosing the degree to which various stakeholders' needs, wants, and desires will be satisfied, and which will not be addressed at all. The likelihood of reaching decisions that are unacceptable to some stakeholder groups is high under these conditions.

During the choice stage of issue evolution, stakeholders may be involved in the process of recommending a decision that balances the needs and concerns of all interested citizens. One model by which this can occur is the citizen task force, in which stakeholders with diverse interests work directly with each other, deliberating trade-offs among policy alternatives as they seek a mutually acceptable management decision. Stakeholders who participate in citizen task forces (as well as managers overseeing the task forces) typically are highly supportive of the decisions they produce.

Improving the Management Environment

Both objectives described above focus on improving management decisions. But stakeholder engagement also contributes to wildlife damage management in less direct ways. Wildlife management depends on a citizenry that supports and contributes to management decisions and actions. Stakeholder engagement throughout the evolution of an issue can improve the social environment in which wildlife damage management occurs by transforming people and their interrelationships. Stakeholder engagement can influence the management environment in four interrelated ways: (1) transforming beliefs and attitudes, (2) changing behaviors, (3) improving relationships among stakeholders, and (4) increasing the

capacity of people and communities to contribute to policy making and management.

These objectives can be achieved in concert with the other engagement objectives already described. For example, when decision makers make a genuine effort to gather and consider citizen input in decision making, stakeholders tend to become more supportive of decisions and more willing to make changes in their personal behavior to help achieve management goals. Relationships and mutual understanding between diverse stakeholders serving on citizen task forces often improve through engagement, improving the climate for meaningful dialogue about management.

Box 3.1 Examples of Stakeholder Engagement Objectives

To help you understand the diverse range of stakeholder engagement objectives, we list a series of possible objectives below, using deer as an example.

Objectives for improving information

» Determine the type of deer-related problems being experienced within a community and how widespread they are.

» Assess the level of support for reducing the deer population.

» Assess the level of support for using bow hunting to reduce the deer population

Objectives for improving judgment

» Identify the negative impacts of deer that must be reduced to satisfy diverse stakeholders.

» Determine the standards used by different stakeholder groups to judge the suitability of management options.

» Achieve consensus for management actions among a group of stakeholders reflecting diverse interests.

Objectives for improving the management environment

» Increase the level of support for using bow hunting to reduce deer populations.

» Reduce the number of people feeding deer adjacent to major roadways.

» Establish an advisory board reflecting diverse stakeholder interests to monitor and revise deer management strategies.

Step 4: Selecting a Stakeholder Engagement Approach

The specific stakeholder involvement strategies one might employ depend on the general approach toward stakeholder engagement you want to take for a particular issue. Wildlife damage managers have taken five basic approaches to stakeholder involvement: expert authority, passive-receptive, inquisitive, transactional, and co-managerial (Decker and Chase 1997). These approaches are distinguished by the relative amount of control the agency and other stakeholders have in the management process and by the particular roles that they play (Figure 3.5). On one end of the spectrum, the authoritative approach keeps the locus of control squarely within the realm of the management agency. The passive/receptive and inquisitive approaches also keep the locus of control within the management agency, but managers accept or even seek input from stakeholders. In contrast, the locus of control is shared by stakeholders and managers in both transactional and co-managerial approaches. This means that stakeholders and managers both have influence over decisions and actions.

If stakeholders are to have little control, the objectives of citizen participation are relatively

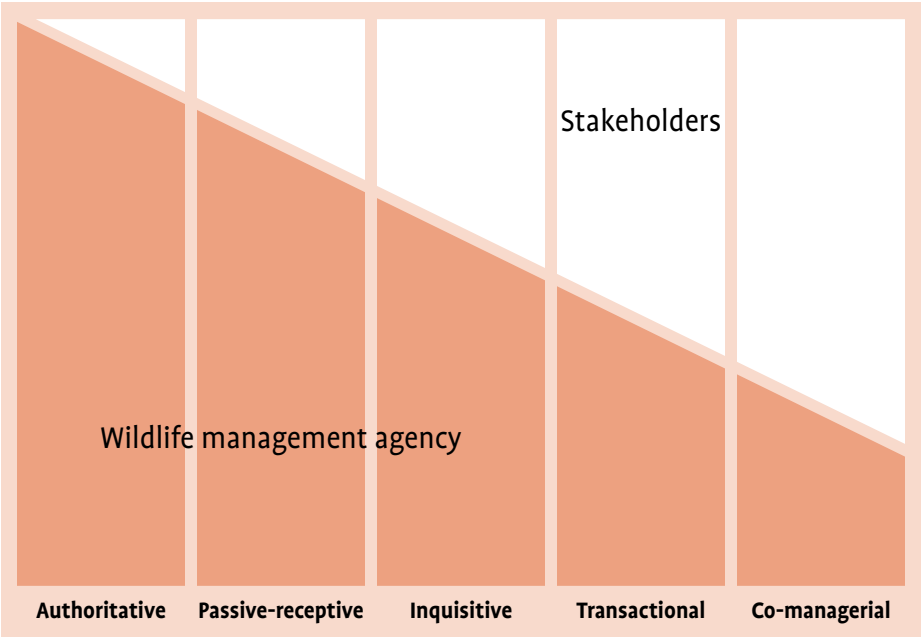


Fig. 3.5 The relative involvement of wildlife agencies and stakeholders in various management approaches (Chase et al. 2000; copyright held by The Wildlife Society).

Table 3.1 Range of approaches to citizen participation

	Objectives	*Locus of control*	*Techniques*	*Citizen participants*
Expert Authority	Improve management climate	Agency	Education through presentations, pamphlets, press releases, etc.	Targeted groups or general population
Passive-Receptive	Improve management climate Provide input	Agency	Unsolicited comments	Citizens who take initiative to contact the agency
Inquisitive	Provide input Improve management climate	Agency	Surveys, public meetings, advisory committees, focus groups, nominal group meetings	May be all citizens, representatives, selected groups or individuals
Transactional	Provide input Evaluate input Improve management climate	Shared by agency and citizens	Task forces, mediation, citizen representatives on policy boards	May be representatives, selected groups or individuals
Co-managerial	Provide input Evaluate input Improve management climate Help with implementation	Shared by agency and citizens	Techniques from all four of the approaches above	May be all citizens, representatives, selected groups or individuals

Adapted from Chase et al. 1999

simple. As stakeholders play a larger role in the management process, however, the stakeholder engagement objectives necessarily expand. The best approach for any wildlife damage issue depends on a variety of factors.

Factors in the selection of an appropriate stakeholder engagement approach

- the level of conflict over the issue;
- the number and type of stakeholders affected;
- stakeholder interest in and awareness of the issue;
- legal mandates to which an agency must adhere;
- the existence of other government entities that can influence management;
- agency resource limitations; and
- the need for information from stakeholders.

We will review each of the five approaches, describing the objectives that are typically associated with each, and how the locus of control, participants, and engagement techniques vary by approach (Table 3.1).

Expert authority

In this approach managers assume the role of technical experts *and* decision makers. The *locus of control* remains with the wildlife management agency. The *objective* of citizen participation under this approach is to improve the climate for management by building stakeholder support for decisions or actions. The expert authority approach is most appropriate when conflict over an issue is low and an agency has a non-controversial, established approach to damage management.

Press releases, pamphlets, videos, radio announcements, presentations at schools and meetings of community organizations, newsletters, and web pages are all *techniques* that an agency can use to inform stakeholders about wildlife damage management. Depending on the specific objectives, the targeted *participants* will vary. Agencies may attempt to reach the general public, or they may focus their efforts on certain groups of stakeholders such as homeowners.

Passive-receptive approach

Under the passive-receptive approach, managers are open to input about stakeholders' beliefs, attitudes, values, behaviors, and experiences. Stakeholder input to management occurs only if they take the initiative to reach managers. The *locus of control* remains with the agency.

The *objectives* of citizen participation under the passive-receptive approach are to build support for management decisions and actions and to add to the information base on which decisions are made. The *participants* will be stakeholders who take the initiative to communicate their concerns and desires to managers. Citizen participation *techniques* typically include unsolicited telephone calls, letters, and comments during informal conversations between stakeholders and wildlife managers.

The passive-receptive approach is most appropriate in issues where public interest and conflict are low, and the types of stakeholders affected are few and easily identified. These conditions are most likely to occur in early stages of emergent wildlife problems.

Inquisitive approach

Managers taking the inquisitive approach assume that knowledge of stakeholders' perspectives will be essential in wildlife damage management decisions. Seeking this information can have the dual *objectives* of both improving decisions and improving public acceptance of decisions. Wildlife managers acquire this information through scientific inquiry to avoid potential biases of considering the perspectives of only those stakeholders who contact the agency. Marginally important stakes can be over blown by lots of publicity and contacts with the agency. Like the expert authority and passive-receptive approaches, the *locus of control* remains with the agency, which decides whether and how to reflect different perspectives in its final management decisions.

Surveys and public meetings are two common *techniques* used in the inquisitive approach. Surveys include mail-back questionnaires, telephone interviews, and in-person interviews. Depending on the type of information sought, the survey will target different *participants*.

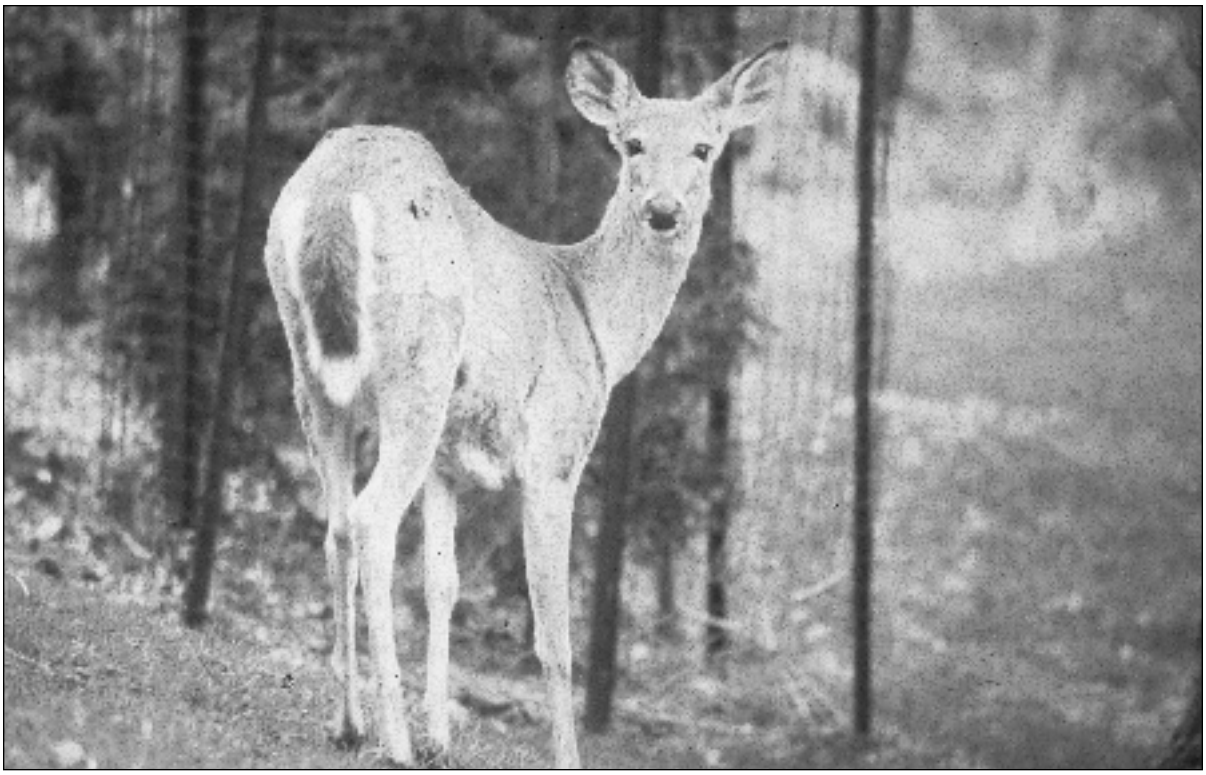
Though less systematic, meetings allow managers and stakeholders to air ideas and perspectives. The *participants* may be specific stakeholder groups or the general public. Other *techniques* useful for the inquisitive approach include advisory committees, focus groups, nominal group meetings, and the solicitation of letters from interested members of the public.

The inquisitive approach can be appropriate when conflict is moderate and managers want to identify and understand perspectives of stakeholders. For example, managers may feel the need to find out what types of farmers are experiencing wildlife damage, particular areas of damage concentration, how much damage they are experiencing, and how willing they are to tolerate this damage. The inquisitive approach requires a greater commitment of agency resources than the preceding approaches.

Transactional approach

Stakeholders frequently have conflicting perspectives, complicating how those perspectives are balanced in management decisions. In politically charged issues involving diverse perspectives or where trust between stakeholders and wildlife managers has not been established, managers often rely on a transactional approach to involve stakeholders. In this approach, stakeholders determine through deliberation the relative importance of stakes and balance of impacts to be reflected in management objectives. Wildlife managers administer the process and provide technical advice. Thus, the *locus of control* is shared. Managers may delegate decisions to stakeholders within some bounds, or may retain the power to reject or approve stakeholders' recommendations.

An important element of the transactional approach is interaction among participants and between them and wildlife managers. In wildlife damage management, task forces are a common transactional *technique*. Due to the importance of face-to-face communication, task forces may be limited to fewer than 20 participants who are expected to reflect various stakes or represent various stakeholder groups. As stakeholders



COURTESY OF PAUL CURTIS

Fig. 3.6 Plant damage and other deer-related problems have been increasing across the northeast.

Box 3.2 Co-managing deer in New York

The co-managerial approach has already been applied by some agencies in a few places. A well-documented case is the deer management situation in Irondequoit, New York. Citizens of the Town of Irondequoit, a suburb of Rochester, were divided over management of the burgeoning deer population. Due to archery and firearm restrictions, the deer population had been growing unchecked for decades. Local citizen groups with different viewpoints on deer management had organized and were vocal in their demands. In the fall of 1991, the state wildlife agency decided to apply a modified version of the Citizen Task Forces (CTFs) they had been using successfully in rural areas. The charge to the CTF was not only to set a deer-population objective, but also to recommend methods for achieving that objective. The success of the modified CTF has been debated (Curtis and Hauber 1997, Baker and Fritsch 1997), but one outcome is clear: the transactional approach of the CTF led the way for increased responsibility on the part of the community and a shift toward the co-managerial approach.

The CTF recommended a combination of culling deer through bait-and-shoot and bow hunting in designated areas as well as research on contraception as a long-term method of population control. The lead for implementing methods for deer management was taken by an interagency task force composed of 12 members of town, county, and state government. Members included a representative from the state wildlife agency, the Irondequoit town supervisor, one of the town board members, two county legislators, the head of the county transportation office, and a representative from the county park's department. In addition to sharing decision-making and implementation responsibility with the state wildlife agency, the community funded the bait-and-shoot program, and the contraception research was paid for by the NYS legislature.

This story of Irondequoit is still unfolding. Despite the gains made in opening communication through the transactional approach, controversy over deer management continues in Irondequoit and probably will do so for years to come. Nonetheless, this is an example where a community has become involved in many aspects of deer management—all in cooperation with the state wildlife agency.

deliberate to reach consensus, they essentially negotiate how to weight their different perspectives. A more thorough analysis of management problems and a more balanced solution to those problems can result.

The transactional approach can fulfill multiple *objectives*: (1) improve the social information base of decisions by revealing stakeholders' beliefs, attitudes, and preferences; and (2) improve the social climate of management by building ownership in and support for management decisions and actions. Often, participating in activities as part of a transactional approach allows diverse stakeholders to reach agreement about appropriate management actions.

Co-managerial approach

Several trends convince us of the likelihood for further evolution of community-based collaborative wildlife management (co-management) in the Northeast: (1) continued growth of human-wildlife problems (often community specific), (2) greater public expectations for tailored solutions suitable for their communities, and (3) continuing limitations on agency funds and personnel. If these trends continue, wildlife agencies are likely to find more instances where it

makes sense to consider sharing or delegating responsibility for management to stakeholders at the community level. We believe that community-level co-management will become a common approach to dealing with wildlife damage management issues, especially in urban and suburban communities. Stakeholder engagement is the basis for co-management.

In a co-managerial approach, operational guidelines for partners, accountability and evaluation processes, and assignment of responsibility would be negotiated such that the *locus of control* over all aspects of management would be shared among agencies and local communities. This approach calls for educational communication programs for stakeholders on a level seldom seen in wildlife management. Decision-making processes that engage local stakeholders have to incorporate receptive, inquisitive and transactional elements. Therefore, co-management needs to draw on *techniques* from all of the approaches discussed earlier. In addition, governing boards of citizens and managers may be established to oversee decisions and activities.

The role of the wildlife management agency might include providing biological and human dimensions expertise, managing processes, training community participants, approving community wildlife management plans, certifying private consultants, and monitoring management activities. Agency wildlife managers would work more extensively with stakeholders in local communities, collaborating with them to develop guidelines, standards, criteria, and requirements for local community management efforts.

Co-management approaches to stakeholder engagement are not necessary for every situation. However, co-management is appropriate when managers are seeking assistance with both decision-making and decision implementation. This can often be the case with a suburban deer or goose management issue.

Each community has different human and fiscal resources that can be brought to bear on the resolution of a wildlife damage problem. In other words, each community has a unique capacity to participate as a partner in management. Community capacity is a product of factors such as local leadership resources, municipal budgets, and infrastructure. Co-management efforts will have little chance of success if the community does not have the capacity to accept wildlife management responsibilities. Because of this, both managers and communities will find it useful to assess community capacity before making a commitment to share management authority and responsibilities in a given area.

Box 3.3 New Jersey's Community-Based Deer Management Program

During the 1990s, many suburban New Jersey communities witnessed increasing numbers of deer. Representatives of local governments and private parks went to the New Jersey Division of Fish and Wildlife seeking solutions to deer-related problems in areas where traditional forms of hunting were not controlling the populations effectively. In response, the Division developed the Community-Based Deer Management Program (Lund 1997). Under the auspices of the program, the Division partners with federal, state, county, or municipal representatives to share deer management responsibilities.

In each case, a written memorandum of understanding specifies a management plan and the roles of the Division and its management partners. The Division agrees to provide technical assistance with development, implementation, and evaluation of deer control options and to "facilitate and permit" (Lund 1997:489) deer management alternatives, such as modified deer-hunting seasons, deer-culling programs, or deer contraceptive procedures.

The partner organization agrees to pay for all aspects of program implementation, including costs for deer population estimation, use of private contractors to cull deer, processing of deer meat, and human dimensions research before or after program implementation. It can include costs incurred by the Division for services provided.

The Division decided that it would only take on partners who were willing to agree to several ground rules. Community partners must first come to the Division with evidence that "a majority of residents believe that a deer problem exists" (Lund 1997:490). Cooperators must also agree to "(1) discourage supplemental feeding of deer, (2) support the use of deer hunting as a control option where it can be used, (3) make an effort to ensure that deer taken by means other than public hunting are used appropriately" (Lund 1997:489).

In 1995 and 1996, two county park systems signed memoranda of understanding to begin co-management of deer in their parks. Both eventually went on to hold annual culling operations that resulted in movement toward deer population goals set by the Division and the cooperating park systems.

The Division regards the program as a viable approach to managing deer in many suburban contexts.

Source: Robert C. Lund

Responding to grassroots initiative

The five approaches discussed above all assume the wildlife management agency decides whether to initiate citizen participation. As Hahn's (1990) issue-evolution model discussed in Step 1 points out, stakeholders themselves will organize and begin to press managers for action as they proceed from the concern to the involvement stage. Grassroots organizations have formed to advocate for everything from restoration of wolves in wildlands to control of white-tailed deer and Canada geese in suburbs. Indeed, stakeholders may be able to move an issue right through the choice

Box 3.4 Citizen Initiatives Related to Trapping in Massachusetts

Massachusetts voters have a long history of direct involvement in furbearer management through the state's ballot referendum process. Proponents of a referendum submit the language of their bill to the Secretary of State and the Attorney General a year before a scheduled election. Bills deemed constitutional become initiative petitions, which the proponents circulate for voter signatures. If they accumulate 75,000 valid signatures from registered voters in five different geographic regions, the initiative petition becomes a bill in the legislature. If the legislature neither acts on the bill nor rejects it, it becomes a ballot referendum in the next statewide election.

In 1930, Massachusetts voters approved a state referendum that outlawed trapping devices that "cause continued suffering" to the trapped animals (Gentile 1987). That legislation, which banned the use of leghold traps, was repealed just a few years later. In 1974, legislation was passed that restricted trap use, this time through a ban on the use of all steel-jawed leghold traps on land.

The Massachusetts Division of Fisheries and Wildlife (MDFW) continued to allow the use of "soft-catch" traps (leghold traps with rubber pads covering the jaws) after 1975. The Humane Society of the United States (HSUS), a private citizen's group that opposed the use of leghold traps, filed a legal suit against the MDFW to stop that practice. A lower court returned a decision declaring that use of padded traps was not legal. The MDFW appealed the lower court's decision. After six years of litigation, a Massachusetts Supreme Judicial Court overturned the decision and ruled that the padded trap was humane and therefore legal.

The higher court's ruling in the early 1990s prompted the HSUS to pursue its interests through the ballot referendum process. Its initiative petition drive was successful. The ballot referendum appeared on the statewide ballot in November 1996 as "Question 1" (the Wildlife Protection Act). The measure was passed (55% of election participants voted yes; 30% voted no; 15% cast no vote on Question 1; Debliner et al. 1999).

The legislation eliminated the legal use of leghold and body-gripping traps (snap traps excepted). It also prohibited pursuit of bears and bobcats with hounds, prohibited bear baiting (already prohibited by regulation), and allowed for a change in the composition of the Fisheries and Wildlife Board, which establishes regulations and oversees the operations of the MDFW.

Source: Robert D. Deblinger

and implementation stages by promoting ballot initiatives, litigation, and legislation to influence the authority of wildlife agencies with respect to damage management. Grassroots involvement often arises at the initiative of stakeholders in response to problems that they perceive.

Recognizing grassroots stakeholder activity quickly can be a tremendous advantage to agencies because such activity indicates which damage management issues are in urgent need of attention. Partnering with stakeholders who are initiating grassroots activity can be valuable in the management process. Ignoring grassroots involvement can be perilous. Citizens who do not consider an agency a potential partner to resolve their problems may proceed to achieve their objectives without regard for the agency. When this happens, efforts to circumvent or curtail agency authority (e.g., through ballot initiatives) may be undertaken or citizens may take illegal "management actions" of their own—sometimes putting a valuable wildlife resource at risk.

Step 5: Designing Stakeholder Engagement Strategies

A basic guideline in designing stakeholder engagement strategies is to select involvement techniques that are consistent with your objectives for stakeholder involvement. The techniques you choose should fit together as a strategy reflecting one of the approaches to stakeholder engagement described in the preceding section. Our discussion of techniques is organized by stakeholder involvement objectives.

Common stakeholder involvement techniques

Gathering Information

Several techniques are commonly used to gather first-hand information from or about important stakeholders: public meetings, solicitation of comments, surveys, and focus groups. Each technique has both pros and cons.

Public meetings. Public meetings typically allow managers to present information about a wildlife damage issue and then solicit feedback from stakeholders. Public meetings can reveal the range of concerns and opinions about particular management proposals.

Pros

- Public meetings give managers the opportunity to provide background information that allows attendees to learn something about the issue.
- Public meetings also give participants (including managers) a chance to learn about the perspectives of other stakeholders attending.

Cons

- People attending public meetings tend *not* to be representative of the community of stakeholders interested in a particular issue.
- Meetings attract vocal critics of management objectives or programs who can sometimes dominate meetings out of proportion to their actual numbers or the importance of their stake and gain media exposure through this kind of event.

BILL WARREN / *THE ITHACA JOURNAL*

Fig. 3.7 **Public meetings are a common tool for learning about stakeholders' perspectives.** ***(Reprinted with permission from the* Ithaca Journal, *January 18, 2001 edition)***

- Some stakeholders find it inconvenient to attend meetings because of location or timing, making it difficult for managers to gather input from all important stakeholders.
- Sometimes it is difficult to keep attendees focused on the most critical information needs.

Solicited comments. Another technique commonly employed by agencies is to solicit (e.g., via mass media) written comments (e.g., letter, e-mail) on management issues or programs.

Pros

- Submitting written comments is an input vehicle available to all interested stakeholders, and a more convenient form of participation than attending public meetings for many individuals.
- Agency requests for public comment can also be accompanied by background information about an issue to stakeholders—sometimes this background information is in the form of an environmental impact assessment.

Cons

- Soliciting written comments does not provide the opportunity for interaction between diverse stakeholders and the learning such interaction provides. The quality of input, therefore, may be lower than with some other techniques.
- Solicited comments are seldom representative of all stakeholders for a given issue—interest groups with many members can sometimes generate a flood of letters in response to agency requests for input.
- No opportunity exists for immediate or spontaneous classification or elaboration of points if the agency does not feel the comment is clear.

Surveys. Surveys are described in the appendix on research methods.

Pros

- Surveys are effective for gathering information from a large, widely dispersed, representative sample of stakeholders.
- Surveys can be designed to gather the most critical information needed.
- Most surveys, particularly mail surveys, can ask numerous questions and, therefore, provide a large quantity of information.

Cons

- Although some background information on an issue can be provided in surveys, the op-

Fig. 3.8 Surveys are a useful way to collect a large quantity of information from a large and representative sample of stakeholders.

portunity to inform respondents before they offer feedback usually is limited.

- Survey respondents do not have a chance to interact with and learn from each other. Consequently, the feedback agencies obtain from surveys can be based on limited knowledge of other stakeholders' concerns.

Focus groups. Focus groups involve gathering eight to twelve individuals to provide feedback on pressing management questions. Typically focus groups are designed to convene stakeholders representing similar interests. To broaden input, a series of focus groups may be used to collect information from separate groups, each representing different stakes, interests, or demographics.

Pros

- Focus groups allow the opportunity for interactions between participants. The learning that occurs through these interactions may yield higher quality feedback.
- Managers often can gather more detailed feedback from each participant in focus groups than with other methods.

Cons

- Only a very limited number of individuals can participate in focus groups, even if a series of them is held. Therefore, interested stakeholders may feel left out of the process and be less supportive of management plans developed based on focus groups alone.

Improving Judgment

As we discussed in the section on stakeholder engagement objectives, sometimes it is important to go beyond gathering information from stakeholders and to have them judge the implications of that information for management. Techniques that allow for stakeholders to deliberate with each other about management issues are particularly well suited for this purpose.

Citizen task forces. A citizen task force (CTF) typically engages 10–15 diverse stakeholders in a process of trying to reach consensus, or unanimous agreement, on management recommendations (e.g., population objectives for a species causing damage or appropriate actions to achieve these objectives). CTF members are provided detailed background information about the management issue and have the opportunity to request additional information during the course of their discussions. Usually a CTF will require several meetings to accomplish its task.

As stakeholders are selected to participate in a CTF, managers aim to represent a broad array of interests rather than choose a representative

sample. The goal of a CTF is to identify a solution that will satisfy all or most stakeholders.

Pros

- CTFs have been effective at educating participating stakeholders (i.e., those on the CTF) about important management considerations and other stakeholders' perspectives. Indeed, CTF members often increase appreciation of others' interests as a result of their participation.
- Relationships between participants tend to improve, increasing their capacity to work together on management issues.
- If consensus is achieved on CTF recommendations, these recommendations typically have strong support of CTF members, making implementation easier for managers.

Cons

- The benefits of CTFs are limited to the small number of stakeholders who have the opportunity to serve on one. Therefore, even if strong support for the recommendations exists among CTF members, that same support may not be present among the broader populace without additional stakeholder involvement strategies.
- Consensus is not possible in all cases, and, when it is not, some CTF members may become disillusioned with the process and oppose resulting recommendations.

Workshops. Workshops bear some similarities to public meetings. They can be open to all interested participants (but not always). What distinguishes workshops from public meetings is that attendees are often divided into small groups and assigned some specific tasks that will contribute to management needs. Workshops could focus on generating a list of problems that need to be addressed; brainstorming options for addressing problems; identifying advantages and disadvantages of different options; or recommending a package of management options.

Box 3.5 Monitoring Stakeholders for Wildlife Damage Management

The mission of the Wildlife Services Program of the U.S. Department of Agriculture's Animal and Plant Health Inspection Service is to "provide federal leadership in managing damage caused by wildlife," and its vision is to "improve the relationship of people and wildlife by utilizing wildlife damage management strategies that are biologically sound, environmentally safe and socially acceptable" (Clay and Schmidt 1998:216).

Wildlife Services administrators have long recognized the role of values and attitudes in shaping the program's activities. Experiences over three decades clearly identified these stakeholders: Wildlife Services employees; other state and federal agencies that deal with wildlife, health, transportation, and agriculture; agriculturalists; nongovernmental organizations representing recreational, animal protection, or environmental interests; wildlife professionals; and the general public. Development of a cooperative research relationship with Utah State University in 1991 expanded Wildlife Services' ability to learn more about stakeholders and how to incorporate that understanding into decision making. Wildlife Services has used public comment, quantitative surveys, and focus groups to gain insights about stakeholders.

Public comment. In 1994 Wildlife Services analyzed and responded to stakeholders who had provided public comment during a nationwide environmental impact statement process. The process provided qualitative information on stakeholders' concerns. Many states require similar processes, giving Wildlife Services ongoing opportunities to identify new stakeholders and monitor trends in stakeholder interests.

Quantitative surveys. In 1993 and 1995, Wildlife Services surveyed people who received assistance from the agency, revealing high satisfaction with Wildlife Services. In 1995, the agency conducted a national survey to gauge public attitudes toward various aspects of wildlife damage management. The survey identified public preferences for various control techniques and helped reaffirm key public concerns related to public transportation safety, animal suffering, control method efficiency, and relief from agricultural damage.

A 1995 survey of Wildlife Services employees helped the agency compare the attitudes of employees with those of the public. Another 1995 survey collected data on members of The Wildlife Society, which revealed that wildlife professionals are not homogeneous in their views on wildlife damage control. The study found that many professionals had negative views toward traditional wildlife damage tools and techniques.

Focus groups. In 1993, Wildlife Services conducted six focus groups representing three interests: wildlife management, animal protection, and traditional agriculture. Each group was asked to comment on these questions: For what purposes is wildlife damage management appropriate? What techniques are appropriate? What changes are needed in Wildlife Services? The focus groups made these recommendations: (1) improve communication, (2) become more open and accessible, (3) emphasize research-based decisions, (4) improve control tools and techniques, and (5) improve organizational culture and skills.

In 1994 and 1995 Wildlife Services followed up by holding focus groups with its own employees in 17 western states. A key finding was that employees wanted respect and understanding from the public and believed the public wanted them to be compassionate and professional.

Actions. Stakeholder input identified substantial public support for a federal role in wildlife damage management, support for protection of public safety and agricultural interests, and high satisfaction among traditional agency stakeholder groups. Key stakeholder concerns also were identified that, if not addressed, would surely erode public support for the agency.

As a direct result of stakeholder response, Wildlife Services administrators now meet regularly with a range of stakeholders. Information about agency activities is accessible to the public on the World Wide Web and in a newsletter. Research on nonlethal control techniques was increased. Administrators encourage staff members to participate more in professional forums and have formalized their expectations that research staff members would publish their work in peer-reviewed scientific journals.

Source: William H. Clay and Robert Schmidt

Pros

- Like CTFs, workshops can improve relationships between stakeholders by having them work together on common tasks.
- Workshops can engage more stakeholders than CTFs and, therefore, their benefits can extend to more individuals.

Cons

- Workshops are not ideal for complex tasks that require attendees to meet over multiple sessions. With the large number of people that can attend a workshop, it is impossible to ensure that the same individuals will be able to attend multiple sessions. Therefore, workshops must break down tasks into units that can be accomplished in a single session.

Improving the Management Climate

Improving the management climate has three objectives: (1) informing stakeholders, (2) improving stakeholder relationships, and (3) improving stakeholders' capacity to contribute to management.

Managers have many reasons for wanting to inform stakeholders. These include raising awareness of a problem, increasing understanding of the impacts of various management options, and increasing support for management objectives and actions. A variety of techniques are appropriate for influencing the beliefs and attitudes of the stakeholders within a community. These include issuing press releases, developing educational brochures, and preparing and distributing environmental impact assessments.

These techniques have the advantage of being able to reach a diverse and large number of people. They have the disadvantage of being very limited interventions. Most people pay little attention to educational materials, and, consequently, they need to be exposed to this material repeatedly if it is to have an effect. Therefore, an action such as issuing a press release is likely to have little value by itself. It needs to be part of a much broader strategy employing a set of public outreach techniques.

Of course, beliefs and attitudes can also be influenced by some of the techniques described earlier. Public meetings, CTFs, and workshops all provide wildlife agencies the opportunity to disseminate information as well as collect it. Indeed, merely the act of soliciting input from the public can improve attitudes toward management decisions, as long as an agency uses such input in decision making and lets people know it.

Improving the management climate also involves pursuing objectives that may yield few benefits in the short term but lay the groundwork for future management. These objectives include (1) improving relationships between stakeholders and (2) increasing the capacity of stakeholders to contribute to management. These objectives are best served by techniques that allow the opportunity for extended interaction between diverse stakeholders, and the learning that such interaction entails. Public meetings, CTFs, and workshops are among the most appropriate techniques. They can develop a solid foundation for management over the long term by increasing the ability of critical stakeholders to work together, increasing their understanding of management issues, and improving their ability to juggle competing considerations in reaching management decisions.

General considerations for design of stakeholder involvement

Several considerations are critical when developing stakeholder involvement strategies. First, regardless of the particular technique selected, what is most important is how that technique is tailored to meet objectives. Public meetings can be designed either to promote agency positions or they can be effective means of educating stakeholders and gathering input. The difference lies in how the meeting is structured. A clear vision of what you want to accomplish is key to tailoring particular techniques to your needs.

A second consideration is that rarely will one technique be adequate to meet all stakeholder engagement objectives. Stakeholder involvement strategies, therefore, involve the artful combination and tailoring of a variety of techniques. For this reason, consultation with a citizen participation specialist will be valuable as you develop a stakeholder engagement strategy.

Finally, the techniques you employ may be less important than the mind-set with which you approach them. Wildlife managers who have been successful at involving stakeholders as a

regular way of doing business often share several key traits.

Key traits of wildlife managers

Receptivity. Be open and receptive to unsolicited input from stakeholders. This input can take many forms—telephone calls, office visits, letters, stakeholder newsletter columns, letters to the editor, editorials, news coverage of all types, posters, graffiti, demonstrations, etc. Such input contributes to understanding the landscape of public opinion surrounding a wildlife damage management issue, but managers must remember that small minority interests are sometimes capable of making large media impacts, often out of proportion with the actual stake of these interests in an issue.

Inquisitiveness. To avoid a limited perspective, the wildlife manager needs to inquire about stakeholder needs and interests. The inquisitive manager asks several questions:

- What is the range of relevant stakes associated with a particular management issue?
- Who are the people with this stake?
- What's the size of this group?
- What are their relevant beliefs, attitudes, and behaviors?

Seeking answers to these questions can help managers anticipate as well as recognize the potential for problems. This gives the inquisitive manager an important "edge" that can enable him/her to avoid problems more often.

Problem solvers. Effective managers need to be problem solvers, not just process managers. Effective problem solving requires definition of the problem and scoping out its important elements.

- What are the kinds of management decisions that will inevitably be made?
- Who should be involved, and to what degree?
- Is stakeholder input enough for this situation, or will active participation be needed?
- Is participation sufficient, or will stakeholders expect to be involved in decisions?
- Is involvement in decisions sufficient, or is it essential for stakeholders to be involved in implementation and evaluation of the management effort?

Decision focused. The principal value of human dimensions insight is to serve management decisions. General human dimensions understanding can aid planning and improve timely response to changing conditions, enabling an agency to be agile as well as adaptable. An ongoing, inquisitive, problem-solving approach to accumulating various kinds of human dimensions knowledge, such as stakeholder attitudes and values, multiple "wildlife acceptance capacities," influence of experience and risk perception on attitudes, etc., can inform wildlife managers as they make decisions in the daily performance of their duties.

Step 6: Implementing Stakeholder Engagement

In this section we discuss implementing stakeholder engagement strategies. Considerations include challenges to expect when implementing stakeholder engagement, defining the agency's role, and recommendations for how to get the most out of stakeholder involvement efforts.

Challenges to stakeholder engagement

Conducting a successful stakeholder engagement process involves both *internal* (related to the management agency and how it operates) and *external* (related to the public and how the agency interacts with it) challenges. Meeting these challenges successfully determines whether the benefits of stakeholder engagement will be reaped.

Citizen participation is sometimes viewed as threatening to wildlife management agencies because some forms of participation involve sharing control over decision making and implementation. Agencies may be reluctant to let citizens with little biological expertise contribute to wildlife management decisions. They may believe that technical decisions are best left to technical experts. These are attractive justifications for avoiding stakeholder engagement, but don't lose sight of the important role values play in all wildlife management decisions. Decisions about management objectives and about management methods are based in large part on stakeholder values. Determining values that are to guide management is certainly in the domain of stakeholders.

Even agencies that want to engage stakeholders may find it difficult because of historically poor relationships with certain groups. These may range from agricultural organizations that do not believe their situations have been considered adequately to animal welfare organizations who are philosophically opposed to wildlife management, or private property rights advocates who resent the government intrusion. Poor relationships and mutual distrust can thwart attempts to engage citizens productively in wildlife damage management. In these cases, agencies may have to take a long-term view of citizen participation, attempting first to create or restore trusting relationships with certain stakeholder

Box 3.6 Identifying Facilitators

Recognizing the value of good facilitation is one thing, but finding skilled facilitators is another. Fortunately, several means exist to help agencies identify facilitators:

Cooperative Extension offices often have trained facilitators on staff, some of whom are knowledgeable about both wildlife and public policy issues. They have successfully facilitated meetings, workshops, and citizen task forces that address wildlife damage concerns.

Several organizations of facilitators and conflict resolution practitioners may be of help in either identifying skilled professionals or providing facilitation training for agency staff. These organizations include:

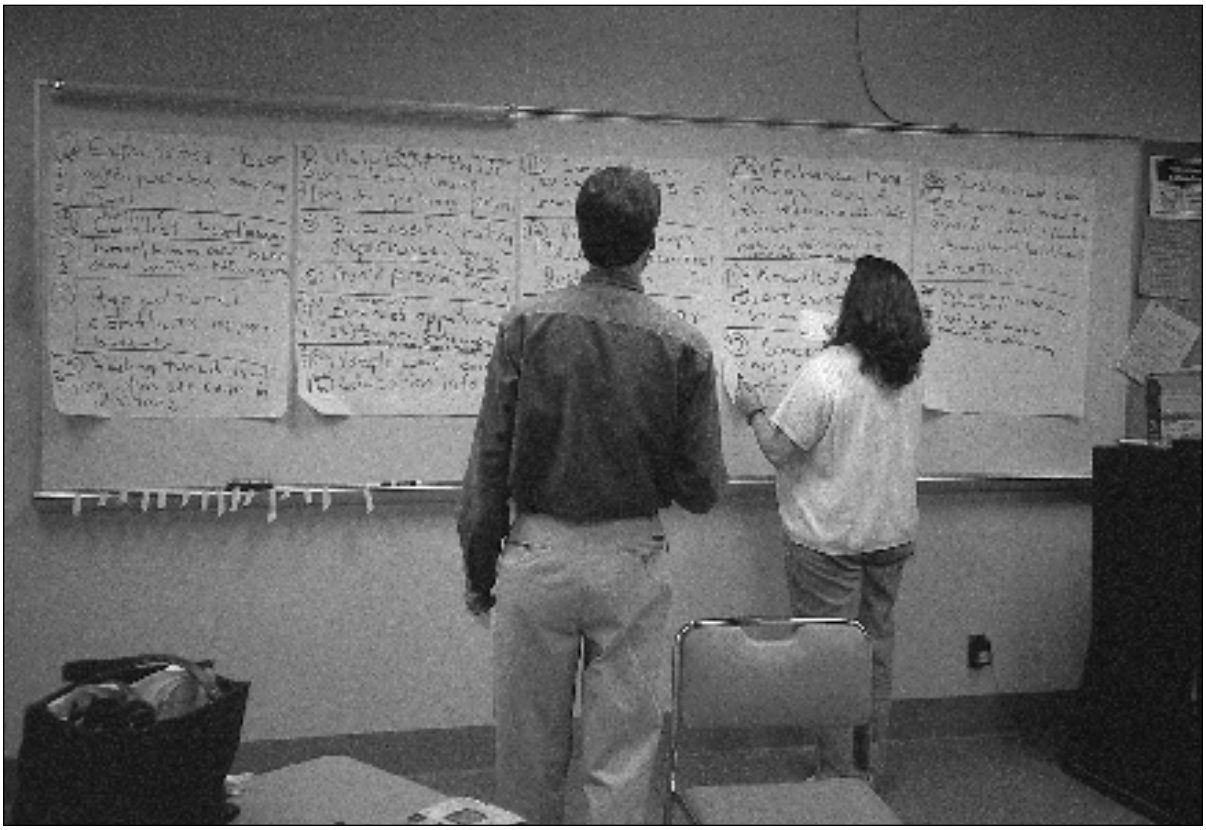
- U.S. Institute for Environmental Conflict Resolution (Suite 3350, 110 S. Church Avenue, Tucson, AZ 85701; 520 670-5299)
- Association for Conflict Resolution (1527 New Hampshire Avenue, NW, Third Floor Washington, DC 20036; 202 667-9700)
- The International Association for Public Participation (P.O. Box 10146, Alexandria, VA 22310; 800 644-4273)

groups before expecting their involvement in management decisions or actions.

Defining the agency's role

The most appropriate role of agency staff in stakeholder involvement activities is not easy to specify because agencies may wear many different hats. If responsibility for management decisions is yielded in part to stakeholders (e.g., citizen task force), agency staff sometimes play the role of expert advisors—educating stakeholders about wildlife biology, ecology, the impacts of species, the effects of alternative management actions, and other important management considerations. Although this can be a valuable role to play, care is needed in exercising it. Some stakeholders will view agencies as biased and not consider the "expertise" they offer as neutral, whether or not this perception is justified. To avoid suspicion, wildlife managers must not blur the distinction between their scientific and ethical judgments when playing the expert advisor role (Decker et al. 1991)

Agency staff may serve as facilitators, concentrating on designing and implementing stakeholder involvement processes. This is a useful role, but many agencies face limitations as they try to fill it. Agency staff may not have sufficient expertise in stakeholder involvement processes to do this well. Also, the importance of a *neutral*



COURTESY OF WILLIAM SIEMER

Fig. 3.10 Accurately recording stakeholders' comments at public meetings increases their faith in involvement processes.

facilitator in stakeholder involvement processes can not be overstated—process facilitators must forego opportunities to advocate their own agenda because their primary job is to allow *others* to express their perspectives. Therefore, having agency staff serve as facilitators may hamstring them in their ability to contribute their perspectives to quality management decisions. Outside facilitators are often hired for this reason.

It is becoming more common for agency staff to play the role of one of many stakeholders in management decision making—this is particularly true in co-managerial approaches. In other words, agencies may advocate particular objectives and actions, but share decision making with others. For example, an agency staff member might sit on an interagency task force with other state and local government representatives to make decisions in a local area about the management of a particular species.

Step 7: Evaluating Stakeholder Engagement

The final step in stakeholder engagement—evaluation—should not be overlooked. Evaluation can be beneficial to agencies and stakeholders alike. We already have articulated the ends that might be sought through stakeholder involvement, and these are the typical foci of evaluation.

Foci of evaluation of stakeholder engagement

- obtaining good quality information about stakeholders;
- promoting sound judgment in management decisions;
- improving relationships between stakeholders;
- informing stakeholder attitudes, beliefs, or behaviors; and
- improving the capacity of stakeholders to contribute to management.

Given the resources agencies may spend on stakeholder involvement, it is important to know if the objectives of engagement have been achieved. Did stakeholder involvement result in more public support for a management decision? Did a survey of farmers result in better understanding of how much deer damage they could tolerate? Did the members of a task force fully understand the trade-offs involved in different methods of managing suburban geese before they recommended a particular method?

General rules of thumb for evaluating stakeholder engagement

- **Tie your evaluation to your objectives.** Earlier, we recommended clearly articulating your objectives for stakeholder involvement. Use these objectives as a focus for your evaluation.
- **Be open to unexpected outcomes.** Although it is important to determine whether you achieved your stated objectives, it is worthwhile to keep in mind that *unexpected* outcomes—both good and bad—also may result.
- **Use appropriate methods.** Both research and stakeholder involvement methods can be suitable for evaluation purposes. The key consideration is clearly articulating the evaluation questions you are trying to answer in advance and ensuring that the methods are suitable for answering those questions.
- **Incorporate evaluation throughout stakeholder involvement.** "Evaluation" tends to be an image of an activity undertaken after something is completed—suggesting that you might turn to evaluation only after stakeholder involvement is complete. But evaluation is often most useful during stakeholder involvement activities so that they can be improved. There are at least two advantages to integrating evaluation with stakeholder involvement: (1) it allows you to adapt and improve the stakeholder involvement process as you go and (2) it requires less of an investment of resources if evaluation can be incorporated into activities that are already taking place.
- **Consult a human dimensions research specialist.** Evaluation is a form of inquiry, and, consequently, it can raise many thorny issues about the best approach to take. Seek advice from a human dimensions specialist.

Section Summary

Stakeholder engagement means involving people in making, understanding, implementing or evaluating wildlife management decisions. Though strategies for effective stakeholder engagement vary by context, it is helpful to consider seven general steps as you design an engagement process. First, it helps to develop a situation analysis, using tools such as Hahn's issue evolution model, to describe the characteristics of the wildlife damage issue you are trying to manage. To effectively design an engagement approach, you also will need to carefully identify stakeholders—the people who will be affected by, or can affect management related to your issue. You will need to establish clear objectives for involving stakeholders in management. Your objectives might include improving the information-base for decision-making, improving the judgments on which decisions are based, or improving the social environment in which wildlife damage management occurs. Having taken these steps, you will be better able to select an overarching stakeholder engagement approach. Wildlife managers have taken five basic approaches to stakeholder involvement: expert authority, passive-receptive, inquisitive, transactional, and co-managerial. Choosing the best approach will depend on a variety of factors, including: the level of conflict over the issue; the number and type of stakeholders affected; stakeholder interest in and awareness of the issue; legal mandates to which an agency must adhere; the existence of other government entities that can influence management; agency resource limitations; and the need for information from stakeholders. Within your overall stakeholder engagement approach, you also will need to carefully select one or more specific strategies, like public meetings, focus groups, or quantitative surveys. Each of these specific strategies have pros and cons you will need to consider. You may face internal and external barriers to stakeholder engagement. You will need to identify and address those barriers to successfully implement the stakeholder engagement approach you select. Finally, you should consider how you will evaluate your process, to determine whether your stakeholder engagement objectives were achieved.

Richer stakeholder engagement facilitates a professional shift toward stakeholder-identified impacts as the primary focus of management. We encourage a deliberative, purposeful effort to define goals of management and specify measurable objectives in terms of impacts that reflect human values. If stakeholder-defined impacts can be articulated clearly in terms of important affected human values, wildlife managers can become more creative in developing a wider range of management interventions to achieve the outcomes people desire.

We believe that society will be well served by wildlife managers who adopt a management perspective that integrates human and ecological dimensions, engages stakeholders in all aspects of the management process, and explicitly seeks impact-focused objectives that reflect operant human values. In many respects, wildlife managers dealing with damage management are leading the way on all these fronts.

Human Dimensions Research Methods

Some Background About Human Dimensions Research Methods

Both quantitative and qualitative research methods are used in human dimensions research. Quantitative methods generally are favored if data are needed from a large representative sample and researchers must rely on measures that can be easily quantified. Often quantitative human dimensions data are collected through some type of survey: face-to-face interviews, telephone interviews, or mail surveys using questionnaires. Each of these approaches to surveys has advantages and disadvantages (Table A.1).

Quantitative methods may have limited utility for certain management needs. Many researchers believe that reducing complex phenomena, such as attitudes, beliefs, and behaviors, to numbers necessarily involves discarding or ignoring a considerable amount of information. Sometimes that information is relevant or even critical for an adequate understanding of the management issue.

Under such circumstances, qualitative research methods are valuable. Qualitative methods generate in-depth understanding of people through their own words or observation of their actions (Table A.2). These methods take three basic forms. In individual or group interviews, respondents are encouraged to respond to questions at length and in their own words. In observation, researchers record detailed written or verbal descriptions based on their direct observation of stakeholder behavior. In document analysis, excerpts from written documents are used to characterize stakeholders.

Many variations of quantitative and qualitative methods exist. A human dimensions study may use both quantitative and qualitative methods to benefit from the strengths and compensate for the weaknesses of each. Sorting out which methods are best suited for meeting the information needs of a particular situation should be undertaken as a partnership between the wildlife manager and the human dimensions research specialist. In the next section, we offer general guidance for the wildlife manager.

Box A.1 Developing Human Dimensions Expertise

Wildlife managers have several avenues to pursue to increase their human dimensions knowledge:

Human dimensions specialists. Individuals with human dimensions expertise, who can aid in the planning and execution of studies, are often found at universities—particularly land-grant universities. They may be on staff in departments of wildlife, natural resources, rural sociology, or related fields. Responsive Management (130 Franklin Street, Harrisonburg, VA, 22801; 540-432-1888), a public opinion polling and survey research firm specializing in wildlife and natural resource issues, is also widely used by wildlife management agencies. Other public opinion polling and survey research firms may also be able to help managers address human dimensions issues. Some state wildlife agencies have hired human dimensions specialists to work within their agencies.

Human dimensions literature. Many widely available texts and journals can increase managers' understanding of human dimensions research. Don Dillman has authored several "how to" texts to guide survey research that are widely used by human dimensions researchers. Many of the prominent wildlife and natural resources journals (e.g., Wildlife Society Bulletin, Society and Natural Resources, Human Dimensions of Wildlife) publish articles on human dimensions topics that can help managers increase their understanding of these issues.

Conferences and workshops. Conferences and workshops provide valuable opportunities to interact with a wide variety of managers and researchers with experience in human dimensions. The Wildlife Society's annual conference (check the program to see if human dimensions papers are to be presented) and the International Symposium on Society and Resource Management are two of the most widely attended conferences.

Questions to Ask When Planning a Stakeholder Study

When managers call on social scientists to develop a stakeholder study, they typically find themselves first asked to articulate the management problem to be addressed. The wildlife manager brings to the study unique knowledge and insight about the context: the history of management actions and public reactions to them, tensions and alliances between stakeholder groups, and information about what the stakeholders need to learn about the issue at hand. Applying those manager insights is critical

Table A.1 Strengths and Weaknesses of Quantitative Methods

Method	*Strengths*	*Weaknesses*
Face-to-face interview	allows a lengthy instrument to be administered has a high item-response rate, because interviewees usually answer every question can include complex questions can include branching,* depending on the answers to screening questions allows the interviewer to clarify questions and probe for a more complete answer allows for field observation of equipment used, game harvested, and other factors of interest can include people who aren't likely or able to respond to telephone or mail	is expensive because of staff time and travel costs requires highly trained interviewers may require a lot of time to reach potential respondents and complete all interviews has potential for interviewer bias has potential for social desirability bias (when answers are socially acceptable rather than truthful)
Telephone interview	can be implemented quickly is highly conducive to branching (with computer-assisted interview instruments) provides more control over who answers questions than a mail survey has a higher cooperation rate than a mail questionnaire (but lower than a face-to-face interview) can be implemented with a geographically dispersed group	must include questions that are brief and easily understood must be short has some potential for social desirability bias requires highly trained interviewers willing to work evenings and weekends
Mail survey	can include complex questions can be implemented to a geographically dispersed group allows respondents to reply at their convenience, resulting in better memory recall (they can verify the information) has low potential for social desirability bias	can include only a limited amount of branching raises problems of nonresponse bias takes a long time—usually eight weeks—before all responses are in provides no opportunity to explain questions doesn't provide certainty about who actually completed the questionnaire doesn't give the researcher complete control over the order in which the questions are answered

** "Branching" means that the questions respondents are asked depend on the answers they have given to previous questions.*

to shaping a useful study. The social scientist should not develop and implement a study of stakeholders without ongoing involvement of the wildlife manager. Here are some questions you'll want to consider before and after you decide you need a study.

Do we really need a study?

When an issue is particularly contentious, conducting a study is sometimes a tactic used to create a cooling-off period for the opposing stakeholders or to postpone a decision to a more propitious time. These are the *wrong* reasons for a human dimensions study.

Does the information already exist?

Perhaps the information you want already exists. Perhaps there are secondary data, obtained for another purpose, that could provide adequate insight for the current situation. A literature review or consultation with a human dimensions spe-

Table A.2 Strengths and Weaknesses of Qualitative Methods

Method	*Strengths*	*Weaknesses*
Interviews	respondents describe their characteristics in their own words entails face-to-face interactions, in which any questions or misunderstandings can be clarified opportunity for researcher to ask follow-up questions to increase relevance of data group interviews offer opportunities for deliberation of points	requires skilled and knowledgeable interviewers different interviewers may collect different data because of choice of follow up questions can be time-consuming and expensive often requires travel to dispersed sites
Behavioral observation	is unobtrusive provides direct information about human behaviors of interest researcher often has minimal influence on what is observed	requires field staff that have extensive training different researchers may collect different data because of attention to different details does not allow researchers to ask questions to increase relevance of data can be time-consuming and expensive often requires travel to dispersed sites
Document analysis	researcher has no influence on data provides insights about communication and relationships between groups allows for exploration of change over time is unobtrusive and does not interfere with ongoing communication between groups	does not allow researchers to ask questions to increase relevance of data

cialist may uncover a study of a similar situation that can be generalized to your situation.

Is a new study worth the cost?

Sometimes more or better data would be reassuring, but the extra measure of validation or precision does not justify the expense of a study. In fact, many decisions aren't important enough to warrant a study at all.

Will a study build unrealistic expectations?

Wildlife damage managers sometimes want to identify support for an innovative management action and look to a stakeholder study as a way to verify the support. There's nothing wrong with that. However, the decision to undertake such an inquiry needs to be made cautiously; moving ahead with the study may build expectations for follow-through that the agency can't meet if an action is later determined to be biologically, fiscally, or politically unfeasible. That can create a public backlash.

Is there enough time?

Occasionally input is needed too quickly to conduct an inquiry with proper technique; a good study done too late to be used in decision making is a waste of resources. It may be possible to launch a limited, but credible, study on short notice with rapid turnaround time, but more often such studies have limitations that lead to disappointment in the outcome. Don't ask the researcher to compromise on methodology to get the job done on an unreasonable schedule.

Who needs to be involved?

It's absolutely necessary that wildlife agency leaders and staff, as well as key stakeholders, be supportive of the human dimensions inquiry. Frequently the decision-making process can be enhanced significantly simply by including other relevant entities (e.g., other land management agencies and nongovernmental organizations) in

the design and implementation of a study. They can make valuable contributions to study development, and through their involvement they become vested in the study and more comfortable with the application of the results in decision making.

Who should do the study?

Many considerations go into a decision about who should conduct a stakeholder study in a particular situation. Considerations include time constraints, political climate, cost, potential contribution to the knowledge base and theory, internal and external perceptions of bias on the part of the research entity, the effect that the reputation of the research entity may have on peer and stakeholder acceptance of the results, and so on.

One easily can imagine circumstances where a stakeholder study should not be conducted by agency staff. If an agency has already taken a position on a contentious issue, any study it conducts directly would be seen as an attempt to reinforce its position. Similarly, even when a nongovernmental organization wants to conduct or sponsor a study simply to enhance the human dimensions knowledge base on an issue, the public may not have faith in such a study if the organization has a particular position on the issue. In such situations you should consider retaining the services of a respected outside researcher.

What decision is to be served by the study; and what kinds of data will be most helpful?

Focus on the decision to be made and the decision makers to ensure the data you collect will be useful. For example, you may be considering a bait-and-shoot program to manage an urban deer problem. A citizen task force in a community may have decided it's the only feasible action, from a population-dynamics viewpoint and in consideration of other factors. What you want to know is whether the residents in the problem area would find that bait-and-shoot program acceptable and why. Seeking less specific information (e.g., general attitudes about wildlife) at this point will not help predict acceptability of the decision.

On the other hand, perhaps your informal assessment of the situation doesn't indicate an obvious action preference, and you're still considering various management alternatives. In that case you may want to generally learn whether residents would find lethal or nonlethal alternatives acceptable.

Should there be an external study advisory team?

Stakeholders usually have little involvement in the design and implementation of human dimensions studies. But there are many situations when it is useful to involve stakeholder representatives as a study advisory team. Interaction among managers, researchers, and an advisory team during the design and implementation of a study can increase public confidence in the study design and public trust in study findings.

Situations when study advisory teams are useful

- when multiple entities have jurisdictions relevant to the issue (include people from those entities);
- when the issue is contentious enough that organized factions don't trust the wildlife agency, or any other single organization, to design and implement an unbiased study;
- when insight from people involved in an issue (both those within the wildlife agency and those external to it) needs to be on tap from beginning to end, and their commitment to an advisory team will help ensure their input;
- when others will have key roles in making or communicating a management decision, and their involvement on an advisory team will build their knowledge; and
- when others are paying for the study, and their involvement partly or entirely fills accountability requirements.

In each situation, the purposes of an advisory team must be clear, and the roles and responsibilities of each individual and the team overall must be spelled out and agreed on at the outset to avoid confusion of purpose and mixed expectations. Care must be taken with respect to the process of identifying advisory team members.

What information do you want?

Think carefully about the kind of information you need to inform the decision to be made. Leaving that task to the researcher would be inappropriate. Most researchers wisely will refuse to do your job. You should be able to explain the

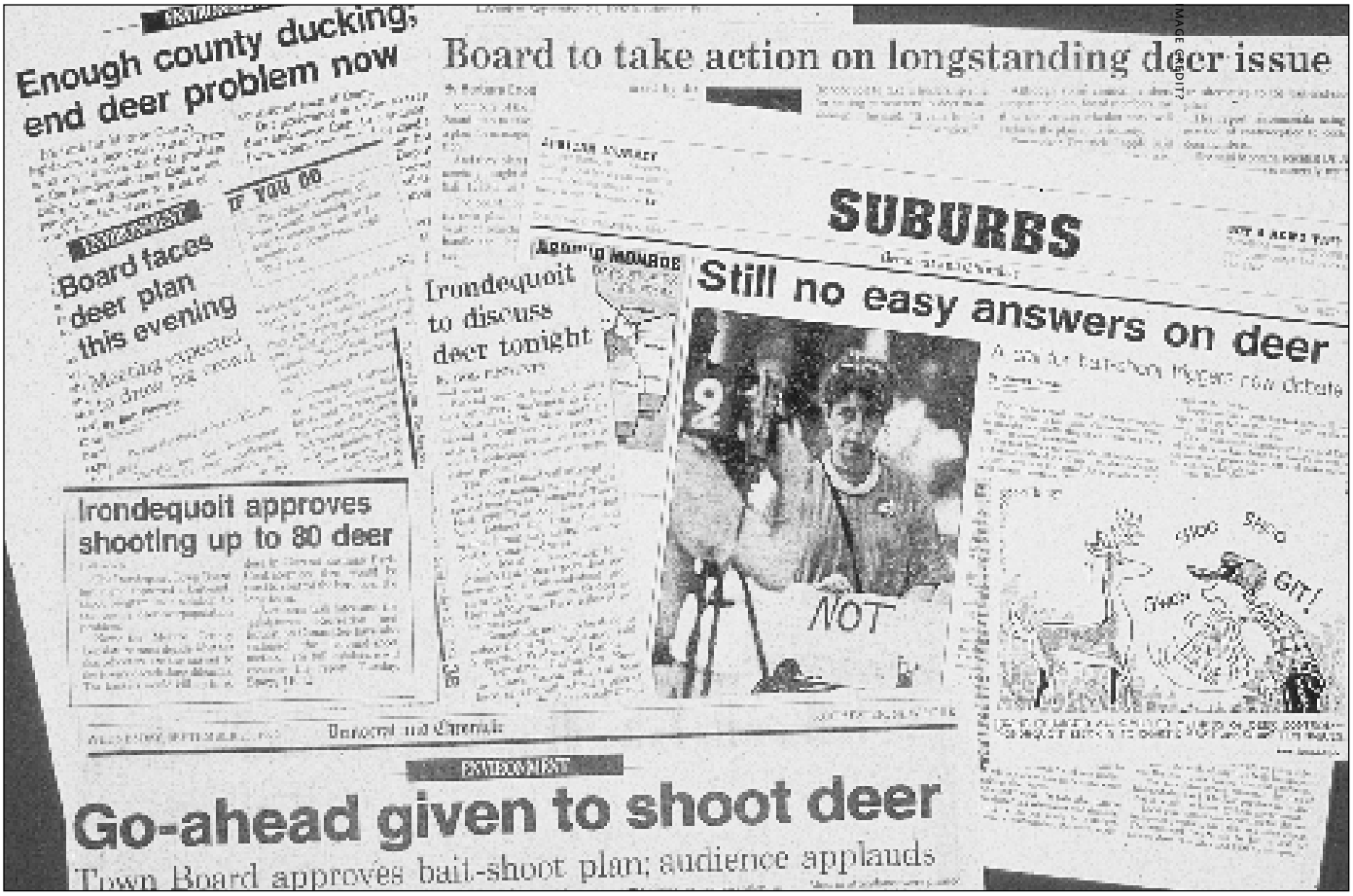


Fig. A.1 Media coverage can have a substantial effect on wildlife damage management.

kind of information you need and why. *Don't draft a questionnaire*; rather, develop information objectives that the human dimensions specialist can use to design the questionnaire. Distinguish between information that would be interesting for background and that which is essential.

Who will handle the media and how will media relations be coordinated?

Some studies are low-key undertakings that generate little media interest. Other studies are focused on hot topics (e.g., culling deer in a national park) that interest the media. Media relations in the latter case can affect a human dimensions study in several ways. First, high profile coverage before and during implementation can affect the results themselves. Second, the human dimensions researchers and wildlife managers can be distracted dealing with the media; it takes time to answer reporters' questions and those of stakeholders generated by the media coverage. Third, media treatment of a study can create tensions between the agency and the researcher (e.g., misquotes or even accurate statements from the researcher that aren't in line with agency policy) and between the agency and the stakeholders. These concerns need to be addressed by planning media relations ahead of time.

Do people know enough?

People can be enticed to respond to almost anything. The goal is to be sure you're getting truthful, accurate responses to reasonable questions. Expectations of stakeholders' ability to provide information has to be realistic. Ask appropriate, relevant, and needed questions.

Answers to questions about hypothetical scenarios or potential interactions with species that people haven't experienced will necessarily be superficial, no matter how sophisticated the inquiry is otherwise. Responses to such questions may reveal how a stakeholder would react to a proposal, but they wouldn't reveal the stakeholder's likely response to the actual scenario experience.

How precise do results need to be?

When designing a sampling strategy, you should anticipate being asked how precise the results need to be. Can you live with fairly broad estimates—say plus or minus 7%—of important population parameters (e.g., level of support for a management program, percentage of public experiencing wildlife damage, etc.)? Or can you tolerate only a 3% error range? Your answer will make a big difference in sample size, which in turn will influence cost and time.

How confident must you be in the results, statistically speaking? Do you need to have only a 1 in 20 chance ($P = 0.05$) of a measure for the stakeholder population falling outside the error range? Or, given the level of uncertainty that exists for other parameters in a decision, could you accept a 1 in 5 ($P = 0.20$) chance that the actual value for a parameter might not be within the error range specified? The more confidence you demand, the greater the sample size required, and the higher the cost and longer the time required for the study.

Sometimes subsets of a population of interest need special attention. For example, for a statewide assessment of farmers' acceptance of deer, a sample of 500 might be adequate. But if you want data from 10 deer management regions that is specific enough to allow you to be responsive to the needs of each region, geographicstratification of sampling would be needed. Each region would be sampled to give region-by-region data. The total sample size might jump to 5,000, and study costs would rise.

You'll need to consider precision, confidence, and stratification carefully to assure that the study yields information of the right kind and the right quality for decision making. Typically, you'll have to make trade-offs to keep the study within budget. Every case is unique, and it is the wildlife manager, not the advising researcher or statistician, who should make such decisions.

What about nonrespondents?

Unless a response rate is very high, you should be concerned about nonresponse bias. Forget about the justifications you have occasionally read in papers or reports using results from a survey with a low response rate (e.g., "We experienced a 25% response rate, which is good for single-wave mail surveys."). You'll want to know if the people who didn't respond have characteristics markedly different from those who did. If they do, knowledge of those characteristics may influence your interpretation of results and implications (i.e., generalizability). A nonrespondent follow-up is typically a telephone survey of a randomly selected group of nonrespondents to a mail survey, and sometimes even of nonrespondents to a telephone survey.

Literature Cited

Baker, S. V., and J. A. Fritsch. 1997. New territory for deer management: human conflicts on the suburban frontier. Wildlife Society Bulletin 25:404–407.

Brown, T. L., and D. J. Decker. 1979. Incorporating farmers' attitudes into management of white-tailed deer in New York. Journal of Wildlife Management 43:236–239.

Butler, J. S., J. E. Shanahan, and D. J. Decker. 2001. Wildlife attitudes and values: a trend analysis. HDRU Series Publication Number 01-4, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Calvert, R., and M. Ellingwood. 2001. Bear damage management in New Hampshire: past, present and future. Abstracts of the 57th Northeast Fish and Wildlife Conference. The Northeastern Association of Fish and Wildlife Agencies, 22–25 April, 2001, Saratoga Springs, New York, USA.

Carpenter, L. H., D. J. Decker, and J. F. Lipscomb. 2000. Stakeholder acceptance capacity in wildlife management. Human Dimensions of Wildlife 5:5–19.

Chase, L. C., T. M. Schusler, and D. J. Decker. 2000. Innovations in stakeholder involvement: what's the next step? Wildlife Society Bulletin 28:208–217.

Chase, L. C., W. F. Siemer, and D. J. Decker. 1999. Designing strategies for stakeholder involvement in wildlife management: insights from case studies in Colorado and New York. HDRU Series Publication Number 99-9, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Clay, W. H., and R. H. Schmidt. 1998. Utilizing human dimensions information in federal damage management programs. Transactions of the North American Fish, Wildlife, and Natural Resources Conference 63:215–226.

Conover, M. R. 1997. Monetary and intangible valuation of deer in the United States. Wildlife Society Bulletin 25:298–305.

Curtis, P. D., and J. R. Hauber. 1997. Public involvement in deer management decisions: consensus versus consent. Wildlife Society Bulletin 25:399–403.

Deblinger, R. D., W. A. Woytek, and R. R. Zwick. 1999. Demographics of voting on the 1996 Massachusetts ballot referendum. Human Dimensions of Wildlife 4(2):40–55.

Decker, D. J. 1985. Agency image: a key to successful natural resource management. Transactions of the Northeast Section of The Wildlife Society 41:43–56.

Decker, D. J., T. L. Brown, N. A. Connelly, J. W. Enck, G. A. Pomerantz, K. G. Purdy, and W. F. Siemer. 1992. Toward a comprehensive paradigm of wildlife management: integrating the human and biological dimensions. Pages 33–54 *in* W. R. Mangun, editor. American fish and wildlife policy: the human dimension. Southern Illinois University Press, Carbondale, Illinois, USA.

Decker, D. J,. and L. C. Chase. 1997. Human dimensions of living with wildlife—a management challenge for the 21st century. Wildlife Society Bulletin 25:788–795.

Decker, D. J., C. C. Krueger, R. A. Baer, Jr., B. A. Knuth, and M. E. Richmond. 1996. From clients to stakeholders: a philosophical shift for fish and wildlife management. Human Dimensions of Wildlife 1:70–82.

Decker, D. J., and K. G. Purdy. 1988. Toward a concept of wildlife acceptance capacity in wildlife management. Wildlife Society Bulletin 16:53–57.

Decker, D. J., T. M. Schusler, T. L. Brown, and G. F. Mattfeld. 2000. Co-management: an evolving process for the future of wildlife management? Transactions of the North American Wildlife and Natural Resources Conference 65:262–277.

Decker, D. J., R. E. Shanks, L. A. Nielsen, and G. R. Parsons. 1991. Ethical and scientific judgements in management: beware of blurred distinctions. Wildlife Society Bulletin 19:523–527.

Eilon, S. 1995. Goal and constraints in decision-making. Pages 3–15 *in* S. Eilon, editor. Management science: an anthology. Dartmouth Publishing Company, Brookfield, Vermont, USA.

Fischoff, B., S. Lichtenstein, P. Slovic, S. L. Derby, and R. L. Keeney. 1981. Acceptable risk. Cambridge University Press, New York, New York, USA.

Gentile, J. R. 1987. The evolution of antitrapping sentiment in the United States: a review and commentary. Wildlife Society Bulletin 15:490–503.

Hahn, A. J. 1990. Issues-oriented public policy education: a framework for integrating the process. Journal of Extension 28:15–19.

Knuth, B. A., R. J. Stout, W. F. Siemer, D. J. Decker, and R. C. Stedman. 1992. Risk management concepts for improving wildlife population decisions and public communication strategies. Transactions of the North American Wildlife and Natural Resources Conference 57:63–74.

Lauber, T. B., and T. L. Brown. 2000. Hunting access on private lands in Dutchess County. HDRU Series Publication Number 00-12, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Lauber, T. B., and B. A. Knuth. 1998. Suburban residents' attitudes towards contraception and other deer management techniques. HDRU Series Publication Number 98-8, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Lauber, T. B., and B. A. Knuth. 2000. Citizen participation in natural resource management: a synthesis of HDRU research. HDRU Series Publication Number 00-7. Department of Natural Resources, Cornell University, Ithaca, NY, USA.

Loker, C. A., D. J. Decker, and S. J. Schwager. 1999. Social acceptability of wildlife management actions in suburban areas: 3 cases from New York. Wildlife Society Bulletin 27:152–159.

Lund, R. C. 1997. A cooperative community-based approach for the management of suburban deer populations. Wildlife Society Bulletin 25:488–490.

Minnis, D. L., and R. B. Peyton. 1995. Cultural carrying capacity: modeling a notion. Pages 19–34 in J. B. McAninch, editor. Urban deer: a manageable resource? Proceedings of the symposium of the 55th Midwest Fish and Wildlife Conference. North Central Section of The Wildlife Society, 12–14 December 1993, St. Louis, Missouri, USA.

New Jersey Division of Fish and Wildlife. 2000. News release archive. http://www.state.nj.us/dep/fgw/news/pastnr.htm.

Pinkerton, E. W. 1999. Factors in overcoming barriers to implementing co-management in British Columbia salmon fisheries. Conservation Ecology 3(2): 2. [online] URL: http://www.consecol.org/vol3/iss2/art2.

Pomerantz, G. A., C. Ng, and D. J. Decker. 1986. Summary of research on human tolerance of wildlife damage. Natural Resources Research and Extensions Series Number 25, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Purdy, K. G., and D. J. Decker. 1989. Obtaining wildlife values information for management: the wildlife attitudes and values scale. HDRU Series Publication Number 89-2, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Riley, S. J., and D. J. Decker. 2000a. Risk perception as a factor in wildlife stakeholder acceptance capacity for cougars in Montana. Human Dimensions of Wildlife 5:50–62.

Riley, S. J., and D. J. Decker. 2000b. Wildlife stakeholder acceptance capacity for cougars in Montana. Wildlife Society Bulletin 28:931–939.

Riley, S. J., D. J. Decker, L. H. Carpenter, J. F. Organ, W. F. Siemer, G. F. Mattfeld, and G. Parsons. 2002. The essence of wildlife management. Wildlife Society Bulletin. 30:*in press*.

Schusler, T. M. 1999. Co-management of fish and wildlife in North America: a review of literature. HDRU Series Publication Number 99-2, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Schusler, T. M. 2001. Exploring social learning in the development of collaborative natural resource management. Masters Thesis, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Schusler, T. M., L. C. Chase, and D. J. Decker. 2000. Community-based management: sharing responsibility when tolerance for wildlife is exceeded. Human Dimensions of Wildlife 5:34–49.

Siemer, W. F., and T. L. Brown. 1993. Public access to private land for hunting in New York: a study of 1991 landowners. HDRU Series Publication Number 93-4, Department of Natural Resources, Cornell University, Ithaca, New York, USA

Siemer, W. F., and D. J. Decker. 1991. Human tolerance of wildlife damage: synthesis of research and management implications. HDRU Series Publication Number 91-7, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Slovic, P. 1987. Perception of risk. Science 236:280–285.

Slovic, P. 1993. Perceived risk, trust, and democracy. Risk Analysis 13:675–682.

Stout, R. J., R. C. Stedman, D. J. Decker, and B. A. Knuth. 1993. Perceptions of risk from deer-related vehicle accidents: implications for public preferences for deer herd size. Wildlife Society Bulletin 21:237–249.

Glossary

AIM Adaptive Impact Management—managers focus on impacts and approach management as an adaptive, constantly learning, and improving process.

Attitude a person's favorable or unfavorable evaluation of a person, object, concept, or action; an important component to predicting behavior.

Behavioral observation a research method wherein the researcher makes direct but unobtrusive observations of subjects during a sample of time periods or during the course of particular events.

Citizen participation in wildlife management agency-initiated involvement of wildlife management stakeholders in making, understanding, implementing, or evaluating management decisions for improved wildlife management.

Cognitive risk perceptions perceptions of the probability of an undesirable outcome.

Co-managerial approach management by two or more entities, involving shared control and responsibility for a particular wildlife management situation.

Communication planning a management activity that normally begins with an evaluation of program goals and an effort to link communication goals to program goals.

CTF Citizen Task Force, in which stakeholders are engaged in deliberation over management issues and typically are asked to recommend management objectives and/or actions.

Economic impact the change in economic activity, positive or negative, in a defined geographic area, that is associated with an activity or event.

Expert authority approach a top-down approach in which wildlife managers make decisions and take actions unilaterally.

Face-to-face interviews a research method where trained interviewers complete in-person

interviews, using a carefully designed interview protocol.

Focus group a method wherein a trained moderator poses a prepared set of questions or topics to a small, relatively homogeneous group of people. Reactions from the group are usually recorded for later analysis. Multiple groups may be convened as part of a single study.

Grassroots citizen participation citizen-initiated involvement in wildlife management processes.

Goals (management) broad statements of agency or organizational intent, often based on state and federal policies.

Impacts Countless effects are created through interactions among people, wildlife, and wildlife management agencies. Many effects are largely unnoticed by stakeholders. However, a subset of effects are recognized by people, interpreted as being important, and evaluated as being "good" or "bad." We call that subset of effects "impacts." When a particular effect is regarded as important to many people, it becomes an impact having management significance.

Inquisitive approach a management approach that actively seeks information about stakeholders, and their positions, either during a controversy or before an anticipated problem becomes a public issue.

Media planning the process of selecting appropriate channels for messages intended to reach particular stakeholders.

Nominal group technique a qualitative research method in which a trained facilitator convenes a small group of stakeholders or subject matter experts, elicits ideas in writing on a given topic or question, and has group members prioritize the ideas through a voting process.

Objectives (management) statements that provide measurable definition of the part of the agency or organizational goal that is expected within a particular time frame.

Participant observation technique a field research method in which the researcher records observations of subjects in a particular setting.

Passive-receptive approach an approach where wildlife managers are alert to but do not actively and systematically seek out concerns of stakeholders.

Satisficing is a term used to describe qualitative decision-making techniques (typical for wildlife damage management scenarios) commonly employed by decision makers to select acceptable alternatives. Decision makers are often unable to reconcile the multiple conflicting desires of stakeholders or to conduct an analysis in a more critical or formal process (e.g., optimization, maximization). He or she proceeds with what may not be the "best" decision, but one that is "good enough."

Secondary data data that already exist, such as the most recent census data.

Stakeholder (wildlife) any person or group who will be affected by, or will affect, a particular type of wildlife management.

Stakeholder involvement engagement of stakeholders in making, understanding, implementing or evaluating wildlife management decisions.

Transactional approach a management approach of obtaining public input in which stakeholders engage each other directly through interactive processes to articulate their values and stakes, rather than expressing those values and stakes indirectly, through the wildlife manager.

Values Desirable end states, modes of conduct, or qualities of life humans individually or collectively hold dear. Values are general mental constructs that define what is important to people.

WAVS Wildlife Attitude and Values Scale—a survey scale used to assess beliefs about the value of different types of human-wildlife interactions.

Wildlife management a set of processes and practices that purposefully influence interactions among and between people, wildlife, and habitat to achieve desired impacts, defined in terms of human values and objectives.

Wildlife stakeholder acceptance capacity (WSAC) The unique capacity of a given stakeholder group to accept the positive and negative impacts associated with a particular type of wildlife or wildlife management program.

A PRACTITIONERS' GUIDE

Human-Wildlife Conflict Management

Wildlife management calls for skillful integration of social and biological information. This guide is designed to help wildlife managers with biological backgrounds integrate human dimensions considerations into decisions that involve conflicts between people and wildlife. The guide focuses on two components of the human dimension: social assessment and stakeholder engagement.

Part 1 presents a conceptual foundation for the practice of conflict management. Part 2 summarizes key insights about human tolerance of negative interactions with wildlife. Part 3 offers practical guidance on designing, implementing, and evaluating stakeholder engagement processes in support of wildlife management.

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

The Northeast Wildlife Damage Management Research and Outreach Cooperative

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