Designing stakeholder involvement strategies to resolve wildlife management controversies

Lisa C. Chase, William F. Siemer, and Daniel J. Decker

Abstract Deciding when and how to involve stakeholders in wildlife management is a challenge for state agencies throughout the United States. No single process works well in all cases, and a "cookbook" approach to designing a strategy that will address all the complex situations encountered by wildlife managers is unrealistic. The challenge is great, but experience of wildlife managers together with literature from other fields can help guide agencies toward effective involvement of stakeholders in management. Our analysis suggested that 4 steps were especially useful for designing stakeholder involvement strategies: conducting a situation analysis, defining agency objectives for stakeholder involvement, selecting a general stakeholder involvement approach, and designing a context-specific strategy. To illustrate these steps, we applied them to 2 case studies: elk (*Cervus elaphus*) management in Evergreen, Colorado and white-tailed deer (*Odocoileus virginianus*) management in Cayuga Heights, New York. Our analysis verified that some design elements of stakeholder involvement strategies were unique to specific situations, indicating the need for careful matching of contexts and involvement processes. We found that the desired level of influence of stakeholders was greater in Cayuga Heights than in Evergreen; however, stakeholders in both locations indicated a preference for involvement processes that shared certain characteristics. In both cases, results suggested that agencies should invest the resources necessary to implement stakeholder involvement processes that use scientific information, have genuine influence on decisions, treat citizens fairly, and promote communication and education. While certain aspects of stakeholder involvement strategies appeared to be desirable regardless of the context, the common foundation for stakeholder involvement was complemented by tailored strategies based on inquiry, analysis, and judgment.

Key words attitudes, citizen participation, elk, public input, stakeholder involvement, suburban residents, white-tailed deer

Conflicts over management of abundant wildlife populations have increased dramatically during the last decade. Large herbivores in particular are a source of controversy in many suburban communities. For example, some homeowners enjoy the presence of white-tailed deer (*Odocoileus virginianus*) and elk (*Cervus elaphus*) in their neighborhoods while other residents have become concerned about problems deer and elk may cause, such as damage to gardens and risks of vehicular accidents. In many situations, the tolerance of stakeholders for negative impacts of wildlife has

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been exceeded. Wildlife agencies and stakeholders are faced with the challenge of managing wildlife in areas where traditional management methods such as hunting are infeasible or socially unacceptable.

At issue are not only the technical aspects of wildlife population control but also regard for socially acceptable solutions and management of conflicts among stakeholders with opposing viewpoints. Experience and research demonstrate that well-designed, well-executed stakeholder involvement processes can help agencies and communities resolve conflicts between stakeholders and facilitate implementation of socially acceptable management actions (Curtis and Hauber 1997, Guynn and Landry 1997, Lund 1997). Experience to date is promising, but designing stakeholder involvement strategies appropriate for each unique situation is far from straightforward. Failures in citizen involvement have been noted (Gericke and Sullivan 1994). No single strategy works in all situations, and a "cookbook" approach that can address the myriad of unique factors in these complex situations is unrealistic (Lawrence and Deagen 2001).

Nevertheless, a wealth of experience and literature exists to guide agencies toward effective involvement of stakeholders in management. In this paper, we describe and apply a framework for designing context-specific stakeholder involvement strategies. We begin by identifying 2 cases where wildlife management controversies were emerging at the time we conducted this inquiry. We then describe a framework with a 4-step process for designing stakeholder involvement strategies and explain how each step was applied to the 2 cases. The first step focused on ways to conduct a situation analysis, and we explain our decision to use informal interviews followed by a systematic survey. The second step was identification of agency objectives for stakeholder involvement, and we present such objectives for elk management in Colorado and deer management in New York. The third step involved use of a decision aid, and the 2 cases illustrate how the aid could be employed to link agency objectives with overall stakeholder involvement approaches. The decision aid was complemented by data collected through the survey described in step 1. The fourth step also used data from the survey described in step 1, and it contained a discussion of case similarities and differences and their importance for designing a context-specific stakeholder involvement strategy. We conclude with suggestions regarding how human-dimensions inquiry can help design strategies for constructively involving stakeholders in wildlife management.

Newpaper clippings of elk management controversy in Evergreen, Colorado.

We expect that the framework could be applied in diverse situations and need not be limited to controversies over ungulates in suburban neighborhoods. We chose the following 2 cases as a starting point (i.e., an initial test of the framework). Future research should examine the extent of the transferability of the 4-step process.

Case studies

In cooperation with the Colorado Division of Wildlife (DOW) and the New York State Department of Environmental Conservation's Bureau of Wildlife (DEC), we developed a framework for designing stakeholder involvement strategies (see Chase 2001.) To evaluate the applicability and transferability of the framework, we applied it to 2 cases.

The cases we selected were not representative of the scope of wildlife management controversies throughout the United States. Rather, we worked with the DOW and DEC to identify situations that were of concern to the agencies and were similar in several but not all respects. The 2 cases we selected met the following criteria:

1. controversy about management of a specific wildlife species was emerging;
2. traditional management methods, such as hunting, were likely to be infeasible or socially unacceptable;
3. stakeholders in the community held diverse wildlife values; and
4. local DOW and DEC wildlife managers were

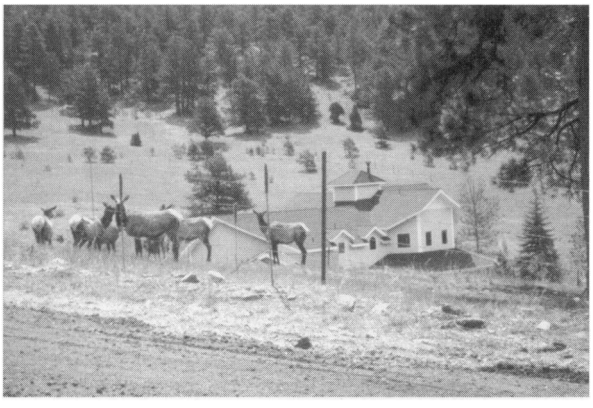
interested in working with us to advance understanding of stakeholder involvement in wildlife management.

DOW and DEC staff helped us identify cases meeting these 4 criteria in their respective states, and together we selected elk management in Evergreen, Colorado and white-tailed deer management in Cayuga Heights, New York as pilot cases for applying the framework and assessing its usefulness and transferability.

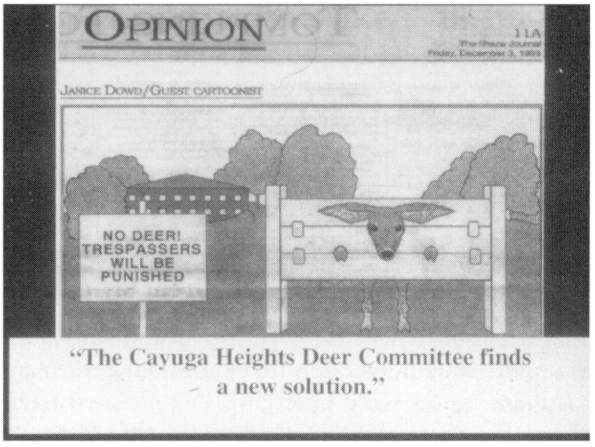
Elk management in Evergreen, Colorado

Evergreen, Colorado is a suburb west of Denver, encompassing approximately 130 square miles. The town of Evergreen is located on a landscape of high plains and mountain foothills with elevations ranging from 2,100–2,800 m. By the 1920s the town had developed into a weekend resort area for Denver residents. Year-round residents increased with improvements to roads and other infrastructure, and parts of Evergreen became residential communities of Denver commuters. Characteristic of rapid population growth in much of Colorado, Evergreen's human population grew from about 13,000 in 1980 to about 24,000 in 1998 (Evergreen Chamber of Commerce 1999).

During the last 2 decades the elk population in the Rocky Mountain foothills region including Evergreen has increased by more than two-thirds (J. L. George, Colorado DOW, personal communication). Growth in the elk population has been concentrated in suburban areas. In 1998 when this study was developed, the DOW was receiving unsolicited complaints about elk damage to residential properties and concerns about the risks of elk–vehicle accidents.



Elk on a roadside in Evergreen, Colorado. Photo by L. C. Chase.



Cartoon about the deer management controversy in Cayuga Heights, New York.

The elk management issue in Evergreen met the 4 criteria necessary for applying our stakeholder involvement framework. DOW wildlife managers identified Evergreen as a community with growing controversy over how and whether to manage elk (i.e., the issue was emerging). DOW staff believed recreational hunting might help reduce the population but additional, nontraditional management actions would be necessary to control the fast-growing elk herd in densely developed subdivisions. The DOW anticipated challenges to attempts to manage elk in Evergreen because it was known that stakeholders in this community had diverse and polarized attitudes about wildlife management. In addition, local wildlife managers expressed interest in working with us on this study. For comparison, we selected another case that met similar criteria but concerned a different wildlife species in a different location.

Deer management in Cayuga Heights, New York

The Village of Cayuga Heights is located in the Township of Ithaca, Tompkins County, New York. Cayuga Heights is a relatively affluent residential community that borders the city of Ithaca. Census figures indicated that the village had 3,613 residents in 1990 (United States Department of Commerce 1992). The village, about 520 hectares in size, is situated on hilly topography east of Cayuga Lake, one of the Finger Lakes in central New York. The village has numerous small woodlots covering side slopes as well as ravines unfavorable for home construction or maintenance as open lawn.

During the winter of 1998, some Cayuga Heights residents conducted a petition drive to document concerns about deer in the village. Presented with these concerns, the mayor appointed a citizen committee to study the situation. The Cayuga Heights Deer Committee was officially created in August of 1998 with the charge of studying "the deer problem" in the village and developing recommendations for the mayor and village trustees.

We selected deer management in Cayuga Heights as a case study because the formation of the Deer Committee demonstrated that suburban deer management issues were emerging. We learned from the DEC that traditional management methods were likely infeasible and socially unacceptable and that stakeholders were known to hold diverse wildlife values. In addition, the DEC and the Deer Committee expressed interest in working with us to develop and apply the 4-step process.

Step 1: Understanding the situation

The first step of the 4-step process was to gain deeper understanding of the situation in question. In general, if stakeholder involvement is being considered, the agency likely has some understanding of the context. Local wildlife managers typically are aware of the key stakeholders affected by an issue, as well as some of their primary concerns, attitudes, and interests. In some cases, agency staff may feel their understanding of a specific situation is adequate, and further investigation is not necessary. In other cases, better understanding of the situation may be essential for productively involving stakeholders in management.

We developed our first impressions of the study areas from discussions with DOW and DEC staff. We then interviewed several stakeholders in each area. Based on those interviews, we developed a structured survey instrument for systematically assessing residents' views about elk and deer management and citizen participation in wildlife management.

We designed a questionnaire to provide the following information about study participants: demographic characteristics; interests, concerns, and attitudes regarding elk or deer management; wildlife values; opinions about stakeholder involvement in elk or deer management; and preferences for personal involvement in elk or deer management. The questionnaire was first implemented in Evergreen and, based on our experiences with that application, modified for implementation in Cayuga Heights (see Chase 2001 for questionnaires.)

Sampling and survey implementation

Evergreen, Colorado. Formal boundaries did not exist for Evergreen because it was unincorporated. For the purpose of this study, Evergreen was defined as households within the postal zip codes of 80437 and 80439. A random sample of 500 of these households was computer-generated by a survey sampling firm and purchased for the mail survey.

Data were collected via a mail survey conducted during April–June of 1998. Of the 500 questionnaires sent in the first mailing, 5% were undeliverable or went to people who did not live in Evergreen. After 3 mailing events, we received 342 usable questionnaires before the cut-off date of 30 June. The response rate, adjusted for undeliverable questionnaires and nonresidents, was 72%.

We did not conduct a follow-up study to assess the possible bias of omitting those who did not respond to the survey because of the combination of the high level of response, a relatively homogeneous population, and our intended use of the data. Social science survey literature reveals disagreement about acceptable response rates, but rates $\geq$65% are often considered acceptable because at such high levels the response bias has little statistical significance (Goyder 1985, Dolsen and Machlis 1991). The impact of response bias, and thus the acceptable response rate, may be lower when the target population is homogeneous (Goudy 1976), as in the case of a small community with similar demographic characteristics such as Evergreen. In addition, our intended use of the data—to design stakeholder involvement strategies—caused us less concern regarding nonrespondents because past research on wildlife issues indicated that nonrespondents were less likely to be involved in wildlife-related activities and had less interest in the specific wildlife issue explored (Tarrant et al. 1993, Loker et al. 1999). Because the overall goal of this study was to design stakeholder involvement strategies for a specific community, we were primarily interested in stakeholders who would voice their concerns about wildlife management and cared about stakeholder involvement. We assumed that those who did not respond to a mail survey were less likely than respondents to desire involvement in management at a later date and thus were of less concern for the overall goal of this study.

Cayuga Heights, New York. We obtained access to a listing of 851 residential properties in the Village of Cayuga Heights through the Tompkins County Office of Real Property Tax Assessment. We randomly selected 550 resident property owners from the list of single- and 2-family year-round residences in Cayuga Heights.

During November and December of 1998, we sent questionnaires to 550 Cayuga Heights property owners. Similar to the Evergreen survey, nonrespondents received up to 3 additional mailings. We received 438 usable responses before the cut-off date of 31 December. The response rate, adjusted for undeliverable questionnaires and nonresidents, was 81%. As discussed earlier for the Evergreen survey, we considered a nonresponse follow-up study unnecessary, given the high response rate, the homogeneous population, and our intended use of the data.

Survey results

Survey data, which were described at length in Chase et al. (1999) and Chase (2001), provided baseline information for the situation analysis. Results revealed that both Evergreen and Cayuga Heights were communities with high income and education levels as compared with nearby towns. As a group, Cayuga Heights respondents were considerably older than Evergreen respondents and more likely to be female (Table 1). We did not collect data regarding race and ethnicity.

Although the majority of residents in both communities enjoyed the presence of large, wild herbivores, Evergreen residents were much more likely to enjoy the elk unequivocally, while Cayuga Heights residents were more likely to worry about problems that deer may cause. Few residents in Evergreen did not enjoy the presence of elk, while one-third of Cayuga Heights residents did not enjoy deer at all (Table 1).

Preferences for animal population size, which we interpreted as an indicator of tolerance of impacts associated with the species of concern, were consistent with respondents' attitudes toward the target species. Evergreen respondents were less likely than those in Cayuga Heights to prefer a population decrease. Although more than 80% of Cayuga Heights respondents wanted to see fewer deer, lethal control methods were not widely accepted (Table 1). However, Cayuga Heights residents were more likely than Evergreen residents to accept invasive management actions (i.e., those that had physical impact on the target animals), with the exception of hunting. Evergreen residents were more likely to accept education and restrictions on development (Table 1).

The factors relevant to the situation (described above and in Table 1) helped to define, or refine, objectives for stakeholder involvement. For example, although residents of Cayuga Heights preferred a decrease in the deer population, they did not readily accept all available means for reducing the size of the deer herd. In addition, variability existed across the community regarding which population

Table 1. Factors important for understanding the contexts regarding elk management in Evergreen, Colorado and deer management in Cayuga Heights, New York, 1998.

Factors relevant for situation analysis	Evergreen	Cayuga Heights
Demographic characteristics of respondents		
Gender (% male)	55%	44%
Mean age (years)	47	59
Average household income ($1000)	$50–75	$75–100
Attitudes toward elk or deer		
Enjoy elk or deer without reservations	65%	11%
Enjoy elk or deer but worry about problem	34%	54%
Do not enjoy elk or deer	1%	34%
Preferred change in population size		
Decrease	30%	81%
No change	44%	12%
Increase	17%	3%
Acceptability of management actions		
Elk or deer reproduction control		
Very acceptable	7%	55%
Moderately acceptable	40%	28%
Not at all acceptable	47%	14%
Trap elk or deer and move them to another area		
Very acceptable	12%	41%
Moderately acceptable	45%	36%
Not at all acceptable	40%	18%
Use sharpshooters to kill elk or deer at bait sites		
Very acceptable	6%	21%
Moderately acceptable	23%	27%
Not at all acceptable	69%	50%
Educate people about living with elk or deer		
Very acceptable	72%	33%
Moderately acceptable	24%	39%
Not at all acceptable	4%	25%
Restrict development to preserve habitat for elk or deer		
Very acceptable	59%	19%
Moderately acceptable	28%	44%
Not at all acceptable	13%	31%
Allow regulated archery hunting by licensed hunters		
Very acceptable	18%	19%
Moderately acceptable	41%	27%
Not at all acceptable	39%	52%

control methods were most acceptable. This realization led the DEC and the Cayuga Heights Deer Committee to conclude that greater stakeholder education and involvement were needed for the development of a socially acceptable management plan.

Although we conducted mail surveys in Evergreen and Cayuga Heights, other methods could be employed to improve understanding of a situation, including public meetings, focus groups, and other activities that elicit input from a community (Thomas 1984). These methods differ in costs and benefits (e.g., quality of input, opportunity for education, effectiveness of communication). Determining the comprehensiveness of a situation analysis would depend in part on the next step: defining agency objectives for stakeholder involvement. Because objectives are often revised as the agency learns more about a wildlife management situation, Steps 1 and 2 could be conducted simultaneously.

Step 2: Defining agency objectives for stakeholder involvement

Based on their understanding of the situation (whether from general impressions, a scientific survey, or other stakeholder-input methods), agencies can define their objectives for stakeholder involvement. Legal mandates may preclude an agency from abrogating or even sharing decision-making authority; however, agencies often have the flexibility to involve stakeholders without relinquishing authority. Complying with legislative requirements may be an agency's primary objective for involving stakeholders, and specific legislative acts may require an agency to use particular methods of public involvement (e.g., open public hearings). However, agencies are seldom restricted from going above and beyond legal requirements in terms of their objectives for stakeholder involvement and the public involvement methods used.

Literature on citizen participation has revealed several additional objectives for involving stakeholders in management (e.g., Bleiker and Bleiker 1997). Lauber and Knuth (2000) concluded that most objectives for citizen involvement in natural resource issues (beyond complying with legislative requirements) could be classified into 4 broad groups that included improving the management climate, providing input for decisions, making decisions, and implementing actions.

Improving the management climate

Often wildlife management depends on stakeholders who will support and contribute to management decisions and actions. The general climate in which wildlife management occurs, or the management environment, consists of cultural, social, economic, political, and ecological elements (Krueger and Decker 1993, Chase et al. 2000). The climate may be more conducive to management when stakeholder input is solicited. For example, management decisions may be accepted more readily when stakeholders believe their concerns are being considered by virtue of being listened to (Lind et al. 1983). Indeed, stakeholders who have had opportunities to express their opinions may be more accepting of a decision even if it goes against their wishes (Lind and Tyler 1988). Although much of this research has been conducted in other fields, these conclusions have been extended to wildlife and natural resource management decision-making (Lawrence et al. 1997, Lauber and Knuth 1999, Tuler and Webler 1999). Thus, stakeholder involvement has been used to improve the general climate in which wildlife management occurs (Chase et al. 2001). For agencies, the potential for this benefit is almost always present when stakeholders are involved, although it may not always be an explicit objective.

Providing input for decisions

An often-cited objective of stakeholder involvement is to gain information about stakeholders' needs, interests, preferences, beliefs, attitudes, and behaviors (Lauber and Knuth 2000). Information may be collected in many ways including scientific surveys, listening sessions, and public meetings. For many years, providing input for decisions was the primary objective of agencies seeking stakeholder involvement. Human-dimensions research was used to collect and analyze data that informed decisions (Chase et al. 2000). In the last decade, many agencies have extended their objectives for stakeholder involvement, allowing stakeholders to become a part of the decision-making process (Decker and Chase 1997).

Helping to make decisions

Even when a wildlife agency is well informed about the diversity of stakeholders' perspectives, setting management objectives and selecting actions may be difficult. Managers are faced with the unenviable task of weighing stakeholder input

and balancing conflicting interests. In such situations, involving stakeholders in the decision-making process can help agencies determine an acceptable balance among the needs and concerns of all stakeholders (Stout et al. 1996). Citizen task forces are an example of a method used by wildlife agencies when an objective of stakeholder involvement is having stakeholders help make decisions.

Helping to implement management actions

Stakeholders may be involved in both helping to make decisions and helping to implement management actions associated with those decisions (Chase et al. 2001). When alternatives to the traditional management tools of hunting and trapping are called for (e.g., using reproductive inhibitors to reduce the deer herd size), having stakeholders involved in implementation may be the only way to accomplish the job because resources otherwise might not be available and the management climate might not be suitable (McCay and Jentoft 1996). Stakeholders may work with wildlife agencies in a variety of ways to implement management actions, including promoting education, providing funding, monitoring wildlife populations, conducting research, and enforcing regulations (Pamplin 1986, Blanchard 1987).

As the examples above illustrate, stakeholder involvement may be used for any of the 4 broad purposes. To implement this step in Evergreen and Cayuga Heights, we worked with agency staff to understand their objectives for participation and how those might change depending on circumstances.

Agency objectives in Evergreen, Colorado

Through interviews with DOW personnel, we learned that staff differed in their objectives for involving stakeholders in elk management in Evergreen. They agreed that agency objectives included improving the management climate and seeking input for decisions. However, some DOW personnel felt strongly that stakeholders should be directly involved in decision-making while others were uncomfortable giving stakeholders such responsibility.

Agency objectives in Cayuga Heights, New York

Through interviews with DEC staff, the purpose of stakeholder involvement in Cayuga Heights encompassed all 4 objectives: improving the management climate, providing input for decisions, helping to make decisions, and helping to implement management actions. The first 3 objectives of stakeholder involvement were common in deer management in New York. The fourth objective, having stakeholders help implement management actions, was uncommon but not unprecedented. Indeed, when management methods were likely to go beyond traditional means of population control, DEC has required that communities play an active role in ensuring that management actions were carried out (Siemer et al. 2000). For example, in the suburbs of Rochester, DEC staff worked closely with a community that altered local ordinances and accepted significant responsibility for the implementation and costs of a bait-and-shoot program combined with research on deer contraception (Curtis et al. 1995, Curtis and Hauber 1997).

Step 3: Selecting a stakeholder involvement approach

Clarity in agency objectives for stakeholder involvement is an essential prerequisite to selecting an effective approach for such involvement. Approaches to stakeholder involvement reflect a continuum that differs with regard to the degree of influence that stakeholders hold compared to the agency. The idea of a continuum of influence originated in business management literature examining the role of employees in organizations and comparing "boss-centered" leadership with "subordinate-centered" leadership (e.g., Tannebaum and Schmidt 1958). Early attempts to adapt the continuum of influence to citizen participation emphasized the perspective of citizens and compared nonparticipation with degrees of tokenism and degrees of citizen power (e.g., Arnstein 1969). Later adaptations compared top-down and bottom-up planning approaches for community participation (e.g., Pretty et al. 1995). The continuum of influence described in Table 2 emphasizes an agency perspective, and the range of stakeholder involvement approaches corresponds specifically with the history of deer management in New York State and generally with the history of wildlife management in the United States (Decker and Chase 1997).

On one end of the continuum, the authoritative approach allows for little to no stakeholder involvement and keeps the locus of control squarely within the realm of the management agency. The passive-receptive approach occurs when agencies receive input from stakeholders who take the

Table 2. Range of approaches to stakeholder involvement and corresponding agency objectives, locus of control, and public involvement methods (adapted from Chase et al. 2001).

Approaches	Objectives	Locus of control	Public involvement methods (examples)
Authoritative	Improve management climate	Agency	Information through press releases
Passive–receptive	Improve management climate, provide input	Agency	Unsolicited comments
Inquisitive	Improve management climate, provide input	Agency	Surveys, public meetings, focus groups, listening sessions
Transactional	Improve management climate, provide input, help make decisions	Shared by agency and stakeholders	Task forces, mediation, citizen representatives on policy boards
Co-managerial	Improve management climate, provide input, help make decisions, help implement actions	Shared by agency and stakeholders	Methods from all 4 approaches above

initiative to contact the agency, while the inquisitive approach occurs when agencies take initiative to gather input from stakeholders. Both the passive-receptive and inquisitive approaches keep the locus of control within the management agency; however, input from stakeholders is accepted or sought, respectively, and may influence decisions. In contrast, the locus of control is shared by stakeholders and managers in both transactional and co-managerial approaches, meaning that both stakeholders and managers have influence over decisions and actions. Transactional approaches allow stakeholders to have direct involvement in decisions while co-management allows stakeholders to participate in actions and other aspects of management in addition to decisions (International Union for Conservation of Nature and Natural Resources 1997, Chase et al. 2000).

The objectives of stakeholder involvement are relatively simple in approaches where stakeholders have little direct influence on decisions (Table 2). Improving the management climate is almost always an objective. As stakeholders play a larger role in the management process, an agency may have multiple objectives for stakeholder involvement. Depending on the situation, all 4 of the objectives described in step 2 may be present. After the agency's objectives for stakeholder involvement have been agreed upon, a decision aid such as a decision tree (Figure 1) could provide guidance for connecting an agency's specific objectives with 1 of the 5 stakeholder involvement approaches.

Selecting a stakeholder involvement approach in Evergreen, Colorado

The DOW's objectives for stakeholder involvement in Evergreen differed among managers, some of whom preferred that stakeholders be limited to providing input for decisions, whereas others preferred to involve stakeholders directly in the decision-making process. Because the DOW was undecided on whether to involve stakeholders in helping to make decisions, 2 paths of the decision tree were pertinent (Figure 1). At a minimum, the DOW expressed an interest in hearing from stake-

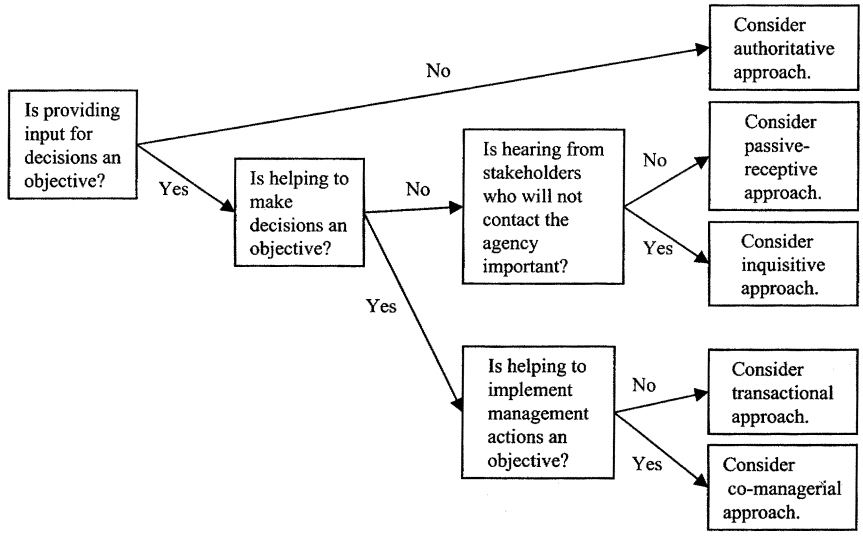


Figure 1. Decision tree for connecting agency objectives with stakeholder involvement approaches.

holders with diverse values, many of whom would be unlikely to initiate contact with the agency; thus, the preferred approach would be inquisitive. If, upon further consideration, the agency extended its objectives and decided it would like to involve stakeholders directly in making decisions but not in implementing actions resulting therefrom, a transactional approach would be adopted.

Although the DOW's preferred approach to stakeholder involvement in Evergreen appeared to be either the inquisitive or the transactional approach, wildlife managers expected increases in both the elk and the human populations in Evergreen, which might precipitate relatively rapid changes in public opinion about elk and elk management in that area. These changes would likely create a need for DOW's wildlife managers to reassess their stakeholder involvement approach within a few years.

Selecting a stakeholder involvement approach in Cayuga Heights, New York

In Cayuga Heights the DEC expected stakeholders to be actively involved in deer management. The agency's objectives for involvement included stakeholders providing input and helping to make decisions and implement management actions. Indeed, if stakeholders requested nontraditional management actions, community assistance with implementation would be required. Assistance from the community or specific groups of stakeholders might include providing funding, personnel, or access to private property, as well as altering local ordinances. Because help with implementation of management actions would be expected, DEC preferred a co-managerial approach to deer management in Cayuga Heights (Figure 1).

After selecting a preferred approach, the next step was to compare the agency's preference for a particular approach with that of stakeholders. The surveys discussed in step 1 provided information useful for this purpose. Evergreen respondents preferred greater agency control while Cayuga Heights respondents preferred greater stakeholder control. Although responses were divided, the most popular option in Evergreen was similar to the transactional approach, and the most popular option in Cayuga Heights was similar to co-management (Table 3). Because agency preferences were roughly in line with those of stakeholders, we continued to the next step. Had preferences differed dramatically, educational interventions and other techniques for adjusting agency and stakeholder preferences would have been needed before moving on.

Table 3. Respondents' preferences (%) for overall stakeholder involvement approaches to address elk management in Evergreen, Colorado and deer management in Cayuga Heights, New York, 1998[a].

Stakeholder involvement approach	Evergreen	Cayuga Heights
Authoritative	5	2
Passive–receptive	19	10
Inquisitive	29	22
Transactional	36	28
Co-managerial	12	35

[a] Respondents were presented with descriptions of the different stakeholder involvement approaches and asked to select one. See Chase 2001 for the survey instrument.

Step 4: Designing a context-specific stakeholder involvement strategy

Adopting an overall approach provides general guidance, but each approach can be implemented in a variety of ways. Agencies need to decide which specific stakeholder involvement activities are appropriate for the current situation. Understanding stakeholders and their individual preferences for involvement in wildlife management is critical to this determination. For this step, we used data collected from the survey described earlier.

Survey results

Nearly all respondents in both communities believed residents should have opportunities for input in wildlife management decisions, although respondents in both communities were divided over how those opportunities should be structured (Table 3). Evergreen and Cayuga Heights residents expressed similar preferences for public involvement methods. The most popular were those that allowed for face-to-face communication, debate, and deliberation, including open meetings and task forces. Fewer respondents supported meetings open to select groups or invited individuals, perhaps showing preference for a process that was inclusive and representative (Table 4).

Although the legal authority and responsibility to manage elk in Evergreen and deer in Cayuga Heights rested with the respective state wildlife agencies, respondents expressed strong preferences for some degree of local control, especially

Table 4. Respondents' preferences (%) regarding several aspects of stakeholder input and involvement to address elk management in Evergreen, Colorado and deer management in Cayuga Heights, New York, 1998.

Stakeholder involvement preferences	Evergreen	Cayuga Heights
Public involvement methods desired		
Open public meetings	73	79
Citizen task forces	59	60
Scientific surveys	51	58
Unsolicited comments such as letters	33	25
Meetings open to select groups	12	16
Final decision-maker preferred		
State wildlife agency	53	24
Majority vote of citizens	17	31
Citizen task force	18	17
Local government	0	20
Level of influence preferred		
State wildlife agency		
Great deal of influence	62	43
Some influence	35	51
No influence	1	6
Local ranchers and farmers		
Great deal of influence	11	42
Some influence	79	52
No influence	10	5
Homeowners who experience damage to trees and gardens		
Great deal of influence	7	57
Some influence	68	41
No influence	25	2
Residents who enjoy elk or deer		
Great deal of influence	45	23
Some influence	53	64
No influence	2	12
Elk or deer hunters		
Great deal of influence	12	8
Some influence	53	40
No influence	35	52
Amount of time respondents were personally willing to devote		
More than 1 hour per week	9	10
One hour per week	12	11
One hour per month	37	26
One hour per year	17	19
No time	10	18

in Cayuga Heights. Evergreen residents were more likely than Cayuga Heights residents to prefer that final decisions be made by their state wildlife agency (Table 4). In both communities, the majority of respondents believed the state wildlife agency should have substantial influence on management decisions, and state residents living outside the affected community should have little influence on management decisions (Table 4).

Also, in both communities respondents gave similar rankings to the relative importance of characteristics of stakeholder involvement processes. The order of the top 4 characteristics (the process uses scientific information, has a genuine influence on the decision, treats all citizens equally, and promotes communication and education) varied between Cayuga Heights and Evergreen, but the bottom 3 were consistent (time-effectiveness, cost-effectiveness, and weighing input). Results from both Evergreen and Cayuga Heights suggested that processes that did not incorporate scientific information would not be acceptable to many stakeholders. On average, respondents were more concerned with treating all citizens equally than with weighing input based on the importance of stakes (e.g., treating all stakeholders the same was preferred to giving more influence to stakeholders who experienced greater impacts). Stakeholders were more concerned that an involvement process be of high quality (i.e., the process uses scientific information, has a genuine influence on the decision, treats all citizens equally, and promotes communication and education) than quick and inexpensive.

Many respondents in both communities were willing to help with wildlife management decisions; however, the amounts of time individuals were willing to commit varied (Table 4). Providing multiple methods for involvement with varying time commitments could allow opportunities for residents to participate in their preferred ways and within the time they are willing to budget for such purposes. For example, residents willing to devote only 1 hour per year might attend a single educational forum, while the small percentage willing to devote as much time as necessary could be involved through a task force or other time-intensive processes that demanded greater commitment. A strategy that included multiple methods for stakeholder input and involvement could satisfy a variety of residents' participation interests.

Summary of findings

Using the framework of the 4-step process to design strategies for stakeholder involvement revealed similarities and differences between Evergreen and Cayuga Heights. In both communities most respondents had been affected by elk- and deer-related problems and believed residents should have a voice in wildlife management decisions. Differences between the 2 communities included greater concern over deer-related problems, stronger preferences for a decrease in the deer herd, and stronger local control sentiments in Cayuga Heights. In contrast Evergreen residents were more comfortable with the current size of the elk herd and with the DOW's execution of its responsibility for wildlife management.

Evergreen. Given the DOW's objectives for stakeholder involvement (improving the management climate, providing input for decisions, and helping to make decisions) and Evergreen residents' support for the DOW as the final decision-maker, an inquisitive or transactional approach appeared appropriate to address local elk management issues. To satisfy stakeholders with different preferences for participation in elk management decisions, DOW could develop a multi-faceted process that allowed individuals to become involved in ways compatible with their levels of interest and time constraints. Education about management actions combined with opportunities to provide input would likely satisfy most residents' desires for involvement. If the DOW decided to include help with decisions as an objective of stakeholder involvement, a collaborative decision-making process such as a task force might improve the management climate and increase support for controversial management actions. Because residents expressed preferences for inclusive and representative methods of involvement, DOW staff might consider taking steps to ensure that any transactional approach they designed included opportunities for broad public input and oversight.

Cayuga Heights. Given the DEC's objectives for stakeholder involvement (improving the management climate, providing input for decisions, helping to make decisions, and helping to implement management actions) and Cayuga Heights residents' desire for involvement and support for local control, a co-managerial approach to deer management appeared appropriate. Because stakeholders had different preferences for participation in deer management, the DEC and the village elected officials could work together to design a public involvement process that would provide multiple opportunities for stakeholder education, input, and deliberation. Education about management actions combined with deliberation of alternatives might help village residents to reconcile differing perspectives on deer management in their community. Extensive involvement opportunities should improve the management climate and help stakeholders develop the capacity to work with the DEC to implement future deer management actions.

Although the general approaches indicated for Evergreen and Cayuga Heights differed, the stakeholder involvement processes shared certain characteristics. In both cases, results suggested it was worthwhile for agencies to spend the time and effort necessary to implement stakeholder involvement processes that used scientific information, had genuine influence, treated citizens fairly, and promoted communication and education. Several involvement methods had the potential to emphasize these characteristics. The challenge for the agencies was to implement stakeholder involvement strategies such that the relevant characteristics were operative and recognized by participants.

Conclusions

Because of the dynamic nature of stakeholder involvement processes, it is unlikely that a "cookbook" could be created to specify a fail-safe recipe guaranteed to work in every context. Moreover, simply knowing some preferences of various stakeholder groups is not enough to design an effective approach to citizen participation in a particular situation. Stakeholder experiences, interests, and preferences are just a few of the many factors to be considered in the design of a public involvement process. The question, "How should stakeholders be involved?" typically has multiple answers.

Wildlife management agencies interested in becoming more effective at involving stakeholders could benefit from the wealth of experience and literature on citizen participation that provides general guidance as agencies attempt to involve stakeholders proactively and manage conflicts. Four steps are important for helping agencies to involve stakeholders productively in management. Step 1 deals with helping the agency understand the situation from the perspective of stakeholders, step 2 helps the agency define its objectives for stakeholder involvement, step 3 presents a decision aid for selecting an overall stakeholder involvement approach, and step 4 provides guidance for designing a context-specific stakeholder involvement strategy.

The 4-step process presented in this paper provides guidance that agencies and communities could use as a starting point for designing involvement strategies tailored to meet the interests, concerns, and management realities present in their local communities. Data from 2 case studies (elk management in Evergreen, Colorado and deer management in Cayuga Heights, New York) illustrated how different circumstances could lead citizens and their state wildlife agencies to design strategies for stakeholder involvement. These cases also illustrated how human dimensions inquiry and collaboration with stakeholders can play an important role

in the design of stakeholder involvement processes. For example, surveys helped agencies and communities improve their understanding of how stakeholders view local wildlife management issues. Meetings and interviews helped agencies define their stakeholder involvement objectives. Decision aids (such as a decision tree) helped agencies select overall stakeholder involvement approaches, and survey data combined with meetings helped agencies and communities work together in a constructive manner. While none of these methods are new in and of themselves (e.g., O'Donnell and VanDruff 1987, Thomas 1995, Lawrence and Deagen 2001), combining them to address the 4 steps of the framework provided a systematic process helpful for agencies grappling with questions of when and how to involve stakeholders.

Although the 4-step process outlined in this paper has been completed in Evergreen and Cayuga Heights, the problems associated with elk and deer management have not yet been resolved. The DOW and DEC are implementing tailored stakeholder involvement strategies. In Evergreen, wildlife managers are exploring ways to expand elk hunting opportunities, and they are monitoring residents' attitudes toward elk as both human and wildlife populations continue to increase. The local wildlife biologist anticipates moving from an inquisitive to a transactional approach if the controversy intensifies (J. L. George, Colorado DOW, personal communication). In Cayuga Heights, a co-managerial approach is underway and the DEC is working with the community to develop a management plan that has broad input and support. The Cayuga Heights Deer Committee, a group of stakeholders with diverse viewpoints about the appropriate size of the deer herd and acceptable management actions, meets regularly and is coordinating with the DEC to conduct research on deer management options. Public meetings, informational pamphlets, and surveys are some of the methods being used to promote education and communication.

The overall approaches and the specific public involvement methods in use differ between Evergreen and Cayuga Heights, but both the DOW and DEC are benefiting by using a multi-faceted approach that allows agencies and communities to address several objectives simultaneously and meet the varied involvement preferences of diverse stakeholders. In both cases, the agencies are monitoring the situations and adapting in response to changing circumstances. Also, in both cases the agencies are working to implement stakeholder involvement strategies that emphasize characteristics identified as important by stakeholders. These public involvement processes use scientifically generated information, have a genuine influence on decisions, treat all citizens equally, and promote communication and education. As this research is extended to more cases, we will examine whether those attributes are important only in certain contexts or whether they are essential traits of constructive citizen participation across the board.

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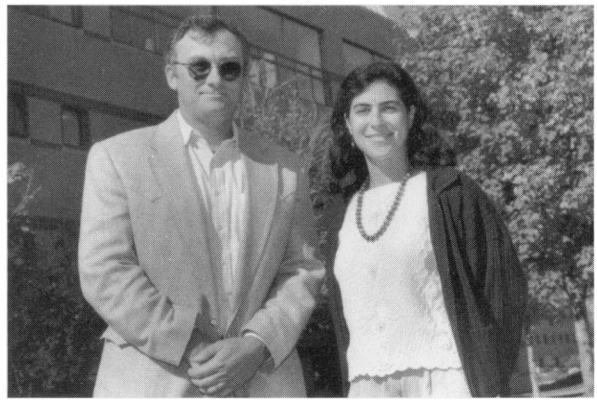

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