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Abstract: Effective stakeholder involvement is among the greatest challenges in wildlife management. In this paper, we describe an effort called the Islip Deer Initiative (IDI) to illustrate one approach that wildlife management professionals can take to design a stakeholder involvement strategy. We used a four-step procedure proposed by Chase et al. (1999) as a general guideline for process design. The procedure involves: (1) developing an understanding of the local situation (i.e., preliminary situation analysis); (2) defining the wildlife agency's objectives for stakeholder involvement; (3) selecting an overarching stakeholder involvement approach; and (4) designing context-specific stakeholder involvement strategies. In this case, preliminary situation analysis led to a decision by the New York State Department of Environmental Conservation (DEC) to seek a partnership with three other parties to cooperatively manage white-tailed deer *(Odocolius virginianus)* in an area that includes three state parks, a national wildlife refuge, and a municipal golf course. The wildlife agency identified its objectives for stakeholder involvement in IDI as: (1) improving the management climate; (2) improving the ability of IDI partners to respond to the interests of diverse stakeholders and interested parties; (3) obtaining input for decisions; (4) increasing participation in decision making; and (5) involving stakeholders in action implementation. DEC chose a co-management approach as the overarching stakeholder involvement approach. The agency sponsored a study of Islip residents in areas occupied by deer to obtain information needed to design specific stakeholder involvement strategies. Most residents in the affected areas expressed a strong interest in providing input to local deer management decisions. Most also found it important that any public involvement process to make deer management decisions in Islip should: utilize scientific information, treat all citizens equally, promote communication, and be time- and cost-effective. We describe how these survey results are being used to inform specific involvement decisions in Islip. A review of the techniques used for IDI illustrates a practical approach to stakeholder involvement design and demonstrates how stakeholder surveys can inform design of specific involvement strategies.

Keywords: collaboration, co-management, New York, stakeholder involvement, suburban deer management.

Introduction

What is stakeholder involvement? Anyone who can affect or is affected by a decision is a stakeholder in that decision (Suiskind and Cruikshank 1987, Crowfoot and Wondolleck 1990).   Wildlife management stakeholders include people who are impacted positively or negatively by wildlife, wildlife management, or wildlife-related recreationists

(Decker etal. 1996). Involving stakeholders is a process. It is a way to help define and pursue the public good (Lauber and Knuth 2000). With regard to wildlife management, stakeholder involvement is a process of involving people who affect or are affected by wildlife in setting objectives, making decisions, or taking actions to achieve desired end states in a particular place and time.

By the 1990's stakeholder involvement was becoming a common activity for many wildlife management agencies (Chase et al. 2000, D. J. Decker, Cornell University, unpublished data). The purposes for stakeholder involvement in public policy arenas are diverse (Kweit and Kweit 1981). The potential approaches to involvement are diverse, as well. Effective stakeholder involvement is challenging; some observers consider it to be among the greatest challenges that wildlife management practitioners face (Decker and Chase 1997).

Developing guidelines for stakeholder involvement in wildlife management has proved to be a difficult task. Fortunately, managers and researchers are building a body of experience and literature that provides some practical guidelines for addressing this complex task. Our goal is to provide such guidance without promising a fail-safe recipe for involvement process design. In this paper, we describe an effort called the Islip Deer Initiative to illustrate how wildlife management professionals can effectively design a stakeholder involvement strategy. Our example focuses on a suburban deer management issue in a Long Island township. However, the procedures we describe are applicable to management of a broad range of settings and species.

We begin the paper by describing a framework that breaks the process of designing stakeholder involvement into a procedure with 4 general stages or subprocesses. We then describe the specific ways that managers and researchers addressed each of those procedures in Islip.

A 4-step framework for designing stakeholder involvement

Wildlife managers can approach involvement process design in many different ways, depending on the specific characteristics of the situation at hand. We chose to use a 4-step framework described by Chase et al. (1999) as a tool to outline key challenges, opportunities, and considerations related to involving deer management stakeholders in Islip Township. This framework provides a set of general guidelines based on literature review and management experience. We provide a synopsis of each step in this section. For more detailed discussion of the process design framework and additional illustration of its application to wildlife management, we refer the reader to Chase et al. (1999) and Chase 2001.

Step 1: Complete a Situation Analysis. The first step in the Chase et al. framework is a comprehensive situation analysis. The purpose of a situation analysis is to answer at least the following key questions: (1) how are human values affected by wildlife (what are the most important wildlife-related impacts); (2) who are the key stakeholders; and (3) what are the key management limits/constraints? Managers can use situation analysis to obtain information needed to make choices within each step of the involvement design process. Situation analysis is particularly useful as a means to guide development of specific

248

involvement strategies targeted toward particular stakeholder groups.

One might employ a variety of techniques to aid in situation analysis (Thomas 1984). In some cases, the agency has extensive experience with a particular issue and agency staff may be able to articulate a comprehensive situation analysis without conducting additional investigation. In other cases, the agency may recognize important information gaps on key questions and so may choose to conduct additional investigations to fill those information gaps. The level of investigation will depend on the nature of the missing information and the level of precision decision-makers need to move forward with involvement process design. Like other steps in this framework, situation analysis can be implemented multiple times and may be done concurrently with other steps.

Step 2: Define Agency Objectives. Step two in the framework is defining agency objectives for stakeholder involvement. A comprehensive situation analysis should provide an agency with the situation-specific understanding it needs to develop appropriate objectives for a stakeholder involvement process. Objectives for stakeholder involvement may include: (1) improving the management climate; (2) improving the information base for decision-making (i.e., providing input for decisions); (3) improving judgment processes; or (4) improving decision implementation (i.e., by involving stakeholders in management actions) (Chase et al. 1999, Lauber and Knuth 2000).

Step 3: Select an Overarching Involvement Approach. Step three of the framework is selecting an overarching stakeholder involvement approach. Again at

this stage, agencies can choose among several different paths, each of which has relative advantages and disadvantages. Decker and Chase (1997) outlined a continuum of 5 categories of stakeholder involvement approaches (Table 1). These approaches differ according to the degree of control that stakeholders have compared to the agency (called the locus of control), the particular stakeholder involvement techniques that are used, and the participants included in the process. 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; however, these approaches accept or even seek input from stakeholders, which may influence decisions. In contrast, the locus of control is shared by stakeholders and managers in both transactional and co-managerial approaches. This means that both stakeholders and managers have influence over decisions and actions.

Wildlife agencies can select a different overarching approach for involving different stakeholder groups. When objectives for stakeholder involvement are relatively simple or routine, passive-receptive or inquisitive approaches are usually the best choice. When managers recognize a need for more complex public input or assistance with the process of making management decisions, transactional or co-management approaches are more appropriate. Co-management also is a compelling approach when managers recognize that they must rely on stakeholders to effectively carry out management actions.

The five involvement approaches outlined in Table 1 are in part characterized by

specific involvement objectives for a given stakeholder group. Identifying stakeholders and involvement objectives are not the only things agencies need to consider when choosing an involvement approach. Other factors to consider include the availability of staff time, administrative costs, and stakeholder willingness/interest in wildlife management. However, the process of identifying stakeholders and articulating involvement objectives for each stakeholder group can help wildlife agency staff make a preliminary assessment of the overarching approach that seems most appropriate for involving particular stakeholders. For example, an agency that had identified a specific stakeholder group and an objective to gather representative input for decisions from that stakeholder group could make a preliminary choice to pursue an inquisitive involvement approach with those stakeholders.

Table 1. Range of approaches to stakeholder involvement and the relative degree of control of wildlife management agencies and stakeholders proposed by Decker and Chase (1997).

Approaches	Relative degree of control	
	Wildlife Agency	Stakeholders
Authoritative	Highest	Lowest
Passive-receptive		
Inquisitive	↑	↓
Transactional		
Co-management	Lowest	Highest

The agency could then follow-up with additional situation analysis to further evaluate that preliminary choice and how it could be operationalized for the specific group and issue at hand.

Step 4: Design Specific Involvement Strategies. Step four in the framework is designing a context-specific stakeholder involvement strategy. Agencies can choose among a broad range of involvement techniques within each general approach to stakeholder involvement. Agencies need to weigh a variety of considerations (e.g., staff time, program budget, stakeholder attitudes) to make specific decisions about how to involve stakeholders. Though the specifics of design are a function of internal factors, like agency staff time and resource, managers are more likely to select effective strategies if they base decisions on direct input from stakeholders. Managers need specific information about stakeholders and their individual preferences to identify the most appropriate tools for specific involvement needs. Fortunately, such input can be obtained in a variety of ways.

Our example: the Islip Deer Initiative

In 1998, several state   legislators

250

contacted regional DEC staff on behalf of constituents in selected areas of Islip who had complained to their representatives of problems they believed to be related to the presence of deer. By February 1999, State Senator Caesar Trunzo had convened a meeting of New York State Department of Environmental Conservation staff, representatives of the Islip Town Supervisor's office, public land management agencies in the town, and Cornell University's Human Dimensions Research Unit (HDRU) to discuss a possible response to residents' concerns. The events leading up to and including that meeting resulted in the Islip Deer Initiative, which will include a stakeholder involvement process. Both management experience and human dimensions research were used to design the stakeholder involvement process associated with IDI. In this section we describe how wildlife agency staff experience and human dimensions research were used in process design. Management experience was used to conduct steps 1-3. Human dimensions research was utilized to repeat step 1, evaluate DEC choices related to step 2, and to inform step 4.

Using management experience to conduct step 1 (situation analysis)

Identifying key values affected by deer. State wildlife managers already had a general understanding of the deer management situation in Islip when public concerns became more vocal in 1998. Historical development of the issue suggested to managers that the key positive and negative impacts associated with deer were: benefits created by opportunities to watch deer and costs associated with deer damage to plants; costs and safety hazards to motorists; and health risks associated with exposure to Lyme disease.

Remnant populations of deer persisted on a few large private parcels and parks which served as refugia for deer during the rapid development of the township that took place after World War H Managers kept a record of deer-related complaints. By the 1990's, the location of people who complained about deer to DEC suggested that deer were present in Town of Islip and Suffolk County parks and preserves, as well as on hundreds of residential lots in the hamlets of Islip, East Islip, Great River, Islip Terrace, North Great River, Oakdale and Bohemia.

Residents of the Town of Islip began contacting DEC with complaints about conflicts with deer as early as 1960. Early complaints related mainly to plant damage. In later decades, vehicle collisions and transmission of Lyme disease became important concerns. Most of the complaints about and attention to deer in Islip has focused on deer within Seatuck NWR, Heckscher State Park, and the Connetquot River State Park Preserve. In the mid-1980's, for example, concerns about deer in those areas reached a high level and precipitated attention from wildlife managers, local political representatives, and researchers. In 1985, Cornell researchers conducted a survey of residents living adjacent to Seatuck NWR to assess their attitudes toward deer and the prevalence of deer-related problems (Decker and Gavin 1985, 1987), especially damage to ornamental plants. Throughout this period (from the 1960's on), deer viewing was an activity valued by many residents. Deer viewing and deer feeding became common activities in several parks. Deer feeding in parks has been discouraged in recent years.
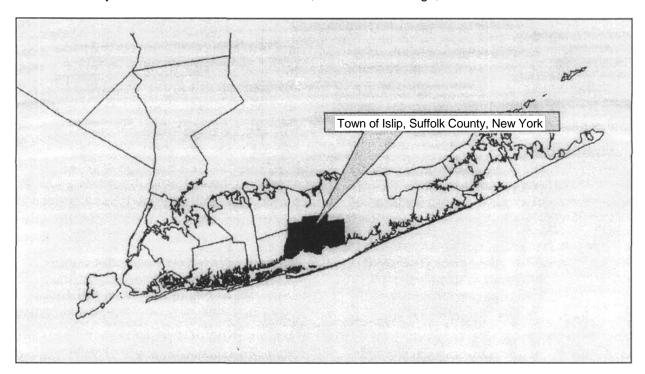
Figure 1. Location of Islip, New York.

Identifying key stakeholders. For any type of natural resource management program, stakeholders can be grouped into four broad categories: direct participants in management; parties who must approve management actions; parties affected by management actions; and parties that represent potential resources (Schkade et al. 1996). Given the history of issue development in Islip, DEC staff had a general sense of the key stakeholders affected by deer, as well as some of their primary concerns, attitudes, interests, and preferences. DEC staff were able to identify a preliminary list of key stakeholders in each category for the IDI (Table 2).

Identifying management limits/constraints. Regulated hunting (DEC s primary means of deer management in rural areas) is relatively unavailable and highly restricted in Islip. Under current state Environmental Conservation Law (ECL), all of Suffolk County is open for archery deer hunting from November 1 through December 31. Each year, hunters report taking a few deer by archery in Islip, but it is illegal to discharge a firearm, or bow and arrow within 500 feet of a house or other building without permission of the building owner, so little opportunity for bowhunting exits in the heavily developed town.

ECL authorizes the DEC to establish a firearms deer hunting season in Suffolk County during January. The DEC has established such a season in the six easternmost towns of Suffolk County but not in Islip. By law only landowners who own 10 acres or more may permit firearms hunting during the January season. As very few landowners in Islip have lots of this size there is little opportunity to utilize this season, unless the public landowners permit firearms hunting.

252

Table 2. Summary of key stakeholders in Islip deer management.

Types of Deer Management Stakeholders	Specific Representatives in Islip
Direct Participants: Parties directly involved in the financing, implementation, maintenance, or monitoring of a deer management program. These parties are typically core participants in design of deer management policies. They have the power to reject what they see as unacceptable management alternatives.	• NYS Department of Environmental Conservation, Region 1 • US Fish and Wildlife Service, Long Island Refuge System • NYS Office of Parks, Recreation, and Historic Preservation, local parks
Approval Required: Parties that do not actively participate in local deer management, but must provide some form of approval for management proposals. These stakeholders are not usually core participants in the design of local deer management, but have the power to reject what they see as unacceptable management alternatives.	• NYS Department of Environmental Conservation, Central Office • US Fish and Wildlife Service, National Office • Town of Islip • County of Suffolk, Dept. of Parks, Recreation and Conservation, Supervisor's Office • Local elected officials
Affected Parties: Parties who are affected by local deer management, but have no formal role in it. These parties only become part of the core group of stakeholders if they are invited by direct participants in management, or if they mobilize themselves because they believe their interests are being damaged. These parties can stop deer management actions indirectly, through legal or political actions.	• Islip residents • Residents living in areas occupied by deer • Islip homeowners or community organizations.
Potential Resources: These are parties who could bring a resource to the deer management design process. Resources include: information, technical expertise, process facilitation, materials, volunteers, and money.	• HDRU, Cornell University • Cornell Cooperative Extension • Islip homeowners or community • organizations. • US Fish and Wildlife Service volunteers NYS parks volunteers

ECL authorizes the DEC to issue permits for the taking of deer which have become a nuisance or are destructive to property. The DEC has from time to time received inquiries about or applications for such Nuisance Deer Permits (NDP) from residents in Islip, but the required 500 foot safety zone around a shooter has precluded issuance of NDPs to homeowners in Islip. NDPs have been issued over the past four years to the U.S. Fish and Wildlife Service (USFWS) for use at the Seatuck NWR and to the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) for use at Bayard Cutting Arboretum.

Authority for deer management in New York State rests with the New York State Department of Environmental Conservation. However, DEC does not exert direct influence over deer management decisions and actions on lands other than state lands managed by that agency. As a recent DEC publication explains, "...the DEC has no authority to dictate to public or private landowners that they must control deer on their properties. The DEC has no authority to direct municipalities to control deer within their boundaries, and the DEC does not implement deer control operations with its own staff (Lowery 1999:2).

Lack of direct management control, relative unavailability of hunting, and other local circumstances make it difficult and undesirable for DEC to make unilateral decisions about deer management in Islip. Collaborative management of deer offers DEC a potential avenue to overcome some of these common management barriers and move toward a management process that produces wise, fair, and lasting decisions. By late 1998,

DEC staff had come to the conclusion that effective deer management in Islip would not be possible without the cooperation of public land managers, town officials, and residents in areas occupied by deer. At the February meeting organized by Senator Trunzo to discuss resolution of the conflicts occurring between deer and people in Islip, DEC staff outlined a proposal for interagency cooperation in deer management and proposed that any change in management be based on a public involvement process. What resulted from that meeting was an agreement among four parties (i.e., DEC; New York State Department of Environmental Conservation, New York State Office of Parks, Recreation, and Historic Preservation; Town of Islip; and Scully Science Center [National Audubon Society]) to cooperate in co-managing the Islip deer herd. The Islip Deer Initiative was created to address deer management in an area of the township occupied by deer (Figure 2). That area includes three state parks (Connetquot, Heckscher, and Bayard Cutting Arboretum), a national wildlife refuge (Seatuck National Wildlife Refuge), and a municipal golf course (West Saville County Golf Course).

Using management experience to conduct step 2 (defining objectives)

DEC staff (Lowery 1999:1) proposed that IDI partners develop a public involvement process to achieve four goals. The proposed IDI goals were formulated to address dimensions within three of the four general goals described by Chase et al. (1999).

Two of the proposed goals were to:(l) "inform/educate area residents about deer and deer management"; and (2) "improve the ability of IDI partners to respond to the
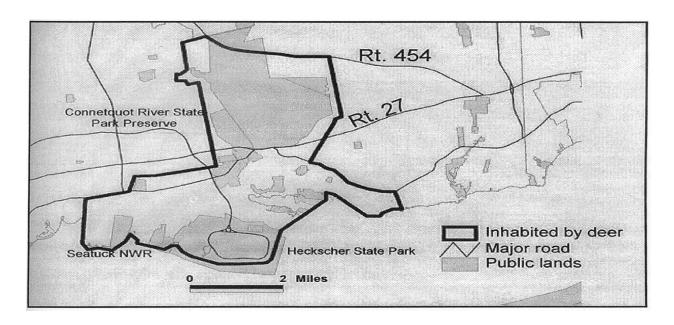
254

Figure 2. Islip Deer Initiative Area

interests of diverse stakeholders and interested parties in suburban wildlife issues." These goals were proposed as a means of improving the social climate/environment in which local deer management is conducted.

A third proposed goal for the IDI was to "determine desirable deer population levels." This goal falls under the category of obtaining input for wildlife management decisions. The final proposed goal was to "determine publicly acceptable deer population control methods, if warranted." This goal falls under the heading of involving stakeholders to help make wildlife management decisions. The DEC decision to seek collaboration with local land managers represents an implied goal to involve stakeholders to implement management decisions.

Using management experience to conduct step 3 (selecting an involvement approach)

The decision-making tree presented in Figure 3 can be used to label the overall involvement approaches for any given group of stakeholders. In order to gain assistance from local land managers with implementation of deer management actions, the DEC will probably need to design a co-management approach to involvement among IDI partners. The DEC will likely need to develop a transactional approach to achieve IDI objectives 3 and 4 with Islip residents in areas occupied by deer. DEC staff can achieve IDI objectives 1 and 2 through an inquisitive approach aimed at a range of stakeholders.
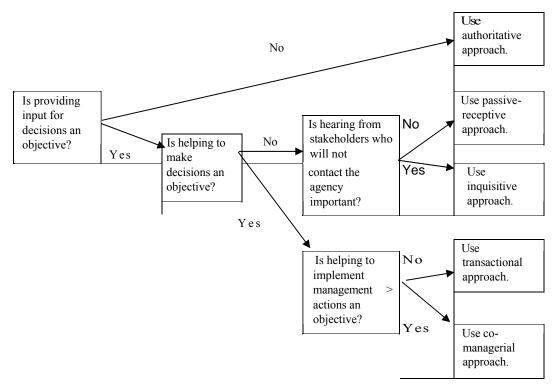
255

Figure 3. Decision tree for connecting agency objectives with stakeholder involvement approaches (developed by Chase et al. [1999]).

The critical link, and perhaps the greatest stakeholder involvement challenge in IDI, will be co-management of deer among the IDI partners. Co-management approaches can take many forms, but in general, they involve some sharing of authority and responsibilities among management partners and public stakeholders. They also are based on the premise that the partners or participants will make decisions by consensus, however they choose to define that term.

Sharing authority, sharing responsibility, making decisions by consensus—any seasoned wildlife professional recognizes these as practices that can be extremely difficult to implement. In light of the management constraints identified in the situation analysis, DEC staff judged co-management to be an approach worth considering, despite the recognition that such an approach would be difficult to implement.

Using human dimensions research to repeat step 1

As deer management became a more salient issue in 1999, DEC staff saw a need for additional situation analysis as an aid to community deliberation about local deer management. Among other things, they identified a need for better information about: the proportion of residents who see deer (or evidence of deer); residents' interests in deer and deer management; attitudes toward deer; and preferences related to deer population size.

256

Through a contractual agreement with the DEC, the Human Dimensions Research Unit at Cornell University designed and implemented a survey of Islip residents to address those information needs. HDRU staff designed the survey to provide additional situation analysis, evaluate DEC's involvement objectives, and inform stakeholder design. Islip residents in two subgroups were surveyed: (1) residents living near Seatuck NWR; and (2) residents living near one of three state parks (Heckscher State Park, Connetquot State Park Preserve, or Bayard Cutting Arboretum). A town wide sample of residents was surveyed as well, but response to that effort was poor (36%), so that portion of the study was dropped and analysis focused exclusively on data from respondents living in the areas occupied by deer.

We designed the questionnaire to provide information about area residents': demographic characteristics; mass media use characteristics; interests, concerns and attitudes toward deer and deer management; wildlife-related value orientations; opinions about who should be making and implementing deer management decisions; opinions about citizen involvement in deer management decisions; preferences for personal involvement in deer management decisions; and desired elements of a public-involvement process. We implemented the Islip resident survey during fall, 1999. Adjusted response rates for the state parks area and the Seatuck NWR area were 50% (n= 185) and 60% (n=278), respectively. We completed a telephone follow-up study with a sample of nonrespondents to assess potential bias associated with nonresponse. For a full description of study methods and study results, we refer the reader to Siemer et al. (2001). We provide a few survey highlights here to

illustrate how the results are being used to inform design of stakeholder involvement processes.

Quantifying wildlife-related impacts. The survey revealed that most residents of the study areas were seeking few benefits from deer. The majority of area residents expressed little interest in hunting, feeding, or photographing deer, though a substantial minority expressed moderate or higher interest in watching or seeing deer. A majority of residents in these areas were moderately to very concerned about a variety of problems associated with deer. Exposure to Lyme disease and deer-car collisions topped the list of concerns. Majorities of residents also expressed high levels of concern about damage to landscape plants and gardens.

The problems that concerned residents most (e.g. Lyme disease, deer-car collisions, and plant damage) were problems frequently encountered. Fifty percent of Seatuck area respondents reported that they had personally experienced deer-related problems. About 44% of parks area respondents reported that they had personally experienced deer-related problems. Damage to landscape plants and gardens was the problem experienced most frequently. Personal experiences with deer-car collisions Lyme disease were less common.

The 1998 survey found that 58% of residents living adjacent to Seatuck NWR and 53% of residents living near the state parks preferred a deer population decrease. By comparison, Decker and Gavin (1985) found that 32% of residents living near Seatuck NWR preferred a deer population reduction in 1985.

These results did not come as **a** complete surprise to DEC managers. However, the survey data were valuable because they quantified what had been qualitative assumptions. The survey data now give IDI partners a shared understanding of the key impacts involved and the key perceptions of residents in areas occupied by deer.

In many cases, human dimensions research may not generate "new" information about the key impacts associated with a controversial suburban deer management issue. The issue may be long-standing and the key impacts may be a matter of public record. What human dimensions research can do is: (1) provide representative, quantitative information about impacts; (2) give all partners in a process a defensible set of data from which to characterize the impacts; (3) and create a shared knowledge-base among process partners.

Using human dimensions research to evaluate decisions in step 2

Improving the management climate. Often, management of deer in suburban areas hinges on the degree to which key stakeholders support particular management decisions and actions. Public acceptance of management methods and management proposals is an important facet of the social climate. Stakeholder involvement is commonly used to improve the general climate in which deer management occurs. IDI goal 3 represents a proposal to improve the management climate through public education about deer and deer management. The survey results did not raise any particular concerns about adopting public education as a broad goal for stakeholder involvement in Islip. This finding gave

agency staff greater confidence that public education is an appropriate goal for DDL

Providing input for decisions. Learning more about stakeholders - their needs, interests, preferences, beliefs, attitudes, and behaviors—is a very common objective of stakeholder involvement suburban deer management. In this case, DEC staff proposed that IDI partners gather public input on matters such as personal experience with deer-related problems, concerns about deer, deer population preferences, and attitudes toward various deer population management actions. Some of this information has now been gathered through the survey of Islip residents. The IDI partners could obtain additional information about residents on an as-needed basis, through a variety of quantitative and qualitative techniques (e.g., park visitor surveys, public meetings, or focus groups).

The HDRU survey revealed that many residents of areas occupied by deer have a keen interest in providing input to deer management decisions. Those results suggest that involving stakeholders for the purpose of providing input to decisions is appropriate and expected in this case. Poor response to the townwide survey suggests that interest in providing input is probably lower in areas of the township not occupied by deer. Siemer et al. (2001) recommended IDI partners consider using different input mechanisms to accommodate residents with different levels of interest in deer management.

Helping to make decisions. Suburban deer management inevitably forces the wildlife agency to make choices about how to weight stakeholder input and balance conflicting interests. Having information about key stakeholders doesn't make these choices any

easier, even if it improves the likelihood of carefully considered choices (Decker and Chase 1997). However, involving stakeholders in the decision-making process does offer a way for agencies to improve the likelihood that wildlife management decisions will address community needs and concerns in a way that is acceptable to all key stakeholders (Decker and Chase 1997, Chase et al. 2000).

We found that residents of areas occupied by deer tended to believe that residents of the town and DEC wildlife managers should have a great deal of responsibility for making deer management decisions. They tended to believe that public land managers and town and county officials should have a somewhat lower level of responsibility for making deer management decisions. Those results indicate that residents of areas occupied by deer want to influence decision making and believe that area residents should share responsibility for decision making with DEC managers, managers of public lands in the town, and town officials. Such findings suggest that involving stakeholders in decision making is an appropriate and socially acceptable objective for stakeholder involvement in Islip. These findings also give the IDI partners some assurance that local residents see it as legitimate for the wildlife management agency and local land managers to play a role in deer management decisions.

Implementing management decisions. Stakeholders can play a direct role in implementing deer management actions. Licensed hunters are one example of a stakeholder group who participate directly in conventional deer management directly through their actions. Suburban deer management stakeholders can implement deer

management actions, as well. In fact, when nontraditional management actions are called for, having stakeholders help with implementation may be the only way to overcome management constraints and limitations. Some of the ways in which suburban deer management stakeholders might help to implement management decisions include: promoting deer management education, providing matching funds for specific activities, assisting with efforts to monitor deer populations, or assisting with enforcement of local ordinances or wildlife management regulations.

We found that Islip residents in areas occupied by deer tended to believe that DEC wildlife managers should have a great deal of responsibility for implementing deer management decisions. They tended to believe that public land managers and town and county officials should have a substantial, but somewhat lower level of responsibility. They were divided with regard to how much responsibility residents should have for implementation of decisions.

These findings give DEC and other partners some assurance that residents find it appropriate for public agencies to implement deer management decisions. However, such findings could be an indication that some residents are not comfortable with the idea that residents also may need to assume more responsibility for implementing any deer management solutions in the town. These survey results alerted the EDI partners to a potential barrier that the may have to overcome in order to effectively implement a co-management approach.

Using human dimensions research to inform step 4

The survey of residents in areas occupied by deer led to the following specific recommendations for design of involvement processes. Detailed results related to these recommendations are provided in Siemer et al. (2001).

Treat township subgroups as separate stakeholder groups. Deer management was found to be a top-of-mind issue for many people living in the areas occupied by deer, but the issue probably has less relevance for township residents as a whole. The difference in topic salience bolsters support for the notion that a related public involvement process should treat residents of deer-occupied areas as a stakeholder group distinct from the remainder of the township. Although town residents outside the areas occupied by deer are generally less interested in this issue, it was recommended that some opportunities for town-wide stakeholder involvement be developed. These opportunities probably need not be as extensive as those offered to residents of areas occupied by deer.

Create multiple involvement opportunities and formats. Given the survey results, HDRU staff suggested that DEC staff design multiple opportunities for involvement of stakeholders in areas occupied by deer. The level of concern about plant damage and experiences with plant damage were significantly higher for residents living adjacent to Seatuck NWR. These and other differences between groups would support a proposal to treat the Seatuck adjacent residents and the parks adjacent residents as two separate stakeholder groups.

HDRU staff suggested that IDI include opportunities to meet different involvement preferences. The methods of public involvement preferred by the greatest number of respondents were those that allowed for face-to-face communication, debate, and deliberation. The most popular was meetings open to all. Majorities of respondents also supported a committee representing a variety of interests and surveys as ways to involve stakeholders and gather input. Fewer respondents supported meetings open to select groups or invited individuals. These findings identified some of the involvement techniques likely to be popular in Islip. However, the results also confirmed that residents varied with regard to their preferred mechanism for involvement and the level of time they would be willing to devote to providing input. The majority expressed willingness to devote some of their personal time to help make decisions about deer management. However, some were willing to invest only an hour per year, while others were willing to invest an hour per week or more. Respondents from the Seatuck area were more likely than respondents from the parks area to express willingness to devote some personal time to address local deer management decisions. These differences in interests and willingness to participate in a process led to a recommendation to offer a range of involvement opportunities to meet different preferences and levels of commitment to the issue.

Provide opportunities to meet different stakeholder interests. The level of interest in public involvement was significantly higher for residents living adjacent to Seatuck NWR. Such differences between groups would support a proposal to develop different or additional involvement opportunities for the residents living adjacent to Seatuck NWR.

Alternatively, the IDI partners could develop different involvement opportunities that appeal to stakeholders with different primary interests. For example, the Partners could develop involvement opportunities around topics such as deer viewing, deer-car collisions, Lyme disease transmission, and deer damage to residential gardens and landscape plantings.

Involve to inform and educate. Any stakeholder involvement design should include a strategy for keeping stakeholders apprised of the best and most current information on issues under deliberation. The resident survey suggested that few Islip residents look directly to DEC, or local land managers for information about deer. Residents were much more likely to use their local newspapers, the Channel 12 local news, and New York Newsday as sources of information about deer and deer management. It was recommended that the IDI Partners keep these communication behaviors in mind as they decide how to disseminate information about the IDI initiative and other local deer management topics.

Include more than public meetings. Survey results indicate that public meetings would be an appreciated format for providing input to local deer management decisions. However, public meetings alone are unlikely to provide all the characteristics local residents desire in an involvement process (i.e., residents expressed a strong interest in a process that uses scientific information, promotes communication, treats all residents equally, and is time- and cost-effective). To ensure that all of these elements are present, it was recommended that the IDI partners use public meetings as one of several involvement formats.

Capitalize on citizen trust in scientific surveys. Residents expressed substantial interest in using surveys to gather public input on local management. Efforts to share the results of this survey with residents should help assure residents that their input is valued and is being considered by the IDI partners. The partners may find additional survey research useful to gather new kinds of input as public deliberation about local deer management continues. For example, if deliberations proceed to a point where specific deer management options are being considered, a survey of area residents could be used to gain additional insights about public reaction to specific management proposals.

Consider citizen advisory groups, panels, or task forces. Confirmatory factor analysis revealed four criteria of importance for a public involvement process: use of scientific information, treating all citizens equally, promoting communication, and time/cost effectiveness. All of these factors were reported as highly desirable as part of a decision-making process regarding management of deer in the Town of Islip. Citizen advisory groups offer a means to promote these qualities in a public involvement process.

Creating citizen advisory groups can be a very useful way to involve citizens in the difficult process of weighting different stakes in decisions about deer management. For example, DEC has institutionalized a task force approach to set specific deer population objectives for the wildlife management units across the state. Well over 100 task forces have been convened to date. Nearly all of these advisory groups have been able to reach a consensus decision about deer management objectives in their local management unit, and

261

the agency has accepted those decisions as local management goals.

Citizen advisory groups could be very useful in Islip. They need not resemble the deer management task force system currently used by the DEC, but like those task forces, any groups formed in Islip are most likely to be productive if they have clear direction, clear authority, and carefully defined responsibilities. Serving on an advisory group is a demanding responsibility for both citizens and agency staff. Citizen participants should be selected carefully, based on their ability and willingness to represent a particular stakeholder group. Any advisory group design should include detailed plans for selection and replacement of stakeholder representatives.

Summary and Parting Comments

Developing effective stakeholder involvement strategies is among the greatest challenges facing wildlife managers. However, through research and accumulated experience wildlife professionals are developing some general guidelines that give practitioners some context for process design, and thus makes the task of process design more manageable. This paper has offered one such framework. The main elements in this framework include: (1) developing an understanding of the local situation (i.e., preliminary situation analysis); (2) defining the wildlife agency's objectives for stakeholder involvement; (3) selecting an overarching stakeholder involvement approach; and (4) designing context-specific stakeholder involvement strategies. We offered the example of stakeholder involvement in Islip, New York to provide practitioners with a concrete example showing how wildlife managers and researchers can design strategies to involve stakeholders in the resolution of wildlife damage management issues at a community level.

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264