

Preliminary Assessment of Social Feasibility

for Reintroducing Gray Wolves to
the Adirondack Park in Northern New York

by

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EXECUTIVE SUMMARY

Introduction

Social feasibility pertains, in part, to the degree to which public attitudes and beliefs about restoration of a wildlife species are shaped by the abilities of local residents and other stakeholders to identify and build on restoration-related opportunities and to overcome or mitigate potential restoration-related problems. Thus, data about community members and their communities' capacity vis-a-vis restoration provides a context for exploring some of the consequences that may be associated with restoration. For this reason, the proportion of residents who hold either positive or negative attitudes about restoration should never be used as the sole social input and treated as a surrogate referendum about restoring a species. Rather, the ways in which community members think about possible impacts in the context of their own community, and the ways in which this context affects attitudes, must be understood.

Our research is intended to be a first step toward understanding social feasibility in this way. Specifically, we have attempted to determine the social context within which the issue of wolf restoration currently is being thought about in the Adirondack Park and statewide. We also have determined current levels of public attitudes and factors that seem to influence those attitudes within the existing social context. Thus, our research should be considered as a preliminary social and economic outlook of likely effects of wolf restorations, and not a definitive answer about whether wolf restoration is socially feasible.

Methods

The set of characteristics associated with each respondent's local community provides an important contextual foundation within which respondents can consider potential impacts of restoration. To better understand this context, we obtained 7 kinds of social and economic data from a variety of sources for each Adirondack Town and Village. From this, we developed an index to each community's capacity to respond to change, relative to the capacity of all other Adirondack communities. Further, we obtained detailed information from a sample of 422 Adirondack residents to assess their attitudes about wolf restoration and to better understand how their beliefs and the local community characteristics provided context within which they developed those attitudes. We contacted another 501 residents from throughout the state by telephone and asked similar questions about their attitudes and beliefs.

Findings

Regulatory Context

The decision about whether or not to restore wolves to the Adirondack Park lies primarily with the New York State Department of Environmental Conservation (DEC). The U.S. Fish and Wildlife Service (FWS) likely would play a role only if a decision was made to restore wolves, and wolves remained classified as endangered in the region. Similarly, the Adirondack Park Agency, U.S. Department of Agriculture's Wildlife Services, or other regulatory agencies would possibly have implementation roles - - but only if a decision was made to restore wolves.

Potential Impacts

Possible wolf depredation on livestock. Impacts of wolves in the area where they would be released (presumably public lands in the central Adirondacks) should be almost nonexistent. However, it is possible that wolves might migrate to regions that contain livestock. Even if they do, we would not expect unreasonable amounts of livestock damage, based on the experience in other areas of the U.S. Further, in other areas of wolf restoration, either state government or Defenders of Wildlife has reimbursed farmers or ranchers for livestock losses attributable to wolves. Although New York State does not have a program that reimburses farmers for damage from wildlife, Defenders of Wildlife has indicated a willingness to institute a reimbursement program in New York for wolf-related damage to livestock. Another key management criterion would be the federal classification of wolves in New York at the time when any livestock damage occurred. If wolves were classified as threatened rather than endangered, trapping and relocating at a minimum would be a possible management tool that could reduce the potential livestock damage from wolves.

Possible economic impact on deer hunting. Because we have no specifically proposed release site, it is not possible to estimate meaningfully how wolves would affect deer populations, and how this in turn would affect the economics of deer hunting in the Park. However, in areas of higher prey suitability, a small population of wolves theoretically could be maintained without undue impacts on the deer population, if a system were in place to manage the wolves. This is why FWS classification of wolves in the Adirondacks (which implies the ability of DEC to manage wolves) is critical. If a wolf population successfully thrived and multiplied, at some point management capability could be needed to keep the wolf population from reducing the deer population to the point that it would negatively impact deer hunting

Possible economic impact on tourism. Little evidence exists to indicate that significant numbers of tourists are attracted to northern New York currently for wildlife-viewing opportunities. Therefore we would not expect the presence of wolves to add significantly to the regional economy of the area they would inhabit without a significant investment of an ecocenter somewhat analogous to the one in Ely, MN. However, ecocenters usually are secondary attractions, which greatly rely upon the touristic appeal of the primary attraction, typically a nearby nature reserve. If such an ecocenter were to be created in the Adirondacks after wolf

restoration is initiated, it would greatly rely on the existing tourist base of the Adirondacks. Such a center may not have a significant regional economic impact on an area the size of the Adirondacks, but could have a significant impact on the local economy in and immediately surrounding the area of the center's location.

Community Potential Profiles

Profiling of the 102 communities encompassed by the Adirondack Park identified 22 communities with high potential capacity to identify and take advantage of restoration-related opportunities and/or identify and overcome restoration-related challenges. Sixteen communities were designated as having moderate and increasing potential capacity while 14 were designated as having moderate but decreasing potential capacity. Fifty communities were designated as having low potential capacity. These measures compare each community against other communities in the Adirondack Park in a relative sense. Any community's designation of potential capacity could change if a different set of communities was used in the comparison.

Communities designated as having either moderate and increasing or high potential feasibility tended to be aggregated in the southeastern quarter of the Adirondack Park. Many of these communities already have in place the infrastructure needed to be able to benefit from wolf-related tourism. Many of the high-capacity communities have food and lodging establishments and developed, nature-based attractions. Many of the communities we identified as having lower potential capacity lack the infrastructure needed to benefit from wolf-related tourism (which is only 1 possible benefit albeit a potentially important benefit). In addition, most communities with lower potential capacity lack either the economic and social resources necessary to create that infrastructure, or the formal planning mechanisms to facilitate infrastructure development, even if it is desired.

Public Surveys

Adirondack residents are evenly split with respect to approving or disapproving of restoring wolves to the Adirondacks: 42% approve, 41% disapprove, 17% neither approve nor disapprove. Statewide, a majority of New York State residents (60%) approve, 34% neither approve nor disapprove, and 6% disapprove. The most important factors that influence restoration attitudes positively are: having a positive attitude towards wolves, desiring an increase in the local coyote population, seeing less media attention about the wolf restoration issue, being more knowledgeable about wolves, believing possible impacts of wolf restoration would be good for their local community, and desiring that nongovernmental organizations should take a great amount of responsibility for several roles in the wildlife management decision-making process (from providing input, to making the decision, to implementing the decision).

The amount of importance residents place on the issue of wolf restoration has an important moderating effect on attitude towards wolves. Just less than one-half of the respondents (46%) said the issue of wolf restoration was of little or no importance to them. The main differences between those persons and the 54% who thought the issue was at least of moderate importance is that “low-importance” respondents with a positive attitude generally believe that wildlife managers should simply decide the question of restoration. “Low-importance” respondents are not influenced by level of knowledge about wolves or desired future changes in coyote populations. “High-importance” respondents generally are not affected by the amount of media attention they see about the issue. However, those with positive attitudes towards wolf restoration tend to believe that nongovernmental organizations should take greater amounts of responsibility for providing input into wildlife management decisions, compared to “high-importance” respondents with negative attitudes towards wolf restoration.

Most respondents to both surveys (66% for mail, 70% for telephone) believe that impacts associated with wolf restoration either would be positive, or that possible negative impacts would be unlikely to happen. About 30% of Adirondack residents and 20% of statewide residents believe impacts would tend to be negative, or that possible positive impacts would be unlikely to happen. These *evaluative beliefs* (i.e., assessments about whether impacts are likely to happen and whether they would be good or bad) should be considered carefully in light of the finding that most respondents to both the mail and telephone surveys know relatively little about wolves and impacts that have been experienced in other places that have wolves. Of 7 knowledge questions asked, Adirondack residents averaged 3.6 correct responses and more than one-half (53%) of statewide residents gave 3 or fewer correct responses.

Given the importance of evaluative beliefs in affecting Adirondack residents’ attitudes towards wolf restoration, additional analysis is needed to better understand how people evaluate possible impacts in the context of their own communities' capacity to turn opportunities into reality or to mitigate potential problems. Also, a better understanding is needed regarding how attitudes are shaped by the amount of responsibility they believe different stakeholder groups should take regarding wildlife management decisions. Persons with different attitudes towards restoration were influenced in different ways by the amount of responsibility they believe various stakeholders should take for providing input, making, and implementing wildlife management decisions.

Conclusions

Adirondack residents are split with respect to their attitudes about the possibility of wolf restoration in the Park. Most statewide residents hold positive attitudes towards restoration, but believe that local residents should take much responsibility for wildlife management decisions affecting the Adirondacks. Attitude towards restoration should not be mistaken as a vote for or against restoration with any degree of finality. Rather, it indicates how people thought about the issue at the time they were surveyed.

Overall, attitudes towards wolves generally are positive, but people worry about some

kinds of impacts on local areas. Greatest concern pertains to the possibilities of government restricting activities on private land, wolves killing pets, wolves killing livestock, people killing wolves, and wolves decreasing the deer population. Killing of pets and livestock are unlikely to be serious problems for most communities, based on experiences in other states. Decreases in deer populations are possible according to the biological feasibility study, most likely in areas with many low-capacity communities. Those communities may not benefit much economically at this time from out-of-area deer hunters because they lack infrastructure to support visitors, but local residents' deer hunting opportunities may be affected.

Governmental restrictions on uses of private land could be a possibility under the federal Endangered Species Act, but it is not a certainty. Concern about governmental involvement is a long-standing concern by residents in the Adirondacks. However, this concern is somewhat tempered in this situation, given the amount of responsibility many respondents place with wildlife agency (i.e., government) officials for making and/or implementing wildlife management decisions. The high levels of responsibility residents believe wildlife officials should take for decision-making presents an opportunity for wildlife managers to provide their ecological expertise in discussions about the issue.

Such expertise could help residents become more knowledgeable about wolves. Overall, knowledge levels were relatively low. Provision of a fact sheet to half of the sample in the mail survey increased knowledge scores for that group, but had limited influence on attitudes towards restoration. Still, factual knowledge about wolves would be useful as residents discuss the issue of wolf restoration, and increased knowledge would enhance opportunities for residents to adequately assess the degree to which their communities could possibly take advantage of, or deal with, potential impacts related to wolf ecology and behavior.

The opportunity for residents to discuss the restoration issue in the context of their own communities' interests could be an important part of the overall decision-making process that so far has been dominated by local elected officials and NGOs (both for and against restoration). Respondents indicated that local residents should take higher levels of responsibility than either local elected officials or NGOs, especially for providing input and helping to make decisions that affect their local communities. This suggests that local residents want to be involved in what we refer to as co-management decisions, where they share responsibility for decision-making with officials from wildlife agencies.

Community-based discussions will be most useful to the overall decision-making process if discussions are framed within an appropriate context. This context includes an understanding of their community's social and physical characteristics, goals for the future, and linkages with neighboring communities. This would allow residents to consider how their own community experiences and characteristics might influence, or be influenced by, potential restoration impacts.

Further, such a context would allow local residents to discuss questions for which they are best-suited to address. For example, they could appropriately decide the ways (both good

and bad) in which wolf restoration would likely affect their ability to achieve community goals, rather than being asked only the broader question of whether wolves should be restored to the Adirondacks. Answering the broader question will involve understanding biological feasibility and the complex regulatory context of endangered species restoration—both of which require the input of specialized expertise. Further, by considering the local context and real community experiences and characteristics, residents could be confident that the appropriate decisions they make are based as much as possible on the reality of their own situations and not just on hypothetical situations.

Our findings support the notion that residents can assess potential restoration impacts in the context of their local situation. For example, Adirondack residents generally indicated that (a) wolves attacking people, (b) local residents restricting activities on private land, (c) wolves killing pets, and (d) wolves killing livestock would be “bad” impacts associated with restoration. However, most respondents said these impacts were unlikely to happen in their communities. Thus, those potential impacts are not important considerations in many communities.

It is important to note, however, that the capacity of communities to identify restoration-related opportunities they may want to pursue or to identify potential problems they may wish to prevent/mitigate differs across the Adirondack Park. High-capacity communities are those with the greatest likelihood of benefiting in some tangible way, and mitigating negative impacts associated with wildlife restoration. Low-capacity communities are least likely to benefit from restoration, and most likely to experience, with little ability to mitigate, some set of negative impacts if restoration proceeds. Moderate-capacity communities have a demonstrated ability to experience some benefits from a local change like restoration, but barriers exist that negatively affect the degree to which those communities could benefit from opportunities or mitigate possible undesirable impacts.

In addition, residents in communities with different levels of capacity also indicated different levels of decision-making responsibility for local residents and wildlife officials. Respondents in low-capacity communities want wildlife officials to share with them the responsibility of providing input to decisions, and want wildlife officials to take greatest levels of responsibility for making and carrying out decisions. Residents in moderate-capacity communities want greater responsibility for providing input, making decisions, and even carrying out decisions. Residents in high-capacity communities generally want the greatest responsibility for providing input, but are willing to share responsibility with wildlife officials for making decisions, and want those officials to take greatest responsibility for carrying out decisions.

High-capacity communities are most capable of benefiting from wolf restoration in some way, but generally are located some distance from areas wolves are likely to inhabit if restored. Many low-capacity communities are located in areas likely to be inhabited by wolves if they were restored, but those communities are least capable of dealing with restoration-related problems on their own without some kind of external help. Respondents in low-capacity areas may have recognized that need when they indicated wildlife officials should take high levels of

responsibility for making and carrying out wildlife decisions.

Conservation NGOs, like Defenders of Wildlife, have demonstrated interest in other areas (e.g., Greater Yellowstone Ecosystem, American southwest) in helping to implement wildlife management decisions by contributing funds for translocating animals and establishing funds to compensate ranchers for livestock lost to restored wolf populations. Respondents to the mail survey showed little interest in NGOs like Defenders taking on this kind of responsibility in the Adirondacks. Indeed, respondents indicated no greater responsibility for NGO officials in carrying out decisions than in providing input or making decisions.

This does not mean that NGOs should abandon this role if a decision eventually was made to restore wolves. Indeed, if restoration proceeded, most communities likely could benefit greatly by sharing implementation responsibilities with interested NGOs. Further, respondents who wanted NGOs to take on more responsibility in the decision-making process tended to hold positive attitudes towards wolf restoration. Perhaps they recognized that their community's chances of either benefiting from wolf restoration, or overcoming possible negative impacts, would be enhanced if NGOs took on some responsibility.

Finally, we reiterate that this is a general and preliminary social feasibility assessment. In conjunction with the biological assessment, this research should provide valuable insights about the wolf restoration issue in the Adirondack Park. The actual process of determining whether restoration should proceed likely will occur under guidelines such as those specified in an Environmental Impact Statement (EIS) and State Environmental Quality Review (SEQR). That process will require input at the local level that is beyond the scope of this feasibility study. This project should not be seen as a substitute for that process. Rather, this research will help communities, decision makers, and the public understand the likely general social and economic impacts of wolf restoration and set the stage for further discussion.

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INTRODUCTION

The gray wolf (*Canus lupis*) is classified as an endangered species in the contiguous 48 U.S. States. The last known wolf died in New York State in about 1874 (Fowler 1974 as cited in Hossack 1996). As part of a national recovery effort, the U.S. Fish and Wildlife Service is developing a recovery plan for the northeastern U.S., including New York State. The Defenders of Wildlife became interested in examining the feasibility of restoring wolves to the Adirondack Park of New York State in anticipation of that federal recovery plan. This report presents information from a preliminary assessment of social feasibility for reintroducing gray wolves to northern New York. Studies examining the social feasibility of restoring moose (Lauber and Knuth 1996) and elk (Enck et al. 1998) in New York State have shown that decisions about whether to reintroduce a large mammalian species are very complex. Various stakeholders typically are affected in different, sometimes unexpected ways. Thus, any assessment of social feasibility must identify the different types of stakeholders involved, the decisions with which they are faced, and the kinds of information required to make those decisions.

Ultimate answers to the question of whether to reintroduce wolves to New York will involve decisions by state and federal wildlife management agencies about whether to issue necessary permits. These decisions would be made only after investigating likely impacts of specific restoration alternatives and obtaining public input. For example, decisions about issuing state permits for wolf restoration would require a State Environmental Quality Review (SEQR) procedure. A federal environmental impact assessment may also be required.

Staff with New York State Department of Environmental Conservation's (DEC's) Division of Fish and Wildlife and many elected officials consider very carefully the wishes of the public in making major wildlife policy decisions. For species restoration, the likely impacts on local stakeholder groups as well as local public sentiment need to be considered. With the recent discussion of possible elk restoration, DEC indicated the desire that restoration, if it is to occur, be requested by one or more communities at the local level (Enck et al. 1998). As a result, a social feasibility study determined the degree to which communities in several areas of New York have a high likelihood of benefitting from elk restoration. An analogous effort has been built into our preliminary assessment of social feasibility regarding the restoration of wolves.

The context for our work is best described as a preliminary study. Should it be shown that wolves are biologically suited to the Adirondacks and that there is support for wolf restoration in one or more areas, a specific restoration proposal would likely be brought forth, perhaps containing one or more alternatives. The social and economic impacts of those specific proposals would need further study and public input. The actual process of determining whether restoration should proceed will occur under guidelines such as those specified in an Environmental Impact Statement (EIS) and State Environmental Quality Review (SEQR). That process will require input at the local level that is beyond the scope of this feasibility study. This project should not be seen as a substitute for that process. Rather, this research will help communities, decision makers, and the public understand the likely general social and economic impacts of wolf restoration and set the stage for further discussion and perhaps, specific restoration proposals.

Study Objectives

Determine and summarize the decision making context for the question of wolf restoration (e.g., decisions, decision makers, information needed), given the regulatory context of endangered species restoration within the Adirondack Park.

Derive qualitative, and if possible, quantitative descriptions and estimates of benefits and costs associated with wolf restoration elsewhere; and to the extent possible, characterize the likely levels of impacts reintroduced wolves would have in the Adirondack Park.

Profile communities (municipalities) within the Adirondack Park based on their social infrastructure; assess their level of potential feasibility to benefit from wolf restoration and to overcome any negative impacts associated with restoration.

Determine attitudes towards wolf restoration and factors affecting those attitudes for (a) residents of the Adirondack Park and (b) citizens throughout New York State.

Organization of This Report

The remainder of this report is organized around these 4 main objectives. A methods section follows, and specific methods pertaining to each objective is described in a subsection. Study findings are similarly presented in subsections within a results section.

METHODS

Regulatory Objective

We reviewed and synthesized the following:

- applicable legislation (including legislation creating the Forest Preserve and the Adirondack Park), agency mandates and policies (federal, state and local), and relevant land use regulations associated with restoration, public access, and providing public services associated with tourism related to seeing or hearing wolves;
- requirements for public involvement as any specific proposal for wolf restoration is considered, and
- responsibility for management of wolf populations, including dealing with individual animals who may cause damage or become nuisances.

Impacts Objective

We reviewed the literature pertaining to impacts associated with wolves in other locations in which wolves have been reintroduced or have recolonized on their own. In addition, we telephoned key informants in other areas of the U.S. and Canada inhabited by wolves. From these sources we derived qualitative and in some cases, quantitative descriptions and estimates of benefits and costs associated with wolf restoration. Where possible, we linked these benefits and costs to (1) time frame following restorations, (2) population numbers and density of wolves, (3) mix of land uses and ownerships in the region inhabited by wolves, and (4) distance (remoteness) of the restoration area from human population centers.

To the extent possible, we characterized likely levels of impacts of wolves in the Adirondack Park. We paid particular attention to

- positive economic impacts that could occur from increased nature-based tourism, and
- negative economic impacts that could occur related to a decrease in hunting opportunities if deer populations are reduced.

Community Potential Objective

We profiled the social infrastructure (Enck et al. 1998) of communities (township and village municipalities) in the Adirondacks (Figure 1). From this profile, we designated the level of potential "community capacity" for all communities based on their hypothesized capacity to identify and take advantage of possible restoration-related benefits and/or identify and overcome possible restoration-related problems. First, we obtained social and economic data for all 102 communities that exist wholly or partially within the Park. Then we applied these data in a 3-stage key developed by Enck et al. (1998) to compare current and recent trend in social infrastructure for all communities (Figure 2). This resulted in a relative (rather than absolute) measure of potential community capacity.

The first stage in the key distinguishes between communities with a well-defined mechanism for making decisions about their futures (i.e., a mechanism with legal standing) and communities lacking such a mechanism. The single indicator for this step is presence/absence of either formal zoning regulations or a written comprehensive plan. Communities with either or both of these mechanisms are most likely to be able to take

Figure 1. Communities (towns and village municipalities) encompassed by the Adirondack Park in northern New York State.

Figure 2. Stepwise model for designating capacity of communities to identify and take advantage of restoration-related opportunities and/or identify and overcome restoration-related problems.

advantage of restoration-related opportunities (Enck et al. 1998). Conversely, communities that have not carefully considered their futures and how they want to manage those futures are more likely to experience possible negative consequences of restoration and be less likely to experience positive consequences.

Step 2 in the key identified communities that have demonstrated some success in using formal planning mechanisms to achieve high levels of well-being (Eberts and Khawaga 1988). We used a combination of 3 indicators for this step--Dependency Ratio (Hall 1994, McNamara and Deaton 1996), per capita baseline expenditures, and per pupil education expenditures because no single available indicator adequately measures community well-being. This second stage examines the "current condition" of a community's social infrastructure. Here, "current" pertains to the most recent point in time for which data are available. The 3 variables indicate the degree to which the social services in a community are strained (Dependency Ratio) and the degree to which community members invest in their own future (through baseline and education expenditures), relative to other communities.

The third stage in the key determines whether communities have experienced improving or worsening trends in their social infrastructure. Again, 3 variables are used--trend in Dependency Ratio, trend in total population (U.S. Bureau of the Census 1981, 1991), and trend in property values (Office of the State Comptroller 1991, 1996). Both trend in Dependency Ratio and trend in total population indicate whether community residents are being retained/attracted to the community. Trend in property values indicate whether persons express confidence in the community by investing in property located there.

Interpretation of quantitative data for variables pertaining to Dependency Ratio, expenditures, and trends required the intermediate step of calculating a median value for each variable. For each of these 6 variables, we compared data for each community to the median values of the 6 variables for all 102 communities. Communities with "better" social and physical infrastructures (and thus greater levels of potential social feasibility) are those which have a value "better" than the median value. Greater potential community capacity is associated with values above the overall median for baseline expenditures and education expenditures, but below the overall median for Dependency Ratio.

We converted trend data to percent change over time to standardize the data among communities. Then we compared percent change over time for each community with the median percent change for all communities. Thus, greater potential community capacity was indicated by values above the median change in the trend for total population and property values, and by values below the median for trend in Dependency Ratio.

Finally, for stages 2 and 3, we determined the degree of consistency among the combined variables. Situational factors may affect the outcome for any of the variables used (e.g., communities containing a college may have a relatively high dependency ratio without causing excessive strain on the social infrastructure of that community). An acceptable degree of consistency among variables existed if at least 2 of the 3 variables had values better than the median value. Any 2 of the 3 variables could be positive because all 3 indicators carried equal weight in the assessment.

Communities having a combination of a formal planning mechanism, a consistent measure of having a “better” current situation than most other communities and a consistent measure of having a “better” recent trend than most other communities are designated as having high potential community capacity (see Table 1). Communities having a formal planning mechanism, but (a) a weak current condition and (b) an inconsistent or negative recent trend in their social infrastructures are designated as having low potential community capacity. These communities are least likely to benefit from restoration, but are most likely (compared to other communities) to experience negative consequences from restoration because they likely lack capacity for mitigation.

Our key designates communities without a formal planning mechanism as having low potential community capacity. Although some of these communities may have a strong current situation and a positive trend for indicators associated with their social infrastructure, lack of a formal planning mechanism likely would prevent them from directing their futures in the same ways as communities with such mechanisms. Indicators associated with the current condition and recent trend in social infrastructure of communities lacking a formal planning mechanism most likely are influenced by factors occurring outside of those communities, rather than being a result of efforts within the communities. Communities designated as having low potential capacity are least likely to benefit from local restoration of an extirpated wildlife species, and are

Table 1. Relationships between (a) current condition of social infrastructure, (b) recent trends in condition of social infrastructure, and (c) level of community capacity, for those communities with a formal planning mechanism.

<u>Current Condition of Social Infrastructure</u>	<u>Recent Trend in Social Infrastructure</u>	
	<u>Positive</u>	<u>Inconsistent or Negative</u>
Strong	High potential community capacity	Moderate but decreasing potential capacity
Weak	Moderate but increasing potential capacity	Low potential potential community capacity

most likely to experience, with little ability to mitigate, some set of negative consequences if restoration proceeds.

Communities designated as having moderate potential capacity have demonstrated that they could experience some benefit from a local change such as restoration. However, several important barriers likely exist that negatively affect whether they could identify and take advantage of restoration-related benefits -- without important changes in social infrastructure occurring in the communities. Also, communities with moderate capacity are less likely, than those designated with high potential capacity, to be able to address and successfully mitigate most negative consequences that may be associated with restoration.

High-potential-capacity communities have a high likelihood of benefitting in some tangible way from wildlife restoration, and mitigating negative consequences associated with restoration. **A designation of high potential capacity does not guarantee that a community will benefit or that possible benefits will be consistent with goals, nor does it indicate that a community will desire restoration. Further, a designation of moderate capacity or even low potential capacity does not preclude a community from benefiting, comparing consequences and goals, or pursuing the idea of restoration.** This research simply provides insights into the social and institutional context that presents the opportunity for communities to best discuss how restoration might affect them and decide whether they may want to pursue restoration.

Public Surveys Objective

We conducted 2 household surveys to assess public attitudes towards wolves and the idea of wolf restoration, and factors affecting those attitudes. One was a mail survey sent to a random sample of 1,250 households within the boundary of the Adirondack Park. The second was a telephone survey completed with 500 randomly selected residents throughout New York State.

The Adirondack household mail survey was implemented on 7 September 1999. Each household in the sample received a notification letter informing the households that they would be receiving a questionnaire, and those were followed by questionnaires using Salant and Dillman's (1994) revised 4-wave procedure. One-half of the households were sent a fact sheet about wolves and describing impacts of wolf restoration experienced in other locations, with their notification letter. Instructions were sent with the questionnaires asking that it be completed by the adult with the most recent birthday in the household. To determine whether nonresponse bias existed for attitude and belief questions, we completed telephone interviews with 101 nonrespondents to the mail survey. The nonrespondent follow-up was conducted between 27 October and 6 November 1999.

The existence of nonresponse bias was assessed for variables asked in both the mail survey and nonrespondent telephone follow-up. For the continuous variable "how many years have you lived in the Adirondack Park," we used a t-test to compare means. For all other categorical variables (i.e., knowledge, issue importance, and attitude items), we use Chi-square analysis to assess whether nonresponse bias existed. We controlled for gender in all instances because of gender differences among respondents.

The statewide telephone survey was pretested with a random sample of 25 households across the state. Minor changes in wording were made to enhance reading comprehension and reliability. A total of 501 telephone interviews was completed between 21 September and 2 November 1999. To ensure randomness, interviewers asked to speak with the adult with the most recent birthday in the household. Up to 13 call-backs were used to reach potential respondents. The 501 completed interviews provides opinion estimates with an error range no larger than + or - 4.5% at the 95% confidence level.

Attitude towards wolf restoration was determined in the mail survey by averaging the results of 3, 7-point bipolar questions (Table 2). The 3 items were averaged to create a single 7-point index that we used as a dependent variable in regression analyses. Average indices tend to have higher validity than single question indicators (Azjen and Fishbein 1980). Due to space and time considerations, we only asked 1 question in the telephone survey (Do you approve or disapprove of restoring wolves to the Adirondacks?). We compared responses from the mail and telephone surveys using this question.

Attitude towards wolves was assessed using a single 7-point, bipolar question (Table 2). Subjects were asked whether their attitude was extremely, moderately, slightly, or neither positive nor negative. This question was asked in both the mail and telephone surveys.

Objective knowledge about wolves and wolf restoration was determined by asking a set of 7 "yes or no" questions in both the mail and telephone surveys (Table 2). A knowledge index was created by summing the number of correct answers for each respondent. We did this in both surveys. To examine the influence of providing balanced information on knowledge as well as attitudes and beliefs, answers to the knowledge questions were provided in the fact sheet mailed to one-half of the sample in the mail survey only.

Perceptions of possible impacts of wolf restoration (Table 2) were determined through a series of 13 items adapted from Bright and Manfredi (1996) and Pate et al. (1996). Perceptions were assessed in both surveys using the same set of possible impacts. For each possible impact, we asked subjects the extent to which they agreed or disagreed that each impact would happen in their community (i.e., belief strength). Then we asked them to consider whether each impact would be extremely, moderately, slightly, or neither good nor bad for their community (i.e., outcome evaluation). We developed a

Table 2. Indices and individual items used to assess factors affecting public attitudes towards the possibility of wolf restoration in the Adirondack Park of northern New York.

<u>Indices and items used for construction of index</u>	<u>Range used for construction of index</u>	<u>Reliability coefficient</u>
Attitude towards wolf restoration (average of 3 items)	-3 to +3	0.98
<p>Do you approve or disapprove of restoring wolves to the Adirondacks?</p> <p>Is the idea of restoring wolves to the Adirondacks a good idea or a bad idea?</p> <p>Do you like or dislike the prospect of wolves being restored to the Adirondacks?</p>		
Attitude towards wolves (single item)	-3 to +3	N/A
<p>Would you say your general attitude towards wolves is positive, negative, or neutral?</p>		
Objective knowledge (sum of correct responses)	0 to 7	N/A
<p>Did wolves live in the Adirondacks in the past? (T)</p> <p>Are wolf attacks on humans common in areas where wolves live close to humans? (F)</p> <p>Are wolves found in many countries around the world? (T)</p> <p>Do coyotes kill more sheep than wolves in farming areas inhabited by both coyotes and wolves? (T)</p> <p>Do wolves prefer to eat livestock even when wild animals are plentiful? (F)</p> <p>Are wolves in danger of becoming extinct worldwide? (F)</p> <p>Do wolves kill a large number of pets where wolves live near homes with pets? (F)</p>		

Table 2 (continued).

<u>Indices and items used for construction of index</u>	<u>Range used for construction of index</u>	<u>Reliability coefficient</u>
Perceptions of possible impacts of restoring wolves (sum of products of beliefs [-3 to +3] about following 13 items times evaluations [-3 to +3] of those 13 items) Restoring wolves to the Adirondacks would... <ul style="list-style-type: none"> ...preserve the wolf as a species. ...reduce the coyote population. ...result in wolves lolling livestock on a large number of farms. ...keep deer populations in balance with their habitat. ...increase tourism. ...result in people killing wolves. ...result in wolf snacks on humans. ...result in government agencies restricting activities on private land to protect wolves from disturbance. ...return an important missing component of wilderness. ...result in wolves killing pets. ...reduce the deer population. ...reduce the rodent population. ...result in local residents restricting activities on private land to protect wolves from disturbance. 	-117 to +117	N/A

Table 2 (continued).

<u>Indices and items used for construction of index</u>	<u>Range used for construction of index</u>	<u>Reliability coefficient</u>
<p>Perceptions of potential social feasibility (average of 3 items)</p> <p>The town or village I live in usually can find a way to overcome most problems it faces.</p> <p>My town or village is better off than most Adirondack towns and villages.</p> <p>The town or village I live in usually can identify and take advantage of opportunities that are consistent with its vision for the future.</p>	-3 to +3	0.77
<p>Perceptions about level decision-making responsibility that each of 5 stakeholder groups should be willing to take (sum of 3 items)</p> <p>How much responsibility should each stakeholder group be willing to take for...</p> <p>...providing input for wildlife management decisions.</p> <p>...making wildlife management decisions.</p> <p>...carrying out wildlife management decisions.</p>	0 to 9	N/A

belief evaluation index by multiplying belief strength by outcome evaluation for each impact. Individual indices were summed to create an overall index for each subject (Bright and Manfredi 1996).

For every respondent, the belief evaluation index could be either positive or negative for each impact. A positive index results if the respondent agrees the impact will happen and it would be good, or if the impact would be bad but the respondent disagrees that it will happen in his/her community. A negative index results if the respondent believes the impact would be bad and agrees it will happen, or if the respondent disagrees that a good impact would happen.

Perceptions of potential community capacity were assessed by measuring the degree to which respondents believed their community could take advantage of new opportunities or overcome problems. This assessment of “community capacity” was determined in the mail survey only. We asked 3, 7-point bipolar questions on a scale from strongly agree to strongly disagree (Table 2). We averaged scores for the 3 items to obtain a highly reliable index of “community capacity.”

Perceptions about level of decision-making responsibility that each of 5 stakeholder groups should be willing to take was assessed in the mail survey only. The process of decision-making in the context of wildlife management involves several components including (a) having input from all potentially affected stakeholders, (b) having a mechanism for actually making the decision(s), and (c) having a way to carry out actions related to the decision(s). Responsibility for these components of the decision-making process could be taken on by 1 stakeholder group or shared among several.

We used 3, 4-point items to assess level of responsibility that residents believed should be taken by each of 5 stakeholder groups (Table 2). Possible responses ranged from “no responsibility” to “a great deal of responsibility”. Respondents also could indicate that they did not know how much responsibility a stakeholder group should take for a particular co-management action. The 5 stakeholder groups were: (1) residents of your local community, (2) local elected officials in your community, (3) officials of wildlife management agencies, (4) officials of nongovernmental conservation organizations, and (5) residents living outside your local area.

RESULTS

Regulatory Objective

Agency and Organizational Responsibilities for Wolf Restoration: The purpose of this section is to explain the likely roles of agencies and organizations having particular responsibilities with respect to wolf restoration, should restoration proceed at some point in the future. A general characterization will be presented below, but the specifics of some roles are subject to change pending the final outcome of the U.S. Fish and Wildlife

Service's classification of the eastern gray wolf in the Northeast. This will be elaborated on below.

With the possible restoration of any endangered or threatened species, close coordination between the U.S. Fish and Wildlife Service (FWS), which administers the Endangered Species Act, and state wildlife management agencies, is the norm. We have every reason to believe that close coordination would occur between FWS and the New York State Department of Environmental Conservation (DEC), should wolf restoration occur in the Adirondacks. The listing of responsibilities below is intended to indicate in which situations DEC clearly would be the lead agency and in which situations FWS would have an important policy-making role. Other agencies and organizations with particular interests and responsibilities related to wolf restoration are also covered below.

U.S. Fish and Wildlife Service (FWS)

No federally owned lands occur within the Adirondack Park or Northern New York which are managed for natural resource conservation or preservation. As a result, FWS would not be a major "on the ground" player in the management of gray wolves, should restoration occur. Conversations with several FWS staff indicated they would expect DEC to be the primary management agency, but that FWS would work together with DEC in a manner consistent with FWS's role.

The above implies that the decision on whether or not to restore wolves to the Adirondacks would lie primarily with DEC--that FWS would be very unlikely to recommend or participate in wolf restoration unless DEC either requested or agreed to restoration. Should wolves be restored, however, FWS would have a role in their management if wolves remain classified as endangered in the region of restoration. In this case, wolves that wander onto private land and cause property damage could be trapped and relocated, but normally they could not be destroyed without a permit from FWS. Similarly, if wolf populations grew large enough over time to have a significant impact on the deer population of Northern New York, wolves could not be destroyed without a FWS permit unless FWS first removes them from endangered status.

Should the gray wolf be restored to the Adirondacks, it might be done under several FWS classifications. The three possibilities that are most plausible are:

- The gray wolf retains endangered species classification, including the individual animals released in New York.
- The gray wolf, while maintaining "endangered" status, is restored under "experimental population" status in which the individual animals released are considered nonessential to the survival of the species.
- The gray wolf in the Northeast is downlisted to "threatened."

FWS is in the process of proposing regulations that would downlist the gray wolf from endangered to threatened in New York and the 3 northernmost New England states. It is not known at this time whether or not this proposal will receive favorable review.

New York State Department of Environmental Conservation (DEC)

Given DEC's responsibility for managing wildlife in New York and the fact that there are no federal lands in Northern New York of significant size except for military bases and historical sites, DEC would be expected to be the lead agency initially in any venture to restore wolves. DEC could be influenced to act (or not to act) by the Governor and State Legislature, the public, or various organizations, in addition to the professional judgment of its Bureau of Wildlife staff. However, whether DEC took the initiative on its own or was persuaded by others to do so, DEC cooperation would be necessary for wolf restoration.

The degree of management flexibility DEC would have once wolves were restored depends on the endangered/threatened status of wolves at the time some management action is contemplated. If wolves are downlisted or considered an experimental population not essential to the survival of the species, DEC would have considerable latitude on their own in management activities. If wolves were still listed as endangered and DEC felt management actions were needed, a permit from FWS would be required.

U.S. Department of Agriculture's Wildlife Services

Wildlife Services typically is involved in nuisance situations involving federally protected wildlife species. In the event of overpopulation of wolves (e.g., causing undue damage to the deer herd), or the spread of wolves to areas of human habitation where nuisance situations occurred, Wildlife Services could be requested by FWS, (with concurrence or request from DEC), to intervene.

Adirondack Park Agency (APA)

APA has no direct authority for managing wildlife but has review authority over DEC's unit management plans (UMPS) within the Adirondack Park. Restrictions exist in state-designated wilderness areas regarding use of helicopters, dropping animals in man-made release boxes, etc. If the release of wolves required any actions such as these, a permit from APA would be required. Final approval for UMPS must come from the Governor's Office; hence the New York Governor's office could become involved in a decision involving wolf restoration from this perspective as well as from its role as the lead executive agency in New York and any oversight it might wish to exert over DEC from this perspective.

Governor's Office

See comments under APA above.

New York State Legislature

The State Legislature gives DEC the authority to manage wildlife and it could remove this authority if it deemed DEC were not acting in the public interest. While the State Legislature intervenes directly in wildlife management situations infrequently, if it determined that the issue of wolf restoration were sufficiently controversial, or had significant impacts, the Legislature could hold hearings on the topic. Further, if it chose to do so, the Legislature could attempt to pass legislation concerning wolf restoration.

County Governments

Essex and St. Lawrence Counties have passed laws against the introduction of wolves or wildlife species groups that are intended to include wolves. While DEC legal staff believe that the counties have gone beyond their legal authority in passing such laws, the laws do express the wishes of county government. It would be very difficult politically for DEC to release, or condone the release of wolves in those counties as long as this legislation is on the books.

State of Vermont

New York and Vermont have binding agreements on the management of wildlife species of interstate concern. Thus, if wolf restoration were seriously contemplated, Vermont would be consulted. Should Vermont strongly object to wolf restoration in New York, it is questionable that restoration would proceed unless a way could be found to allay Vermont's concern.

Province of Quebec

Both through the Lake Champlain Management Conference and professional contacts with the Province of Quebec on more general wildlife issues, consultation with the Province of Quebec likely would occur on any proposed plan to restore wolves to Northern New York.

Other Organizations

The views of many other organizations would be considered actively in making decisions about wolf restoration. Town and municipal governments, the New York State Association of Counties, the Association of Towns of the State of New York, the Fish and Wildlife Management Board, the Conservation Fund Advisory Board, and organizations representing many other stakeholders also would be considered. However, these organizations have no direct legal authority related to restoration of wolves or other wildlife species.

Impacts Objective

The second objective was to develop the best possible estimates of the impacts, positive or negative, that might be expected from wolf restoration in the Adirondacks. It was recognized in the study proposal that these estimates would necessarily be very qualitative. Limited time and effort was devoted to this task in the project budget but in addition, no quantitative data exist in New York or the Northeast from which such impact projections could be made.

The general method for estimating the extent of impacts of various types was to first review the published literature and a substantial amount of material from organizations such as FWS and Defenders of Wildlife on internet sites. Some information exists on impacts of several wolf populations that have recolonized naturally (e.g., in the upper Midwest, northern Montana) or in which active restoration attempts are being made (e.g., the Greater Yellowstone Ecosystem, Great Smoky Mountains National Park, eastern North Carolina, and Arizona and New Mexico). The size of the wolf population in these areas and the length of time wolves have been “on the ground” varies considerably from area to area. These factors and human population, demographic, and geographic factors were all considered in arriving at some general estimate of the various impacts. In addition, some assumptions about management capability were necessary. These assumptions are discussed below where they are relevant. A summary of the findings for the possible impacts investigated follows.

Wolf Depredation on Domestic Livestock

Background: Given protection in areas of high biological feasibility, wolves can expand their range rapidly (Fuller et. al. 1992). Furthermore, wherever wolves and livestock coexist, wolves may prey on domestic animals (Fritts et. al. 1992). Several studies have found that wolves attack and kill livestock (Bangs and Fritts 1996, Wydeven 1996, Mladenoff et. al. 1997, McIntyre 1995). Occurrences of wolf predation on livestock have been documented in Idaho, Yellowstone, Wisconsin, Minnesota, Montana and North Carolina. However, in none of these locations has the incidence of depredation on livestock been high.

Evidence to date suggest that while wolves will occasionally prey on livestock and pets, wolves generally prefer wild game for food. This statement must be qualified to some extent, however. Most of the restored wolf populations in the Lower 48 states originated in the 1990s, with relatively few wolves restored at each location. Thus, wolf populations are quite low in most localities around the country. Only in Northern Minnesota does the wolf population exceed 2,000 animals.

Federal and state agencies and other organizations have recorded data for a number of years on total estimated livestock depredation in particular areas. Other information is available on the capture of particular problem-causing individual wolves. In attempt to generalize from these data, we have tried to examine the number of livestock deaths per thousand animals.

Thompson (1993) followed this approach for data he obtained through approximately 1990. Losses at that time in Minnesota were about 4.7 cattle and 26.6 sheep per 10,000 of each, from a wolf population of roughly 1,500 animals. The order of magnitude was similar in Alberta and British Columbia. Losses in the Greater Yellowstone area were even smaller, <0.5 cattle per 10,000 and 2.66 sheep per thousand, but for a population of only 150 wolves.

Some areas don't provide adequate data to estimate livestock kills on a relative basis, but the incidence is obviously quite low. For example, wolves in northwestern Montana killed an average of only 5 cattle and 4 sheep annually from 1987 to about 1996, according to USDA Wildlife Services data. Between 1996-1998, wolves killed an average of 2 cattle and 17 sheep annually in Idaho, and 2 cattle and 27 sheep in Yellowstone.

Where wolves have thrived and their populations have increased, livestock damage also has increased to some extent. As populations increased from roughly 1,500 to 2,400 in Minnesota over the span of a decade or so, the number of complaints increased. The number of verified complaints (by USDA Wildlife Services) increased from 76 in 1990 to 109 in 1997; the number of farms reporting complaints increased from 55 in 1990 to 93 in 1997. The average annual number of cattle and turkeys taken by wolves increased over the 1993-97 period compared to the long-term average. The average number of sheep taken in recent years declined, perhaps due to reductions in number of sheep raised. Despite the increases noted above, depredation from wolves occurs in any given year on <1% of Northern Minnesota farms (www.wolf.org/mgt/).

Assessment for Northern New York: According to the 1992 USDA Agriculture Census, the amount of farmland in counties comprising the Adirondacks is similar to that found in the Great Lakes region of the Midwest (i.e. northern Michigan, Wisconsin, and Minnesota.) The counties in and around the Adirondack Park had about 370,000 cattle and 8,000 sheep. The area within the Minnesota wolf range contained an estimated 232,000 cattle and 16,000 sheep. Counties on the periphery of the Adirondack Park contain many more cattle and sheep than those counties that are entirely or mostly within the boundaries of the park (Hamilton, Warren, Essex, and Fulton.)

If wolves found sufficient game populations in the area where they would be released (presumably public lands in the central Adirondacks), the impacts on livestock producers should be almost nonexistent. We know, however, that wolves often migrate large distances. Thus it is quite possible, depending on where wolves are restored and whether they survive, that they might

migrate to regions that contain livestock. Even if they do, we would not expect unreasonable amounts of livestock damage, based on the experience in other areas of the U.S. Livestock depredation in Michigan, Wisconsin and Minnesota has been low since wolves have recolonized these areas. Considering that these states are similar to the Adirondacks in respect to their agricultural areas, livestock depredation in the Adirondacks may also be similarly low if wolves are restored.

In other areas of wolf restoration, either state government or Defenders of Wildlife has reimbursed farmers or ranchers for livestock losses attributable to wolves. New York State does not have a program that reimburses farmers for damage from wildlife. However, Defenders of Wildlife has indicated a willingness to institute a reimbursement program in New York for wolf-related damage to livestock.

Beyond reimbursement, a key management criterion would be the federal classification of wolves in New York at the time when any livestock damage occurred. If wolves were classified as threatened rather than endangered, trapping and relocating at a minimum would be a possible management tool that could reduce the potential livestock damage from wolves.

Economic Impacts on Hunting

Background: One concern expressed about restoration of wolves to the Adirondacks is that wolves could deplete the deer population to a point that fewer hunters from the Southern Zone of New York and elsewhere would be attracted to the Adirondacks, and that negative economic impacts could result from lowered levels of deer hunting. As with other impacts, assessments of what might happen in New York are only qualitative and must be based on the experience of other areas where wolves have been restored or have recolonized.

The contention that restored wolves would negatively impact the deer population and therefore deer hunting is unfounded, based on evidence to date, but not necessarily unrealistic. In the Upper Great Lakes States, big game license sales and hunting demand has been generally increasing in recent years, whereas in New York and other parts of the Northeast, hunting license sales have been slowly diminishing. Thus, because of greater hunting demand in the Upper Great Lakes states, this region should have felt the impacts of wolf depredation on deer more strongly than would be the case in New York. Yet, license sales and white-tailed deer harvests in the Upper Great Lakes states have increased steadily over the past 20 years.

Green et. al. (1996) failed to detect a negative relationship between wolf numbers and wild ungulate [primarily deer and elk] harvest, hunter participation, or hunter success. In contrast, the authors found that all 5 states examined where wolves had been restored (Michigan, Minnesota, Wisconsin, Montana, and North Carolina) experienced an overall increase in deer harvest and hunter participation over the period examined (1973-1994). These findings are due mostly to large increases in white-tailed deer populations generally in the eastern half of the U.S., as a result of favorable changes in deer habitat.

In Central Idaho and the Greater Yellowstone Ecosystem, the EIS prior to initiation of wolf restoration predicted that wolf predation would kill 1,600 wild ungulates annually, primarily elk (Bangs and Fritts 1996). In the Greater Yellowstone Ecosystem, elk populations were predicted to be reduced 5-30% in some herds; deer, 3-19%; moose, 7-13%; and bison, <15%. This was not predicted to affect hunter harvest of male ungulates, but would reduce harvest of female elk, deer, and moose. The female elk harvest was predicted to be reduced by 10-15%. Decreased hunter benefits were estimated to be \$757,000 - \$1,135,000. These amounts were based on what hunters reported that hunting female elk was worth to them and their expenditures associated with hunting female elk.

No documentation of actual losses has occurred since wolf restoration in central Idaho and Yellowstone National Park. In a 14-county area of northeastern Minnesota encompassing the core of the state's wolf range, the number of bucks harvested between 1945 and 1997 has remained high even in the face of an expanding wolf population (internet data from www.wolforg/GH/Preview/Fall98/fall98a2.htm, site no longer active). By 1996, wolves in northeastern Minnesota had expanded their range to include most of Minnesota's main Deer Management Zones. If wolves were having a dramatic effect on deer harvest, one might expect hunter success to drop significantly during this expansion. Yet overall hunter success in harvesting both buck and antlerless deer did not decrease substantially. Harvest success did fluctuate, but according to the Minnesota Department of Natural Resources, this was largely due to changes in the number of antlerless permits issued. In some areas of northern Minnesota, however, wolf depredation, when combined with severe winter weather and poor deer habitat, has caused declines in deer numbers.

Assessment for Northern New York: We don't believe a firm assessment of the impacts of wolves on deer in Northern New York is possible. Available evidence suggests that the deer population in the central Adirondacks is lower and growing more slowly than in the Upper Midwest. If a wolf population were able to thrive in the Central Adirondacks, it is possible that in time it could affect the deer herd. Paquet et al. (1999) note that (1) the subregions of the Adirondacks vary considerably in their ability to support wolves, and (2) habitats likely to support wolves in the Adirondacks often are discontinuous with each other. In the 44% of the Adirondacks that Paquet et al. rated as having low prey suitability, wolves could affect the deer population more quickly, although Paquet et al. suggest the wolves would migrate to other areas with higher deer and other prey populations.

Because we have no specifically proposed release site, we find it impossible to estimate in a meaningful way how wolves would affect deer populations, and how this in turn would

affect the economics of deer hunting in the Park. However, in areas of higher prey suitability, a small population of wolves theoretically could be maintained without undue impacts on the deer population, if a system were in place to manage the wolves. This is why we believe that the FWS classification of wolves in the Adirondacks (which implies the ability of DEC to manage wolves) is critical. If a wolf population successfully thrived and multiplied, at some point management capability could be needed to keep the wolf population from reducing the deer population to the point that it would negatively impact deer hunting.

Economic Impact on Tourism

Background: Travel related to wildlife watching has become a popular activity over the past two decades. In 1996, almost 24 million people aged 16 years and older took trips away from home for the primary purpose of watching, photographing, or feeding wildlife (U.S. Fish and Wildlife Service 1997). The Adirondacks is one of New York's most popular tourism regions. Both summer and winter outdoor activities are popular in the region, and it is also a fall destination for many people who wish to view colorful fall foliage. Many outdoor activities are popular in the Adirondacks and viewing of wildlife is undoubtedly an important secondary or incidental activity associated with fishing, canoeing, hiking, hunting, etc.

The region has a number of charismatic wildlife species (moose, deer, beaver), and people with some background in wildlife also enjoy seeing many birds and small mammals. Yet, the region is not heavily promoted for its wildlife viewing resources. Many who favor wolf restoration believe that viewing and hearing wolves could be an important additional tourism attraction to the region that could add a meaningful component to its heavily tourism-based economy.

Limited information exists on the extent to which the restoration of wolves elsewhere has added to local economies. A number of these restorations occurred in the mid-1990s and perhaps are too recent for the wolf populations to have grown significantly and for the regions to have gained a reputation among the general public as places to view or hear wolves. There is anecdotal evidence from newspapers in the Greater Yellowstone Ecosystem that retail businesses catering to tourists have seen some growth in business due to visitors who have been attracted by wolves.

The best evidence of the potential impact of wolves on tourism comes from the Ely area of northern Minnesota, home of the The International Wolf Center (IWC). This center, which has displays and other audiovisual educational resources about wolves, is known as an "ecocenter" (Schaller 1996). Other wildlife-related examples of ecocenters include the International Crane Foundation in Baraboo, Wisconsin; the Sigurd Olson Institute's Loon Project in Ashland, Wisconsin; and the National Bighorn Sheep Interpretive Center in Wyoming.

A survey was taken of a random sample of 862 tourists in the Ely area from May 1995 to February 1996 (Schaller 1996). Just over half of these were visitors of the IWC. The results of the survey showed that Ely is predominantly a regional attraction, but is also a national destination. About 51% of IWC visitors report that the Wolf Center had either a great or some influence on their decision to visit Ely. Total tourist expenditures in 1995 amounted to about \$725,000. Moreover, total annual economic activity amounted to about \$3 million with the addition of 66 full-time jobs.

Assessment for Northern New York: As indicated above, there is little evidence that significant numbers of tourists are attracted to northern New York currently for wildlife-viewing opportunities. Therefore we would not expect the presence of wolves to add significantly to the local economy of the area they would inhabit without a significant investment of an ecocenter somewhat analogous to the one in Ely, MN. As Wilson and Heberlein (1996) note, tourism potential "inevitably confronts limitations imposed by ecology." Wolves are very elusive and try to avoid humans. Thus, the opportunity for a planned encounter with wolves at a given time on a given day is remote. Feeding and denning times occur fairly randomly rather than at predicted times. As a result, most of the public would need specialized opportunities to view or hear wolves.

Little is known about the role such ecocenters play in regional tourism. They usually are seen as secondary attractions, which greatly rely upon the touristic appeal of the primary attraction, typically a nearby nature reserve. If such an ecocenter were to be created in the Adirondacks after wolf restoration is initiated, it would greatly rely on the existing tourist base of the Adirondacks. Such a center may not have a significant regional economic impact on an area the size of the Adirondacks, but could possibly have a significant impact on the local economy in and immediately surrounding the area of the center's location. This could occur through a combination of attracting some new tourists to the region and encouraging tourists who came for other reasons to extend their stay by a day or more to learn about, and hopefully to observe or hear wolves.

Community Potential Objective

Profiling of the 102 communities encompassed by the Adirondack Park identified 22 communities with high potential capacity, 16 communities with moderate and increasing potential capacity, 14 with moderate but decreasing potential capacity, and 50 communities with low potential capacity (Table 3). Recall, these measures compare each community against other communities in the Adirondack Park in a relative sense. These results do not identify absolute measures of potential capacity. A community's designation of potential capacity could possibly change if a different set of communities was used in the comparison. Thus, a community identified as having low potential capacity in this instance may have a higher designation in a comparison with a different set of communities.

Table 3. Human population within Adirondack communities, by level of potential community capacity, 1999.

Level of potential community capacity	Human population	
	<u>n</u>	<u>% of total</u>
High	43,885	19.2
Moderate, increasing	66,009	38.9
Moderate, decreasing	20,456	9.0
Low	118,547	42.9

A relatively large proportion (42.9%) of the total human population in the area examined live in communities designated as having low potential capacity. However, nearly one-fifth of the population live in communities designated as having high potential capacity, and another 28.9% live in communities designated as having moderate and increasing potential capacity (Table 3). Thus, nearly one-half of the people residing in the area examined live in communities that have the highest capacity to identify and take advantage of possible restoration-related opportunities and/or identify and overcome possible restoration-related problems.

Communities with either low or moderate but decreasing potential capacity accounted for about two-thirds of the land area examined (Figure 3). Communities designated as having either moderate and increasing or high potential capacity tended to be aggregated in the southeastern quarter of the Adirondack Park. Communities in this section of the Park are closer to some of northern New York's larger human population centers (e.g., Glens Falls, Saratoga Springs) and to the state capital (Albany) than are communities in other parts of the Park.

Larger population centers typically provide more opportunities for residents to be involved in a wide array of community activities, which in turn stimulates diffusion of information and ideas within those communities (Swanson 1996). Further, population centers often have associated with them civic organizations that are available to all socioeconomic strata in those communities, which fosters fluidity of interaction and discussion (Eberts and Khawaga 1988). Eberts and Khawaga found this fluidity to be reflected in competitive interest among various segments of a community to identify and select alternatives for stimulating the development of new opportunities within the community.

Figure 3. Designations of community capacity for all communities within the Adirondack Park.

Communities we identified as having higher potential social capacity had higher levels of community well-being as measured by the social and economic indicator variables we used, compared to lower capacity communities. Communities with higher levels of well-being usually have a wide array of public and private social services that "...underwrite and coordinate social and economic needs" within a community (Swanson 1996:116). Some of the most important community needs include public and private health care (medical services, water and sewer), housing, education, and public safety (police and fire). Some of these social service needs are addressed by governmental agencies. Others are addressed by the private sector through local churches, libraries, civic volunteer groups, and regional development corporations.

Adequate social services help ensure the retention of highly educated, productive members of the community who can stimulate community action and provide a potential leadership pool for the community (Hall 1994). These persons usually are most likely to bring issues forward for discussion and action. They also often have the means to invest time and capital in the community (Eberts and Khawaga 1985).

Having adequate social services and members who are able to reinvest in the community are important prerequisites for a community to benefit from wildlife restoration in some important ways such as attracting visitors who want to experience the restored species. Communities that cannot meet the needs of their own members are less likely to be able to develop and provide the kinds of services necessary to attract visitors who are willing to stay in the community long enough (e.g., overnight) to provide an economic boost to the community. Where such visitor services are developed at the expense of meeting the needs of local residents, a result is that disparities in well-being are magnified among segments of the community (Eberts and Khawaga 1988). Further, attracting visitors to a community may result in additional strains on local social services because visitors use some of the same kinds of services that residents need (e.g., health care, public safety, sanitation).

In general, communities we identified as having high potential capacity have already in place the infrastructure needed to be able to benefit from wolf-related tourism. Many of the high-capacity communities have food and lodging establishments and other nature-based attractions such as ski facilities. Nature-based tourism already has been identified by those communities as desirable, and through formal planning efforts, those communities have invested in needed infrastructure. Many of the communities we identified as having lower potential capacity lack the infrastructure needed to benefit from wolf-related tourism (which is only 1 possible benefit albeit a potentially important benefit). In addition, most communities with lower capacity lack either the economic and social resources necessary to create that infrastructure, or the formal planning mechanisms to facilitate infrastructure development, even if it is desired.

Public Surveys Objective

Response to the Mail Survey of Adirondack Residents

The initial sample of 1,250 households resulted in 995 deliverable questionnaires and 422 useable returns (42.4% response rate). We selected a random sample of 250 households that did not respond to the mail survey to assess whether nonresponse bias existed in our findings. We called each household up to 5 times. From this sample, we completed 101 telephone interviews, identified 21 unusable numbers (e.g., commercial not residential, disconnected, out of service), and experienced 61 refusals.

To determine whether nonresponse bias existed for the mail survey, we compared findings for respondents and nonrespondents by gender because preliminary analysis revealed gender differences within each of these groups. Male respondents were similar to male nonrespondents, with 4 exceptions. First, more male nonrespondents believed that wolves are endangered worldwide ($X^2 = 15.168$, $P = 0.001$, $df = 5$). Second, a higher percentage of male nonrespondents had a neutral attitude towards wolves ($X^2 = 19.903$, $P = 0.000$, $df = 5$). Third, a higher percentage of nonrespondents also had a neutral attitude about whether wolves should be restored to the Adirondacks ($X^2 = 6.515$, $P = 0.038$, $df = 5$). Fourth, more nonrespondents had a neutral attitude about the idea of wolf restoration ($X^2 = 12.783$, $P = 0.002$, $df = 5$).

Female respondents and nonrespondents differed on 3 variables. More nonrespondents had a neutral attitude towards wolves ($X^2 = 10.870$, $P = 0.004$, $df = 5$), about whether wolves should be restored to the Adirondacks ($X^2 = 8.485$, $P = 0.014$, $df = 5$), and about the idea of wolf restoration ($X^2 = 24.058$, $P = 0.000$, $df = 5$). As appropriate for specific variables mentioned below, we adjusted the data to overcome nonresponse bias. Adjusted data always are noted.

Response to the Telephone Survey of Residents Statewide

A total of 17,202 attempts were made to contact households in an initial random sample of 2,643 (1-15 attempts per household, mean = 6.5). These attempts resulted in 501 completed interviews; 278 with Downstate households (Westchester County and south) and 223 Upstate households. Unusable numbers (e.g., commercial rather than residential, disconnected, out of service) accounted for 27.4% of the initial sample. The adjusted completion rate for the statewide sample (taking into account unusable numbers) was 26.1%. Adjusted refusal rate was 25.7% (18.6% of the initial sample). Adjusted noncompletion rate due to household members speaking a language other than English was 6.8% (5.0% of the initial sample).

Characteristics of Respondents to the Mail and Telephone Surveys

Social and demographic variables revealed that respondents to both surveys reflected a broad cross-section of the public (Table 4). Females accounted for about one-half of respondents to both surveys although a somewhat higher proportion of respondents to the telephone survey were female. Respondents to both surveys exhibited a wide range of ages, education levels, and household income levels.

As expected, respondents to the statewide telephone survey tended to have relatively limited Adirondack experience whereas respondents to the mail survey tended to have lived in the Adirondack Park for many years. About one-half (53.6%) of nonAdirondack residents who responded to the statewide telephone survey had never visited the Park. Among those who had, about one-fifth (21.3%) had done so in the last 2 years. These recent visitors averaged 3.7 trips to the Park during 1998-99. Respondents to the mail survey had lived in the Park for an average of 34.7 years. Only 13% had lived in the Adirondacks <10 years.

Mail survey respondents participated in a variety of wildlife-related recreational activities within the 12 months prior to the survey. Two-thirds identified wildlife species (67.0%) or fed wildlife around their home (66.3%), and nearly as many (60.2%) hiked on a trail. Nearly one-half of respondents photographed wildlife around their home (46.5%) and fished (46.0%). About one-third took a trip >1 mile away from their home specifically to photograph or view wildlife (36.2%), with the average number of trips taken being 7.1, and 13.1% of respondents taking ≥ 10 trips. Another one-third of respondents hunted (32.0%) or camped in a tent (29.2%).

Attitudes Towards Wolf Restoration

Adirondack residents surveyed by mail were split almost evenly with respect to approving or disapproving of restoring wolves to the Adirondacks (adjusted for nonresponse bias); 42.0% approved, 41.3% disapproved, and 16.7% neither approved nor disapproved. Adirondack residents also were split (adjusted for nonresponse bias) with respect to whether the idea of restoring wolves to the Adirondacks was a good idea (39.6%) a bad idea (36.9%) or neither a good nor bad idea (23.5%).

A higher proportion of statewide than Adirondack Park residents were positive towards restoration. A majority of statewide residents (60.3%) approved of restoring wolves (27.0% strongly approved). About one-third (34.3%) neither approved nor disapproved. Few (5.4%) disapproved (although 3.8% strongly disapproved). Because of concerns about interview length, only 1 item was used on the telephone survey of statewide households to measure attitude towards wolf restoration.

Since Responsive Management (1996) conducted its telephone surveys 4 years ago, Adirondack and statewide residents seem to have become less sure about their

Table 4. Social and demographic characteristics of respondents to a mail survey of households in the Adirondack Park and a telephone survey of households throughout New York State.

<u>Characteristic</u>	<u>Adirondack residents</u> <u>(mail survey)</u>		<u>Statewide residents</u> <u>(telephone survey)</u>	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
<i>Gender</i>				
Female	*	45.1	274	54.7
Male	*	54.9	227	45.3
<i>Age</i>				
	Mean = 54.8		Mean = 43.5	
	SE = 0.74		SE = 0.71	
	Range = 21-86		Range 18-91	
<i>Education</i>				
≤11 years	31	7.6	20	4.0
High School degree	93	22.8	123	24.6
Some college	101	24.8	103	20.6
College degree	111	27.2	173	34.6
≥Some Postgraduate	72	17.6	81	16.2
<i>Annual household income</i>				
≤\$15,000	33	8.8	25	6.3
\$15,001-30,000	98	26.3	70	17.8
\$30,001-50,000	104	27.9	106	26.9
\$50,001-75,000	74	19.8	90	22.8
\$75,001-100,000	32	8.6	45	11.4
>\$100,000	32	8.6	58	15.7

*Numbers of males and females responding to the mail survey are not presented because the percent is adjusted to address nonresponse bias. Age, education, and income were not assessed in the nonrespondent follow-up.

attitudes towards wolf restoration. In 1996, only 5% of Adirondack residents and 10% of statewide residents were neutral or did not know what their attitude was towards restoration. Now, 3 times as many residents in both samples are neutral towards the issue. Another difference from 1996 is that a higher percentage of residents in both samples now hold negative attitudes towards wolf restoration. We caution that interpretations of these comparisons are difficult because of differences in survey methodology and question wording. Further, Responsive Management prefaced its single attitude question with statements about humans having eliminated wolves from the Adirondacks in the 1800s and that the Adirondack Park had been identified by the U.S. Fish and Wildlife Service “as one of three sites in New England that are suitable for wolf reintroduction and recovery (Responsive Management 1996:14). These kinds of statements may have influenced people’s attitudes towards restoration.

Factors Influencing Respondents' Attitudes Towards Restoration

We used the unadjusted, 3-item, averaged index of attitude towards wolf restoration as the basis for understanding reasons why Adirondack residents felt the way they did about wolf restoration. This index was highly reliable (see Table 2), indicating that all 3 items contributed meaningfully to the measurement of respondents' attitudes. Attitude towards wolf restoration was predicted by a combination of 6 variables that explained 69% of the variance in attitudes (Figure 4). The strongest predictor was attitude towards wolves, which by itself explained about 57% of the variance. Other significant predictor variables that correlated positively with attitude towards restoration were (a) respondents' perceptions about possible restoration impacts, (b) level of responsibility nongovernmental organizations should take for participating in all aspects of co-management decisions, (c) level of objective knowledge about wolves, and (d) respondents' desired future change in the coyote population. Amount of media attention respondents had seen about the wolf restoration issue was the only significant predictor variable that correlated negatively with attitude towards wolf restoration.

Importance of the issue of wolf restoration had an important moderating effect on Adirondack residents’ attitudes towards wolves. Respondents who indicated that the issue was at least moderately important were more likely than those who indicated low-issue-importance to have extreme attitudes (either positive or negative). Therefore, we stratified respondents based on the level of importance they assigned the issue, and identified factors affecting attitude towards wolf restoration for both groups.

For Adirondack residents who indicated the issue of wolf restoration was of high importance, attitude towards wolf restoration was predicted by 5 variables that explained 71% of the variance. These were: attitude towards wolves, perceptions about possible restoration impacts, level of objective knowledge about wolves, desired future change in the coyote population, and level of responsibility nongovernmental organizations should take for providing input for co-management decisions (Figure 4). By itself, attitude towards wolves explained 57% of the variance in attitude towards restoration.

Figure 4. Predictors of Adirondack residents' attitudes towards wolf restoration (for all standardized betas and adjusted R^2 , first value is for all respondents, second is for those indicating the issue of wolf restoration was at least moderately important, third is for those indicating the issue is of low or no importance).

Four of the 5 significant variables were the same as for the regression model using all respondents (Figure 4). The variable "amount of media seen about the issue" did not enter this model. The other difference was that the summed NGO co-management index was replaced by the single item "amount of responsibility NGOs should take for providing input to wildlife management decisions. All these variables were positively correlated with attitude towards restoration. Higher values for the predictor variables corresponded to more positive attitudes towards restoration.

Among Adirondack residents who indicated the issue of wolf restoration was only "slightly important" or "not at all important," attitude towards wolf restoration was predicted by 4 variables that explained 67% of the variance (Figure 4). Three of the predictor variables had a positive relationship with attitude towards wolf restoration including (a) attitude towards wolves, (b) perceptions about evaluative beliefs, and (c) level of responsibility wildlife management officials should take for making management decisions. Amount of media coverage seen about the issue was a significant but negative predictor of attitude towards restoration.

A similar set of variables predicted statewide residents' attitudes towards wolf restoration, and explained 54% of the variance in attitude towards wolf restoration (Figure 5). Recall we only were able to ask 1 question about attitude towards restoration in the telephone survey. Thus, the dependent variable (attitude towards restoration) for this regression analysis was response to a single item. Attitudes towards wolves, by itself, explained 38% of the variance in attitude towards restoration. In addition, a positive attitude towards restoration was predicted by (a) higher issue importance (b) higher objective knowledge about wolves, (c) increasing likelihood of visiting the Adirondacks if wolves were restored, and (d) more positive perceptions about possible restoration impacts.

Attitudes Towards Wolves

A plurality (38.1%) of Adirondack residents surveyed by mail (adjusted for nonresponse bias) indicated a positive attitude towards wolves. About one-third (32.7%) said their attitudes were neither positive nor negative. A statistically similar percentage (29.2%) said their attitudes towards wolves were negative.

Statewide residents responding to the telephone survey also tended to hold slightly more positive than negative attitudes towards wolves. Nearly one-half (47.6%) said their attitudes towards wolves were positive. A statistically similar percentage (44.5%) had neutral attitudes. Few (7.9%) indicated negative attitudes towards wolves.

Objective Knowledge about Wolves and Impacts Experienced Elsewhere

Respondents to both the Adirondack mail survey and statewide telephone survey have some misperceptions about wolves, and many indicated they did not know answers

Figure 5. Predictors of statewide residents' attitudes towards wolf restoration.

to specific questions (Table 5). Respondents to the Adirondack mail survey correctly answered an average of 3.6 of the 7 knowledge questions (not adjusted for nonresponse bias). Respondents to the statewide telephone survey correctly answered an average of 3.0. Between one-sixth and one-half of Adirondackers answered “don’t know” to each question. Similarly, “don’t know” responses were given to each question by between one-quarter and one-half of statewide residents.

More than one-fifth of Adirondackers erroneously believed that wolves are in danger of becoming extinct worldwide (38.8%) and that wolves kill large numbers of pets where wolves live near homes with pets (21.8%). Statewide residents particularly lacked knowledge about the population status of wolves worldwide. One-quarter (24.2%) of statewide residents did not know that wolves are found in many countries around the world, and nearly two-thirds (61.5%) erroneously believed that wolves were in danger of becoming extinct worldwide. Overall, a higher percentage of Adirondackers than statewide residents erroneously believed wolves kill a large number of pets (21.8% vs. 11.4%), prefer to eat livestock over wild game (14.2% vs. 8.4%), and that wolves eat more livestock than coyotes where both live near farming areas (10.3% vs. 8.0%).

To examine whether presentation of factual information as part of the survey could increase knowledge about wolves, we developed and mailed a fact sheet (Appendix A) to a 50% random subsample of Adirondack households. The fact sheet had a positive influence on knowledge for 5 of the 7 knowledge questions. Higher percentages of those receiving the fact sheet, compared to those not receiving it, correctly answered that wolf attacks on humans are uncommon ($X^2 = 7.897$, $p = 0.019$), wolves are found in many countries around the world ($X^2 = 7.701$, $p = 0.021$), coyotes kill more sheep than wolves ($X^2 = 15.544$, $p = 0.000$), wolves are not endangered worldwide ($X^2 = 14.898$, $p = 0.001$), and wolves do not kill large numbers of pets annually ($X^2 = 19.284$, $p = 0.000$). Further, fewer fact sheet recipients answered “don’t know” to those questions. Despite this influence on knowledge, receipt of the fact sheet had no influence on (a) attitude towards wolf restoration, (b) attitude towards wolves, or (c) perceptions about possible impacts of wolf restoration.

The fact that the issue of wolf restoration has been discussed at least at the local government level in the Adirondacks since the mid 1990s seems not to have resulted in increased knowledge about wolves. In 1996, Responsive Management reported that relatively few Adirondack residents or statewide residents correctly answered questions about (a) the population status of wolves in the U.S. or (b) the number of people seriously injured or killed by wolves each year in the U.S. About one-third of Adirondack and statewide residents indicated in 1996 they did not know the population status of wolves in the U.S., and about one-half of residents said they did not know how many people were injured or killed annually.

Table 5. Number and proportion of respondents to a mail survey of Adirondack households and a telephone survey of statewide households who correctly and incorrectly answered questions about wolves and wolf-related impacts experienced in places where wolves live.

Question	Mail survey (Adirondacks)				Telephone survey (statewide)			
	Correct responses		Don't know responses		Correct responses		Don't know responses	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
Did wolves live in the Adirondacks in the past? (Yes)	*	82.8	*	16.1	291	58.1	197	39.3
Are wolf attacks on humans common in areas where wolves live close to humans? (No)	*	68.2	*	23.7	313	62.5	144	28.7
Are wolves found in many countries around the world? (Yes)	*	49.0	*	32.4	226	45.1	154	30.7
Do coyotes kill more sheep in farming areas inhabited by both coyotes and wolves? (Yes)	*	37.9	*	51.8	178	35.5	283	56.5
Do wolves prefer to eat livestock even when wild animals are plentiful? (No)	*	54.9	*	30.9	282	56.3	177	35.3
Are wolves in danger of becoming extinct worldwide? (No)	*	28.0	*	33.2	47	9.4	146	29.1
Do wolves kill a large number of pets where wolves live near homes with pets? (No)	*	48.4	*	29.8	274	54.7	170	33.9

* Numbers of correct and don't know responses are not presented for the mail survey because the percents are adjusted to address nonresponse bias.

Perceptions About Possible Impacts of Wolf Restoration

Overall, about two-thirds of respondents to both surveys (66% for mail, 69% for telephone) held positive belief evaluations about the set of 13 possible impacts of wolf restoration that we examined. For 8 of the 13 in the mail survey, relatively small percentages of respondents (6.6%-22.5%) held negative perceptions while the remaining respondents were split between neutral (33.5%-50.6%) or positive (34.5%-55.7%) perceptions (Table 6).

Positive perceptions could result if a respondent (a) agreed that a possible impact would happen and believed that the impact would be good, or (b) believed that a possible impact would be bad but disagreed that it would happen¹. Respondents to the mail survey generally had positive perceptions about the possibility that wolf restoration would (1) reduce the coyote population and (2) reduce rodent populations because those impacts were likely to occur in respondents' communities and would be good. Positive perceptions were held about the possibility of (3) local residents restricting activities on private land and (4) wolves attacking people because those impacts, while bad, were unlikely to occur. Respondents tended to be split about whether the possibility of (5) returning a missing component of wilderness, (6) balancing the deer population with its habitat, (7) preservation of the wolf as a species, and (8) increasing tourism would be good and likely to occur or bad but unlikely to occur.

Respondents to the mail survey were about evenly split with respect to whether they perceived 5 possible impacts to be positive, neutral, or negative (Table 7). Those with a positive perception about the possibility of (1) government restricting activities on private land were evenly split about whether that impact would be bad but unlikely or whether it would be likely and good. Respondents with a positive perception about the possibility of (2) wolves killing pets and (3) wolves killing livestock tended to believe that these impacts would be bad but unlikely to occur in their communities. Those with a positive perception about the possibility of (4) wolves reducing the deer population and (5) people killing wolves tended to believe that these impacts were likely to occur and would be good for their communities. For all 5 of these possible impacts, respondents with negative perceptions believed the impacts were likely to occur and would be bad for their communities.

When the 13 possible impacts were examined individually, many respondents to the statewide telephone survey said they either did not know if a possible impact was likely to occur, or had no opinion about whether it would be good or bad. This was reflected in relatively high percentages (33.5-74.5) of respondents having a neutral perception for all 13 possible impacts (Table 8). Indeed, a large majority (74.6%) of

¹Respondents who believe that bad impacts that may happen some places but not in their area have positive perceptions towards those impacts.

Table 6. Possible restoration-related impacts for which respondents to the mail survey generally held either neutral or positive perceptions, and reasons for positive perceptions.

Possible impact	Those with <u>neutral perception</u>		Those with <u>positive perception</u>		<u>Of those with positive perception...</u>				Mean evaluative <u>belief product</u>
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	<u>Likely to occur, would be good</u>		<u>Would be bad, but unlikely to occur</u>		
					<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>	
Reduce coyote population	198	50.6	125	34.5	111	28.4	24	6.1	0.86
Reduce rodent populations	159	41.2	179	46.4	157	40.7	22	5.7	1.44
Return missing component of wilderness	148	38.7	209	54.7	128	33.5	81	21.2	2.75
Balance deer population	133	33.5	221	55.7	131	33.0	90	22.7	2.32
Preserve wolf as a species	173	43.5	187	46.9	110	27.6	77	19.3	2.02
Increase tourism	164	42.6	146	37.9	74	19.2	72	18.7	1.01
Local residents will restrict activities on private land	145	37.9	151	39.7	36	9.6	115	30.1	0.72
Wolves will attack people	133	34.5	187	48.6	21	5.5	166	43.1	2.17

Table 7. Possible restoration-related impacts for which respondents to the mail survey generally were split about whether they were positive, neutral, or negative, and reasons for positive or negative perceptions.

<u>Possible impact</u>	<u>Of those with negative perception...</u>				<u>Those with neutral perception</u>	<u>Of those with a positive perception...</u>				<u>Mean evaluative belief product</u>	
	<u>Likely to occur, would be bad</u>		<u>Would be good, but unlikely to occur</u>			<u>Likely to occur, would be good</u>		<u>Would be bad, but unlikely to occur</u>			
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>		<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>		
Government will restrict activities on private land	170	44.3	5	1.3	106	27.6	46	12.0	57	14.8	-1.31
Wolves will kill pets	149	38.8	1	0.3	89	23.2	29	7.6	116	30.2	-0.33
Wolves will kill livestock	96	24.6	11	2.8	148	37.9	18	4.6	118	30.2	0.23
People will kill wolves	136	35.6	3	0.8	112	29.3	91	23.8	40	10.5	0.29
Reduce deer population	143	37.0	13	3.4	112	28.9	92	23.8	27	7.0	-1.14

Table 8. Perceptions of possible restoration-related impacts held by respondents to the statewide telephone survey, and reasons for positive or negative perceptions.

Possible impact	Of those with negative perception...				Of those with a positive perception...					
	Likely to occur, would be bad		Would be good, but unlikely to occur		Those with neutral perception		Likely to occur, would be good		Would be bad, but unlikely to occur	
	n	%	n	%	n	%	n	%	n	%
Reduce coyote population	13	2.8	9	1.9	346	74.6	90	19.4	6	1.3
Wolves will attack people	164	32.9	3	0.6	191	38.4	4	0.8	136	27.3
Wolves will kill livestock	91	18.3	2	0.4	237	47.8	2	0.4	164	33.1
People will kill wolves	238	48.3	3	0.6	186	37.7	22	4.5	44	8.9
Wolves will kill pets	162	32.6	6	1.2	265	53.3	34	6.8	30	6.0
Return missing component of wilderness	4	0.8	11	2.3	161	33.5	301	62.6	4	0.8
Reduce rodent population	24	4.9	10	2.1	181	37.2	266	54.6	6	1.2
Balance deer population	18	3.7	4	0.8	198	40.5	258	52.8	11	2.2
Preserve wolf as a species	6	1.2	5	1.0	265	53.7	210	42.6	7	1.4
Reduce deer population	74	15.1	11	2.2	221	45.2	165	33.7	18	3.7
Increase tourism	26	5.3	33	6.7	276	55.9	135	27.4	23	4.7
Local residents will restrict activities on private land	21	4.3	50	10.1	262	53.0	132	26.7	29	5.9
Government will restrict activities on private land	73	14.8	19	3.9	284	57.7	130	26.4	34	6.9

respondents held a neutral perception about the possibility of the coyote population being reduced. Telephone respondents were split in their perceptions about the possibility of wolves attacking people. Three possible impacts were perceived generally to be negative or neutral: (1) people killing wolves, (2) wolves being killed by people, and (3) wolves killing pets. For these 3 possible impacts, many respondents thought they would occur and would be bad.

The other 8 possible impacts were perceived to be either neutral or positive by telephone survey respondents (see Table 8). Among those with positive perceptions about the possibility of wolves killing livestock, most agreed this impact would be bad but unlikely to occur. Among those with positive perceptions about the remaining 7 possible impacts, most agreed they would occur and would be good. More than one-half of the telephone respondents believed this to be true for the possibility of returning a missing component of wilderness, reducing the rodent population, and balancing the deer population with its habitat.

Adirondack residents' perceptions about possible impacts of restoration seem to have changed little since the Responsive Management survey in 1996. In general, fewer Adirondack residents believed that specific kinds of positive impacts were likely than believed specific kinds of negative impacts were likely. For example, only 27% (our survey) to 33% (1996 survey) agreed that wolf restoration would result in increased tourism. Conversely, 62% (1996 survey) to 74% agreed that some wolves would be shot by humans. About two-thirds (62%) said wolf predation on livestock or pets was at least a minor concern for them in the 1996 survey. In our study, 50% agreed that wolves would prey on pets in their communities, but only 33% agreed that wolves would prey on livestock in their community (probably because few communities have livestock farms).

Three differences in beliefs seem to exist between those reported by Responsive Management (1996) and those we found. In 1996, 52% of residents said they had at least a minor concern about wolves attacking humans whereas only 25% of respondents to our survey agreed that wolves would harm humans in the Adirondacks. In 1996, 43% had at least a minor concern that restrictions would be placed on property rights if wolves were restored, but 63% of our respondents agreed that government would restrict activities on private land, and 34% agreed that private property owners would restrict activities on private land. Responsive Management (1996) reported that 39% had at least a minor concern that wolves would reduce the deer population too much. In our survey, 68% agreed that wolves would reduce the deer population although 24% believed this would be a good outcome.

Perceptions About Potential Community Capacity (mail survey only)

About one-half (53.5%) of Adirondackers perceived they lived in communities with high capacity to identify and take advantage of opportunities consistent with their vision for the future and/or identify problems their community faced. That is, these respondents believed they lived

in high-capacity communities. About one-third (32.9%) perceived they lived in moderate-capacity communities. The remainder perceived their communities to have low capacity to identify and influence opportunities or problems facing them.

Because the number of respondents differed among communities, we aggregated responses by community to determine the proportion of communities that respondents identified as having high, moderate, and low capacity (Table 9). Some of the 102 communities were not represented in this analysis for 2 reasons. First, for some communities, responding residents did not answer the particular questions in the survey that we used in the analysis. Second, the original sample was selected based on census blocks identified by the U.S. Bureau of the Census rather than by our list of communities. Thus, some of communities on our list had small enough populations that none of their residents were selected to be in the original sample.

Among the 83 communities for which we received adequate responses, 42.2% were considered by their own residents to be high-capacity communities, 51.8% were considered to be moderate-capacity, and 6.0% were characterized as being low-capacity. Thus, many communities were identified by their own residents as having high potential to identify and take advantage of restoration-related opportunities that would be consistent with the vision those communities had for their own futures. Only a very few communities were identified as having the lowest capacity to benefit in some way or to overcome possible problems that would arise from restoration.

Table 9. Perceptions of level of potential social feasibility, from the perspective of respondents and aggregated by community.

<u>Perception of potential community capacity</u>	<u>Respondents</u>		<u>Communities</u>	
	<u>n</u>	<u>%</u>	<u>n</u>	<u>%</u>
High	209	53.7	35	42.2
Moderate	128	32.9	43	51.8
Low	52	13.4	5	6.0

Perceptions About Level of Decision-making Responsibility

Our findings confirm that respondents to the mail survey think about wildlife management decisions as having 3 components: (1) providing input to decisions, (2) making the decisions, and (3) carrying out or implementing decisions (Table 10). Generally, respondents indicated that local residents should have greatest responsibility for providing input when compared to 4 other possible groups although wildlife management professionals and local elected officials should also have moderate responsibility². Responsibility for making decisions should be shared between local residents and wildlife management professionals. Wildlife professionals should have greatest responsibility for implementing decisions.

These findings support the concept of “co-management” in which wildlife management professionals work in tandem with local stakeholders to make decisions about issues that affect the local area. They also identify a desire by local residents to take an active role in co-management decisions, and not to let those decisions be made automatically by local elected officials. Further, these findings suggest that conservation NGOs could have some level of responsibility for all 3 components, but that the level of responsibility should be slight.

The limited level of co-management responsibility that should be had by both NGO officials and residents living outside a local affected area also were confirmed in the statewide telephone survey (Table 11). The question we asked in the telephone survey focused on involvement in wildlife management decisions that specifically affect the Adirondack Park. However, the overall findings were consistent with the mail survey results. Statewide residents believed it was of greatest importance for local residents and wildlife professionals to be involved in decisions that affected the Park. Despite the fact that the Park exists for the benefit of all state residents, respondents to the telephone survey indicated that state residents living outside the Park should have the lowest levels of involvement in management decisions there, compared to the other 4 stakeholder groups about which we asked.

Examining level of co-management responsibility in comparison with community capacity designation provides additional insights relative to decision making about potential wolf restoration. Respondents from communities designated through community profiling as having high, moderate but increasing, and moderate but decreasing all indicated that local residents should have the greatest responsibility for providing input to decisions (Table 12). Respondents from low-capacity communities indicated that

²The desire of local residents in the Adirondacks to have opportunities for providing input into management decisions was also reported by Responsive Management (1996:26). Fifty-six percent of Park residents in the 1996 survey said they would be more supportive of wolf restoration if “local communities in and around Adirondack Park had input in wolf management decisions.”

Table 10. Mean level of responsibility various stakeholder groups should be willing to take for each of 3 components of wildlife management decision-making.

<u>Stakeholder group</u>	Providing input for decisions (scaled 0-3)		Making decisions (scaled 0-3)		Implementing or carrying out decisions (scaled 0-3)		Total responsibility (scaled 0-9)	
	<u>Q</u>	<u>(SE)</u>	<u>Q</u>	<u>(SE)</u>	<u>Q</u>	<u>(SE)</u>	<u>Q</u>	<u>(SE)</u>
Residents of your local community	2.60	(0.04)	2.39	(0.04)	2.27	(0.05)	7.27	(0.11)
Local elected officials in your community	2.03	(0.05)	1.84	(0.05)	2.08	(0.05)	6.01	(0.15)
Officials of wildlife management agencies	2.45	(0.04)	2.39	(0.04)	2.53	(0.04)	7.39	(0.12)
Officials of nongovernmental conservation organizations	1.66	(0.06)	1.48	(0.06)	1.54	(0.04)	4.65	(0.17)
Residents living outside your local area	0.44	(0.04)	0.32	(0.03)	0.39	(0.04)	1.10	(0.10)

Table 11. Mean level of importance for various stakeholder groups to be involved in wildlife management decisions that affect the Adirondack Park.

<u>Stakeholder group</u>	Importance (scaled 0-3)	
	<u>Q</u>	<u>(SE)</u>
Adirondack residents	2.49	(0.04)
Local elected officials in the Adirondacks	2.02	(0.04)
Officials of wildlife management agencies	2.26	(0.04)
Officials of nongovernmental conservation organizations	1.99	(0.04)
Residents of New York State living outside the Adirondack Park	1.38	(0.04)

responsibility for providing input should be shared between local residents and wildlife management officials.

Respondents from both kinds of moderate-capacity communities indicated that the greatest responsibility for making wildlife management decisions should be taken by local residents. In high-capacity communities, greatest responsibility for decision-making should be shared between local residents and wildlife management officials. In low-capacity communities, respondents indicated that wildlife management officials should have the greatest responsibility for making decisions.

Greatest responsibility for taking actions to carry out or implement wildlife management decisions was placed on wildlife management officials by residents in communities designated as having high, low, and moderate but increasing capacity. Residents from communities with moderate but decreasing capacity indicated that this responsibility should be shared between local residents and wildlife management officials.

Overall, a dichotomy between community types was found with respect to total amount of responsibility for all aspects of wildlife management decision-making. Respondents from both kinds of moderate-capacity communities placed aggregate responsibility in the hands of local

Table 12. Mean levels of responsibility that should be taken by each of 5 stakeholder groups for 3 different aspects of the wildlife management decision-making process, by designation of community capacity.

<u>Aspects of Decision-Making</u>	<u>Community capacity designation</u>			<u>Low</u>
	<u>High</u>	<u>Moderate increasing</u>	<u>Moderate decreasing</u>	
Providing input for management decisions (range 0-3)				
Local residents	2.58	2.70	2.62	2.55
Local elected officials	2.01	2.14	2.09	2.09
Officials of wildlife agencies	2.51	2.31	2.27	2.55
Officials of NGOs	1.52	1.63	1.61	1.70
Residents from outside area	0.40	0.30	0.49	0.48
Making management decisions (range 0-3)				
Local residents	2.47	2.44	2.48	2.24
Local elected officials	1.84	1.82	1.95	1.85
Officials of wildlife agencies	2.45	2.27	2.16	2.51
Officials of NGOs	1.40	1.35	1.43	1.57
Residents from outside area	0.31	0.30	0.30	0.31
Carrying out management decisions (range 0-3)				
Local residents	2.25	2.19	2.36	2.25
Local elected officials	2.00	2.16	2.23	2.08
Officials of wildlife agencies	2.65	2.47	2.39	2.55
Officials of NGOs	1.56	1.38	1.66	1.54
Residents from outside area	0.41	0.31	0.30	0.41
Aggregate responsibility for management decisions (range 0-9)				
Local residents	7.30	7.33	7.45	7.04
Local elected officials	5.85	6.13	6.28	6.02
Officials of wildlife agencies	7.61	7.05	6.82	7.62
Officials of NGOs	4.49	4.37	4.70	4.81
Residents from outside area	1.12	0.90	1.09	1.20

residents. According to respondents from high and low capacity communities, the greatest aggregate responsibility should be taken by wildlife management officials. This suggests that different kinds of decision-making processes might be most appropriate for discussing questions about wolf restoration in different places in the Adirondacks depending on community capacity.

CONCLUSIONS

Attitudes about the possibility of wolf restoration are split among Adirondack residents. Most statewide residents hold positive attitudes towards restoration, but believe that local residents should take much responsibility for wildlife management decisions affecting the Adirondacks. Attitude towards restoration should not be mistaken as a vote for or against restoration with any degree of finality, rather it indicates how people thought about the issue at the time they were surveyed.

Overall, attitudes towards wolves generally are positive, but people worry about some kinds of impacts on local areas. In particular, Adirondack residents seem most concerned about the possibility of government restricting activities on private land, wolves killing pets, wolves killing livestock, people killing wolves, and wolves decreasing the deer population. Killing of pets and livestock are unlikely to be serious problems for most communities, based on experiences in other states. Decreases in deer populations are possible according to the biological feasibility study (Paquet et al. 1999). Decreases in deer populations are most likely in areas with many low-capacity communities. Many of those communities may not benefit much economically from out-of-area deer hunters because they lack infrastructure to support visitors, but local residents' deer hunting opportunities may be affected.

Governmental restrictions on uses of private land could be a possibility under the federal Endangered Species Act, but it is not a certainty. Concern about governmental involvement is a long-standing concern by residents in the Adirondacks. However, this concern is somewhat tempered in this situation, given the amount of responsibility many respondents place with wildlife agency (i.e., government) officials for making and/or implementing wildlife management decisions. The high levels of responsibility residents believe wildlife officials should take for decision-making presents an opportunity for wildlife managers to provide their ecological expertise in discussions about the issue.

Such expertise could help residents become more knowledgeable about wolves. Overall, knowledge levels were relatively low. Provision of a fact sheet to half of the sample in the mail survey increased knowledge scores for that group, but had limited influence on attitudes towards restoration. Still, factual knowledge about wolves would be useful as residents discuss the issue of wolf restoration, and increased knowledge would enhance opportunities for residents to adequately assess the degree to which their communities could possibly take advantage of, or deal with, potential impacts related to wolf ecology and behavior.

The opportunity for residents to discuss the restoration issue in the context of their own community's interests could be an important part of the overall decision-making process that so far has been dominated by local elected officials and NGOs (both for and against restoration). Respondents indicated that local residents should take higher levels of responsibility than either local elected officials or NGOs, especially for providing input and helping to make decisions that affect their local communities. This suggests that local residents want to be involved in what we refer to as co-management decisions, where they share responsibility for decision-making with officials from wildlife agencies.

Community-based discussions will be most useful to the overall decision-making process if discussions are framed within an appropriate context. This context includes an understanding of their community's social and physical characteristics, goals for the future, and linkages with neighboring communities. This would allow residents to consider how their own community experiences and characteristics might influence, or be influenced by, potential restoration impacts.

Further, such a context would allow local residents to discuss questions for which they are best-suited to address. For example, they could appropriately decide the ways (both good and bad) in which wolf restoration would likely affect their ability to achieve community goals, rather than being asked only the broader question of whether wolves should be restored to the Adirondacks. Answering the broader question will involve understanding biological feasibility and the complex regulatory context of endangered species restoration—both of which require the input of specialized expertise. Further, by considering the local context and real community experiences and characteristics, residents could be confident that decisions they make are based as much as possible on the reality of their own situations and not just hypothetical situations.

Our findings support the notion that residents can assess potential restoration impacts in the context of their local situation. For example, Adirondack residents generally indicated that (a) wolves attacking people, (b) local residents restricting activities on private land, (c) wolves killing pets, and (d) wolves killing livestock would be “bad” impacts associated with restoration. However, most respondents said these impacts were unlikely to happen in their communities. Thus, those potential impacts are not important considerations in many communities.

It is important to note, however, that the capacity of communities to identify restoration-related opportunities they may want to pursue or to identify and prevent/mitigate potential problems differs across the Adirondack Park. In addition, residents in communities with different levels of capacity also indicated different levels of decision-making responsibility for local residents and wildlife officials. Respondents in low-capacity communities want wildlife officials to share with them the responsibility of providing input to decisions, and want wildlife officials to take greatest levels of responsibility for making and carrying out decisions. Residents in moderate-capacity communities want greater responsibility for providing input,

making decisions, and even carrying out decisions. Residents in high-capacity communities generally want the greatest responsibility for providing input, but are willing to share responsibility with wildlife officials for making decisions, and want those officials to take greatest responsibility for carrying out decisions.

High-capacity communities are most capable of benefiting from wolf restoration in some way, but generally are located some distance from where wolves are likely to exist if restored. Many low-capacity communities are located in areas likely to be inhabited by wolves if they were restored, but those communities are least capable of dealing with restoration-related problems on their own without some kind of external help. Respondents in low-capacity areas may have recognized that need when they indicated wildlife officials should take high levels of responsibility for making and carrying out wildlife decisions.

Conservation NGOs, like Defenders of Wildlife, have demonstrated an interest in other areas (e.g., Greater Yellowstone Ecosystem, American southwest) to help implement wildlife management decisions by contributing funds for translocating animals and establishing funds to compensate ranchers for livestock preyed on by wolves. Respondents to the mail survey showed little support for NGOs like Defenders taking on this kind of responsibility in the Adirondacks. Indeed, respondents indicated no greater responsibility for NGO officials in carrying out decisions than in providing input or making decisions.

This does not mean that NGOs should abandon this role if a decision eventually was made to restore wolves. Indeed, if restoration proceeded, most communities likely could benefit greatly by sharing implementation responsibilities with interested NGOs. Further, respondents that wanted NGOs to take on more responsibility in the decision-making process tended to hold positive attitudes towards wolf restoration. Perhaps they recognized that their community's chances of either benefiting from wolf restoration, or overcoming possible negative impacts, would be enhanced if NGOs take on some responsibility.

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