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# Attitude and behavior change associated with the New York NeighBEARhood Watch Program



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## EXECUTIVE SUMMARY

In many areas where people and black bears coexist, negative interactions are increasing in frequency and magnitude. Reducing the risks associated with human-black bear conflict is an important goal for diverse stakeholders. This research evaluated attitude and behavior change associated with an outreach intervention designed to change residential bear-related behavior and reduce conflict. Based on the Elaboration Likelihood Model of persuasive communication, the New York NeighBEARhood Watch (NYNW) pilot program aimed to change 6 residential human behaviors (i.e., bird feeding, pet feeding, composting, garbage storage, grill storage, hobby farming) and reduce human-black bear conflict.

Four towns in the Catskill black bear range were selected for this research: 1) Warwick; 2) Woodstock; 3) Deerpark; and 4) Saugerties. Using the non-equivalent control group design with pre-and post-test samples, pre-treatment and post-treatment measures were conducted using voluntary mail survey and secondary data. The design was implemented in all four towns. Woodstock and Warwick served as exposure (treatment) towns and Deerpark and Saugerties served as reference (no treatment) towns. Both pre-program and post-program questionnaires were self-administered, mail-back instruments designed to obtain information about respondents' demographic characteristics, risk perceptions, attitudes towards bears, residential bear-related behavior, experiences with bears, and motivation to adopt future behaviors.

The outreach intervention, the New York NeighBEARhood Watch program, was focused on 6 human behaviors: refraining from hanging *birdfeeders* during warm-weather months; feeding *pets* indoors not outdoors; storing *BBQ grills* indoors when not in use; curbing *garbage* the morning of pick-up and storing it indoors at all other times; keeping home *compost* contained and secure; and picking up fruit dropped from *fruit trees* and harvesting fruit from trees before fruit falls. In all, 11,117 materials (billboards, bear-o-meters, brochures, magnets, posters, lawn signs, article reprints, fact sheets) were distributed. Direct associated costs for the NYNW program were approximately \$27,000, not including staff/researcher time.

The total pre-program survey response rate was 46.6% ( $n = 1211$ ) (Woodstock = 61.5%, Warwick = 41.7%, Saugerties = 53.6%, Deerpark = 42.3%); the total post-program survey response rate was 41.1% ( $n = 950$ ) (Woodstock = 50.5%, Warwick = 39.1%, Saugerties = 37.7%, Deerpark = 39.3%). Respondents' knowledge scores did not change after the NYNW program in treatment ( $\chi^2 = 9.933$ ,  $p = 0.270$ ) and reference ( $\chi^2 = 13.42$ ,  $p = 0.144$ ) towns. Types of experiences with black bears at or near homes or property decreased for both treatment ( $\chi^2 = 39.741$ ,  $p = 0.00$ ) and reference ( $\chi^2 = 9.670$ ,  $p = 0.046$ ) town respondents, however there was no difference between groups ( $\chi^2 = 6.437$ ,  $p = 0.169$ ). Risk perception increased in both treatment and reference towns after the NYNW program, as did the difference in risk perception measures between treatment and reference towns. Respondents in both treatment and reference towns were less likely to strongly agree that the risks associated with black bears were acceptably low after the NYNW program; the increase was greater in the treatment towns than it was in the reference towns. Of the 6 bear-related human behaviors targeted by the NYNW program, only composting demonstrated clear behavior change between years. The majority (57%) of all (i.e., pooled) post-program respondents saw between 0 and 1 NYNW program materials ( $\mu = 1.61$ ,  $SD = 1.77$ ). Overall, respondents most frequently reported recalling the lawn sign and the billboard, but judged the fact sheet, brochure, or the article to be most effective at improving their ability to cope with bears.

Demographic characteristics such as age and gender did not influence who adopted the outreach intervention within the context of NYNW program. Experiences involving a potential

threat to human or pet health and safety were influential on risk perception whereas just seeing a bear was not. For those who exhibited a change in risk perception, types of direct experiences with bears influenced the shift in risk perception more than information provided by the NYNW program. A willingness to change behavior was a key characteristic of intervention adopters, whereas experience and knowledge were not. This research suggests outreach specialists and practitioners articulate clearly their outreach intervention goals, tie these goals and implementation plans to a realistic timeframe over which outcomes can be achieved, and consider outreach approaches that provide insight into the experiential dimensions of bear-human interactions and appeal to the reasons why residents may be willing to change behavior.

## ACKNOWLEDGMENTS

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## TABLE OF CONTENTS

Executive Summary .....	i
Acknowledgments.....	iii
Table of Contents.....	iv
List of Tables .....	v
List of Figures.....	vi
Human-black bear interactions .....	1
Modifying human behavior to reduce negative human-black bear interactions.....	1
Study justification .....	3
Definitions.....	3
Conceptual Framework.....	5
Methods.....	6
Themes of research .....	6
Study sites .....	7
Study design.....	8
Data collection .....	10
The New York NeighBEARhood Watch Program.....	12
Data analysis .....	16
Results.....	18
Community-level change.....	18
Individual-level change.....	24
Implications.....	25
Conclusions, recommendations, and questions for consideration .....	26
Literature Cited .....	30
Appendix I .....	35
Appendix II.....	37
Appendix III.....	45

## LIST OF TABLES

Table 1: Quasi-experimental control group design with pre- and post-test samples. ....	9
Table 2: Key characteristics of two treatment (Woodstock and Warwick) and reference (Saugerties and Deerpark) towns. ....	9
Table 3: Demographic characteristics of pre- and post-program survey respondents in treatment and reference towns. ....	19
Table 4: Percent of treatment and reference town respondents' changes in risk perception associated with human-black bear conflict. ....	20
Table 5: Percentage and counts of pre-program (2004) and post-program (2005) survey respondents who did not engage in desirable bear-related human behaviors targeted by the New York NeighBEARhood Watch Program. ....	21
Table 6: Post-program (2005) respondents' perceptions about outreach intervention materials that were very effective at helping them cope with living with black bears. ....	22
Table 7: Frequency of respondents from both treatment towns who reported changing bear-related behavior after the New York NeighBEARhood Watch program was implemented. ....	23
Table 8: Variables influencing individual changes in residential bear-related behavior. ....	23
Table 9: Individuals' behavior change, material recall, and material efficacy. ....	25

## LIST OF FIGURES

Figure 1: The Elaboration Likelihood Model of persuasive communication adapted for the context of human-black bear conflict in Southeastern New York.....	5
Figure 2: Location of study towns: 1) Warwick (treatment); 2) Woodstock (treatment); 3) Deerpark (reference); and 4) Saugerties (reference).....	7

## **HUMAN-BLACK BEAR INTERACTIONS**

Interactions between humans and black bears (*Ursus americanus*) can be positive and/or negative, depending on the circumstance and environment in which the interaction occurs. Diverse stakeholders are interested in black bears and their management: wildlife-related recreationists (e.g., wildlife watchers, photographers, hunters, trappers); outdoor recreationists (e.g., campers, hikers); people concerned about animals, conservation, or the environment; private landowners; agriculturalists; and homeowners with the potential to have bears in their backyard. These stakeholders experience many bear-related “effects or positive and negative outcomes of interactions among bears, people, and habitat” (NYSDEC 2003: 12). Bear-related impacts are effects that stakeholders “recognize and regard” as important (NYSDEC 2003: 12).

Human-bear conflict is an effect that can have impacts for many people, including ecological, economic, health/safety, psychological, and social impacts. Reducing negative health and safety impacts associated with human-bear conflict is a priority for wildlife managers and black bear stakeholders in New York State; state agency biologists have defined a need to reduce the number of negative human-bear encounters, reduce the number of calls to wildlife officials regarding nuisance black bears, increase citizen’s understanding of nuisance bear management, and increase overall public satisfaction with, and support for, NYSDEC’s bear management (Kerpez personal communication 2004).

Management strategies to reduce human-bear conflict are diverse. Many wildlife agencies and communities have formalized specific bear-related policies to reduce conflict. Such policies are often implemented to reduce non-sport loss of bears, and incorporate behavior modification education for bears and people. Implementation of these non-lethal control programs often includes translocation, aversive conditioning, changes in regulatory policy (e.g., mandatory bear-resistant garbage disposal containers, no-feeding ordinances), and outreach interventions. The design and efficacy of outreach interventions is the focus of this report.

### **Modifying human behavior to reduce negative human-black bear interactions**

Habituation, tolerance, and food-conditioning are three key ethological characteristics underlying many of the human-black bear interactions in Southeastern New York. Changing human behavior to remove the bear attractants may reduce threats to both humans and black bears. Removing food attractants is an important way to reduce the potential for human-black bear conflict (Kerpez personal communication 2004). Indeed, the interaction of these factors arguably underlies a majority of the negative human-black bear interactions occurring in residential areas.

The New York State Department of Environmental Conservation’s (NYSDEC) standardized black bear complaint form records a number of types of negative human-black bear interactions, including home entry, birdfeeder damage, and damage to refuse containers (i.e., garbage cans or sheds). The complaint forms, recommendations of state black bear biologists, previous survey data, and data from direct observation of human behavior suggested which residential behaviors might be targeted through an outreach intervention. These include behaviors related to: 1) birdfeeders; 2) garbage; 3) compost; 4) grills; 5) hobby farming; and 6) outdoor pet feeding. These six residential behaviors provide food for bears and may lead to

bears' food conditioning. Certainly, bears may be attracted to apiaries, orchards, livestock, and corn fields, but formal agricultural commodities and activities were not included in this study.

Birdfeeders are the primary source of negative human-black bear interactions in New York. Indeed, in years past, up to 80% of the complaints filed to wildlife authorities in Region 3 were related to birdfeeder damage (Kerpez personal communication 2004). Common birdseeds, including black oil sunflower seed, Niger seed/thistle, suet, cracked corn, and millet, attract bears. Hummingbird feeders filled with sugar water also attract black bears to a lesser degree (Merchant personal communication 2004). The type of birdfeeder or location in a yard has no influence on a bear's attraction to a birdfeeder. Black bears repeatedly destroy birdfeeders without birdseed and will break into a garage to get to bags or bins of birdseed. Birdseed is a high-calorie, fat-rich food source that humans make available year-round in easily accessible areas.

Garbage is another significant source of negative human-black bear interactions in New York. Garbage stored outside in plastic or wood sheds or garbage cans attracts black bears, even if a plastic bag or liner is used. Less frequently, a black bear will break into a closed garage to get at a garbage can or bin. Garbage including food scraps, wrappers, dirty diapers, or containers can attract bears. Cans or bottles of soda may attract black bears. Black bears repeatedly raid garbage cans, dumpsters, and bins in open or exposed areas, dragging garbage into the woods or other safer places to eat. Plastic lids, bungee cords, or cement blocks placed on lids do not prevent bears from getting into garbage. Odor-masking substances, such as ammonia, thick garbage bags, and cayenne pepper have not been proven totally effective at preventing bears from getting into garbage. Garbage offers another high-calorie, fat-rich food source that humans make available year-round in easily accessible areas.

Composting kitchen scraps or waste can attract black bears. Compost in closed bins or garden waste is less of an attractant. Vegetable matter, a main ingredient for compost, can supplement black bears' diets. Meat scraps are less commonly composted, but will readily attract black bears. Composting is often a seasonal activity, significantly slowing during snowy, winter months when bears are in their dens. Compost piles are thus a third source of food that humans make easily accessible during times of high black bear activity.

Charcoal, gas, and electric outdoor grills may attract black bears. Grills are less frequently mentioned as the cause of negative human-black bear interactions. Grease cans hung to collect drippings underneath grills may attract black bears. Grill grates, when left uncleaned, may carry an odor and also attract black bears. Often, the act of grilling itself may lure a black bear into a residential area and lead to a negative human-black bear interaction. Finally, grill use in New York (warm-weather months) coincides with periods of bear activity.

Hobby farming small plots of vegetables, fruit trees, berry bushes, chickens, or sheep may serve as a source for negative human-black bear interactions. Gardening flowers and shrubs do not directly attract bears for food-related reasons. The concentration of food in areas often excluded from smaller, less adaptive wildlife (e.g., rabbits kept away from vegetables by a fence; coyotes kept away from chickens by a wood shed), may serve to attract black bears. Vegetable growing seasons preclude bear-related damage early in the year; damage during the harvest

season is more common. Much of the livestock-related damage caused by black bears occurs shortly after spring den emergence, when black bears are hungry and natural foods may be scarce.

Finally, people may feed their pets (e.g., dog, cat, rabbit) outside. Often, residents may set food outside for pets that are left to wander on their own accord and return home for food or water. Pet food, nutritionally balanced and replenished on a daily basis, can serve as a key food source for a bear during times of natural food scarcity. Many residents choose to leave pet food extremely close to their house (e.g., in front of garage door, on the back porch), potentially leading not only to food-conditioning a black bear, but also to the habituation of black bears to people.

## **STUDY JUSTIFICATION**

Negative human-black bear interactions, indeed human-black bear conflicts, are increasing in magnitude and frequency (Gore et al. 2006a). The causes of conflict vary. So too do institutionalized programs designed to reduce conflict, and stakeholders (i.e., agency, nongovernmental organizations, homeowners associations) involved in program design, implementation, and evaluation. Outreach interventions are popular among many stakeholder groups, but the effectiveness of these programs has not been evaluated critically (Beckmann et al. 2004). Regardless of the context of the outreach intervention, such programs are often based upon the disciplines of education and persuasive communication (Gore et al. 2006a). Both education and persuasion can be related to black bear management and black bear research within the context of human-bear conflict mitigation. Food conditioning and habituation of black bears is considered to be the primary cause of human-bear conflict, and providing bears with food (intentionally or not), is considered to be the primary human behavior that can be changed to reduce human-bear conflict (Herrero 2002).

Education and persuasion can be used to influence such human behavior change, including behavior related to black bears. Persuasive communication incorporating risk messages has been found to effectively motivate responsible (health and wildlife-related) behavior change (Cho 2003). Because risk perception may influence people's beliefs, attitudes, and support for [black bear] management goals and approaches, behavior toward bears, and receptivity to educational messages (Knuth et al. 1992), insights about how people perceive risks from black bears may be used to proactively manage human-bear issues by providing a foundation upon which to build and deliver communication and education programs.

## **DEFINITIONS**

It is helpful to define terms and further explore concepts relating to this research before proceeding.

*Risk Perception.* In the context of this research, risk perception can be considered to be innate risk judgments made by citizens as opposed to risk assessments made by risk experts (Slovic 1987). The notion evolved out of a need from decision makers to formulate policy that incorporated people's opinions on and responses to risk (Slovic 1987). Identifying, quantifying,

and characterizing risk perceptions can inform effective and persuasive risk communication. Distinguishing between types of risk perception can highlight the subjective elements and complexities of risk perception. Cognitive risk perceptions are perceived probabilities of suffering injury or loss involving unsure hazards (Renn 1992). Affective risk perceptions are feelings of trepidation or concern about potential hazards (Sjoberg 1998). Individuals make judgments about risks based on hazard characteristics, or risk perception factors.

*Outreach Intervention.* Outreach interventions can be broadly defined as any activity or method strategically designed to achieve a pre-determined objective. In the case of human-bear conflict in New York, the ultimate objective is to reduce conflict to levels tolerable to diverse stakeholders (i.e., black bear managers, residents). Miriam-Webster (<http://dictionaryreference.com> 2003) defines intervention as “the act of intervening (as to mediate a dispute).” Interventionists are individuals or institutions that intentionally motivate change (Rogers 1990). Wildlife-related interventions can be broadly grouped into lethal and non-lethal categories. Lethal interventions include sport-hunting, euthanasia, culling, etc. Non-lethal interventions include human education regarding wildlife and related conflict, translocation of wildlife, regulations regarding garbage disposal, etc. Outreach interventions are traditionally designed to enhance society’s “capacity to understand and address complex, often controversial topics” (Curtis et. al 2003:1).

*Education.* Education has been defined as any deliberate activity or process that results in [individual] understanding of specific management issues (Raik et al. 2003). Education can: 1) facilitate understanding on public issues; 2) promote dialogue on public issues between and among stakeholder groups; and 3) contribute to informed decision-making, both at the community and individual levels (Boggs 1991). Education should not “be construed as an opportunity to advance a particular agenda or an agency’s view of what should be done...education should be conceptualized as a way to help people make informed choices about what *they* think should be done in a particular situation,” or what they can do personally in their interactions with wildlife (Lauber et al. 2002: 582).

Education is commonly suggested and implemented as a bear-related human behavior modification intervention regarding human-bear conflict (Gore et al. 2006). This research effort recognizes the semantics associated with education interventions related to human-bear conflict, and assumes that the ultimate objective of such activities is to reduce conflict non-lethally.

*Persuasion.* Persuasion, in the environmental/wildlife sense, can be defined as “the involvement of one or more persons who are engaged in the activity of creating, reinforcing, modifying, or extinguishing beliefs, attitudes, intentions, motivations, and/or behaviors within the constraints [and environmental/wildlife-related] context” (Gass and Seiter 2003: 34). Persuasion has been correlated with wildlife-related human behavior modification (Cho 2003; Messmer 2000) and can simultaneously change and neutralize opposition and develop, strengthen, or conserve support for wildlife-management strategies (Reading and Kellert 1993). Further, persuasion can increase knowledge and understanding related to human-wildlife conflict (Messmer 2000) and may encourage acceptance by society and individuals of fish and wildlife-related management strategies (Decker and Krueger 1993). A final benefit of using persuasion is that it can be used to increase public participation (Perloff 1993) in wildlife contexts.

## CONCEPTUAL FRAMEWORK

The Elaboration Likelihood Model (ELM; Petty and Cacioppo 1981) of persuasive communication is an information processing theory that provides an integrative framework for understanding the antecedents and consequences of attitude change (Figure 1, A through E):

A) the antecedents to attitude and behavior change (a = experience, b = motivation, and c = knowledge);

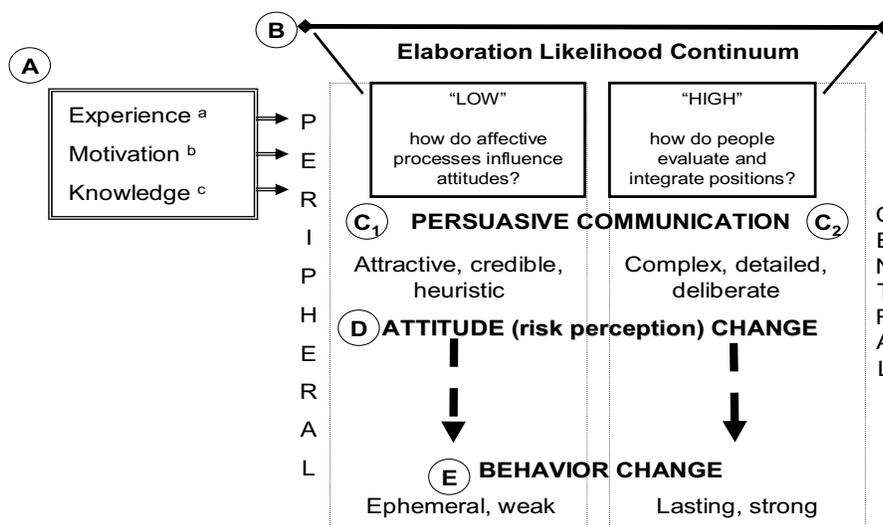
B) the elaboration spectrum, ranging from low (how do affective processes influence attitudes?) to high (how do people evaluate and integrate information into positions?) can be summarized by qualitatively different routes to persuasion (peripheral and central);

C1 and C2) elaboration likelihood informs content/format of New York NeighBEARhood Watch outreach intervention;

D) attitudes may change from processing information; and

E) behaviors of interest (bird feeding, outdoor pet feeding, unsecured garbage storage) may change as a consequence of information processing and attitude change.

Petty et al. (1997) defined attitudes as people’s global evaluations of objects, issues, or people; a key reason attitudes are thought to be important is that they are presumed to guide people’s actions. The steps of influencing human behavior (Manfredo et al.1992) include exposure, attention, reception, interpretation, integration, and action. The interpretation stage is considered a critical step because at this stage, a person yields to or rejects the message.



**Figure 1:** The Elaboration Likelihood Model of persuasive communication adapted for the context of human-black bear conflict in Southeastern New York.

The ELM is commonly used in interpretation stage research, and has been applied to diverse topics and issues outside psychology, including recreation (Lackey and Ham 2003), health (Alabarracin 2006), natural resources (Teel 2006), and natural hazards such as wildfire (Toman et al. 2006). Practical contributions from the ELM include recognition that communication should target salient beliefs, the relevance of message content influences cognitive elaboration among receivers, and contextual factors influence message effect (Toman et al. 2006).

Elaboration refers to the reflection process of an individual regarding a problem or issue, in this case human-black bear conflict. Elaboration likelihood, the extent to which an individual thinks about the arguments (i.e., message) related to a problem that a message contains, can be considered a continuum bound by high and low elaboration likelihood (Figure 1, B). The continuum can be summarized by having two qualitatively distinct paths or routes to persuasion. The 2 processing paths are the central and peripheral routes, respectively (Igartua et al. 2003). The ELM summarizes that at the low end of the continuum, peripheral processes assume primary responsibility for attitude change and at the high end of the continuum, central processes dominate (Larson 2001). Antecedents, or causal agents, to attitude change (Figure 2, A) vary by individual, issue, context, and other factors. However the literature notes in low likelihood situations (where the antecedents *motivation*, *experience*, and *knowledge* are low) an individual will process arguments within a message using tangential cues of the context in which the communication takes place (Figure 1, C<sub>1</sub>). We call these individuals peripheral processors. In high elaboration likelihood scenarios (where the antecedents *motivation*, *experience*, and *knowledge* are high), an individual will process information and arguments within the message (i.e., content of persuasive communication) in a reflective and evaluative manner (Figure 1, C<sub>2</sub>). We call these individuals central processors. At most points along the continuum, attitudes (Figure 1, D) may be influenced by both central and peripheral processes. One utility of the central and peripheral conceptualization is that the predominant route to persuasion reveals the consequences (i.e., behavior) of attitude change or formation (Figure 1, E). The multiple functions notion of the model helps explain a variety of persuasion effects.

## METHODS

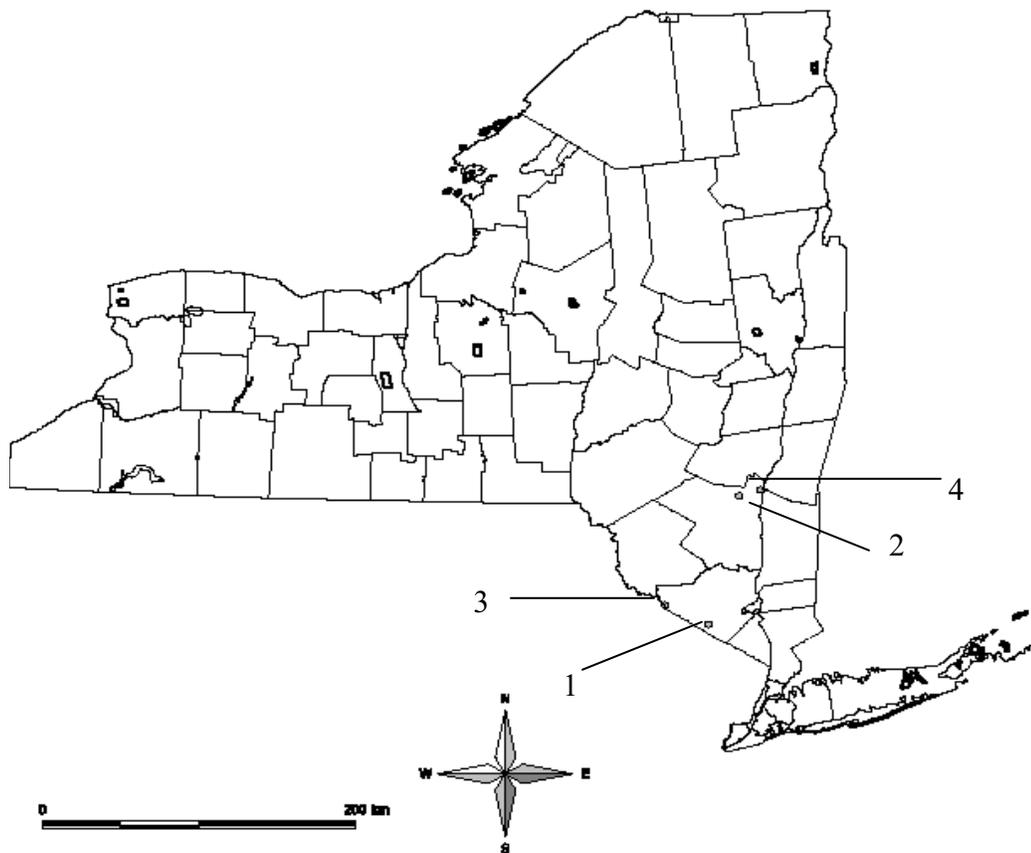
### Themes of research

This research was developed to evaluate the effectiveness of an outreach intervention (New York NeighBEARhood Watch program) designed to reduce human-bear conflict via modification of human behavior. Utilizing the persuasive communication and behavior change-based theory of the Elaboration Likelihood Model of persuasion (ELM) to design, implement, and test materials that were part of the intervention, a number of questions were explored:

- ✓ How effective is the outreach intervention at modifying human behavior at a community-level?
- ✓ What are the factors potentially contributing to or inhibiting desired outcomes?
- ✓ What are the characteristics of individuals who adopt desired behaviors?
- ✓ What is the ability of the ELM to inform the study design, outreach intervention implementation, analysis of data, and interpretation of results?

## Study sites

Four towns in the Catskill black bear range were selected for this research: 1) Warwick; 2) Woodstock; 3) Deerpark; and 4) Saugerties (Figure 2). Deerpark and Warwick lie in the southern geographic boundary of the Catskill black bear range; Saugerties and Woodstock lie in the northern geographic boundary. This entire southeast region of the state has seen an increase in the black bear and human population in recent years (Berchielli et al. 2003). Study towns were selected based on data and input from New York State Department of Environmental Conservation black bear biologists (the state agency charged with managing New York's black bear population) regarding the frequency and type of human-black bear interactions, the overall regional health of the black bear population, land use types (forested and human inhabited), and available regional resources. Woodstock and Warwick were selected as treatment towns; Saugerties and Deerpark were selected as reference towns.



**Figure 2:** Location of study towns: 1) Warwick (treatment); 2) Woodstock (treatment); 3) Deerpark (reference); and 4) Saugerties (reference).

Warwick lies in Orange County, on the border of the State of New Jersey. It has three incorporated villages, Florida, Greenwood Lake, and Warwick, comprising an area of 303 mi<sup>2</sup> (193,920 acres) and a population density of 102 people/mi<sup>2</sup>. In 2000, the total population of

Warwick was 30,764, 50.2% of which were male and 91.1% were white ([www.factfinder.census.gov](http://www.factfinder.census.gov)). Warwick, situated just 55 miles from New York City, has a unique landscape and natural environment. Warwick, particularly the Village of Florida, is well known for its' fertile "black dirt" soil, which formed over 12,000 years ago as glaciers retreated and a shallow lake formed. Today, Warwick produces one half of New York's onion crop, as well as lettuce, radish, cabbage, corn, pumpkin, squash, and sod (<http://www.thrall.org/blackdirt/report.htm>). In addition to farmland, Warwick hosts the 14,289 acre Sterling State Forest, which includes Sterling Ridge Corridor, the largest block of unfragmented forest in the Hudson Highlands. Much of the border of New Jersey transecting Warwick town is forested; across the border in New Jersey lies the 18,235 acre Wawayanda State Park.

Woodstock, New York lies at the northern boundary of Ulster County and almost fully within the 700,000 acre Catskill Park and State Forest Preserve. Its villages of Bearsville, Lake Hill, and Willow comprise an area of 67 mi<sup>2</sup> (42,880 acres) and retain a population density of 93 people/mi<sup>2</sup>. The town of Woodstock, approximately 114 miles from New York City, had a 2000 population of 6,241 full-time residents ([www.factfinder.census.gov](http://www.factfinder.census.gov)), 58.6% of which were male and 94.2% were white. Part-time, seasonal residents often increase the town's population almost five-fold. The town is well known for its music festivals and bedroom community atmosphere; however, a world-class trout fishery persists in the Hudson River tributary Esopus River, and a number of monasteries have settled into the quiet, forested mountains.

Deerpark lies in the southeastern corner of Orange County at the confluence of the New York, New Jersey, and Pennsylvania borders. Deerpark's population of 7,585 live in 66 mi<sup>2</sup> (42,240 acres), about 78 miles from New York City; the population density is 113 people/mi<sup>2</sup>. In 2000, 50% of the total population was male, and 95.5% were white ([www.factfinder.census.gov](http://www.factfinder.census.gov)). Even with urban Port Jervis at its southern end, Deerpark retains large contiguous areas of undeveloped forest at its center and abuts New Jersey's 15,413 acre High Point State Park. Complimenting this forested landscape are two large rivers and surrounding corridors: the Delaware River and its tributary, the Neversink River.

Saugerties lies adjacent to the Hudson River and partially within the 700,000 acre Catskill Park and State Forest Preserve. This eastern Ulster County town had a 2000 population of 19,868 inhabiting an area of 65 mi<sup>2</sup> (41,600 acres), 51.3% of which were male and 92% were white ([www.factfinder.census.gov](http://www.factfinder.census.gov)), with a density of 308 people/mi<sup>2</sup>. Just 90 miles north of New York City, Saugerties' landscape is a diverse mix of farmland and forested mountains with an urban center.

## **Study design**

This research used the non-equivalent control group design with separate pretest and posttest samples (Campbell and Stanley 1968) (Table 1). The design has a number of strengths. First, it is applicable when the researcher strongly suggests that pretest measurements could affect posttest responses in a way that leads to incorrect inferences about causality. Second, it is applicable with both non-equivalent treatment and control groups. Third, the design is strong at reducing internal threats to validity, such as saturation/maturation (Cook and Campbell 1979).

Using this design, pre-treatment and post-treatment measures were conducted using voluntary mail survey and secondary data. The design was implemented in all four towns. Woodstock and Warwick served as exposure (treatment) towns and Deerpark and Saugerties served as reference (reference) towns. In order to maximize the rigor of the study design, each town had similar human-black bear conflict characteristics and varied in demographics (Table 2).

**Table 1:** Quasi-experimental control group design with pre- and post-test samples.

Community	s1	d1	Intervention	s2	d2
N <sub>t</sub> (Woodstock)	N <sub>ts1</sub>	N <sub>td1</sub>	NYNW	N <sub>ts2</sub>	N <sub>td2</sub>
N <sub>r</sub> (Saugerties)	N <sub>rs1</sub>	N <sub>rd1</sub>		N <sub>rs2</sub>	N <sub>rd2</sub>
S <sub>t</sub> (Warwick)	S <sub>ts1</sub>	S <sub>td1</sub>	NYNW	S <sub>ts2</sub>	S <sub>td2</sub>
S <sub>r</sub> (Deerpark)	S <sub>rs1</sub>	S <sub>rd1</sub>		S <sub>rs2</sub>	S <sub>rd2</sub>

N: Northern Catskill region towns

S: Southern Catskill region towns

t: treatment town

r: reference town

s: survey observation

d: secondary data

1: 2004

2: 2005

NYNW: New York NeighBEARhood Watch Program

**Table 2:** Key characteristics of two treatment (Woodstock and Warwick) and reference (Saugerties and Deerpark) towns.

Town	Population (2000)	Population density (people/mi <sup>2</sup> )	Acreage (mi <sup>2</sup> )	Black bears hunted in 2003	Percent respondents with bear damage in 2004
Woodstock	6,241	93	67	10	38
Warwick	30,764	102	303	21	18
Deerpark	7,858	118	66	15	18
Saugerties	19,868	308	65	9	17

To ensure an adequate program logic model and accurate representation of the context of human-black bear conflict in the region, we used pre-program survey data to inform material message content and format. We reviewed 2 decades worth of regional human dimensions of black bear research (see Brown et al. 1979, Decker et al. 1985, Siemer and Decker 2003) as well as the literature on human-bear conflict and wildlife-related interventions (see Gore et al. 2006a). Internal review, exploratory research, and prescriptive stakeholder engagement (e.g., pre-program survey data, media outreach, agency review) helped focus our attention on various

stages of program design, implementation, and distribution (Figure 6.1, a and b). The program implementation plan was reviewed by state wildlife officials and discussed with treatment town residents and the media (e.g., newspapers, radio, television). To limit divergence from the implementation plan, one individual was responsible for the large majority of the implementation (Figure 6.1, c). Finally, we used multiple data sets to ensure good quality evaluation (Figure 6.1, d and e). The data, collected before and after the implementation of the outreach intervention, included a voluntary mail survey (Salant and Dillman 1994) and secondary data sets (i.e., 10 years of harvest, precipitation, black bear complaints, and hard mast crop data). We based our program expectations about outcomes (Figure 6.1, f) on a review of 6 noteworthy North American black bear-related outreach interventions (Gore et al. 2006a).

## **Data collection**

A pre-program survey was internally reviewed by members of Cornell University's Human Dimensions Research Unit, the New York State Department of Environmental Conservation's black bear management team, and approximately 12 graduate students in Cornell University's Department of Natural Resources. We pre-tested the pre-program questionnaire in Dutchess and Sullivan Counties through a July 2004 mail survey to determine respondent difficulties not anticipated during study planning and increase the face validity of the survey instrument (Salant and Dillman, 1994; Wimmer and Dominick, 2003). We randomly sampled 150 adults from a list of residents having filed bear-related complaints with the NYSDEC. The pre-test was designed to ensure respondents would understand and interpret all the questions in a similar manner, that questions measured concepts properly, and capture any researcher bias in the questionnaire (Salant and Dillman 1994). After obtaining feedback about the format and content of the questionnaire, minor revisions were made to the pre-treatment survey instrument.

We obtained initial data on experiences, risk perceptions, motivations, attitudes, and behaviors through an October 2004 pre-program mail survey of residents in four towns experiencing increased residential human-black bear conflict (two treatment and two reference towns) (Appendix II). We randomly sampled 2,800 adults in two northern (Woodstock and Saugerties) and two southern (Warwick and Deerpark) New York towns. We designed the study to sample 700 residents living in each of the towns. We anticipated a total response rate of 40% (final response rate was 46.6%). We mailed a cover letter, questionnaire, and return envelope to all members of the sample on 15 October 2004. Nonrespondents received up to 3 reminder notices urging participation in the survey. Because we designed the study to include a post-treatment survey, we did not conduct nonrespondent follow-up. The booklet-sized, pre-treatment questionnaire had a green cover with a black and white photograph of a bear and three double-sided inside pages.

Following implementation of the New York NeighBEARhood Watch program (May-October 2005), we obtained post-program data on experiences, risk perceptions, motivations, attitudes, behaviors, and program efficacy through an October 2005 mail survey of residents in the same four towns sampled in the pre-program survey (Appendix III). We randomly sampled a different group of 2,800 adult residents from the 2004 tax records, sampling 700 different single-family adult residents living in each of the four towns. We anticipated a total response rate of 40% (final response rate was 41.1%). We mailed a cover letter, questionnaire, and return

envelope to all members of the sample on 18 October 2005. Post-program cover letters were identical to pre-program letters; questionnaires had identical questions on experiences, motivations, risk perceptions, and behaviors. We added additional questions about program recall, exposure, and efficacy. We did not conduct nonrespondent follow-up because of the study design. The booklet-sized post-program questionnaire had a blue cover with a black and white photograph of a bear and three double-sided inside pages.

Both pre-program and post-program questionnaires were self-administered, mail-back instruments designed to obtain information about respondents' demographic characteristics, risk perceptions, attitudes towards bears, residential bear-related behavior, experiences with bears, and motivation to adopt future behaviors. We used a standard 4-wave implementation (i.e., all members of the sample received an initial mailing and follow-up reminder letter; nonrespondents received up to two additional reminder mailings, including a replacement questionnaire) (Salant and Dillman 1994).

All survey data entry was conducted by three researchers using an MS-DOS coding program written to minimize researcher bias and mirror the questionnaire code books and imported into SPSS v13 for analysis. We used 5-point Likert-type scales to measure attitudes, beliefs, motivations, and risk perceptions associated with black bears in both the pre-program and post-program mail surveys. No forced-choice questions were used to measure attitudes, beliefs, or risk perception. Knowledge questions were used to measure cognitive understanding about black bear biology and management. Reliability checks were incorporated into all risk perception questions to facilitate confirmation of conclusions previously made during exploratory research and analysis. A number of questions focused on topics that could elicit social desirability or undesirability bias in respondent answers. We used a range of closed, open, and dichotomous questions to measure exposure to and experience with black bears. We were concerned with telescoping, or respondents misremembering the date when exposure to program materials and experience with black bears occurred (Sudman and Bradburn 1982).

We used an assortment of closed and open questions to measure demographic characteristics about respondents, such as gender, age, duration of residence in current town, home ownership, and number of children under 18 residing in the household. Free-response questions were also used to measure demographic characteristics. We chose to measure program efficacy using a variety of techniques to minimize respondent memory error. We used aided-recall procedures to measure respondent recall of the eight NeighBEARhood Watch Program materials. Filter questions were also used to measure material efficiency and efficacy. We collected data from secondary sources to assist in program evaluation; interpreting survey results within the context of environmental and social secondary data allowed us to better understand the probable impacts of the outreach intervention. We searched the literature to understand what environmental or external factors might potentially influence human-black bear interactions in my study areas. We then explored potential sources of available data in the study region, particularly those data that occurred simultaneously with the study period. Some data, such as annual soft mast crop estimates, were not available and so were excluded from the secondary data set. We collected 10 years of data about harvest rates, precipitation, temperature, total acorn crop, viable acorn crop, and bear-related complaints filed to authorities. Sources included the Black Rock Research Forest, the NYSDEC, and the Northeast Regional Climate

Center. Data were collated in a Microsoft Excel file and imported into SPSS v13 for analysis (Appendix I). The research presented herein was granted approval by the Cornell University Committee on Human Subjects (protocol ID numbers for research associated with this study were 03-05-002 and 04-06-008).

### **The New York NeighBEARhood Watch Program**

Prior to the development of the NYNW program, human-black bear conflict in Southeastern New York was as follows: 1) annual complaints about human-black bear conflict vacillated over time, but 6 of the past 10 years witnessed above-average complaint loads (M. Merchant, personal communication 2004); 2) stakeholder input groups highlighted the need for increased outreach and intervention efforts (Schusler and Siemer 2004); 3) the state experienced its first bear-related human fatality in summer 2002 (Gore et al. 2005); 4) black bear and human populations were both increasing in number and density in Southeastern New York (Berchielli et al. 2003); and 5) no contemporary stakeholder-informed, statewide outreach intervention existed. Similar to other bear-related outreach interventions, the NYNW program was designed with the intended outcomes of reducing the number of complaints filed to authorities, reducing the magnitude and frequency of negative human-black bear interactions, and helping communities cope with living with black bears. It was also designed to facilitate summative evaluation of its effects on human perceptions and behaviors within the study towns.

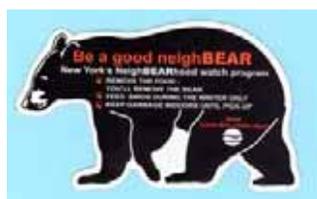
The New York NeighBEARhood Watch Program was implemented in 2 towns (i.e., Warwick and Woodstock) May through October 2005. The program included distribution of eight materials developed and implemented by the Human Dimensions Research Unit at Cornell University and the New York State Department of Environmental Conservation's (NYSDEC) Bureau of Wildlife. The program had 3 objectives: 1) reach as many residents as possible in each of the two towns; 2) reduce residential human-black bear conflict; and 3) provide an evaluation component. A black bear portable education trunk was also created and used as a vehicle for distributing materials, but was not evaluated as part of this research project. The trunk contained many of the items below, plus other hands-on learning materials such as a bear skull.

A collaborative effort between a state agency (New York State Department of Environmental Conservation), an academic institution (Cornell University), and an inter-state cooperative (Northeast Wildlife Damage Management Cooperative), the program involved a set of 8 materials whose content focused on residential behaviors that could be changed to reduce the proximate (i.e., property damage) and ultimate (i.e., physical injury to humans or bears) risk of human black bear-conflict. Specifically, 6 human behaviors were emphasized: refraining from hanging *birdfeeders* during warm-weather months; feeding *pets* indoors not outdoors; storing *BBQ grills* indoors when not in use; curbing *garbage* the morning of pick-up and storing it indoors at all other times; keeping home *compost* contained and secure; and picking up fruit dropped from *fruit trees* and harvesting fruit from trees before fruit falls. In all, 11,117 materials (billboards, bear-o-meters, brochures, magnets, posters, lawn signs, article reprints, fact sheets) were distributed. Direct associated costs for the NYNW program were approximately \$27,000, not including staff/researcher time.

*Brochure.* Titled, “Living with Bears,” the full-color 3-fold brochure detailed the most common residential attractants for black bears, including barbeque grills, pet food, unprotected livestock and beehives, birdfeeders, garbage cans, and compost. Bear relocation, and what people should do if they see a black bear, and black bear facts were also covered. The New York NeighBEARhood Watch logo appeared inside the brochure, the NYSDEC website was given, and a professional photo of a black bear at a birdfeeder was purchased. The brochure was made available in PDF format at the NYSDEC website. The brochure (n = 5006) was distributed in treatment towns in retail stores, supermarkets, post offices, gas stations, town offices, libraries, and churches. In addition, in Woodstock, a saturation mailing distributed one brochure, along with a magnet and letter from the NYSDEC, to each postal patron.



*Magnet.* The three-color bear-shaped magnet advised, “Be a good NeighBEAR,” by exhibiting three behaviors: remove the food and remove the bear problem; feed birds during winter months only, and storing garbage indoors. The NYSDEC website was listed. The magnet (n = 4805) was distributed in the same locations as the brochure.



*Poster.* Titled, “What attracts bears to your neighborhood?,” the 8 ½” x 11” full-color glossy poster featured four behaviors residents could take to help keep neighborhood residents and black bears safe. The New York NeighBEARhood Watch and NYSDEC’s logo was listed, as was the NYSDEC website. The poster (n = 76) was hung in store windows, post offices, town hall offices, libraries, gas stations, with permission.



*Fact Sheet.* The Wildlife Damage Management Fact Sheet Series on black bear was published by Cornell Cooperative Extension. The four page fact sheet provided detailed information on the general biology, management status, habitat and food habits, and description and prevention of damage caused by black bears. The fact sheet was made available in PDF format at the Northeast Wildlife Damage Management Cooperative website. The fact sheet (n = 247) was distributed at town hall offices, nature centers, libraries, school offices, police and fire stations, and campgrounds.

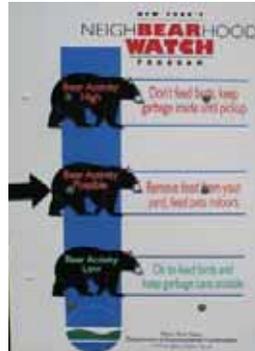


*Lawn Sign.* Weatherproof, one-sided, lawn signs advertised, “I’m a good NeighBEAR...I don’t feed the bears!” The 11” x 14” 3-color signs featured the New York NeighBEARhood Watch logo as well as the NYSDEC logo and website. Lawn signs (n = 321) were supplied to town conservation board representatives (with instructions to stay within town) and distributed to residents.



*BEAR-o-meter.* Detailing three levels of black bear activity (i.e., high, medium, low) and suggestions for corresponding human behaviors (e.g., feed pets indoors, remove bird feeders), the adjustable, weatherproof, 6’ x 4’ BEAR-o-meter was attached to lawn stakes and sunk into

the ground. BEAR-o-meters (n = 6) were posted by the Woodstock Environmental Commission and the Warwick Department of Public Works on town land.



*Conservationist Magazine Reprint.* The NYSDEC quarterly magazine, “The Conservationist,” featured a four-page article in October 2004. Reprints of the article were printed on 8 ½” x 11” glossy paper and tri-folded. Reprints (n = 714) were distributed in the same location as brochures and magnets, but were not included in the saturation mailing.



*Billboard.* Along with a photo of a bear at a birdfeeder and a raided garbage can a large illustrated black bear was surrounded by, “Got bear problems?” “Remove the food and you’ll remove the bear. The billboard was printed on reusable vinyl-like material and contracted through Clear Channel Media, Inc. One billboard was posted on Route 17A in Warwick, and one on Route 212 in Woodstock.



## Data analysis

The first objective was to evaluate the process and outcomes of a community-centered communication program designed to reduce negative human-black bear interactions and interpret program effectiveness (efficacy) within the context of explanatory variables. To ensure we were evaluating an adequate program model, we made efforts to accurately represent the context of human-black bear conflict in the region by using pre-program survey data to inform material message content and format as described earlier. We based program expectations about outcomes on a review of 6 noteworthy North American black bear-related outreach interventions (Gore et al. 2006a). The program implementation plan was reviewed by state wildlife officials and discussed with program town residents and the media (e.g., newspapers, radio, television). To limit divergence from the implementation plan, one individual was responsible for the large majority of the implementation. Finally, we interpreted results by considering potential external influences such as mast crop and annual harvest (e.g., secondary data).

We contextualized 3 antecedents to bear-related attitudes based on ELM-related outreach intervention literature, exploratory research, and insights from state wildlife biologists: knowledge, willingness to change, and experience. Our attitude of primary interest was risk perception. We created a “knowledge score” for each respondent based on the number of correct answers to nine true/false/don’t know cognitive knowledge questions about New York’s bears (e.g., black bears can easily climb trees, black bears may lose up to one-third of their body weight during winter denning). We also asked respondents to agree or disagree with the statement, “I know how to keep bears away from my home.” We posed 3 questions to understand respondents’ motivation to take action to prevent bear problems near their home (i.e., purchase bear-resistant garbage container, refrain from feeding birds from early spring to late fall, contact someone for help if they had a bear on their property). We asked respondents 3 questions to understand the degree to which they perceived residential bear-related risks to be acceptably low. Three related questions were posed to understand cognitive risk perception about residential bear-related risks.

To understand variables influencing risk perception associated with residential human-black bear conflict, we asked respondents to agree/disagree with risk-related statements. In 2005 only, we asked respondents to report 6 bear-related behaviors related to: 1) garbage storage; 2) pet food; 3) grill storage; 4) composting; 5) hanging birdfeeders; and 6) fruit tree harvest. We also asked if the behavior was a recent change (in the past 6 months). Reliability estimates (Chronbach’s alpha) were determined for each set of antecedent and consequence questions; all alpha scores were above the recommended 0.6 (Hair et al. 1998). Chi-square tests were used to determine goodness-of-fit and a GLM Univariate procedure produced an analysis of variance used to determine effect. We pooled the two program and two reference town respondents into program town and reference town groups to increase generalizability and statistical power of outcomes and conclusions.

The second objective was to use the ELM as an analysis tool to understand the correlations between individual attitudes and behaviors about black bears as well as peripherally-

or centrally-oriented materials. We adapted the ELM for design, implementation and analysis of the outreach intervention. Within the context of human-black bear conflict, the model considered black bear-related involvement and experience, motivation and relevance, and capacity and knowledge as potential antecedents to attitude change, the placement of individual “high” or “low” on the elaboration likelihood continuum, whether persuasive communication messages would be processed peripherally or centrally, whether attitude (e.g., risk perception) change occurred from either processing route, and the consequence of the degree and endurance of behavior change generated from attitude change. We classified the billboard, magnet, lawn sign, poster, and bear-o-meter as peripherally-oriented materials and the magazine article reprint, brochure, and fact sheet as centrally-oriented materials. Each classification was based on: 1) detail of information; 2) complexity of information; 3) use of graphics and color; 4) attractiveness; and 5) content. Peripheral materials included those with low detail, low complexity, high use of graphics and color, attractive layout, and simplified content (i.e., lists). Central materials included those with high detail, high complexity, low use of graphics and color, attractive layout, and multifarious content (i.e., legal codes, range maps, ecological and ethological facts).

Based on context gleaned from the exploratory research (Gore et al. 2006b), we defined the antecedent experience as encounters with black bears at home or on property, the antecedent willingness as motivation to change behavior to reduce negative human-black bear interactions, and the antecedent knowledge as cognitive understanding about black bear biology and management. We defined risk perception as the perceived likelihood and acceptability of risks from black bears. We limited my focus on consequence to three behaviors/consequences of interest: bird feeding during warm weather months, feeding pets outdoors, and storing garbage unsecured, outdoors. These three behaviors were the most commonly reported changed behaviors and constitute a large majority of bear-related complaints filed to authorities.

We posed a minimum of 3 survey questions for each antecedent and determined Chronbach’s alpha to test for internal reliability. Alpha scores were above the recommended 0.6 (Hair et. al 1998); we created three summative antecedent index scores for each respondent. We posed three questions for each concept to determine perceived likelihood and acceptability of bear-related risks. Alpha scores were also above 0.6; we created one summative risk perception index score for each respondent. We created a summative behavior score for individuals based on their reported correct change (or lack of incorrect change) in each of the 3 behaviors of interest. Correct changes in behavior included not feeding birds during warm weather months, not feeding pets outdoors, and not storing garbage outdoors in unsecured containers. Respondents were asked to rank the efficacy of each material they reported recalling. Efficacy responses were aggregated and recoded so that each respondent could be classified as finding centrally- or peripherally-oriented materials as being more effective within the context of human-black bear conflict.

Using SPSS v13, we ran repeated measures ANOVA and binary logistic regression using the conditional stepwise method. We selected the Hosmer and Lemeshow test to determine goodness of fit and the Wald test to determine effect for the later hypothesis; such tests are robust in studying differential effects in multiple social groups (Liao 2004). We did not weight data, as this could have introduced additional sources of bias to the data (Babbie 1998).

## Results

The response rate for the pre-test was 62.6%. The total pre-program survey response rate was 46.6% ( $n = 1211$ ) (Woodstock = 61.5%, Warwick = 41.7%, Saugerties = 53.6%, Deerpark = 42.3%); the total post-program survey response rate was 41.1% ( $n = 950$ ) (Woodstock = 50.5%, Warwick = 39.1%, Saugerties = 37.7%, Deerpark = 39.3%). The average age of treatment town respondents and reference respondents did not differ between years, nor significantly between communities. Although females comprised larger percentages of respondents than males in treatment towns in both years, the proportion of female respondents from treatment towns increased in 2005 from 2004. On average, treatment town respondents had lived in their county of residence longer time than reference town respondents. Treatment town respondents had, on average, achieved higher levels of education than reference town respondents. In both pre- and post-program samples, approximately 70% of treatment town respondents had at least a four-year degree, whereas the same proportion of reference town respondents had at least a two-year degree (Table 3). All survey respondents (i.e., in both treatment and reference towns) were slightly older than the general population ([www.citydata.com](http://www.citydata.com)). All survey respondents, particularly in reference towns, were more educated than the general population.

### Community-level change

Respondents' knowledge scores did not change after the NYNW program in both treatment ( $\chi^2 = 9.933$ ,  $p = 0.270$ ) and reference ( $\chi^2 = 13.42$ ,  $p = 0.144$ ) towns. In 2004, reference and treatment town respondents did not differ in their knowledge of how to keep black bears away from their home ( $\chi^2 = 1.439$ ,  $p = 0.230$ ); one year later, neither group demonstrated a change in this knowledge. Neither treatment ( $\chi^2 = 2.668$ ,  $p = 0.263$ ) nor reference ( $\chi^2 = 1.216$ ,  $p = 0.544$ ) towns indicated a change in their willingness to adopt desired behaviors after the NYNW.

Types of experiences with black bears at or near homes or property decreased for both treatment ( $\chi^2 = 39.741$ ,  $p = 0.00$ ) and reference ( $\chi^2 = 9.670$ ,  $p = 0.046$ ) town respondents, but there was no difference between groups ( $\chi^2 = 6.437$ ,  $p = 0.169$ ). This reflected a decrease in complaints filed to NYSDEC in 2005 (237), which was down from 2004 (465) and 2003 (331) (M. Merchant, unpublished data 2005). We pooled pre- and post-program survey data from all towns to better understand bear-related experiences and found a decrease between years in the proportion of respondents who had seen a bear at home ( $\chi^2 = 31.008$ ,  $p = 0.000$ ), seen evidence of a bear at home ( $\chi^2 = 21.537$ ,  $p = 0.000$ ), had property damage caused by a bear at home ( $\chi^2 = 6.658$ ,  $p = 0.010$ ), and had known a person with property damage caused by a bear ( $\chi^2 = 8.403$ ,  $p = 0.004$ ).

Risk perception increased after the NYNW program and between treatment and reference towns. Respondents in both treatment and reference towns were less likely to strongly agree that the risks associated with black bears were acceptably low after the NYNW program; the decrease was greater in the treatment towns than in the reference towns (Table 4). While the acceptability of bear-related risks varied for all towns' respondents, the likelihood of risks increased in reference towns ( $\chi^2 = 23.145$ ,  $p = 0.000$ ) but did not change significantly in treatment towns ( $\chi^2 = 1.897$ ,  $p = 0.594$ ).

**Table 3:** Demographic characteristics of pre- and post-program survey respondents in treatment and reference towns.

Variable	Town	Pre-program (2004) (N = 1211)	Post-program (2005) (N = 950)	$\chi^2$ (Year)
Age	Treatment	58 (SD = 13.3)	58 (SD = 12.8)	74.391
	Reference	56 (SD = 14.0)	56 (SD = 13.2)	
Gender (female)	Treatment	48	55	5.037*
	Reference	37	41	
Years living in county	Treatment	28 (SD = 19.2)	29 (SD = 18.8)	8.356*
	Reference	23 (SD = 17.0)	22 (SD = 17.1)	
Minimum education	Treatment	70% 4-year degree	71% 4-year degree	112.763*
	Reference	71% 2-year degree	74% 2-year degree	

\* Significant at  $p < 0.05$ .

**Table 4:** Percent of treatment and reference town respondents' changes in risk perception associated with human-black bear conflict.

Question	Town	Year	SA	A	Neither			$\chi^2$
					A nor D	D	SD	
The risk I'll experience property damage from a black bear is acceptably low.	T	2004	58.0	21.4	7.2	8.8	4.5	46.76*
		2005	37.7	37.2	11.0	10.3	3.9	
		Change	-20.3	15.8	3.8	1.5	-0.6	
	R	2004	60.2	24.0	6.8	5.2	3.8	23.21*
		2005	45.7	33.3	9.6	7.1	4.4	
		Change	-14.5	9.3	2.8	1.9	0.6	
The risk I'll have pets/ livestock threatened by a black bear is acceptably low.	T	2004	59.9	19.9	11.0	5.7	3.5	62.94*
		2005	35.2	35.9	13.3	10.5	5.0	
		Change	-24.7	16.0	2.3	4.8	1.5	
	R	2004	64.8	18.3	7.6	5.9	3.3	39.75*
		2005	46.9	30.6	9.6	6.5	6.5	
		Change	-17.9	12.3	2.0	0.6	3.2	
The risk I or a family member will be threatened by a black bear is acceptably low.	T	2004	57.8	20.9	9.7	7.5	4.1	61.57*
		2005	34.3	39.8	10.2	10.2	5.5	
		Change	-23.5	18.9	0.5	2.7	1.4	
	R	2004	61.1	20.3	8.4	7.0	2.7	31.15*
		2005	45.3	30.8	11.0	8.1	4.8	
		Change	-15.8	10.5	2.6	1.1	2.1	

\*Significant at  $p < 0.05$   
T = Treatment  
R = Reference  
SA = Strongly Agree  
SD = Strongly Disagree

Types of bear-related experiences that influenced risk perception in both treatment and reference towns included personal threats in backyard ( $F = 11.65, p = 0.000$ ), property damage in backyard ( $F = 13.82, p = 0.000$ ), knowing friend or family with property damage ( $F = 8.16, p = 0.000$ ), having a pet threatened in backyard ( $F = 4.36, p = 0.03$ ), and the interaction term of gender, membership in a conservation organization, and year surveyed ( $F = 3.33, p = 0.03$ ).

**Table 5:** Percentage and counts of pre-program (2004) and post-program (2005) survey respondents who did not engage in desirable bear-related human behaviors targeted by the New York NeighBEARhood Watch Program.

Behavior	Town	2004	2005
		N = 1211	N = 950
Keeping garbage unsecured	Treatment	43.3 (n = 520)	42.0 (n = 399)
	Reference	54.0 (n = 653)	48.8 (n = 463)
Feed pets outdoors	Treatment	3.6 (n = 43)	4.0 (n = 38)
	Reference	8.8 (n = 106)	8.0 (n = 76)
Storing BBQ outdoors when not in use	Treatment	68.5 (n = 823)	70.8 (n = 672)
	Reference	72.5 (n = 871)	73.8 (n = 701)
Keeping compost unsecured	Treatment	81.6 (n = 980)	72.5* (n = 688)
	Reference	82.5 (n = 999)	77.2* (n = 733)
Hanging birdfeeders in warm weather	Treatment	56.5 (n = 684)	56.5 (n = 536)
	Reference	42.4 (n = 513)	42.9 (n = 407)
Not harvesting fruit from trees	Treatment	40.3 (n = 488)	40.2 (n = 381)
	Reference	41.0 (n = 496)	40.7 (n = 386)

\*  $\chi^2$  (on count data) significant at  $p < 0.05$

The majority (57%) of all (i.e., pooled) post-program respondents saw between 0 and 1 NYNW program material ( $\mu = 1.61, SD = 1.77$ ). Exposure to NYNW materials did not influence the behavior of all (i.e., pooled) post-program respondents ( $F = 1.267, p = 0.261$ ). However, the same group of respondents most frequently recalled the lawn sign and reported the magazine article reprint as the most effective material helping them cope with living with black bears (Table 6). Post-program respondents who reported having decreased residential human-black bear conflict in the past year recalled the lawn sign most frequently and as most effective

at helping them cope with living with black bears. These respondents reported the bear-o-meter least effective and recalled the magazine article reprint least.

**Table 6:** Post-program (2005) respondents’ perceptions about outreach intervention materials that were very effective at helping them cope with living with black bears.

Material	Percent who recalled material	Percent who recalled material and reported it as very effective
Article reprint	8	51
Brochure	21	49
Fact sheet	15	49
Billboard	29	40
Poster	17	39
Lawn sign	39	35
Magnet	14	33
Bear-o-meter	18	27

Some post-program survey respondents provided editorial comments about certain NYNW materials or about the program in general that demonstrated a connection between fewer bear-related problems in 2005 and the outreach intervention. “All in all, I think this is an effective program. The bears are less a problem this year than last.” Or, “After being exposed to your info re: not to feed the bears, I took down birdfeeders but continued to feed birds and other small animals and occasionally deer on the ground, which got eaten during the day...I’ve had no problems with bears since I took the feeders down.”

A strong majority of respondents (63%) had a peripheral material orientation. Two antecedents, *willingness* ( $F = 4.302, p = 0.04$ ) and *knowledge* ( $F = 4.026, p = 0.04$ ), positively influenced respondents who ranked centrally-oriented materials as being the most effective at helping them cope with living with black bears (central processors). *Willingness* ( $F = 24.807, p = 0.00$ ) and *experience* ( $F = 4.015, p = 0.04$ ) positively influenced respondents who ranked peripherally-oriented materials as being the most effective at helping them cope with living with black bears (peripheral processors).

The 3 bear-related behaviors most frequently reported to authorities (M. Merchant, unpublished data 2005) were also the 3 human behaviors most frequently reported as having changed after the outreach intervention (based on merged treatment town datasets): bird feeding, unsecured garbage, and outdoor pet feeding (Table 7). Individuals who changed their bird feeding behavior ( $n = 55$ ) recalled the lawn sign most frequently and the article least. The same individuals ranked the article reprint as being most effective at helping them cope with living with black bears and the bear-o-meter as least effective. Individuals who changed their garbage storage behavior ( $n = 97$ ) recalled the lawn sign most frequently and the article least. The same individuals ranked the fact sheet as being most effective at helping them cope with living with black bears and the bear-o-meter as being least effective. Finally, individuals who changed their pet feeding behavior ( $n = 42$ ) recalled the lawn sign most frequently and the article least. The same individuals ranked the fact sheet as being most effective at helping them cope with living

with black bears and the magnet as least effective. Individual behavior scores were positively influenced only by peripherally-oriented outreach intervention materials ( $F = 2.183, p = 0.00$ ). There was neither a positive nor negative influence of material orientation (i.e., peripheral or central) on risk perception ( $F = 0.00, p = 1.00$ ). The influence of risk perception on behavior scores differed for central processors versus peripheral processors.

**Table 7:** Frequency of respondents from both treatment towns who reported changing bear-related behavior after the New York NeighBEARhood Watch program was implemented.

Desired behavior	Number reporting having changed their behavior after outreach intervention
Secured garbage	97
Not feeding birds	55
Indoor pet feeding	42
Secured BBQ grill	20
Secured compost	16
Harvesting fruit from trees before it falls to ground	6

For central processors (individuals who reported centrally-oriented materials as being most effective), bear-related behavior change was positively influenced by the acceptability of bear-related risks ( $F = 2.194, p = 0.01$ ). For peripheral processors (individuals who reported peripherally-oriented materials as being most effective), bear-related behavior change was positively influenced by the interaction of the acceptability and likelihood of bear-related risks ( $F = 1.508, p = 0.03$ ). *Willingness, knowledge, and group* (i.e., treatment or reference town) positively influenced individuals who reported correct bird-feeding behavior (i.e., only during winter months). *Willingness* positively influenced respondents who reported correct pet feeding behavior (i.e., indoors); *experience* positively influenced respondents who reported correct garbage storage behavior (i.e., indoors, curbed the morning of pick-up where applicable) (Table 8).

**Table 8:** Variables influencing individual changes in residential bear-related behavior.

Behavior	Hosmer-Lemeshow $\chi^2$	$p$	Variable	Wald statistic
Bird feeding	10.294	0.245	willingness	34.159*
			knowledge	5.889*
			group	10.310*
Pet feeding	3.641	0.725	willingness	14.561*
Garbage storage	2.738	0.434	experience	5.670*

\* Significant at  $p = 0.01$

Composting decreased slightly after the NYNW program, yet the five other behaviors targeted by the program did not change. Exposure to NYNW materials did not influence the behavior of post-program respondents, aggregated for each township. The association some survey respondents made between fewer black bear problems and the NYNW program is noteworthy for summative evaluation. The connection supports the notion that wildlife-related outreach intervention evaluations are valuable (and should examine comprehensive sets of evaluation data to interpret outcomes) (Gore et al. 2006a).

Of the variables examined for this research knowledge about bears and a willingness to change remained the same in all towns after the NYNW program; encounters with black bears (e.g., seeing a bear near home or property, property damage near home or property) decreased in all communities. For those who exhibited a change in risk perception, types of direct experiences with bears influenced the shift in risk perception more so than information provided by the NYNW program. Experiences involving a potential threat to human or pet health and safety were influential on risk perception whereas just seeing a bear was not. Not all experiences with bears were of a threatening nature, and people reported seeing fewer bears. That fewer respondents agreed bear-related risks were acceptably low and unlikely, yet fewer respondents reported seeing bears, implies a factor other than increased encounters increased the perceived seriousness respondents assigned to this issue. It is possible that other external influences, such as mass media (e.g., newspapers, television, radio) coverage of the program, may have influenced risk perception.

### **Individual-level change**

In the context of this research, individuals who changed their bird feeding, pet feeding, or garbage storage behavior after exposure to one season of the NYNW program materials can be considered intervention adopters. Cultivating the capacity of intervention adopters over time may be paramount to the long-term success of outreach the NYNW program. Further, replication of the NYNW program will likely hinge in large part on the willingness of adopter-types to accept (i.e., process) information presented in the outreach intervention.

Demographic characteristics such as age and gender did not influence who adopted the outreach intervention within the context of NYNW program. The outreach intervention adopters had lived in their county of residence for a long time (>5 years). Intervention adopters who reported changing bird feeding behavior to be more risk-reducing were influenced by a willingness to change behavior and knowledge about bears. Individuals who reported changing pet feeding behavior to be more risk-reducing were influenced by a willingness to change behavior. Individuals who reported changing garbage behavior to be more risk-reducing were influenced by experience with bears. In general, the behavior change of intervention adopters was influenced mostly by peripheral-type materials (e.g., included cues, well-packaged, photos, little text, trusted messenger): lawn sign, magnet, poster, billboard, bear-o-meter. Peripheral processors were influenced by a willingness to change behavior and experience with bears.

Central processors were influenced by a willingness to change behavior and knowledge about bears. A willingness to change behavior and experience with bears were important variables in changing risk perception, yet there was no influence on risk perception of being a

peripheral or central processor. The lawn sign was usually the most frequently recalled material, and the fact sheet was frequently considered the most effective (Table 9).

**Table 9:** Individuals’ behavior change, material recall, and material efficacy.

Behavior	Material most frequently recalled	Material considered most effective
Garbage	lawn sign	fact sheet
Pet food	lawn sign	fact sheet
BBQ	brochure	fact sheet
Compost	lawn sign	brochure/fact sheet
Bird food	lawn sign	article
Fruit tree	lawn sign	fact sheet

## IMPLICATIONS

Behavioral solutions to environmental problems are appealing in part because they can be sustainable; outreach interventions based on principles of education and communication are one popular mechanism for encouraging such desirable behavior change. As new wildlife-related outreach interventions come on-line and financial and personnel resources become more limited, it will be increasingly important to understand the ability of interventions to reduce conflict, foster awareness, modify behavior, and encourage coexistence between people and wildlife (Gore et al. 2006a). From a conservation perspective, achieving behavior change at a community-level is important for meaningful resolution of human-wildlife conflicts. The collective behavior of humans in the human-wildlife conflict equation will ultimately influence the magnitude and frequency of conflict. Insights from these community-level evaluations may assist wildlife practitioners to devise more comprehensive and adaptive management frameworks. However, given the unique mitigating circumstances (i.e., cultural values, normative beliefs, government structures, stakeholders involved) (Fulton et al. 1996, Zinn et al. 1998) within which human-wildlife conflict occurs, community-level evaluations may fail to capture key details about individuals’ behavior change. This information is key because individual change is a precursor to community-level effects.

Information about individuals can deepen our understanding about requisites of successful intervention application for certain types of stakeholders, such as intervention adopters. Further, such information may broaden the information base, advance theory, and refine methodology. Insights into what precedes individuals’ change in wildlife-related attitudes can provide crucial details about future behavior. Understanding the characteristics of these individuals is valuable because there is the potential for individuals’ adoption of these behaviors to diffuse throughout the communities (i.e., via the social networks of the adopters) within which they occurred (Rogers 1983). Further, this information can help focus the content and format of outreach interventions for particular stakeholder groups. Thus, this evaluation considers both community and individual-level changes.

Volition may be of less importance to changing bear-related behavior than actual ability (i.e., capacity) to do so. Practitioners may invest resources less in persuading residents to store their garbage properly (e.g., with a garbage ordinance or ticketing) and more in facilitating residents' ability to do so (e.g., offering bear-resistant garbage cans for sale at local stores or working with garbage hauling companies to supply such cans). Because experience is such an influential variable, practitioners may invest in creating surrogate experiences, in lieu of fostering direct contact between bears and people, such as putting damaged birdfeeders or garbage cans on public display in front of garden supply stores, or supporting a network of community members who have had experiences with black bears to communicate with neighbors who have the potential to have an experience in the future. A willingness to change behavior was a key characteristic of intervention adopters, whereas experience and knowledge were not.

Individuals who may not have had experience with bears, or know much about their ecology or ethology, can still be intervention adopters. This is important information for a key human-black bear conflict stakeholder group and intervention audience: "newcomers." Stakeholders new to an area inhabited by black bears may be unaware of the potential risks associated with bears; targeting the willingness of newcomers could be more meaningful for conflict resolution, rather than inundating them with factoids via brochure or fact sheet. Practitioners may increase willingness to modify behavior using strategic messages or regulations (e.g., garbage ordinance). Alternatively, practitioners may recognize that human-black bear conflict may not be relevant to key stakeholder groups, and consider investing limited resources in issues of greater importance to publics.

## **CONCLUSIONS, RECOMMENDATIONS, AND QUESTIONS FOR CONSIDERATION**

The extent to which NYNW objectives were achieved varied. The number of complaints filed to authorities in 2005 was below average (see secondary data set), but this decrease was likely due to other factors in addition to the NYNW program (i.e., above average harvest, mast, media, other). The magnitude of these complaints decreased in 2005 as well (i.e., fewer home entries, no severe human injury), but this decrease was also likely not only due to NYNW. The program helped communities cope with living with black bears, especially Woodstock. Summative, short-term evaluation of program effects on human attitudes and behaviors within the study townships was conducted. Below is a checklist of key findings, with specific recommendations and questions for consideration.

- ✓ Implementing outreach interventions for one season only is not sufficient to generate community-level behavior change, but change may be generated at an individual-level. Over time, more change may be evidenced at a community level as more individuals adopt desired behaviors. [Evaluation about the frequency and magnitude of bear-related complaints and program effects should be done at all levels and occur for more than one year].
  - Use multiple sources of data to determine/interpret outreach intervention impact (e.g., mast crop, annual bear harvest, precipitation, media coverage).

**ASK: What data do we currently have available? What would be feasible to collect in the future?**

- Clearly articulate outreach intervention goals, and tie goals and implementation plans to realistic timeframe over which outcomes can be achieved.

**ASK: What are our goals? To reduce conflict frequency? To improve agency credibility/image?**
- Time is likely an important factor in ultimate program success or failure, but its influence is unknown at this time.

**ASK: What future research might clarify the impact of time on behavior change?**
- ✓ Implementing behavior change via intervention is most successful when it is multi-level (addresses communities and individuals at a minimum, but may also include institutions and organizations). Other interventions may be needed IN ADDITION to outreach interventions in order to reduce human-black bear conflict, especially when dealing with multiple audiences.
  - Consider regulation incentive/disincentive, or exclusion in addition to outreach interventions.

**ASK: What are the indicators of success for other interventions, such as regulations? Can the list of indicators be modified/refined?**
  - Action should be as context-specific as possible, and communicated by trusted, credible sources (e.g., local, state experts).

**ASK: Should we endorse national bear outreach programs? Do national programs match our goals? Should we expand on existing programs? Modify programs? Retain the status quo?**
- ✓ Many survey respondents made a connection between fewer black bear problems and the NYNW program. The NYNW program was context-specific and reflected local attitudes.
  - Outreach interventions designed to modify human behavior may have added value. This study (and others) show that the effect of the intervention is not always “massive.”

**ASK: What is the consensus on behavioral outcomes that would define success?**
- ✓ Willingness to change behavior was influential to all adopters. Volition may be of less importance to changing bear-related behavior than actual ability.
  - Cultivate the capacity of adopters over time in order to have long-term success with outreach intervention. See Florida Fish and Wildlife Conservation Commission’s “Bear Liaison Program.”

**ASK: How else can we reach potential adopters? Should there be Bear Forums in other parts of the state?**

➤ Invest resources less in persuading residents to store garbage (e.g., with garbage ordinance or ticket) and more in facilitating residents' ability to do so (e.g., work with local stores to offer bear-resistant garbage cans or with garbage hauling company to supply cans).

**ASK: How else can we help audiences live with bears?**

**Demonstrations? Question and answer sessions with media? Bring cameras to shadow biologists during den work? Film nuisance activity for TV?**

✓ Experience/personal relevance of the issue was influential to individuals who thought lawn sign, billboard, bear-o-meter, and magnet were effective.

➤ Invest in creating surrogate experiences: put damaged birdfeeders in front of garden-supply stores, or create a support network (i.e., internet blog, video parties) of community members who have had experiences to communicate with others who have the potential to experience bear problems in the future.

**ASK: How else can we help create positive and instructive experiences?**

➤ Newcomers may not have experience with bears (especially if they are coming from urban areas), thus, "peripheral" materials are not going to be as effective for helping them cope with living with black bears.

**ASK: How else can we reach newcomers? Who are the other audiences we need to target?**

✓ Materials vary in their effectiveness at changing behavior. A combination of peripheral and central materials is needed.

**ASK: Are there some materials from the NYNW that are worth continuing? Some materials that should be discontinued?**

In sum, the impact of the outreach intervention designed to modify bear-related human behavior was varied. Perceived acceptability and likelihood of bear-related risks, and one behavior, composting, decreased after the intervention. Town-level cognitive knowledge and willingness to change behavior remained the same in all towns after the NYNW program; encounters with black bears decreased in both treatment and reference communities. Wildlife-related outreach interventions (NYNW program or others) are not without substantial value, but, expectations of town-level behavior change may be inappropriate in the short term. That the lawn sign (a peripheral-use material) was highly recalled and judged effective by many respondents implies that the peripheral route was, in fact, dominating respondents' information processing. While this research noted changes in risk perception, these changes were not evidenced strongly in the intended consequence: adoption of desired bear-related human behaviors.

Bear-related human behavior intervention programs' content and format should focus on the experience and willingness of potential adopters, and effort should be made to ensure an outreach intervention includes well-packed, peripherally-oriented materials. Time (i.e., of program implementation and evaluation) is likely an important factor to ultimate program success or failure, although, this research did not fully explore this concept. Opportunities for dialogue about black bear management policy should be maximized; resource users or laypersons may present managers with insights about the success or failure of management activities and objectives or opinions about strategies. Discourse about risk perception constructs may provide a basis for formative process and outcome evaluation by highlighting changes or stability in congruent and divergent perceptions. Such evaluation is critical for understanding the contribution of these bear-related communication programs in achieving management goals.

Personal experience and willingness to change were found to be positively influential to human behavior change from both a population-level and an individual-level. Thus, if practitioners are interested in influencing behavior change, having a proxy (i.e., surrogate) for personal experience might be useful. Future research might address this gap by asking, does such a proxy exist? In what contexts could the proxy operate? In which could it not? What are other methods of ethically and progressively triggering individuals' sense of personal relevance, motivation or willingness, or personal experience?

This research suggests that outreach specialists and practitioners need to articulate clearly their outreach intervention goals, and tie these goals and implementation plans to a realistic timeframe over which outcomes can be achieved. Future research should focus on improving understanding of the relationship between knowledge, attitudes, and behaviors possible to achieve through outreach intervention programs. Further, this research also supports focusing intervention program content and format on the experience and willingness of intervention adopters, ensuring that the program includes well-packaged, peripherally-oriented materials, and providing experientially-based learning opportunities that relate to the reasons individuals may be willing to engage in desired behaviors. Timeframe (i.e., of program implementation and evolution, and evaluation) is likely an important factor to ultimate program success or failure; future research is needed to facilitate understanding in this area.

A lingering question is will the management and conservation challenges associated with human-wildlife conflict be eliminated? The solution to the human-wildlife conflict equation, if solved, will likely be complex and conditional. What role will outreach efforts targeting wildlife-related human behavior change play in solving the equation? What alternative methods exist to determine the effects, impacts, and future potential of such programs? More research is needed on the efficacy of outreach programs to modify human behavior and reduce conflict. Similar to this vein of inquiry, research is needed to better understand what effective alternatives exist to human behavior change programs. What is the potential of regulating desired behavior change and reducing human-wildlife conflict? What is the potential of incentive programs (e.g., awards) to reduce human-wildlife conflict? What other methods and study designs are well-suited to capture program effects and changes in human behavior?

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## APPENDIX I

### Secondary Data

Year	Total acorns per acre <sup>1</sup>	Viable acorns per acre <sup>1, 2</sup>	Orange County Bear Complaints	Ulster County Bear Complaints	Region 3 Bear Complaints
1995	29722.00	14722.00	35	102	179
1996	45619.00	37170.00	43	96	175
1997	59443.00	21238.00	72	128	295
1998	59977.00	30559.00	40	56	134
1999	0.00	0.00	70	129	245
2000	4910.00	4249.00	55	119	244
2001	74921.00	53727.00	22	44	114
2002	64430.00	29973.00	47	115	248
2003	2000.00	0.00	83	149	331
2004	23170.00	20474.00	48	261	465
2005	19158	18776	35	91	237
<b>AVE</b>	<b>38335.00</b>	<b>20989.82</b>	<b>50</b>	<b>117</b>	<b>242</b>

Year	Orange County Bear Harvest	Ulster County Bear Harvest	Region 3 Bear Harvest	Average State Temperature <sup>4</sup>	Average State Precipitation <sup>4</sup>
1995	14	33	74	45.7	35.63
1996	13	85	150	44.9	50.04
1997	28	42	116	44.8	38.55
1998	28	82	183	48.8	40.57
1999 <sup>3</sup>	32	21	88	47.2	38.47
2000	26	95	213	45.1	46.1
2001	35	46	147	47.2	33.89
2002	41	77	199	47.2	43.65
2003	62	102	298	44.8	47.59
2004	29	47	169	45.4	44.82
2005	55	112	297	46.7	45.64
<b>AVE</b>	<b>44</b>	<b>67</b>	<b>176</b>	<b>46.16</b>	<b>42.27</b>

<sup>1</sup> Acorn data includes black oak, white oak, northern red and chestnut oak. White and chestnut oak produce every year; red and black oak produce every two. Data from M. Munson, Black Rock Forest.

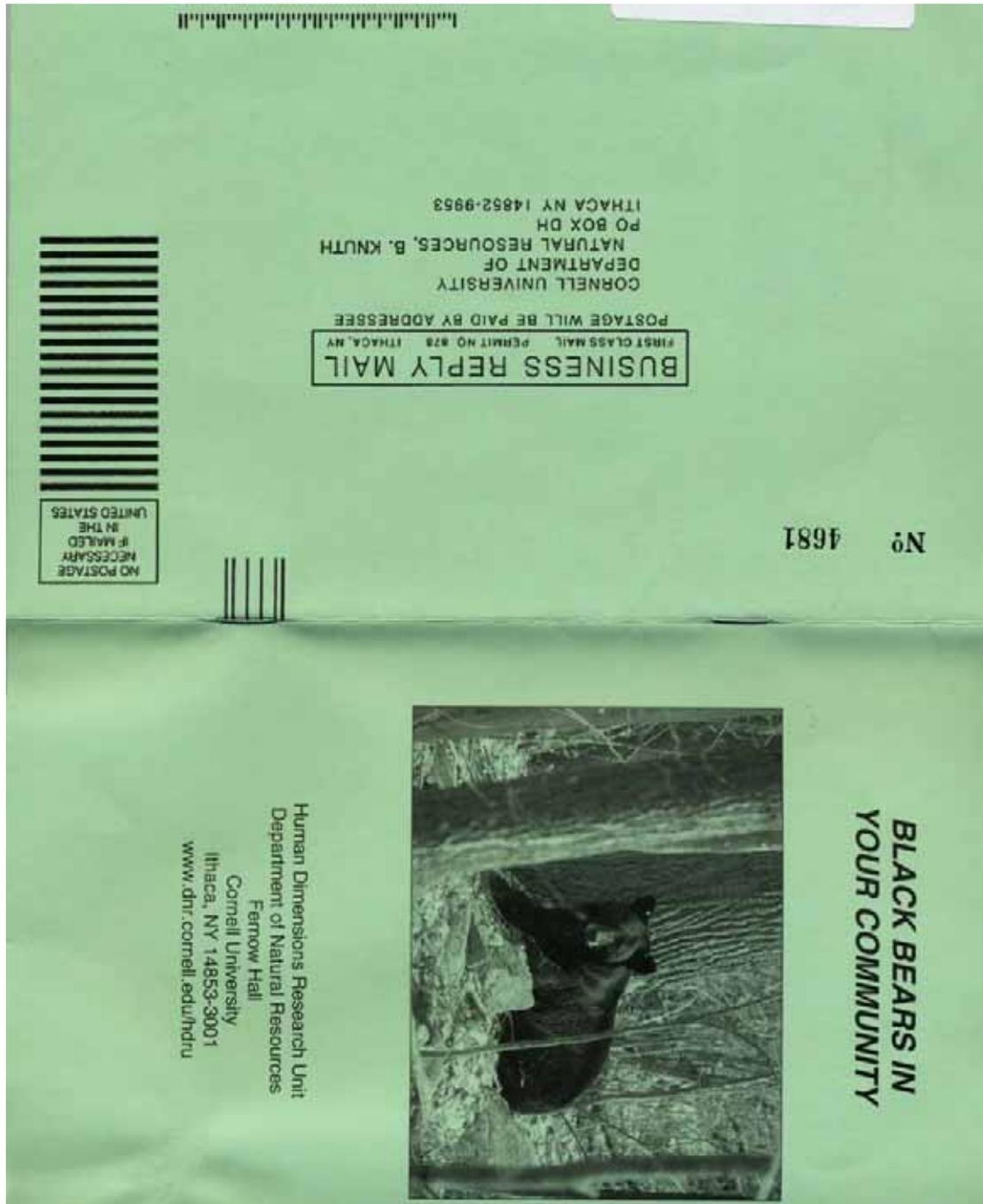
<sup>2</sup> Viable acorns refers to the applied percentage of germination potential to dry acorns. Acorns are opened to determine insect damage (i.e., discoloration, larvae present).

<sup>3</sup> No acorn crop in 1999 due to drought. This led to a crash in the weevil population which subsequently allowed for high acorn viability in 2000 and 2001.

<sup>4</sup> Temperature and precipitation data from the Northeast Regional Climate Center.

## APPENDIX II

Pre-program questionnaire, October 2004



The purpose of this questionnaire is to learn more about your attitudes about and experiences with black bears in Southeastern New York. The results will help state and local wildlife managers plan educational programs based on the interests and concerns of residents such as you. We are contacting a sample of area residents, so your views are very important to us. However, your participation is voluntary.

Please complete this questionnaire at your earliest convenience, seal it, and drop it in any mailbox (no envelope is needed); return postage has been provided. Your responses will remain confidential and will never be associated with your name. The questionnaire has an identification number so your name can be crossed off our list when you return it. Your prompt response is appreciated. **THANK YOU VERY MUCH FOR YOUR HELP!**

This project is funded by the New York State Department of Environmental Conservation and the Cornell University Agricultural Experiment Station. This project is conducted by the Department of Natural Resources, Cornell University.



Human Dimensions Research Unit



**1. Please indicate the type(s) of contact you have experienced with black bears near your home or on property you own in Southeastern New York within the past 24 months.** (Please select one response for each statement.)

**If you remember, in what month(s) and year did this contact occur?**

Saw a wild black bear at or near my home or property.       No       Yes

Saw evidence of a black bear at or near my home or property.       No       Yes

Self or family member personally threatened by a black bear at or near my home or property.       No       Yes

Had belongings damaged by a black bear at or near my home or property.       No       Yes

Have known a person to have belongings damaged by a black bear at or near my home or property.       No       Yes

Had an apiary damaged by a black bear at or near my home or property.       No       Yes

Had a black bear threaten or attack pets or livestock at or near my home or property.       No       Yes

Other (please explain): \_\_\_\_\_

2. How often do you read or hear about black bears in New York State from the following sources? (Please select one response for each statement.)

	Frequently	Sometimes	Rarely	Never
Television	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Radio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Newspaper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flyers or brochures at community locations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Internet/Web	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cornell Cooperative Extension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
New York State Department of Environmental Conservation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conservation Organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garbage/Trash Collection Company	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Town Government	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Department of Health	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sportsman's Organization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Family/Friend/Neighbor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (please specify):				

3. Please tell us about the following aspects of your home. (Please select one response for each statement.)

	Outside garage, house, or storage shed	Inside garage, house, or storage shed	Do not have	Other (please explain)
Where do you normally keep household garbage cans or bags?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Where do you normally keep pet dishes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Where do you normally keep a barbecue grill when not in use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do you normally put food scraps in a compost pile?	<input type="checkbox"/>	<input type="checkbox"/>		
Do you use a garbage collection company?	<input type="checkbox"/>	<input type="checkbox"/>		
Do you burn your garbage?	<input type="checkbox"/>	<input type="checkbox"/>		
I would like to learn more about living with black bears.	<input type="checkbox"/>	<input type="checkbox"/>		

4. How many times are you aware that black bears have come into your neighborhood since January, 2004? (These are bear sightings or interactions anywhere in your neighborhood, regardless of whether you were involved.) (Please select one response.)

- None
- 1 - 2
- 3 - 5
- 6 -10
- Over 10
- Don't know

5. Since January, 2004: (Please select one response for each statement.)

- |  | Do not have              | No                       | Yes                      | Other (please explain): |
|--|--------------------------|--------------------------|--------------------------|-------------------------|
| Have you hung a birdfeder on your property?                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | _____                   |
| Do you normally take birdfeeders inside at night?                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | _____                   |
| Have you normally harvested fruit from trees before fruit falls to the ground? | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | _____                   |
| Have you used a "bear proof" garbage container?                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | _____                   |
| Have you noticed bears in your neighbor's yard?                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | _____                   |

4

6. Over the next 12 months, how likely are you to experience the following? (Please select one response for each statement.)

- |   | Very unlikely | Somewhat unlikely | Neutral | Somewhat likely | Very likely |
|---|---------------|-------------------|---------|-----------------|-------------|
| Property damage caused by a black bear.             | 1             | 2                 | 3       | 4               | 5           |
| Have a pet or livestock threatened by a black bear. | 1             | 2                 | 3       | 4               | 5           |
| Feel personally threatened by a black bear.         | 1             | 2                 | 3       | 4               | 5           |

7. Considering what you know about bears, to what extent do you agree or disagree with the following statements? (Please select one response for each statement.)

- |  | Strongly agree | Somewhat agree | Neutral | Somewhat disagree | Strongly disagree |
|--|----------------|----------------|---------|-------------------|-------------------|
| The risk I will experience property damage caused by a black bear is acceptably low.       | 1              | 2              | 3       | 4                 | 5                 |
| The risk I will have a pet or livestock threatened by a black bear is acceptably low.      | 1              | 2              | 3       | 4                 | 5                 |
| The risk that I or a family member will feel threatened by a black bear is acceptably low. | 1              | 2              | 3       | 4                 | 5                 |

5

**8. To what extent do you agree or disagree with the following statements about bears? (Please select one response for each statement.)**

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
My neighbor's actions increase my chance of having problems with black bears.	1	2	3	4	5
I rely on the state wildlife agency to manage problems involving black bears.	1	2	3	4	5
The risks from black bears are increased by my community's development.	1	2	3	4	5
I seek out opportunities to observe black bears.	1	2	3	4	5
I feel helpless in the face of problems caused by black bears.	1	2	3	4	5
I enjoy knowing black bears live near my community.	1	2	3	4	5
Black bears are predictable.	1	2	3	4	5
I consider property damage under \$200 caused by a black bear to be serious.	1	2	3	4	5

6

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
I trust the state wildlife agency to manage problems associated with black bears.	1	2	3	4	5

Problems involving black bears are increased by environmental factors (e.g., drought, snow, and/or lack of natural food.)	1	2	3	4	5
---	---	---	---	---	---

I worry about the risk of a black bear causing a family member physical harm.	1	2	3	4	5
---	---	---	---	---	---

Any evidence of a black bear in a residential area is a serious issue.	1	2	3	4	5
--	---	---	---	---	---

The state wildlife agency is actively managing the risks from black bears.	1	2	3	4	5
--	---	---	---	---	---

I feel I have control over the risks posed by black bears.	1	2	3	4	5
--	---	---	---	---	---

I worry about the risk of a black bear causing me physical harm.	1	2	3	4	5
--	---	---	---	---	---

Black bear management is important to me.	1	2	3	4	5
---	---	---	---	---	---



7

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
I trust wildlife managers to protect human safety related to human-bear interactions.	1	2	3	4	5
Evidence of black bears is rare in my community.	1	2	3	4	5
I hope to have a black bear on my property within the next year.	1	2	3	4	5
I am satisfied with the way black bears are managed in my community.	1	2	3	4	5
I will be afraid if black bears come near my home.	1	2	3	4	5
I seek opportunities to view black bears in my community.	1	2	3	4	5
The state wildlife agency resolves problems with black bears.	1	2	3	4	5
I know how to keep black bears away from my home.	1	2	3	4	5
If the black bear population increases, human-bear interactions will increase.	1	2	3	4	5
	8				

**9. Please indicate whether you think each statement below is true or false. This information will be used to plan educational programs about black bears. (Please select one response for each statement.)**

	True	False	Don't know
A New York black bear's diet consists mostly of plants.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears kill a large number of pets in areas where bears live close to humans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears avoid humans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears can easily climb trees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears may lose up to a third of their body weight during hibernation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mother black bears typically defend their cubs from humans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears can have litters of up to five cubs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears are most active at night.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears are in danger of becoming extinct in New York.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



9

**10. Please tell us about actions you would be willing to take to prevent bear problems near your home. (Please select one response for each statement.)**

Would you be willing to purchase a "bear-proof" garbage container?

Unwilling      Somewhat unwilling      Neutral      Somewhat willing      Very willing

Because some black bears are attracted to birdfeeders, would you be willing to refrain from feeding birds from late spring through early summer?

Would you be willing to contribute to a community fund targeted toward reducing local black bear problems?

Would you be willing to contact someone for help if you had a black bear problem on your property?



10

**Please tell us about your background so we can better understand your responses. All information is confidential.**

**11. How many years have you lived in your current county of residence?**

\_\_\_\_\_ Years

**12. What year were you born?**

19 \_\_\_\_\_

**13. Are you:**

Male      Female

**14. Are you a member of a conservation organization?**

No   
 Yes (please specify):  \_\_\_\_\_

**15. Please circle your highest completed level of education.**

- 1 Less than high school
- 2 Completed high school or GED
- 3 Vocational or trade school
- 4 Some college
- 5 Two-year degree
- 6 Four-year degree
- 7 Graduate school

11

16. How many people under age 18 live in your household?  
(Please select one response.)

- None
- 1 - 2
- 3 - 4
- Over 5

17. Many people derive all or part of their income from farming or are hobby farmers (less than \$1,000 in gross sales per year). Do you participate in farming activities? (Please select "yes" or "no.")

(Please check all that apply)

No  Yes  →  Livestock

Orchards

Bees

Grain

Vegetables

Other (please specify): \_\_\_\_\_

12

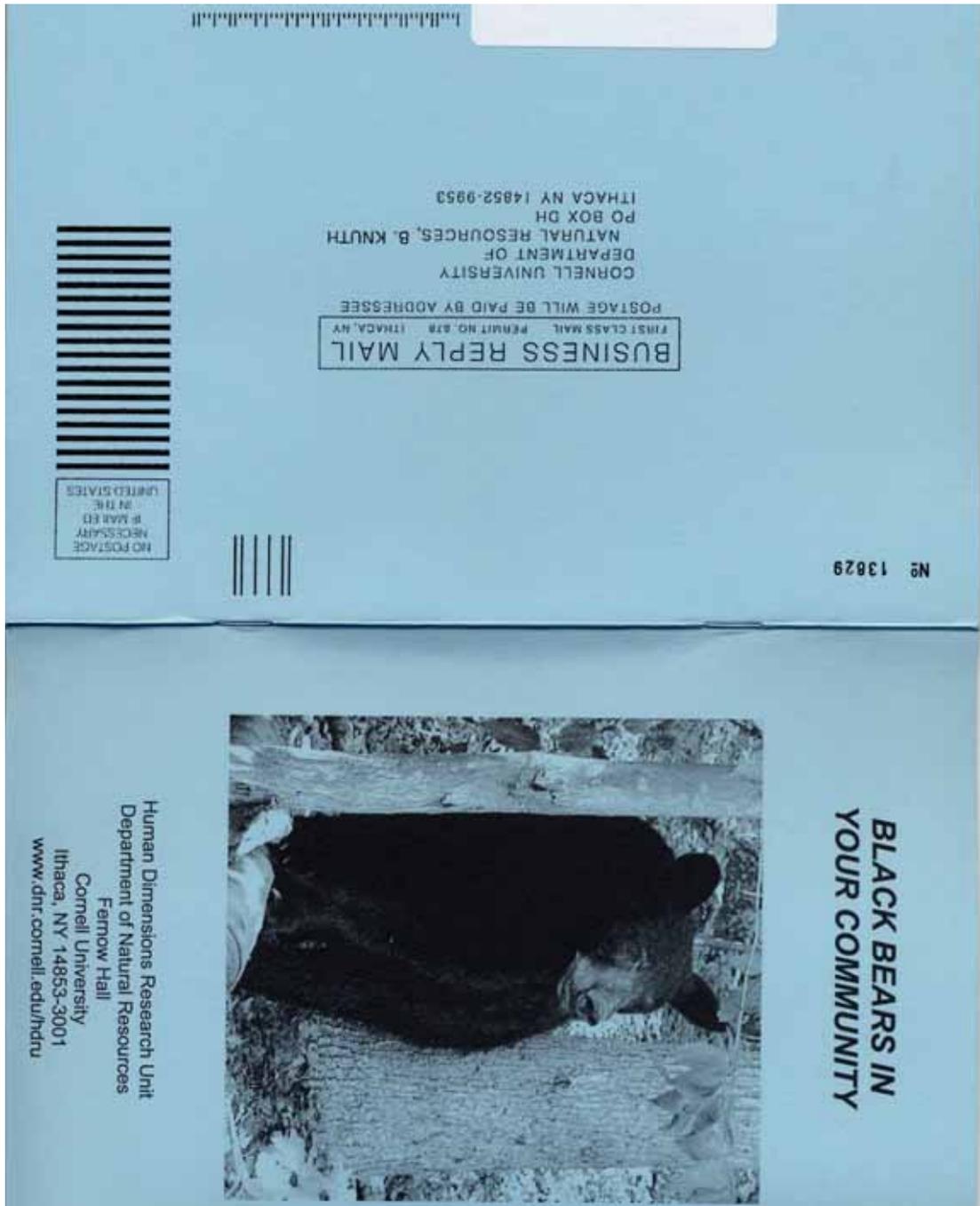
Please use the space below for any additional comments you wish to make.

**THANK YOU FOR YOUR TIME AND EFFORT!**  
To return this survey, please seal it using the white resealable label (postage has been provided) and drop it in the nearest mailbox.



# APPENDIX III

Post-program questionnaire, October 2005



The purpose of this questionnaire is to learn more about your attitudes about and experiences with black bears in Southeastern New York. The results will help state and local wildlife managers plan educational programs based on the interests and concerns of residents such as you. We are contacting a representative sample of area residents, so your response is very important to us. However, your participation is voluntary.

Please complete this questionnaire at your earliest convenience, seal it, and drop it in any mailbox (no envelope is needed), return postage has been provided. Your responses will remain confidential and will never be associated with your name. The questionnaire has an identification number so your name can be crossed off our list when you return it. Your prompt response is appreciated. **THANK YOU VERY MUCH FOR YOUR HELP!**

This project is funded by the New York State Department of Environmental Conservation and the Cornell University Agricultural Experiment Station. This project is being conducted by the Department of Natural Resources, Cornell University.



Human Dimensions  
Research Unit

**1. Please indicate the type(s) of contact you have experienced with black bears near your home or on property you own in southeastern New York within the past 12 months. (Please select one response for each statement.)**

	No	Yes	If you remember, in what month(s) did this contact occur?
Saw a wild black bear at or near my home or property.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Saw evidence of a black bear at or near my home or property.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Self or family member personally threatened by a black bear at or near my home or property.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Had belongings damaged by a black bear at or near my home or property.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Have known a person who had belongings damaged by a black bear at or near my home or property.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Had an apriary damaged by a black bear at or near my home or property.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Had a black bear threaten or attack pets or livestock at or near my home or property.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other (please explain)	_____		

2. The "New York NeighBEARhood Watch Program" is an education program designed to help people understand more about bear behavior and how to decrease bear-related problems. Please tell us if you recall seeing any of the program materials, and if you did see them, how effective the information was in helping you cope with living with bears. (Please circle one response for each item.)

Do you recall seeing a...

Brochure, called "Living with Bears"



Yes No Do not know

How effective was the information? not at all somewhat very no opinion

Lawn Sign, saying, "I'm a good NeighBEAR..."



Yes No Do not know

How effective was the information? not at all somewhat very no opinion

Poster, about bears in your neighborhood



Yes No Do not know

How effective was the information? not at all somewhat very no opinion

Billboard about bear problems



Yes No Do not know

How effective was the information? not at all somewhat very no opinion

Fact Sheet about black bears



Yes No Do not know

How effective was the information? not at all somewhat very no opinion

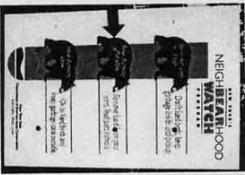
Magnet about being a good NeighBEAR



Yes No Do not know

How effective was the information? not at all somewhat very no opinion

BEAR-o-meter, indicating the level of bear activity in the area



Yes No Do not know

How effective was the information? not at all somewhat very no opinion

Article reprint from "Conservationist Magazine" about black bears in New York



Yes No Do not know

How effective was the information? not at all somewhat very no opinion

3. Do you recall reading or hearing a story about the NeighBEARhood Watch Program? (Please check all that apply.)

- In a newspaper (printed or on line)  No  Yes  Do not know
- On the radio
- On TV
- From a friend, family member, or neighbor
- Other (Please explain) \_\_\_\_\_

4. Overall, do you feel the information presented in the NeighBEARhood Watch Program materials was credible? (Please select one response.)

not at all somewhat very no opinion

5. How concerned are you about black bears in your neighborhood? (Please select one response.)

not at all somewhat very no opinion

6. Overall, how important do you feel it is to have a healthy bear population in New York? (Please select one response.)

not at all somewhat very no opinion

7. To what extent do you agree or disagree with the following statements about bears? (Please select one response for each statement.)

Strongly agree Somewhat agree Neutral Somewhat disagree Strongly disagree

The state wildlife agency resolves problems people have with black bears. 1 2 3 4 5

I trust the state wildlife agency to manage problems associated with black bears. 1 2 3 4 5

Problems involving black bears are increased by environmental factors (e.g., drought, snow, lack of natural food.) 1 2 3 4 5

I worry about the risk of a black bear causing a family member physical harm. 1 2 3 4 5

Any evidence of a black bear in a residential area is a serious issue. 1 2 3 4 5

If the black bear population increases, human-bear interactions will increase. 1 2 3 4 5

	<b>Strongly agree</b>					
	<b>Somewhat agree</b>					
	<b>Neutral</b>					
	<b>Somewhat disagree</b>					
	<b>Strongly disagree</b>					

Black bears are predictable.	1	2	3	4	5
------------------------------	---	---	---	---	---

I trust wildlife managers to protect human safety related to human-bear interactions.	1	2	3	4	5
---	---	---	---	---	---

Evidence of black bears is rare in my community.	1	2	3	4	5
--	---	---	---	---	---

I hope to have a black bear on my property within the next year.	1	2	3	4	5
--	---	---	---	---	---

I am satisfied with the way black bears are managed in my community.	1	2	3	4	5
--	---	---	---	---	---

I will be afraid if black bears come near my home.	1	2	3	4	5
--	---	---	---	---	---

	<b>Strongly agree</b>				
	<b>Somewhat agree</b>				
	<b>Neutral</b>				
	<b>Somewhat disagree</b>				
	<b>Strongly disagree</b>				

The state wildlife agency is actively managing the risks from black bears.	1	2	3	4	5
--	---	---	---	---	---

I feel I have control over the risks posed by black bears.	1	2	3	4	5
--	---	---	---	---	---

I worry about the risk of a black bear causing me physical harm.	1	2	3	4	5
--	---	---	---	---	---

Black bear management is important to me.	1	2	3	4	5
---	---	---	---	---	---

I consider property damage under \$200 caused by a black bear to be serious.	1	2	3	4	5
--	---	---	---	---	---

I seek opportunities to view black bears in my community.	1	2	3	4	5
---	---	---	---	---	---

I enjoy knowing black bears live near my community.	1	2	3	4	5
---	---	---	---	---	---

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
My neighbor's actions increase my chance of having problems with black bears.	1	2	3	4	5
I rely on the state wildlife agency to manage problems involving black bears.	1	2	3	4	5
The risks from black bears are increased by my community's development.	1	2	3	4	5
I seek out opportunities to observe black bears.	1	2	3	4	5
I feel helpless in the face of problems caused by black bears.	1	2	3	4	5
I know how to keep black bears away from my home.	1	2	3	4	5



**8. To what extent do you agree or disagree with the following statements? (Please select one response for each statement.)**

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
The risk that I will experience property damage caused by a black bear is acceptably low.	1	2	3	4	5
The risk that I will have a pet or livestock threatened by a black bear is acceptably low.	1	2	3	4	5
The risk that I or a family member will feel threatened by a black bear is acceptably low.	1	2	3	4	5

**9. Please indicate whether you think each statement below is true or false. This information will be used to plan future educational programs about black bears. (Please select one response for each statement.)**

	True	False	Do not know
A New York black bear's diet consists mostly of plants.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears kill a large number of pets in areas where bears live close to humans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears avoid humans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears can easily climb trees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears may lose up to a third of their body weight during hibernation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mother black bears typically defend their cubs from humans.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears can have litters of up to five cubs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears are most active at night.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Black bears are in danger of becoming extinct in New York.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**10. Please tell us about the following aspects of your home during the past 6 months. (Please circle one response for each statement.)**

I keep household garbage cans or bags...	Outside garage or house	Inside garage or house	Do not have
Is this a recent change (in the past 6 months?)	No	Yes →	Why: _____
I normally keep pet dishes...	Outside garage or house	Inside garage or house	Do not have
Is this a recent change (in the past 6 months?)	No	Yes →	Why: _____
I normally keep a barbecue grill...	Outside garage or house	Inside garage or house	Do not have
Is this a recent change (in the past 6 months?)	No	Yes →	Why: _____
Do you normally put food scraps in a compost pile?	No	Yes	Do not have
Is this a recent change (in the past 6 months?)	No	Yes →	Why: _____
Do you use a garbage collection company?	No	Yes	Do not have
Is this a recent change (in the past 6 months?)	No	Yes →	Why: _____
Do you burn your garbage?	No	Yes	Do not have
Is this a recent change (in the past 6 months?)	No	Yes →	Why: _____
Do you hang a bird feeder?	No	Yes	Do not have
Is this a recent change (in the past 6 months?)	No	Yes →	Why: _____

Do you normally take bird feeders in at night?	No	Yes	Do not have
Is this a recent change (in the past 6 months?)	No	Yes →	Why: _____
Have you harvested fruit from trees before fruit falls to the ground?	No	Yes	Do not have
Is this a recent change (in the past 6 months?)	No	Yes →	Why: _____
Have you used a "bear resistant" garbage container?	No	Yes	Do not have
Is this a recent change (in the past 6 months?)	No	Yes →	Why: _____

**11. Over the next 12 months, how likely are you to experience the following? (Please select one response for each statement.)**

Property damage caused by a black bear.	1	2	3	4	5
Have a pet or livestock threatened by a black bear.	1	2	3	4	5
Feel personally threatened by a black bear.	1	2	3	4	5

**12. Please tell us about actions you would be willing to take to prevent bear problems near your home. (Please select one response for each statement.)**

Purchase a "bear-proof" garbage container?	Unwilling	Somewhat unwilling	Neutral	Somewhat willing	Very willing
Refrain from feeding birds from late spring through early fall?	<input type="checkbox"/>				
Contact someone for help if you had a black bear problem on your property?	<input type="checkbox"/>				

13. How many times are you aware that black bears have come into your neighborhood since January, 2005? (These are bear sightings or interactions anywhere in your neighborhood, regardless of whether you were involved.) (Please select one response.)

- None \_\_\_\_\_ 6 - 10 \_\_\_\_\_  
1 - 2 \_\_\_\_\_ Over 10 \_\_\_\_\_  
3 - 5 \_\_\_\_\_ Don't know \_\_\_\_\_

Please tell us about your background so we can better understand your responses. All information is confidential.

14. How many years have you lived in your current county of residence? \_\_\_\_\_ Years

15. In what year were you born? 19 \_\_\_\_\_

16. Are you male or female?

\_\_\_\_\_ Male \_\_\_\_\_ Female

17. Are you a member of a conservation organization?

No  Yes (please specify):  \_\_\_\_\_

18. Please circle your highest completed level of education.

- 1 Less than high school
- 2 Completed high school or GED
- 3 Vocational or trade school
- 4 Some college
- 5 Two-year degree
- 6 Four-year degree
- 7 Graduate degree

19. What kind of work do you do (did you do on your last regular job)?

Occupation: \_\_\_\_\_

20. Do you (does your family) own this house (apartment)? (Please check one response.) \_\_\_\_\_ Yes \_\_\_\_\_ No

21. Which best describes where you spent most of your time growing up? (Please select one answer.)

- \_\_\_\_\_ Grew up on a farm
- \_\_\_\_\_ Grew up in country-side but not on a farm
- \_\_\_\_\_ Small town (less than 5,000)
- \_\_\_\_\_ Small city (5,000 to 50,000 people)
- \_\_\_\_\_ Large city (over 50,000 but less than 300,000)
- \_\_\_\_\_ Very large city (300,000 people or more)
- \_\_\_\_\_ I grew up in more than one area with different sized population

Please use the space below for any additional comments you wish to make.

THANK YOU FOR YOUR TIME AND EFFORT!

To return this survey, please seal it using the white resealable label (postage has been provided) and drop it in the nearest mailbox.

