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Risk Communication Associated with Bat-Related Service Calls

Exploratory interviews

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EXECUTIVE SUMMARY

When residential and commercial property owners need assistance removing and excluding bats, they often call a wildlife control operator (WCO). Bat-related service calls present WCOs with opportunities to communicate about threats bats pose to humans and conservation threats humans pose to bats. In 2020 and 2021, we completed personal interviews with 16 WCOs who served residential and commercial clients in upstate New York, focusing especially on counties with confirmed cases of white-nose syndrome (WNS) in bats. The purpose of this exploratory, qualitative study was to: (1) document the range of WCO's formal and informal risk communication efforts, and (2) improve understanding of WCO client's bat-related concerns, beliefs, and attitudes when they discover bats in their home or other structures.

The WCOs we interviewed had a wide range of experience responding to bat-related service calls. Five interviewees (31%) noted that they had done little work with bats in recent years (attributing the decline to reduction of bat populations associated with WNS). We interviewed two WCOs who dealt exclusively with bat-related service calls and did a large volume of work with residential and commercial clients who needed bat exclusion and bat-proofing services. We asked WCOs about the concerns and beliefs their clients expressed during bat-related service calls. Across interviewees, a few consistent themes emerged. Most interviewees said that fear of being exposed to or contracting rabies was the most common specific concern that clients expressed on bat-related service calls. Along with a fear of contracting rabies, interviewees said that their typical client had a generalized fear of bats and high anxiety about any interactions with bats inside a house. Aside from rabies, there was concern about health risks associated with bat droppings. Although the majority of clients did not want bats to be harmed, WCOs told us that client questions about risks to bat populations or conservation of bats were uncommon. WCOs also noted that their clients were sometimes frustrated to learn that WCOs cannot remove bat colonies at certain times of the year. In summary, interviews suggest that dealing with client fears, anxieties, and frustrations is an integral part of bat-related service calls.

Interview comments suggested that WCOs consistently communicated two related messages about bats and rabies: (1) very few bats have rabies, (2) but if people or pets were exposed to a bat, the bat should be captured, euthanized, and tested for rabies (WCOs also communicated that in cases where people or pets were exposed to a bat that cannot be tested for rabies, the humans/pets exposed to the bat should seek medical attention for possible exposure to rabies). Communication about rabies testing followed a script of questions and protocol from the NYS Department of Health, which WCOs are required to follow.

Interview comments suggest that WCOs delivered two different kinds of messages about human health risks associated with bat guano: some clients were told that bat droppings posed little risk to people and could be left undisturbed, other clients were told that bat droppings posed a significant risk to humans and should be removed. Messaging depended in part on context (i.e., location and amount of guano) and in part on types of services offered by the wildlife control business responding to the call.

At the outset of our study, we had hypothesized that some of the conversations transpiring between WCOs and property owners include exchange of information about threats bats pose to people. Interview data supported that hypothesis: WCOs were serving as risk communicators on topics related to rabies. Interviews suggest that WCOs routinely communicated about rabies because: (1) it is central to clients' greatest concern (i.e., that the bats in their house are rabid and threaten their family members or pets), (2) clients specifically asked them questions about rabies, and (3) they were required to follow NYSDOH protocols for exposure to rabies vector species. Our interviews suggest that WCOs are acting as more than just informal risk communicators; the need to communicate with their clients about NYS laws designed to protect public health and conserve bat maternity roosts obligates WCOs to take on a formal risk communication role on the topic of rabies.

Whether WCOs recognize it or not, they do serve as formal and informal risk communicators. WCOs are in a position to dampen or elevate their clients' rabies-related risk perceptions. Given that the main concern of clients and the main risk communication by WCOs focuses on rabies, WCOs may be receptive to materials or training opportunities that would help them to educate the public about rabies and rabies prevention. Providing information and/or training experiences for WCOs could help ensure consistent messaging about bats and rabies.

Although WCOs may not characterize themselves as risk communicators, some think of themselves as environmental educators: they provide information about basic aspects of wildlife behavior and natural history. WCOs send the message that they use nonlethal bat exclusion techniques because bats are valuable for insect control and bats are "good" for the environment. Our findings suggest that WCOs may be receptive to information or training opportunities that would help them to promote accurate perceptions of bat behavior and increase awareness of bat-related benefits to people.

We had also hypothesized that some of the conversations transpiring between WCOs and property owners include exchange of information about threats people pose to bats. We found some support for that hypothesis. WCOs often communicated with their clients about the welfare of individual bats that the WCO was removing or excluding. Several WCOs noted that their typical client did not want any bats killed during the removal/exclusion process. WCOs

provided information and experiences that made their clients feel less threatened by bats. Once a WCO has reduced a client's fear of bats, clients who already feel empathy for the welfare of individual bats may be receptive to messages about threats to bat populations and the need for bat conservation.

To summarize, this study was motivated by our interest in determining whether WCOs do or could serve as communicators of balanced health and conservation messages about bats. While WCOs communicate with homeowners about bats, their messages are largely shaped by client interests and concerns. To that end, WCOs often communicate information about the health risks posed by bats to people, and that information often alleviates client concerns about bats. Given that so few clients express concerns about conservation of bat populations during a bat service call, opportunities to and incentives for WCOs to communicate with clients about conservation of bat populations appear to be very limited. It seems unlikely that WCOs could be persuaded to devote additional time during service calls to discuss bat conservation. Nevertheless, messages from WCOs may ultimately benefit bat conservation, by alleviating concerns that influence the way people perceive and respond to bats.

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INTRODUCTION

Historically, Cooperative Extension Service, state fish and wildlife agency, and federal wildlife damage control employees provided information, consultation and direct assistance to homeowners and business owners experiencing problems with wildlife (Bollengier, 1987; San Julian, 1987). But in the 1980s, state and federal agencies stopped providing nuisance wildlife removal services, and a private sector nuisance wildlife control industry emerged to provide fee-based services to homeowners seeking assistance with removal of small mammals, birds, and reptiles (Miller, 2007). Over time, states established permit systems to regulate and monitor wildlife control operators (WCOs), Cooperative Extension professionals developed training curricula and licensing exams for WCO's (Curtis et al., 2006; Curtis et al. 2015), and trade groups formed to support professional development of WCOs.

Wildlife control operators in New York State are required to pass an exam and pay a license fee to obtain a nuisance wildlife control operator license from the NYS Department of Environmental Conservation (NYSDEC). The number of WCOs in New York State increased rapidly in the 1980s and 1990s (Curtis, 1995). There were more than 1,200 WCOs in New York State in 2019.

Bats are among the species prompting calls to WCOs. Bat exclusion services became common in the 1990s, following development of specialized products and training. Wildlife control operators provide bat removal and exclusion services within regulatory sideboards, including state regulations on handling rabies vector species, laws on pesticide application, New York State Environmental Conservation law, and state and federal endangered species law.

Bat populations in New York State (and North America generally) are threatened by the spread of white-nose syndrome (WNS), a highly contagious disease among bats caused by the fungus *Pseudogymnoascus destructans* (Blehert et al., 2009). Since it was first detected in upstate New York in 2006, WNS has caused the largest die-off of bats in North American history; more than 6 million bats have died due to the disease, which has mortality rates higher than 90% for some species (Froschauer & Coleman, 2012). Scientists have documented the rapid and continuing spread of WNS across the U.S. (<https://www.whitenosesyndrome.org/spreadmap>).

Protecting bat populations, especially maternal bat colonies, has taken on increased importance with the spread of WNS. Loss of robust bat populations affects people because bats provide economic and ecosystem services (Ghanem & Voight, 2012; Kasso & Balakrishnan, 2013, Kunz et al., 2011; Maine & Boyles, 2015), including suppression of insect populations. Bats are prodigious consumers of insects that cause crop damage or serve as vectors for disease transmission to humans (Ducummon, 2000; Kunz et al., 2011).

But encouraging positive attitudes toward bats and their conservation is complicated, because human-bat interactions bring potential human health risks. Bats are susceptible to a wide range

of viruses, bacteria, fungi, and parasites with zoonotic potential for humans and domestic animals (Letko et al., 2020; Mühldorfer, 2013). Potential for transmission of the rabies virus from bats to humans is frequently communicated by state health departments and is likely the human health risk topic most familiar to lay audiences. In addition to Lyssaviruses, such as rabies, bats can serve as hosts for a range of coronaviruses, such as the virus that causes severe acute respiratory syndrome (SARS). Bats have also been found to host Ebola viruses. Bat feces can contain bacterial pathogens common in human diseases (e.g. Salmonella) and spores from the fungus that causes histoplasmosis. The linkages between bats and specific zoonotic disease outbreaks is often unclear, and scholars argue that communication or miscommunication about such linkages can heighten fear and misunderstanding of bats (López-Baucells et al., 2018). Thus, communication (and miscommunication) about bat-related health risks to humans have important implications for bat conservation.

The ways that property owners respond when they discover bats within a home or other building have implications for bat conservation and public health. If bats are using a structure as a maternity roost and are excluded mid-season, the young pups not ready to fly may perish inside the building. If bats are not excluded from areas frequented by people and pets, there may be a higher chance of exposure to rabies.

Interactions between WCOs and property owners during bat service calls offer opportunities for communication about threats bats pose to humans and conservation threats humans pose to bats, but this communication may or may not occur. In this study, we sought to determine whether and to what extent WCOs communicate with property owners about the risks to and from bats.

We are not aware of any previous research focused on risk communication exchanges between WCOs and the residential property owners who call them for assistance with bat issues. Very few studies have focused on WCO's. Barnes (1993) surveyed WCO's in Kentucky to characterize their training and techniques. Barnes (1995) surveyed attendees of a WCO short-course to assess their support for state-mandated education, licensing, and insurance requirements and their attitudes regarding fate of live-trapped nuisance wildlife. Curtis et al. (1995) reviewed 1989-90 activity logs of WCOs in New York to determine the species handled, disposition and location of animals handled, and economic impact of the nuisance wildlife control industry in New York.

Liesener et al. (2006) provide some insights about bat-related risk communication by professionals other than WCOs. They conducted a telephone survey of the 437 Minnesota residents who submitted a bat to the Minnesota Department of Health for rabies testing in 2003 (351 residents completed an interview, 80% response rate). Liesener et al. (2006) identified animal control officers, veterinarians and health care providers as primary sources of information about the risks of bat exposures and the availability of rabies testing. In particular,

they found that, “In areas where they are available, animal control officers play a key role in informing individuals of the rabies risk associated with exposure to bats” (Liesener et al. 2006, page 214). They suggested that, “Health departments might assist animal control agencies with staff training to help them deliver up-to-date rabies prevention messages to the public” (Liesener et al. 2006, page 214).

Study Objectives

Objective 1: Document the range of WCOs’ formal and informal risk communication efforts.

Our first objective was to use open-ended personal interviews with WCOs to characterize the nature and degree of informal risk communication that occurs when WCOs assist property owners with bat-related complaints. Rickard (2011, page 645) describes informal risk communicators who work in occupational settings that pose potential health risks to themselves and those they serve, and may provide risk information to the public as a secondary part of their job. She described commercial pesticide applicators as an example of an occupational group who are informal risk communicators. The herbicides and pesticides that pest control and lawn care professionals apply to turf grass can present cancer risks to themselves and their clients. Risk communication is not the primary job responsibility of pest control or lawn care professionals, but they convey information about risks of herbicide and pesticide application to property owners, both through behavior (e.g., use/disuse of personal protective equipment, signage on treated lawns) and brief conversations with property owners about the human health risks associated with herbicide or pesticide application (Dantzker et al., 2010). Rickard (2011, page 643) notes that informal risk communicators may not: (1) have any training in risk communication, (2) think of themselves as “risk communicators,” or (3) believe they have any obligation to ensure that the public learns about or understands particular threats.

In the planning stage of this project, we hypothesized that WCOs knowingly or unknowingly serve as informal communicators about threats to and from bats when they respond to bat service calls. The primary job responsibilities of a WCO are to alleviate bat-related complaints, not provide risk information about bats. WCOs may not think of themselves as being responsible for educating property owners about the threats bats present to people or the conservation threats that people pose to bats. Nevertheless, they represent a property owner’s most direct contact with a person with bat-related expertise, and WCO service calls have the potential to provide a unique learning opportunity when property owners are motivated to seek information on how to resolve a bat-related problem. We hypothesized that some of the informal conversations transpiring between WCOs and property owners could include exchange

of information about threats bats pose to people and conservation threats people pose to bats. We believed we could explore these hypotheses through interviews with WCOs designed to better understand the types of messages WCOs convey to property owners about threats to people and threats to bats.

Objective 2: Improve understanding of WCO clients' bat-related concerns, beliefs, and attitudes when they discover bats in their home or other structures, and their receptivity to information about bats and recommendations for managing bats in residential buildings.

Our second objective was to interview WCOs as informants about the beliefs, concerns, and attitudes of residential property owners who encounter individual bats or colonies of bats. Species of wildlife that are threatened by humans and also threatening to humans (e.g., sharks, large terrestrial carnivores) are often depicted in mass media as both vulnerable and threatening; depicting these species as “scary victims” can send mixed messages that make conservation of those species more challenging (Bomieri et al., 2018; Muter, Gore, Gledill, Lamont, & Huveneers, 2013). Bats in New York may also be portrayed as scary victims because bats pose health risks to people (rabies, histoplasmosis), but bats are also in jeopardy because of white-nose syndrome (WNS) and people's actions can exacerbate or reduce threats to bats. WCOs could serve as key informants about whether residential property owners perceive bats as scary, but threatened (by habitat loss, disease spread, or exclusion from buildings at the wrong time of year). We believed WCO interviews could shed light on how property owners' may modify their beliefs about bats due to interaction with a WCO.

METHODS

Sampling Approach

Our study area was eastern New York State. We prioritized the 14 counties where white-nose syndrome (WNS) had been confirmed by 2020 (i.e., Albany, Clinton, Columbia, Essex, Franklin, Hamilton, Montgomery, Orange, Putnam, Schoharie, Sullivan, Ulster, Warren, and Washington counties), but we sampled other counties, as well.

NYSDEC maintains a list of licensed WCOs. We began our sampling process by screening the list of licensed WCOs to identify providers of bat removal services in all 14 counties in New York where WNS has been detected. We reviewed all available WCO websites in each county to identify WCOs who listed bat removal or exclusion as one of their business services. Through this process we identified 33 individual WCOs in 23 different businesses who listed bat removal as a service. We used this set of 33 individuals as our initial sample. We completed 7 interviews before exhausting the original sample, then we expanded our sampling approach to complete

additional interviews with WCOs. We expanded the sampling approach by adding counties across eastern New York. As we exhausted the list of WCOs in a given county, we would move on to listings in another county in eastern New York.

In March 2020, we attended a meeting of wildlife control operators held by the New York State Wildlife Management Association (NYSWMA). Discussions with NYSWMA officers and meeting attendees helped inform development of the interview protocol. Two WCOs who volunteered to participate in the study were later interviewed, even though they did not work in eastern New York.

Data Collection and Analysis

We collected data through telephone interviews. Our goal was to conduct interviews until information became redundant, or until we reached a target of 20 interviews. We completed 10 interviews between May and October, 2020, and 6 more interviews in March, 2021. We made a decision to stop the process after completing 16 interviews, because interviews were not producing novel information. Only one WCO refused to be interviewed, but it was difficult to reach members of the target audience (i.e., active WCOs who dealt with bat-related service calls). Outcome of attempts to reach WCOs is shown in Table 1.

We followed an interview guide that contained a series of background and open-ended questions (Appendix A). Interviews started with background questions to establish the counties a WCO served, the extent to which their WCO work focused on bats, the bat-related services they offered, and how they developed their professional expertise. We asked a series of questions about how WCOs deal with personal safety, which were included to explore whether WCOs were communicating risk messages unintentionally through their actions. Next, we asked WCOs to describe their clients' bat-related concerns, beliefs, and attitudes, and to describe how each interviewee responded to clients' concerns. Questions about how WCOs responded to client concerns were intended to provide insights about WCOs' bat-related beliefs and attitudes, information sources, and messages they do or do not communicate about bat-related risks and bat conservation. We transcribed the interview recordings and reviewed transcripts to identify: the range of clients' concerns and attitudes, types of messages WCOs communicated to clients, and how WCOs believed their messages affected clients. We synthesized information directly related to our research questions and identified message themes across interviews.

Table 1. Outcome of attempts to call wildlife control operators (WCOs) to complete an interview.

Outcome	n
Interview completed	16
Left a message, WCO did not return call	27
Automated answering service (# owner not identified), no message left	15
WCO willing to do interview, but did no bat-related service calls	13
Telephone number out of service/wrong telephone number	13
Voice mail for a pest control business, did not leave a message	8
Busy signal/did not pick up after 7 rings	5
No longer a WCO	2
Refused to be interviewed	1
Total	100

RESULTS

Interviewees provided wildlife control services in at least 30 counties, including all counties with confirmed cases of WNS at the time of the study (Table 2). Six interviewees were part-time WCOs; the rest were full-time WCOs. A few of the WCOs we interviewed (n=3) provided pest control services¹ to residential or commercial clients; pest control was their primary business, but they also occasionally provided wildlife removal and exclusion services. The majority of WCOs interviewed (n=11) served mainly residential clients, but all had some commercial clients. Most of those interviewed (n=11) were involved primarily in excluding bats living in a home and bat-proofing homes so that bats could not return. A few of the WCOs we interviewed only dealt with removal of single bats that had entered a living space (they referred homeowners to others for bat-proofing services). The WCOs we interviewed had a wide range of experience responding to bat-related service calls. Five interviewees (31%) noted that they had done little

¹ Pest control involves physical, mechanical, and chemical actions to remove or exterminate small rodents (e.g., Norway rat, house mouse) and insect pests (e.g., termites, ants, wasps, bees, roaches, bed bugs).

work with bats in recent years (attributing the decline to reduction of bat populations associated with WNS). Two interviewees (13%) dealt exclusively with bat-related service calls and did a large volume of bat-exclusion work with residential and commercial clients.

WCOs told us that they developed their professional expertise through a combination of formal training, on-the-job training, and personal experience (learning what works through trial and error). They sought out formal and informal training both to obtain their WCO license and to learn their trade. Multiple interviewees mentioned formal training resources that were valuable to them, including New York State Wildlife Management Association (NYSWMA) and National Wildlife Control Operators Association (NWCOA) seminars and workshops, the Cornell Integrated Pest Management manual, and internet resources. Multiple interviewees mentioned that formal training in other fields was also helpful. The fields mentioned included pest management, home building trades, wildlife management, and environmental management. Many interviewees said that they learned how to provide bat removal and bat exclusion services through personal trial and error and on-the-job training with a more experienced WCO. A few interviewees mentioned that being part of a professional network of WCOs was important in developing their professional expertise as a WCO.

Table 2. Counties where interviewed wildlife control operators (WCOs) responded to bat-related service calls.

Albany	Fulton	Ontario	St. Lawrence	Sullivan
Clinton	Greene	Orange	Saratoga	Ulster
Columbia	Hamilton	Otsego	Schenectady	Warren
Dutchess	Herkimer	Putnam	Schoharie	Washington
Essex	Jefferson	Rensselaer	Schuyler	Westchester
Franklin	Montgomery	Rockland	Steuben	Yates

One of the WCOs we interviewed described his impression of how approaches to bat exclusion and WCOs’ perceptions about bats had changed since the emergence of the nuisance wildlife control industry in the 1980s.

[Have you seen any change in how WCOs deal with bats? Or talk to the public about bats?] *“I think that overall, I think everyone is kind of on board with doing it the right*

way. When I started [in the 1980s] there were exterminators dealing with bats with poisons and traps, and everything else. All kinds of things, I saw all kinds of crazy things in the early 1980s, but I don't really see that anymore. So I really think the word has gotten out about bats being beneficial to the environment."

Clients' Bat-Related Concerns and Beliefs

People call a WCO seeking professional help to remove and/or exclude bats. One interviewee told us that the most frequently asked questions by homeowners included, "How did they get into my house? Are there more? How do we keep future bats from getting in?" (WCO#8). In the process of answering and addressing those questions, WCOs have an opportunity to learn about their clients' bat-related concerns, beliefs, and attitudes. We asked WCOs about the concerns and beliefs their clients expressed during bat-related service calls. Across interviewees, a few consistent themes emerged. Each theme is described below and supported with illustrative quotes.

Concern about Exposure to Rabies

Most interviewees said that fear of being exposed to or contracting rabies was the most common specific concern that clients expressed on bat-related service calls. Multiple WCOs said that nearly every client they work with is concerned about people being exposed to rabies because a bat was seen in or around an occupied dwelling.

"Well, the main thing is rabies. Eighty or 90% of the time that's what I get. 'Will I get rabies? Does this animal have rabies?'" (WCO#2)

"Some of the questions are, 'if you get scratched or bit, do you have to get rabies shots?'" (WCO#4)

"Well, most of the people are concerned about rabies, that's their biggest concern. ... [Do they mention any other diseases they could get from bats?] "No, just the rabies, that's their biggest concern." (WCO#5)

"People's concerns are that they're going to get rabies. That's their concern with bats." (WCO#6)

"Well, some of the fears are that they are going to get bit. They're going to get bit right away and get rabies. ... But rabies is the number 1, biggest fear perception." (WCO#9)

A few WCOs mentioned that their clients often believe that all bats have rabies. Some WCOs believed that widespread misperception about bats and rabies contributed to their clients' unfounded fears and strong, visceral reactions to a bat flying inside a house.

"You know, a lot of them [homeowners] are thinking that every one of them [bats] is rabid. That's just a generalization of how they think. Most of them [homeowners] are not educated on it." (WCO#10)

"The biggest fear is rabies...People really do believe they are disease-carrying, malicious marauders ...there's definitely a prejudice against bats." (WCO#12)

"I think in my personal experience, the biggest thing that I ran into in my career is the fear of rabies. 'Every bat has rabies' [he responds] No, they don't." (WCO#14)

Fear and Anxiety Associated with a Bat Encounter

Along with a fear of contracting rabies, interviewees said that their typical client has a generalized fear of bats and high anxiety about any interactions with bats inside a house. One interviewee said their typical first interaction with a residential client involves a homeowner who has seen or heard a bat, "which freaks them out" (WCO#1). Several interviewees mention that clients are fearful that bats will attack them or fly into their hair. One interviewee noted that, "Mostly, when people call they are in a panic." (WCO#3).

"Mostly, when people call they're in a panic. ... most of the time they're in a panic and just want to get rid of it [the bat], they just want it gone." (WCO#3)

"They [homeowners] don't know a lot about it, just that they want them [the bats] gone. Their general concern is 'just get rid of them.' And of course, a lot of them [homeowners] have a phobia about them [bats]." (WCO#10)

"...Everybody wants them [bats] out of their house, thinks it's going to kill their family, it's going to kill their pets, just an over-reaction. And let's face it, the movies didn't do bats any favors." (WCO#14)

[Are they expressing fear of bats?] *"Aw, yeah, they're all afraid of bats. That's why they call. Well, that's why 99% of them call. Even 300-pound, big burly men, just as afraid as a women. Yeah. They're all afraid of them in their house. The bat's just flying around, but they [homeowners] think they're attacking them." (WCO#16)*

Concerns about Bat Droppings

WCOs also encountered concerns related to bat droppings. But in contrast to clients' concerns about rabies, which were specific and ubiquitous, concerns about bat droppings were nonspecific (i.e., were not linked to awareness of or concern about a specific disease) and less frequent. Some WCOs noted that concern about bat droppings did not come up in all their interactions with clients; some said none of their clients raised concerns about bat droppings.

[Do customers ever ask questions about bat guano?] *"Yes, they do ask me about whether the droppings are something they should be concerned with."* (WCO#2)

"They ask about the feces smell. ...And then of course you get concern about rabies. ...Those are the main two concerns." (WCO#16)

[What about the guano? Does anyone ask you about that?] *"No, you know a lot of people don't know about that. But I bring it up to them."* (WCO#3)

[Do people ever mention the droppings] *"No, they don't talk too much about it [bat droppings]."* (WCO#5)

[Any other concerns, other than rabies?] *"Not really. I mean, there is histoplasmosis, and some people are concerned about bat droppings, but those are in an attic and most people are not up there."* (WCO#8)

Concern about Bats and Bat Conservation

Across interviews, WCOs made it clear that bat conservation is not the focus of WCO-homeowner interactions. First and foremost, clients want the bats out of their home. One interviewee gave an example of the tension between clients' desire to rid their home of bats and regulations protecting maternal bat colonies, and the frustration that sometimes results when clients are told they will have to wait before removing a bat colony (WCO#10, see "bats are a protected species" messages, Appendix B, Table B4).

Interviewee comments suggest that, more frequently, WCOs encounter clients who are concerned about the welfare of individual bats. Even though many clients are alarmed when they find a bat in their living space, and have called a WCO to have the bat(s) removed from their house, interviewees said that most clients do not want any bats harmed in the process of removal.

"There are the people that want the bats out of their house, but they want the bat to be OK. That's pretty much 99% of the people. Most people I deal with are nervous, but they want everything to be OK with the animals." (WCO#4)

“What I do get is some people who are concerned about the bat. A lot of people who are just animal lovers and they don’t want you to do anything with them....I’ve gone to jobs where people ask ‘what are you going to do with the animal?’, and when I tell them, they cancel the job. You get a lot of those people now.” (WCO#3)

[Do people ever mention the safety of the bats?] *“Yes.”* [What do they say?] *“You aren’t going to kill it are you? Does it have to be tested? If the bat flew in with the people, as long as there was no contact, it can be released.” (WCO#8)*

Conversation about bat conservation is tangential to the WCOs’ work; clients generally do not ask questions about bat conservation or threats to bat populations. When those questions come up they do so later in the conversation, after more immediate questions have been discussed. Similarly, WCOs may encounter a client that asks a question about bat natural history as the WCO describes why bats are in their home or building at a given time of year. But in most cases the WCO rather than the client brings up bat natural history. WCOs noted that some clients ask about installing bat houses; it wasn’t clear from interviews whether clients’ interest in bat houses was motivated by concern about bat conservation.

[Do customers ever ask you about things that are threatening bats or bat population?] *“No, people just want the bat out of their house. It’s very rare that I get someone who is concerned from an ecological standpoint about the welfare of the bats. That’s very secondary.” (WCO#2)*

“I do get other questions about their natural history. I’ll get questions like, ‘are they migratory?’ or something like that. I always have to explain the difference between a big brown bat and a little brown bat. Most people are like, ‘this thing was HUGE.’ They don’t realize that big brown bat is part of their common name, not a description of its size.” (WCO#2)

[Do you ever hear customers raise concerns about bat conservation?] *“Once in a while someone will ask about putting up a bat house on the property... That’s about it. Other than that, most people really don’t care, they just want you to get rid of the problem [i.e., bats in their house].” (WCO#9)*

[Do people ever mention anything related to bat conservation, or white-nose syndrome?] *“A lot of people have mentioned putting up bat houses...” (WCO#8)*

Some WCOs working in counties where WNS is well documented said their residential clients were often aware of WNS. For example, we interviewed a WCO who said in his service area (i.e., Fulton, Montgomery, and Hamilton counties) the WNS outbreak had been publicized by

local media, his clients often were aware of WNS, and those clients understood why WCOs use nonlethal means to exclude bats from people's homes.

[My clients say] *"We know bats are good, we just don't want them in our house or in our building. ... Everybody is pretty much on board, they [clients] know about white-nose syndrome to an extent, and they know the bat populations are low, so they definitely don't want us killing them [the bats] (WCO#13)*

[Are clients expressing concerns about other diseases?] *"Well, the other one is the white-nose syndrome. A lot of people have heard of it, they have a little research on it, but ... People don't know that the vast majority of population of bats, we're talking over 90% of little brown bats, were pretty much wiped out."* (WCO#2)

In other counties, WCOs said that their residential clients were typically unaware of WNS or its impacts on populations of bats in NYS. Interviewees said that client questions about WNS were very uncommon; one noted that questions about WNS were more common when WNS was first discovered in New York, but declined in recent years.

[What about white-nose?] *"There's not a lot of people who know about that. Some do."* (WCO#3)

[Do people ever express concerns about white-nose syndrome or other things that affect bats?] *"I haven't heard anything like that."* (WCO#4)

[Do people ever mention anything related to bat conservation, or white-nose syndrome?] *"...Surprisingly, a lot of people aren't aware of the white-nose syndrome, so not too many people mention that."* (WCO#8)

Risk-Related Messages from WCOs

We identified 7 different messages that WCOs delivered in response to their clients' bat-related risk perceptions. Because there were a large number of quotes related to risk communication, we placed all the risk-communication quotes in an appendix (Appendix B). Below, we list the 7 messages and the tables where quotes illustrating those messages may be found.

- 1) Not all bats have rabies; your risk of contracting rabies from a bat in your house is very low. (Appendix B, Table 1)
- 2) If people or pets were exposed to a bat, the bat should be captured, euthanized, and submitted to NYSDOH for rabies testing (Appendix B, Table 1)

- 3) It is important to bat-proof your home because bats carry pests and diseases (Appendix B, Table 2)
- 4) A small amount of bat droppings in an unused attic pose little risk to human health (Appendix B, Table 3)
- 5) Bat droppings are a significant human health risk and have to be removed properly to avoid respiratory diseases (Appendix B, Table 3)
- 6) Bats are protected species; it is illegal to remove bat colonies from buildings at certain times of the year (Appendix B, Table 4)
- 7) Normal, healthy bats don't attack people (Appendix B, Table 5)

Messages about Bats and Rabies

Interview comments suggest that WCOs consistently communicate two related messages about bats and rabies: (1) not all bats have rabies, (2) but if people or pets were exposed to a bat, the bat should be captured, euthanized, and tested for rabies (Appendix B, Table B1). Messaging about rabies was consistent across all interviewees. Consistency in messaging likely occurs because communication about rabies testing follows a script of questions and protocol from the NYS Department of Health, which WCOs are required to follow in situations where a bat may have come into contact with a person or their pets. Additionally, all interviewees seemed to share the same personal experience related to rabies testing; multiple interviewees told us that they had not seen more than 1 or 2 rabies-positive bats over their entire WCO careers.

Messages about Human Health Risks Other than Rabies

WCOs noted that in many cases the homeowner is not aware of bat-related disease risks other than rabies until after a bat encounter, when they learn about potential risks as they search the internet for information or they receive information from a WCO. Three interviewees noted that most people don't realize that bats can carry ticks or mites (which can transmit disease), so they don't know enough to be concerned about those potential vectors of disease transmission (Appendix B, Table B2).

[Do they ever ask you about zoonotic diseases?] *"Once they get exposed to a bat, they start doing some research [online], and then they say, oh, what's this [disease]? What's that [disease]?"* (WCO#16)

[Are they saying things that indicate concern about any other diseases?] *"No [they never mention diseases other than rabies], that's something I mention to them. I just know that because I have a friend who had that kind of respiratory illness. They [residential clients] don't seem to know much about respiratory illnesses they could get when they are just sweeping up their attic. They don't seem to have much concern, they don't seem*

to know much about them.” [respiratory illnesses]. ... with the internet, you’d think they would be well read, but they’re usually not. (WCO#10)

Interview comments suggest that clients may receive two types of messages from WCOs about human health risks associated with bat guano: some clients are told that bat droppings pose little risk to people and can be left undisturbed, other clients are told that bat droppings pose a significant risk to humans and should be removed (Appendix B, Table B3). Messaging depends in part on context (i.e., location and amount of guano) and in part on types of services offered by the wildlife control business responding to the call. WCOs told us that small amounts of bat droppings in inaccessible attic spaces called for little or no remediation. WCOs consistently said that larger amounts of guano in accessible attic spaces do require removal using proper disposal techniques and personal protective gear. A few interviewees believed that companies with a financial incentive to sell attic cleanout services used fear tactics to sell those services.

Messages about Protecting Bat Colonies

Communication exchanges between WCOs and their clients focus on bat removal, bat exclusion, and rabies-related risks. Threats to bats (e.g., WNS) and bat conservation (e.g., habitat loss) are discussed infrequently. But WCOs do deliver messages about laws that protect maternal colonies of bats. Several WCOs mentioned that they do have to educate their clients about laws that prevent removal of bat colonies at certain times of the year (Appendix B, Table B4).

Messages about Behavior of Healthy, Flying Bats

Multiple WCOs noted that misperceptions about bats are common among their clients. The most frequently mentioned misperceptions were:

- All bats have rabies, so the one in my house must have rabies;
- The bat flying around my house wants to attack me;
- Bats like to fly into people’s hair.

Interviews suggest that, in the process of trying to calm clients down and reduce their fear of bats, WCOs often find themselves trying to correct clients’ misperceptions about bats. WCOs explain that normal, healthy bats don’t attack people or purposefully fly into people’s hair (Appendix B, Table B5). Multiple interviewees said that they explain that bats are small, harmless, and beneficial to people (because they consume insect pests). One interviewee provided the following example.

[Do you think the information you provide changes people's beliefs or attitudes about bats?] *"I hope so. That's all I can say is I hope so. Because someone like me recognizes that they're way more beneficial than harmful. So that's one of the things I try to get across to people. The problem with it is people are still thinking of Bella Lugosi. There was a video I had, still have, it was called facts about bats. In my biology class [as a teacher] I used to play it. It was to dispel a lot of the myths about bats. The crap you hear. Because they are more beneficial than anything else. Hopefully some people take it to heart. I used to write a blog for the [newspaper name] ... and one of the articles I wrote was about the fearsome foursome. It was about the four groups of species or critters that people really fear. Sharks, spiders, snakes and bats were the focus. There is just this underlying fear, and it has no basis in reality."* (WCO#2)

Perceptions of Change in Clients' Beliefs or Attitudes

We asked WCOs how the information they provided had changed their clients' beliefs or attitudes about bats. Some interviewees didn't think their clients had changed at all.

"Thinking back, no, not really. Most of the time they just want 'em gone." (WCO#3)

"...I think people have stayed the same [over his 30 years in the nuisance wildlife control business], I just don't think they understand bats. And then the fear of rabies is their concern a lot of the times. And it [rabies] is found in a small percentage, but unfortunately, we have operators who overplay that." (WCO#7)

"I don't think I've turned anybody's perceptions or attitudes to bats, maybe because we live in a more rural setting up here in [placename] and they are a little more aware. A lot of people know they eat a lot of bugs and insects and mosquitoes, so they're all for that." (WCO#13)

Some interviewees believed their interactions with clients did lead to change in attitudes or perceptions. Multiple interviews believed that providing information gave their clients a better understanding of bats, which reduced fears about bats and put people at ease.

"Yes, I do, I absolutely do [think some clients have changed their beliefs]. I think it helps them understand. Like yesterday, I had a call from an old lady with bats up in her attic, and she was deathly afraid the bats were gonna get down into her house. And I explained to her, that's not how bats work, they don't want to be down in your living quarters, and they don't want to hurt you, and she felt a lot better after I left the house, put it that way." (WCO#5)

“Just education, with good information, usually gets people from panic to calm. So people’s minds are not open at first, because they’re stressed and anxious, but once they’re calmed down, they’ll usually error on the side of reason. That’s my experience”. (WCO#6)

“People will say now that you have educated me I feel a lot better about bats.” (WCO#8)

“You never convince the person that is absolutely freaked out about them [bats]. But they leave knowing more about them and knowing that bats are beneficial. I don’t know if anybody’s changed [after I left]. When I go in there, everybody is screaming. But they do get more information...I do a lot of work over the phone and never end up going to the house, so I don’t know what those people do. But they definitely leave more educated after I’m on the phone with them. They leave knowing what beneficial things bats can do and what they can do that can harm you. So they are more aware...I get calls from their neighbors later, so I know there is information transfer, that’s all I know.” (WCO#10)

“I’m sure it’s been useful in putting them at ease. And giving them the knowledge, just shedding light on their concerns.” (WCO#11)

“A lot of times when I’m done talking to people they feel a lot more comfortable. They don’t fear the bat quite as much as they did, but they still want them gone. They believe what I say, because I’m honest. And when everything is all said and done, they highly believe what I say. ...I tell them the truth and don’t try to scare them, and put your best foot forward and keep it there.” (WCO#16)

One interviewee related that the best thing he can do to change people’s beliefs is “show people the animal” (WCO#12). Whether it be a bat, a woodchuck, or a raccoon, he believed that the thing that changes people is showing them and telling them about the animal once it has been captured. He said that he has seen concern change to interest once there is no threat. He said most people he encounters are interested in bats, they just don’t want bats flying around the house.

“ I think it does a lot for them. Once they see that they are literally just flying mice, they’re tiny. ...many people, like if you do have to catch one and release it, just showing people, it’s in a cage, it’s not going to hurt you. ...up to then it was just a thing and it was in their way. Once they see them and start understanding their habits, ...once you get a little education in people they start seeing it your way” [seeing that the animal isn’t dangerous or malicious]. (WCO#12)

Another interviewee (WCO#14) shared the belief that showing people the animals he catches can really change their attitude about that species (bats, opossum, even squirrels). He gave an example of a call where a woman called him to capture a bat that was in her skylight. The woman's spouse had gotten a hotel room for the night because he was so afraid to be in the house with a bat. When the WCO caught the bat, he showed the animal to the husband. The man became so fascinated with the bat, after learning that it was the size of a mouse, that he went on to purchase and install bat houses to attract bats.

DISCUSSION

At the outset of our study, we hypothesized that some of the conversations transpiring between WCOs and property owners include exchange of information about threats bats pose to people. Interview data supported that hypothesis: WCOs are serving as risk communicators on topics related to rabies. WCOs communicate with their clients about the prevalence of rabies in bats and the NYSDOH protocols that WCOs must follow when people or pets have been exposed to a bat. Interviews suggest that WCOs routinely communicate about rabies because: (1) it is central to clients' greatest concern (i.e., that the bat(s) in their house are rabid and they, their family members or their pets are at risk), (2) because clients specifically ask them questions about rabies, and (3) because they are required to follow NYSDOH protocols for exposure to rabies vector species.

Our interviews documented that WCOs are acting as more than informal risk communicators. Rickard (2011, page 643) notes that informal risk communicators may not believe they have any obligation to ensure that the public learns about or understands particular threats. Interviews suggest that WCOs do generally believe they have an obligation to help their clients understand threats from rabies (and health risks associated with bat droppings). The need to communicate with their clients about NYS laws designed to protect public health and conserve bat maternity roosts obligates WCOs to take on a formal risk communication role on the topic of rabies. These findings suggest that it would be useful for state wildlife and Cooperative Extension staff to develop materials that can help WCOs understand and communicate about public health and conservation laws related to bats.

WCOs are in a position to dampen or elevate their clients' rabies-related risk perceptions. Given that the main concern of clients and the main risk communication by WCOs focuses on rabies, WCOs may be receptive to materials or training opportunities that would help them to educate the public about rabies and rabies prevention. Providing information and/or training experiences for WCOs could help ensure consistent messaging about bats and rabies.

Rickard (2011, page 643) notes that informal risk communicators may not think of themselves as "risk communicators." Interview findings suggest that WCOs are more likely to think of

themselves as problem solvers: they see part of their role as helping clients understand the problems they are experiencing and how those problems can be resolved. But as service providers, they do appreciate that communicating with the public about risks is an important dimension of their work.

Although WCOs may not characterize themselves as risk communicators, our interviews make it clear that some think of themselves as environmental educators: they provide information about basic aspects of wildlife behavior and natural history. WCOs do not portray bats as scary victims. WCOs send the message that they use nonlethal bat exclusion techniques because bats are valuable for insect control and bats are “good” for the environment. Our findings suggest that WCOs may be receptive to information or training opportunities that would help them to correct inaccurate perceptions of bat behavior and increase awareness of bat-related benefits to people.

We had also hypothesized that some of the conversations transpiring between WCOs and property owners include exchange of information about threats people pose to bats. We found some support for that hypothesis. WCOs often communicate with their clients about the welfare of individual bats that the WCO is removing or excluding. Several WCOs noted that their typical client does not want any bats killed during the removal/exclusion process. WCOs provide information and experiences that make their clients feel less threatened by bats. Once a WCO has reduced a client’s fear of bats, clients who already feel empathy for the welfare of individual bats may be receptive to messages about threats to bat populations and the need for bat conservation.

Although WCOs sometimes mentioned WNS to clients, or answered clients’ questions about bat houses, those were infrequent topics of conversation. None of the WCOs we interviewed mentioned discussion of bat habitat loss. Conservation of bat populations is tangential to clients’ concerns during a service call, and thus there is little incentive for WCOs to discuss conservation of bat populations. Although some WCOs have websites that provide information about threats to bats, we don’t know whether that information is being consumed by the public.

It is understandable that threats to bat populations (e.g., spread of WNS, loss of hibernacula, and quality of habitat for feeding bats) are discussed infrequently by WCOs. Communication between WCOs and their clients is driven by the questions clients ask. Clients routinely ask WCOs questions about rabies, so WCOs communicate about rabies frequently. Clients ask questions about welfare of individual bats, so WCOs communicate about nonlethal bat removal. Questions about WNS or decline of bat populations are far less common, so WCOs communicate about those topics infrequently. Given that so few clients express concerns about conservation of bat populations during a bat service call, opportunities to and incentives for WCOs to communicate with clients about conservation of bat populations appear to be very

limited. Nevertheless, messages from WCOs may ultimately benefit bat conservation, by alleviating concerns that influence the way people perceive and respond to bats.

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APPENDIX A: INTERVIEW GUIDE

Date:

Subject's name and business affiliation:

Introduction

I'd like to start with a few general questions, to give me a sense of your professional work.

1. Which counties does your business serve?
2. How much of your professional work focuses on bats, and what other types of services do you provide?

[INTERVIEWER NOTE: Keep this discussion brief. We just want to confirm whether interviewee specializes on bats and what other professional experiences that have, since professional experience may be an influence on how they function as informal risk communicators.]

3. What types of clients do you work with on bat service calls –is it a mix of commercial and residential clients? Do you also work with municipalities on bat calls?
4. Do you do bat removal, bat exclusion, or both?
5. Could you give me an overview of how you developed your expertise on working with bats?

[5b Follow-up: If they do not mention training, ask specifically if they have completed any specific training or formal education that helped them develop expertise in this area.]

Ok, now I have a few questions about your personal safety on the job.

6. I assume that responding to bat service calls can come with the hazards of working on ladders and roof tops. What other kinds of safety hazards do you face on bat service calls?
7. How do you manage or reduce those hazards? (What kinds of precautions do you take?)
8. How much of an effort do you make to protect the bats when you are working on bat service calls? [note what types of actions they take]

(8b) Follow-up question: [For each type of action] Why do you take that action?

OK, now I'd like to move on to questions about your residential clients and communication between you and your clients about bats.

9. On your service calls, what kinds of concerns and questions about bats do you hear from residential clients?

[INTERVIEWER NOTE: Use checklist below to note the categories of concern/question topics mentioned by interviewee, then follow up with question #10 for each area of concern]

Threats to people	Threats to bats	
<input type="checkbox"/> General fear of bats	<input type="checkbox"/> Safety of bats I remove	<input type="checkbox"/> Other (list)
<input type="checkbox"/> Worry about rabies	<input type="checkbox"/> Protecting roosting bats	
<input type="checkbox"/> Worry about other diseases	<input type="checkbox"/> WNS and bat decline	
<input type="checkbox"/> Worry about bat droppings	<input type="checkbox"/> Loss of places for bats to live	
<input type="checkbox"/> Other (list)	<input type="checkbox"/> Other conservation issues	

10. [Follow-up questions: For each category of concerns/questions ask:] How do you respond to concerns and questions about [...fear of bats, rabies, decline of bats, etc.].

11. You told me earlier about how you developed the expertise to respond to bat service calls. What kinds of experience or training helped you learn how to respond to the kinds of questions and concerns you hear from your clients?

12. How do you think the information you provide affects your clients' beliefs or attitudes about bats? [Follow-up question: If respondent doesn't do so, prompt them to give me an example where a client seemed to change a belief or attitude towards bats based on communication with the WCO.]

**APPENDIX B: MESSAGES WILDLIFE CONTROL OPERATORS
DELIVER ABOUT BAT RELATED RISKS**

Appendix B, Table B1. Messages that WCOs deliver to their clients about bats and rabies.

Message 1: Not all bats have rabies; your risk of contracting rabies from a bat in your house is very low

Examples:

[Communication in response to client's perception that bats seen in mid-day must have rabies, or that all bats have rabies]

"There's a lot of reasons for a bat to be out during the day, most of them don't have anything to do with rabies. My understanding is that rabies occurs in bats less than 1% of the time. So that's really the education that I have to provide to people. [The message he has to communicate is] You don't really have to worry about it. The chances of you getting rabies from this bat is infinitesimal. (WCO#2)

"I explain that rabies is in a small portion of the bat population. I usually calm people's fears about bats. I'm not an alarmist with these things. I give people a lot of freedom, a lot of choice in what they do." (WCO#6)

25 *"If they have a bat in their house, they're concerned about rabies. I try to reason with them. I always use the analogy that you have a better chance of winning the lottery than of being bitten by a bat with rabies. So giving them the odds. And some people understand that, others don't. They say, well rabies is fatal. And that's true, but the odds of getting it are less than 1%. It's a constant education process. It just depends on how much research they do on their own, online. As you know, there's a bunch of information out there, and so much misinformation. By the time I get there, they already have all these thoughts in their head and I have to try to de-program them, in how they're looking at bats negatively." (WCO#7)*

"We'll tell them that less than 1% of bats carry rabies. It's not easy to get rabies. Things like that." (WCO#8)

[Messages that WCO communicates to clients concerned about rabies] *"...the percentage that have been proven to have rabies is very low. Probably a better chance of being bitten by a rabid raccoon than a rabid bat. I explain to them, that if it's the first bat in their house, it could have come through a door or a window, before we start searching the attic and duct work and everything else." (WCO#10)*

Appendix B, Table B1. (continued).

Message 1 (cont.): Not all bats have rabies; your risk of contracting rabies from a bat in your house is very low

Examples:

“Well, some of the fears are that they are going to get bit. They’re going to get bit right away and get rabies. I try to explain to them that it’s not necessarily the case. But rabies is the number 1, biggest fear.” (WCO#9)

“Primarily everybody is concerned with rabies, so we have to educate them about that.” (WCO#13)

Message 2: If people or pets were exposed to a bat, the bat should be captured, euthanized, and submitted to NYSDOH for rabies testing

Examples:

[Even though the probability of encountering a rabid bat is very low, we can’t take that risk] *“...However, you still have to take it [rabies] into consideration. You know, we haven’t conquered the rabies virus yet. So whenever I come across a bat in the house I have to ask the customer, has anybody to your knowledge come in contact with this bat? Or has it come in contact with a pet? How long do you think the bat has been in the house? But anytime I find a bat in the house I let the customer know that I’m going to have it tested for rabies, just to make sure, because I’m paranoid about it. And they’re paranoid over it, even though it’s very unlikely, it’s still something that is very serious to most people.”* (WCO#2)

[in response to concern about rabies] *“...I have to ask the three questions: if there are any youngsters in there, any invalids, any old people? You gotta ask those three questions before you even do a job. Because you want to make sure nobody has been hurt, bit, you know? And then I go from there...”* (WCO#3)

“Well, most of the people are concerned about rabies, that’s their biggest concern. ...What you’ve got to worry about is if you’re sleeping, you don’t know about, sometimes they’ll bite you at night and you don’t know it.” (WCO#5)

Appendix B, Table B1. (continued).

Message 2 (cont.): If people or pets were exposed to a bat, the bat should be captured, euthanized, and submitted to NYSDOH for rabies testing

Examples:

- “Some of the questions [from clients] are ‘if you get scratched or bit, do you have to get rabies shots?’ There’s no guesswork. The bat could carry rabies and it’s fatal. Wouldn’t want to take a chance on that. We had one that [was] priced and they decided not to spend \$800 on bat proofing, and a year later his son got bit by a rabid bat. They caught the bat, it was under the refrigerator. And it did test positive for rabies. And so, he hired me after that.” (WCO#4)

“But sometimes people grab them [the bats] themselves, and then I go through the whole spiel about call the health department, because I think you should get the [rabies] shots, just in case. You know, because there is no way of testing the bat. Some people do crazy things just to get them out of the house. I explain the whole deal of what the health department considers interaction or contact [with a bat], and if I think they have broken it, I tell them to contact the health department.” (WCO#10)

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“...But also, you do have to error on the side of caution, so if you do come into contact with a bat, did it compromise the skin, did it wake you, you have to ask them those questions. You have to go through the protocols that the health department has established. You want to make sure that you’re covering all the bases. But usually rabies is always the first thing that pops up. ...I’d say that’s what almost everybody is concerned about. And then they say, we see stuff online, and there’s some good information online, and there’s some bad.” (WCO#15)

“... I like to be up front with them, be polite, and try to be sympathetic with them, but sometimes you have to tell them, if you got any infants in there, we gotta put that bat down so we can test it. Cause we don’t know if that infant has been bit. It’s just plain and simple. “ (WCO#3)

Appendix B, Table B2. Messages that WCOs deliver to their clients about bat-related disease threats other than rabies.

Message: It is important to bat-proof your home because bats carry pests and diseases

Examples:

"...People don't realize how much disease and all that other crap they carry. ...We had a couple cases with bats, fleas showed up in the bedroom because bats carried the fleas into the structure. We've had the same thing with birds nesting in the house. Bird mites come through the ceiling in the bedroom. You know, all kinds of things happen, and the best thing is to keep a clean house, and keeping it tight and maintained." (WCO#4)

[Most people don't realize that bats can carry ticks or mites]. *"There's all kinds of things associated with a bat situation, so once you educate them, they get it."* [They understand why bat-proofing is costly, but necessary]. (WCO#9)

28 *"My concerns over the years has been respiratory illness and rabies. The other thing is bat bugs and bed bugs. You know, when you remove them [bats], those bed bugs that are up in the attic are going to go looking for another host. So I always try to get them [homeowners] to coordinate with a pest applicator, to make a treatment to get rid of that pest. Because I've had a couple customers that had problems where they got rid of their own [bats] and then they had trouble with bedbugs [or closely-related bat bugs] in the attic."* (WCO#10)

Appendix B, Table B3. Messages that WCOs deliver to their clients about health risks associated with bat guano.

Message 1: A small amount of bat droppings in an unused attic pose little risk to human health

Examples:

[Messages about removing bat guano] *“I don’t really do clean-up of guano. I do recommend another fellow to clean up bat guano. What I tell them is that the guano will have bacteria in it as long as it is fairly moist, fresh, but once it dries out the bacteria have nothing to eat, nutritionally, so there’s not too much of a problem with that unless there’s like a ton of it. If it breaks down ... to an aerosol, so I’m breathing it in, I do recommend cleaning that up.”* (WCO#2)

[Do people have concerns about the health risks associated with the guano, or is that something you tell them after you get there?] *“Most of the time, attics, you’re not gonna be in there anyway. It’s like a barrier. You’ve got insulation. Most of the time it’s a little over here, and little over there, some on top [of insulation]. You’re [the homeowner is] not up there anyways. And I can’t crawl around in a 3-foot attic. There’s different situations. If you have a walk-in attic or pull-down stairs, something with more access, then cleanup is recommended. Lot of times if you exclude them so they’re not getting in the house that’s enough. Some of your real older farm houses we’ve seen piles of stuff [guano] but most of the time it’s not that much, so we don’t have to do anything.”* (WCO#4)

“Well, usually once they get exposed to a bat, they start doing some research, before I even get to the house. They’ll see some things online about bat guano and all these diseases. And then they say, oh, what’s this? What’s this? ...If you go into any attic at any point, there is going to be some level of excrement in there, whether it be bats or mice or something. The stuff you see online is worse-case scenario. So people have these images now like, Oh my God, my house is completely infested! Some companies prey on that and use that to their advantage. I try to talk them off the edge. Calming them down, saying it’s not like that. You know, they start reading about things like plague and histoplasmosis, and those things are few and far between.” (WCO#15)

“Sometimes if there is an old house, they’re concerned about feces and guano in the attic, so I educate them on that, how to not try to remove it [the guano] by sweeping and dusting it up. That they may have to call a cleaning service that can handle that type of thing, has the right kinds of filters and things.” (WCO#13)

Appendix B, Table B3. (continued).

Message 2: Bat droppings are a significant human health risk and have to be removed properly to avoid respiratory diseases

Examples:

[Do people ever voice disease concerns about topics other than rabies?]” *Sure, [concerns] about bat droppings, histoplasmosis. Bigger companies, I notice, try to push cleanups of attics, for like \$10,000. Big box companies. But if I go into an attic and find a couple bats and some droppings, that doesn’t warrant a cleanup. That isn’t a big problem, especially if you aren’t up there using the attic. But these big box companies tell them ‘you got a get that out of there, it’s contaminated.’ I look like the bad guy when I leave it there, but when you take it out you have even more problems. You’re creating dust particles. And especially if there’s no window in the attic. Now you’re taking stuff like insulation through the house. ...In my area, just outside New York City, people don’t usually let things get to that point. I just have a mini HEPA vacuum that I use and that’s enough to clean up. Take away that single piece of insulation [where the few bats lived], replace that, and that’s pretty much it. That’s enough to me. Like I say, the other companies, they know home insurance may pay, so they try to make it a whole big production. ...I had one situation where a woman was so afraid, at one point she was in tears, she was so afraid of bats. And this [other] gentleman got the job, he ended up getting the job over me because this woman was so afraid. I was trying to downplay it [the risk of bats] and I ended up looking like the bad guy. ...it’s kind of a hard thing to tell someone.” (WCO#7)*

“Some people don’t think it is a big deal [they don’t know why the WCO wears personal protective gear] “Sometimes you gotta explain it to them. You can get hanta virus, you can get this, you can get that, you gotta be careful with this. But they’re like, nah, I can just have my cousin do it with a shovel [do the attic cleanout themselves]. And I’m like, what are you, nuts? But I can’t tell somebody what to do, I can just advise them on what to do or not do. But that’s the perception. I’ve dealt with, either ‘I can do it myself—Mr. DIY’ or the super-paranoid –and they want the booties, and they want this, they want that [protective gear used]. And sometimes they overreact, because of information they get on the internet. ...You can’t always believe everything you see or you read. ... So pretty much it’s a paranoid viewpoint until they get the facts. Then it’s, OK, alright, now I understand, now I get it. And then they understand why it might be this price or why it might take this amount of time, or how it started in the first place. ... (WCO#9)

Appendix B, Table B4. Messages that WCOs deliver to their clients about protecting bat maternal colonies.

Message: Bats are protected species; it is illegal to remove bat colonies from buildings at certain times of the year

Examples:

[Threats to the bats themselves?] *“Well, a lot of people don’t know that the bats are a protected species. They’re ignorant of that. They don’t realize that. So when I tell them we got to protect them, we can’t kill them, most people understand that, and they’re alright with that. Once in a while you get a few hard-nosed people who are like, ‘just kill them.’ And I try to explain to them the benefits of having bats around. The insects and everything like that, so.” ...Goshen seems to be a place with a lot of bats with the old houses there, I get a lot of calls from Goshen. I tell them if you want bats around, put up a few bat houses. You just don’t want them in your house. And they understand that.” (WCO#5)*

[What about white-nose or bat conservation issues? Do they mention that?] *“They don’t mention that. I try to educate them on that. ...I tell them [homeowners] that there is white-nose syndrome and it’s killed a lot of bats, and bats have habitat loss and we don’t want to harm them, but a lot of people don’t want the G..D... bats in their attic, PERIOD. They don’t want to wait until August. I had a couple customers arguing with the DEC about how they got somebody in their house with allergies and they don’t want a respiratory illness and they want the bats out now, not at the beginning of August. So I just told them I don’t want to do it. It’s not good for the bats. I understand that you have an issue, and I let them take it up with the state. But overall, people are pretty decent about it. It’s just that, I explain to them, the bats didn’t just get there today. They’ve been there, you didn’t do anything about it, and now you want to possibly kill all the little ones just because you didn’t do anything about it a month ago. That’s the biggest thing I find, and maybe I lose jobs because I won’t touch them [until August]. It’s their own fault for not doing something sooner.” (WCO#10)*

“...it’s really about an education process. I try to explain to everybody that they’re beneficial, that there’s no attack bats, they don’t all carry rabies.” (WCO#7)

Appendix B, Table B5. Messages that WCOs deliver to their clients about behavior of healthy, flying bats.

Examples:

Message: Normal, healthy bats don't attack people

[What kinds of experience or training helped you learn how to respond to the concerns you hear from clients?] *“Well, doing a lot of research on animals, and our own experiences. Mine in particular, because I really used to be terrified of flying things. I mean really afraid of flying things. And just learning about the animal and realizing what they are capable of and what you need to be afraid of and what you don't need to be afraid of. And basically, animals don't want to cause you harm. So that relates with a lot of people, because a lot of people are afraid of bats flying in their houses. So the experience of knowing that terror that people are feeling [helps]. And speaking with people helps [this WCO talks 15-30 minutes with clients after a bat is captured]. After they learn a little bit about bat behavior and all of that. ...once you start education people on bats, most people are interested to listen and learn about it.”* (WCO#8)

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“I kind of approach the customer as if I'm going to be talking to myself, or I would be talking to a family member. Just be really, try to put them at ease. I'll make light of the situation, to calm down their anxiety, or ad lib a quick joke or something like that, just so they relax a little bit, and say listen, nobody is going to be turning into vampires here...get them to chuckle a little bit, takes their mind off it. And then I let them explain to me what's going on. ...part of being in the public eye is sometimes you have to listen. Some people just don't have that ability to just listen. ..and then when they are ready I tell them what I suggest and I look at what's what, and then go from there. And they seem to be pretty much accepting of that.” (WCO#9)

“I'm a fireman, that's my fulltime job...so I deal with the public a lot, in what you might call emerging situations...you learn how to take cues from people. First, you want to make people understand that they're not in any inherent danger. Make them feel comfortable. And then education, I think is probably the best route for anything. Like most people ask, why is the bat in my house? Going from there.” (WCO#12)

Appendix B, Table B5. (continued).

Message (cont.): Normal, healthy bats don't attack people

Examples:

[Explaining why we wear personal protective gear] *"We just tell them that the bats are not trying to get into the house to attack you. A lot of people have artificial fears because of what they've seen on TV. We just try to reduce those fears, and try to explain to them that the only reason we are doing it [putting on protective gear] is because we are getting up close and personal, but if you meet them outside you don't have to wear this kind of stuff; they are going to fly away from you. Just reassuring them that they are not a vicious species. They're not going to bite you unless it is out of fear or nervousness. They're not going to attack you. Just try to quell those artificial fears."* (WCO#14)

"Bats are always portrayed as a very rabid, blood-thirsty animal. So, again, I try to defuse all kinds of anxieties. That they are going to try to bite you, and get in your hair. Those are usually the first elements that people are concerned about. You know, 'the bat's flying around, it scared us, it's going to bite us'. When a bat is confined in a [human] living space, it knows it's in a foreign environment, and it wants to get out. It's not trying to harm anybody. It doesn't want to harm anybody. It's scared. So I always try to educate and inform, diffuse anxiety, try to get people at ease. ..." (WCO#15)
