# Alaskan brown bears, humans, and habituation

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***Abstract:*** We present a new paradigm for understanding habituation and the role it plays in brown bear (*Ursus arctos*) populations and interactions with humans in Alaska. We assert that 3 forms of habituation occur in Alaska: bear-to-bear, bear-to-human, and human-to-bear. We present data that supports our theory that bear density is an important factor influencing a bear's overt reaction distance (ORD); that as bear density increases, overt reaction distance decreases, as does the likelihood of bear–human interactions. We maintain that the effects of bear-to-bear habituation are largely responsible for not only shaping bear aggregations but also for creating the relatively safe environment for bear viewing experienced at areas where there are high densities of brown bears. By promoting a better understanding of the forces that shape bear social interactions within populations and with humans that mingle with them, we can better manage human activities and minimize bear–human conflict.

***Key words:*** Alaska, bear–human interactions, bear viewing, Brooks Camp, brown bears, habituation, individual distance, Katmai National Park, McNeil River, overt reaction distance, personal space, *Ursus arctos*

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A clear understanding of the forces that influence and modify bear social structure is essential for the successful management of human activities and to avoid conflicts between brown bears (*Ursus arctos*) and humans. To achieve this understanding, biologists and managers must be explicit in their use of behavioral terminology (Whittaker and Knight 1998). Hence, we must be careful in the use of words such as habituation, and how they are applied to bears. Through ideas presented in this paper, we attempt to foster a clearer understanding of the habituation process and the role it plays among bear populations and in interactions with humans.

To accomplish this objective we define habituation, discuss misuse of the term, and present examples of misuse. We describe 3 forms of habituation we believe operate among bear populations of varying densities in Alaska and present data to support our theory as to how the 3 forms are inter-related and function. Finally, we discuss implications of our findings to management.

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## Methods

### *Terminology*

Imprecise terminology, or misuse of terms, leads to confusion. Because of this confusion, we include relevant definitions for clarity. A *bear sighting* is when a person sees a bear, but the bear is apparently unaware of the person. A *bear–human interaction* occurs when a person(s) and bear(s) are mutually aware of one another. Bears may react with seeming indifference, by leaving the area, or approaching the person. An *encounter* is synonymous with *interaction*. An *incident* is an interaction between a bear(s) and a person(s) in which the bear acts aggressively. Bear incidents are a subset of bear–human interactions and have outcomes ranging from benign to injury. An *attack* is the intentional contact by a bear resulting in human injury. Bear attacks are a subset of incidents.

In this paper we use the term overt reaction distance (ORD, Herrero et al. 2005), to replace terms such as individual distance or personal space. ORD refers to the distance at which a bear overtly reacts to another bear or a person. A bear may react internally before reacting in a manner people can observe.

### *Alaska bear attacks database*

T. Smith and S. Herrero collected Alaska bear attack data from published accounts, management agency records, newspapers, and existing bear attack databases (Middaugh 1987). This effort amassed 515 incidents involving 3 species of bear (*U. maritimus*, *U. americanus*, *U. arctos*), and spanned 1900–2004. We believe that bear incident data for Alaska include most fatal and serious injuries (defined as those requiring 24 hours or more of hospitalization) inflicted by bears, although some are likely missing from the earlier part of the 20$^{th}$ century. Of these incidents 420 (82%) involved brown bears, the focus of this research. Alaska statewide brown bear density estimates used for analysis were derived from Miller (1993). All bear incident and bear density data were entered into a GIS (geographic information system) database (Arc View 3.3, ESRI, Redlands, California, USA) to create separate themes for analysis.

### *Alaska bear attacks database definitions*

We entered incidents into a database and classified them according to Herrero and Higgins (1995, 2003), with slight modification. For this work we selected only brown bear incidents involving aggressive–defensive attacks, as opposed to others attributed to curiosity, attraction to foodstuffs, carcass defense, or provocation (216 of 420, 51%). We believe the distance at which human presence triggers a charge is primarily a function of bear density (bear-to-bear habituation); greater distances are associated with areas of lower bear densities. Incidents of brown bears charging humans were selected from the 216 aggressive–defensive incidents (70 of 216, 32%); each record's narrative was carefully reviewed before inclusion in the analysis dataset. We further filtered these data ($N = 70$) by eliminating the shortest charge distances reported for each bear density category to see if patterns existed in the upper ranges of reported charge distances (45 of 70, 64%). Charge distances were estimated by persons involved and therefore cautious interpretation is warranted.

### *Statistical analyses*

One-way analysis of variance was used to explore relationships between bear density and charge distances. The Student's *t*-test was used to compare individual charge distance categories for significance. Statistical significance was set at $\alpha = 0.05$.

## Habituation and tolerance: definitions and caveats of use

Habituation has been defined as "the waning of a response to a repeated, neutral stimuli" (Whittaker and Knight 1998:313). Habituation is adaptive in that it reduces time and energy costs by eliminating or reducing irrelevant behaviors (McCullough 1982). Typically, habituation of bears to humans refers to the loss of avoidance and escape responses. Although the habituation of bears to humans ("human-habituated") has been widely reported in the literature (Jope 1983, Haroldson and Mattson 1985, Gilbert 1989, Aumiller and Matt 1994, Olson et al. 1997, Herrero 2002), what was described may actually have been variation in tolerance. Tolerance, as opposed to habituation, is "the intensity of disturbance that an individual tolerates without responding in a defined way" (Nisbet 2000:315).

To document habituation requires repeated measures of response in individuals subjected to controlled repetition of the same stimulus (Nisbet 2000). We know of no such studies for bears and caution that in the absence of scientifically acceptable evidence, labeling a bear as human-habituated because it displays tolerance toward people is potentially a misuse of the term, is premature, may be inaccurate, and curtails further inquiry regarding the causes behind observed behaviors. Confusion often arises because bears that are human-habituated and those that are naturally tolerant behave similarly toward people, although the pathways leading to their tolerance differ. Hence, the mistake lies in assuming that all tolerant bears have arrived at their disposition through repeated exposure to humans. In this paper, when we use the word 'tolerant' we refer to the behavioral manifestation, regardless of its ultimate causation.

We also mention the term food-conditioning, which has been frequently misquoted as food-habituation. Herrero (2002) stated that a bear that eats people's food behaves differently from a bear that is only habituated to people. Such a bear forms a simple association between people and food and is appropriately labeled 'food conditioned'.

Wildlife biologists and managers must be careful labeling a bear (or aggregation of bears) as human-habituated because of implications associated with the term. For example, if a population of bears within a national park (such as Brooks Camp, Katmai National Park) has been described as human-habituated, the implication is that a human-mediated change in bear behavior has occurred. Human activities that alter wildlife behavior are generally of concern to the National Park

**Table 1. Causes and effects of habituation involving bears in Alaska, USA.**

| Type of habituation | Facilitating mechanism | Operational level | Range of influence | Effects of habituation |
|---|---|---|---|---|
| Bear-to-bear | high bear density, frequent bear–bear contact | social flexibility within individual bears | sub-populations of bears | small overt reaction distances, attenuated aggressiveness toward conspecifics, facilitated foraging aggregations |
| Bear-to-human | frequent, innocuous interaction with humans | social flexibility within an individual bear | individual bears (perhaps modeled by other bears) | access to forage and other resources near humans, can lead to conflicts given reduced interspecies distances |
| Human-to-bear | frequent, innocuous interaction with bears | social flexibility within individual humans | individual humans (perhaps modeled by other humans) | reduced or eliminated unnecessary fear responses to bears, can lead to conflicts with bears if people act inappropriately or bears associate humans with food |

Service (NPS), particularly when they are perceived as fostering the habituation of bears to people (McCullough 1982, Albert and Bowyer 1991). Additionally, some feel it is unethical to hunt human-habituated bears (Alaska Outdoor Council 2004), necessitating a scientific way to establish that populations are human-habituated rather than simply tolerant. Finally, if a population of bears is highly tolerant of people but not human habituated, observed responses of bears toward people might be incorrectly attributed to the wrong underlying process.

## Habituation and Alaskan brown bears

We propose that there are 3 forms of habituation occurring in Alaska: bear-to-bear, bear-to-human, and human-to-bear (Table 1). In the first 2 instances, bears benefit as habituation lessens unnecessary energy expenditures and enables adaptation to local circumstances. In the last case, humans benefit by not responding unnecessarily to bears that are not threatening. We propose that the frequency of occurrence of these forms of habituation is related to brown bear density in the area (Miller 1993, Fig. 1). Brown bear density is influenced by a number of factors, but in wilderness Alaska it is primarily controlled by amount of nutrients available to bears: the more available nutrients a particular area has, the more bears it supports (Hilderbrand et al. 1999). Brown bears with access to spawning fish exhibit densities 20 times greater than populations that do not (Miller et al. 1997). We posit that as bear density increases so does the prevalence of these forms of habituation. We suggest the following relationship exists between these forms of habituation:

1. The nutrient density of a given area controls the number of bears it can support.
2. Bear-to-bear habituation is facilitated by bear density. As bear numbers increase, bears interact more frequently with other bears, and bear-to-bear habituation is more likely to occur.
3. Bear-to-human habituation may be facilitated by bear-to-bear habituation. In high-density bear areas we expect bear-to-human habituation to be more prevalent than in lower density areas. Bears in high density areas have small ORDs (Herrero et al. 2005)
4. Human-to-bear habituation is facilitated, in large part, by the degree of bear-to-human habituation occurring in an area. When people spend time around bears with very small ORDs, people tend to habituate to these bears, that is, they lose their wariness of bears.

### *Bear-to-bear habituation*

Rich forage resources promote high-density bear populations in Alaska (Hilderbrand et al. 1999). High-density populations and clumped, high-quality foods such as salmon (*Oncorhynchus* spp.) facilitate bear-to-bear habituation (Bunnell and Tait 1981, Aumiller and Matt 1994). We postulate that bears' social flexibility enables habituation to one another, thus allowing them to use rich forage resources that would otherwise be unavailable to them (Egbert 1978, Jope 1983, Craighead et al. 1995). Bear-to-bear habituation promotes tolerance for conspecifics as manifest by extremely short ORDs, occasionally as short as the reach of their paws. Bears foraging in aggregations at Brooks Falls or McNeil Falls, mere meters apart, is an example of bear-to-bear habituation. By not responding to conspecifics at

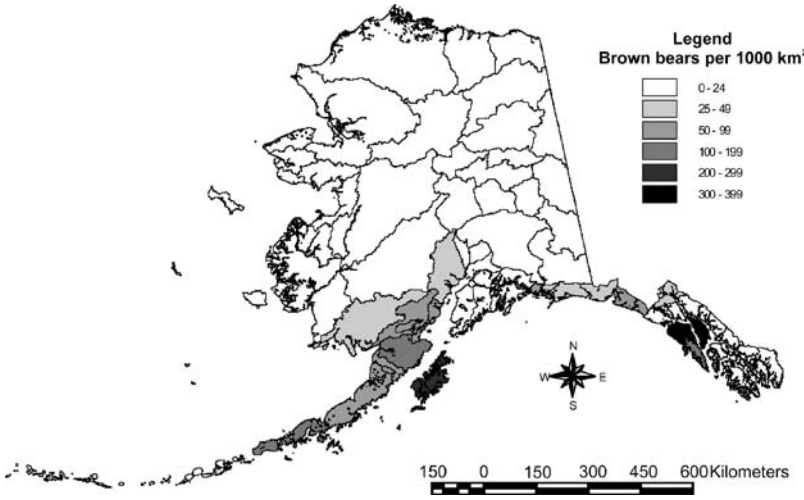


**Fig. 1. Density of brown bears in Alaska, USA (Miller et al. 1997).**

extremely close distances, access to abundant salmon is made feasible and the energetic costs and injuries associated with intraspecific conflict ameliorated. We hypothesize that bear-to-bear habituation provides relatively safe bear viewing opportunities for humans because: (1) habituation toward other bears appears to be generalized to people, thus eliminating the single greatest source of brown bear-inflicted injury: surprise encounters (Herrero 1970, 2002), and (2) habituation reduces food-defending behaviors, which are also a frequent cause of human-directed attacks (Herrero 1970, 2002). Seasonal aggregations of highly tolerant bears provide excellent bear viewing conditions throughout Alaska. The most popular areas include Anan Creek, Pack Creek, Wolverine Creek, Brooks Camp, and McNeil River. Bear-to-bear habituation has been observed to increase with prolonged interaction with conspecifics. Stonorov and Stokes (1972), and Bledsoe (1987) noted that the intensity and frequency of aggressive interactions between conspecifics at feeding aggregations declined sharply over time.

### *Bear-to-human habituation*

Bear-to-human habituation results as bears adapt to the innocuous presence of people. Many have reported bears habituating to people at bear-viewing areas throughout Alaska (Stonorov and Stokes 1972, Warner 1987, Aumiller and Matt 1994, Olson and Gilbert 1994). Although most bears at aggregations exhibit attenuated wariness to people, some are slow to habituate (Bledsoe 1987), whereas others avoid these areas altogether (Aumiller and Matt 1994, Olson and Gilbert 1994). Large male bears are reportedly the least tolerant of human activity at bear-viewing sites (Olson et al. 1997, Smith 2002, Nevin and Gilbert 2005). In an extreme case of bear-to-human habituation, some adult females have been observed caching their cubs near aggregations of people, presumably to protect them from other bears while they fish (Peirce and DeBruyn 1999, Nevin and Gilbert 2005). A number of costs and benefits accrue for both species when bears habituate to the people (Herrero et al. 2005).

Although bear-to-human habituation occurs across the gradient of bear densities, we believe that as bear numbers decline, the occurrence of bear-to-human habituation becomes less prevalent. Regardless of density, however, bear-to-human habituation may occur whenever bears come in frequent and benign contact with people. This is most likely to take place in parks, sanctuaries, or other reserves where bears are protected from hunting and where human activities are more stringently controlled. For example, although brown bear densities at Denali National Park and Preserve are 1/20th those of Katmai (Miller et al. 1997), reports of bears habituating to human presence along the Denali Park road are not uncommon (Albert and Bowyer 1991). However at Denali, experience suggests that ORDs to humans are typically longer than for denser populations (J. Keay, US Geological Survey, Kearneysville, West Virginia, USA, personal communication, 2004). In the absence of scientific data, we recommend research that explores factors that influence bear ORDs across a gradient of bear densities in Alaska.

### *Human-to-bear habituation*

The close association of many bears and people at bear-viewing locations in Alaska may lead to another form of habituation: human-to-bear habituation. Human-to-bear habituation occurs when a person's initial response of caution and wariness to brown bears gives way to a careless casualness. Bear biologists C. Servheen and J. Schoen (1998, Brown bears at Brooks Camp, Katmai National Park: recommendations for management, National Park Service Alaska Regional Office, Anchorage, Alaska, USA) described human-to-bear habituation occurring at Brooks Camp when they wrote

> Humans habituate to bears at Brooks. This results from repeated encounters with bears at close range . . . Such bears

are often described as 'cute' by people and these people tend to lose their common sense by getting too close. There is a need to identify ways to lessen habituation in visitors.

Human-to-bear habituation at Brooks Camp has long been a concern of the NPS (M. Wagner, NPS, St. Mary, Montana, USA, personal communication, 2004) and noted by others (Schullery 2001). As with the other 2 forms of habituation, when bear numbers are low and bear-to-human habituation is rare or non-existent, human-to-bear habituation is less likely to occur. Exceptions exist, however, such as the low density brown bear population at Prudhoe Bay, Alaska. Drawn to human activity centers by unsecured garbage, these bears become food-conditioned, mingle closely with humans, and do not display aggressive behaviors. Consequently, people at Prudhoe Bay are strikingly casual and unconcerned with these barren-ground grizzlies (R. Shideler, Alaska Department of Fish and Game, Fairbanks, Alaska, USA, personal communication, 2004). We provide no test of this hypothesis in this paper, but believe that this third form of habituation exists, affects bear–human interactions, and is worthy of future research effort.

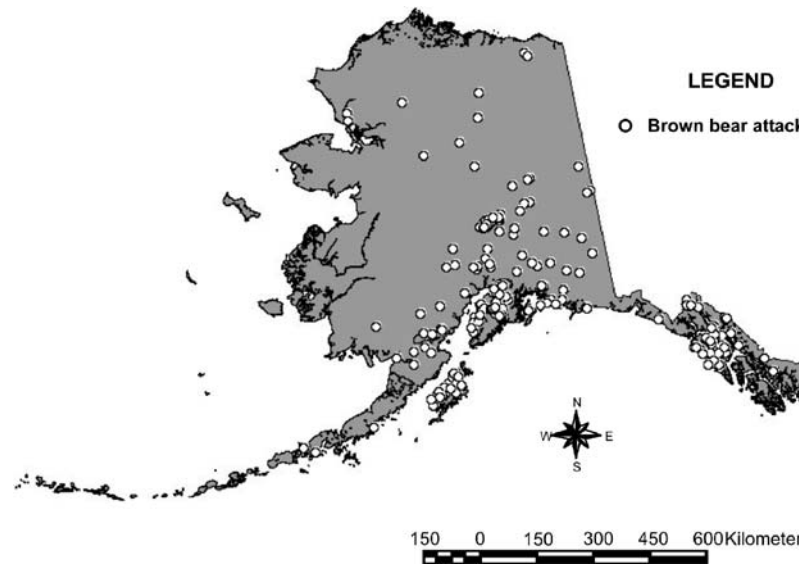


**Fig. 2. Location of brown bear attacks in Alaska, USA 1900–2004.**

In some areas of Alaska we observe all 3 forms of habituation simultaneously. For example, Katmai National Park's Brooks Camp occasionally hosts >300 people daily, drawn by the opportunity to observe as many as 60 brown bears feeding on salmon. At Brooks and other bear aggregations, bear-to-bear habituation reduces bears' ORDs, thus enabling them to gain access to the river with a minimum of conflict. Because bears' ORDs are very small at Brooks Camp, perhaps only a few meters, only 2 bear attacks have been recorded in the past 50 years (T. Smith and S. Herrero unpublished data).

The shorter the ORD, the less likely a person will violate a bear's personal space and prompt an aggressive response; hence, bears at aggregations such as Brooks are safely viewed throughout Alaska. This is not to suggest, however, that brown bears at aggregations are somehow less capable of inflicting serious injury on a person. Rather, we acknowledge that it is less likely a person will unintentionally trigger an aggressive response at aggregations. At Brooks Camp, the proximity of many bears and people facilitates bear-to-human habituation, where bears' wariness of people wanes due to frequent, innocuous contact. The resulting lack of aggressive responses toward people, in turn, fosters human-to-bear habituation as the fear of bears wanes as the result of repeated exposures without negative consequences.

## A density-dependent bear behavior hypothesis

Analysis of the distribution of bear attacks in Alaska (Fig. 2) identified a number of potential explanatory factors (T. Smith and S. Herrero unpublished data). Among these, bear density appears to strongly influence the frequency of bear–human conflict. For example, 59% of all brown bear attacks occurred in areas of the lowest bear density (Fig. 3), and brown bears at the lowest and highest densities, respectively, exhibited significantly shorter and longer charging distances (51.8 m, SE = 9.0 vs. 10.1 m, SE = 2.6 m, Fig. 4). We attribute the pattern of attack distribution to underlying bear density, while recognizing that other factors contribute. For example, the spike in incidents for densities around 300 bears/1,000 $km^2$ reflects high levels of ungulate hunting in those areas (Fig. 4). Importantly, incidents reported at the lowest density are >16× the number of those reported at the highest density. We also note what appears to be a threshold effect of density, where bear attacks in the lowest density areas dominate attack records.

Our interpretation of both the number of attacks and charge distances is that bear density acts to modify a bear's ORD: bears at the lowest densities have the

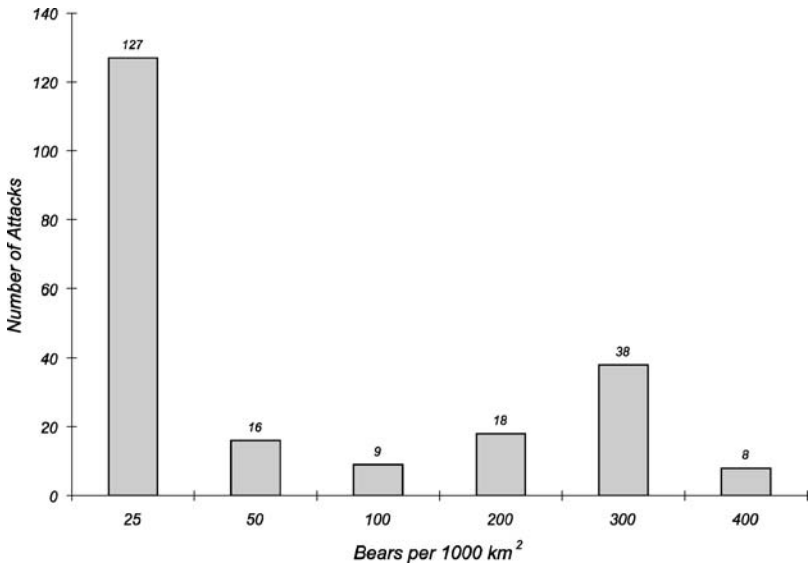


**Fig. 3. Relationship between brown bear density and the number of bear attacks, 1900–2004. Density is presented in bears/1,000 km$^2$. Numbers above bars are counts.**

longest ORDs, whereas bears at the highest densities have the shortest. When ORDs are long, humans are more likely to unintentionally trigger an aggressive response from a bear, hence the relationship between bear density and attack frequency (Fig. 3). Stated another way: although humans stand a much greater chance of meeting a bear in high-density areas like the Alaska Peninsula, the likelihood of that encounter escalating to conflict is much lower than a bear encounter in a low density area, such as interior Alaska. This suggests that the process of bear-to-bear habituation not only reduces intraspecific conflict at aggregations but is also responsible for creating the relatively safe environment in which close-up bear viewing occurs at high-density bear aggregations in the state. The effects of bear-to-bear habituation are manifest beyond areas of bear viewing and foster a safer bear–human experience wherever high-density populations of bears occur.

Failure to recognize this phenomenon can lead to confusion. For example, the Katmai General Management Plan (National Park Service 1986:108) stated that bear–human conflict at Brooks Camp has been rare because bears have habituated to humans there, but continued that ''... it was not clear why [bear attacks] have been rare in areas of Katmai beyond Brooks Camp'', where bear–human contact is rare. Work by Sellers et al. (1998) suggests that many Katmai coastal brown bears rarely, if ever, encounter human activity. We suggest that the lack of conflict is primarily due to bear-to-bear habituation, rather than bear-to-human habituation, and offer that as an explanation why the park has had minimal bear–human conflict beyond Brooks Camp.

There could be fewer attacks in high density bear areas because of higher food availability. Certainly, food is the ultimate factor that results in short ORDs. However, short-term fluctuations in food availability do not seem to influence bear aggressiveness toward people, although fluctuations have been cited as responsible for increased bear–bear aggression during low salmon years at McNeil (Egbert and Stokes 1974). If food availability were an important influence on bear aggressiveness, we would expect to see increases in bear–human incidents when food is scarce. Statewide, we do not see this pattern in bear attacks; food is scarce in both spring and fall, which have the lowest rates of bear attacks (T. Smith and S. Herrero unpublished data). Nor does this pattern exist at smaller scales, such as at the Brooks River where bears often aggregate weeks in advance of the arrival of salmon. These are anecdotal observations, and research could further answer this question by testing changes in ORD through time for known bears.

Several have claimed that bear-to-human habituation is the main factor responsible for creating safe bear-viewing at sites in Alaska (Aumiller and Matt 1994, Whittaker and Knight 1998). We do not deny that bears habituate to people and that this can enhance human safety. We do, however, maintain that bear-to-bear habituation is primarily responsible for the tolerant demeanor bears often have toward one another, and this tolerance sets the stage for humans to commingle at close range without great risk. Additional data that support our hypothesis include the following 4 points.

First, control of human activity (temporal, spatial, and numerical) has not significantly altered the outcome for humans at bear-viewing aggregations. For example, McNeil River State Game Sanctuary (state controlled) and Brooks River (federally controlled) bear-viewing sites have different management approaches. At McNeil River, only 10 people daily (plus at least 1 sanctuary guard) view bears at the McNeil Falls. Daily trips to and from the Falls are along the same path and essentially

at the same time. McNeil has never experienced a significant bear–human conflict. Brooks River, on the other hand, has few temporal, spatial, or numerical controls over visitors beyond established trails, boardwalks, and viewing platforms. On the busiest days, >300 people traverse the area unbounded by established trails, and yet no significant bear–human conflict has occurred in the past 50 years. Hence, we maintain that the safe environment enjoyed by people at bear-viewing sites is largely a result of bear-to-bear habituation, rather than bear-to-human habituation. Optimizing the temporal-spatial predictability of humans at bear aggregations is a laudable management objective. However, we cannot conclude that the way in which people have been managed at these 2 sites has been the primary factor responsible for their impressive visitor safety records.

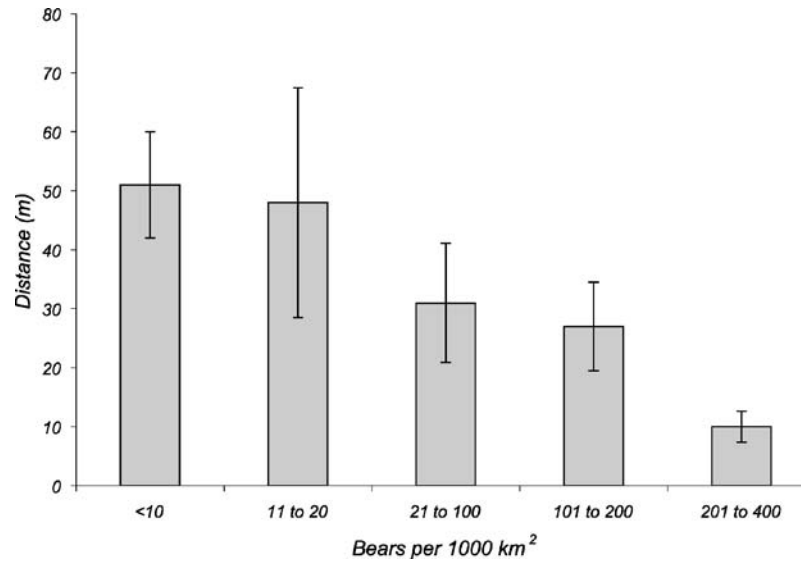


**Fig. 4. Relationship between brown bear density and charge distances. Error bars represent 1 standard error.**

Second, intraspecific aggression in brown bears that occasionally results in fatalities and cannibalism has been widely reported in the literature. Sellers et al. (1998) reported a 75% mortality rate for cubs <2 years of age at Katmai and speculated that much was attributable to intraspecific predation. Bears' lives are filled with intraspecific strife, as evidenced by scarred hides, injurious fights, and the occasional loss of life (Stonorov and Stokes 1972, Egbert 1978). This conflict undoubtedly results in a strong aversion by individual bears toward certain conspecifics. Hence, we maintain that bears are primarily concerned with conspecifics, and humans secondarily. Although bears exhibit wariness to people that may wane over time through repeated exposure (bear-to-human habituation), they consistently show high levels of wariness for approaching, or close, conspecifics (T. Smith and T.D. DeBruyn personal observation).

Third, at Brooks Camp and McNeil River there has been no observed spike in bear–human conflicts when bears that have not been observed previously suddenly arrive. These bears presumably lack habituation to humans (a reasonable supposition, since other centers of human activity are distant from the Brooks Camp area), yet the newcomers tolerate people (T.D. DeBruyn personal observations). We suggest that this tolerance for people evolves from bear-to-bear habituation rather than bear-to-human habituation. An alternative hypothesis may be that bear-to-bear habituation sets the stage for rapid bear-to-human habituation. Research directed to answer this question is warranted.

Fourth, in Alaska the National Park Service's policy regarding safe approach distances to bears reflects a working knowledge of the underlying variation in brown bear aggressiveness. Katmai National Park, which supports one of the highest density populations of brown bears in Alaska (Miller et al. 1997), recommends that people maintain at least a 50-yard buffer from bears (NPS 2003). Denali National Park, known to support a very low-density brown bear population, directs visitors to maintain a minimum buffer of 400 yards between themselves and bears (J. Van Horn, 2004, Rationale for ¼ mile viewing distance for bears, NPS memo to Denali Park Assistant Superintendent, Denali National Park headquarters, Denali Park, Alaska).

## Implications of misunderstanding

Many carnivores exhibit large intraspecific variations in social structure between populations (Sandell 1989), and brown bears are no exception (Gilbert 1989). Failure to recognize the behavioral plasticity inherent among ursids may lead to misunderstandings regarding local populations. For instance, the popular work by Treadwell and Palovak (1997) detailing his extremely close association with a high-density population of brown bears along Katmai's coast (e.g., approaching to within

meters and even touching wild bears) fails to note that regional differences in bear ORDs (i.e., tolerance) to people exist and that Katmai bears represent an extreme along a continuum of ORDs. Failure to make that distinction may lead others to assume that close approaches to wild bears are possible if one only fosters the attitude and behaviors set forth by Treadwell and Palovak (1997).

In another example, a letter to the Alaska National Parks regional director cautioned that Brooks Camp was "the most dangerous bear–human interaction situation" and that "the issue is not if a death or injury will result, it is when it will happen" (C. Servheen and J. Schoen, 1998 Brown bears at Brooks Camp, Katmai National Park: recommendations for management, National Park Service Alaska Regional Office, Anchorage, Alaska, USA). Much of the management advice in this document is valuable and appropriate, but failure to recognize that the demeanor of bears in high-density aggregations is fundamentally different (i.e., that their ORDs are considerably shorter) than those occurring elsewhere unnecessarily elevates concerns for safety. In over 50 years of intense human activity at Brooks Camp, only 2 people have sustained injuries by bears. Although human safety is of paramount importance at bear-viewing sites, management must be based on realistic perceptions of the risks associated with specific sites. Clearly, there are risks associated whenever people freely commingle with foraging brown bears. But historical records support our contention that the magnitude of risk inherent at Brooks Camp is far less than that depicted by those failing to consider the effects of bear-to-bear habituation.

## Management and research implications

Our theory that high bear density modifies bear tolerance toward humans has several management implications. Bear viewing at seasonal aggregation sites throughout Alaska has proven to be a reasonably safe activity, in spite of concerns voiced by some. This is consistent with our hypothesis that increased tolerance for conspecifics at these sites is generalized to humans. We suggest that this understanding should temper management concerns for human safety at these sites. Secondly, our theory may have important implications regarding the ethics of hunting bears that are also subjected to bear-viewing operations. Further research to determine the spatial and temporal context of habitation is warranted. Finally, our theory predicts that the length of a bear's ORD will vary inversely with the bear density in the area (the lower the density, the longer the ORD). Consequently, distances at which people can reasonably expect to view bears will vary by location and should be reflected in site specific guidelines (Herrero et al. 2005).

Because many studies claim to have involved habituated bears but have not documented the phenomenon, research is needed. Because some claim that bear viewing habituates bears to humans and that hunting those same bears is unethical, specific research addressing this issue is needed. Carefully constructed studies aimed at separating the effects of tolerance-to-humans and habituation-to-humans is needed. Research investigating whether habituation to humans is site-specific would also contribute to our understanding of how habituation functions in bears populations. Finally, we noted that bear-to-human habituation can occur under a variety of circumstances and may have differing consequences for people who commingle with these bears. Specific research to explore these phenomena and expand our understanding of habituation would be unifying.

## Conclusions

A paradigm is a basic interpretive structure that frames our inputs from the natural world. It provides a means for interpreting data from science. Unfortunately, a false paradigm may cause us to filter data that do not fit our expectations (Barash 1982). We have presented a new paradigm for understanding habituation and how it functions among Alaskan brown bear populations. We maintain that bear-to-bear habituation is the single most important factor that influences brown bear aggressiveness toward humans on a regional scale. It is our desire to foster positive bear–human interactions across the continuum of bear densities in Alaska. By acknowledging that regional differences in bear aggressiveness exist, and applying that knowledge to bear–human interactions, we may be able to co-exist more peaceably with this important species.

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