

Bear spray, yes or no?

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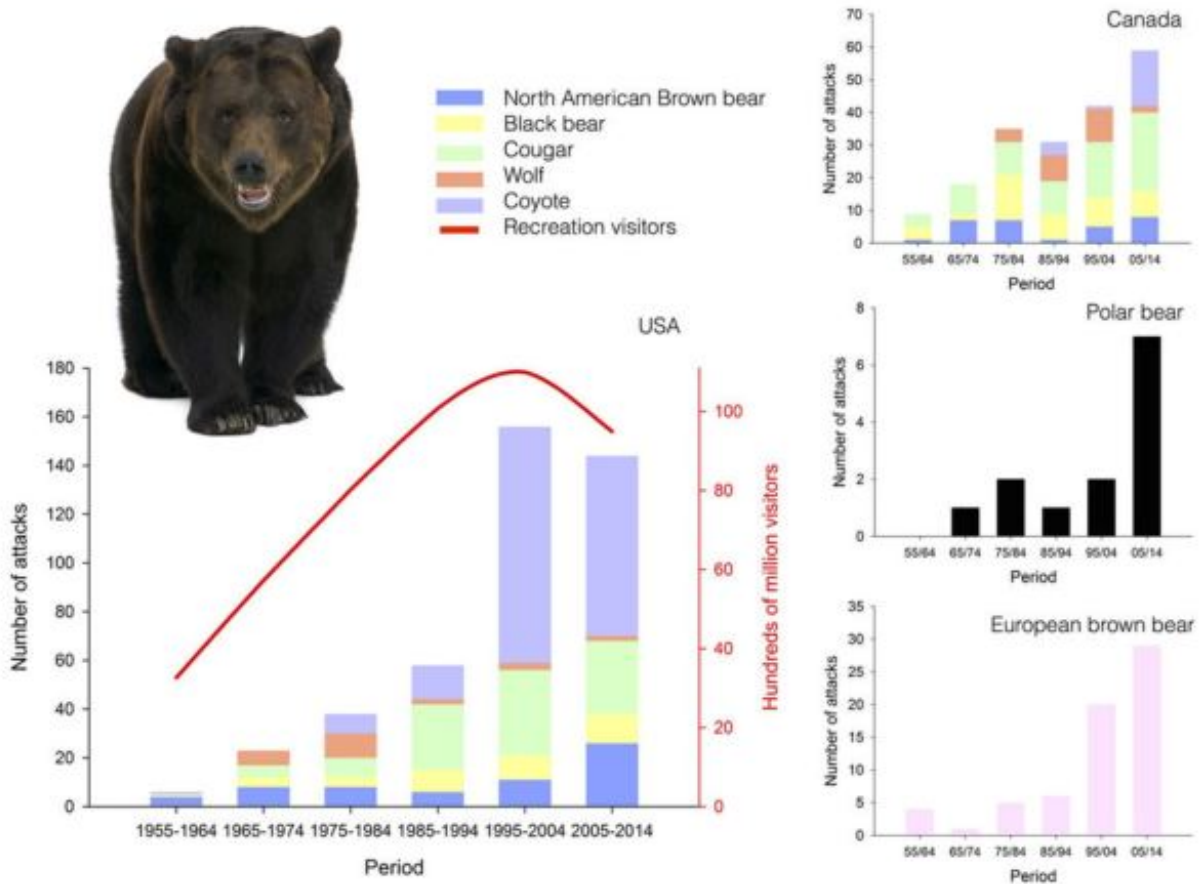


Illustration from the study “Human behaviour can trigger large carnivore attacks in developed countries”

In the wake of a bear attack in which bear spray didn't work, in a world with animal attacks trending upward, more than a few Alaskans are pondering the effectiveness of the popular pepper spray which had come to be considered the be-all to end-all in bear protection in the 49th state.

Twenty-seven-year-old Erin Johnson from Anchorage died June 19 after she and a coworker were attacked by a predatory black bear while doing environmental studies in brushy forest about five miles from the state's largest underground gold mine.

Johnson's coworker sprayed the bear with a canister of red-pepper bear deterrent. The capsicum-based sprays have generally worked in other cases, but the spray failed to drive off this bear, which was later shot by a mine employee near Johnson's body.

Why the spray didn't work has been the subject of considerable discussion, though there have long been questions about pepper spray and predatory bears.

“Whether the spray would be effective against potentially predaceous black bear remains unanswered,” Stephen Herrero and Andrew Higgins from the University of Calgary wrote in a 1998 study published in Ursus, a journal published by the International Association for Bear Research and Management.

The study – “FIELD USE OF CAPSICUM SPRAY AS A BEAR DETERRENT” – examined 66 cases in which the spray was used from 1984 to 1994.

“In 94 percent of the close-range encounters with aggressive brown (grizzly bears), the spray appeared to stop the behavior the bear was displaying immediately prior to being sprayed,” they wrote. “In three of these cases, the bear attacked the person spraying....In all three injurious encounters, the bear received a substantial dose of spray to the face.”

Since that study, there have been dozens of other cases in which spray has successfully driven off bears and a few cases where people have been injured by bears after spraying them. But until the Pogo tragedy there were no reports of a case in which spray was used and someone died.

How exactly the spray was used in that incident remains unknown. For the spray to be effective on a quietly approaching, predatory bear, there is some evidence to indicate that it needs to be sprayed into the animal's face at very close range – a matter of a few feet – to maximize the determined animal's exposure to the pepper.

Predatory bears

Alaska has witnessed a number of predatory bear fatalities in recent years. Four years before Johnson was attacked and killed just east of Delta Junction on the Alaska Highway, a black bear killed and partially consumed 64-year-old Robert Weaver near George Lake just east of Delta Junction.

A year earlier in Denali National Park and Preserve, a grizzly bear killed and partially consumed 49-year-old Richard White from San Diego. After White's death, it was suggested he was partially to blame for failing to carry pepper spray and for taking photographs of the bear at close range.

White had previous experience hiking in Denali, where the bears largely ignore people. It is not uncommon for bears there to approach within tens of feet of groups of people. White started taking photos of the bear that killed him at a distance of about 40 yards, the National Park Service reported.

The photographs left behind in his camera revealed a bear that sensed his presence and then began a methodical approach. Rangers who viewed the photographs, which were never publicly released, said there were none that indicated the bear charged.

And ranger Pete Webster told the Anchorage Daily News at the time that in the last couple of photographs the bear had “a definite, focused stare.”

Rob Foster, a Canadian biologist, describes seeing a similar look on the face of a predatory black bear before it attacked him in 2013. Foster drove the bear off with spray, but it came back. He sprayed it three more times and threatened it with the spray many more times over the course of a 45-minute encounter.

Marti Miller, a U.S. Geological Survey geologist who was actively stalked by a black bear in central Alaska, said she will never forget seeing the look in that bear’s eyes. A colleague of Cynthia Dusel-Bacon, an unarmed geologist a bear tried to eat in central Alaska, Miller was carrying a gun for bear protection. Miller shot and killed the animal.

In Foster’s case, the spray helped him escape the bear, but it wasn’t easy. And Foster’s aggressiveness toward the bear might have played as big a role in his survival as the spray. With the bear aware the object in Foster’s hands could make it uncomfortable, Foster repeatedly charged the bear waving the can as if he was about to spray.

That, Foster said, caused the bear to back off. And after the 45-minute dance of predatory and prey, with Foster the potential prey, the bear finally gave up the attack and slipped away into the woods.

Whether the spray would have worked on the grizzly that approached White as prey will never be known, but the Denali incident fits the most commonly agreed upon definition of a predatory bear attack:

The bear approaches calmly, kills someone, drags the body to a feeding location, and begins feeding on it. Dusel-Bacon, who lost her arms but survived an attack by a predatory black bear in the Pogo area in 1977, describes being dragged by the animal to its feeding location before it started ripping away chunks of her flesh. Denali Park rangers shot the bear that killed White atop a food cache where it was defending the man’s remains from other bears.

Discussions of predatory bears attacks have largely focused on black bears since Stephen Herrero, a noted bear authority, and Andrew Higgins published a 2011 study cataloging an average of one such attack per year by black bears in North America since the 1960s.

But there have been a number of predatory attacks on people by grizzly bears – the bigger, more powerful relative of the black bear – in Alaska. The year White was killed and partially eaten in Denali, the same thing happened to another man on Chichagof Island

north of Sitka in the Alaska Panhandle.

And in the most famous bear attack in Alaska history, both self-professed “bear whisperer” Timothy Treadwell and his girlfriend Amie Huguenard were killed and largely eaten by a grizzly bear, what Alaskans often call a “brown bear,” in Katmai National Park and Preserve in 2003.

Treadwell had neither spray nor a gun for bear protection. He felt no need for either. He had spent 13 years getting close to bears in Katmai – close enough to pet, hug and kiss them – and believed he fully understood the animals’ behavior.

And he did until he met the rare, predatory bear.

The Treadwell case illustrates both the danger of such a bear and how rare the phenomenon. Treadwell had thousands of bear encounters, possibly tens of thousands of bear encounters, in the years before that October night when a predatory bear invaded his camp.

His last words, recorded on the audio of a camera turned on at the start of the encounter though the lens remained covered, were a request for Huguenard to hit the bear with a frying pan, the couple’s only weapon. That didn’t work.

Whether bear spray would have proven more effective is debatable.

Interesting theory

Sean Farley, a bear researcher and wildlife physiologist with the Alaska Department of Fish and Game, emphasized that bear spray has proven hugely effective on charging bears, especially charging grizzlies.

But he noted the physical state of those bears. They charge with eyes wide open, nostrils flaring and often huffing air into their lungs. They are fully exposed to the active ingredient in the spray – oleoresin capsicum, an oily extract from the pepper plant.

Unlike tear gas, which appears to work poorly on bears, capsicum causes more than just irritation to the eyes. Inhaled, it inflames airways making it temporarily harder to breathe and from what is known about research on humans, it might do even more than that.

“With acute exposure, there is rapid onset of constitutional symptoms including nausea, fear and disorientation,” a 1999 study on the “Health Hazards of Pepper Spray” concluded.

Dave Smith, the author of a book on bear safety, said how well the spray works on bears might depend on so something as basic as whether “the bear is breathing in or breathing out” when the spray hits.

Reactions to capsaicin, that health study noted, are highly dose dependent. A charging grizzly is likely to get a big dose of capsaicin. That is not necessarily the case for a predatory bear.

Farley describes predatory bears as approaching with eyes squinting, mouths shut and nostrils narrowed. They come in like bears approaching beehives ready to suffer a bit to get the food they want. Their physical preparations would serve to minimize the dose of spray hitting the bear.

Couple such a dose-minimizing approach with a bear's inherently high pain threshold, Farley said, stir in the individual variability of bears who like people might have greater or lesser tolerances for capsaicin, and you can come up with a pretty good theory as to why some bears appear able to tolerate spray.

U.S. Fish and Wildlife Service biologist Brad Benter, who has experience with spraying several bears that barely responded, describes spray as "better than nothing," but warns people need to be aware it might not work very well.

Twice, Benter said, he has sprayed bears in the face from as close as six feet and solicited only a minimal reaction. In one case, he said, the bear backed away from the weatherport into which it had been peering. In the other, the bear just ignored the spray.

In neither of those cases did the spray spark aggression, but "it wasn't like the bears went away," Benter said.

Benter, ironically, was among the first of a bunch of mountain runners to respond to the scene of a predatory bear attack that left 16-year-old Patrick "Jack" Cooper dead along a popular hiking trail just off a busy highway only 25 miles south of Alaska's largest city on June 18. Benter had bear spray with him and thought about rushing the bear to try to get it away from Cooper's body.

With others in the area, however, including more young runners, he calculated the risk of such a move was too great. He has wrestled with that decision ever since, though it would appear he made the absolutely right call.

Documented danger

After 37-year-old Texan Patti McConnel was killed by a black bear near Laird River Hot Springs Provincial Park in British Columbia, Canada in 1997, a local man tried to drive the bear off her body.

Raymond Kitchen, 56, from nearby Fort Nelson was "believed to have been an experienced hunter familiar with the habits of bears," the Associated Press reported at the time. Canadian officials say Kitchen hit the bear in the head with a shovel. Such an aggressive

attack would normally send a black bear fleeing.

This one instead attacked and killed Kitchen. Black bears – which are almost never aggressive in defense of their cubs, a behavior exactly the opposite of grizzly bears – appear every bit as dangerous as their bigger cousins when defending what they consider to be their food.

The best way, and possibly the only safe way, to deal with such a bear is with a bullet. The Laird “bear was shot and killed by a tourist who rushed to get a weapon,” the AP reported. The bear on Cooper’s body was shot and wounded by a Chugach State Park ranger and later shot and killed by employees of the state Division of Wildlife Conservation.

The bear found guarding Johnson’s body was killed by a Pogo employee.

Sales pitch

Bear spray is pitched by almost everyone these days as a must-have piece of Alaska safety gear, though the risks of being attacked by a bear are so low it is reasonable to wonder how much people should worry about bears at all.

Statistically, you are orders of magnitude more likely to die in a motor vehicle or boating accident in Alaska than to be attacked by a bear, let alone killed by one.

No bookmaker has ever calculated the odds on being killed by a bear in Alaska, but the National Park Service once ran the numbers for Yellowstone National Park.

The odds of being attacked by a bear in Yellowstone were put at 1 in 2.1 million. Bear densities in Yellowstone are a half or less those in Alaska. So the odds in Alaska would be fall to one in a million or less – maybe as low as 1 per 100,000 or 200,000 – in areas where bears concentrate.

But even with that, the risks pale next to many other ways of dying. The odds of being killed by a dog in the U.S. are 1 in 112,400, according to the National Safety Council, and you’re about twice as likely to die in a severe storm or from a slip in the bathroom.

The biggest dangers are things people take for granted on a day-to-day basis like riding a motorcycle, where the odds of death are calculated at 1 in 985; taking a walk where there are motor vehicles, odds of death at 1 in 647; succumbing to the injuries from a motor-vehicle crash, odds at 1 in 114; falling victim to a respiratory disease, odds at 1 in 28, or dying from cancer or heart disease, odds at 1 in 7.

Given the latter two categories, a valid argument could be made that it is actually safer to put in earbuds and go for a run oblivious to the many bears along the Brooks River in bear-infested Katmai National Park and Preserve than to lounge on the sofa watching TV, eating

chips and drinking beer as your cardiovascular system slowly decays.

“Folks are terrible at risk assessment,” said Jeff Benowitz, an assistant professor of geochronology at the University of Alaska Fairbanks, and a veteran Alaska climber and adventurer. “Twenty-six years of spending months in the backcountry every year, often alone, stalked by three bears – two brown, one black – in that time and chased them off by my being a big, nasty bear.

“Bears are way down on my fear list, avalanches and rock fall being rated much higher.”

This logical observation makes Benowitz an oddity. The numbers mean nothing to most people. Bears spark a primal fear, and bear-spray – no matter its limitations – has become the antidote for that fear.

National Geographic in 2015 labeled spray “a revolutionary tool for better co-existence” between people and bears.

The Sierra Club is now lobbying the federal government to make it a requirement that anyone entering a national forest home to grizzlies carry spray. Some tout bear spray as more effective than firearms though the evidence is nowhere that clearcut.

What can be said for certain is that the spray is better for bears, at least in the short-term, because it saves their lives. The long-term consequences for both bears and humans are unknown.

Guns

Guns kill bears. There is no doubt about that, and tens of thousands of black bears have been gunned down in North America in the past decade.

At the same time, black bear populations have grown and are now thriving in Canada and in many U.S. states from California in the west to New Jersey in the east and as far south as Florida.

Biology functions on the basis of populations, not individuals. Saving individual animals when a population is endangered is vital, but there is nothing wrong with killing dangerous animals when a population is healthy, and killing those animals might be good for people.

A comprehensive 2016 study of the growing number of attacks by bears, wolves, coyotes and cougars in both North America and Europe observed that the uptick in attacks and deaths may “reflect an increasing number of bold individuals in large carnivore populations, as this trait is often correlated with aggressiveness, and this might lead to more aggressive responses when large carnivores encounter humans. We hypothesise that

intense and prolonged human-caused mortality imposes selection pressures on target populations (selective removal of certain phenotypes) and might lead to rapid evolutionary changes.

“Natural selection maintains a mix of behavioural phenotypes in populations, the shy-bold behavioural continuum; bold individuals thrive on risk and novelty, whereas shy individuals shrink from the same situations. Persecution, however, is expected to result in the disproportionate removal of bold individuals, as they are less cautious, and thus more likely to be killed. As a consequence, shy individuals might have been over-represented in remnant large carnivore populations in the past. Additionally, individuals may become more vigilant and actively avoid contact with humans during times of intense persecution.”

The study posed a sobering question of what happens if this trend continues.

“The contemporary conservation paradigm emerged during the 1960s–1970s, when most bounty systems were banned and large carnivores were reclassified from vermins or bountied predators to game or protected species,” the authors wrote. “Since then, although large carnivores have continued to be hunted or managed, most populations have generally increased during the past four decades. Increasing population trends in conjunction with relaxed artificial selection may potentially engender higher variation in behavioural temperaments, which is likely to alter individual responses to human encounters. This significant increase of large carnivore populations in both North America and Europe, and their consequent range expansion, also may contribute to explain the observed increase in the attacks on humans.”

The paper buttresses the argument for killing aggressive bears – dozens of which are killed in Alaska every year in what are classified as legal, “defense of life and property (DLP)” shootings.

DLP shootings, which dramatically boost the number of incidents in which guns are effective, complicate the debate on what weapon – bear spray or a gun – is best for protection from bears in remote Alaska, though weapons are but one tool for defense.

Other defenses all too often get overlooked in a discussion that moves quickly to technological solutions to ending bear problems with little discussion of simpler solutions. The best ways to avoid bear problems remain to travel in groups, make noise, and avoid bears.

If you see them, give them lots of room. If you get into an area with a lot of concentrated bear sign, back track or head in a different direction. If you think there are bears around, make a lot of noise to scare them off. If you meet one up close, stand up to the bear and make it obvious you’re not an easy target. If you have to, drive the bear off by throwing rocks or sticks.

Even predatory bears apparently after another kill have been driven back by groups of aggressive people.

But if you do run into that rare, predatory bear – especially if you are alone – Smith, the author of “Backcountry Bear Basics,” is one of those who believes you might be better off with a gun than with spray.

He has been tracking bear spray use in the Lower 48 and believes it is seriously over-hyped.

“Bear spray is holy, holy, hold, down here,” the former Alaskan said by telephone from his home in Arizona. Smith is not an opponent of bear spray. Like Benter, Foster and a lot of Alaska wildlife biologists, he considers spray a tool, and like all tools it has its pluses and minuses.

“Bear spray is a good deal, and there are a lot of people who don’t like guns or don’t want to carry a gun for other reasons,” he said before ticking off a list of bear-spray pluses:

Lighter than a gun; requires less training; no risk of an accidental, fatal shooting; and no real skill required for use.

“So fine, go to bear spray,” he said, “but realize you’re giving up something.”

There is simply not enough evidence to conclude – as some have – that bear spray is more effective than a firearm, Smith said, and the attack on Johnson at Pogo Mine underlines that. Smith is deeply critical of government officials for suggesting bear spray might be more effective than a firearm.

He is of the belief that it was only a matter of time before the growing faith in bear spray got someone killed. He’s not alone.

“I have never used bear spray,” said Rob Wright. “I don’t trust an aerosol can for one. You can’t take it on commercial airlines...and they’re finding out that it isn’t working very well.”

Trained as a wildlife biologist, Wright is now in the business of protecting people from bears. He runs a Fairbanks-based company that teaches bear safety and provides “bear guards” for the employees of mining and petroleum exploration companies working in wild Alaska.

“I teach bear safety with a shotgun,” he said.

The Pogo Mine is reported to have hired a number of bear guards to provide protection for those doing work in wild areas away from the mine proper since Johnson’s death. Pogo spokeswoman Lorna Shaw did not return phone calls asking about guards.

Meanwhile, the question of whether Alaskans should rely on spray, simply stop worrying about bears, or arm themselves is undergoing another round of discussion in a state where some popular salmon fishing streams – such as the Kenai Peninsula’s Russian River – already sport so many bear-fearing, pistol-packing anglers that the gun wary worry about the dangers of an accidental shooting linked to a bear.

That has never happened in Alaska. But there have now been a number of people accidentally gassed with pepper spray at the Russian.

CORRECTION: This story was edited July 12, 2017 to reflect that the odds in Yellowstone Park were calculated for bear attacks, not fatalities. The odds of being killed are significantly less. Most people survive bear attacks. And since the study cited in this story, a new analysis has lowered the odds to 1 in 2.7 million visits with the odds for those using only developed areas of the park falling to 1 in 25.1 million. The odds do increase to 1 in 232,000 for backpackers hiking between campsites, but even that is a low risk level compared to driving to the park.

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