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June 21, 2016

Via Hand-Delivery

Jim Unsworth, Chair
Matt Hogan, Co-Chair
Interagency Grizzly Bear Committee
U.S. Forest Service, Northern Region
Building 26 Fort Missoula Road
Missoula, MT 59804

Re: IGBC Bear Spray Recommendations and Implied Commercial Endorsement

Chairman Unsworth and Co-Chairman Hogan,

UDAP Industries, Inc. ("UDAP") has retained Crowley Fleck PLLP as its government relations counsel to present its concerns to the Executive Committee regarding the IGBC's bear pepper spray recommendations and the appearance of implied endorsement of a commercial bear spray product. We appreciate the opportunity to present UDAP's position at the upcoming meeting in Bonners Ferry, Idaho on June 23. The points outlined below and the related exhibits are submitted in support of UDAP's presentation and its request for this Committee to take swift and appropriate action in response to UDAP's concerns.

Before addressing the particulars, please understand that UDAP shares and participates in the IGBC's mission to conserve and protect bears and to keep people safe while traveling in bear country. Public outreach and education regarding bear awareness and bear spray safety are common goals of UDAP and the IGBC. Despite this, there is a long history of discord concerning the IGBC's bear spray recommendations and perceived endorsement by the IGBC and/or its affiliates of one particular brand of EPA-registered bear spray to the exclusion of all others. To resolve these on-going issues and concerns, UDAP is requesting that the IGBC Executive Committee take several actions, as outlined below. It is believed that these reasonable and justifiable steps will lead to communicating accurate and reliable information to the public, contribute to public safety and bear conservation, and forge a new and collaborative relationship so that the IGBC may properly focus its resources on coordinating the recovery of grizzlies and UDAP may concentrate on producing a safe and effective bear pepper spray product.

To this end, UDAP is requesting the following motions be made at the upcoming meeting:

MOTION REQUEST NO. 1

THAT THE IGBC WITHDRAW THE 6-SECOND SPRAY DURATION RECOMMENDATION AND RECONSIDER THE COMMITTEE'S ROLE IN ISSUING PUBLIC POSITION STATEMENTS ON BEAR SPRAY PRODUCT PERFORMANCE AND EFFICACY.

This motion request is supported by the following points, which will be presented in more detail at the meeting:

- The 6-second duration recommendation is not supported by science or empirical data.

  - ✓ No scientific study, research, or empirical data states or otherwise suggests that a 6-second spray duration is necessary for safety or efficacy of bear sprays. **Ex. 1 (compilation and excerpts of bear spray research).** Studies do, however, support using bear spray that is capable of multiple shots or bursts of bear-stopping pepper spray, but this is not necessarily a function of spray duration. Rather, it is a function of the volume of product in the can, product delivery-rate, and how the user deploys the spray. **Ex. 2 (J. Kapeles Letter).**

  - ✓ Available science does not support a bear spray duration recommendation. Indeed, Professor Tom Smith, PhD (BYU), a leading bear researcher and wildlife biologist, has concluded that all of the EPA-registered bear spray products on the market "fall within an acceptable range of effectiveness," despite the fact that not all sprays meet the IGBC's 6-second recommendation. Further, based on the data Dr. Smith collected, "there is no indication that any of the commercially available products bests another by durations that vary by a few seconds." **Ex. 3 (Dr. Smith Letter).**[1] *Accord* **Ex. 4 (Dr. Stringham Letter).**

- The 6-second duration recommendation is arbitrary and has no meaningful or rational relationship to product performance or efficacy.

  - ✓ Whether a bear spray discharges in 6 or more seconds is irrelevant so long as the volume of the can is capable of producing multiple, bear-stopping sprays and the user knows how to properly deploy it. There is nothing "magic" about 6 seconds. If used properly, bear spray products capable of discharging faster than 6 seconds are not less safe or less effective than those of a similar volume that discharge in 6 or more seconds. **Ex. 3; Ex. 4; Ex. 5 (E. Burge Letter); Ex. 6 (G. Bettas Letter).**

  - ✓ Given equal sized cans with equal volume and potency of bear spray product, the can with a faster discharge rate will result in a higher velocity spray, greater distance, and a higher delivery-rate (measured in weight of product discharged per second), meaning a bear-stopping dose of deterrent spray can be delivered faster and further than the slower discharging can. **Ex. 2; Ex. 9 (MTDC Test Data).** Nevertheless, the IGBC's current recommendations suggest that a can which discharges slower provides superior protection.

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[1] Exhibit 1 is an unsigned version of Dr. Smith's letter. A signed letter will be submitted to the IGBC Executive Committee upon Dr. Smith's return from Alaska.

This recommendation is groundless. Given similar capsaicin content, the relevant considerations in terms of efficacy are volume, delivery-rate, and how the user deploys the spray. ***See* Ex. 2; Ex. 4; Ex. 5.**

- ✓ A one-size-fits-all numeric spray duration standard is an improvident metric upon which to base a public recommendation because it fails to account for variability in capsaicin delivery-rate, among other factors, as between EPA-registered bear spray products on the market.

- ✓ The 6-second recommendation also fails to account for variability in discharge duration based on external environmental factors, such as outside temperature or elevation. The outside temperature at the time of discharge can significantly affect spray duration due to increases or decreases in can pressure. For example, a bear spray canister that empties in 4 seconds at 80 degrees may last 6 seconds at 40 degrees. ***See* Ex. 5.**

- ✓ In terms of efficacy, there is no meaningful difference between bear spray cans of similar volumes that empty in 4, 5.4, 6, or even 9 seconds, if each can is capable of delivering multiple bursts of spray with sufficient capsaicinoid content to deter a bear attack, and is deployed properly according to the manufacturer's instructions. ***See* Ex. 4; Ex. 5; Ex. 6.**

- The IGBC's apparent rationale for a 6-second spray recommendation is misguided.

  - ✓ The IGBC recommends "spray duration of 6 seconds to compensate for multiple bears, wind, bears that may zigzag, circle, or charge repeatedly, and for the hike out." IGBC Bear Spray Report (June 2008). These scenarios suggest the need for a bear spray canister that is capable of multiple bear-stopping sprays and that has sufficient reserve volume for possible bear encounters on the hike out. A 6-second spray duration recommendation is an inaccurate and under-inclusive standard to compensate for these scenarios because it excludes bear spray canisters capable of addressing these situations, but that do not meet the 6-second requirement. ***See, e.g.*, Ex. 7 (R. Nance Letter).** Moreover, the standard is contrary to the Yellowstone Ecosystem Subcommittee's original Bear Spray Position Paper which recommended using the "largest size available" (not longest duration) to compensate for the above factors. **Ex. 12 (YES Bear Spray Position Paper).**

  - ✓ For example, UDAP's 7.9 oz / 225 gram canister of Pepper Power (its smallest and fastest emptying) fully discharges in approximately 4 seconds. The canister is capable of four 1-second bear-stopping bursts of spray. A user would have the ability to discharge three shots to compensate for multiple bear and repeated charge scenarios, or other environmental conditions, and would still have one remaining shot for the hike out. Dr. Smith's bear spray efficacy research indicates that, where data were provided, 100% (59 of 59) of bear encounters were deterred in three sprays or less. **Ex. 3**. Moreover, IGBC's own test data for UDAP suggests that a 1-second burst would be sufficient to deter most bear attacks. A 0.836 second burst of UDAP spray will travel approximately 18 feet in under 1 second. **Ex. 9.** After the initial burst is released, the spray will continue to propel forward and billow outward beyond 25 feet to create a protective cone of bear spray fog. Dr. Smith's research indicates that 96% of the time bears were sprayed at 23 feet or less

and those sprays were 98% effective. Thus, according to Dr. Smith's research, a 1-second burst from a UDAP can would be sufficient to deter an overwhelming majority of bear encounters, and adequate product would remain in the can for multiple charge/spray scenarios and for hiking out.

✓ Additionally, Dr. Smith's bear spray efficacy research indicates that the sight and sound associated with spray release were reported as key factors in changing bear behavior. **Ex. 1 (Smith 2008); *see also* Ex. 1 (Herrero 1998); Ex. 4**. The report also makes note that high exit velocities of spray from cans likely compensates for cross-wind effects and may account for the low incidence of wind-related effects reported in Alaska. **Ex. 1 (Smith 2008).** From this research, one could conclude a product that releases greater amounts of spray in a shorter time would be desired, particularly when seconds or milliseconds matter in the context of a charging bear. ***See* Ex.9; Ex. 4; Ex. 5.**

- The 6-second spray duration recommendation implies that bear spray canisters which discharge in under 6 seconds are ineffective and unsafe, which is untrue.

✓ Pursuant to federal law, all bear spray products are pesticides and are thusly required to be registered by the EPA for review of product safety and design. EPA Pesticide Registration Notice 2002-1 provides a list of "pests of significant public health importance," of which bears are included, and notes that the "list is derived in large part from review of the pesticide/pest combinations for which efficacy (product performance) data are generally required to be submitted and reviewed prior to registration." **Ex. 10 (PR Notice 2002-1).**

✓ There is no evidence that any of the EPA-registered bear sprays currently on the market with a discharge duration under 6 seconds are unsafe or ineffective. To the contrary, bear sprays that discharge under 6 seconds have safely and effectively deterred bear attacks, saved lives, and have kept bears from being removed from the population. **Exs. 4-8.**

- The IGBC's attempt to duplicate EPA's role in certifying/recommending bear spray confuses the public and its own constituent agencies.

✓ The EPA and the IGBC apply differing standards for certifying and recommending bear spray canisters and this dueling oversight from two federal governmental bodies leaves the public confused as to which bear spray products are safe and effective.

✓ Even certain IGBC member agencies are confused about the differing standards. Several National Park Service websites incorrectly indicates that the IGBC's distance and duration recommendations are actually EPA requirements. **Ex. 11.**

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- The 6-second spray recommendation unnecessarily creates fodder for creative marketing tactics that confuse and mislead the public and cause economic and reputational harm to reliable manufactures of safe, effective bear spray.

  ✓ Suspiciously, the 6-second spray guideline has historically excluded all but one bear spray manufacturer from compliance with IGBC recommendations. This manufacturer has developed a widely-distributed (although incomplete) chart comparing certain bear spray canisters based on the IGBC recommendations as a marketing tool to suggest that it is the only company that meets such recommendations, and is, thus, superior. The chart implies that all other bear sprays are less effective, unsafe, or otherwise not recommended by the IGBC. **Ex. 7.** As a result, vendors and consumers of bear spray have expressed confusion and concern about whether UDAP's products are effective at deterring bear attacks and this has caused lost sales and harm to UDAP's reputation. Counterintuitively, it may also have led to the unintended consequence of reducing the number of users carrying bear spray in the backcountry, as YNP visitors have declined to rent UDAP from a vendor after viewing the comparative chart based on IGBC's recommendations. **Ex. 8.**

  ✓ As explained above, the 6-second spray recommendation is arbitrary, capricious, and serves no other meaningful purpose other than to give one bear spray company a market advantage over all others. ***See, e.g.*, Exs. 6-7.**

- Rational and sensible alternatives exist to the 6-second spray guideline.

  ✓ For example, the IGBC could withdraw its numeric bear spray guidelines, defer to EPA regulatory authority, and recommend any EPA-registered bear spray. In this connection, the IGBC could remove itself from the bear spray efficacy business, focus its resources on bear spray education and outreach, and concentrate its efforts not on which bear spray product an individual should use, but on increasing the percentage of backcountry users who carry bear spray. The NPS recently reported that only 28% of YNP visitors who enter the park's backcountry carry bear spray, which, from a bear management and human safety perspective, is unacceptable. The IGBC's role is better served by educating the public to carry EPA-registered bear spray, by encouraging users to become familiar with the specific characteristics of the particular EPA-registered bear spray product they chose to purchase, and to know how to properly use the chosen product consistent with the manufacturer's instructions.

  ✓ Alternatively, the IGBC could invest the necessary resources to develop, in a transparent manner, a defensible, science-based, empirically-driven recommendation adopting a range of appropriate spray durations determined to fall within an acceptable range of effectiveness. Obviously, to do this in a non-arbitrary manner, so as to provide the public with accurate and reliable information, will require a significant commitment of IGBC resources, complete and thorough product testing, and careful scientific and technical analysis. To date, no similar effort has ever been undertaken.

MOTION REQUEST NO. 2

THAT THE IGBC FULFILL ITS PROMISE NOT TO PROMOTE OR ENDORSE ONE COMMERCIAL BEAR SPRAY PRODUCT OVER ANY OTHER.

- In 2007, the IGBC made a commitment to ensure "that all IGBC information materials produced or distributed by or for the IGBC, including the IGBC website, . . . [will] not convey any message or image that could be construed as an endorsement of any single brand of EPA-approved bear spray." **Ex. 13 (Dec. 11, 2007 IGBC minutes).**

- In 2008, the U.S. Department of Interior ("DOI") issued the IGBC an ethics ruling suggesting that "materials which are produced for the IGBC should limit the logos and names of organizations listed in the materials, to the members of the IGBC and organization which has done the production." **Ex. 14 (DOI Ethics Opinion).** It was specifically recommended that "if the IGBC continues to use CWI [Center for Wildlife Information] for its publications and other materials, that CWI only include the organizations within the IGBC and the CWI logo and do not include organizations which are aligned with CWI but not necessarily with the IGBC." ***Id.***

- The IGBC's commitment has not been fully honored and the DOI's recommendation has not been fully implemented. While the IGBC has made improvements, such as sometimes using a *blue* can of bear spray instead of a *red* one, the appearance of IGBC promotion or endorsement of one particular brand of bear spray continues to pervade the IGBC's website and other informational materials made available to the public. For example:

  - ✓ The IGBC's numeric bear spray recommendations continue to promote one particular brand of bear spray to the exclusion of all others, and, as explained above, the IGBC lacks a rational or legitimate basis for doing so.

  - ✓ The IGBC's website prominently displays Counter Assault bear spray canisters. **Ex. 15.**

  - ✓ The concluding page of the IGBC Bear Spray Report (June 2008) depicts various bear spray educational products, all of which prominently display a red can. **Ex. 16.** Counter Assault is the only bear spray manufacturer to use a red can.

  - ✓ The IGBC website contains links to the Center for Wildlife Information website which contains numerous bear awareness and bear spray materials that were created for the IGBC, with public funding from the IGBC, and which prominently depict a red can. **Ex. 17.** Some of these publications also contain the Counter Assault logo and website. The CWI materials have not been modified to comply with the U.S. DOI's ethics recommendations and, yet, they remain in distribution by the IGBC and its constituent agencies.

  - ✓ The IGBC website contains links to Yellowstone National Park's "A Bear Doesn't Care" campaign materials, which depict celebrities carrying a red can. **Ex. 18.**

- If the IGBC is to continue educating the public about bear awareness and bear spray use, it ought to do so in a neutral manner that does not – directly, indirectly, or by appearance – endorse or promote a single bear spray manufacturer over all others.

Thank you again for giving UDAP the opportunity to voice these concerns to the IGBC Executive Committee. We look forward to working with you to resolve these matters.

Sincerely,

CROWLEY FLECK PLLP

Gregory F. Dorrington

TABLE OF EXHIBITS

Exhibit No.	Document Title or Description
1.	Bear Spray Scientific Research (full reports, excerpts, and citations)
2.	John Kapeles (Safariland) Letter of Support, June 2016
3.	Dr. Tom S. Smith Letter to UDAP, June 14, 2016 (unsigned)
4.	Dr. Stephen Stringham Letter, June 20, 2016
5.	Eric Burge Letter of Support, with attachment, June 21, 2016
6.	George Bettas Letter of Support, June 15, 2016
7.	Robert Nance (SABRE) Letter of Support, June 21, 2016
8.	Sally Vering Letter of Support, June 15, 2016
9.	MTDC Bear Spray Test Photos, September 23, 2008
10.	EPA Pesticide Registration Notice 2002-1 (excerpt)
11.	NPS Websites Conflating IGBC and EPA Standards
12.	Yellowstone Ecosystem Subcommittee – Bear Spray Position Paper
13.	IGBC Winter Meeting Minutes, December 11, 2007 (excerpt)
14.	DOI Ethics Opinion (Matthew J. Costello), January 14, 2008
15.	IGBC Website Depicting Counter Assault
16.	Last Page of IGBC Bear Spray Report Depicting Red Cans
17.	IGBC Website with Active Links to CWI & CWI Sample Publication (from CWI Website)
18.	IGBC Website with Active Links to NPS "A Bear Doesn't Care Campaign"

Management and Conservation Note

Efficacy of Bear Deterrent Spray in Alaska

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TERRY D. DEBRUYN, *United States National Park Service, Alaska Support Office, 240 W 5th Avenue, Anchorage, AK 99501, USA*
JAMES M. WILDER, *Minerals Management Service, 3801 Centerpoint Drive, Suite 500, Anchorage, AK 99503-5823, USA*

ABSTRACT We present a comprehensive look at a sample of bear spray incidents that occurred in Alaska, USA, from 1985 to 2006. We analyzed 83 bear spray incidents involving brown bears (*Ursus arctos*; 61 cases, 74%), black bears (*Ursus americanus*; 20 cases, 24%), and polar bears (*Ursus maritimus*; 2 cases, 2%). Of the 72 cases where persons sprayed bears to defend themselves, 50 (69%) involved brown bears, 20 (28%) black bears, and 2 (3%) polar bears. Red pepper spray stopped bears' undesirable behavior 92% of the time when used on brown bears, 90% for black bears, and 100% for polar bears. Of all persons carrying sprays, 98% were uninjured by bears in close-range encounters. All bear-inflicted injuries ($n = 3$) associated with defensive spraying involved brown bears and were relatively minor (i.e., no hospitalization required). In 7% (5 of 71) of bear spray incidents, wind was reported to have interfered with spray accuracy, although it reached the bear in all cases. In 14% (10 of 71) of bear spray incidents, users reported the spray having had negative side effects upon themselves, ranging from minor irritation (11%, 8 of 71) to near incapacitation (3%, 2 of 71). Bear spray represents an effective alternative to lethal force and should be considered as an option for personal safety for those recreating and working in bear country. (JOURNAL OF WILDLIFE MANAGEMENT 72(3):640–645; 2008)

DOI: 10.2193/2006-452

KEY WORDS Alaska, bear deterrent spray, bear–human interactions, black bears, brown bears, polar bears, *Ursus americanus*, *Ursus arctos*, *Ursus maritimus*.

Throughout North America, bear–human conflict periodically results in serious, sometimes fatal, injuries to both bears and humans (Herrero 2002). These conflicts between bears and people include negative interactions that are aggressive, defensive, or nuisance in nature (Gore et al. 2006). A few studies have investigated bear–human conflict in North America (Herrero 1970; Middaugh 1987; Herrero and Higgins 1999, 2003; Miller and Tutterow 1999). Miller and Tutterow (1999) reported that brown bear (*Ursus arctos*; synonymous with "grizzly bear" and hereafter brown bear) attacks resulted in 2.75 injuries and 0.42 deaths per year in Alaska, USA, from 1986 to 1996.

Miller and Chihuly (1987) found that 72% of nonsport brown bear deaths in Alaska were the result of aggressive bear–human interactions. It is likely that some of these bear fatalities could have been avoided had nonlethal deterrents been available. On Alaska's Kenai Peninsula, the number of brown bears killed in defense of life or property has increased more than 5-fold in recent years and presently exceeds population sustainability (Suring and Del Frate 2002).

People rely on a variety of deterrents for protection from bears, including firearms, red pepper sprays, signal flares, incendiary screamers, and an assortment of noise makers (Herrero 2002). Red pepper spray repellants, hereafter bear spray, were initially developed in the 1960s as a defense against aggressive domestic dogs (Miller 2001). The active ingredients in bear spray, capsaicin and related capsaicinoid compounds, produce a nonlethal yet debilitating response, including coughing, sneezing, bronchoconstriction, apnea, retrosternal discomfort, laryngeal paralysis, and temporary blindness (Miller 2001). Miller (1980) tested dog repellent sprays on captive brown bears and found that charging bears were stopped when sprayed in the face. Spraying resulted in swift retreats to the farthest corner of the cage where bears rubbed their eyes and blinked vigorously (Miller 1980). Encouraged by these results, Miller (1980) advocated the development of red pepper spray–based repellents for bear defense.

Initial tests of the improved formulation and packaging proved promising, so research trials were conducted involving captive bears (Hunt 1984). Rogers (1984) reported positive results when red pepper spray was used on free-ranging black bears (*Ursus americanus*). Importantly, none of these studies reported bears responding aggressively when sprayed.

Herrero and Higgins (1998) analyzed 66 nonexperimental incidents in which bear spray was used on both wild brown and black bears and found that in aggressive encounters with brown bears bear spray ended the bears' unwanted behavior in 94% (15 of 16) of incidents. However, in 6 cases the bear continued to act aggressively; in 3 of these cases the bear attacked the person spraying. In 88% (14 of 16) of the cases the bear(s) eventually left the area after being sprayed. Results regarding black bears were more variable, but no humans were injured after spray use.

Some people have been reluctant to rely on bear spray for protection. We believe several reasons contribute to their reluctance. Chief among these is the notion that bear sprays are too weak to dissuade curious or aggressive bears from approaching people. Additionally, some people believe that wind can easily render sprays ineffective and that wind-driven spray may incapacitate the user. We present data from Alaska bear spray incidents that address these concerns. Additionally, we present bear spray incidents involving polar bears (*Ursus maritimus*), the first reported in

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the literature. Our goal was to provide data regarding the effectiveness of bear spray over a 20-year period. Given the overall lack of evaluation of the efficacy of bear–human conflict interventions, including bear spray, analysis of bear spray effectiveness is needed (Gore et al. 2006). Insight about bear spray efficacy may contribute to more informed decisions regarding its use and reduce human injury and nonsport loss of bears.

METHODS

We collected bear spray incident records from 1985 to 2006 from state and federal agencies, newspaper accounts, and anecdotally. We included all Alaska records (31) previously analyzed by Herrero and Higgins (1998) so we could present a comprehensive, updated assessment of bear spray incidents from Alaska. Bear spray incident variables of interest included date, time, location of incident, number of persons involved, person's activity before interaction, bear species and age-sex class, bear's activity before being sprayed, manufacturer of spray used, wind effects, effects on humans, dosage of spray administered, dosage of spray received, distance to bear when sprayed, bear's response to spray, mechanical problems, and whether the bear returned after being sprayed. Whenever records were incomplete ($n = 10$), we interviewed individuals involved. We regrouped values for the variable distance to bear when sprayed into broader categories to aid analysis (e.g., 0–5 m, ≥6–10 m, and ≥11–20 m). Subjectivity of incident records, presence of confounding factors (e.g., multiple manufacturer's products having been used), and small sample sizes limited statistical analyses.

We pooled bear spray incident data by bear species and bear behavior, consistent with Herrero and Higgins (1998). Data included incidents involving black, brown, and polar bears. We labeled bears curious if they were exploring the environment in a nonaggressive manner. We deemed bears aggressive when the encounter included behaviors such as charging, agonistic vocalizations, or persistent following (Herrero and Higgins 1998). In some instances, we could not infer the bear's behavior and we classified those behaviors as unknown.

We pooled data by behavior of the bear before being sprayed into 2 categories, food motivated and nonfood motivated, consistent with Herrero and Higgins (1998). Bears in the first category were perceived to be searching for human food or garbage. If aggressiveness was involved in these incidents, it was with respect to acquiring food or garbage. Bears in the second category were acting aggressively, and they were not attempting to acquire food or garbage.

We defined successful outcomes as bear spray having stopped the undesirable behavior of the bear. A bear that no longer pursues a person, breaks off an attack, abandons attempts to acquire food or garbage, or turns and leaves the area are examples of successful outcomes. We deemed failures spray incidents in which the bear continued its pursuit, persisted in attempts to acquire food or garbage, or showed no change in its undesirable behaviors. A bear not leaving an area after being sprayed, however, was not deemed a failure so long as threatening behaviors, rummaging through trash, or direct risks to people ceased.

To address wind effects on spray, we tested the velocity of bear spray issuing from canisters at the actuator, or nozzle, using a Kestrel wind meter (Nielsen-Kellerman, Inc., Sylvan Lake, MI). We held the meter approximately 5 cm from the actuator and released a 1-second burst of spray. We recorded maximum wind speed attained. We replicated this procedure 5 times to calculate a mean exit velocity for bear spray. We used the G test for goodness-of-fit for differences between observed and expected frequencies (Dytham 2003). We selected the G test because we were dealing with observed frequencies of various categories and expected proportions for those categories that we did not derive from the data. We set significance at $P = 0.05$.

RESULTS

We analyzed 83 cases involving the use of bear sprays in Alaska (Table 1), of which 72 incidents involved persons spraying menacing bears, and the remainder ($n = 11$) are examples of spray misuse or bear attraction to residues. We address instances of bear spray misuse separately.

From 1985 to 2006, our sample of bear spray incidents showed that Alaska averaged 3.1 ± 0.7 reported bear spray incidents per year. Of the 83 incidents we examined, brown bears were involved in 61 (74%), black bears in 20 (24%), and polar bears in 2 (2%; $G_1 = 96.6$, $P < 0.001$). Of the 72 cases where persons defensively sprayed bears, 50 (69%) involved brown bears, 20 (28%) black bears, and 2 (3%) polar bears ($G_1 = 73.0$, $P = 0.000$). All instances of spray misuse ($n = 11$), or of spray residues attracting bears, involved brown bears. In 92% (46 of 50; $G_1 = 41.4$, $P < 0.001$) of close-range encounters with brown bears, spray stopped undesirable behavior in which the bear was engaged. In 90% (18 of 20; $G_1 = 14.7$, $P = 0.001$) of close-range encounters with black bears, spray stopped the bear's undesirable behavior. All bear-inflicted injuries ($n = 3$) involved brown bears and were relatively minor (i.e., no hospitalization required). During 1985–1995, Herrero and Higgins (1998) found bear spray use in Alaska 94% effective overall (30 of 32 incidents; $G_1 = 31.3$, $P < 0.001$); we found that in the decade following bear spray, efficacy was 90% (36 of 41 cases; $G_1 = 33.4$, $P < 0.001$).

Bear spray incidents for which time of day was known (65%, 47 of 72) show that none occurred between 0100 hours and 0600 hours, 14 (30%) occurred between 0600 hours and 1200 hours, 14 (30%) occurred between 1200 hours and 1800 hours, and 18 (38%) occurred between 1800 hours and 2400 hours; only one (2%) occurred between 2400 hours and 0100 hours (Fig. 1).

In 96% (69 of 72) of bear spray incidents the person's activity at the time was reported (Fig. 2). The largest category involved hikers (35%), followed by persons engaged in bear management activities (30%), people at their home or cabin (15%), campers in their tents (9%),

Table 1. Bear spray incident data from Alaska, USA, 1985–1995 and 1996–2006. We did not include incidents of misuse ($n = 11$) with these data.

	Decade of study	
	1985–1995[a]	1996–2006[b]
Total no. of incidents	32	40
Black bears (total)	6	14
Single bears	4	13
F with cubs	2	1
Brown bears (total)	26	24
Single bears	21	11
F with cubs	4	9
Large M	0	2
Pair of bears	1	2
Polar bears (total)	0	2
Single bears	0	2
Injuries inflicted[c]	0	3
Successful deterrence (no.)[d]	30	36
%	94	90
Return after spraying[e]	5	8
Mean distance to bear (m)	3.4	4.8
Behavior before spraying		
Aggressive	9	16
Curiosity	23	23
Indeterminable	0	1

[a] Data from Herrero and Higgins (1998).
[b] Data from this study.
[c] Minor injuries resulting in outpatient treatment (e.g., scratches and lacerations).
[d] Spray was deemed successful when the undesirable behavior of the bear was stopped.
[e] No. of incidents in which the bear returned after initial spraying.

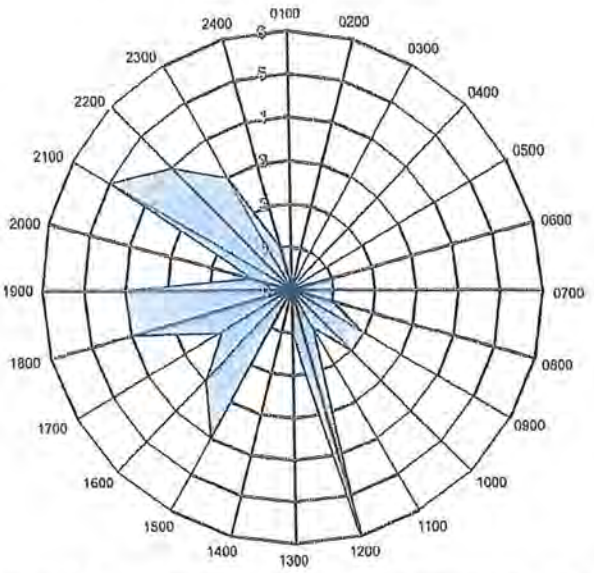

Figure 1. Temporal distribution of bear spray incidents by time of day (hr) in Alaska, USA, 1985–2006. Radial lines are time of day; concentric circles represent counts.

people working on various jobs outdoors (4%), sport fishers (4%), a hunter stalking a wounded bear (1%), and a photographer (1%). Persons injured in bear spray incidents included 2 hikers and one field biologist.

In 62% (31 of 50) of brown bear incidents bears were either acting curious or searching for food or garbage before being sprayed. Of these bears, 13% (4 of 31) were acting aggressively with respect to obtaining food; 87% (27 of 31) were not acting aggressively. In 77% of incidents (24 of 31), one bear was involved, but in the remaining incidents females with cubs made up 10% (3 of 31), large males 7% (2 of 31), and a pair of siblings 7% (2 of 31) of bears involved. In 100% (29 of 29; $G_1 = 32.8$, $P < 0.001$) of these incidents, use of bear spray stopped the undesirable behavior of the bears involved. In 17% of incidents (5 of 29; $G_1 = 13.5$, $P = 0.001$), the bear returned after being sprayed.

In 68% (13 of 19) of black bear incidents, bears were either acting curious or were searching for food or garbage. Of these bears, none acted aggressively toward people while in pursuit of human foods. In 77% (10 of 13) of these incidents, one bear was involved, but the remaining 23% (3 of 13) involved family groups. In 85% (11 of 13; $G_1 = 6.9$, $P = 0.032$) of these incidents, bear spray stopped the bear's behavior, whereas in 15% (2 of 13) the outcome was unclear due to confounding factors (i.e., bear trapped inside a structure and unable to flee, linkage between spraying and cessation of behavior unclear). In 11% (2 of 19; $G_1 = 13.6$, $P = 0.001$) of incidents, the black bear returned to the site following initial spraying.

In both polar bear incidents, subadult bears approached humans in a pickup truck there to observe bears feeding on bowhead whale (*Balaena mysticetus*) remains near the village of Kaktovik, Barter Island, Alaska, USA. In both instances (100%), bear spray stopped the bear's approach and turned the bear away. Neither of these bears returned to the truck following spraying.

In 36% (18 of 50) of brown bear incidents, brown bears acted aggressively towards people before being sprayed. In 86% (12 of 14 for which distance was known) of these incidents, the person was first aware of the bear at <15 m, with a mean estimated distance of 6 m. In the remaining 2 instances, bears were first noticed at 25 m and 50 m, respectively. In 64% (9 of 14) of these close encounters, brown bears charged the person(s) before being sprayed. In 85% (12 of 14; $G_1 = 7.9$, $P = 0.019$) of aggressive encounters with brown bears, bear spray stopped the bear's aggressive behavior; in 12% (1 of 14) the person spraying the bear was not injured, but the bear charged through the fog, halting 1 m from the person before moving off. In 12% (1 of 14) of aggressive encounters the bear contacted and slightly injured the person in the interaction (i.e., deep scratches requiring stitches). Of brown bears involved in aggressive interactions unrelated to food procurement, 38% (6 of 16) were single bears, 56% (9 of 16) were females with dependent young, and 6% (1 of 16) were a pair of bears. In 3 instances (21%, 3 of 14) aggressive brown bears returned after being sprayed.

In 35% (7 of 20) of incidents involving black bears, bears acted aggressively towards people without an apparent food-related motive. In 4 of these 7 aggressive incidents, the bear was apparently surprised at close range (≤15 m). Only in one case (1 of 7, 14%) did the black bear charge before being sprayed. In 100% (7 of 7) of bear spray incidents

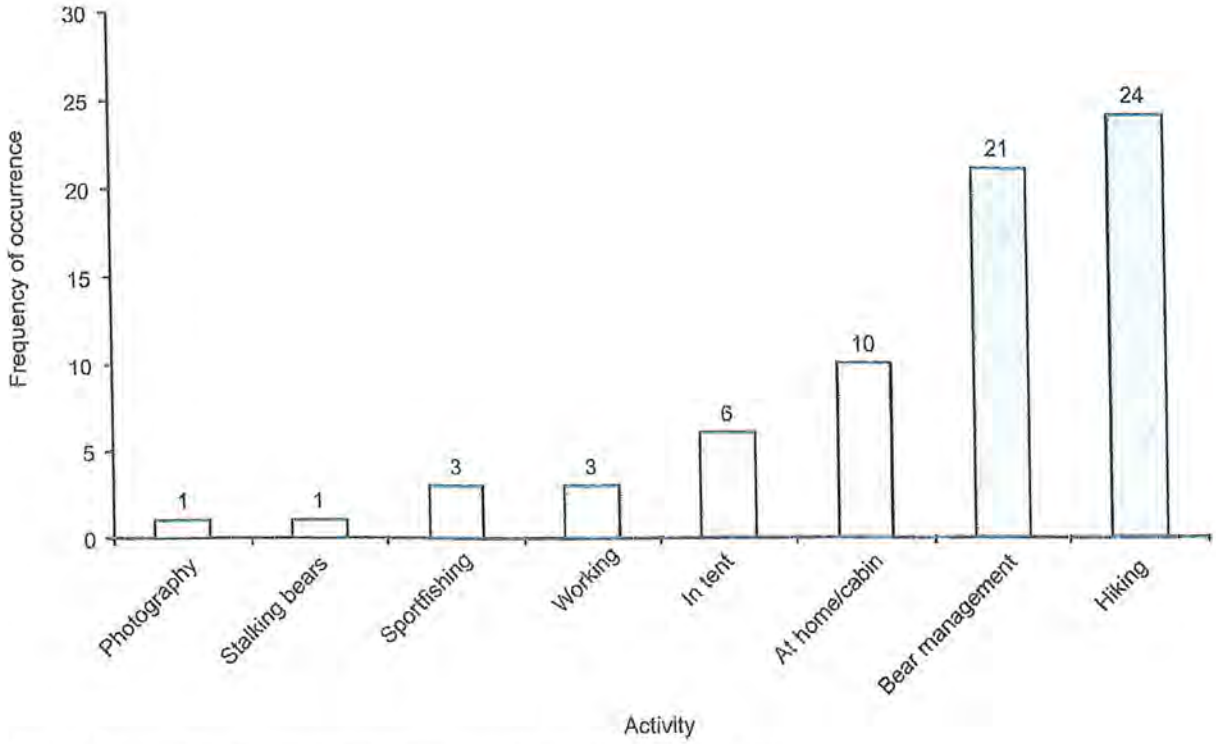

Figure 2. Primary activity of persons involved in bear spray incidents in Alaska, USA, 1985–2006.

involving aggressive black bears, the undesirable behavior was stopped by spraying. No one using bear spray was injured by black bears in any behavioral mode, aggressive, food seeking, or curious. Of black bears involved in aggressive interactions, 100% (7 of 7) were single bears, one reportedly a subadult and the others adults. After being sprayed, 3 bears (43%, 3 of 7) returned, 3 did not return (43%, 3 of 7), and one (14%, 1 of 7) did not leave the general area.

In 7% (5 of 71) of bear spray incidents, wind was reported to have interfered with spray accuracy, although it reached bears in all cases. In 14% (10 of 71) of bear spray incidents, users reported spray having negative side effects upon themselves, ranging from minor irritation (11%, 8 of 71) to near incapacitation (3%, 2 of 71).

On 10 occasions (14%, 10 of 71) the sight and sound associated with spray release were reported as key factors in changing bear behavior. In 67 spray incidents for which distance was reported, the mean distance between user and bear at the time of spraying was 4 m (range 1–15 m). One user commented that he had "squarely hit the bear" at 10 m, although at distances >5 m success was variable. When bears were sprayed at ≤3 m (33 cases), the spray always enveloped the bear, with only one resulting in a failure to deter the attacking bear.

Three persons (<2% of the 175 persons involved in 71 separate incidents) suffered injury by bears that had been sprayed with bear deterrent. One person halted the attacking bear by spraying it at close range in the face, and the other 2 persons were unable to spray a second dose because the initial attack knocked the spray canister from their hands. Nonetheless, only one of the 3 reported that the spray had failed to protect them. No mechanical failures of spray canisters were reported in the 71 cases.

We analyzed 11 incidents of spray misuse that resulted in unintended consequences. In 45% (5 of 11) of incidents, persons applied spray to objects they hoped to protect from damage by curious bears; these efforts all failed. In 2 instances (18%), persons applied sprays as a zonal repellent but reported bears inordinately attracted to these locations (i.e., tent and on river bank). In 2 instances (18%), persons reported bears attracted to spray residues following use of bear spray for practice purposes. Repeated sprays ($n = 5$) with fully pressurized cans showed mean exit velocities >112 ± 4 km/hr (70 ± 2 miles/hr).

DISCUSSION

Two decades of bear spray use in Alaska confirm that it is an effective bear deterrent. Findings by Herrero and Higgins (1998) regarding the efficacy of bear spray in Alaska from 1985 to 1995 were comparable to ours for the following decade, 1996–2006. As there were only 2 incidents involving polar bears, these results should be interpreted with caution. However, we located 3 additional polar bear incidents, 2 from Russia and one from northern Canada, which support our findings (Cochran 2000, Ovsyanikov 2004). In Russia and Canada, bear spray successfully protected the user from injury by aggressive polar bears. The only injuries ($n = 3$)

associated with bear spray usage in Alaska were inflicted by brown bears, consistent with findings by Middaugh (1987) and Herrero and Higgins (2003) that brown bears are the most aggressive of all 3 North American bear species.

We found little change in the overall efficacy of bear sprays between the 2 decades of study (94% vs. 90%), in spite of reported improvements by manufacturers (e.g., increased capsaicinoid content, pressure, and dispersal distance). Differences in bear deterrent spray brand formulation (e.g., % capsaicin, chemical carrier composition, and vol), spray duration, and distance exist, but our data were too few for rigorous performance comparisons or analysis.

In 18% of cases we analyzed (13 of 72), both brown and black bears resumed their threatening behavior after having been sprayed the first time. In these instances, repeated spraying eventually deterred bears such that the user could escape the situation. Bear spray diffuses potentially dangerous situations in the short term by providing the user time to move out of harm's way and allowing the bear time to reassess the situation and move on. When food or garbage is involved with bear conflict, bear spray is effective initially, but one can expect bears to continue returning until these attractants are removed or otherwise secured. In surprise encounter situations, bear spray buys time for both the human and bear to go their separate ways.

Consistent with others' findings regarding bear–human conflict, our data show hikers to be the largest group involved in bear spray incidents (Middaugh 1987, Herrero and Higgins 2003). This activity correlates with the most frequent time of day for bear spray use, between 0600 hours and 1800 hours (60%; Fig. 1). The increase in bear spray incidents in the evening (38%; 1800–2400 hr) was largely due to bear management activities.

Wind can influence bear spray's accuracy and distance; however, our data show that wind rarely affected the outcome of bear–human interactions involving bear spray, which is likely because many close encounters do not occur in open areas, but rather in dense brush or forests where wind is greatly attenuated (T. Smith, Brigham Young University, unpublished data; S. Herrero, University of Calgary, unpublished data). High exit velocities of spray from cans likely compensates for cross-wind effects and may account for the low incidence of wind-related effects reported in Alaska. Of the 72 incidents we studied, 4 (6%) involved persons that had to leave the area to alleviate burning eyes and coughing. No one reported being incapacitated by spray, although one user said he had to move or he would have been overwhelmed.

Importantly, latent bear spray residues have been found to attract brown bears rather than repel them (Smith 1998), which was evident in 7 instances in Alaska where persons applied bear spray to objects with the intention of repelling bears. Unfortunately, bears were attracted to, and subsequently destroyed, the property that had been coated with bear spray, similar to observations reported by Smith (1998). These observations underscore a need to carefully manage spray residues by not indiscriminately dispersing spray.

Because some persons had to spray bears multiple times to drive bears off in 24% (17 of 72) of instances we studied, spray conservation, and total canister volume, may be concerns. We suggest discarding bear spray when contents fall below 90% of the original amount (as determined by weighing), or when the canister is past its expiration date, generally 3–4 years from date of purchase.

Management Implications

Our research shows that bear deterrent spray is an effective tool for defusing bear–human conflict in a nonlethal manner. In Alaska, bear spray was highly effective in dealing with all 3 species of North American bears, although more data on polar bear responses is needed. Persons working and recreating in bear habitat should feel confident that they are safe if carrying bear spray. Although bear spray was 92% effective by our definition of success, it is important to note that 98% of persons carrying it were uninjured after a close encounter with bears.

In portions of North America where bears are in decline managers may reduce the number of bears killed in defense-of-life by arming employees with bear deterrent sprays in addition to firearms. No bear spray has ever been reported to kill a bear. It is our belief that widespread use of bear spray will promote human safety and bear conservation.

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FIELD USE OF CAPSICUM SPRAY AS A BEAR DETERRENT

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Abstract: We analyzed 66 cases of field use of capsicum sprays between 1984–94. In 94% (15 of 16) of the close-range encounters with aggressive brown (grizzly) bears (*Ursus arctos*), the spray appeared to stop the behavior that the bear was displaying immediately prior to being sprayed. In 6 cases, the bear continued to act aggressively; in 3 of these cases the bear attacked the person spraying. In 1 of these 3 cases, the bear left after further spraying. In all 3 injurious encounters, the bear received a substantial dose of spray to the face. In 88% (14/16) of the cases, the bear eventually left the area after being sprayed. While we do not know how these encounters would have ended in the absence of spray, the use of spray appears to have prevented injury in most of these encounters. In 100% (20 of 20) of the encounters with curious brown bears or bears searching for people's food or garbage, the spray appeared to stop the behavior. The bear left the area in 90% (18 of 20) of the cases. In only 2 of these 18 cases was it known to have returned. In 100% (4 of 4) of the encounters with aggressive and surprised, or possibly predacious black bears (*Ursus americanus*), the spray appeared to stop the behavior that the bear was displaying immediately prior to being sprayed. However, no bears left in response to being sprayed. In 73% (19 of 26) of the cases associated with curiosity, the spray appeared to stop the behavior. The bear left the area in 54% (14 of 26) of the cases, but in 6 of these 14 cases it returned. In 62% (8 of 13) of the incidents where the black bear received a substantial dose to the face, it either did not leave the area or left the area and returned. Sprays containing capsicum appear to be potentially useful in a variety of field situations: however, variable responses by bears occur. Because the database is composed of diverse field records, the results should be viewed with caution.

Ursus 10:533–537

Key words: black bear, brown bear, capsicum, deterrent, *Ursus americanus, Ursus arctos.*

The number and rate of injuries inflicted by brown bears and American black bears to people appear to be generally accepted as part of having bears and the natural environments that support them and other wildlife. However, because of the tragedy of some bear-inflicted injuries, we will continue to try to reduce the chances of bear-inflicted injury (Herrero 1985). One possible means of decreasing bear-inflicted injuries would be to use a deterrent. Ideally a deterrent would be highly effective against bears but would not permanently injury bears or people. We present results of field use of sprays containing capsicum pepper derivatives as their active ingredient and deployed when bears were acting aggressively toward people, or were demonstrating other undesirable behavior.

The physiological effects of capsicum (*Capsicum* spp., family Solanaceae) derivatives on various animals have been studied (Miller 1980, Hunt 1984, Rogers 1984). Osol et al. (1967) described capsaicin (a common derivative of capsicum) as a powerful local irritant of sensory nerve endings, but causing no blisters. Capsicum causes significant inflammation of certain soft tissues, especially the eyes and respiratory tract of human beings (M. Stalder, Anza Borrego Desert State Park, Borrego Springs, Calif., pers. commun., 1995). In people, capsicum spray can cause involuntary closing of the eyes and temporary loss of muscular strength and coordination. Products containing capsicum are now used in police work against aggressive people. Most researchers conclude that the powerful local effects are temporary on all animals that have been tested, including bears and people (see Rogers [1984] for a review). One human death was, however, caused (11 July 1993 in Concord, N.C.) by police use of oleoresin capsicum on a "combatant" (M. Stalder, Anza Borrego Desert State Park, Borrego Springs, Calif., pers. commun., 1995). The autopsy revealed that the deceased probably had several predisposing conditions, including a "significant underlying pulmonary condition." The spray can also get into the pores of soft contact lenses and can be impossible to completely remove.

When used as a bear deterrent in controlled laboratory tests and in limited field tests, sprays containing 10% capsicum derivative as their active ingredient have generally stopped the behavior evidenced immediately prior to spraying. This was true for laboratory-induced aggression in both brown bears and black bears (Miller 1980, Hunt 1984). Field testing of capsicum spray on aggressive bears has not been previously reported. Rogers (1984) successfully deterred non-aggressive black bears from baits in field tests, but he had a very small sample, $n = 5$. Hunt (1984) reported that black bears were repelled from food baits in 18 of 21 field tests; however 86% of the animals returned and resumed foraging an average of 17 minutes later. Because bears are behaviorally complex, individual differences in response to being sprayed are expected (Rogers 1984, Herrero 1985). Importantly, no one has reported that use of capsicum spray on either black or brown bears resulted in increased aggression.

Our research used data from throughout North America regarding field use of capsicum sprays on either aggressive, curious, or human-food conditioned brown bears or black bears. Despite a lack of experimental controls, we assumed that the response of bears to being sprayed is detectable. We also propose that the case history approach is the most effective means of studying the response of free-ranging, aggressive brown bears to being sprayed.

We thank the people who provided us with the field records on which our data are based. A special thanks is owed to R. Potts and B. Holmes of Katmai National Park for providing a number of well-documented records of interactions in the Brooks River area. We also thank C. Gagnon of Counter Assault Personal Defense Sprays for sharing descriptions of the spray use that had been sent to him.

METHODS

As part of a broader study of bear–human interactions, we sent inquiries to 235 agencies throughout Canada and the United States that either had responsibility for bear management or whose personnel frequent bear habitat. We requested records of field use of aerosol sprays containing extracts of capsicum as a deterrent against bears. In addition to agency reports of such use, we directly contacted individuals who because of newspaper reports or word of mouth, we believed had used capsicum spray as a bear deterrent.

We analyzed reports of capsicum spray use on bears by entering each incident into a computer database. Such reports are subject to various recording and interpretation errors and to the problem of trying to adequately represent complex, real-world situations (with many variables complexly interwoven) in a form permitting analysis. Such errors and uncontrolled variables create "noise" in the database, but with our sample size we assume that patterns of response by bears to use of capsicum spray as a deterrent emerge as an approximation of free-ranging bears' actual responses to being sprayed. Because these incidents were not part of a controlled experimental design, we did not statistically analyze the data since results should be viewed with caution given the lack of controlled methodology. One inconsistency is that various capsicum sprays were used in the field situations. Variations between brands could not be systematically investigated because of small sample sizes for all brands except Counter Assault (Bushwacker Backpack and Supply Co., Missoula, Mont.) (n = 50). All sprays used in situations included in our database likely contained 10% capsicum extract as their active ingredient.

We grouped data by bear species and by the behavior or inferred motivation of the bear in the incident. For both black and brown bear incidents, we recognized 2 types of incidents. In 1 type, the bear's behavior prior to being sprayed appeared to be searching for food or garbage or being curious. When aggression was involved it seemed to be directed toward obtaining food or garbage. Often such incidents took place in developed portions of parks, and the bear probably had a history of feeding on people's food (including just-caught fish) or garbage. In the second type of incident, people perceived that the bear was acting aggressively prior to being sprayed, without the element of food or garbage. These incidents included bear behaviors such as charging, making aggressive noises, or persistent following.

RESULTS

We analyzed 66 cases of field use of capsicum sprays . Brown bears were involved in 36, black bears in 30. Incidents occurred primarily in Alaska, British Columbia, Montana, and Alberta.

Delivery of Spray to the Bear.—We separated the incidents into 3 classes: cases where the bear was reported by the sprayer to have received a substantial dose to the face, cases where it reportedly did not, and cases where the dose was not determined. Although we did not apply any statistical tests, no obvious differences in response were apparent between these subsets and therefore we pooled data. In slightly more than half of the incidents, the person using the spray reported that the bear received a substantial dose of spray to the face.

Brown Bears Acting Aggressively.—In 81% (13 of 16) of these incidents the person reported not being aware of the bear until it was <50 m away; however, in 2 incidents the bear or bears involved were first sighted at >200 m. In 88% (14/16) of the cases the bear charged at the person or people. In 62% (10 of 16) of the incidents, a female bear with offspring (ages varied) was involved, and in 6 only a single bear was seen. Only 1 incident was known to have involved an adult male bear.

In 94% (15 of 16) of the cases, use of the spray was associated with the bear stopping its aggressive behavior. In 38% (6 of 16) of the cases, the bear either continued to act aggressively (1 of 16) or briefly stopped but then resumed its aggressive behavior (5 of 16). In 3 of these cases, the bear attacked and injured the person using the spray. In 2 cases the person spraying required <24 hours of hospitalization; the other required >24 hours of hospitalization. In 1 of these 3 cases further spraying appeared to have caused the bear to leave. Of the 3 inci-

dents that resulted in injury to the person using the spray, 2 involved a female with one or more cubs, and the other involved a single, adult male. In all 3 injurious encounters, the bear received a substantial dose of spray to the face at close range. In 2 incidents, the person was injured after spraying a bear that was attacking a companion. Here the approach by the sprayer, combined with the spraying, redirected the attack to the person spraying. In 88% (14 of 16) of the cases the bear left the area after being sprayed. These included incidents where the bear continued to act aggressively after the first spraying and did not leave until after the second or third spraying. In 12% (2 of 16) of the cases the bear remained and the person left the area.

Brown Bear Acting Curiously or Searching for People's Food or Garbage.—In each of these cases the bear involved was either not acting aggressively prior to being sprayed (80%, 16 of 20) or the aggression involved a direct approach apparently aimed at getting a person's food, such as a fish (20%, 4 of 20). The bear was, however, behaving in a way that the person using the spray found undesirable. In 80% (16 of 20) of these cases, only a single bear was involved. In the other 20% (4 of 20) cases, a sibling pair or larger sibling group was involved. In total, 85% (17 of 20) of the incidents involved subadult bears. In 100% (20 of 20) of the cases, use of the spray was associated with the bear stopping the undesirable behavior immediately after being sprayed. The bear left the area immediately after being sprayed in 90% (18 of 20) of the incidents. In only 2 of these cases was the bear known to have returned. In 38% (3 of 8) of the incidents where the bear did not receive a substantial dose of spray to the face, the people involved reported that the bear was apparently deterred by the sound of the spray discharging and the spray cloud.

Black Bears Acting Aggressively.—In 3 of 4 cases a black bear either charged (2 cases) or vocalized aggressively and then approached (1 case). All three of these cases appeared to involve responses to 1 or 2 people suddenly being within 50 m of 1 or 2 black bears. In 1 case the aggressive bear may have been 1 member of a pair of black bears engaged in courtship. In the fourth case, the bear exhibited predatory behavior as defined by Herrero (1985) and Herrero and Higgins (1995). The bear saw the people involved, followed them for several minutes, and then approached quietly.

In all of the 4 incidents the spray apparently changed the behavior of the bear; however, in no cases did the bear leave the area after being sprayed. In 1 case the bear was shot and killed after being sprayed. In another case the bear left after a shotgun was fired. In the other 2 cases the person left. In 1 the bear didn't follow, but in the other the bear followed and the person was finally able to make it to camp, but only after firing a bear banger. No people were injured.

Black Bears Acting Curiously or Searching for People's Food or Garbage.—As with brown bears, in this type of incident prior to being sprayed the black bear was either not acting aggressively (85%, 22 of 26) or the aggression seemed to be directed at obtaining food or garbage (15%, 4 of 26). In 92% (24 of 26) of these cases only 1 bear was seen. In the other 8% (2 of 26) of incidents, a female bear with 1 or more cubs was involved. In 73% (19 of 26) of this type of incident the spray had the apparent effect of changing the behavior. In the other 27% (7 of 26) of cases, the spray elicited varied and sometimes unclear responses. In 2 of these cases, the bear showed no apparent response to being sprayed. The bear left the area after being sprayed in 54% (14 of 26) of the cases; however, in 6 of these 14 cases the bear returned. In 62% (8 of 13) of the incidents where the bear received a substantial dose to the face, it either did not leave the area or it left and returned.

Environmental Conditions and Spray Application.—In 9% (6 of 66) of incidents, the sprayer reported that environmental conditions interfered with the application of the spray. In 4 of these incidents, there was a headwind or crosswind. In the fifth incident, heavy rain quickly dispersed the spray. In the sixth incident, thick bushes limited the size of the spray cloud. None of the incidents involved injury. However, in 2 incidents involving a headwind, the person using the spray had it blown back on him and was affected by it. To deliver a substantial dose of spray to the bear under typical conditions, most sprayers reported having to be within 6 m of the bear, with greater success from within 3 m.

Mechanical Problems with Spray Canisters.—In 3% (2 of 66) of incidents, the sprayer reported some mechanical deficiency with the spray. In 1 incident, the spray released from the canister in a stream-like shot rather than as a mist or fog. In another incident, the canister lost pressure and some of the contents dribbled down its side. The sprayer thought the canister was clogged, but it may have been empty. Neither of these incidents involved injury. In a third incident, the sprayer was injured by a brown bear when the can emptied during the bear's charge.

DISCUSSION AND CONCLUSIONS

Our results are consistent with tests conducted on a small number of captive grizzly bears (Miller 1980, Hunt 1984) and on captive (Hunt 1984) and free-ranging black

bears (Hunt 1984, Rogers 1984). Capsicum spray appeared to be reasonably, but not 100%, effective as a deterrent against free-ranging, aggressive brown bears. Many of the cases we studied involved female brown bears apparently defending their young and responding to a person suddenly sensed nearby, although in 2 cases the bear family was first seen at >200 m. In most cases the bear or bears involved responded by charging. In 6 of 16 cases the bear continued to act aggressively after being sprayed. In a minority of instances, despite receiving a full dose of spray to the face, the bear inflicted injury to the person using the spray. Despite a small number of people being injured after spraying an aggressive brown bear, in no cases did use of the spray appear to be responsible for increasing the extent of injury.

We do not know how a given incident might have ended without use of the spray. Herrero (1985) reported that most brown bear charges did not result in contact or injury when spray was not used and that black bears often charged people but very rarely contacted and injured them.

One caution regarding generalizing our results is that in the 1 instance where capsicum spray was known to have been used on an adult female grizzly bear with cubs that charged from a nearby ungulate carcass, injury to the sprayer resulted. For certain individual brown bears, the spray may not be effective if the bear is encountered at close range and near a carcass.

Capsicum spray very effectively deterred free-ranging brown bears approaching people out of curiosity or to get at their food (including fish) or garbage. These bears which were primarily sub-adult, stopped their undesirable behavior and left the area. In 2 cases, however, the bear returned. The success of capsicum spray to deter adult, free-ranging brown bears in this context is unknown.

Because there were only 4 instances of spray use on free-ranging aggressive black bears, results should be viewed with caution. The spray appeared to be less effective than when used in aggressive incidents with brown bears. All black bears stopped what they were doing when sprayed, but none left the area immediately. Whether the spray would be effective against potentially predaceous black bear remains unanswered.

Rogers (1984) reported clear-cut aversive responses in 5 free-ranging black bears that he sprayed with capsaicin while they were approaching food he set out in a campground or garbage dump. With a significantly larger sample ($n = 21$), Hunt (1984) found that most bears were repelled from food baits after being sprayed, but most of them also returned a short while later. Our findings regarding curious black bears or bears searching for people's food or garbage (and presumably already food-conditioned and habituated to people) were unclear. In about half of the 26 cases we studied, the bear either did not leave or it left and returned a short time later. These results show that at least for black bears, there does not appear to be an overwhelming physiological response that might cause bears to leave after being sprayed. The response to spraying might depend on the degree of food-conditioning or individual differences between bears.

Our results raise the possibility that black and brown bears have different responses to capsicum spray. The uncontrolled nature of our database does not allow further comment.

Spray dispersal into a cloud rather than a narrow stream appears to be beneficial for 2 reasons. First, the formation of the cloud (and the noise made by discharge from the canister) may in some instances be a deterrent independent of any of the spray actually reaching the bear. Second, this pattern of dispersal saves the sprayer from having to accurately direct the spray at a charging bear in what is a high-stress situation. Use of the spray does not require the training or experience needed to shoot accurately at a charging bear with a rifle or a shotgun.

The spray canisters in this data set were generally mechanically reliable. Users should be aware that mechanical failures can occur and should familiarize themselves with what to do in the event of an aggressive encounter in which the canister malfunctions or otherwise doesn't deter aggression. Users may wish to test the canister with a brief spraying to ensure that the propellant works and to become familiar with the dispersal pattern of the spray.

Users should consider environmental conditions when using the spray. The ability to deliver a sufficient amount of spray to the bear may be limited in conditions of moderate or high wind, heavy rain, or thick vegetation. If the wind blows capsicum into the user's face, this could make it difficult to either play dead or fight back, both appropriate responses in certain types of bear incidents (Herrero 1985). Conversely, if a person can maneuver upwind of the bear, the wind may assist in delivering spray to the bear. Capsicum is believed to exert its primary effect on soft tissue, causing inflammation of the eyes and inflammation and constriction of the respiratory tract (Rogers 1984, M. Stalder, Anza Borrego Desert State Park, Borrego Springs, Calif., pers. commun., 1995). For this reason, spray should be directed at the bear's face.

We believe that bears' responses to the spray are not solely a function of the dose received. A substantial dose of spray to the face was not sufficient to deter the bear in a number of incidents. Study of the 3 incidents involving injury to the person using the spray showed that the per-

son had delivered a substantial dose to the bear's face before being injured. In other incidents, the bear was successfully deterred even though it did not receive a substantial dose of spray to the face. Aggressive encounters between bears and humans are complex events influenced by a large number of variables. We believe this to be true regardless of whether capsicum spray is used—capsicum does not appear to become the sole variable influencing behavior after spraying.

We conclude that sprays containing capsicum appear to be useful in a variety of field situations when used on free-ranging brown bears. Our results show an acceptable level of effectiveness and that injury will sometimes occur despite effective deployment of the spray. When used on aggressive black bears our data only cover a small sample ($n = 4$). For the remaining incidents that deal primarily with habituated and food-conditioned black bears, the sample was much larger ($n = 26$) but results were variable. We recommend further testing through documented field use and other means.

An increasing number of people are buying spray containing capsicum for possible use against aggressive bears. This is reasonable as the spray may prevent or limit injury to people and bears. However, as Dr. Stephen French, a grizzly bear researcher in the Yellowstone Ecosystem says, "the spray isn't brains in a can." Carrying bear spray is not a substitute for the normal precautions when traveling or camping in bear country (Rogers 1984, Herrero 1985).

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Hunt 1985

Carrie Hunt [redacted]

DESCRIPTIONS OF FIVE PROMISING DETERRENT AND REPELLENT PRODUCTS FOR USE ON BEARS

by

Carrie L. Hunt

Final Report

U.S. Fish and Wildlife Service
Office of Grizzly Bear Recovery Coordinator

March, 1985

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C. Servheen
U. S. Fish & Wildlife Service

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Introduction

Conflicts between bears and people have grown with the expansion of human populations and activities into areas used by bears. Incidences of property damage, encounters, and human injuries have increased in frequency as activities such as logging, oil and gas exploration, and tourism have intensified and spread (Jonkel 1970, Schweinsburg 1976).

Most commonly, conflicts involve property damage (Mundy and Flook 1973, Jonkel 1975, Herrero 1976, Schweinsburg 1976, Singer and Bratton 1980). The majority of these incidences appear to stem from situations where bears have been fed, or are using human food sources such as garbage. There is also evidence to suggest that these problems escalate during years when natural foods are in low abundance (Eager and Pelton 1979).

Increasing encounters with bears and injuries to humans in our national parks have been correlated with increases in the number of people visiting the parks and in the unnatural foods made available to the bears by visitors (Mundy and Flook 1973, Singer and Bratton 1980, Hastings et al. 1981, Herrero 1984). The majority of documented attacks have involved bears that have received "handouts", or fed on garbage (Eager and Pelton 1979, Follman et al. 1980, Hastings and Gilbert 1981, Herrero 1984). Situations associated with grizzly (Ursus

arctos) versus black bear (U. americanus) inflicted injury do appear to be somewhat different. Most injuries caused by black and grizzly bears were correlated with prior experience with people's food or garbage and provoked situations, but for grizzlies, injuries were also significantly related to sudden encounters. Of the 11 people killed by grizzly bears since 1967, eight were killed by bears habituated to garbage, one by a bear habituated to people, and one by a bear believed to have been habituated to people (Herrero 1984).

Currently, the most widely used methods for control of nuisance bears are to relocate animals to areas where they presumably will not cause further problems, or to destroy them. These methods are expensive, time consuming, and ineffective as long-term solutions to most bear-human problems (Herrero 1976, Jorgensen et al. 1978, Eager and Pelton 1979). They are generally only treatments of the symptoms, and do not eliminate the causal factors that create nuisance bears.

Management efforts should be focused on elimination of situations that create the potential for bear-human conflicts, in particular, bear use of human-related food sources such as garbage. If a situation cannot be eliminated, the strategy should be to prevent or discourage bear use of the food resource, to reduce incidences of bear-human conflicts. A decrease in incidences will reduce the time and money spent on problem bears, the number of bears destroyed or relocated, and

the number of conflicts that occur at the same site and/or are caused by the same bear.

Prevention of many conflicts can be achieved by excluding unwanted animals from a resource or decreasing its attractiveness (Follman et al. 1980, Conover 1981). The strategy of bear-proofing, or preventing access to a resource has significantly reduced bear conflicts in our national parks (Herrero 1976, Meagher and Phillips 1980, Hastings et al. 1981). Unfortunately, in many situations physical exclusion of bears may not be cost-effective or even feasible. An alternative strategy is to modify undesirable behaviors, by the use of repellent or deterrent stimuli that can reduce the bear's desire to approach a bait or enter an area, or that reduce the palatability of a human-related food resource.

Both repellent and deterrent stimuli should elicit avoidance responses. There is a general lack of distinction between these terms in the literature. In this report they are distinguished as follows (Hunt 1983):

1. Repellents are activated , humans and should immediately turn a bear away during a close approach or attack.

2. Deterrents should prevent undesirable behaviors by turning bears away before a conflict occurs, such as bears approaching camps, orchards, or garbage dumps. They need not be monitored or manually activated humans.

3. Aversive conditioning should modify previously established undesirable behavior through the use of repellents or deterrents. The conditioning must be repeated until avoidance of people or their property has been established.

It is important to keep in mind that repellents and deterrents should aid, but not be a substitute for preventative measures that eliminate or reduce the potential for bear-human conflicts. Repellents and deterrents should be considered as a second line of defense against bear problems.

The purpose of this report is to detail five promising bear deterrent and repellent products currently available for use. These systems have undergone limited testing on bears, and the results have been favorable. Each may be applicable in specific problem situations where the attractant cannot be eliminated or "bear-proofed" (ie. campsites, outfitter camps, road sides, subdivisions, livestock, poultry, orchards, gardens, landfills, garbage dumpsites). They should be used in conjunction with relocation or destruction of problem bears that fail to respond suitably to application of stimuli, or when bear behavior is believed to pose an immediate threat to human safety.

Animal Repel (Capsaicin Product) By Bushwacker Backpack and Supply Co.

Most human injuries caused by bears are due to surprise encounters with grizzly bears or grizzly and black bears that have used human-related food sources (Herrero 1984). Most bear-caused human fatalities have been the result of grizzly bear attacks on humans sleeping in tents. An effective bear repellent that is easily carried by hikers or campers could decrease the severity and perhaps even the number of these incidents.

To this end, tests of capsaicin, an ingredient of cayenne peppers have been conducted on captive and free-ranging black and grizzly bears. Tests results indicate that capsaicin is an effective repellent for most grizzly and black bears (Jenkins and Hayes 1962, Miller 1980, Follman 1980, Smith 1983, in prep., Hunt 1984, Rogers 1984). Further tests of the stimulus on free-ranging bears are necessary. In addition, if the stimulus is to be effective in a variety of situations, the product's delivery system must be improved to increase the range of the capsaicin.

Capsaicin is a local irritant of sensory nerve endings. Toxicity tests have shown no lasting harm to the skin or eyes of humans (Osol et al. 1967), dogs (Jenkins and Hayes 1962), or albino rabbits (Paynter 1962, Becker and Parke 1976). The

stimulus can be washed off with soap and water.

Currently, capsaicin is widely used by mailmen and meter readers as a dog repellent. It is available commercially in a spray form as Halt, Dog Shield, or Animal Repel. Halt and Dog Shield are sold nationally in pet stores; the capsaicin is in solution at less than 1%, and dispensed from a canister in a stream a few inches wide, with a range of 3 to 6m. The products have a long shelf life. Animal Repel was developed specifically for use on bears by the Montana based Bushwacker Backpack and Supply Co., due to the favorable responses of all black and grizzly bears tested with Halt by Hunt (1984) and Smith (1983. in prep.). Although further improvement of the product can be expected. Animal Repel is currently available for distribution in a 400 gram (17 oz.) canister, with an atomized spray width of approximately lm, a spray range of 6m to 8m, and a capsaicin solution of 10%.

Capsaicin has been tested in 86 trials on captive (generally caged) grizzly (n=10) and black bears (n=16) (Jenkins and Hayes 1962, Follman 1980, Miller 1980, Smith 1983. in prep., Hunt 1984). Products tested were Animal Repel (n=16), Phaser (an earlier generation of Animal Repel; n=12), Halt (n=40), and a Skunker/Halt combination (n=18; Skunker is a synthesized skunk odor produced by Bear Country Products, Orinda. CA).

During 77 tests, bears were sprayed while charging or aggressively approaching a human that was on the other side of a barred door or fence. Responses by all bears were remarkably similar. When sprayed all bears (100%) were repelled. Most responded by immediately turning and running away; during a few tests bears quickly backed away. After an initial retreat of several meters bears usually stopped and pawed at their faces before continuing to move a w a y . At no time were any aggressive responses noted (Miller 1980, Hunt 1984, Smith in prep.). Tests of capsaicin effected bear behavior in subsequent tests, reducing the frequency of immediate charges and the overall tendency to charge. Tests of Halt with the synthesized skunk odor, reduced the occurrence of initial charges during testing and charges during subsequent tests (Hunt 1984).

Capsaicin was tested once on an attacking free—ranging bear; the result was favorable. In Yellowstone Park, during the summer of 1984, a biologist carrying Animal Repel was attacked by a 600 lb. male grizzly bear (D. Dunbar 1984 pers. comm.). The bear charged from 25m away and was initially hit with the spray at 4 to 5m. The animal continued to within 1.5m of Dunbar before stopping. It paused, shook its head and then attacked. At the same time, Dunbar was reportedly attempting to back away as he continued to spray Animal Repel at the bear. He is unsure as to whether or not he sprayed the animal in the eyes at this time. The bear held the man to the

ground and bit into his side, inadvertently biting into his hip-radio as well. Dunbar then sprayed it in the eyes. The bear immediately ran off and did not return. The bears pause and head shake at 1.5m corresponds well with the behavior displayed by most captive and free-ranging bears when tested. The pattern generally goes as follows: immediate and vigorous retreat-stop-shake head,paw at face- re-orient-move away (Miller 1980, Hunt 1984, Rogers 1984, Smith in prep). It is possible that, having stopped, the bear continued the attack because its momentum had carried it into such close proximity to Dunbar, and/or as it shook its head (possibly re-orienting itself) Dunbar ceased to spray it in the eyes.

Capsaicin has been tested on hungry, curious, free-ranging bears in a variety of situations. The stimulus was tested as a repellent on black bears at dumps 76 times. Products tested were Phaser (n=7), Animal Repel (n=20) and Halt (n=49; Smith 1983, in prep., Hunt 1984, Rogers 1984).

Hunt (1984) and Smith (1983, in prep.) sprayed capsaicin from remote triggered devices as black bears ate baits of homemade sugar-syrup and slum-gum (a honey by-product). Bears were repelled during 63 (88%) of these tests. No aggressive responses were observed. All bears tested with Phaser and Animal Repel were repelled (n=27). All of the tests where black bears were not repelled were with Halt (n=8). These responses may have occurred because the bears were not sprayed

directly in the eyes; the content quality of the Halt was poor (due to production or external factors); or because certain bears have an increased tolerance of the stimulus (Hunt 1984, M. Smith 1985 pers. comm.).

Rogers (1984) and Smith (in prep.) delivered 10 tests to approaching black bears while standing next to baits of meat and slum-gum, respectively. During seven (70%) of the tests bears were immediately and rapidly repelled. One of the three exceptions occurred when Halt was tested on a large male (Rogers 1984). Although the bear was repelled, it returned to be sprayed three more times before it left the site (Rogers 1984). The two remaining tests were with Animal Repel and involved one individual male bear (M. Smith pers. comm.). When initially sprayed, the bear remained facing Smith for about 30 seconds, then slowly moved off. Two days later, he was again tested and responded by immediately walking away. This bear had large scars across his face and nose that may have effected his response to the stimulus. It was not a dominant animal at the dump.

When repelled, most free-ranging bears responded by immediately running a distance of 20-25m. then stopping and shaking their heads, and pawing at their eyes. They then either continued to move off into the timber, or stayed near the timber at the site perimeter (Hunt 1984, Rogers 1984, Smith in prep.). Following tests where bears were repelled by

remote-triggered devices, bears often returned to feed at the site in less than a half hour (Hunt 1984, Smith in prep.). During tests by Rogers (1984), where bears were sprayed and repelled by a human standing by a test bait, bears did not return to make themselves available for retesting.

Capsaicin was placed around baits and tested as a deterrent for polar bears during 34 tests at Cape Churchill, Manitoba (Miller 1980). Smashed sardines and cooking oil were used as bait and the area around their perimeter saturated with Halt. None of the bears were deterred, however, bears spent less time at these baits then they did at the untreated baits.

It is possible that capsaicin may be effective if applied directly on a food resource (garbage, carcass, etc.). A capsaicin solution (Hot Sauce Animal Repellent, Miller Chemical Co., Hanover, PA) has been effective in preventing deer from eating various types of forage when sprayed directly on the surface of the vegetation (Charles Svec, 1985 pers. comm., T. Trent 1985 pers. comm.).

Considerations In Application

It must be stressed that deterrents and repellents should be used in conjunction with management measures designed to eliminate or reduce the potential for bear-human conflicts (Mc Cabe and Kozicky 1972, Gilbert 1977, Follman et al. 1980). The focus of management efforts to minimize bear-human conflicts should be to prevent or minimize bear use of human-related food sources, thereby reducing incidences of property damage, sudden encounters, and bear inflicted injuries.

To successfully reduce bear-people conflicts on a large scale. three basic, preventative management efforts are needed:

1. the reduction of bear access to human food sources, especially garbage, on public and private lands;

2. education of the public as to the effect of their activities on bear populations; and

3. interagency cooperation and consistency in reducing conditions that are attractive to bears. Efforts toward 1 and 2 above should be consistent across jurisdictional boundaries.

Where repellents and deterrents are used, application of methods should be coordinated, and data collection standardized. To allow for uniform data collection, a standard data sheet is provided in Fig. 2.

Successful application of any deterrent/repellent program is contingent on a variety of interacting factors. Key factors that will increase or decrease the effectiveness of any program are:

1. consistency in application of the method;
2. timing and delivery of the stimulus in terms of its meaning to the subject bear;
3. characteristics of the individual bear being tested; and
4. the attractiveness of the problem site in terms of the availability of alternative, natural food sources.

Control of items 1 and 2 above is most likely. Programs must be planned to allow for consistent, consecutive presentation of a stimulus each time an undesirable target behavior is displayed, until the behavior is extinguished (at least at the target site). The experience should be maximally unpleasant with as little physical damage to the animal as

Animal Repel (Capsaicin Product)

Principle Problems in Application - To be effective this chemical must be applied directly to the eyes of a bear. Therefore, the range and accuracy afforded by the delivery system during application is critical. Wind, vegetation, or other factors may further decrease the product's efficiency. Currently, the delivery system of Animal Repel can be effective and accurate up to 6-8m; for use in close encounters such as immediately before or during an attack, or on bears entering tents. However, further development of the delivery system and additional deterrent cues for presentation with the product are necessary for the product to be effective at longer ranges.

Directions for Solutions - Ideally, for portable use by hikers, campers, etc., the product should remain at about its present weight (17 oz), to allow for repeated application and have an accurate spray range of at least 10m, to repel a bear at about one running stride away, to mark the boundary of our personal space, before contact is actually made. The spray should be wide (the current width of 1m is appropriate) and powerful, to increase the chances of hitting a bear in the eyes and to mitigate the effects of external factors such as wind.

Presentation of another visual, auditory, or olfactory deterrent stimulus immediately before, or in conjunction with delivery of the capsaicin, may increase the product's effectiveness by adding to its range and deterring bears from approaching closely. In addition, once hit with

the capsaicin/stimulus combination, upon subsequent exposure, bears may be repelled by delivery of the stimulus whether or not they are accurately sprayed with capsaicin.

Further tests should be conducted on captive and free—ranging bears to address questions as to the product's effect on bears highly motivated to attack, and whether it causes subsequent avoidance of people or their properties. With respect to the latter, laboratory tests indicated that physiologically, bears recovered quickly from the effects of capsaicin (Miller 1980, Hunt 1984). This was also suggested by bear responses during field tests. Following tests of capsaicin bears quickly returned to feed at the dump sites, but not to the capsaicin test baits (Smith 1983, Hunt 1984). Results of the laboratory and field tests suggested that many bears learned to avoid the test situation following one exposure to the stimulus. Bears were reluctant to reapproach people or test baits, especially if an additional deterrent cue (such as the skunk odor) was presented with the stimulus (Hunt 1984, Rogers 1984, Smith in prep.). The stimulus may be more effective in causing bears to avoid further approaches if bears are repelled when approaching, rather than while eating food attractants.

It is possible that capsaicin may be used as a repellent in much the same way as projectiles. If bought in bulk and loaded into powerful canisters, it may be effective in

repelling bears that are approaching human-related food sources at sites, roadsides, etc. Bushwacker Backpack and Supply Co. is currently developing a semi-portable canister with an effective range of 30m.

Tests of the product on or around baits as a deterrent for bear use of food resources should also be considered. Miller Chemical Co. (Box 333, Hanover, PA, 17331; phone: 717-632-8921) currently markets the product in bulk, in conjunction with Vapor Gard, a Turpine resine that, when mixed with the capsaicin, protects the stimulus from volatilization and precipitation. The company is willing to work toward developing a product for deterring bears from food resources (Charles Svec, President, 1985 pers. comm.).

1984

Vol. 1. Behavioral responses of bears to tests of repellents deterrents and aversive conditioning Vol. 2. Deterrents aversive conditioning and other practices: An annotated bibliography to aid in bear management.

Carrie. Hunt
The University of Montana

Wildl. Soc. Bull. 12:59-61, 1984

REACTIONS OF FREE-RANGING BLACK BEARS TO CAPSAICIN SPRAY REPELLENT

LYNN L. ROGERS, ***USDA Forest Service, North Central Forest Experiment Station, 1992 Folwell Ave., St. Paul, MN 55108***

A bear repellent is needed that is effective, humane, and can be carried easily by hikers and campers. Of several chemical sprays that have been tested on caged bears, the most favorable results have been with capsaicin ($C_{18}H_{27}NO_3$), an ingredient of cayenne peppers *(Capsicum* spp.) (Jenkins and Hayes 1962, Miller 1980). Capsaicin is a powerful local irritant of sensory nerve endings, but causes no blisters because it has little effect on capillaries or other blood vessels (Osol et al. 1967). Toxicity tests on capsaicin have shown no lasting harm to the skin or eyes of people (Osol et al. 1967), dogs (Jenkins and Hayes 1962), or albino rabbits (Paynter 1962, Becker and Parke 1976). Jenkins intentionally sprayed capsaicin solution into his eye, which then "burned" for nearly 30 min despite washing and blotting, but no effects were evident the next day (Jenkins and Hayes 1962). Capsaicin spray is sold commercially as Halt (Animal Repellents, Inc., Griffin, Ga. 30223)[1] or Dog Shield (Norton Co., Safety Products Div, Rockford, 111. 61101) and is used widely by mailmen and meter readers as a dog repellent.

Aggressive responses to capsaicin spray have not been reported for any species. Tests have been conducted on 14 dogs, 6 house cats, a captive "wildcat" (presumably *Lynx* sp.), and an aggressive, rutting white-tailed deer *(Odocoileus virginianus),* all of which retreated immediately without aggression (Jenkins and Hayes 1962). Also, 6 trained dogs that were sprayed while fighting stopped within 20 sec and could not be induced to resume fighting 10-30 min later (Jenkins and Hayes 1962). In 3 tests on 2 caged grizzly bears *(Ursus arctos horribilis),* one or the other of the bears charged across their cages until they were sprayed in the eyes with capsaicin, whereupon each stopped and ran to the farthest corner of the cage and rubbed its eyes (Miller 1980). Jenkins and Hayes (1962) used capsaicin spray also to drive 2 caged adult black bears (*U. americanus)* immediately to cover. C. Hunt and C. Jonkel (pers. commun.) obtained similarly favorable results in tests on 5 caged black bears, 1 caged adult grizzly bear, and 2 caged grizzly bear cubs. Despite these results and the lack of aggressive responses, capsaicin has not been field-tested, and it is seldom used against free-ranging bears due to uncorroborated concern that it might anger them.

To test the effectiveness of capsaicin on free-ranging bears and to determine if free-ranging bears tend to react aggressively to it, I visited campgrounds and garbage dumps in Minnesota and Michigan where black bears were reported to be taking food from people. I sprayed bears that attempted to take meat from a box beside me. Five adults (4 males, 1 female) were sprayed in the eye(s) with capsaicin solution at dusk or at night from a distance of 1.5 to 3 m. All immediately blinked hard, whirled away, and fled 7 to 20 m where they stopped and rubbed their eyes with their paws for up to a minute. Four of them then moved out of view, but a male weighing 200-225 kg returned and was sprayed 3 more times. He turned away from the second and third spray attempts, causing the spray to miss his eyes. After each miss he immediately turned back to the bait. The fourth spray again hit his eyes, and he left the area at a fast walk.

[1] Mention of products does not constitute endorsement by the U.S.D.A. Forest Service.

He was not seen for at least 2 days after that although he had been seen daily before the test.

None of the bears made any vocalization, blew, chomped its teeth, extended its upper lip, nor showed any other sign of aggression after being sprayed. The bear that returned appeared intent on the meat and did not show increased attention to the tester although his avoidance reactions showed that he recognized the direction from which the sprays came.

To determine if black bears would react aggressively to a chemical irritant that is purportedly less effective than capsaicin, additional tests were conducted using CN tear gas. Hass (1981) stated, on behalf of the manufacturer of Mace, a tear gas product, that tear gas may be irritating to the mucosa of bears but is generally ineffective in incapacitating them. This substance proved only weakly effective in repelling 4 adults that were sprayed in the eyes, but, like capsaicin, it elicited no overt aggression. Two of the sprayed bears stood blinking for a few seconds before turning and walking away. Two others left immediately at a fast walk or trot but returned in a few minutes.

Major limitations of capsaicin spray are that it must hit an eye to be effective and that, with available equipment, it has a typical range of only 3 m (Halt) or 6 m (Dog Shield). Range may be longer or shorter depending on wind direction; but in my experience, most bears approached from downwind, which gave the spray additional range. Advantages are that full canisters of Halt or Dog Shield weigh less than 80 grams and that the material has a long shelf life. Material used in this test was stored at room temperature for 8 years prior to use.

Results of capsaicin tests on free-ranging bears were similar to previous results using caged bears, confirming the validity of using caged bears in preliminary tests of repellents. Moreover, there has been remarkably little individual variation in responses of all bears tested, whether caged or free-ranging (12 black bears, 5 grizzly bears); all were repelled vigorously without aggression. The tests indicate that capsaicin has considerable potential as a bear repellent and that it merits further testing on free-ranging bears. Questions remain concerning its effectiveness on bears highly motivated to attack and concerning whether the spray causes any permanent avoidance of people or locations. Tests to date also have not adequately shown the range of individual variation of bear responses or the range of circumstances in which chemical spray repellents may be useful. New equipment is needed to give the spray greater range.

Because of the timidity of most bears, it is difficult to test a large sample of free-ranging individuals. Bears tested in this study did not make themselves available for follow-up testing. Large sample sizes of bear responses to capsaicin spray probably will be developed only through cooperative efforts of researchers, wildlife managers, conservation officers, park rangers, and others who deal professionally with bears, each contributing their observations on the effectiveness and limitations of this repellent. Spray repellents should not be regarded as substitutes for sanitary camping practices or other preventive management practices designed to minimize encounters between people and bears.

Acknowledgments.—I thank R. Buech, C. Hunt, C. Jonkel, and G. Miller for helpful suggestions on the manuscript.

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"Partners-In-Life" Program
Wind River Karelian Bear Dogs

Wind River Bear Institute

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Date: January 11, 2008

To: The Interagency Grizzly Bear Committee (IGBC)

From: Wind River Bear Institute, Carrie Hunt, Executive Director

Subject: Information on Origin of Pepper Spray Specs, As Requested By IGBC

Memo:
Dear IGBC Committee Members:

I was contacted by IGBC Committee member, Doug Zimmerman, in December 2007, following the IGBC meeting in Missoula. Doug asked if I could provide some history on the "early days" of bear spray and how the current specs for effective spray were developed. The following memo and enclosed document is my answer to this request.

Timeline and Events:

- I was the Wildlife Biology Graduate student at the University of Montana, studying under Dr. Charles Jonkel, who identified and developed the concept and use of capsaicin to deter or repel bears during 1082-1984. My Masters thesis was completed in 1984, is available through the University of Montana, and is entitled: *Behavioral Responses of Bears to Tests of Repellents, Deterrents and Aversive Conditioning.*
- During the field work on my Masters and shortly after I discovered how well Capsaicin worked on bears, I was interviewed by *"The Missoulian"*, our local news paper regarding my research, the article was entitled "*Ace and the Queen of Hearts*". There, I was quoted as saying that I thought that I had discovered that "capsaicin worked to deter or repel both captive and free-ranging bears, but that to be effective for portable use by campers and hikers, "it needed to be in a better delivery system". This was because the product "Halt" that I had tested during my research, was difficult to administer accurately or effectively even to captive bears at a 1 foot distance, due to its pencil thin spray, short duration and short range.
- Shortly after the article came out I was contacted by Mr. Bill Pounds, the owner of Bushwacker, Backpack and Supply Co. He told me that he had read the article and would like to develop a canister for us to test with a better delivery system. Mr. Pounds asked me to give him the specs that I would like to see in a "Bear Spray" can. Based on the reactions I had observed, filmed and documented during my masters while testing Halt on 6 captive bears and 31 free-ranging bears, I gave him my recommendation for spray width, range and duration. This recommendation was the same recommendation I documented in my contracted report to the US Fish and Wildlife Service, below. Ponds then developed a can to meet the specs I gave him, which was subsequently tested during our research and marketed by Pounds as "Animal Repel". This was the predecessor to "Counter Assault", marketed by the same company and was the first bear spray on the market. I never received any money from Pounds for my research.
- In 1985, immediately after finishing my Masters Thesis, I contacted Dr. Chris Servheen, the U.S. Fish and Wildlife Service, Grizzly Bear Recovery Coordinator, and proposed that

I compile a brief report to document and summarize the most promising Deterrent and Repellent Products currently available to reduce human bear conflict based on the research and field observations of various researchers. I have enclosed the attached, original, 1985 research report that I wrote for the US Fish and Wildlife Service, Office of the Grizzly Bear Recovery Coordinator, entitled: *"Descriptions of Five Promising Deterrent and Repellent Products For Use on Bears".* The Report is divided into 3 sections: an "Introduction", Separate Descriptions of the 5 products, and importantly, a section entitled "Considerations In Application", where I discuss each product and its limitations, and make recommendations for use and Improvement. The use of capsaicin through the delivery system of the product "Animal Repel", is one of the 5 products discussed in the "Considerations in Application" section. In this section, I recommend the same specs I gave to Mr. Pounds.

Baseline Research to Support the Bear Spray Use and Delivery System Specs:

- *The report described above, "Descriptions of Five Promising Deterrent and Repellent Products For Use on Bears"*, is enclosed with this memo. It was typed in 1985 and therefore was not available digitally on a computer. **Hence I have just scanned it so that it can be sent to the committee and you will see that the formatting has been scrambled in some places due to scanning such old print.** However, the sections covering the Capsaicin product are clear and complete.
- The sections on capsaicin and recommendations as to its use and delivery systems are **based on all the pertinent research data and field observations by various bear researchers that were available at that time.**
- When reading the document, **the sections that are pertinent to the evolution of the use of capsaicin for bears and the specs for effective delivery systems are**:
    - *Introduction*- Pages 1-2
        - Background
        - Justification
    - *Animal Repel (Capsaicin Product)*- Pages 22-23
        - System Description
        - Rest Results
    - *Considerations in Application*- Pages 28-29 and 40
        - General Considerations
        - Animal Repel (Capsaicin Product)- Page 40
            -Principle Problems In Application
            -Direction for Solution
- **Recommendations and specs copied from "*Direction for Solution*" section in report: See Attachment A**
- For details of initial investigation and results of testing of capsaicin on bears during my Master of Science work and by other researcher up that time please see:
    - Hunt, C. 1984. *Behavioral Responses of Bears to Tests of Repellents, Deterrents, and Aversive Conditioning.* M.S. Thesis, University of Montana, Missoula. 137 pp.
    - Hunt, C. 1983. *Deterrents, Aversive Conditioning, and Other Practices; An Annotated Bibliography to Aid in Bear Management.* National Park Service Report, Glacier National Park, Montana. 136 pp.

I hope this memo and enclosed report provide the clarity and documentation your committee needs to resolve the current questions re the origin and rationale behind the supported specifications for bear spray delivery systems identified and supported by the IGBC. Please contact me at our office if you have further questions: telephone: 273-4899 and e-mail: windriver@beardogs.org.

Carrie Hunt, Executive Director

Attachment A.

Section Taken from:

Hunt, C. 1985. *Descriptions of Five Repellant/Deterrent Products for Use on Bears.* Grizzly Bear Recovery Coordinator, U.S. Fish and Wildlife Service, Missoula, Montana. 50 pp.

Animal Repel (Capsaicin Product)

Principle Problems in Application - To be effective this chemical must be applied directly to the eyes of a bear. Therefore, the range and accuracy afforded by the delivery system during application is critical. Wind, vegetation, or other. factors may further decrease the product's efficiency. Currently, the delivery system of Animal Repel can be effective and accurate up to 6-8m; for use in close encounters such as immediately before or during an attack, or on bears entering tents. However, further development of the delivery system and additional deterrent cues for presentation with the product are necessary for the product to be effective at longer ranges.

Directions for Solutions - Ideally, for portable use by hikers, campers. etc., the product should remain at about its present weight (17 oz), to allow for repeated application and have an accurate spray range of at least 10m, to repel a bear at about one running stride away, to mark the boundary of our personal space, before contact is actually made. The spray should be wide (the current width of 1m is appropriate) and powerful, to increase the chances of hitting a bear in the eyes and to mitigate the effects of external factors such as wind.

Presentation of another visual, auditory, or olfactory deterrent stimulus immediately before, or in conjunction with delivery of the capsaicin, may increase the product's effectiveness by adding to the product's range and deterring bears from approaching closely. In addition, once hit with the capsaicin/stimulus combination, upon subsequent exposure, bears may be repelled by delivery of the stimulus whether or not they are accurately sprayed.

Further tests should be conducted on captive and free—ranging bears to address questions as to the product's effect on bears highly motivated to attack. and whether it causes subsequent avoidance of people or their properties. With respect to the latter, laboratory tests indicated that physiologically, bears recovered quickly from the effects of capsaicin (Miller 1980, Hunt 1984). This was also suggested by bear responses during field tests. Following tests of capsaicin bears quickly returned to feed at the dump sites, but not to the capsaicin test baits (Smith 1983, Hunt 1984). Results of the laboratory and field tests suggested that many bears learned to avoid the test situation following one exposure to the stimulus. Bears were reluctant to reapproach people or test baits, especially if an additional deterrent cue (such as the skunk odor) was presented with the stimulus (Hunt 1984, Rogers 1984, Smith in prep.). The stimulus may be more effective in causing bears to avoid further approaches if bears are repelled when approaching, rather than while eating food attractants.

Safariland, LLC
1855 South Loop
Casper, WY 82601
307.235.2136

THE SAFARILAND GROUP

June 22, 2016

Jim Unsworth, Chair
Matt Hogan, Co-Chair
Interagency Grizzly Bear Committee
200 East Broadway
Missoula, MT 59802

Re: Technical Aspects of Bear Spray

Dear Director Unsworth and Deputy Hogan,

I am the Category and Engineering Director of Defense Technology for the Safariland Group, a major developer and manufacturer of less lethal products for law enforcement and military markets. Safariland is the contract aerosol filler for UDAP's Pepper Power brand bear spray. As an engineer, I am familiar with the design, operational features, and technical aspects of bear spray. I am submitting this letter solely to provide technical information relating to the bear spray that we are contracted to fill for UDAP. I express no opinion on the IGBC's bear spray recommendations or performance guidelines.

The canisters we fill for UDAP are specifically designed to discharge bear spray hard and fast, giving the user the ability to discharge an effective dose of spray in a very short amount of time. The point is to deliver the maximum exposure of product to the aggressive bear at the right moment. Some technical features of aerosol sprays that are applicable to the bear spray product are explained below.

- The spray that Safariland manufactures for UDAP has several design features that have proven to be beneficial, including:
    - The propellant-to-concentrate ratio is fairly high. This does several things:
        - The droplet size is very small, as much of the liquid-content of the expelled liquid evaporates quickly, leaving very small droplets which are more inhalable than larger droplets.
        - The nozzle makes a loud hissing sound when sprayed, which is a warning-sound to most wildlife
        - The can pressure is relatively high, resulting in high-velocity as well as high delivery-rate (which is measurable in weight of product discharged per second).

- Higher exit velocity (and the associated weight-per-second) is important to longer range, as well as resisting the effect of crosswind for a longer distance in the spray-pattern.

- Orifice size is one of several factors which can affect delivery rate/velocity. A smaller nozzle orifice size reduces the delivery-rate.

- UDAP cans are capable of providing multiple shots of bear spray. Whether the product delivers its contents over 6 seconds or 9 seconds is a function of the discharge rate (weight of product discharged per second).

- On the assumption that Brand A and Brand B bear sprays have the same weight of contents, the two cans could have markedly different volumes (dependent on the density of the formula). However, on a weight percentage basis, they could both carry the same capsaicinoid content (which is the substance in the pepper extract responsible for the pungency or "hotness"). The Brand with the quicker delivery rate would be dispensing more capsaicinoids in a shorter time, which could have the effect of requiring less spray in a bear encounter.

- Faster discharge time translates to more product discharged per unit of time elapsed. Given two bear spray cans with the same weight of product, the one with a faster total discharge time will put a greater amount of product into the air per second of discharge. For example, a 260 gram can of bear spray that fully discharges in 5.4 seconds will provide roughly 48 grams of product per second of discharge. A 260 gram can that fully discharges in 7 seconds will provide roughly 37 grams of product per second, and probably will not travel as far in distance.

Please direct any questions regarding the above to the undersigned at (307) 235-2136 Ex. 234.

Sincerely,

John Kapeles
Category and Engineering Director
The Safariland Group

14 June 2016

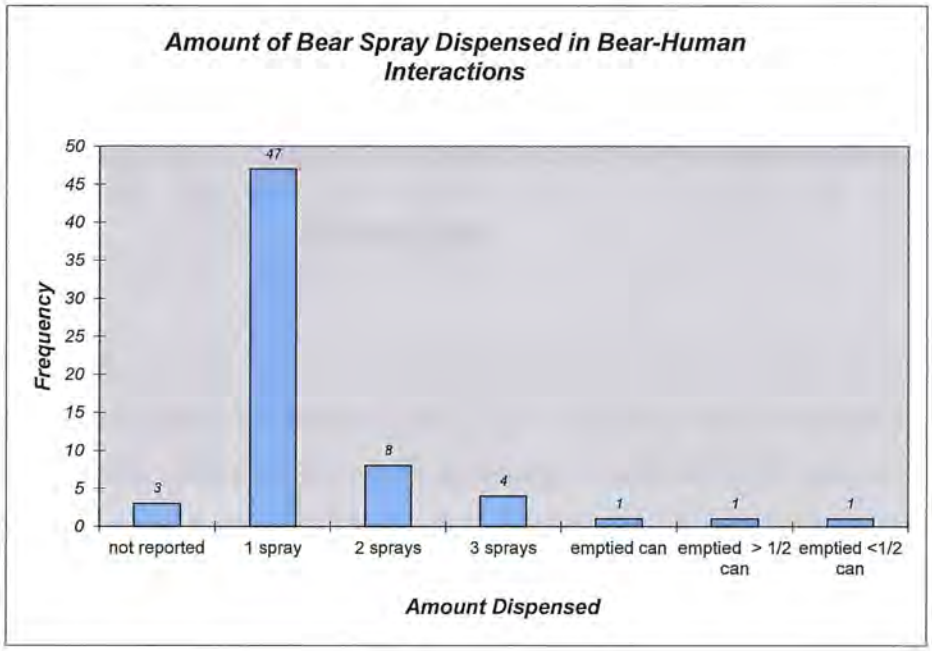
By Email: bears@udap.com

UDAP Industries
1703 Waterline Road
Butte, MT 59702

RE: Bear Spray Distance and Duration

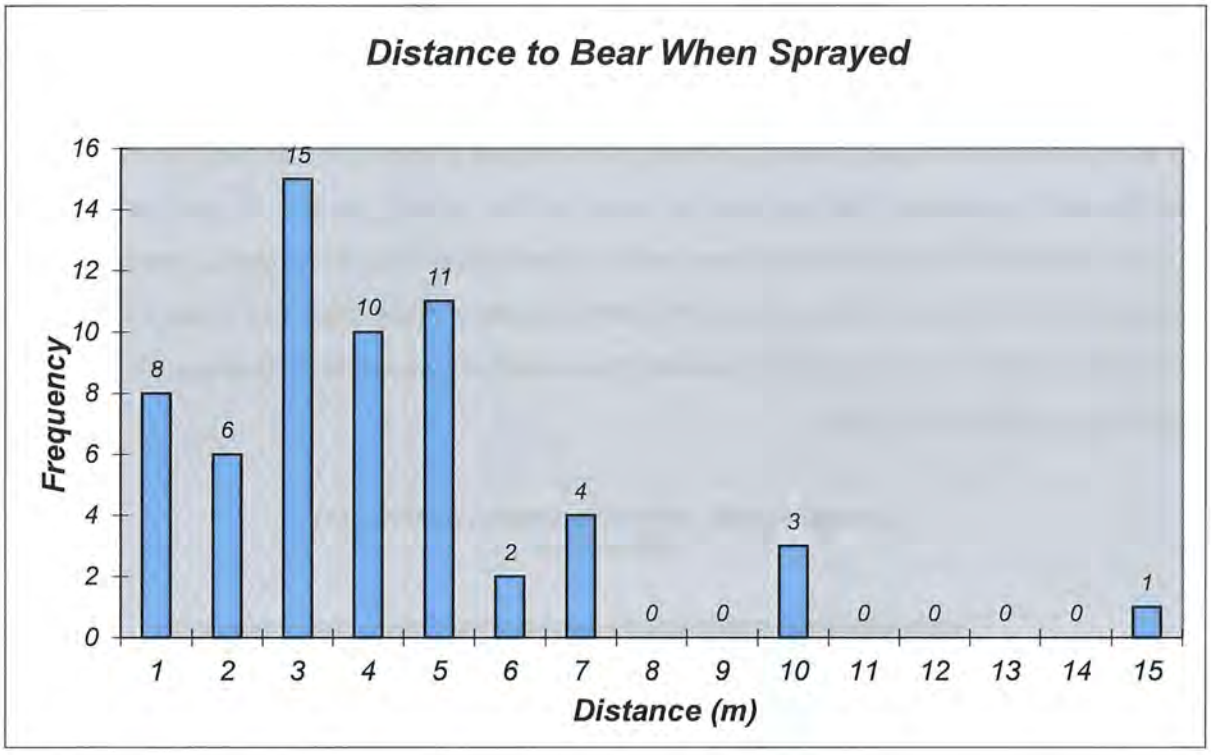
To Whom It May Concern:

On multiple occasions, I have been asked for additional information regarding the research I conducted on the efficacy of bear spray (See the article entitled "Efficacy of bear deterrent spray in Alaska" published in 2008 in the Journal of Wildlife Management Volume 72, Issue 3, pages 640-645). One question that has come up repeatedly is whether my research was able to shed light on specific values for spray duration (seconds) and distance (meters), values that could be used as guidelines for purchasing. In the above-referenced article, the only possible suggestion that spray duration might be of some relevance was when I found that in 24% of incidents, bears had to be sprayed multiple times. I did not, however, elaborate on how many times so I'll take a moment to present those data now. This graphic presents the number of sprays that persons reported using on bears in 65 incidents in Alaska.



Clearly, where data were provided, in 80% (47 of 59) of incidents, a single spray was sufficient to deal with a menacingly curious, or aggressive, bear. In the remaining 6 cases, a specific number of sprays was not specified. Duration in seconds, was not provided by any persons involved in our sample. Based on data we collected, there is no indication that any of the commercially available products bests another by durations that vary by a few seconds, at least as I see it.

With regard to the question of spray distance, the following graphic provides data from my study:



In this graphic we see that of 70 incidents wherein distance to bear was reported, 96% (67 of 70) of the time bears were sprayed at 7 m (23 feet), or less. In nearly 75% of all cases, bears were 16 feet or less from the person spraying the bear. Additionally, since sprays were 98% effective in preventing injury it is not possible to ascribe effectiveness to a particular distance from the user. Therefore, I cannot provide a recommendation based on distance for any of the currently available bear spray products over the others. Consequently, when asked which bear spray product

I recommend I state that I am comfortable using any of the EPA-approved products on the market because while they do vary somewhat in duration and distance, all fall within an acceptable range of effectiveness in light of the results of the study I conducted on the efficacy of bear spray in Alaska.

Sincerely,

Tom S. Smith, PhD
Associate Professor
Plant and Wildlife Sciences
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Brigham Young University
Provo, Utah 84602

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"Making good conservation good business"

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gdorrington@crowleyfleck.com.

Re: Efficacy of bear pepper spray 20 June 2016

To whom it may concern:

I was asked by Mr. Dorrington to comment on the efficacy of bear pepper sprays (BPS), based on my professional experience with bears and with BPS. This request arose out of the IGBC recommendation that people use a brand of spray whose complete dispersal from a can takes at least 6 seconds – a characteristic which is currently met by only one brand of spray. Consequently, alternative brands have been erroneously characterized as inferior by the general public and some government agencies.

I have read the testimonials at the end of the IGBC 2008 **Bear Spray Report.** Those writers basically argued that more distance and more duration are better, and expressed this opinion in terms of the figures provided by IGBC: that a spray should extend at least 25 ft and last at least 6 seconds. Had they been offered alternatives such as 30 or 35 ft, they might have selected one of those figures rater than 25 ft. None of the authors provided any empirical evidence that 6 seconds is even slightly more effective than say 5.5 seconds or even 5 seconds. Those testimonials either state or imply that the alternatives of shorter duration or less distance would arise from a lower volume of spray or of propellant in each can. They did not address the tradeoffs between duration vs. distance (e.g., why make the minimum distance 25 ft rather than 30 ft or 35 ft?) Nor did any of them address potential advantages of dispersing as much spray as possible, as quickly as possible – which, as I recall, is the reason why Pepper Power is designed for more rapid deployment than some other brands. Granted that Dr. Smith's review of actual incidents indicates that most bears were sprayed for only 1-2 seconds, and that this sufficed, the issue deserves further experimental study. For example, there are indications that the hissing sound of spraying is an important component of a BPS's effectiveness. Does more rapid deployment of BPS produce a louder, more effective sound?

I consider the 6–second requirement as irrelevant in practice, based both on assessments by Dr. Tom Smith and on my own experience. Although duration is important, I don't find enough difference between the brands I have tested to matter. In order to have a longer duration of spray available, to deal with multiple bears and other contingencies

listed by IGBC, I carry 2-3 cans of BPS. Carrying 2-3 cans is warranted because I am frequently within sight of numerous brown bears or black bears, and have sometimes been confronted by a mother-cub family or a group of 2-4 pre-adolescents or adolescents. I have also had to spray bears multiple times before they were deterred. Furthermore, there is always the possibility of one can malfunctioning.

I concur with Dr. Smith's points, in his 14 June 2016 letter to UDAP, that focus on differences among EPA-approved brands in how far a can of bear pepper spray shoots, or how long it takes spray to exit a can, have been given far more importance in IGBC discussions than is warranted by their pragmatic consequences.

Furthermore, that emphasis distracts attention from other characteristics of sprays which are more likely to have a strong impact on efficacy. I describe these below, based largely on personal experience, and on long discussions with Kate and Cody Dwire (the organic chemists who invented the first BPS and then later an oil-free BPS marketed as Bear Pause), as well as with Dr. Smith, and with Dr. Chas Jonkel, who (along with Carrie Hunt) did the initial testing of BPSs. Note that the statistics provided by Dr. Smith in his 14 June 2016 letter to UDAP do not include all, if any, of my own observations on use of BPS against bears. Nor do they include the many tests made by Cody Dwire against brown bears on Kodiak Island using his product Bear Pause. Regarding these additional cases, they all confirm the efficacy of pepper spray, even with bursts as short as 1 second.

Background

1) Since I began studying bears in 1969, I have had roughly 15,000 close encounters with black and brown bears. My experience has been split between (a) assessing population dynamics – i.e., how various factors affect vital rates and harvestable yield; (b) assessing the behavior of bears as individuals and in small groups, as they interact with one another and with humans; and (c) factors governing human safety during close encounters. Among those factors is BPS.

2) Understanding efficacy of pepper BPS requires understanding both the physical properties of the BPS, as well as how humans and bears behave during an encounter that might warrant use of BPS.

Observations and hypotheses concerning the properties of pepper spray

1) Most of my comments on BPS are based on personal experience with several brands of BPS. I have shot PBS toward black and brown/grizzly bears. I have anointed substrates (soil, wood, etc.) with BPS and observed how brown/grizzly bears react to it. And I have tested several brands of BPS to observe how the BPS behaved in the air – for instance how far it traveled before falling to the ground, being blown away, or atomizing and visibly hanging in the air, or 'evaporating' and being lost from sight. But I have not done a systematic comparison of brands or a thorough formal test of efficacy for any brand.

2) When BPS exits a can, it is supposed to come out in cloud whose shape is roughly conical. The cone can be distorted sideways by wind blowing across the cone from one side or the other. Hence, users are advised to give one very brief squirt of BPS to test wind direction, then to turn the can far enough in the opposite direction to compensate for wind deflection, before pressing the trigger for a longer period to hit the bear with BPS. I also recommend limiting each press on the can's trigger to about 1 second, lest the person exhaust the can while the bear is still too far away to be affected, and to avoid using more BPS on any given bear than is necessary to deter it.

Field testing and utilization

1) During actual deployment of BPS against a bear, there is a tendency – not reflected in Dr. Smith's letter to UDAP on this issue – for users to hold down the trigger until the bear is visibly deterred. Instructing people to only press the trigger briefly isn't likely to be effective unless they practice this repeatedly. Practice is best done with a substance other than BPS, but which behaves similarly. The difference in deployment between someone well trained vs. a novice is likely to matter much more than whether a can takes 6+ seconds to deploy full, vs. one that deploys slightly faster.

1) During an encounter, the amount of time that a person has in which to (a) assess the situation and (b) deploy BPS, depend on the person's distance from the bear and how fast the bear and person are approaching one another.

   a) Bears running on a road have been clocked at 30-45 mph, which is equivalent to 45-65 ft per sec. Bears running over broken terrain, through dense vegetation, presumably run somewhat slower.

   b) In cases where a bear charges someone, the charge usually starts within 50 yards (150') of the person, and nearly always within 100 yards (300'). So if a bear is charging, a person typically has no more than about 5 - 7 seconds (=300/65) to react, and sometimes less than 3 seconds.

   c) Concerning extreme situations where there are only a few seconds available before contact, I could not disagree with UDAP's claim that the more BPS which can be delivered during those few seconds, the better.

3) IGBC recommendations should advise people to learn enough bear body language to distinguish offensive vs. defensive aggression, as well as aggression vs. non-aggression, for instance as described in my books the *Alaska Magnum Bear Safety Manual*, *When Bears Whisper, Do You Listen*?, and *The Language of Bears*.

Sincerely,

Stephen F. Stringham

Stephen F. Stringham, PhD - President – WildWatch

June 21, 2016

Jim Unsworth, Chair
Matt Hogan, Co-Chair
Interagency Grizzly Bear Committee
U.S. Forest Service, Northern Region
Building 26 Fort Missoula Road
Missoula, MT 59804

Re: Public Comment Supporting Withdrawal of IGBC Bear Spray Duration Guideline

Dear Director Unsworth, Deputy Hogan, and to whomever else this may concern.

I hold a BS degree in Food Science and Technology and a MFA degree in Science and Natural History Filmmaking. My MFA thesis investigated the unique chemistry and thermogenic nature of capsaicinoids, their wide use in the food and pharmacological industries as well as their efficacious use in less-lethal aerosol weapons. During the course of my thesis research, I qualified as a tactical aerosol instructor trainer and am considered by many to be an expert on capsaicin and its use for law enforcement and large predator deterrence. I am also a grizzly attack survivor and UDAP bear spray user. I am submitting this letter to support UDAP's request that the IGBC withdraw its six-second bear spray duration recommendation. The recommendation has little scientific basis and discourages users from purchasing and using effective, EPA-registered bear spray products, such as UDAP. The IGBC's six-second spray duration recommendation implies that bear sprays which discharge faster than six seconds are somehow less safe or not as effective at deterring a bear attack. In my opinion, this recommendation is ambiguous and fails to consider other critical parameters of the total aerosol system.

For example, it used to be standard practice to label "pepper" spray contents according to percent Oleoresin Capsicum (%OC) as measured by volume, but that was insufficient as it failed to fully consider the thermogenic characteristics, both qualitative and quantitative, of the specific oleoresin used. The term was modified later to read: percent Capcaisin and Related Capsaicinoids (CRC), a superior comparative metric. An even more objective measurement would be to use Scoville Heat Unit equivalence as determined by high performance liquid chromatography (HPLC), which is the standard scale used for determining thermogenicity of organic compounds. Presently, EPA regulations require a pepper spray to contain between 1-2% CRC in order to be labeled as a "bear deterrent". If a particular formula batch measured 2.2% CRC it would fail to meet EPA regulations even though common sense would suggest that it is at least as effective as a 2.0% batch. I make this point as evidence that the bear deterrent industry, governing agencies, and associated research are still evolving and are presently in a dynamic state of flux. Complete aerosol delivery systems need to be more closely examined if accurate data are to drive any meaningful policy changes, not simply comparing individual and somewhat arbitrary parameters.

Another example: Given 2 cans of equal volume discharged under the same atmospheric conditions, with regard to ambient temperature and pressure (or elevation), if one discharges faster than the other it is putting more product out where it's needed faster. Simple logic and elementary physics would influence my preference for the faster discharge rate over the longer duration.

assuming sufficient volume was available for at least three to four bursts of approximately 1 second each. Any greater reserve is ineffective as time is paramount when dealing with an agitated grizzly at full charge.

I know UDAP is effective because it saved my life. During the fall of 1999, I was bowhunting for elk in the Gallatin Range just north of Yellowstone National Park when three grizzly bears charged me from roughly 40 yards out in thick timber, a typical close encounter startle event for the bears. The two younger, sub-adult bears stopped their charge at about 15 yards from me, but the fully mature female continued toward me at blinding speed. I deployed my UDAP bear spray and discharged its contents toward the charging sow using three short bursts – first when she was approximately 20 feet away, next at 10-12 feet, and finally at about 7 feet. The bear tried to get around the "wall" of bear spray between us, but the multiple shots created a cloud that engulfed her on all sides. At 7 feet, the grizzly stopped abruptly, turned, and bolted the other direction, followed by her two cubs. Even though the full encounter lasted about 15-20 seconds, I only used approximately half of the available contents of the UDAP container. By weighing the can after the incident, we learned that as of that date this was the most product ever used in a single altercation with a UDAP product, which at the time was the only bear spray on the market measuring a full 2%CRC. Attached is an article from the Bozeman Daily Chronicle that describes the encounter in more detail.

The UDAP spray container I had with me on that day was the 9.2 ounce, 260 gram can, which at the time was the largest container UDAP made. The label on the can indicated that it completely discharges in 5.4 seconds. If that's the case, the can of bear spray that surely saved my life does not even meet the IGBC's recommendation for spray duration. Notwithstanding that fact, the UDAP can was able to produce multiple shots of spray and discharge a sufficient amount of product in an extremely short period of time to deter the attack, which under the conditions of my grizzly encounter was exactly what the situation called for. I know from personal experience facing a charging grizzly that I needed the product to shoot out of the can as quickly as possible with sufficient volume and pressure to overcome the turbulent wind conditions present at the time. With UDAP's 9.2 oz can, not only did I have sufficient product to fire three bursts of spray and stop the bear, but I also had sufficient spray left in the container for peace of mind on my several mile hike off the mountain.

To issue a bear spray duration recommendation that implies UDAP's product is not safe or "recommended" is not only disingenuous, it is irresponsible. UDAP sells an effective, life-saving product, as likely do the other bear spray producers. To steer the public away from all but one particular bear spray makes no sense.

I support UDAP's efforts to remove the six-second spray duration recommendation. The extended amount of time it may take for a bear spray product to discharge a given volume from the can bears no rational relationship to whether the user can discharge multiple, bear-stopping clouds or whether there will be sufficient product left after the encounter to guard a retreat to safer ground. The critical components are the SHU rating of the product, total volume available, and how the user deploys it.

Please feel free to contact me with any questions or comments, or if I may be of any further assistance.

Sincerely,

Eric Burge

(310) 499-8200 cell

http://www.bozemandailychronicle.com/news/yellowstone_national_park/bear-spray-helps-fend-off-charge/article_6a8c6556-5910-5038-a7d6-552700ec6118.html

Bear spray helps fend off charge

By JOAN HAINES - Chronicle Staff Writer Oct 7, 1999

Eric Burge has worked as a whitewater stunt man and is accustomed to living on the edge, but he said he came a little too close to the edge Wednesday.

Burge, 40, had been looking for elk for a month this bowhunting season and hadn't shot one ye An experienced hunter, this was his first time out with a bow. He was in Tom Miner Basin Wednesday near Steamboat Mountain in a whitebark pine stand at 9,200 feet.

He was dressed in camouflage and walking softly. He had seen grizzly scat in the area. He was alone.

"I was stealthing into the wind," the Bozeman hunter said. He knew he was not following the safety rules for preventing encounters with bears.

"I've been hunting and fishing all my life," Burge said. "I knew it was grizzly habitat. I knew a guy had been mauled at Black Butte Creek. I knew there were elk in the area. I was willing to take th chance."

George Terry Langley Jr. of Seattle was badly injured by a sow grizzly in Yellowstone National Park on Sept. 22. That sow was with two other grizzlies, probably cubs, that were about the sam size as the sow.

As Burge walked up a hill, he saw three grizzly bears come over a rise, possibly a sow with two cubs of similar size. They were only 40 to 45 yards away.

The three grizzlies charged immediately until they were about 15 yards away from him. One bear continued toward him, head down, ears back.

"I clicked into auto pilot," the hunter said.

He sprayed the sow three times, first when she was 20 feet away, next at 15 feet and finally at about 10 feet.

"She was trying to get around the cloud," Burge said. "I was just hoping the spray worked as it was advertised." He had bought the largest size and strongest mixture of UDAP, a pepper spray manufactured in Bozeman.

At about 7 feet, the grizzly stopped. "I got her good in the face," he said. The sow bolted in the opposite direction, followed by the two other bears.

"If I would have had a gun, I would have used it," said Burge, who had considered taking a gun on the hunt. However, he said, if he had shot at the bear and missed, he probably would have been attacked and injured. If he hadn't missed, the bear could have been killed.

He estimated the entire encounter lasted 20 seconds. He used only about half of the spray's container.

When the encounter was over, Burge was able to find an alternate three-mile route back to his truck with a Global Positioning System.

Burge intends to go into the backcountry again soon.

"I'm out there, but probably not in the same whitebark pine stand," he said.

Grizzly bear specialist Kevin Frey of Bozeman, who works for the state Department of Fish, Wildlife and Parks, said because bowhunters are hunting quietly and since elk and bears use th same habitat, archers put themselves at higher risk.

"About the only thing they can do is be very alert to their surroundings," he said. "Two sets of eyes are better than one."

[U+2022]After the interview, he said he would meet with UDAP manufacturer, Mark Methany, who would measure how much spray would left and supply him with a new can.

June 15, 2016

By Email: ellendavis@fs.fed.us

Jim Unsworth, Chair
Matt Hogan, Co-Chair
Interagency Grizzly Bear Committee
200 East Broadway
Missoula, MT 59802

Re: Public Comment Supporting Withdrawal of IGBC Bear Spray Duration Guideline

Dear Director Unsworth and Deputy Hogan,

I recently retired as the Executive Director of the Montana Fish, Wildlife and Parks Foundation (Aka Montana's Outdoor Legacy Foundation) in which role I also served as the Trust Manager for the Montana Fish and Wildlife Conservation Trust. Prior to these roles I was the Executive Director of the Boone and Crockett Club, a position I accepted after 32 years at Washington State University as a senior administrator and faculty member. I have been an avid outdoorsman/hunter-conservationist all of my life and have held leadership roles with conservation organizations including the Boone and Crockett Club, Rocky Mountain Elk Foundation and I was one of the founders of the Mule Deer Foundation. I am submitting this letter to support UDAP's request that the IGBC withdraw its six-second bear spray duration recommendation. The recommendation has no scientific basis, is not the result of empirical testing and discourages users from purchasing and using effective, EPA-registered bear spray products, such as UDAP. The IGBC's six-second spray duration requirement implies that bear sprays which discharge faster than six seconds are somehow less safe or not as effective at deterring a bear attack. In my experience this is simply not true.

My experience with grizzly bears dates back to 1982 when I made my first unguided hunt for Alaska brown bears near Cold Bay, Alaska, with my brother who is an Alaska resident. Alaska game laws permit nonresident hunters who are within the second degree of kindred to hunt grizzly bears, sheep and goats without a professional guide. Subsequent to that trip I have made 7 different trips to Alaska hunting brown bear and Dall's sheep with my brother. In 2002 I had an Alaska Assistant Guide license and guided clients hunting brown bear near Cold Bay, Alaska, with my brother. In addition to my Alaskan experiences with both inland grizzlies and coastal brown bears, I have had almost annual experiences with grizzly bears while hunting in Montana over the past 15 years.

Until I moved to Montana I had no experience with bear spray and knew little about its effectiveness or use. My attitude, like most hunters, at that time was that bear spray was for tourists and was no substitute for an adequate big game rifle or 12 gauge shotgun with #4 buckshot and slugs.

I first became aware of bear spray when Chuck Bartlebaugh, who was with the Center for Wildlife Information, contacted me seeking support from the Boone and Crockett Club for an initiative he was developing with Gen. H. Norman Schwarzkopf as a spokesperson for grizzly bear recovery.

During that conversation and subsequent conversations Chuck was a strong advocate for the use of bear spray as a deterrent for repelling aggressive grizzlies. Conversations with Chuck piqued my interest and I began seeking information about the product. Chuck was adamant about the "six second" discharge time related to bear spray, and as a result I was led to believe that the Counter Assault product was the only reliable and effective bear spray product available. At the same time I was also led to believe that UDAP bear spray was not effective because of the "six second rule" and thus, was an inferior product.

Throughout my career(s) I have worked on conservation projects with more than 20 different state and federal agencies and conservation organizations. I understand the desire to protect and enhance Montana lands for conservation and public access and the need to keep the public educated, especially when it comes to grizzly bears. Having the "right stuff" is a key to being safe year after year in the back country, but in my view, being competent in the use of bear spray and following the basic tenants of the Be Bear Aware program are much more important than whether the bear spray you may be carrying sprays for 4, 6 or 10 seconds.

Since I spend a lot of time hunting and horse packing in the backcountry I encounter many different people who may or may not be carrying bear spray. Whenever I meet a stranger with a can (or two) and often a pistol on their hip in the backcountry I nearly always ask them if they have ever practiced with the bear spray. Invariably their answer is "No." Bear attacks are sudden and usually unanticipated, requiring almost reflex action in discharging bear spray. The fact of the matter is that it makes no difference whether the duration of the discharge of the bear spray is 5 seconds, 6 seconds or whatever. If you don't know how to use it in an emergency it is essentially useless. IGBC's six-second spray duration requirement makes little difference in situation like this. To me it makes more sense to educate people about the need to practice with and become proficient with using bear spray rather than focusing upon how long it takes the spray canister to discharge.

On the other hand, I use commercial bear resistant food containers and have made my own bear resistant panniers for horse packing. In order for the panniers which I made to be certified for use in USFS areas requiring bear resistant food containers, the USFS Missoula Technical Development Center tested and certified them to insure they met the minimum design and structural standards. The testing methodology used involved impact-testing machines that closely simulate the pressure a bear can exert on a container. They had specific devices for testing the strength and design of such panniers as well as other food containers. These tests are based upon IGBC guidelines which are specific and measurable when it comes to wall strength, seams, etc. The difference between the IGBC food container guidelines (garbage containers as well) and the bear spray guidelines is that the food containers/and garbage containers are actually tested with grizzly bears to make sure the bears cannot open them. As far as I am aware, no such tests have been performed with bear spray to determine if, in fact, a minimum of a 6 second discharge time is required to deter a grizzly bear from attacking.

The conservation organizations I have worked with have all supported the IGBC's vision of recovering grizzly bears in Montana. I have helped raise significant funding for Montana FWP's Grizzly Bear Augmentation project as well as its grizzly bear management and recovery efforts over the past 8 years. I have also presented to the public on these projects as well as general "safe practices" for hunting and horse packing in the grizzly country. I understand and support the need for professionals to manage the grizzly bear population.

The IGBC food storage container guidelines are enforced by the Forest Service and are based upon empirical as well as structural testing. However, the bear spray guidelines were developed in some manner other than empirical testing. Bear spray products are registered with the EPA, so when it comes to developing bear spray product guidelines for deterring a grizzly bear attack it seems to me that these guidelines should be promulgated by only after empirical testing and administered by the EPA.

In my view, as an experienced hunter, the IGBC recommending a .375 Ruger Magnum rifle over a .375 Weatherby, or a 30-06 is akin to recommending one bear spray over another simply because one sprays for 6 seconds instead of 5 seconds. Any of these rifles with proper ammunition will kill a bear just as fast and just as dead as the other, if one knows how to use the rifle properly. The same holds true with both Counter Assault and UDAP bear sprays.

In sum, I do not believe that the IGBC should deter the public from purchasing one bear spray over another when the products available on the market have all met the EPA criteria. To issue a bear spray duration recommendation that implies UDAP's product is not safe or "recommended" is not only disingenuous, it is unethical and irresponsible. UDAP sells an effective, life-saving product, as likely do the other bear spray producers, and to steer the public away from all but one particular bear spray makes no sense.

Whether you're hunting or hiking, bear spray is essential in grizzly country and I always keep bear spray attached to my day pack where I can get to it in an emergency. Having used both Counter Assault and UDAP, I prefer UDAP….. but that is not to say that Counter Assault products are not effective. I use and am a strong advocate of the Counter Assault Pentagon electric bear fence.

I support UDAP's efforts to remove the six-second spray duration recommendation. The amount of time it takes for bear spray product to come out of the can bears no rational relationship to whether the user can fire multiple or bear-stopping shots. The critical components are the volume of product in the can and how the user deploys it.

Please feel free to contact me if you have questions or if I can be of any further assistance.

Sincerely,

George J Bettas

George Bettas
gbettas@gmail.com
(406)360-5976

SECURITY
EQUIPMENT CORPORATION

June 15, 2016

Jim Unsworth, Chair
Matt Hogan, Co-Chair
Interagency Grizzly Bear Committee
200 East Broadway
Missoula, MT 59802

Re: Public Comment Supporting Withdrawal of IGBC Bear Spray Duration Guideline

Dear Director Unsworth and Deputy Hogan,

I am the Vice President of Operations for SABRE – Security Equipment Corporation. We manufacture and distribute Frontiersman Bear Attack Deterrent, an EPA-registered bear spray. I am submitting this letter to support UDAP's request that the IGBC withdraw its six-second bear spray duration guideline. The recommendation lacks scientific basis and discourages users from purchasing and using safe, effective, EPA-registered bear spray products, such as Frontiersman. The IGBC's six-second spray duration requirement implies that bear sprays which discharge faster than six seconds are not safe and effective at deterring a bear attack. The IGBC's six-second guideline is leads to confusion in the marketplace, and does not benefit the safety of the public or the conservation of bears.

We manufacture Frontiersman in two sizes (7.9 oz and 9.2 oz) and both discharge a full can of spray in approximately five seconds, which is why the IGBC's six-second recommendation is a serious concern. Frontiersman bear spray uses a duel-propellant delivery system specifically designed to deploy spray quickly to reach and stop an aggressive bear. We pride ourselves in Frontiersman's ability to deliver the formula quickly so the product can quickly create a protective barrier of capsaicin. Bears can charge at a rate of 50 feet per second, necessitating the fast and effective delivery of bear spray. Frontiersman's powerful and fast delivery system allows the user to deploy multiple bursts or shots of spray per can, which is important for multiple bear scenarios, repeated charges, and for retaining spray for the hike out. Notwithstanding the IGBC's six-second duration guideline, Frontiersman is a safe and effective bear spray and there is no demonstrable evidence to the contrary.

The IGBC's six-second guideline appears to promote the one bear spray company (Counter Assault) that has historically produced the only bear spray cans deploying spray slower than six seconds. There is no scientific literature or peer-reviewed research stating that a can with a six-second spray time is safer or more effective than a similar can with a four- or five-second spray time. IGBC's stated justification that six seconds of spray is necessary to compensate for multiple bears, wind, zig-zagging or circling bears, repeated charges, or reserve for the hike out is misguided. All of these scenarios can be compensated for in the way a user discharges a faster deploying bear spray.

747 Sun Park Drive
Fenton, MO 63026

(636) 343-0200
(800) 325-9568
(636) 343-1318 Fax

E-Mail: info@sabrered.com
www.sabrered.com

SECURITY
EQUIPMENT CORPORATION

The IGBC bear spray guidelines cause confusion to retailers, distributors, and end users. A bear spray competitor has developed a comparative chart based on IGBC guidelines which it uses as a marketing tool. The chart implies that our products and those of UDAP do not meet guidelines and are, therefore, unsafe or even dangerous. The IGBC's recommendations are being used as a marketing tool that has the potential to confuse and mislead the public and cause economic and reputational harm to those bear spray companies not meeting the six-second spray duration guideline.

For the above reasons, I support UDAP's position to remove the six-second spray duration recommendation.

If you have any questions or require anything further, please do not hesitate to contact me.

Sincerely,

Robert Nance
V. P. of Operations

747 Sun Park Drive
Fenton, MO 63026

(636) 343-0200
(800) 325-9568
(636) 343-1318 Fax

E-Mail: info@sabrered.com
www.sabrered.com

BEAR aware
BEAR SPRAY RENTALS

715 North Rouse, Bozeman, Montana 59715 | 406-224-5367
sally@bearaware.com | www.bearaware.com

June 15, 2016

Jim Unsworth, Chair
Matt Hogan, Co-Chair
Interagency Grizzly Bear Committee
200 East Broadway
Missoula, MT 59802

Re: Public Comment Supporting Withdrawal of IGBC Bear Spray Duration Guidelines

Dear Director Unsworth and Deputy Hogan,

I am the owner of Bear Aware, LLC, the bear spray rental service in Yellowstone National Park ("YNP"). I started my company in response to the two fatal grizzly bear attacks of 2011 in YNP. Following those attacks, it was learned only 14% of day hikers carry bear spray. Hailing from the Midwest, I understood the misguided mindset of visitors from outside the GYE who hike without spray, for it is considered costly by most and cannot be brought on airplanes. Our mission is to make safe, effective, and affordable bear spray available to park visitors. I am submitting this letter to support UDAP's request that the IGBC withdraw its six-second bear spray duration requirement because it is confusing as to what constitutes a safe and effective bear spray and may actually have the unintended consequence of reducing the number of users carrying bear spray.

Bear Aware, LLC proudly carries UDAP Pepper Power 9.2 oz. Magnum Bear Spray as its exclusive and preferred bear deterrent spray. Before starting my business, I carried UDAP Pepper Power for my personal use. When starting my business, I again researched bear sprays to determine which I would offer to park visitors. I chose UDAP Pepper Power because it shoots an immense amount of spray, creates a thick, protective fog, and stops bear attacks. I prefer UDAP's high velocity of the spray which helps compensate for cross-wind effects.

Since reopening this season (May 21st), I've been approached on at least three occasions where park visitors were confused by the IGBC guidelines chart. I was asked if the spray I carried is "on the chart" and "sprays long enough." That was the first I'd heard of any such chart, and I assured them UDAP spray is proven to deter bear attacks and is EPA regulated and approved. I advised the visitors that National Park officials and bear biologists knew which spray I carry and if it was truly inferior or insufficient, I believe I'd duly informed and banned from carrying UDAP

products. On each occasion, I asked the visitor what chart they were talking about, for I'd never seen anything like it. They said they'd seen it "somewhere" or "in an advertisement" but said the chart was from a government agency. I again assured the visitors UDAP Pepper Power is EPA approved and has been used to stop bear attacks.

None of those visitors rented spray. I'm unsure if they were hiking as we get hundreds of general inquiries per week. However, it's possible they may have ventured onto the trails or into the back country without bear spray due to their concerns after seeing the chart.

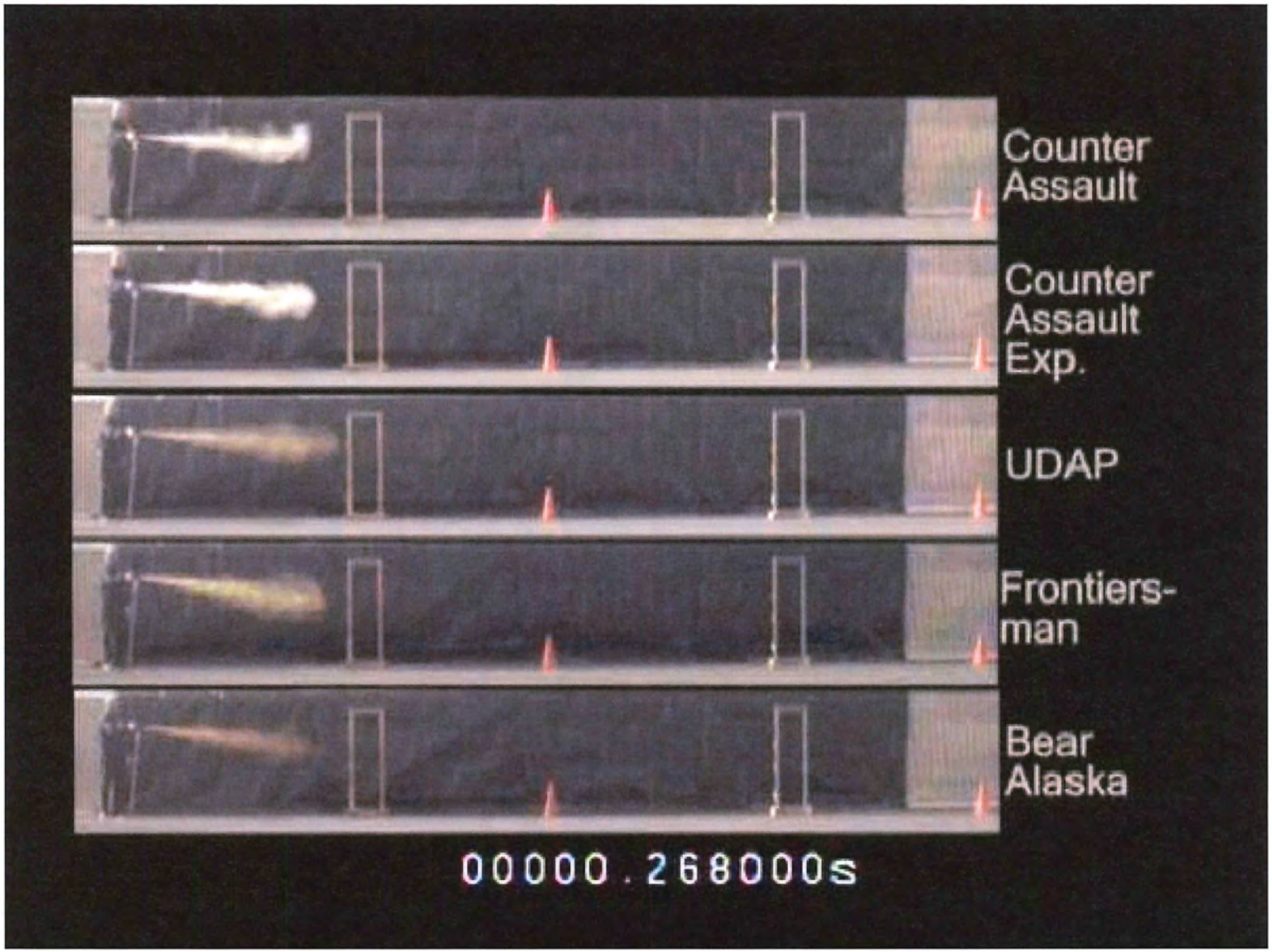
Since 2011, I've worked tirelessly to bring bear spray rentals to YNP and I am passionate about providing people affordable access to safe and effective bear spray. Last year 47% of our customers reported they would have hiked without bear spray if rentals were not available. Despite the park's current "A Bear Doesn't Care," celebrity campaign encouraging people to carry spray, 43% of our customers this season reported likewise. Needless to say, I'm very concerned some visitors may forego carrying spray altogether because they saw "a chart somewhere" that bear spray must shoot a certain duration.

UDAP Pepper Power is EPA-approved and is proven to deter bear attacks. Accordingly, I support UDAP's position to remove the six-second spray duration recommendation so there is no confusion as to whether UDAP is effective.

Thank you for your time and consideration. If you have any questions or need anything further, please do not hesitate to contact me.

Sincerely,

Sally Vering
Founder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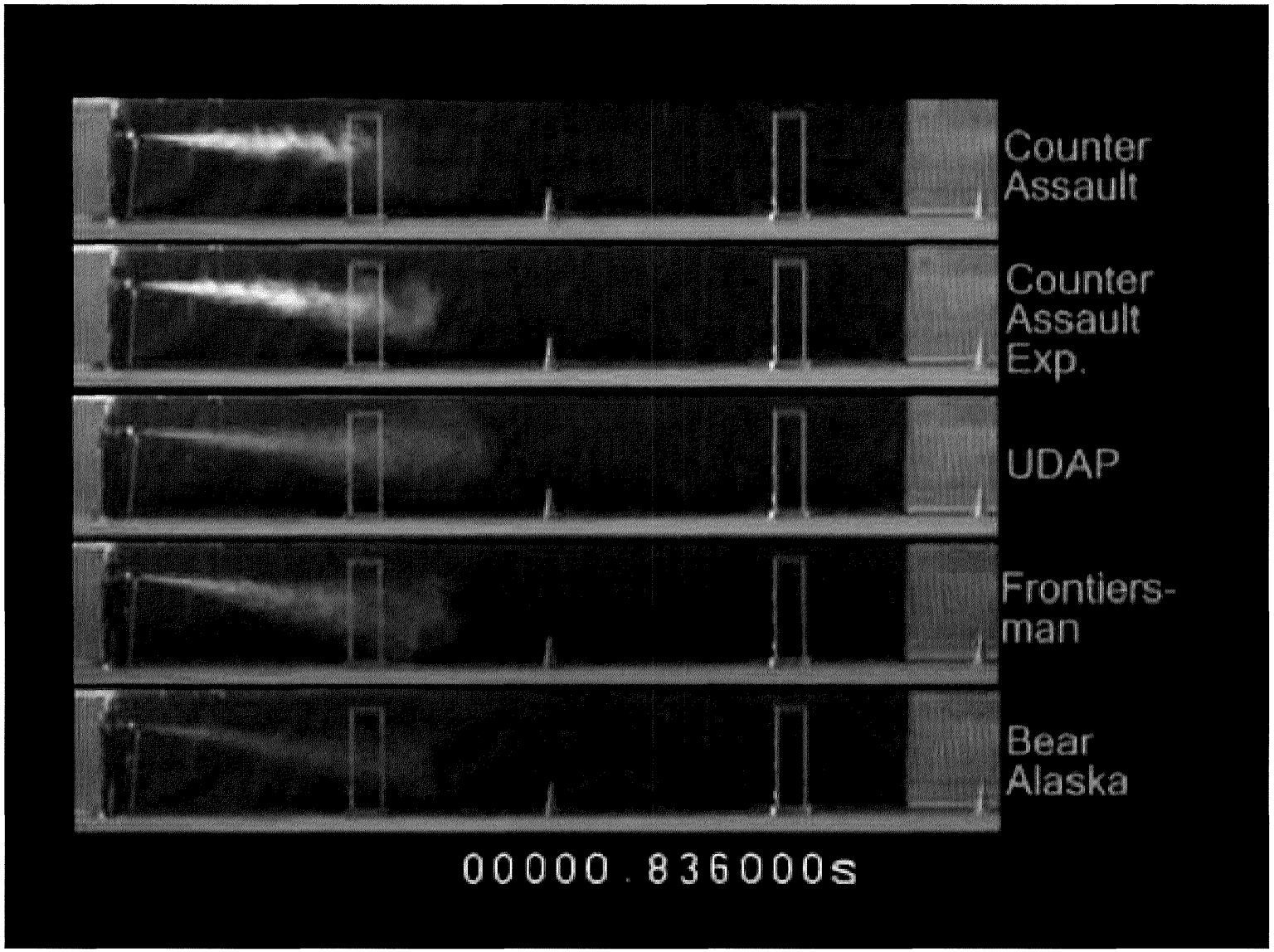
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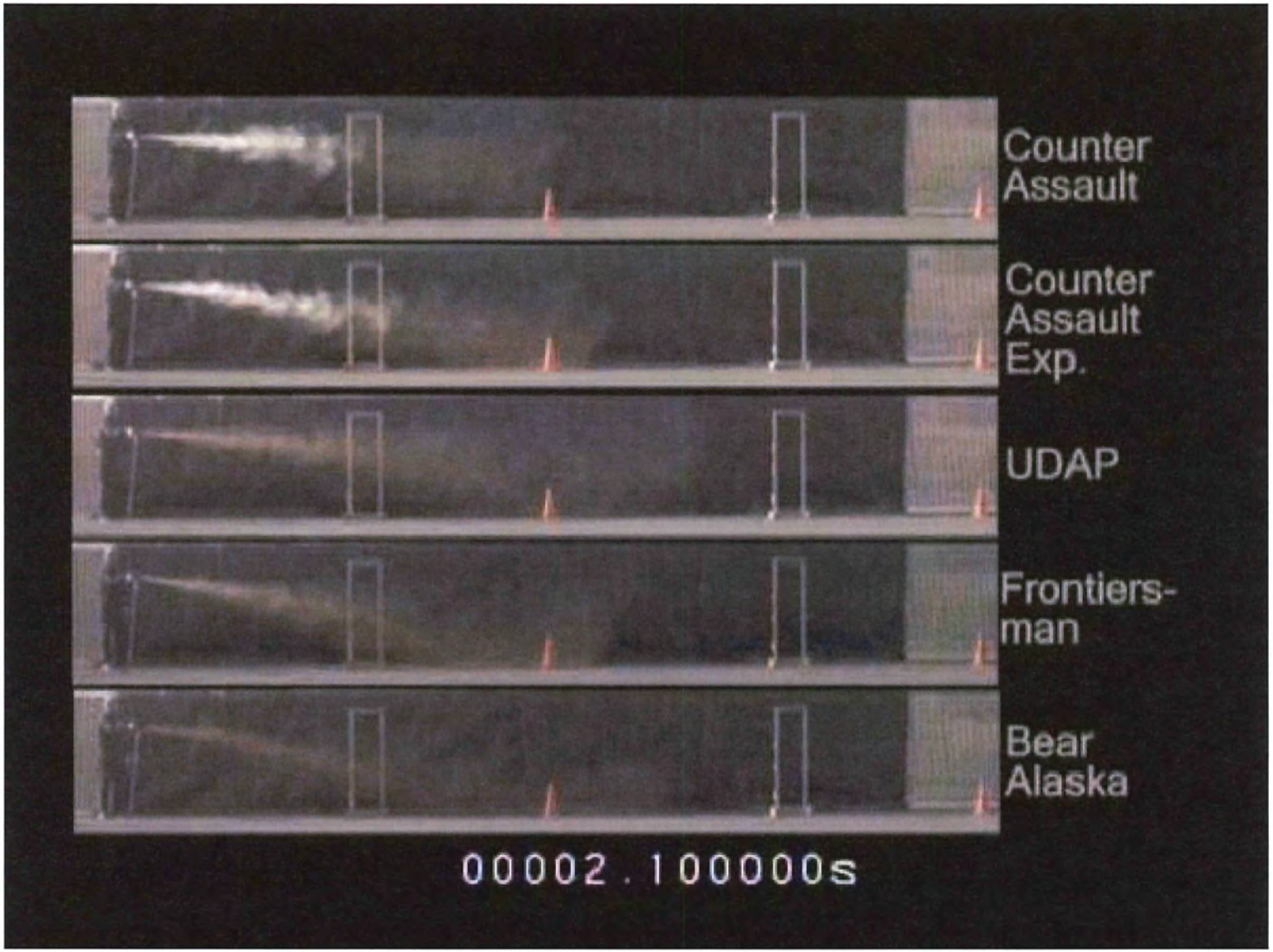
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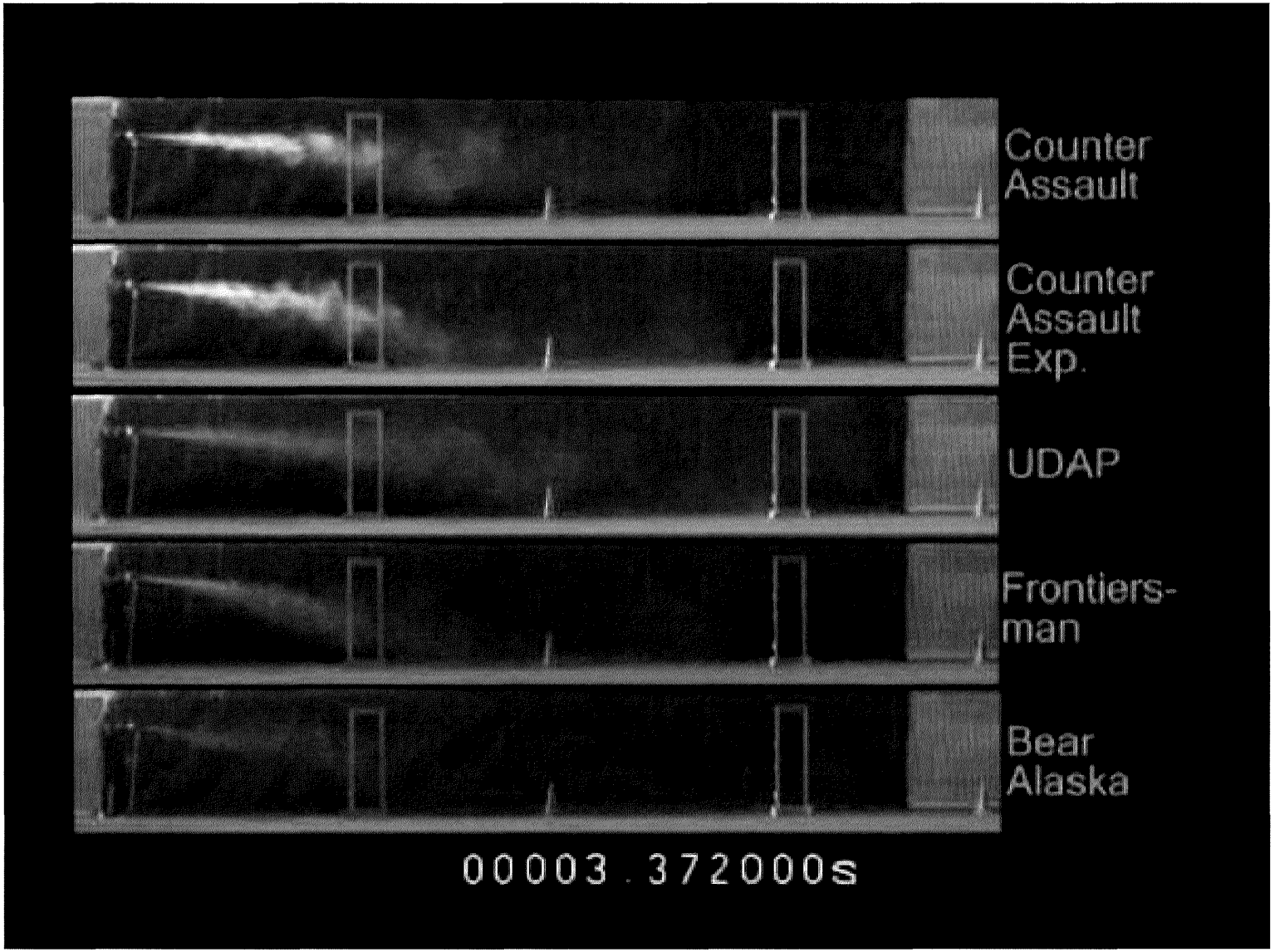
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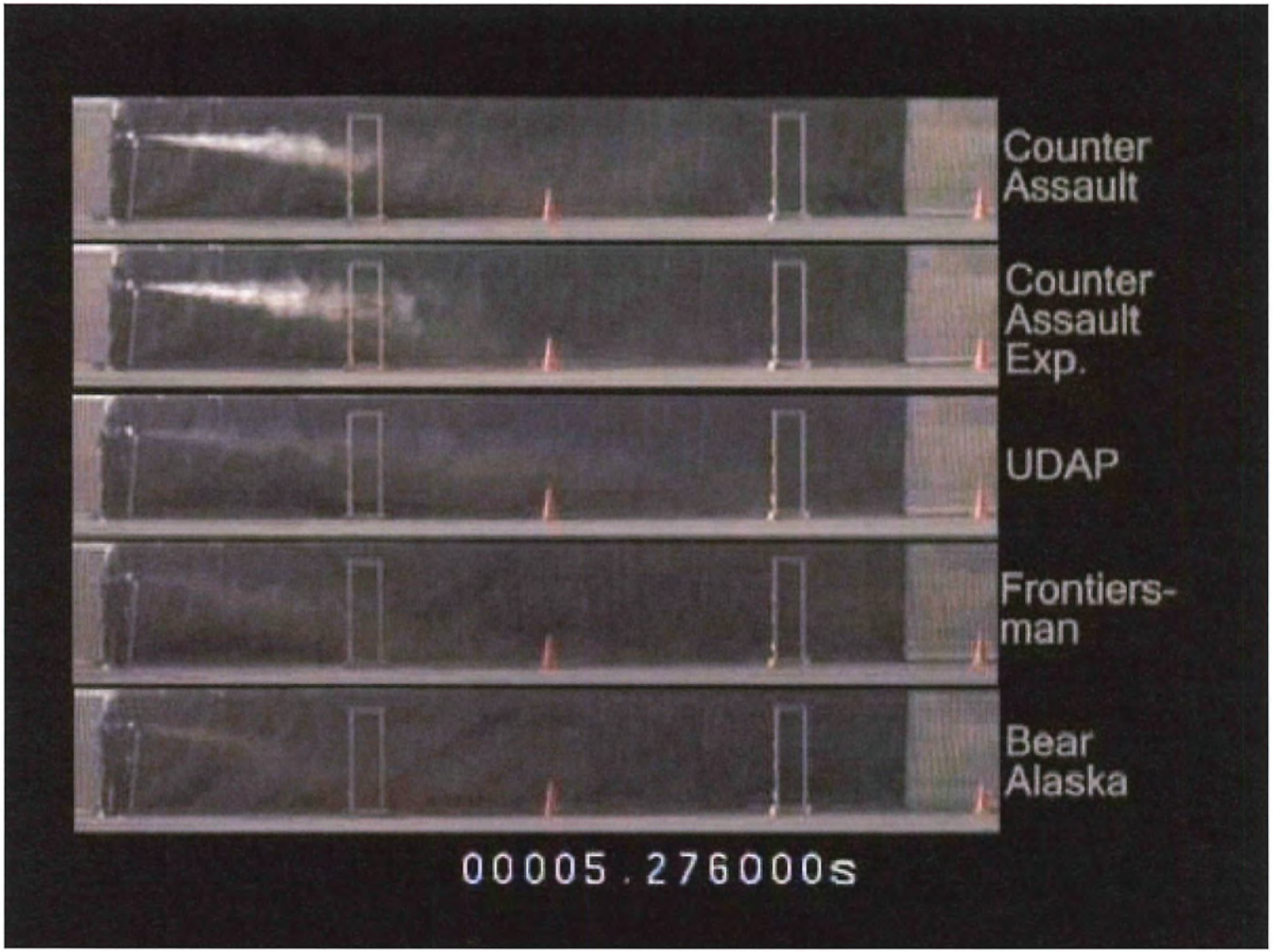
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Pesticide Registration (PR Notice) Notice 2002-1

NOTICE TO MANUFACTURERS, FORMULATORS, PRODUCERS, REGISTRANTS AND APPLICATORS OF PESTICIDE PRODUCTS

ATTENTION: Persons Responsible for Public Health Programs and Those Responsible for Registration of Pesticide Products

SUBJECT: List of Pests of Significant Public Health Importance

This notice identifies pests of significant public health importance. Section 28(d) of the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) requires the United States Environmental Protection Agency (EPA), in coordination with the United States Department of Health and Human Services (HHS) and United States Department of Agriculture (USDA), to identify pests of significant public health importance and, in coordination with the Public Health Service, to develop and implement programs to improve and facilitate the safe and necessary use of chemical, biological and other methods to combat and control such pests of public health importance. Issuance of this list fulfills the requirement of FIFRA sec. 28(d) to identify pests of significant public health importance as a part of this process.

The publication of this list does not affect the regulatory status of any registration or application for registration of any pesticide product. This list does not, by itself, determine whether a pesticide product might be considered a "public health pesticide" as that term is used in FIFRA. That term, is defined in FIFRA section 2(nn); determining whether a pesticide is a public health pesticide is beyond the scope of this PR Notice.

Compilation of this list was a cooperative effort by the HHS, USDA and the EPA. The Office of Pesticide Programs, EPA, coordinated the review by experts in public health and/or pesticide use patterns to compile this list. No person is required to take any action in response to this notice.

The Agency has determined that the list of pests of significant public health importance required under FIFRA section 28(d) can be established independently of the definition of "public health pesticide" in Section 2(nn). EPA is interpreting the term "significant public health importance" broadly, to include pests that pose a widely recognized risk to significant numbers of people. This amended list addresses the majority of comments received and also provides a mechanism for all interested parties to engage further on this topic.

I. BACKGROUND

FIFRA section 28(d) charges EPA with identifying "pests of significant public health importance." FIFRA section 2(t) defines the term "pest" as meaning:

> (1) any insect, rodent, nematode, fungus, weed, or (2) any other form of terrestrial or aquatic plant or animal life or virus, bacteria, or other micro-organism (except viruses, bacteria, or other micro-organism on or in living man or other living animals) which the Administrator declares to be a pest under section 25(c)(1).

Pursuant to the authorization in the second part of this definition, EPA has broadly declared the term pest to cover each of the organisms mentioned except for the organisms specifically excluded by the definition (See 40 CFR 152.5).

II. THE LIST

EPA has determined that the pests identified in Appendix A are pests of significant public health importance as that term is used in FIFRA section 28(d). This list is derived in large part from review of the pesticide/pest combinations for which efficacy (product performance) data are generally required to be submitted and reviewed prior to registration. In no way should this be interpreted to mean that EPA has or would base any regulatory action solely on this list. EPA is publishing this list separate from any statutory or regulatory conclusions which may be associated with public health pesticides.

A brief description of the identified pests or category of pests and an explanation for designating each as a public health pest is provided below:

Cockroaches. The listed cockroaches are controlled to halt the spread of asthma, allergy, and food contamination.

Body, head, and crab lice. These lice are surveyed for and controlled to prevent the spread of skin irritation and rashes, and to prevent the occurrence of louse-borne diseases such as epidemic typhus, trench fever, and epidemic relapsing fever in the United States.

Mosquitoes. Mosquitoes are controlled to prevent the spread of mosquitoes bearing such diseases as malaria; St. Louis, Eastern, Western, West Nile and LaCrosse encephalitis; yellow fever and dengue fever.

Various rats and mice. The listed rats and mice include those which are controlled to prevent the spread of rodent-borne diseases and contamination of food for human consumption.

Various microorganisms, including bacteria, viruses, and protozoans. The listed

microorganisms are the subject of control programs by public health agencies and hospitals for the purpose of preventing the spread of numerous diseases.

Reptiles and birds. The listed organisms are controlled to prevent the spread of disease and the prevention of direct injury.

Various mammals. The listed organisms have the potential for direct human injury and can act as disease reservoirs (i.e., rabies, etc.).

EPA, HHS and USDA do not envision that this list of pests of significant public health importance will remain static. It is possible in the future, as there are new discoveries concerning the roles of species in spreading disease, that this list may need to be changed. Should any additional species be found to present public health problems, EPA may determine that it should consider them to be pests of significant public health importance under FIFRA Section 28 (d). As deemed necessary, the Agency will update the list of pests of significant public health importance. Interested parties are invited to petition the Agency regarding the amendment of this list. This petition should include the common use name and scientific name of the pest, and a rationale regarding the public health threat posed by this pest. These petitions can be sent to the contact under Part VI. For Additional Information.

III. USE OF THE LIST OF PESTS OF SIGNIFICANT PUBLIC HEALTH IMPORTANCE LIST BY THE AGENCY

The Agency will use the list of pests of significant public health importance to:

1. Fulfill the requirements set forth in FIFRA Section 28(d)

2. Together with the Public Health Service, develop and implement programs to improve and facilitate the safe and necessary use of chemical, biological and other methods to control pests of public health importance.

V. WHAT REGISTRANTS SHOULD DO

Registrants do not need to do anything in response to this notice.

VI. FOR ADDITIONAL INFORMATION

If you have questions regarding this PR Notice, contact:

Kevin Sweeney
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW (7505C)

Washington, DC 20460
phone: (703) 305-5063
fax: (703) 305-6596
e-mail: sweeney.kevin@epa.gov

or

Robyn Rose
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW (7505C)
Washington, DC 20460
phone: (703) 308-9581
fax: (703) 308-7026
e-mail: rose.robyn@epa.gov

Signed:_____
Marcia E. Mulkey, Director
Office of Pesticide Programs, (7501C)

Appendix A

Chipmunks (Tamias striatus, Eutamias spp.)	**Buildings (indoor and outdoor areas) where droppings and/or ectoparasites may accumulate. Areas where damage to a building or any of its components presents a hazard to humans.**	**disease, human safety**
Wood rats (Nematoma spp.)	**Any site where this pest is found that presents a hazard or threat of direct injury to humans**	**disease**
Bears (Ursus spp.)	**Any site where an attack on humans may occur.**	**direct injury only repellents are registered for their control**
Raccoon (Procyon lotor)	**Any site where an attack on humans may occur. Areas where damage to a building or any of its components presents a hazard to humans. Any site where this pest is found that presents a hazard or threat of direct injury to humans**	**direct injury, rabies reservoir**
Gray wolf (Canis lupus)	**Any site where an attack on humans may occur.**	**direct injury, disease Control methods employed by State and Federal Biologists.**
Foxes (Vulpes vulpes, Urocyon cinereoargenteus, Alopex lagopus)	**Any site where an attack on humans may occur.**	**direct injury, disease rabies reservoir Control methods employed by State and Federal biologists.**
COMMON/SPECIES NAME	**SITE CLASS**	**PUBLIC HEALTH IMPORTANCE**

Carry Bear Spray - Know How to Use It

Bear spray has proven to be an effective, non-lethal, bear deterrent capable of stopping aggressive behavior in bears. The proper use of bear spray will reduce human injuries caused by bears as well as the number of grizzly bears killed in self defense. When carrying bear spray, it is important that you select an EPA approved product that is specifically designed to stop aggressive behavior from bears. Personal defense, jogger defense, and law enforcement or military defense spray's may not contain the correct active ingredients or have the proper delivery system to divert or stop a charging or attacking bear.

Selecting A Proper Bear Spray

- All bear sprays must be registered with the Environmental Protection Agency (EPA). Only use bear spray products that clearly state "for deterring attacks by bears." The EPA registration number is displayed on the front label.
- EPA registered bear sprays, have an active ingredient, clearly shown on the label, of 1% to 2% Capsaicin and related Capsaicinoids. This active ingredient is what affects the bear's eyes, nose, mouth, throat, and lungs.
- EPA registered bear sprays have a minimum duration of at least 6 seconds or more to compensate for multiple bears; wind; bears that may zigzag, circle, or charge multiple times; and for the hike out after you have stopped a charging bear.
- EPA registered bear sprays shoot a minimum distance of 25 feet or more to reach the bear at a distance sufficient for the bear to react to effects of the active ingredients in time to divert or stop the bear's charge and give the bear time to retreat.
- EPA registered bear sprays have a minimum content of 7.6 oz or 215 grams.
- Visitors in bear country should carry a can of bear spray in a quickly accessible fashion. Bear spray should also be readily available in the sleeping, cooking, and toilet areas of backcountry camps.
- Be sure the expiration date on your bear spray is current.

Safety Tips

- Make sure you are carrying EPA approved Bear Spray as your bear deterrent, don't depend on personal defense products to stop a

Selecting Proper Bear Spray

Carry bear spray. Bear spray works, know how to use it.

NPS/Hennigton

Bear spray has proven to be an effective, non-lethal, bear deterrent capable of stopping aggressive behavior in bears. The proper use of bear spray will reduce human injuries caused by bears as well as the number of grizzly bears killed in self defense. When carrying bear spray it is important that you select an EPA approved product that is specifically designed to stop aggressive behavior from bears. Personal defense, jogger defense, and law enforcement or military defense sprays may not contain the correct active ingredients or have the proper delivery system to divert or stop a charging or attacking bear.

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- Be sure the expiration date on your bear spray is current.

Safety Tip

- Make sure you are carrying EPA approved Bear Spray as your bear deterrent, do[illegible] personal defense products to stop a charging bear.

National Park | ID,MT,WY

Selecting Proper Bear Spray

Carry bear spray. Bear spray works, know how to use it.

NPS/Harrington

Bear spray has proven to be an effective, non-lethal, bear deterrent capable of stopping aggressive behavior in bears. The proper use of bear spray will reduce human injuries caused by bears as well as the number of grizzly bears killed in self defense. When carrying bear spray, it is important that you select an EPA approved product that is specifically designed to stop aggressive behavior from bears. Personal defense, jogger defense, and law enforcement or military defense spray's may not contain the correct active ingredients or have the proper delivery system to divert or stop a charging or attacking bear.

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- Be sure the expiration date on your bear spray is current.

Safety Tip

- Make sure you are carrying EPA approved Bear Spray as your bear deterrent, don't depend on personal defense products to stop a charging bear.

IGBC YELLOWSTONE ECOSYSTEM SUBCOMMITTEE
BEAR SPRAY POSITION PAPER

Grizzly bears appear to be increasing in number, and evidence suggests their distribution across the Yellowstone ecosystem is expanding. Human use of this same area is also on the rise. Consequently, the likelihood of bear/human encounters has grown. There is no substitute for taking the appropriate precautions to avoid conflicts with grizzly bears, including proper food storage and garbage disposal, proper care and attentiveness when hunting or retrieving game carcasses, and following recommended strategies when a grizzly bear is encountered. However, regardless of precautions taken, bear attacks will occasionally occur.

Hunter/grizzly bear conflicts in the Yellowstone Ecosystem are currently the most problematic. Hunters generally move quietly and stealthily while stalking big game and are carrying firearms. Also, hunters and bears share an interest in retrieving dead or wounded game animals. Thus, conflicts between hunters and grizzly bears are usually surprise encounters at close range. These situations can result in a hunter being mauled and a bear being killed or wounded. Close encounters between bears and backcountry recreationists, where firearms are not used, are less likely to result in injury or death of the human or the bear. Shooting a bear can escalate the seriousness of the attack.

For defense during an attack, the Yellowstone Ecosystem Subcommittee of the Interagency Grizzly Bear Committee strongly recommends the use of pepper spray specifically produced as bear deterrent. Bear spray has shown to be very effective in deterring grizzly bears, and the subcommittee encourages all individuals to carry it readily available while in occupied grizzly habitat. Further, the subcommittee recommends the use of recognized brands, using the largest size available containing 1.3 to 1.8% oleoresin capsicum with a spray range of at least 25 feet. Bear spray should be used solely for self defense and should never be sprayed on equipment or around campsites in an attempt to use it as a repellent. **Bear spray is intended as an air borne defense to be sprayed at a threatening predator.** In some cases, if used improperly as a repellent, it may act as an attractant. When properly used, bear spray is safe, effective, **and will not attract bears.**

Use the largest size available to provide additional spray which may be needed in the following situations:

- Windy, rainy or cold days
- A highly protective mother bear
- More than one bear (a mother with cubs)
- A bear with a fresh kill or repeated attacks
- A long hike out may require more spray

No deterrent is 100% effective, but compared to all others, including firearms, bear spray has demonstrated the most success in fending off threatening and attacking bears and preventing injury to the person and animal involved. The proper use of bear spray will reduce the number of grizzly bears killed in self defense and help promote the recovery and survival of the grizzly bear in the Yellowstone Ecosystem.

Interagency Grizzly Bear Committee
Winter Meeting Minutes

December 11, 2007
Holiday Inn, Downtown at the Park
Missoula, MT

Welcome & Introductions: The IGBC Chairman, Chris Smith, opened the meeting and welcomed everyone. Chris's two-year term as IGBC Chairman ended at the conclusion of the meeting and a new chair and vice chair will be elected. Members attending the meeting included the following:

Tom Tidwell, Bob Vaught, Janet Wise, Mike Stewart, Tony Hamilton, Jay Slack, Dave Brittell, Harv Forsgren, Jim Unsworth, Jeff Kershner, Gene Terland,

IGBC Executive Assistant Ellen Davis and IGBC Advisors Chris Servheen, and Jim Claar, and IGBC I&E Subcommittee Chair Doug Zimmer were also present.

Former Executive Committee Members Jack Troyer and Mitch King were recognized for their outstanding service and participation with the IGBC.

ACTION ITEMS: (Note: Additional discussion & details on action items addressed in topics below).

- **Ellen Davis** will work with Tony Hamilton to draft a letter from the IGBC executive committee to the Minister of British Columbia for continued support of the grizzly bear augmentation program on the Canadian side of the border. The letter will be circulated to the IGBC executive committee for edits and comments before finalized and signed by the new IGBC Chair.

- **Tom Tidwell & Jim Claar** will check with the Forestry Science Lab here in Missoula to see if they would be willing to do research on bear spray standards and criteria.

- **Jim Claar** will chair a task group of agency members and bear management specialists to review the need for IGBC guidelines for bear spray in view of the current EPA regulations currently in place. The task force will present a report of findings and make recommendations to the IGBC executive committee by March 1, 2008. Agency members are to submit names of task force participants to Jim Claar ASAP.

- **The IGBC I&E Subcommittee (Doug Zimmer et al)** will make sure that IGBC publications do not imply an endorsement for any specific brand of bear spray. This will include review of current materials on hand and any actions necessary to resolve the concerns raised by UDAP (Pepper Power) regarding the current materials

- **Ellen Davis & Larry Timchak** will work together to identify dates for the next winter IGBC meeting that coincide with dates the Discovery Center is open. A field trip to the Discovery Center would be part of the IGBC meeting. The IGBC executive committee agreed to a 1-day white bark pine workshop in conjunction with the next winter IGBC meeting as well as a site visit to the Discovery Center. The meeting will be held in the Greater Yellowstone Area. Larry will get back to Ellen by the end of January with proposed dates. Ellen will circulate the date options to the executive committee for a decision.

as necessary, to refine the areas where grizzly bear recovery will continue. After this presentation, Tony Hamilton, B.C. Ministry of Environment, voiced concern that if the NCDE was to be delisted in some future scenario, it might take away current emphasis on recovery in other ecosystems, specifically in the nearby Cabinet-Yaak (which may have similar genetics). Tony emphasized that it was very important that recovery efforts should continue in all ecosystems after all the effort that has been expended to date.

Bear Spray Guidelines Issue:

Aerosol spray containing derivatives of capsaicin, initially developed for law enforcement or self-defense against assault by a human, was identified as a potential tool for deterrence of attacks by bears in the 1980's. Several manufacturers began marketing "bear spray" by the mid to late 1990's. The Environmental Protection Agency (EPA) adopted regulatory standards for, and began to register bear pepper spray. In addition, the IGBC tasked a group of agency staff and other interested parties to develop guidelines for bear pepper spray to help consumers make informed choices regarding use of pepper spray to deter bears. Based on the recommendations of the working group, the IGBC adopted recommendations related to the percentage of capsaicin and related capsaicinoids, duration of spray, distance, etc. (see IGBC recommendations). The IGBC recommendations differ from the EPA standards in two ways: the recommendations call for duration of 6 seconds and distance of 25 feet, while the EPA standards do not address duration or distance.

At present, EPA lists Counter Assault Bear Deterrent, EPA Reg No. 55541-2, Guard Alaska Bear Repellent, EPA Reg, No. 71545-1, UDAP Pepper Power, EPA Reg. No. 72007-1, and Frontiersman Bear Attack Deterrent, EPA Reg No. 72265-1.

In addition to these four products, EPA allows "distributor products" that are identical to the above products but have a different name, address, and an additional number to the registration number.

EPA has no data in its files to show that the difference in the products (such as amount of active spray, distance, and time to empty can) affect product effectiveness.

UDAP has questioned the need for, or value of, the IGBC recommendations, and objects to the apparent endorsement of one brand of pepper spray in IGBC-produced materials. In addition, this manufacturer has alleged there is a conflict of interest related to CWI's involvement in development of the IGBC recommendations and publications that reference Counter Assault. The same manufacturer has requested that the IGBC formally review its recommendations and defer to EPA's regulation of bear pepper spray, notify the media and public of the change in IGBC recommendations and ensure that all materials and communication distributed or produced by or for the IGBC are free of overt or implied endorsement of any one EPA-approved product over others.

Action Item: The IGBC appointed a task group of member agency bear specialists to review the need for IGBC guidelines for bear spray in view of EPA's entry into regulation of this product, and that the I&E subcommittee take the lead for ensuring that all IGBC information materials produced or distributed by or for the IGBC, including the IGBC website, from this day forward do not convey any message or image that could be construed as an endorsement of any single brand of EPA-approved bear spray.

Yellowstone Grizzly Bear Coordination Committee – Larry Timchak

Major Accomplishments:

Doug,

After review of your e-mail and subsequent discussions with my staff, I do not see any ethics violations in anything the IGBC has done. However, I would like to make a few suggestions for the future based on appearance issues. One, any further materials which are produced for the IGBC should limit the logos and names of organizations listed in the materials, to the members of the IGBC and the organization which has done the production. I would recommend that if the IGBC continues to use CWI for its publications and other materials, that CWI only include the organizations within the IGBC and the CWI logo and do not include organizations which are aligned with CWI but not necessarily with the IGBC. Secondly, I would make sure that any further materials produced with a picture of bear spray on it continue to not show the full commercial label of the manufacturer of the spray. I hope this helps, and please contact me if you have any further questions or concerns.

Matt

Matthew J. Costello
Ethics Specialist
U.S. Department of the Interior
1849 C ST NW Room 4356
Washington, DC 20240
(202) 208-4110

Douglas_Zimmer@fws.gov

01/08/2008 03:39 PM

To: Matthew J Costello/PEL/OS/DOI@DOI
cc: edavis@fs.fed.us
Subject: Inter-agency Grizzly Bear Committee question

This is a little out of our box but I'm hoping you maybe able to help.

I serve as the Chair of the Information & Education subcommittee of the Interagency Grizzly Bear Committee, the inter-agency state/federal organization tasked with coordinating grizzly bear recovery in the lower 48 United States. Principal members include the USFWS, USFS, NPS, USGS, BLM and the wildlife agencies of the states where grizzlies occur, Washington,

Bear Aware Education Trailer, Yellowstone Ecosystem

IGBC Information & Education Subcommittee

Yellowstone Ecosystem

- **Gregg Losinski** *(Chair)* Idaho Department of Fish and Game

Selkirk/Cabinet-Yaak Ecosystem

- **Kim Annis** Montana Fish, Wildlife and Parks

Bitterroot Ecosystem

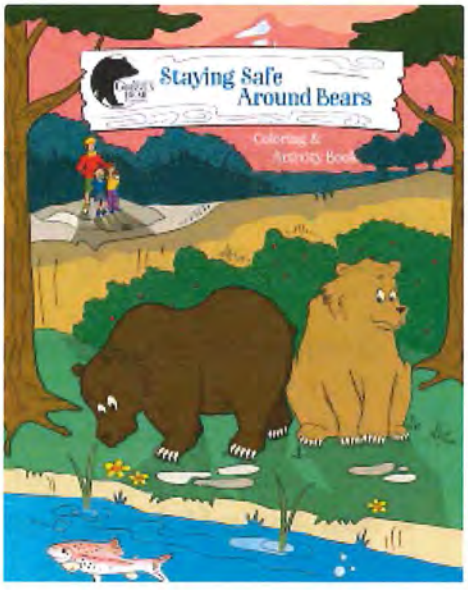
- **Tod McKay** Bitterroot National Forest

Northern Continental Divide Ecosystem

- **Laurie Wolf** Montana Fish, Wildlife and Parks

"Staying Safe Around Bears" Coloring & Activity Booklet–Print Your Own

In 2015, the IGBC sponsored the development of "Staying Safe Around Bears," a coloring and activity book that encourages children to behave safely around grizzly bears and black bears. Please click one of the links below to review a copy of the 16-page booklet.



Coloring Book Front

Print copies from home or download to your computer!

- PDF for printing a booklet with a color cover
- PDF for printing a black and white booklet

Please note that 11 1/2" X 14" paper is required and you'll need to fold and staple the booklet.

Grizzly Population Lesson Plan for Grades 9-

"Providing objective information and data and encouraging students to explore tough questions is important to their learning," concluded Dr. Reynolds-Hogland. "Today's high school students will be tomorrow's decision-makers. We need them to develop critical thinking skills and appreciate the value of science."

Bear Aware Safety Education Trailer on the Road in Southwestern Montana

A new bear aware trailer hit the road recently in the southwestern region of Montana. The educational trailer promotes how to properly manage potential food attractants and how to recreate safely in bear country.

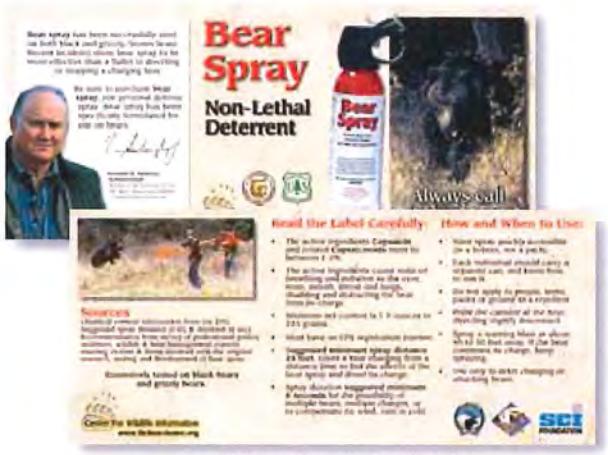
"This is a rewarding project for Montana Fish, Wildlife & Parks," said Laurie Evarts, the

Center for Wildlife Information

Bear Spray Educational Products

8 Page Brochure

DVD



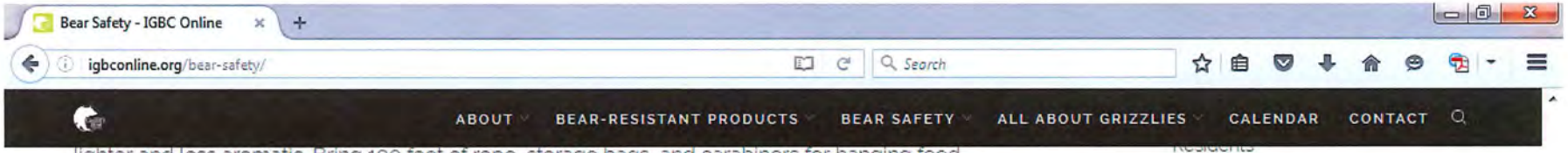
Educational Card 4x9

Educational Poster 11x17

Read the Label Poster 11x17

Bear spray educational materials are available for youth groups, hunter ED classes, staff training, workshops and community bear avoidance events.

For more information you can go to IGBConline.org or BeBearAware.org.



lighter and less aromatic. Bring 100 feet of rope, storage bags, and carabiners for hanging food.

Residents
Farmers & Ranchers

Use bear-resistant containers: A good method for storing food and other odorous items that attract bears, these containers can be purchased or rented from outdoor shops. *Coolers, backpacks, wooden boxes, and tents are NOT bear resistant!*

Be alert: Learn to recognize and watch for signs of bears in the area, like tracks, scat, and diggings. Use binoculars to scan the areas ahead. Bears often use the same trails hikers do, and are attracted to sources of food like berries patches or carcasses.

Read More

Websites with Grizzly Bear Safety Tips

There is a lot of valuable information on the internet about how to live peacefully with bears and be safe in bear country. While we do not officially maintain or endorse any of these websites, we have noted the addresses below for your information on ways of living safely with bears.

- Be Bear Aware, Center for Wildlife Information
- Your Safety in Bear Country, Yellowstone National Park
- Bear Safety, Glacier National Park
- Bear Safety in the North Cascades, North Cascades National Park
- Safety in Bear Country, Grand Tetons National Park
- Videos & Podcasts: Safety in Bear Country, Grand Tetons National Park

The websites listed above are only a sampling of available information on the internet. We urge you to further explore and educate yourself about grizzly bears and bear encounters.

Non-Resident Bear Hunters Mistakenly Kill Grizzly Bear

Photo of informational postcard by Center for Wildlife Information

ISLAND PARK – On the evening of May 5th, a father and son from California were hunting for black bear in Idaho near the Continental Divide above Henrys Lake. The fifteen-year-old son mistakenly shot and killed a nine-year-old male grizzly bear.

Upon returning to their family cabin, the hunters realized that they had mistakenly killed a grizzly bear and called to report the incident to the Idaho Department of Fish & Game (IDFG) the first thing in the morning.

Upon investigation IDFG personnel confirmed that the bear was indeed a grizzly bear. The juvenile was

Search the site

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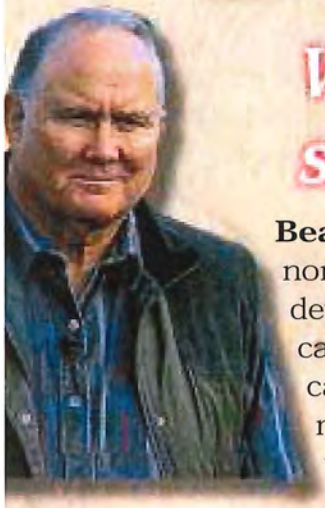
Bear Spray

What Retailers and Consumers should know about Bear Spray



Bear spray is a non-lethal bear deterrent containing capsaicin and related capsaicinoids. It must be registered with the Environmental Protection Agency and with the Agricultural Department of each state. The Environmental Protection Agency and the Center for Wildlife Information have prepared this brochure to help guide you in becoming an informed consumer when purchasing **bear spray**.

General H. Norman Schwarzkopf
National Spokesman for the Be Bear Aware and Wildlife Stewardship Campaign.

www.BeBearAware.org

Center For Wildlife Information

www.BeBearAware.org

The Pittsburgh Foundation, Thyrsa W. Amos, Helen P. Rush and Savina S. Skewis Fund

What is Bear Spray?

Bear spray is a chemical formula designed specifically to deter aggressive or attacking bears. It must be registered with the Environmental Protection Agency and individual states. Bear spray must contain between **1% to 2% of the active ingredients capsaicin and related capsaicinoids.**

Capsaicin and related capsaicinoids are the active ingredients that cause rapid eye closure, heavy watering of the eyes, and severe irritation to the nose, mouth, throat and lungs. This results in difficulty breathing and a temporary loss of the sense of smell and sight causing a bear to be distracted from its charge.

A spray **duration of at least 6 seconds** and a spray **distance of at least 25 feet** are recommended for maximum effectiveness in case you are charged by more than one bear, have more than one confrontation, or to compensate for wind. Consider carrying more than one can of bear spray if you are going to be out for an extended period of time or you are in an area with a high possibility of contact with bears.

Registration Process

Prior to sale to the public, the Environmental Protection Agency (EPA) and individual states must first **register** each **bear spray** product. EPA Federal registration requires each company to submit or reference extensive and acceptable chemistry, toxicity and effectiveness data. EPA also requires labels for canisters of bear spray to indicate the product's active ingredients, and how to store, use, and dispose of the product properly.

The EPA does not register personal defense or law enforcement sprays.It is illegal to sell these types of sprays for use against bears.

Enforcement Monitoring

EPA and the states monitor the sale of bear spray products. Companies selling bear spray may have their products in retail outlets or manufacturing establishments sampled periodically to verify that the products meet the bear spray requirements.

The manufacturers must maintain records verifying that the bear sprays actually contain the active ingredients **capsaicin and related capsaicinoids.**

Read The Label Carefully

To determine if you are **purchasing or selling an actual *bear* spray,** read the label carefully. The label provides information unique to and **only allowed on *bear* spray deterrents.**

1. **Bear spray** will clearly display on the label identifying terms such as **bear deterrent** or **for use in deterring attacks by bears.**

2. The active ingredients of bear spray are **capsaicin** and **related capsaicinoids** and should be between 1% and 2% of the net contents. These active ingredients cause reduced breathing and irritation to the eyes, nose, mouth, throat and lungs, disabling and distracting the bear from its charge.

3. Confirms the active ingredients are derived from oleoresin of capsicum.

4. The **minimum net content** for bear spray is 7.9 ounces or 225 grams.

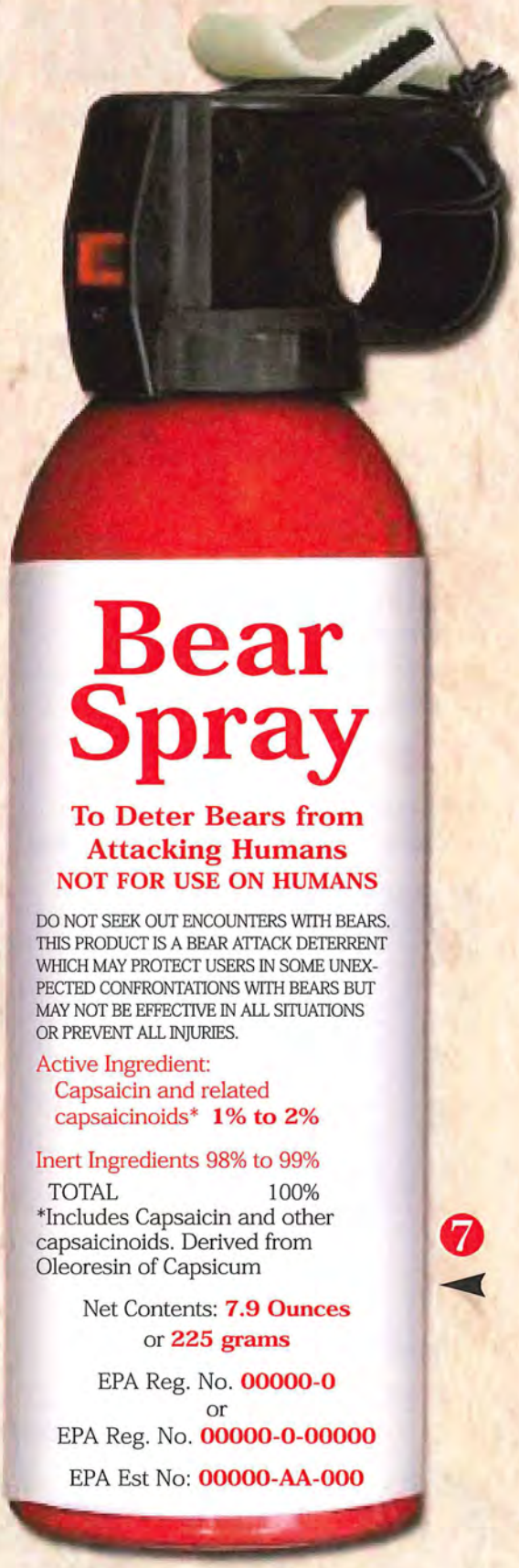
5. The **EPA Reg. No.** is the number assigned by the EPA to the company that makes or distributes the product. A legitimate bear spray must have an EPA Reg. No.

6. The **EPA Est. No**. is the number assisgned by the EPA to the place where the product is manufactured or packaged.

7. **Spray duration** and **spray distance** performance are indicated on the back side of the label.

What's not allowed on label

Not allowed on the label because it may be misleading are claims such as "the hottest" or "shotgun blast," listing of percentage of oleoresin of capsicum or oc, listing of SHU's (Scoville Heat Units)



A generic label has been used for educational purposes.

How and when to use Bear Spray

BE BEAR AWARE™

www.BeBearAware.org

Prior to entering bear country, make sure that everyone:

- knows basic bear avoidance safety techniques,
- has a can of bear spray,
- reads and understands all bear spray instructions, reviews how and when to use bear spray
- practices using the bear spray (removing the safety clip, holding, aiming)
- keeps bear spray readily available (carry in a holster, keep within easy reach in tent at night)

When to use bear spray:

- should **only** be used to deter **charging or attacking bears.**

How to use bear spray:

- point container nozzle at the bear, aiming slightly downward, (you do not have to aim for the face)
- spray a short blast when an approaching bear is 40 to 50 feet away producing an expanding cloud of spray between you and the bear;
- if the bear continues to charge, keep spraying until bear changes direction;
- in sudden close encounters, spray immediately aiming towards the face. Continue spraying until the bear stops its charge,
- leave area promptly, but do not run.

How not to use bear spray:

- do not apply bear spray to people, clothing, tents, packs, or to the ground.

Center For Wildlife Information

www.BeBearAware.org

P.O. Box 8289, Missoula, Montana 59807

ABOUT BEAR-RESISTANT PRODUCTS BEAR SAFETY ALL ABOUT GRIZZLIES CALENDAR CONTACT

May 25, 2016

Yellowstone National Park wants to increase the number of people carrying bear spray through a new engaging, celebrity-filled campaign called "A Bear Doesn't Care." Whether you are a hiker, backpacker, angler, photographer, wolf watcher or geyser gazer, the campaign encourages you to carry bear spray – no excuses!

"A bear doesn't care how far you're hiking, if you're just fishing, or even if you work here," says Superintendent Dan Wenk. "No matter who you are or what you are doing, you should always carry bear spray and know how to use it."

Recent data collected by park scientists revealed that only 28 percent of visitors who enter the park's backcountry carry bear spray. Studies show that bear spray is more than 90 percent effective in stopping an aggressive bear, in fact, it is the most effective deterrent when used in combination with our regular safety recommendations—be alert, make noise, hike in groups of three or more, and do not run if you encounter a bear.

"Yellowstone visitors care deeply about preserving bears and observing them in the wild," says Kerry Gunther, the park's Bear Management Specialist. "Carrying bear spray is the best way for visitors to participate in bear conservation because reducing potential conflicts protects both people and bears."

Beginning this summer, look for posters in retail outlets, ads in magazines, and images on social media of visitors and local celebrities carrying bear spray while recreating in the park.

Search the site...

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Information & Education Subcommittee
Meeting Calendar
News
Archives

RECOVERY ECOSYSTEMS

Bitterroot Ecosystem
North Cascades Ecosystem
North Continental Divide

Local celebrities who appear in the campaign share the message that bear spray is essential for safety in bear country. Initial poster designs include alpinist Conrad Anker, artist Jennifer Lowe-Anker, and National Geographic photographer Ronan Donovan. Actor Jeff Bridges, writer Todd Wilkinson, fly fisherman Craig Mathews, and others will jointhe campaign in the coming months.

Posters from the campaign are available for download at https://flic.kr/s/aHskx93BCw and go.nps.gov/abeardoesntcare. Visit go.nps.gov/bearspray for information about bear encounters and how to use bear spray.

Bear spray demonstrations are conducted by park employees at Yellowstone visitor centers throughout the summer months. Park staff is available to speak with local groups upon request about the history of bear attacks in the park, contributing human behaviors, how to prevent/respond to bear attacks, and bear spray use. If you are interested in hosting an event, please contact us at the number listed above.

See other webpages on this site to explore more information about bear spray and human-bear encounters.

□ Uncategorized / □ No Comments

bear encounters | bear safety tips | bear spray | Yellowstone Ecosystem Subcommittee

RELATED POSTS

□

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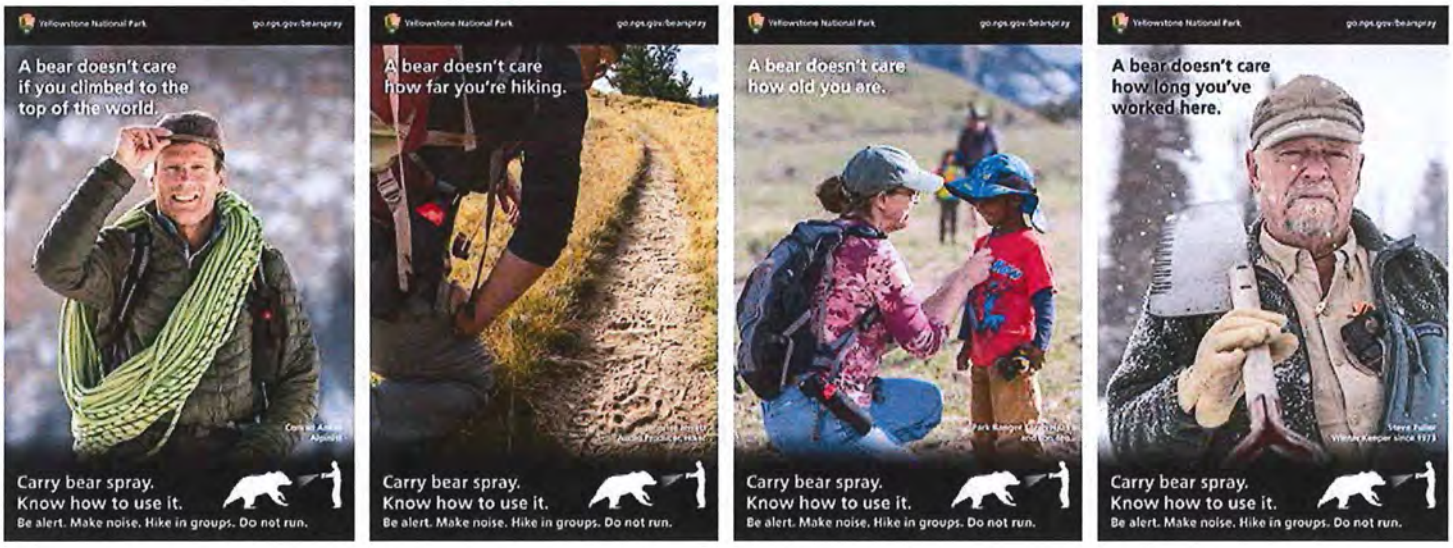
Your email address will not be published. Required fields are marked *

Comment

A Bear Doesn't Care" Campaign



Four posters from the "A Bear Doesn't Care" campaign

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angler, photographer, wolf watcher or geyser gazer, the campaign encourages you to carry bear spray – no excuses!

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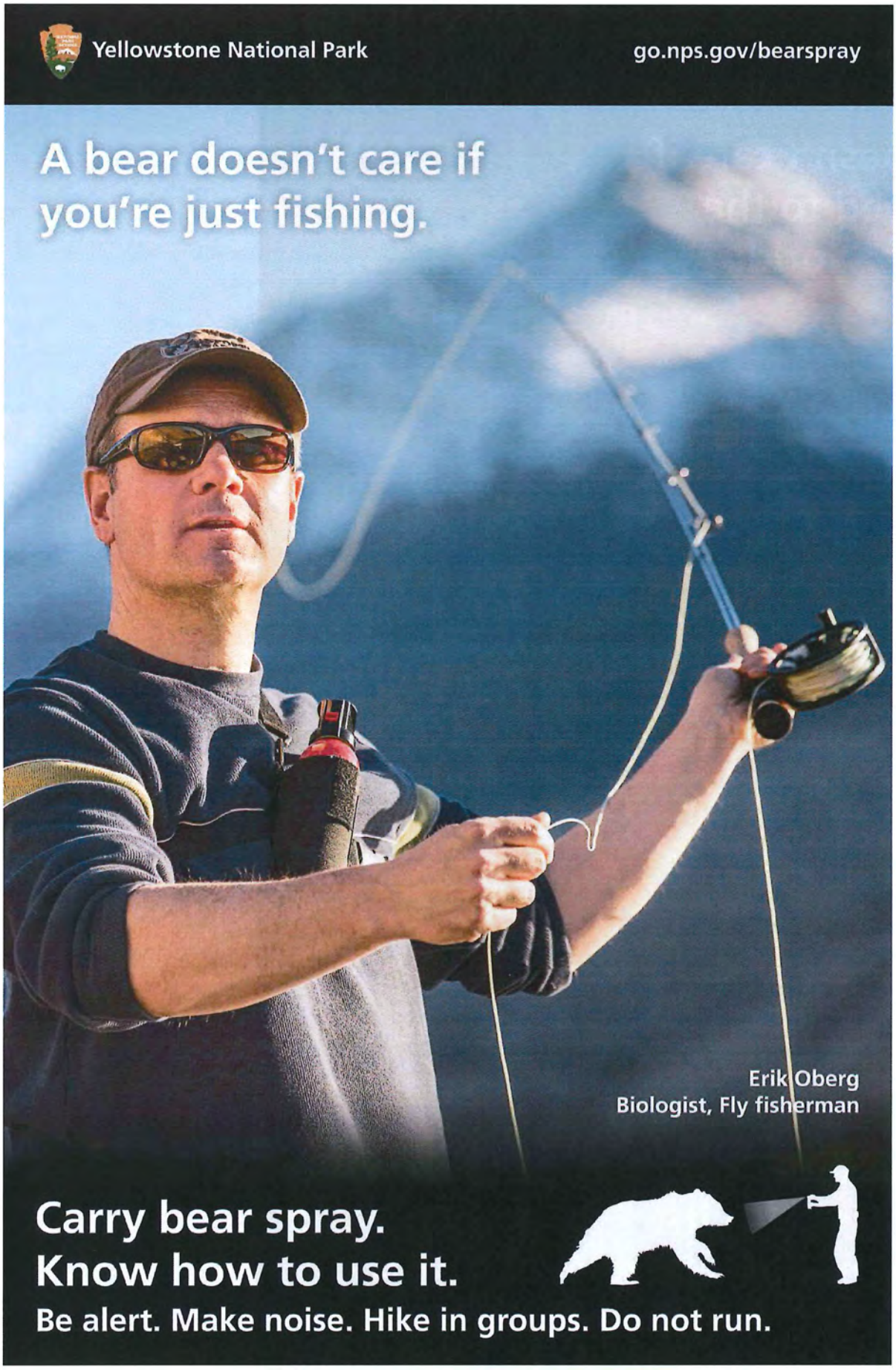
Help us spread the word about the importance of carrying bear spray. Download posters using the links below or **from our Flickr Site**, and be sure to share your favorites. Check back regularly to see new ones!

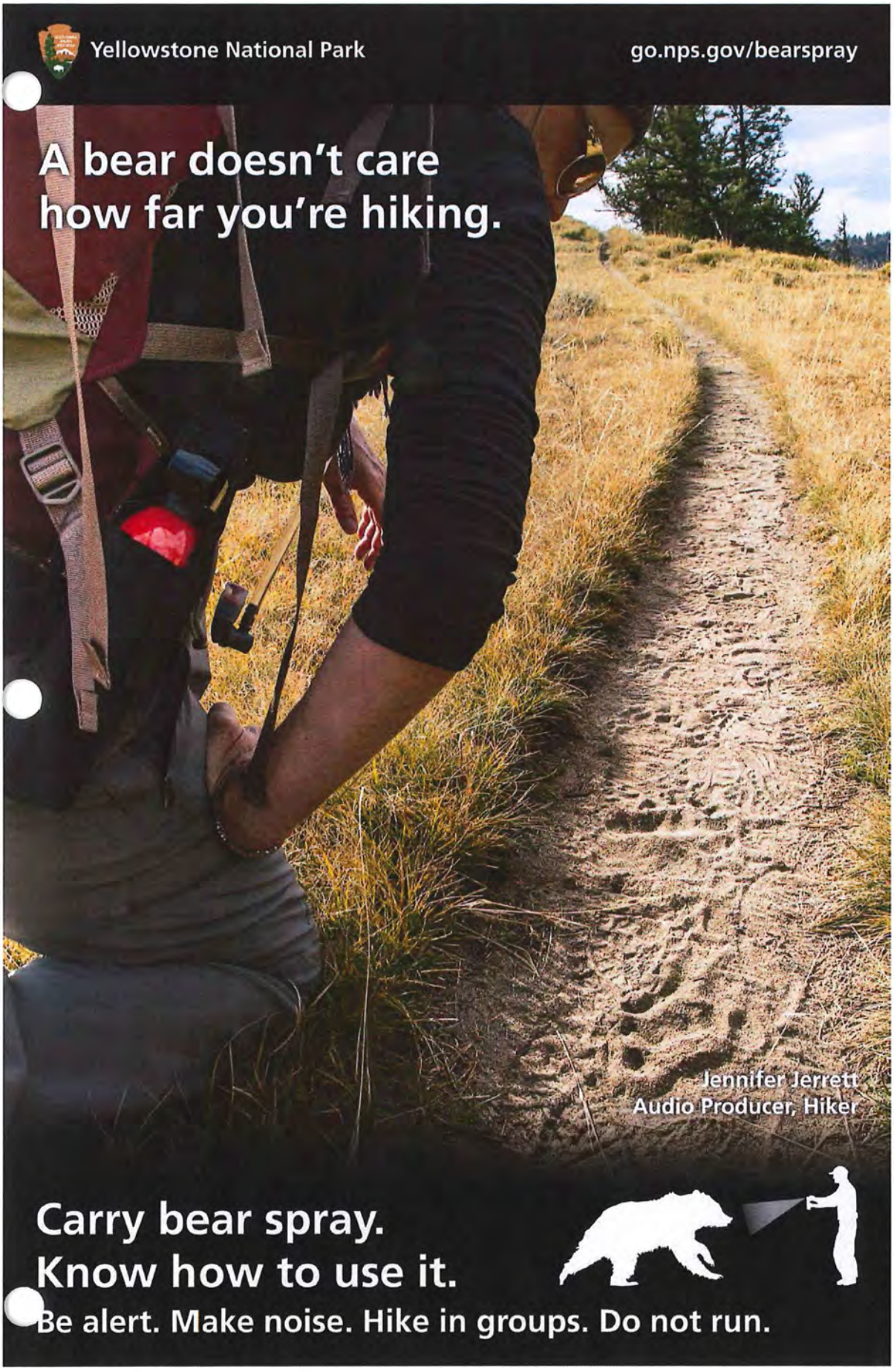
Downloads

All posters are available as full-size JPEGs:

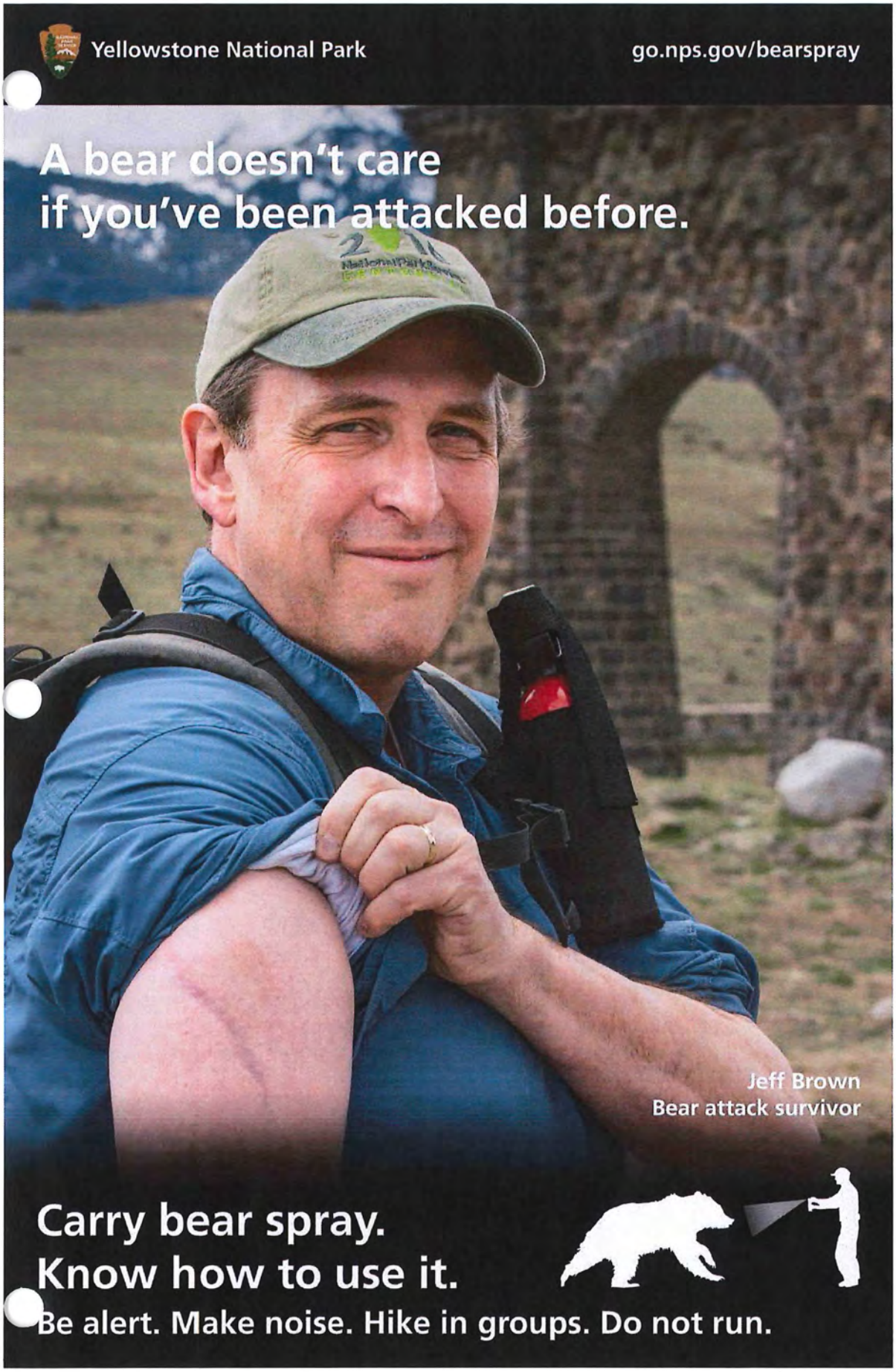
- **"A bear doesn't care if you climbed to the top of the world."**
  Featuring alpinist Conrad Anker
- **"A bear doesn't care if you took its picture."**
  Featuring National Geographic *photographer Ronan Donovan*
- **"A bear doesn't care how long you've worked here."**
  Featuring Yellowstone winter keeper Steve Fuller


Yellowstone National Park
go.nps.gov/bearspray
A bear doesn't care if you climbed to the top of the world.
THE NORTH FACE
Conrad Anker
Alpinist
Carry bear spray.
Know how to use it.
Be alert. Make noise. Hike in groups. Do not run.


Yellowstone National Park
go.nps.gov/bearspray
A bear doesn't care if you're just fishing.
Erik Oberg
Biologist, Fly fisherman
Carry bear spray.
Know how to use it.
Be alert. Make noise. Hike in groups. Do not run.


Yellowstone National Park
go.nps.gov/bearspray
A bear doesn't care how far you're hiking.
Jennifer Jerrett
Audio Producer, Hiker
Carry bear spray.
Know how to use it.
Be alert. Make noise. Hike in groups. Do not run.

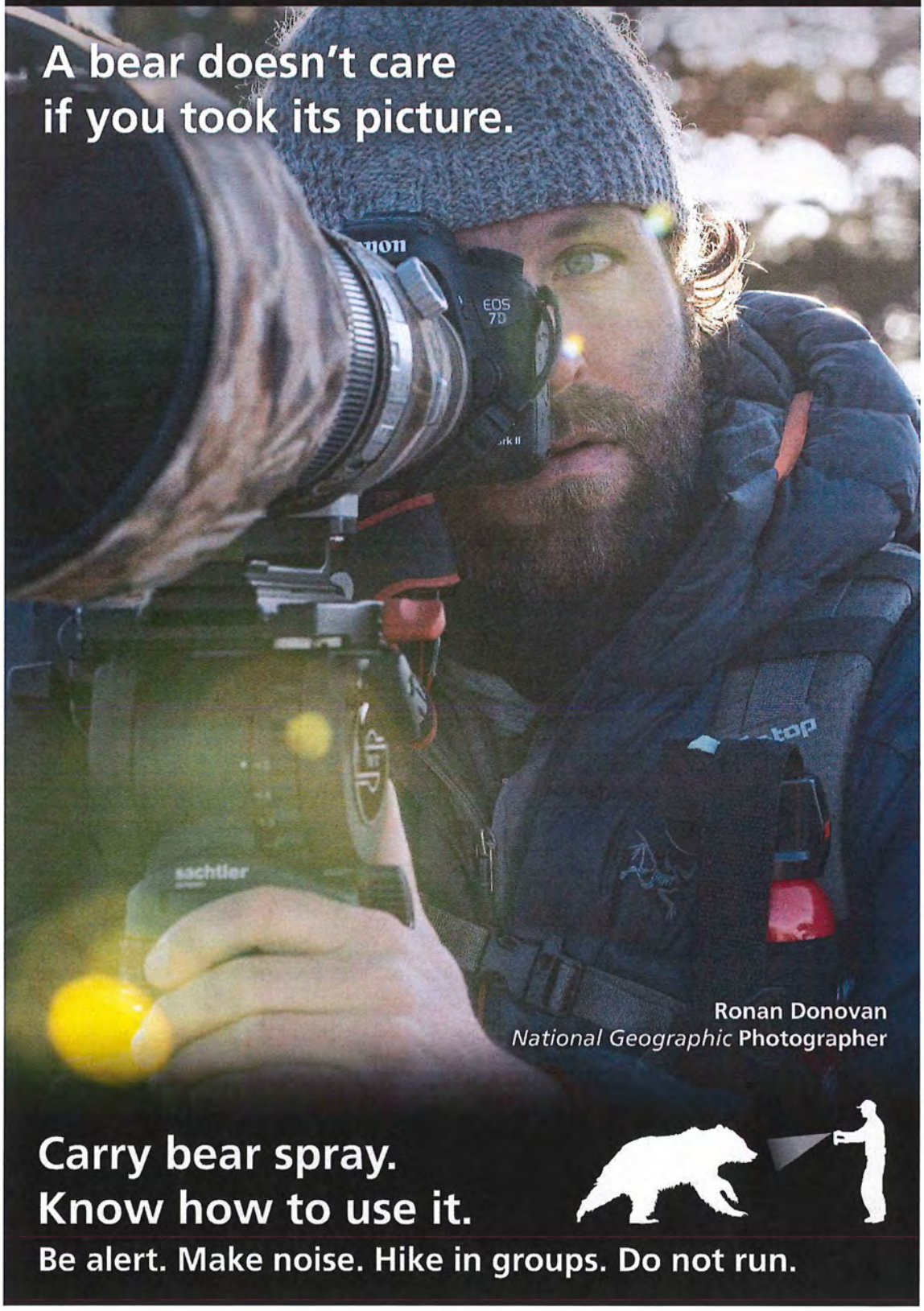

Yellowstone National Park
go.nps.gov/bearspray
A bear doesn't care how old you are.
Park Ranger Sarah Haas and son Teo
Carry bear spray.
Know how to use it.
Be alert. Make noise. Hike in groups. Do not run.


Yellowstone National Park
go.nps.gov/bearspray
A bear doesn't care
if you've been attacked before.
Jeff Brown
Bear attack survivor
Carry bear spray.
Know how to use it.
Be alert. Make noise. Hike in groups. Do not run.


Yellowstone National Park
go.nps.gov/bearspray
A bear doesn't care
if you painted its picture.
Jennifer Lowe-Anker
Artist
Carry bear spray.
Know how to use it.
Be alert. Make noise. Hike in groups. Do not run.

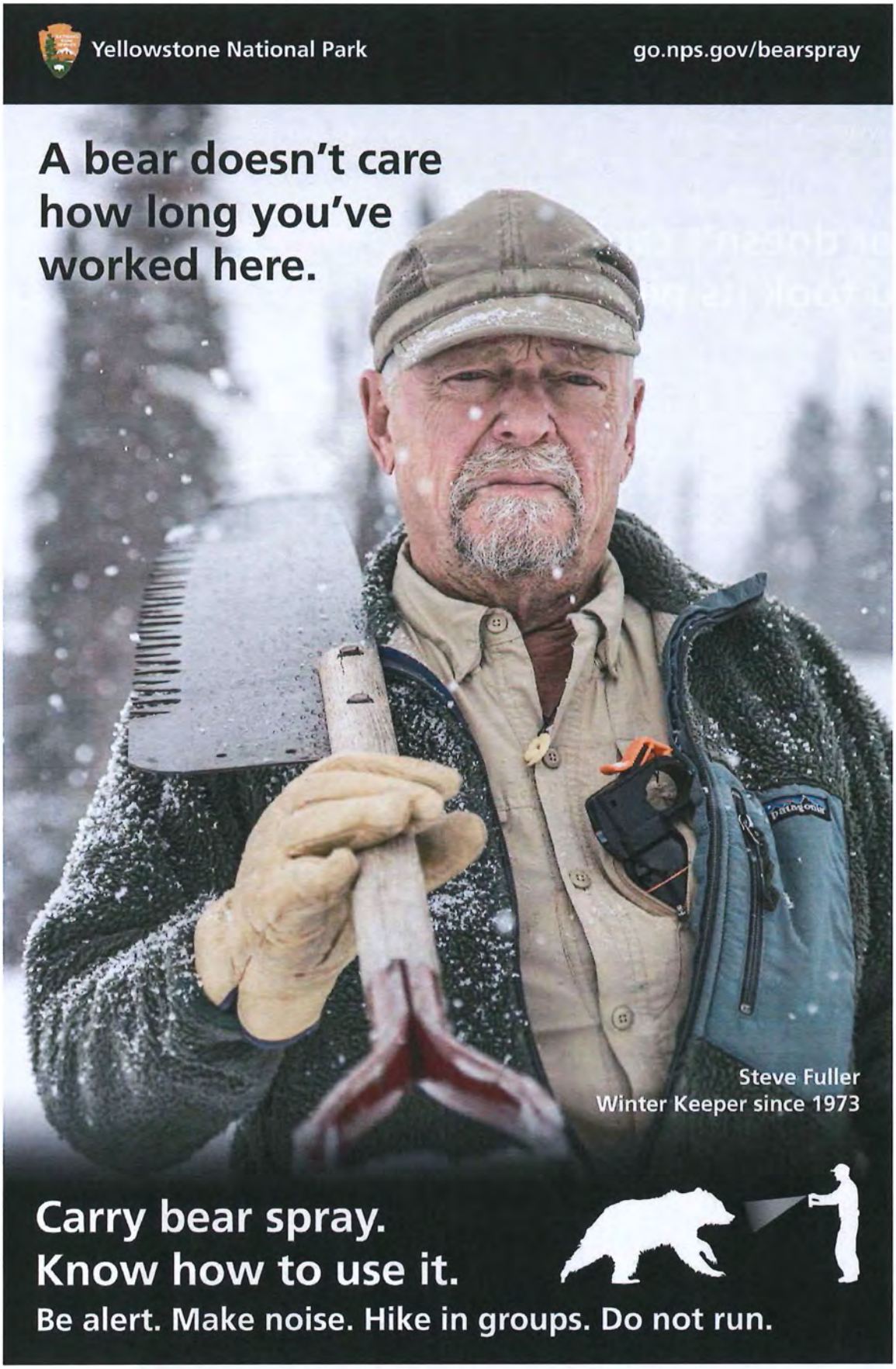
Yellowstone National Park

go.nps.gov/bearspray



Carry bear spray.
Know how to use it.

Be alert. Make noise. Hike in groups. Do not run.


Yellowstone National Park
go.nps.gov/bearspray
A bear doesn't care how long you've worked here.
Steve Fuller
Winter Keeper since 1973
Carry bear spray.
Know how to use it.
Be alert. Make noise. Hike in groups. Do not run.