

Bear Guns

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Excerpted and summarized from USDA Forest Service General Technical Report PNW-152, Safety in Bear Country: Protective Measures and Bullet Performance at Short Range.

The brown bear is a fascinating animal, and seeing one at close range can be one of the most exciting outdoor experiences you can have. A mutual withdrawal is the preferred outcome of such an encounter, but that may not always be possible. The bear is large, fast-moving, and unpredictable in its response to humans. It is a potential hazard to outdoorsmen and those who work in bear country.

Most governmental agencies whose workers spend time in the bush require that at least one member of each work party carry a rifle or shotgun for bear protection. Both the U.S. Forest Service and the Alaska Department of Fish and Game, for example, have such policies. Most experienced outdoorsmen also carry weapons whenever they enter the habitat of *Ursus arctos*.

Debate has often centered on which cartridges provide the best protection. Much has been written about the performance of various cartridges and bullets on big game animals, but these tests are conducted at ranges from 50 to 300 yards or more. Little information is available on the performance of cartridges and bullets at ranges that could be considered critical in an encounter with a hostile bear. Distances greater than 15 or 20 yards probably do not constitute a dangerous situation, because other means of avoiding conflict remain open.

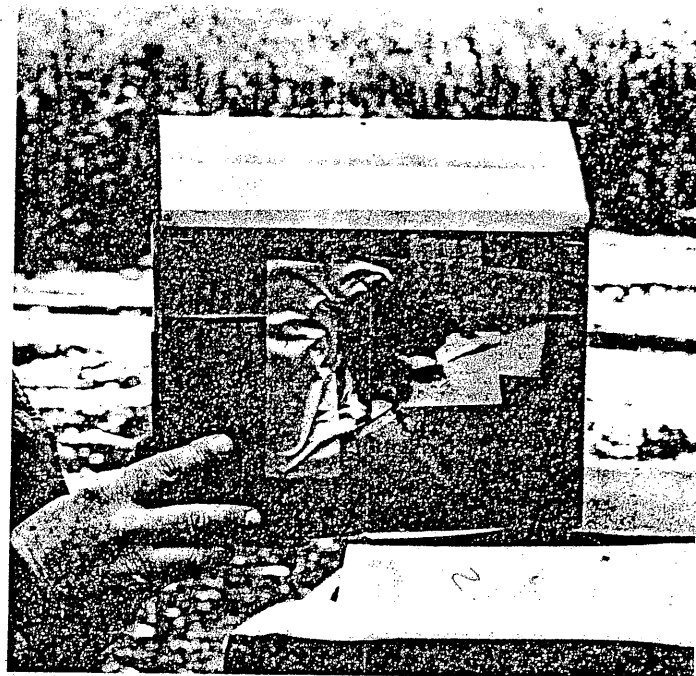
In a study we conducted recently, we evaluated commonly used and readily available cartridges and weapons at short range. We selected a distance of 15 yards as the "point of no return," the distance at which an obviously aggressive bear must be stopped or the person risks injury or death. By an obviously aggressive bear, we mean one that is charging with the assumed intent of doing bodily harm.

We built an open-ended wooden box to hold packets containing a silt and sawdust mixture recommended from previous gun tests. After each shot, we located the bullet by lifting the packets and removing the mixture until we uncovered the bullet. We measured its location to the nearest half inch.

We tested different cartridges, bullet weights, and barrel length combinations in four ballistic categories: striking energy, penetration, retained bullet weight, and bullet expansion. We measured bullet velocity because energy is a function of bullet weight and velocity. We also determined the free recoil energy, because, although not directly involved in short-range ballistics, it is nevertheless significant. Some shooters may become more fearful of the known effect of a heavy recoil than they are of the unknown effect of a charging bear.

Because we had no unbiased way to determine the relative importance of each ballistic category, we considered each to be equally important. The results of the test are contained in the table on page 33. The use of brand names does not signify endorsement or approval. We tested a wide range of weapons, in-

Alaskans spend hours debating which weapon is best for protection against brown bears, so the U.S. Forest Service decided to find out. They tested various guns and ammunition at close range and ranked them. The results will discourage people who carry large-caliber handguns as their primary weapon



cluding those used by government agencies. Ammunition was chosen solely on the basis of availability.

No well-defined distinction exists between combinations of weapon and ammunition that are adequate or inadequate for protection against bears. The final decision must be made by each individual and should include consideration of weapon size and weight, recoil, and the person's experience with fire arms. Our data can, however, be used as a general guide to the effectiveness at close range of these weapons and ammunition.

A rifle in the .375 magnum caliber in the hands of a person who can comfortably tolerate the recoil is a better choice than a .30-06. A .30-06 with 220-grain bullets, however, might be a better choice for a person sensitive to recoil, who may shoot the lighter caliber weapon with more confidence and accuracy.

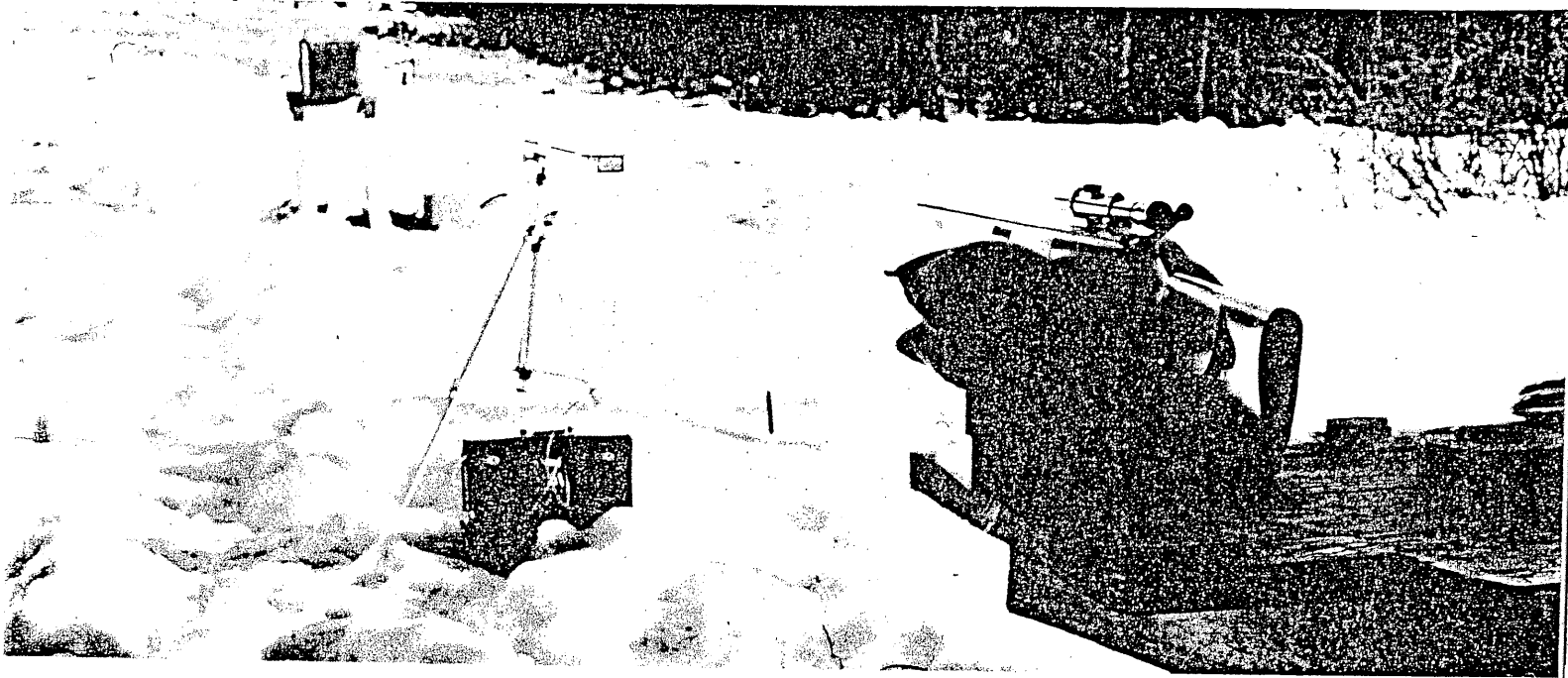
Based on our tests, four cartridge-bullet combinations appear superior for protection against bears:

- .458 magnum, 510-gr soft-point bullet. For a shooter who can handle the recoil of this cartridge, a bolt-action rifle in this caliber is the surest weapon available.
- .375 magnum, 300-gr soft-point bullet. The recoil of a rifle in this caliber, although considerably less than that of the .458 magnum, is still severe for many people. Our tests indicate that the 270-gr soft-point bullet in this caliber is only slightly less effective than the 300-gr bullet and has only slightly less recoil.
- .338 magnum, 300-gr bullet. This combination appears to be a good choice. Recoil is somewhat less than that of the .375

magnum, and our tests indicated that the effectiveness is nearly comparable. If the 300-gr bullet cannot be obtained, the 200-gr bullet should be used.

- .30-06, 220-gr bullet. Mild recoil, compared with that of the large- and medium-bore cartridges, makes this a strong contender for shooters who are sensitive to recoil. The .30-06 also has other advantages. It can be found in several actions—bolt, pump, semi-automatic—and can be obtained as or customized

tion of bullets shot at short range and can be used to compare different cartridges and bullets. Two major points can be inferred from our tests: 1, none of the many different types of bullets tested was completely adequate, and 2, high striking velocities may not be particularly beneficial at short range. The best results were from bullets relatively heavy for their caliber fired at moderate velocity. Many experienced people have also observed this; we have verified their observations under con-



into a short, handy, lightweight weapon.

We also tested various handguns, and the .44 magnum came out on top. Compared to rifles, it was similar in performance to the 8mm magnum 220-gr bullet and the .300 magnum 180-gr bullet, two of the lowest scoring combinations we tested. The superiority of the .44 magnum handgun makes it a good choice for a backup weapon. A revolver using this cartridge, however, should not be considered a primary weapon for protection from bears.

Only slight differences in ballistics were noted between .44's with long and short barrel lengths, but a short-barrelled revolver is lighter and easier to carry and draw.

Although shotguns are popular for bear protection, they did not fare well in our tests because of their low striking energy and the lack of bullet expansion. The lack of bullet expansion is somewhat misleading, because the slug is quite large to begin with. Shotguns with slugs are superior to shotguns with buckshot. We even question whether 00 buckshot would be lethal to a bear at distances beyond 5 yards.

Our tests of the performance of bullets at short range were conducted by shooting into a uniform test medium, not into brown bears. The medium did not have a thick coat of hair, resilient skin, dense muscle tissue, or heavy bones, and it was not angry and excited. Therefore, the validity of the tests may not be directly applicable to a real situation involving a bear.

Nevertheless, we believe the tests were a good relative evalua-

tioned conditions.

When shooting a bear, the shooter assumes the responsibility for making a quick kill. There should be no desire to hurt the bear, only to avoid being hurt oneself.

The most important shot is the first one. If not properly placed, it may also be the last shot. If a bear goes down on the first shot, continue to fire, aiming at vital areas until the bear stays down and is still. A bear that is hit and flees is extremely dangerous. The shooter has a moral responsibility to find and kill the wounded bear. Following a wounded brown bear in dense, poorly lighted forests is an experience most of us would like to avoid.

Although the State of Alaska allows bears or other wild animals to be killed to protect life or property, the dead bear is the property of the state. The hide, with feet attached, and the skull must be removed and turned over to the Department of Fish and Game, or the shooter is liable to prosecution and fines. The state will investigate the kill to determine whether a real necessity existed. No part of the bear may be kept. ■

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Table 1 — Short-range ballistic performance

Cartridge	Ranking		Bullet			Ballistic performance					Firearm		
	Score	Rank	Weight	Type ^{1/}	Brand ^{2/}	Velocity, 15 yd	Energy, 15 yd	Penetra- tion	Retained weight	Expan- sion ratio	Recoil	Weight	Barrel length
			Grains			Ft/s	Ft-lb	Inches	Percent	Times	Ft-lb	Lb	Inches
Rifle: ^{3/}													
.458 Win. Mag.	538	1	510	RSP	W-W	2074	4871	19.0	82	4.6	54.7	9.4	24
.460 Wby. Mag.	487	2	500	RSP	WBY	2364	6204	17.2	65	3.8	76.8	10.7	26
.375 H & H Mag. (L) ^{4/}	301	3	300	SSP	W-W	2541	4903	16.8	67	4.0	41.1	8.6	24
.338 Win. Mag. (S)	260	4	300	RSP	W-W	2314	3568	16.2	61	4.8	35.6	7.4	20
.375 H & H Mag. (L)	239	5	270	RSP	R-P	2659	4241	14.2	64	4.0	37.2	8.6	24
.338 Win. Mag. (S)	213	6	200	PSP	W-W	2699	3235	15.0	69	4.2	28.9	7.4	20
.338 Win. Mag. (S)	197	7	250	SSP	W-W	2507	3491	12.2	57	5.3	33.4	7.4	20
.338 Win. Mag. (L)	191	8	200	PSP	W-W	2834	3563	12.3	60	4.7	26.0	8.6	24
.338 Win. Mag. (L)	186	9	300	RSP	W-W	2360	3710	16.8	57	3.4	31.2	8.6	24
.375 H & H Mag. (S)	185	10	300	SSP	W-W	2401	3843	13.8	63	3.6	44.1	7.2	20.5
.30-06 U.S.	157	11	220	RSP	R-P	2261	2498	17.7	65	3.6	15.3	8.8	22
.30-06 U.S.	153	12	180	RSP	R-P	2456	2411	13.2	71	4.4	14.8	8.8	22
.444 Marlin	146	13	240	FSP	R-P	2237	2668	11.0	72	4.5	27.6	7.3	22
.358 Winchester	142	14	200	SSP	W-W	2366	2488	12.0	71	4.4	33.4	7.4	22
7 mm Rem. Mag.	141	15	175	PSP	W-W	2709	2853	13.0	44	5.6	18.5	9.1	24
.375 H & H Mag. (S)	137	16	270	RSP	R-P	2456	3735	12.3	50	3.9	39.4	7.2	20.5
.45-70 U.S. (S)	133	17	300	HSP	FED	1573	1649	13.0	84	4.8	15.6	7.1	20
.308 Winchester	128	18	180	RSP	FED	2430	2360	12.7	73	3.9	13.6	8.4	22
.45-70 U.S. (L)	124	19	300	HSP	FED	1666	1849	11.0	96	4.1	18.6	7.8	22
.358 Norma Mag.	115	20	250	PSP	NOR	2730	4139	15.2	41	2.9	25.0	8.4	24
8 mm Rem. Mag.	107	21	185	PSP	R-P	2991	3676	10.7	32	5.5	29.1	9.4	24
.300 Wby. Mag.	104	22	180	PSP	WBY	3033	3678	15.2	46	2.6	28.0	9.6	24
.338 Win. Mag. (L)	100	23	250	SSP	W-W	2594	3735	14.7	45	2.6	30.0	8.6	24
.350 Rem. Mag.	93	24	200	SSP	R-P	2568	2931	12.2	52	3.2	34.5	6.4	18.5
7x57 mm Mauser	87	25	175	RSP	FED	2419	2274	13.8	52	3.6	12.7	8.9	24
12-ga x 2 1/4 inch	74	26	438	LRN	FED	1398	1902	15.3	96	1.7	26.1	7.1	20
.45-70 U.S. (L)	65	27	405	RSP	R-P	1322	1572	15.8	93	2.1	17.7	7.8	22
.300 Win. Mag.	60	28	200	PSP	FED	2699	3237	15.2	36	2.2	25.9	7.8	24
.300 Wby. Mag.	59	29	220	RSP	WBY	2798	3826	15.2	34	2.0	30.8	9.6	24
.45-70 U.S. (S)	50	30	405	RSP	R-P	1211	1319	17.8	98	1.4	13.6	7.1	20
8 mm Rem. Mag.	49	31	220	PSP	R-P	2779	3773	12.8	28	2.5	18.9	9.4	24
.44 Rem. Mag. (L)	^{5/} 47	32	240	LGC	R-P	1401	1046	11.5	97	2.6	13.9	3.1	7.5
.390 Win. Mag.	44	33	180	PSP	FED	2959	3268	10.3	30	2.8	26.3	7.8	24
Handgun:													
.44 Rem. Mag. (L)	^{5/} 77	1	240	LGC	R-P	1401	1046	11.5	97	2.6	13.9	3.1	7.5
.44 Rem. Mag. (M)	64	2	240	LGC	R-P	1317	925	12.2	97	2.3	14.1	3.2	6.5
.44 Rem. Mag. (L)	63	3	240	JSP	W-W	1383	1019	14.5	94	1.8	12.4	3.1	7.5
.44 Rem. Mag. (S)	60	4	240	LGC	R-P	1265	853	11.3	97	2.5	15.8	2.9	5
.44 Rem. Mag. (S)	59	5	240	JSP	W-W	1370	1001	9.5	97	2.5	15.1	2.9	5
.44 Rem. Mag. (M)	57	6	240	JSP	W-W	1348	969	11.5	96	2.2	16.4	3.2	6.5
.357 S&W Mag.	27	7	158	JSP	CCI	1226	528	9.5	99	2.1	7.2	2.3	4
.45 Colt (L)	13	8	255	LRN	W-W	825	386	14.3	98	1.0	5.9	2.6	7.5
.45 Auto	12	9	230	SMJ	R-P	819	343	14.2	100	1.0	5.2	2.4	5
.41 Rem. Mag.	11	10	210	LFN	R-P	952	423	10.5	97	1.0	6.0	2.4	4.8
.45 Colt	11	11	225	LHP	FED	813	330	13.3	97	1.0	4.6	2.6	7.5
.45 Colt (S)	10	12	255	LRN	W-W	796	359	11.8	97	1.0	5.9	2.4	4.8
.44 S&W Spec.	9	13	246	LRN	W-W	745	303	12.1	99	1.0	3.9	3.1	7.5

^{1/} RSP = round nose soft point; SSP = semipointed soft point; PSP = pointed soft point; FSP = flat nose soft point; HSP = hollow soft point; LRN = lead round nose; LGC = lead gas-check; JSP = jacketed soft point; SMJ = solid metal jacket; LFN = lead flat nose; LHP = lead hollowpoint.

^{2/} W-W = Winchester-Western; R-P = Remington-Peters; FED = Federal; WBY = Weatherby; NOR = Norma; CCI = Speer.

^{3/} All rifles except 1 shotgun and 1 handgun included for comparison.

^{4/} L = long barrel; M = medium barrel; S = short barrel; applies only when the same cartridge was tested in different length barrels.

^{5/} Score calculated on same basis as rifles and shotgun.

^{6/} Score calculated for handguns only; not equal to rifle scores.