

Considering Terminal Ballistics

By

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Just about every precision rifleman knows the 100-yard group his rifle fires; since he knows his group doubles at 200 yards, and triples at 300, quadruples at 400 and so on, he can determine the maximum distance that he can place a shot in a deer's vitals – which is his maximum range.

Well, that isn't necessarily so -- there's more to consider than just group size. Do you know the distance at which your projectile runs out of enough energy to reliably kill a deer-sized animal?

The classic rule-of-thumb for downing a deer is that a bullet must deliver at least 1000-ft.-lbs. of energy. Aside from proper shot placement (another major consideration) and bullet design (which contributes, too), this 1000-ft.-lb yardstick is a quick way of comparing cartridges and bullet weights to find a caliber and load that offer you a realistic maximum range for deer hunting.

To make this comparison, I have amassed terminal ballistic data on America's most popular big game calibers, identifying the maximum distance at which each one still delivers 1000-ft.-lbs. of energy. This data offers some pretty interesting insights – I'll offer analysis and comments below.

<u>Cartridge</u>	<u>Bullet Weight</u>	<u>Muzzle Velocity</u>	<u>1000 Ft.-Lbs. Max Range</u>
.223 Rem.	55 Gr.	3240 fps	<i>100 Yards</i>
	60 Gr.	3160 fps	<i>100 Yards</i>
	69 Gr.	2950 fps	<i>125 Yards</i>
	77 Gr.	2750 fps	<i>125 Yards</i>
.243 Win.	85 Gr.	3320 fps	<i>350 Yards</i>
	95 Gr.	3025 fps	<i>350 Yards</i>
	100 Gr.	2850 fps	<i>350 Yards</i>
.25-06 Rem.	120 Gr.	2980 fps	<i>450 Yards</i>
7mm Rem Mag.	150 Gr.	3100 fps	<i>850 Yards</i>
	160 Gr.	2950 fps	<i>750 Yards</i>
	175 Gr.	2760 fps	<i>820 Yards</i>
7mm Wby Mag	150 Gr.	3300 fps	<i>925 Yards</i>
7mm 08 Rem	140 Gr.	2800 fps	<i>625 Yards</i>
	150 Gr.	2650 fps	<i>450 Yards</i>
.257 Wby Mag	110 Gr.	3460 fps	<i>650 Yards</i>
	120 Gr.	3305 fps	<i>725 Yards</i>
.260 Rem.	120 Gr.	2950 fps	<i>550 Yards</i>
	140 Gr.	2750 fps	<i>650 Yards</i>
.270 Win.	130 Gr.	3060 fps	<i>600 Yards</i>
	140 Gr.	3100 fps	<i>550 Yards</i>
	150 Gr.	2850 fps	<i>650 Yards</i>
.270 WSM	130 Gr.	3060 fps	<i>600 Yards</i>
	140 Gr.	3080 fps	<i>550 Yards</i>
	150 Gr.	3080 fps	<i>850 Yards</i>
.270 Wby Mag.	150 Gr.	3245 fps	<i>850 Yards</i>
.300 WinMag.	150 Gr.	3200 fps	<i>725 Yards</i>
	180 Gr.	2960 fps	<i>650 Yards</i>
	190 Gr.	2900 fps	<i>925 Yards</i>
	200 Gr.	2700 fps	<i>750 Yards</i>
.300 WSM	150 Gr.	3200 fps	<i>775 Yards</i>
	165 Gr.	3130 fps	<i>750 Yards</i>
	180 Gr.	2970 fps	<i>650 Yards</i>

.300 RUM	180 Gr.	3150 fps	<i>900 Yards</i>
	200 Gr.	3070 fps	<i>970 Yards</i>
.300 Wby Mag	165 Gr.	3350 fps	<i>975 Yards</i>
	180 Gr.	3240 fps	<i>975 Yards</i>
.30-06 Sprfld	150 Gr.	2940 fps	<i>650 Yards</i>
	180 Gr.	2700 fps	<i>820 Yards</i>
	220 Gr.	2410 fps	<i>410 Yards</i>
.30-30 Win.	125 Gr.	2570 fps	<i>175 Yards</i>
	150 Gr.	2390 fps	<i>250 Yards</i>
	170 Gr.	2200 fps	<i>225 Yards</i>
.308 Win.	150 Gr.	2820 fps	<i>600 Yards</i>
	165 Gr.	2700 fps	<i>625 Yards</i>
	180 Gr.	2620 fps	<i>775 Yards</i>
.308 Hornady LeverEvolution	160 Gr.	2400 fps	<i>325 Yards</i>
.338 WinMag	180 Gr.	2830 fps	<i>650 Yards</i>
	200 Gr.	2660 fps	<i>675 Yards</i>
	250 Gr.	2660 fps	<i>875 Yards</i>
.338 RUM	210 Gr.	3280 fps	<i>925 Yards</i>
	225 Gr.	3020 fps	<i>1175 Yards</i>
	250 Gr.	2660 fps	<i>775 Yards</i>
.378 Wby Mag.	200 Gr.	3350 fps	<i>950 Yards</i>
30-378 Wby M.	180 Gr.	3420 fps	<i>1125 Yards</i>

Analysis and Comments

The amount of potential energy a bullet offers is function of weight and velocity. For instance, the .270 Winchester's 130-grain load and the .308 Winchester's slower 150-grain load both offer 1000-ft.-lbs of energy at 600 yards, verifying that a lightweight bullet traveling at high velocity can equal the impact of a heavier bullet traveling slower.

The magnums certainly show why they're called that, with all of them achieving 1000 ft.-lbs. well beyond 500 yards. Of course, the downside of magnums is their heavier recoil and more expensive cartridges, with Weatherby magnums averaging more than \$100 per 20-round box.

It was surprising to see how quickly the .223 Remington's lightweight bullets ran out of power, with all of them dropping to 1000-ft.-lbs. or less by 125 yards. Even the .243 Winchester drops below this at 350 yards, yet it's widely regarded as an excellent cartridge for pronghorn antelopes. These smaller stature animals can be downed by less than 1000-ft.-lbs., but shot placement certainly plays an important role.

The .30-30 Winchester is a fine brush gun, but, we can see, 225 yards is about its maximum range. However, Hornady's LeverEvolution ammo has boosted lever-action rifles' max range by another 100 yards.

I was surprised to see the .270 Winchester Short Magnum's 150-grain load offering performance identical to a 7 mm Remington Magnum, with both impressively producing 1000-ft.-lbs. at 850 yards. Also surprising was the 7mm 08 Remington, whose 140-grain load retained 1000-ft.-lbs. to 625 yards.

Newer cartridges that employ low-drag bullets do well, too. At 550 yards, the Remington .260's 120-gr. bullet outperformed virtually all the non-magnum cartridges of that bullet weight.

Some long-established cartridges compare really well, especially the .270 Winchester, the .30-06 Springfield, and the .300 Winchester Magnum, ensuring their continued use.

The grand champion, this survey demonstrates, is the .338 Remington Ultra Magnum, which delivers 1000-ft.-lbs. at 1175 yards, with the Weatherby .30-378 coming in a close

second at 1125 yards. I've fired the latter cartridge at long range and found it really flat shooting – Weatherby says it's the fastest .30 caliber cartridge in the world.

The Ethics of the Long-Range Shot

Many of these cartridges offer maximum ranges beyond what I consider a big game hunter's *ethical* maximum range, the great concern here being a hunter's ability to avoid needlessly wounding an animal or not recovering it. To figure your ethical range, consider the maximum distance at which you can consistently strike an 8-inch target when firing other than from a bench or prone. Then, in the field, ask yourself, "Do I have an accurate range estimate?" and finally, "Can I accurately predict how the wind will affect my shot, and compensate for it?"

A recreational rifleman who's not accustomed to long-range shooting should probably limit himself to 300 yards or less. A true precision rifleman firing a quality rifle, with a solid range estimate and wind not an issue is capable of 500-yard or further shots against big game, but you have to determine that yourself.

However, here's a big exception: I don't think there's a maximum ethical range when firing at varmints such as prairie dogs and coyotes – that's great practice, fun shooting and a realistic way to determine your maximum range.

The End