Extreme Range Shooting

By Gary Zinn

Hornady .270 Winchester 140 grain SST ammo. Illustration courtesy of Midway USA.

The idea of shooting at game at extreme ranges has become a significant subject on the modern hunting scene. The growing popularity of extreme range target shooting has been catered to by the industry, with rifles, optics and cartridges/loads developed and marketed for the extreme range shooting disciplines.

I have no quarrel with this form of target shooting, but I am disturbed by the related development of introducing extreme range shooting into big game hunting. The ways in which this is encouraged include commercial promotion of dedicated "long range" hunting rifles, scopes, rangefinders and hunting cartridges/loads with claimed extreme range capabilities.

Meanwhile, some shooting and hunting writers, along with "long range shooting schools" and guided hunt businesses, promote extreme range shots at game as an acceptable and even desirable hunting technique. One such promoter asserts that, "Long range hunts are not about the trophy, they are about the distance and skill of the shot." In the same paragraph, a long range shot is defined as, "a minimum of 500 yards and beyond." Draw your own conclusions regarding these statements, but the clunk you heard was my jaw dropping.

Taking extreme range shots at game animals is NOT a responsible hunting practice. It is a terrible idea, which can only work to the detriment of the hunting sport in the long run.

Here at *Guns and Shooting Online*, we have a policy regarding the maximum range limit for prudent and responsible hunting shots. This is clearly stated by G&S Online Owner/Managing Editor Chuck Hawks:

"Our policy is never to attempt a shot at a game animal beyond the +/- 3" maximum point blank range (MPBR) of the cartridge and load."

I believed in this policy long before I became associated with G&S Online. The only caveat I would add is that the MPBR range of many high intensity rifle cartridges may be longer than shots most hunters should take, with total confidence in a vital area hit, under normal hunting conditions. I will say more about this qualification later.

MPBR and Far Zero data summary for selected hunting loads

I did complete ballistic evaluations of three to five high performing commercial loads for each of the cartridges listed below. Each cartridge chosen is a judgment call, based on long range performance, popularity and broad availability of both rifles and factory loads offered. I realize I have not included some very good cartridges, especially the so-called super magnums, but I had to set some limits on the analysis. Therefore, I stuck with the more common cartridges, while covering the .243 through .308 bore size range. (For further perspectives on extreme range rifles and cartridges, see Ultra-Long Range Rifles and Cartridges.)

The loads for which MPBR and far zero (Zero) data are summarized are those that have the best balance of bullet drop, wind drift and downrange Killing Power Score (KPS) at the extreme range of 500 yards. All MV values are for 24" barrels.

The cartridges and loads are:

- **.243 Winchester**, HSM 95 gr. Berger H-VLD: MV = 3174, BC = .486; **MPBR = 312 yds., Zero = 266 yds.**
- **.25-06 Remington**, HSM 115 gr. Berger H-VLD: MV = 3165, BC = .483; **MPBR = 311 yds., Zero = 265 yds.**
- **6.5mm Creedmoor**, Winchester 142 gr. Nosler ABLR: MV = 2700, BC = .719; **MPBR = 276 yds., Zero = 234 yds.**
- **.270 Winchester**, Hornady 140 gr. SST: MV = 3090, BC = .495; **MPBR = 305 yds., Zero = 260 yds.**
- **7mm-08 Remington**, Hornady 139 gr. SST: MV = 2950, BC = .486; **MPBR = 292 yds., Zero = 249 yds.**

- **7mm Rem. Mag.**, Hornady 162 gr. ELD-X: MV = 2930, BC = .613; **MPBR = 296 yds., Zero = 252 yds.**
- **.308 Winchester**, Nosler 168 gr. ABLR: MV = 2750, BC = .598; **MPBR = 278 yds., Zero = 236 yds.**
- **.30-06 Springfield**, Winchester 190 gr. Nosler ABLR: MV = 2750, BC = .640; **MPBR = 279 yds., Zero = 237 yds.**
- **.300 Win. Mag.**, Winchester 190 gr. Nosler ABLR: MV = 2900, BC = .640; **MPBR = 294 yds., Zero = 250 yds.**

MPBRs range from 276 to 312 yards, with an average of 294 yards. Far Zeros range from 234 to 266 yards and average 250 yards. The .243 Winchester load has the longest MPBR and far zero, while the 6.5 Creedmoor has the shortest. (Yet the 6.5 Creedmoor is being vigorously touted as a long range target and hunting cartridge. Interesting.)

Normal, long, very long and extreme range shots

To me, any hunting shot contemplated or taken at a game animal that is beyond the MPBR of a given cartridge and load is an extreme range shot. I will discuss the difficulties that such shots present shortly, but first I want to parse some distance zones within the MPBR range.

From six decades of hunting Whitetail deer, I have found shot opportunities out to about 150 yards to be both the most common and easiest to execute with good results, meaning vital area hits, usually resulting in one-shot kills. I think of such shots as being within normal range.

Next, I think of shots between 150 yards and the far zero (250 yards, more or less) of a cartridge/load as long shots. These must be taken carefully, under favorable conditions, to be executed successfully.

Finally, shots between far zero and MPBR range are very long shots in my world. (I do not care if you call me a wimp.) Such shots, in the general range of 250 to 300 yards, must be set up very carefully and executed with no errors or mishaps to be successful. THERE IS NO MARGIN FOR ERROR!

It has been well over forty years since I have attempted a shot at a deer at a range beyond 250 yards. When I was young, cocky and owned a .270 Winchester rifle, I thought I should be able to hit anything I could see. I attempted a few very long or extreme range shots and missed every one. From this I learned that very long shots are

dammed difficult in the field, so I dropped them from my repertoire. Thus my Personal Range Limit has been no more than about 250 yards, for most of the years I have hunted deer and that range limit is under ideal conditions for executing the shot.

In summary, shots under 150 yards are much better than those at longer range. My judgment is that making a clean killing shot between 150 yards and far zero range is twice as hard as doing so within 150 yards. The difficulty of making the shot between far zero and MPBR doubles again. By extension, making a clean killing shot beyond MPBR range is a very low probability event for most hunters.

The complications of extreme range shots

The .270 Winchester has been the gold standard of flat shooting, hard hitting cartridges for nearly a century. The load detailed below has a MPBR of 305 yards, a bullet drop of just under 30" at 500 yards and a KPS at that range that is sufficient for any Class 2 animal. The load also has a reasonable resistance to wind drift.

The .243 Win. and .25-06 Rem. loads have very slightly flatter trajectories than does the .270 Winchester load. All of the other loads listed have trajectory profiles that do not measure up to that of the .270 Win.

The smaller bullets in the .243 Win. and .25-06 Rem. generate significantly less downrange killing power than the .270 Winchester. The 6.5mm Creedmoor and 7mm-08 Rem. have slightly less killing power than the .270, while the 7mm Rem. Mag. and the three .30 caliber loads have markedly more killing power.

The tabular information for the .270 Winchester load includes its stated muzzle velocity (from a 24" barrel) and the ballistic coefficient of the bullet. The +/-3" maximum point blank range (MPBR) and far zero are noted.

Then the bullet's trajectory (both elevation and windage) is listed for 150, 250, 300, 400, and 500 yard distances. Elevation data are based on the rifle being sighted in for the +/- 3" MPBR of the load; windage data are based on a 10 m.p.h., 90 degree steady cross wind.

Finally, the Guns and Shooting Online Killing Power Score (KPS) of the load is noted, at each of the range increments.

.270 Winchester, Hornady Superformance 140 gr. SST: MV 3090 fps, BC .495, MPBR = 305 yards, Far Zero = 260 yards

- At 150 yds., Elevation = 3.0", Windage = 1.3", KPS = 38.3

The 150 yard downrange data line is at the outer limit of what I call normal hunting shot range. Note that the bullet trajectory is three inches high, while a 10 m.p.h. cross wind will not deflect the bullet laterally by enough to require correction. The terminal power (KPS) of the bullet at this range is adequate for use against Class 3 game animals.

A hunter who sets up and executes a shot well, using an accurate rifle that is properly sighted in, can expect success at or within this normal shot range. Just aim at the center of the vital area, hold steady and touch off the shot.

Here is a true story: Early one morning, my nephew and I exited the back door of his farmhouse, to begin a day of deer hunting. We immediately noticed a whitetail buck standing at the edge of a meadow, a bit less that 150 yards away. My nephew walked a few steps, rested his .270 rifle on the frame of a satellite dish and dropped the deer in its tracks. That was the only ten-second deer hunt I ever witnessed, but normal hunting range shots can be that simple. It usually takes more time, though.

- At 250 yds., Elevation = 0.5", Windage = 3.8", KPS = 33.5
- At 300 yds., Elevation = - 2.6", Windage = 5.5", KPS = 31.2

The 250 and 300 yard data lines also suggest no problems with the elevation of a shot, because we are still within the +/- 3" MPBR of the load. In addition, the load still has Class 3 game killing power at 250 and 300 yards (KPS values greater than 30). However, if there is a significant cross wind, it will drift the bullet enough that one will have to aim into the wind a few inches. With a 10 m.p.h. cross wind, this adjustment would need to be about four inches at 250 yards and 5-1/2 inches at 300 yards.

Wind is the most perplexing environmental factor a hunter normally needs to overcome to make long shots. An in-depth discussion of the effects of various wind speeds and directions on shots traveling over several hundred yards is beyond the scope of this article. I will confine consideration of wind effects to those implied by a 10 m.p.h. cross (90 degree) wind. At least a 10 m.p.h. wind speed would be common during hunting season in most places where l long range shot might be attempted.

At 250 to 300 yards, any instability in shooting position, a slight side torque or twitch during the trigger squeeze, a misreading of the wind, or a small movement by a nervous animal could result in a wounding hit, rather than a good vital area hit. There is little margin for error.

- At 400 yds., Elevation = - 12.9", Windage = 10.0", KPS = 27.1
- At 500 yds., Elevation = - 29.6", Windage = 16.2", KPS = 23.4

To begin, here is some perspective on extreme range distances. 400 yards is .227 mile, 440 yards is .25 mile, 500 yards is .284 mile and 528 yards is .30 mile. 1/4 (.25) mile is a long range at which to consistently hit the side of a pickup truck, never mind the 10" vital area of a deer. I have long known how far a quarter mile is on the ground, for where I grew up, our nearest neighbor lived exactly 1/4 mile down the road. I watched deer grazing in the meadow behind his house many times and they looked very small at that distance!

The ballistic data shows that one must adjust the aiming point a solid foot upward at 400 yards and 2-1/2 feet at 500 yards. In addition, a 10 m.p.h. cross wind will require a substantial lateral adjustment of the aiming point at both ranges. The load does not have Class 3 killing power much beyond 300 yards (KPS falls below 30), but is still plenty strong for all Class 2 game.

Of course, laser rangefinders and scope reticles with holdover dots or stadia can be used to deal with the holdover problem at extreme ranges. This still leaves windage to estimate, plus maintaining a dead steady rest and executing a perfect trigger squeeze. There is NO margin for error when shots are attempted at extreme range. Moreover, the rules of the game do not require that the quarry maintain a motionless broadside pose while the hunter reads the range, sets up and executes the shot.

All things considered, I would rather try to sneak much closer to my quarry, ideally within 150 yards. Then, I could just aim directly on the vital zone and do my best to touch off a good shot.

Finally, I want to make a startling proposal regarding dealing with the wind. If hunting conditions include wind blowing at a speed and angle that will significantly affect bullet flight, the fail-safe coping technique is to shorten the shot. My personal rule of thumb is to forget about even considering shots beyond 150 yards if there is enough wind, blowing anywhere between quartering off (45 degrees) and quartering on (135 degrees) for me to be more than vaguely aware of it. I will go even shorter if the wind is especially nasty.

Conclusion

I believe my attitude toward extreme range hunting shots is clear. I will invoke two other authorities to further support it.

In an article on the recently introduced Hornady 6.5mm PRC cartridge, Chuck Hawks shared these thoughts on extreme range target shooting and hunting:

"Rifle, ammunition, bullet and riflescope manufacturers have rushed to take advantage of the current, marketing driven, long range shooting craze. Long range shooting over known distances from a solid rest at paper or metal targets can be a challenging and rewarding sport."

"Shooting at live animals at extended ranges in the field is an entirely different proposition and should be avoided like the plague. The less experienced a hunter is, the more he or she seems to be fascinated by the allure of long range shooting. Experienced hunters, with a more realistic understanding of their own ability and the variable factors that affect long range ballistics, typically eschew such shots. They have learned that there is NO justification for taking a shot that risks wounding and losing a valuable game animal. It is far better to stalk closer, or wait until another day for a certain, one shot kill."

"Game department studies have shown that, even shooting from a blind with a solid rest, the percentage of wounded and lost animals skyrockets when shots are attempted beyond about 160 yards. Here at Guns and Shooting Online, our policy is never to attempt a shot at a game animal beyond the +/- 3" maximum point blank range (MPBR) of the cartridge and load."

Late in his remarkable career, Jack O'Connor "The Dean of American Gun Writers" wrote a reflective article on the 7x57mm Mauser cartridge ("Forty Years with the Little 7mm"), which appeared in the 1974 *Gun Digest*. In the article, JOC wrote the following about the practical range for hunting shots:

"Two hundred yards is not only the practical killing range of the 7x57, but also the practical killing range of the 30-06, the 7mm Magnum, the .300 Weatherby Magnum and what have you. The reason for this is that very few hunters can lay the bullets into the vital area of a game animal at any greater distance, even under the most favorable conditions. In fact, I'd bet a sugar cookie that most hunters could kill stuff farther away with the 7x57 than they could with the 7mm Magnum. It would not kick them so hard. They wouldn't be afraid of it and they would shoot it better. I have some more news:

game is not killed by foot pounds of energy. In fact, the energy has little to do with killing power. Animals are killed by putting in the right place a bullet that penetrates deep enough and opens up adequately."

"My wife has always stuck with one bullet weight - 160 grains. In her [7x57mm Mauser] rifle this bullet leaves the muzzle at 2,660 fps. She sights in for 200 yards. The bullet drops 9 inches at 300. At 400, it would probably drop about two feet, but she doesn't believe in shooting at things that far away. She says doing so is silly. I'm inclined to agree with her."

Mr. O'Connor, Mr. Hawks and I rest our case.