

# TOO MANY MISSES

A nontoxic-shot ballistics expert helps bird hunters hit their targets.

BY TOM DICKSON



**STRAIGHT SHOOTER** Nontoxic-shot ballistics expert Tom Roster schools a groups of students on shooting proficiency. His cardinal rule: "The worst thing you can do is to shoot behind the target, because you aren't making use of all those pellets in the shot string. It's unforgivable."

**Y**ou'd think it would be easy to kill a flying duck with a shotgun.

After all, many loads contain 150 to 175 pellets that, upon reaching the bird, are spread out in a swarm 3 to 5 feet in diameter and 6 to 8 feet long. How can anyone not hit the target with all that metal in the air?

Yet too often we do, either missing entirely or, even worse, wounding and then never recovering the duck.

Tom Roster has been working 30 years to change that.

A shotgun ballistics expert based in Oregon, Roster is a leading authority on shotgun ammunition efficiency and wounding loss in game bird hunting. He also was a longtime paid consultant with the recently discontinued CONSEP (Cooperative North American Shotgunning Education Program). The nonprofit organization was formed in 1982 and funded by several states' conservation agencies, including Montana Fish, Wildlife & Parks, to improve hunter proficiency with steel and other nontoxic shot. Nontoxic shot has been required for waterfowl hunting since the late 1980s, and is mandatory on federal waterfowl areas for all game bird hunting. The requirement grew out of concerns by waterfowl managers and hunters about lead poisoning in wildlife. Waterfowl ingest pellets when feeding on shallow lake bottoms containing spent shot, and bald eagles and other raptors are poisoned when feeding on birds wounded with lead but not retrieved.

As he has for the past three decades in states across the country, Roster recently conducted a two-day shooting-proficiency seminar in Helena for roughly two dozen outdoor education specialists, game bird conservation group members, and hunter education instructors. He turned many of our long-held beliefs about steel and other nontoxic shot completely upside down.

## WHY SO FEW HITS?

The primary reason bird hunters miss their mark is because the target is moving fast, and shooters misjudge its speed or angle of flight. They also misjudge distance. The optimum killing range for most ducks and geese is

about 30 yards. If a hunter thinks a bird is that far away but it's really 50 yards off, the odds are that no pellets will strike the target's vital areas, though a few pellets may hit nonlethal body parts and wound the animal.

Another reason for crippling is that hunters accustomed to lead use the wrong load or the wrong choke when firing steel.

Finally, misconceptions exist among hunters as to what constitutes a normal daily waterfowl harvest. TV shows, DVDs, and magazine articles that show hunters regularly killing their limits of ducks and geese create the impression that high harvests are commonplace. That causes hunters to believe they should kill a limit just as "everyone else" seems to be doing. In fact, hunters nationwide actually kill an average of two ducks per day afield each year.

## POOR REFLECTION

Wounding loss occurs when a hunter hits a duck or goose with pellets but does not retrieve the bird. According to CONSEP, a conservative average wounding rate for ducks and waterfowl nationwide by hunters is 25 percent, or one bird struck but unretrieved for every three hit and recovered. That translates into roughly 2.5 to 3 million lost ducks and another 1 million lost geese.

To lessen its effect on waterfowl populations, the U.S. Fish & Wildlife Service factors in this loss when making annual hunting regulations. Still, unretrieved ducks and geese don't end up on hunters' dinner plates. If one reason we hunt is to obtain food, wounding obviously makes that goal harder to achieve.

"Wounding also reflects poorly on hunters," says Ken McDonald, head of the FWP Wildlife Division. "Hunters and wildlife agencies have long been committed to hunting ethically and proficiently and taking all measures to reduce suffering of game animals. Out of respect for the resource, we have an obligation to understand and reduce wounding loss with birds and do what we can to improve our shooting."

McDonald notes that FWP does that with big game by requiring hunter safety and bowhunter education emphasizing ethical shot placement. "Improving shotgun shooting proficiency is along the same lines," he says.



## Tom Roster on:

### What kills the bird

Roster has examined thousands of X-rays of dead ducks and geese. He says it's not the trauma of being hit by many pellets that kills a bird but the number of pellets (one or two minimum) that penetrate the brain, heart, lungs, or spinal column. A shooter's goal is to find the right choke that gives him or her enough pellets inside a 30-inch circle at 30 yards to ensure that at least one or two pellets hit those vital spots. Consult Roster's lethality table, found in Montana's waterfowl regulations, for details.

### Penetration

Roster says hunters can't kill a bird unless a few pellets penetrate a vital area. Because steel is lighter than lead, you need a bigger pellet to get the same penetration. So if you want a steel pellet to have the same penetration as a No. 4 lead pellet, it needs to be two shot sizes larger, or a No. 2 steel. For Roster's recommended steel shot sizes and chokes for various sizes of waterfowl, see his lethality table.

### Steel versus lead

Steel appears to be saddled with several disadvantages when compared with lead: (1) Because the harder pellets deform less in the air and don't stray off to the sides, steel has a tighter pattern and therefore is less forgiving on misjudged shots; (2) also due to the fact that fewer pellets deform and slow down, it has a shorter shot string, making it less forgiving in this way, too; and (3) because steel is less dense than lead, shooters need larger

LEFT: TOM DICKSON; ABOVE/RIGHT: RON HOFF

## WHAT TO DO

According to Roster, duck and goose hunters can reduce crippling by taking some simple yet essential steps, including:

- ▶ Learn to judge distances to prevent shooting at birds beyond the effective killing range (“sky busting”). An easy way to practice is by drawing a silhouette of a mallard or Canada goose (depending on which you shoot most) on a sheet of plywood and then posting it at various distances. Look down your shotgun barrel to see how much of the muzzle obscures the silhouette, which you’ll need to remember when you’re in your blind while hunting. Freezout Lake Wildlife Management Area has silhouettes available for public use.

- ▶ Employ decoys and proficient calling to

bring ducks and geese closer.

- ▶ Use a trained hunting dog to find and retrieve cripples.

- ▶ When you wound a bird, stop shooting immediately and make every effort to retrieve it (as state and federal waterfowl regulations require), no matter how far off it lands and even if doing so flares incoming birds.

- ▶ Use the right load and appropriate choke. Roster has developed a copyrighted nontoxic-shot lethality table showing the most effective loads and barrel chokes for different sizes of waterfowl at various distances. The comprehensive chart, found in Montana’s waterfowl regulations, shows which nontoxic-shot sizes do the best job of penetrating the bird’s vital areas with enough pellets to kill it.

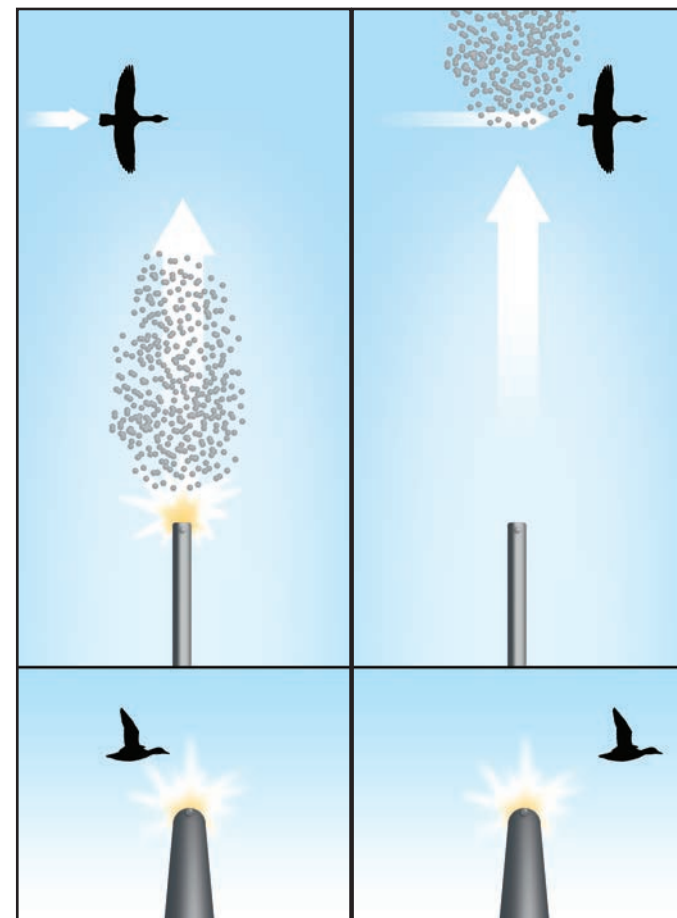
The most important step hunters can take to reduce wounding loss is to learn to shoot more effectively. Over the past three decades, Roster has personally taught roughly 18,000 bird hunters worldwide to do just that. His three tips that registered most with me, someone who has been hunting ducks for 35 years:

(1) Envision the shot string. Just as I once did, many hunters picture pellets flying through the air at a uniform speed, arriving at their target at the same time, like a flyswatter slapping a window. But pellets move in a somewhat cylindrical “string,” with the rounder ones out in front and those that deform lagging behind and spreading out. Due to wind resistance, lead has a longer shot string because the soft metal

## Missed or wounded bird

Shooters who fire at a bird or only slightly ahead...

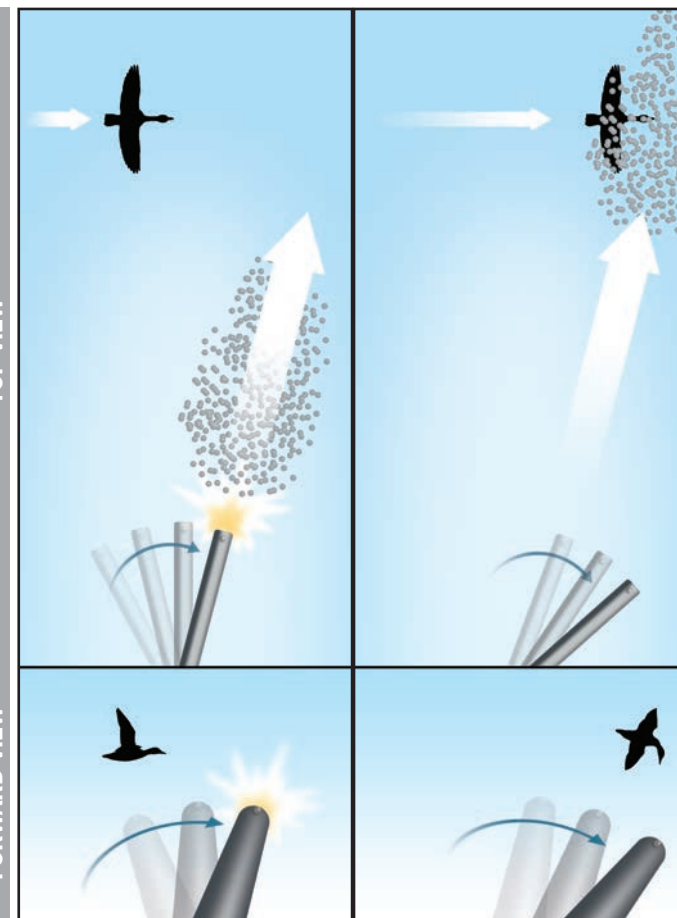
...end up missing or wounding because most of the shot string ends up behind the bird.



## Lethally hit bird

But when shooters swing through and fire ahead of the bird...

...the full “sofa-sized” shot string can do its work.



“PULL!” Tom Roster instructs a student during a recent shotgun shooting clinic. “Start behind, get ahead, shoot, and keep swinging,” is his constant refrain.

deforms more when projected. Because steel and other nontoxic pellets are rounder and less likely to alter shape, the shot has a shorter string and tighter pattern. “So the string with hard nontoxic shot is only about half as long as the sloppy lead string, making it less forgiving,” says Roster. Even so, at 30 or 40 yards nontoxic shot has a shot string that’s about 7 feet long and 4 feet in diameter, about the size of a sofa. So now when I shoot I conceptualize my shotgun sending a sofa-sized volume of shot toward the target.

(2) Get *way* out in front. “The worst thing you can do is to shoot behind the target, because you aren’t making use of all those pellets in the shot string. It’s unforgivable,” says Roster. “I tell every shooter to get way ahead of the target, much farther than you think you should be.” That way, he explains, even if shooters are too far ahead with the beginning of their shot string, they’ll still hit the target with the middle or end of it. “You have a lot more margin of error if you shoot too far ahead, but no margin if you shoot behind,” Roster says.

I found that last sentence to be the single most important thing Roster said during a two-day seminar of telling us a lot of important things.

(3) Follow through. Roster says too often shooters don’t swing through the target and end up stopping as they fire, causing them to shoot behind. “Start off with the muzzle behind the target, catch up to the target, pass the target and fire, then follow through after firing—all in one fluid motion,” he says.

During the field workshop on day two of

the seminar, I was there as Roster worked with a middle-aged shooter who has been hunting ducks since he was a teenager. Using a remote control, Roster ejected clay pigeons from a launcher left to right 30 yards out from the firing line. As he had repeatedly done for the previous hour with a dozen other students, Roster instructed the shooter, “Start behind, get ahead, shoot, and keep swinging.”

The first clay pigeon was cleanly missed. “You were behind. Get out more ahead,” said Roster, who watched over the shooter’s shoulder to view the shot string. “You want to start the barrel behind the target and a tad below, then move through the target and slam the trigger when you get past it.”

The shooter missed a second time, and then insisted he was leading more than ever. A patient man, Roster looked frustrated nonetheless.

“This time get out *twice* as far ahead of the target as you think you should be.”

Suddenly a lightbulb went off in the shooter’s brain. He envisioned sending an entire sofa-shaped mass of shot far out in front of the next target. “Pull!” he said.

Roster launched the target. The shooter powdered it.

Said Roster, “Now that’s what I’m talking about.” 🐾

Roster sells DVDs of his shotgun shooting methods. Order “Shotgun Handling for Hunting,” “Perfecting the Overhead and Side Shot,” or “Pass Shooting Demonstrations and Techniques” by contacting him at [tomroster@charter.net](mailto:tomroster@charter.net)

pellets to get the same pellet weight and, thus, penetration into the bird. So using steel means fewer pellets in the air to hit the bird.

But Roster notes that disadvantage (1) can be overcome by opening the choke (say, from modified to improved cylinder). Shooters can overcome disadvantage (2) by improving shooting proficiency as explained on pages 30-31. And disadvantage (3) isn’t in fact a problem. Roughly the same amount of No. 4 lead pellets end up hitting the bird as do No. 2 steel pellets. Though the lead load contains more pellets, so many deform in flight they end up wobbling off to the sides and don’t come anywhere near the target. It’s not that steel shoots “too tight,” as many shooters complain, Roster says. It’s that lead shoots “too loose.”

## Barrel erosion and damage from steel

Early steel loads damaged barrels, says Roster, but all that changed starting in the 1980s. That’s when manufacturers began using a shotcup system Roster designed and patented to encase the shot so it could move down the barrel without touching the interior surface. As for bulging, Roster says there is a small chance that steel could slightly bulge the muzzle of old European side-by-side shotguns—which have thinner, softer barrels—in full or modified choke. “But that happens very rarely,” he says. Bulging may also occur on early model guns that have screw-in chokes not made for steel. “Always check the owner’s manual,” Roster advises.

## Choke

You want your choke to be as open as possible while still getting the necessary minimum number of pellets into a 30-inch circle at 30 yards. To determine this, pattern your gun with various loads to determine how open a choke you can get away with. Consult Roster’s lethality table for his choke recommendations for various loads.

## Other nontoxic loads

Despite two decades of tinkering with composites of bismuth, tungsten, nickel, and other metals, shell manufacturer have not found a way to equal the density of lead without doubling or tripling the price. “Most bird hunters are sticking with steel, which makes up nearly 90 percent of all nontoxic sales,” says Roster. “It will remain king long into the future.” ■