

STEEL SHOT: OUR ONLY ALTERNATIVE

JULIA MCSHERRY, Louisiana Department of Wildlife and Fisheries Baton Rouge,
LA 70898

Abstract: Lead poisoning of waterfowl is a serious problem causing a loss nationwide of about 2 million ducks and geese each year. Using non-toxic shot on key problem areas may be as significant to the well-being of our waterfowl resource as preserving nesting areas, a project which has long been an important objective of waterfowlers. Yet many hunters fail to see the extent of the lead poisoning problem or object to the use of steel shot for various reasons. With this in mind, the Southeastern Directors I&E Committee with 16 directors concurring at the annual meeting have voted to distribute a 15:50-min, 80-slide presentation produced by the Southeastern Cooperative Information and Education Committee. This project explains the seriousness of the lead poisoning problem and addresses 3 major complaints hunters voice regarding the use of steel shot: price, barrel damage, and fear of increased loss. The presentation points out that these complaints are common misconceptions and that steel is a necessary and viable alternative to lead. "Steel Shot: Our Only Alternative" is designed to answer the hunter's questions on lead poisoning and steel shot. It is available at cost, \$40 to southeastern fish and game agencies, \$50 to other groups. One complimentary copy will be supplied to each member state by Southeastern. This project is significant in that it represents a cooperative effort among the 16 southeastern states. Such an effort is more cost effective and can have greater impact than individual efforts.

Proc. Ann. Conf. S.E. Assoc. Fish & Wildl. Agencies 35:669-673

The raucous cries of migrating waterfowl have filled dawn skies and enchanted hunters for centuries. Ducks and geese have provided man food, keen sport, and the opportunity to utilize a renewable resource. But waterfowl are in trouble today. A serious problem has developed, gradually since the early 1900's, intensely in the past decade: lead poisoning. It occurs across the country, in every flyway, and has affected almost all species of waterfowl. Lead poisoning tends to be most severe in areas where hunting pressure is greatest.

Each year about 3,000 tons (2700 metric tons) of spent lead shot are deposited by waterfowl hunters. Much of it falls on feeding areas of ducks and geese. In popular hunting locations, especially in shallow water with hard bottom, the lead pellets lie beneath the surface readily available to feeding waterfowl. In soft, marshy bottom areas, the pellets sink more quickly and are sooner out of reach.

Each year, biologists with many state game and fish departments and U. S. Fish and Wildlife Service conduct dead-bird pick-ups and analyze thousands of waterfowl gizzards for evidence of lead poisoning. Through various surveys, they estimate that 2 million birds a year die of lead poisoning. Of this 2 million, the hardest hit are mallards (*Anas platyrhynchos*), Black ducks (*Anas rubripes*), pintails (*Anas acuta*), and geese, favorite species of the hunter. The number of ducks dying annually from lead poisoning is just about equal to the number of birds raised each year on Ducks Unlimited wetland projects in Canada. This is a waste that cannot be ignored.

Lead poisoning occurs when lead shot is ingested during feeding and is dissolved by gastric juices and the grinding action of the duck's gizzard. The shot breaks down to lead salts; the lead salts reach the bloodstream and are carried to other tissues throughout the body resulting in lead poisoning.

A bird suffering from lead poisoning can often be recognized from its posture. Typically, the wings droop and the bird can no longer fly. Green staining of the vent is also a common sign of lead poisoning. Within 7 to 10 days after lead shot ingestion, the bird loses power of flight and suffers weight loss. Paralysis soon follows with death in about 3 weeks time.

Lead can outright kill in a few weeks or it can weaken the bird gradually until it contracts common waterfowl diseases or succumbs to a predator. One ingested pellet can be enough to kill. And when mixed with hard diet like corn, millet, rice, or wheat, the pellets are even more deadly.

Lead poisoning is something the average hunter never sees. Often, birds that arrive during the hunting season have not yet ingested pellets or if they have, the lead poisoning is not yet evident. After the season, birds will sometimes feed in ponds that were heavily hunted and are filled with excessive amounts of lead pellets that are readily available. Die-offs often occur in late winter and early spring when the hunter is no longer in the field to observe this happening. Many times, sick birds seek seclusion in heavy cover and carcasses are often consumed by scavengers. Usually lead poisoned birds are found in singles therefore the extent of the lead poisoning problem is not obvious.

But, there are documented cases of massive die-offs in heavily hunted shallow water areas. For example, in February 1981, an estimated 5,000 Canada geese (*Branta canadensis*) died at Lake Puckaway in east-central Wisconsin. In January-February 1980, 4,000 lead poisoned Canada geese were counted along the Missouri River in South Dakota. Biologists estimate that the total loss was 2 to 3 times that figure. Louisiana Department of Wildlife and Fisheries biologists estimate that 4 or 5,000 ducks die each year on Catahoula Lake in central Louisiana. We cannot control some environmental hazards. We can control the amount of lead scattered in prime waterfowl feeding grounds. The tradition of waterfowl hunting demands that we do this. Wise use of a resource requires it.

Using nonpoisonous shot on key problem areas may be as significant to the well-being of our waterfowl resource as preserving nesting areas, a project which has long been an important objective of waterfowlers. We must strive to eliminate unnecessary mortality that occurs to our valuable migratory resource. This means changes in regulations of all kinds. We live with varied bag limits, season lengths, and other state and federal regulations. Use of steel shot is another way we can all share in an effort to maintain our wildlife resource thereby providing more ducks and geese for everyone.

Yet many hunters fail to see the extent of the lead poisoning problem or object to use of steel shot for other reasons. Basically, many hunters unfamiliar with steel shot have 3 common complaints. Price. Steel shot is presently more expensive than lead. The reason for this is that it is still a relatively new product. Wad, powder, and shot are more costly. Demand is low and uncertain. Manufacturers have large expenses to conduct research to technically improve their loads and to cover the cost of components. As the states establish steel shot zones and regulations stabilize thereby identifying demand, steel shot producers can greatly cut

costs by volume production. Already some steel and lead shot loads are not that unequal in price. But more importantly for now, the hunter must realize that the extra dollars spent are critical to preserving his sport of waterfowling.

Gun barrel damage through abrasion is another common concern of many hunters. Improved steel loads on the market today have made barrel damage a myth. Current factory steel shot ammunition contains special 1-piece shotcups made of much heavier and thicker plastic than lead shot wads to offer maximum protection against barrel erosion.

Bob Brister, *Field and Stream* shooting editor and field tester for many ammunition companies and firearm manufacturers, says that damage to guns was *never* what it was built up to be. *Only* certain guns with thin soft barrels like fine doubles are susceptible to barrel damage. Commonly used waterfowl guns, like Remington and Winchester pumps and autoloaders, plus most other guns are not damaged at all. Some guns, such as Browning Belgium-made shotguns and other expensive old double guns possessing thin barrels and tight chokes may be subject to ring bulging. This can be caused by magnum lead loads or steel shot in these type guns but usually occurs only in full choke barrels. A ring bulge is a slight expansion just behind the choke that looks like a ripple. However, the ripple is usually no more than 2½ thousandths of an inch (0.06 mm) and does not normally adversely affect patterning performance nor create a safety problem. It is a cosmetic change only and even that is minimal. Upon close inspection, hunters will find *no* barrel damage from steel on ordinary guns. Continuous research will provide even better technological advances in the future. Until then, carefully follow gun manufacturer's guidelines concerning the use of steel.

Perhaps of greatest concern to hunters is the fear of increased crippling loss with steel shot because it is ballistically different from lead. There is no question that steel shot is different from lead. For 1 thing, it is lighter in weight. Field tests have shown that it is possible to compensate for a difference in density of steel and lead by increasing the velocity and size of steel pellets. For example a number 2 steel pellet corresponds in weight to a number 4 lead pellet. 2's are best for big ducks; no. 1's or BB's for geese. Steel pellets are harder than lead pellets and suffer essentially no deformation when they are fired. The result is a tighter, more consistent pattern and pellets that deliver their energy to the target more efficiently than lead pellets from non-buffered lead loads. Tighter patterns make steel shot slightly less tolerant of aim-error than with some lead loads; aim error is very similar to that of buffered lead magnums. Steel ammunition is faster than lead. This requires adjustment in lead distances. For example, at close range many hunters find they must shorten leads when shooting steel. Yet, because steel slows down faster than lead, they must increase lead distance at longer ranges.

Only practice and familiarization can help the hunter determine what adaptations he'll have to make to get the same performance from steel that he is accustomed to with lead. Hunters should not skybust or attempt to take birds over 50 yards away with lead or steel loads. Skybusting with lead or steel can cripple waterfowl. It is the responsibility of the hunter to realize this and take only reasonably close-in shots whether shooting lead or steel.

Much has been written on lead and steel. Recently, a National Wildlife Federation review summarized 57 studies on the crippling rates of steel and lead shot. Ballistic studies in controlled laboratory, semi-controlled field study, and actual

field evaluations, have continually shown that significant differences in crippling do not exist at any distance, whether close, medium, or long range. For example, U.S. Fish and Wildlife Service conducted a study on Tule Lake in California on snow (*Chen hyperborea*) and white-fronted (*Anser albifrons*) geese in 1977-78 shooting steel versus lead 2¾-inch (7 cm), 12 gauge loads. In 1979, the Illinois Department of Conservation set up a similar test on Canada geese using 3-inch (7.6 cm), 12 gauge lead versus steel loads. In 1980, Missouri conducted a lead versus steel shooting test on ducks at the Schello-Osage wildlife management area using 2¾-inch (7 cm), 12 gauge shells. All tests involved shooters who did not know whether they were shooting lead or steel. All tests showed no significant differences in crippling in the 2 loads. In fact, in the Illinois test, steel loads crippled significantly less than did the lead loads at distances greater than 50 yards (46 m). Any complaints on crippling come from hunters in the field who claim the loss is greater, but these claims have not been substantiated by results of the many shooting tests.

The best thing waterfowlers can do right now to preserve their sport is to learn how to use steel effectively and how to live with it. There are numerous reasons why hunters should not object to the use of steel shot. Bob Brister says steel shot loads have improved dramatically in recent years. Initially, there were some ballistics problems because steel is ½ lighter than the same size lead pellet. This difference in weight caused a problem with volume in shells; extra space was needed to fit more steel pellets. There was a need to develop powder to take up less space and be more effective. There was a need for greater velocity. There was also a need to make better use of case capacity and thicker, tougher shotcup wads to protect against steel pellets scraping the bore. These improvements have been made to make a more efficient load.

Use of steel shot has become an issue with serious repercussions. If we the hunters are saying "we don't care" that 2 million ducks are dying of lead poisoning, we are presenting a bad public image especially with anti-hunting factions. We are also liable for even greater effects of lead poisoning, that is what it does to other birds such as Bald eagles (*Haliaeetus leucocephalus*) feeding on ducks that have died of lead poisoning. Lead poisoned Bald eagles have been found on the Eastern shore of Maryland and in the state of Minnesota, for example. Many other nongame species are also affected by lead poisoning. Failure to convert to steel shot could even result in the necessity of shortening the seasons or lowering bag limits. But even more serious, if the lead poisoning problem is not alleviated, we could even lose our rights to hunt ducks.

The hunter must be more than a man with a gun. He *must* dedicate himself to the support of programs and policies which will enhance wildlife habitat and waterfowl numbers. His concern with preserving the resource is necessary to the future of hunting. The true sportsman does his share to contribute to resource management. Now is time for all sportsmen to listen.

Our professional wildlife managers, on the state and federal levels, have identified a problem and a solution. It is up to the sportsman now to heed their message. The hunter/sportsman must face the statistics and accept the fact that the number of waterfowl lost to lead poisoning is significant. The only solution to the eventual elimination of lead poisoning is to replace lead with non-toxic shot.

Southeastern Association of Fish and Wildlife Agencies, of which your state fish and game department is a member, is convinced that the only way to save thousands of ducks and geese is to convert to steel shot in problem areas. We believe that steel shot is a necessary and viable conservation measure and the only practical answer to the lead poisoning problem. It is our only alternative.

Southeastern Association of Fish and Wildlife Agencies gratefully acknowledges the many individuals and agencies who contributed slides, technical assistance, script writing, and narration, especially the following: Missouri Department of Conservation (slides and script), Texas Parks and wildlife (slides), Louisiana Department of Wildlife and Fisheries (slides and script), Tennessee Wildlife Resources Agency (slides and graphics), Florida Game and Fresh Water Fish Commission (narration and audio production), U.S. Fish and Wildlife Service (slides and technical assistance), Bob Brister (technical assistance and slide use), South Dakota Game, Fish & Parks Department and (slide use), Mississippi Flyway Council Environmental Issues committee, (text review).