

What About Barrel Damage?

The potential problem of barrel damage with steel shot is one of choke expansion which, when it occurs, appears as a slight ring bulge near the muzzle. Tests indicate that the degree of choke expansion varies with different types and models of shotguns. For most shotguns, choke expansion under full choke constriction either has not occurred or has been sufficiently slight as to have no significant effect on gun performance.

There is no evidence that choke expansion poses any safety hazards beyond those normally existing with any ammunition. A slight change in patterning might result from choke expansion, but the tests indicate that such changes are usually very minor and may actually result in slight increases in pattern density. Moreover, choke expansion apparently is not a problem unique to steel shot. In some guns it was found to occur also with lead shot, although to a lesser degree. The potential for choke expansion appears to be greater in guns with full-choke constrictions than those with modified or improved cylinder constrictions. Shotgun owners can write or contact the manufacturers of their guns for more specific facts about the impact of steel shot on individual gun models.

What Will Steel Shot Cost the Hunter?

Ammunition manufacturers estimate that steel shot loads will cost the waterfowler at least 50 percent more than lead loads. Although the costs of raw steel and lead are similar, it will cost more to produce steel shot ammunition.

Many shotgun shooters handload their own ammunition. Powders, primers, and other components, as well as information needed for proper reloading with steel shot have not yet been developed or made available by the manufacturers. When they become available, their combined costs are expected to be more than for lead shot components. The reloader will not be able to vary the charge and loads to the extent possible with lead.

Is There an Alternative to Steel?

The search for alternatives to lead shot has involved more than a dozen attempts to find a non-toxic, ballistically efficient, reasonably priced, and soft surfaced material which precludes barrel damage to shotguns.

To date, steel shot is the only material that meets most of these criteria. The U.S. Fish and Wildlife Service, however, will continue to consider substitutes as they are developed.

Conservation as a Waterfowling Tradition

The use of steel shot as a means of protecting our highly valued waterfowl from death by lead poisoning is a conservation measure that merits the understanding and support of waterfowl hunters. Waterfowl hunters have long been involved in the enhancement of their sport. Funds resulting from duck stamp purchases, for example, are used to acquire and preserve wetlands. Now, after many years of research, the steel shot decision has been made, and the time has come to act.

Cover art by Glenn D. Chambers,
courtesy Missouri Conservation Department.

Department of the Interior

U.S. Fish and Wildlife Service

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THE STEEL SHOT DECISION

What It Means To Birds And Hunters



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It is estimated that about 2 million ducks die in the United States each year from lead poisoning that results when the birds swallow spent shotgun pellets while feeding in fields and on marshbottoms.

Thus, the steel shot decision. To stop the accumulation of lead in areas where it is poisoning ducks, Secretary of the Interior Thomas S. Kleppe decided that steel shot ammunition would be phased in for waterfowl hunting on selected areas in the Atlantic Flyway in 1976, extended to selected areas in the Mississippi Flyway in 1977, and then to portions of the Central and Pacific Flyways in 1978. The progressive implementation of the program westward was designed to allow time for ammunition manufacturers to develop production capabilities. Steel shot zones are those areas in which hunting activity and the resulting lead deposits are most concentrated.

The use of steel shot will apply only to the hunting of ducks, geese, swans, and coots because the hunting of these species is believed to be the source of most of the lead shot deposited in wetland areas. The hunting of other species of aquatic and upland game birds does not appear to be a significant source of lead in birds.

The steel shot decision was made only after intensive studies of the problem, extensive public debate on available courses of action to reduce lead poisoning, and the publication by the U.S. Fish and Wildlife Service of a final environmental impact statement. Among the major conclusions of the impact study were:

- From 1.6 to 2.4 million ducks die each year from lead poisoning, and many others are no doubt weakened by the presence of lead in their bodies.
- Lead shot pellets are being deposited by waterfowl hunters at a rate of 3,000 tons a year in the United States.
- Lead shot is showing up in the digestive tracts of waterfowl in about the same proportions as it did in the 1950's, indicating that current deposits of lead are the source of the problem at most locations.
- Lead levels in the tissues of ducks are highest along the Atlantic Coast and lowest in the Central Flyway.

How Much Lead Collects in the Soils of Hunting Areas?

A density of one pellet per square foot is not unusual in wetlands and 3 or 4 pellets per square foot can be found in some popular hunting areas.

What Happens When Ducks Swallow Lead?

Lead pellets swallowed by waterfowl pass through the upper digestive tract to the gizzard where they are converted to a soluble form and absorbed by the bloodstream. Lead causes a reduction in oxygen supplies to all tissues. It interferes with the body's ability to breakdown glucose or other carbohydrates, leading to weight loss. Lead disrupts the production of hemoglobin, and anemia is the likely result. The imbalance in blood chemistry impairs the functioning of the liver and heart and causes damage to these organs. The external symptoms seen in birds are emaciation as severe as 40 percent loss of weight, wing droop, refusal to eat, a tendency to seek isolation and cover, and loss of the ability to walk or fly.

How Many Waterfowl Are Picking Up Lead?

A number of studies on the incidence of ingested lead shot have been completed in the last 20 years. On a national scale, approximately 7 percent of the ducks shot by hunters contain lead shot in their gizzards. Areas with hardpan bottoms which prevent lead pellets from sinking out of the duck's reach result in much higher levels of ingested lead.

Duck wings collected nationwide from each of the four flyways were tested for lead in the bones in 1972 and 1973. Young birds less than 7 months old were selected for the study because of their limited period of exposure. Lead residues in the bones of these ducks were closely associated with the incidence of spent shot in the gizzards of ducks collected throughout the United States.

How Many Waterfowl Are Dying From Lead?

In 1959, the Illinois Natural History Survey, in collaboration with Winchester-Western, published a report by Frank C. Bellrose. The report described extensive field and laboratory studies of lead poisoning, and included information on the incidence of lead pellets in 36,000 duck gizzards collected nationwide. Based on these studies, it is estimated that annual losses due to lead poisoning are 2 to 3 percent of the fall population of all waterfowl species.

The majority of deaths that occur are not highly

visible, and counts of dead birds during concentrated lead poisoning die-offs are not a meaningful index of total losses since many die-offs are not observed and dead or dying birds are quickly eaten by scavengers or predators. Further, lead poisoning is usually a chronic sickness, and affected individuals have time to disperse before they die. If the stricken birds are not eaten by predators, they seek the security of dense vegetation and die unnoticed.

Will Steel Cause an Additional Loss of Birds Not Retrieved?

When the ban on lead shot was proposed in 1974, opponents said that steel shot would result in more unretrieved ducks than are now dying from lead poisoning. It was claimed that steel would have less striking energy and would be less effective than lead. However, field tests have shown little difference in the effectiveness of standard 1¼ oz. lead shot waterfowl loads and 1¼ oz. steel shot loads. It is possible to compensate for a difference in density of iron and lead by increasing the size of steel pellets—a number 4 steel pellet corresponds roughly in weight to a number 6 lead pellet. Steel pellets are harder than lead pellets and suffer essentially no deformation when they are fired. The result is a more evenly distributed pattern, a shorter shot string, and pellets that deliver their energy to the target more efficiently than lead pellets.

Also minimizing the difference between lead and steel are the ranges at which ducks are shot. This subject was studied by the Michigan Department of Natural Resources. While occasional kills at 50 to 60 yards were recorded, the study indicated that most ducks were fired upon with both lead and steel at ranges less than 50 yards, and that most downed birds were hit at ranges between 20 and 45 yards.

Tests showed that while more ducks might be unretrieved when steel shot is used, the difference is so slight that it is not statistically significant. For example, with hunters using number 4 and 6 lead shot, 16.6 percent of the birds knocked down were not retrieved; with number 4 steel shot, 18.9 percent were not retrieved. If steel shot were used for all waterfowl hunting, the estimated unretrieved loss would be 2.8 million ducks each year. A comparable figure for lead shot is 2.4 million ducks. The program, however, does not call for a complete conversion to steel shot but for its use in those areas where lead shot deposits are most concentrated.