

LEAD SHOT...

potential danger to migratory ducks in Alaska

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DUCKS OFTEN SWALLOW pebbles to help crush food and aid digestion. Under certain conditions, if they ingest spent lead shot at the same time, they may suffer lead poisoning and perhaps even death. Each year tons of lead pellets are spread from hunters' guns across lakes and marshes where waterfowl are hunted. The severity of the poisoning is determined by the number of pellets ingested, the birds' diet and other factors. Estimates by the U. S. Fish and Wildlife Service place waterfowl losses at 2-3 million per year from lead poisoning.

Lead in solution interferes with oxygen transfer to body tissues, energy production for body functions and the transmission of nerve impulses. A lead-poisoned bird slowly loses body weight and coordination, and eventually dies from a lack of oxygen.

In 1976 an Environmental Impact Statement was written regarding a conversion to steel shot for waterfowl hunting. Shot made of steel is not toxic to birds and appears to be the best all-around substitute for lead.

However, strong objections to steel shot have been raised by many groups. Some of the problems with steel shot are that it is significantly more expensive than lead, manufacturers have had trouble with production and distribution, and it may damage gun barrels. The biggest objection is that steel is ballistically inferior to lead and may increase losses due to crippling without making a clean kill.

As with most controversial issues both sides have their own data. The Fish and Wildlife Service has called for a conversion to steel shot in the Pacific Flyway (of which Alaska is a part) during the 1978-79 season. This would be done on an area-by-area basis, depending on the hunting pressure, the severity of the ingested lead shot problem and other factors. Other parts of the U. S. have either made the conversion already, or will do so in the near future.

To find out if a duck carries ingested shot, the

contents of its gizzard are examined. A fluoroscope or x-ray helps detect the presence of metal and flushing the gizzard with water washes away all of the contents except metal and larger pebbles.

We once assumed that there were few ducks in Alaska with ingested lead shot. Due to the relatively low number of waterfowl hunters in Alaska (about 13,500 last season), the small duck harvests compared to many areas outside, and the large land area in Alaska, we surely wouldn't have problems, right? Wrong!

In 1974, Department of Fish and Game biologists, assisted by Federal biologists, members of the Alaska Waterfowl Association and other private citizens, began collecting duck gizzards from hunters. Since the 1974 season, 2,169 gizzards have been analyzed for the presence of lead pellets. The results were surprising. In duck gizzards found over most of Alaska, no pellets were found. However, ducks shot in some of the high hunter-use areas — particularly around Cook Inlet — had a high incidence of ingested shot and frequently were found to have large numbers of pellets in their gizzards.

The following table shows the number of gizzards examined, where they were found and the number of them containing lead shot:

| Area | No. Gizzards | Percent Containing Ingested Shot |
|------------------|--------------|-------------------------------------|
| Southeast | 701 | 0.4 |
| Gulf Coast | 229 | 3.5 |
| Cook Inlet | 602 | 15.0 |
| Kodiak | 79 | 1.3 |
| Alaska Peninsula | 225 | -0- |
| Interior | 333 | 3.9 |

What was especially surprising was that the average number of pellets per gizzard, for those gizzards which contained shot, was nearly 10. This was higher

than any other recorded average in studies across the country!

We were puzzled; ducks with many pellets in their gizzards (up to 154) should have been dead. Instead, they showed no signs of stress and only a very small number had abnormally stained gizzards (an indication of lead poisoning). What all the Alaskan birds did have was a lack of cereal grains in their digestive tract. Most had been on a diet high in animal matter or soft vegetation.

Studies by the Fish and Wildlife Service and others have shown that ducks on a diet of corn and other grains are highly susceptible to lead shot poisoning, but that ducks eating soft vegetation or food high in calcium are only affected to a very small degree by ingested lead. We suspected that this was the case in Alaska.

Liver and bone are major sites of lead storage, and these have been analyzed in studies by the Fish and Wildlife Service and others. By measuring the amount of lead present in these tissues, an indication can be obtained of whether or not birds are actually being poisoned by ingested lead pellets.

During the 1975 season, Department biologists collected livers and wings from ducks shot on the Palmer-Hay Flats and Susitna Flats near Anchorage. These hunting areas both had high incidences of ingested shot in 1974. When the livers and wings from these ducks were analyzed for lead content, we found that the birds' diet was indeed affecting the rate at which lead deposits formed, and thus the incidence of lead poisoning. For example, one Fish and Wildlife Service study showed that the average lead content in the wing bones of mallard ducks on a corn diet, having from 1 to 4 lead shot pellets in their gizzards, was 99 parts per million (ppm). In Alaska, an average of 4 ppm was found for mallards with the same number of pellets in their gizzards.

In seven other studies, an average of 35 ppm lead was found in the livers of mallards actually killed by lead poisoning. The average range was 15 ppm to 55 ppm. In Alaska mallard livers averaged 2.5 parts per million for those with ingested shot, and the range was 0.2 ppm to 9.3 ppm lead.

One of the interesting aspects of this study and other studies is that a certain amount of "background" lead occurs in nature. Birds with no ingested pellets in their gizzards may have more lead in their livers and wing bones than ducks with ingested pellets. This "naturally occurring" lead comes from automobile exhausts, industrial wastes, or lead normally occurring in the environment. For example, adult ducks may store lead in their wing bones which came from California automobile exhausts. We sometimes found significant amounts of lead in young ducks, taken opening day on the Palmer-Hay Flats, which had no ingested pellets.

After three years of intensive study, we came to the following conclusions:

- 1) In only a few intensely hunted areas in Alaska are ducks ingesting significant quantities of lead shot.
- 2) For those few areas where a high shot ingestion rate was found, the type of food eaten by ducks has a mollifying effect on the harmful aspects of ingested lead shot. Thus, we estimate that only a very small number of ducks in Alaska may actually be harmed by eating lead pellets.
- 3) Although ducks are not being killed in Alaska by ingested lead pellets, they may fly south and change their diet before the shot passes from their gizzards. If this is the case, some birds could be harmed by lead pellets obtained in Alaska after they leave our State.
- 4) Further analysis of band recovery data and other information will be required to ascertain the real impact of lead ingested in Alaska upon migratory ducks. 🦆

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