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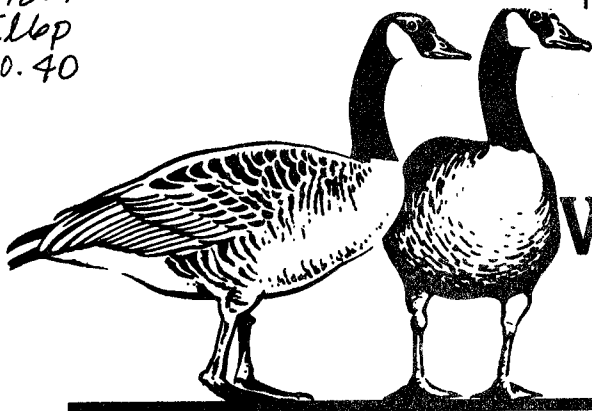
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WATERFOWL PROGRAM

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SPENT SHOTGUN PELLETS IN SOIL ON THE PHEASANT PUT-AND-TAKE HUNTING AREA AT REND LAKE IN 1983

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Abstract: Abundance of spent shotgun pellets in the upper 1 inch of soil on the pheasant put-and-take hunting area at Rend Lake averaged 20,900 per acre in fields heavily used by Canada geese and 55,100 per acre at locations heavily gunned by pheasant hunters. Within the latter, prime bobwhite cover had an average of 59,900 pellets per acre. It was concluded that (1) the fields are becoming a serious aggravation to the lead poisoning problem among waterfowl at Rend Lake, (2) further investigation of lead poisoning in bobwhite is warranted, (3) spent pellets on other (old) pheasant put-and-take areas should be studied, and (4) consideration should be given to testing the effectiveness of nontoxic (steel) shot for pheasant hunting on put-and-take areas.

The purpose of this study was to determine the abundance of spent shotgun pellets in soil--and hence the potential for lead poisoning in wildlife--on the pheasant put-and-take hunting area at Rend Lake. The need for this study was twofold: (1) the pheasant area could be contributing to the lead poisoning problem among waterfowl at Rend Lake (Anderson 1982) and (2) the area might be losing excessive bobwhite and other upland species to lead poisoning. Bobwhite populations on the area, which is also used extensively for sporting dog competition (field trials), have decreased appreciably in recent years. Ingestion of lead shot has been documented for bobwhite (Westemeier 1966), scaled quail (Campbell 1950), pheasants (Hunter and Rosen 1965), and mourning doves (Lewis and Legler 1968).

The pheasant put-and-take hunting area was established on Wayne Fitzgerald State Park, adjacent to Rend Lake, in 1972. This is about 75

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miles south of the range of self-maintaining pheasant populations in Illinois (Warner 1981). In an "average" year, 3,917 hunters harvest 7,154 of 8,791 pheasants released on the 750-acre area during a 30-day season that begins in mid-November. The area consists of small fields (10-20 acres) that are cropped to corn, milo, or wheat, or are fallowed. Fencerows and other woody vegetation are abundant (Fig. 1), and are attractive to both pheasants and hunters. Pheasant hunters discharge approximately 7.4 million pellets on the area each year (7,154 pheasants harvested x 3.7 shells per pheasant x 281 pellets per 2 3/4-inch 12 gauge shell loaded with 1-1/4 oz #6 shot = 7,438,014). (Data for number of shells fired per pheasant harvested courtesy R.E. Warner, Illinois Natural History Survey, pers. commun.)

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METHODS AND MATERIALS

A total of 105 soil samples were collected on the pheasant put-and-take hunting area on 6-12 May 1983. Half (52) of the samples were taken at random in fields heavily used by Canada geese for feeding (Sites A, B, and C), and half (53) were taken at random at locations heavily gunned by pheasant hunters (Sites G, H, I, J, K, and L) (Fig. 1). Five of the latter sites included woody vegetation that was prime cover for bobwhite. Dimensions of the samples (1 foot x 1 foot x 1 inch deep) were determined by pressing a square frame, made of 1-inch angle iron, into the soil. Each sample was placed in a heavy-duty plastic bag for storage and transport. The samples were reduced to small rocks or grit, shotgun pellets, and other relatively coarse material by a

combination of washing with a pressurized stream of water and screening with a 1.27-mm mesh sieve. The materials so retained were allowed to air dry and were then packaged in 8- by 10-inch bags. Shotgun pellets in the samples were first detected by fluoroscopy and then verified by visual examination. The size of each pellet, and whether lead or steel, were carefully noted.

FINDINGS

Twenty-five shotgun pellets were found in the 52 samples collected in the fields heavily used by Canada geese for feeding (Table 1). This equates to 20,900 pellets per acre or an average of 1 pellet for every 2.08 square feet of soil.

The 53 samples from locations heavily gunned by pheasant hunters contained 67 pellets, or 55,100 per acre. Sites characterized by woody vegetation (prime bobwhite cover) were represented by 40 samples that contained 55 pellets, which equals 59,900 per acre.

All 92 of the shotgun pellets found in the samples were lead shot. With regards to size, 44.6% were #6, 35.9% were #7-1/2, #8, or #9, 18.4% were #4 or #5, and 1.1% were #2.

DISCUSSION

Although there is no definitive rule for the number of pellets that must be present to constitute a lead poisoning hazard to wildlife, the threshold for waterfowl appears to be about 20,000 per acre or approximately 1 pellet for every 2 square feet of soil. At such levels, mallards and other waterfowl that will dig into soil for food would be expected to ingest spent pellets at relatively high rates. The die-off of 3,500 Canada geese at Horseshoe Lake (Alexander County) and Union County refuges in January-February 1977 (Anderson and Sanderson 1979) occurred in the presence of 17,424 and 44,431

spent pellets per acre, respectively (Esslinger and Klimstra 1983). Median abundance of pellets on 24 waterfowl areas in 7 states and provinces was 20,255 per acre; the range was 0 to 118,048 (Bellrose 1959).

In light of the above factors, it appears that spent pellets on the pheasant put-and-take hunting area are approaching levels of abundance that are hazardous to waterfowl. Pellets currently average 20,900 per acre in fields heavily used by Canada geese (Table 1). Given the prevailing gunning pressure by pheasant hunters (7.4 million pellets discharged annually), abundance of pellets in fields will increase with passage of each hunting season. If the area is not already, it will soon become a serious aggravation to the lead poisoning problem among waterfowl at Rend Lake.

Abundance of spent pellets in soil in bobwhite cover is high (average 59,900 per acre) on the pheasant put-and-take hunting area and could pose a serious hazard to a variety of upland species. Further investigation of lead poisoning in bobwhite is clearly warranted. A sample of bobwhite (e.g., 20 adult males in summer) should be collected on the pheasant area and their tissues (liver and bone) analyzed for lead. Also, abundance of spent pellets on old put-and-take pheasant areas (e.g., Chain-O-Lakes, Des Plaines, Green River, Iroquois) should be studied. Finally, consideration should be given to testing the effectiveness of non-toxic (steel) shot for pheasant hunting on put-and-take areas.

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Table 1. Abundance of spent shotgun pellets in the upper 1 inch of soil on the pheasant put-and-take hunting area at Rend Lake, Illinois, 6-12 May 1983.

| Location ^a | Vegetation | n ^b | Pellets | |
|---|-------------------------------------|-------------------------|-------------------------|---------------------------------|
| | | | Number | Per Acre |
| <u>HEAVILY USED BY CANADA GEESE</u> | | | | |
| Site A | Milo Stubble | 17 | 9 | 23,100 |
| Site B | Corn Stubble | 17 | 11 | 28,200 |
| Site C | Corn Stubble | 18 | 5 | 12,100 |
| Totals | | 52 | 25 | 20,900 |
| <u>HEAVILY USED BY PHEASANT HUNTERS</u> | | | | |
| Site G | Corn Stubble | 13 | 12 | 40,200 |
| Site H | Woody Fencerow ^c | 8 | 6 | 37,700 |
| Site I | Woody Fencerow ^c | 8 | 21 | 114,300 |
| Site J | Woody Former Farmstead ^c | 6 | 6 | 43,600 |
| Site K | Woody Fencerow ^c | 8 | 10 | 54,500 |
| Site L | Woody Fencerow ^c | 10 | 12 | 52,300 |
| Totals | | 53 (40) ^c | 67 (55) ^c | 55,100 (59,900) ^c |

^aSee Fig. 1.

^bEach sample was 1-foot square and 1 inch deep.

^cPrime bobwhite cover.

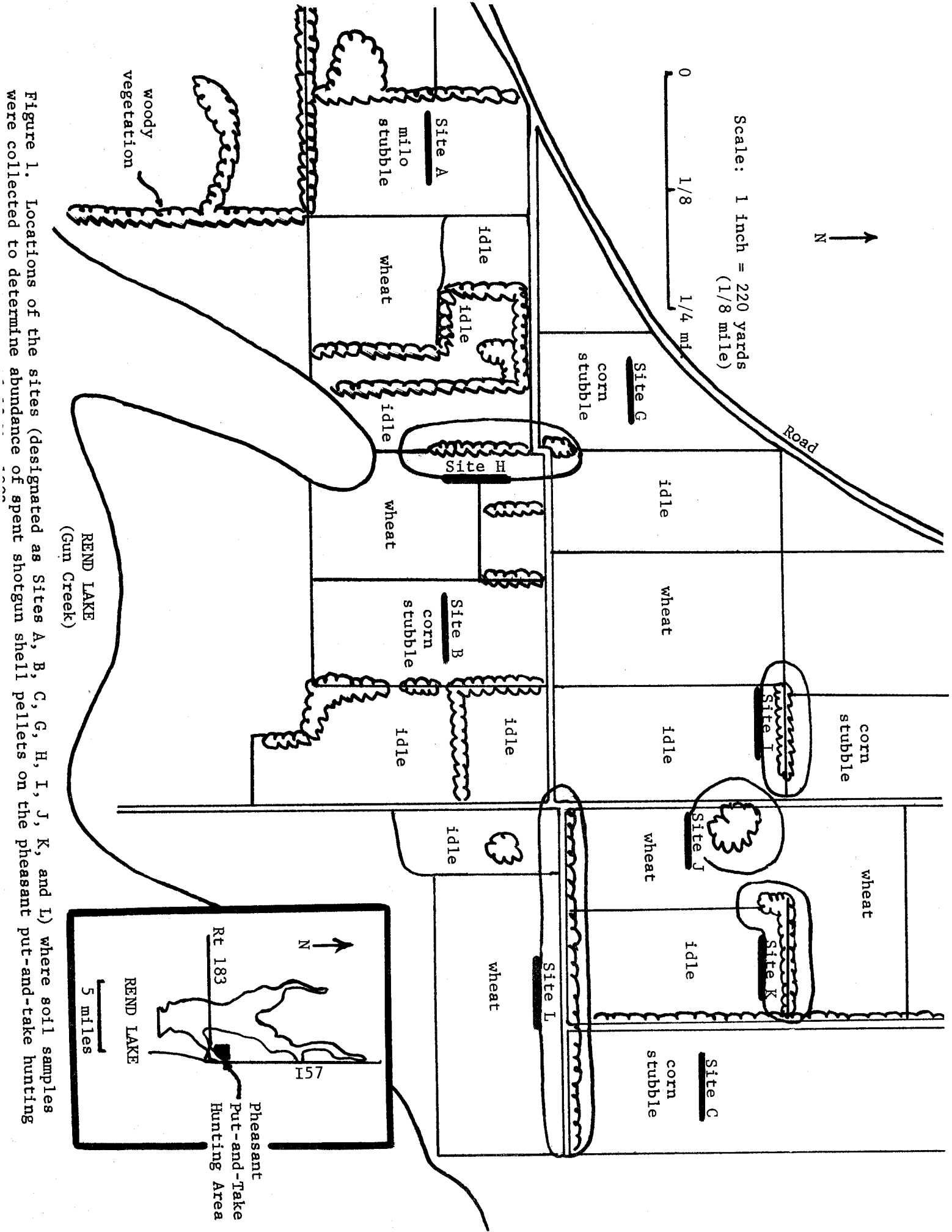


Figure 1. Locations of the sites (designated as Sites A, B, C, G, H, I, J, K, and L) where soil samples were collected to determine abundance of spent shotgun shell pellets on the pheasant put-and-take hunting

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