

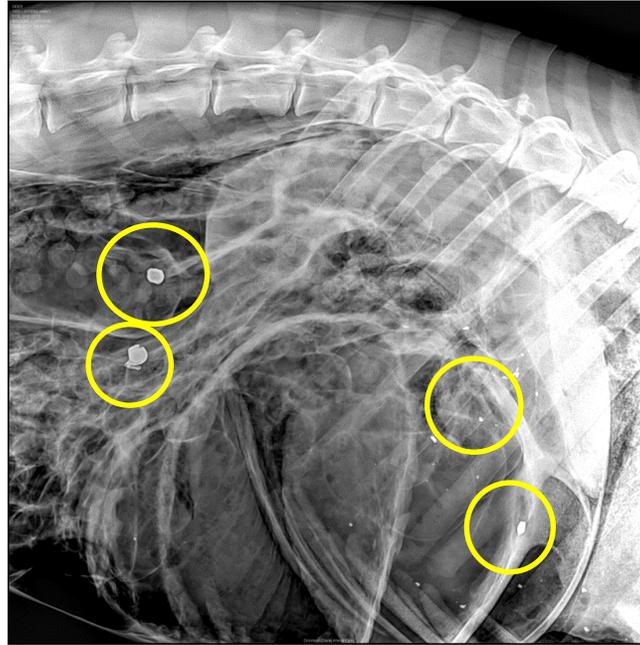
Attitudes of Natural Resource Professionals about voluntary use of nonlead hunting ammunition

John H. Schulz and Sonja Wilhelm Stanis

Deer hunting is a popular outdoor recreational activity across the midwestern United States but use of traditional lead hunting ammunition poses a risk to wildlife and human health. Lead exposure occurs when wildlife ingests bullet fragments in gut piles or unretrieved animal carcasses that have been shot with lead-based ammunition (Fig. 1). The preliminary results reported below were part of a larger multi-method project assessing a USFWS outreach program during 2016–2018 on 54 NWRs in Illinois, Iowa, Indiana, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin (Fig. 2). Socio-political factors prevented us from surveying deer hunters from the general public, however, we were able to explore hunters' beliefs and attitudes about nonlead ammunition within the context of USFWS staff who were both hunters and nonhunters. We focused on attitudes related to mortality factors facing bald eagles, lead poisoning in bald eagles, human health risks from lead bullet fragments in venison, and other issues related to nonlead ammunition. We examined differences in attitudes if participants were deer hunters, choice of ammunition, and behavioral intentions toward ammunition. Of 168 natural resource professionals, 61.9% reported being a deer hunter and 38.1% as a nonhunter, with 57.0% of deer hunters using lead ammunition and 43.0% using nonlead. Alternatively, 63.6% of hunters reported likely intentions to use nonlead, while 36.4% reported nonlead use was unlikely. Important variables related to nonlead use included firearm compatibility, minimal complexity, usefulness of shooting demonstrations, and ballistic characteristics of nonlead ammunition. Other factors affecting nonlead intentions included reduced eagle mortality,

seriousness of the issue, and reduced human health risk from lead bullet fragments in venison. In comparison, variables affecting lead ammunition use included the high cost and reduced availability of nonlead, perceived damage to firearms, and reduced accuracy and lethality of nonlead. Factors supporting continued lead use included insufficient scientific information, belief that most eagles likely recover from lead poisoning, and lack of friends or relatives who use nonlead ammunition. Because this study focused on natural resource professionals, our results likely represent a best-case scenario for voluntary use of nonlead ammunition among deer hunters. Positive messages related to human health were considered important for future outreach programs given people are at risk of lead exposure from venison. Our results suggest the importance of perceived norms and the use of messages targeting friends and relatives of deer hunters recognizing the risk of sharing lead-tainted venison; this message could also be expanded to venison donations at food banks.

(A)



(B)



Figure 1. Lead bullet fragments in a deer carcass (A) and ingested in a dead bald eagle (B) found in northwestern Iowa during January 2017 (photos Project SOAR, Saving Our Avian Resources; Kay Neumann).

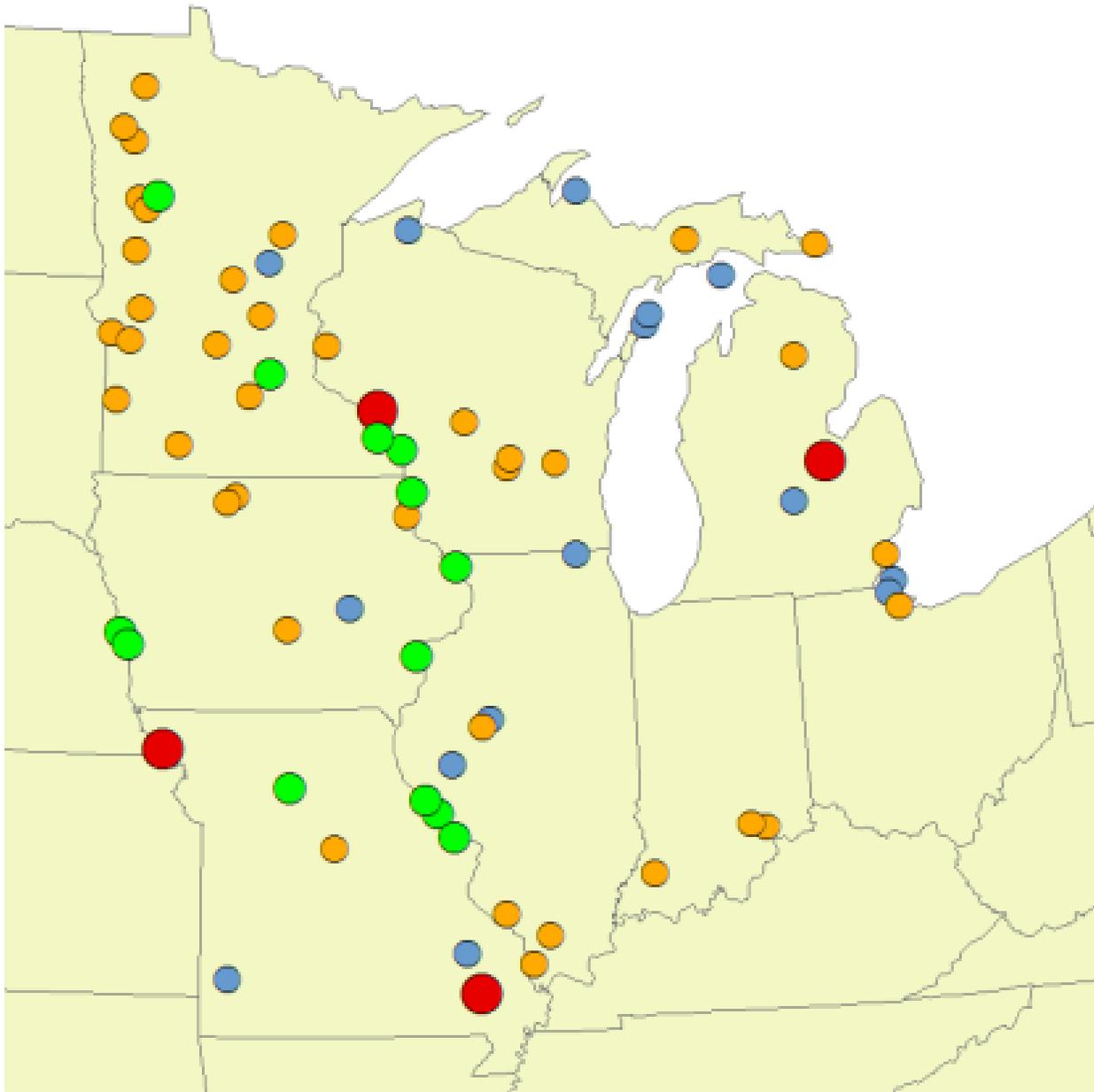


Figure 2. Locations of U.S. Fish and Wildlife Service National Wildlife Refuges in the Midwest Region (Region 3); red dots designate areas entering the outreach program in 2016, green dots in 2017, and orange dots in 2018.

(A)



(B)



Figure 3. Example of epoxy gel blocks used for demonstrating differences in bullet fragmentation characteristics between lead and nonlead ammunition for (A) high-power rifles and (B) shotgun slugs. Both bullets usually appear similar externally, but the lead bullet (right) has lead core with a copper jacket to control expansion. It is designed to fragment and dissipate the bullet's energy throughout the animal's carcass bringing about a quick kill. The nonlead bullet (left) is usually made of solid copper and retains nearly all its initial mass with copper 'petals' peeling backwards upon striking the animal causing fatal hemorrhaging.