Effects of Predator Management on Duck Nesting Success in the Devils Lake Wetland Management District, North Dakota

Prepared by

Ryan Shively
Biological Science Technician
U.S. Fish and Wildlife Service
Devils Lake Wetland Management District

August, 2003

Effects of Predator Management on Duck Nesting Success in the Devils Lake Wetland Management District, North Dakota

Introduction

The U.S. Fish and Wildlife Service (FWS), with the financial assistance of the Max McGraw Wildlife Foundation, undertook a study in two locations within the Devils Lake Wetland Management District (DLWMD) to determine the effects of mammalian predator management on waterfowl nesting success. The DLWMD manages habitat that is critical for a multitude of wildlife species. The primary objectives are wetland/habitat protection and waterfowl production. The DLWMD manages and protects over 64,000 acres of wetlands and other wildlife habitats including: 210 Waterfowl Production Areas (48,690 acres); Lake Alice National Wildlife Refuge (12,095 acres); Sullys Hill National Game Preserve (1,675 acres); and Kellys Slough National Wildlife Refuge (1,876 acres).

Populations of mammalian predators have expanded in the Prairie Pothole Region causing a parallel reduction in the overall nesting habitat. Habitat loss and fragmentation due to intensive agricultural practices has accounted for much of the depressed waterfowl productivity. These combined factors have concentrated predators in the remaining habitat to create a serious predation problem for ground nesting birds, particularly waterfowl.

Two 36 square mile sites were selected within the Prairie Pothole Region, which underwent intensive predator management through different types of trapping efforts. The Kellys Slough site was located in portions of Blooming, Rye, and Lakeville Townships, Grand Forks County, at Kellys Slough National Wildlife Refuge (NWR) (Appendix A). The Rock Lake site was located in Rock Lake Township, Towner County, North Dakota (Appendix B). The sites were chosen based on available nesting habitat, contiguous tracts of public land, cooperative landowners, as well as areas with high concentrations of breeding waterfowl pairs.

Methods

Nest Success

Each site was dragged for nests systematically using a 150 foot 5/16 chain between two all-terrain vehicles. The sites were searched on one or two occasions depending on nest densities. Nests were marked with willow sticks and data was recorded on a U.S. Geological Survey (USGS) habitat/nest record. The nests were re-checked every ten days until terminated or depredated. Finally, nest success was analyzed using both a mean Mayfield method and apparent success techniques to determine the effectiveness of the predator management activities.

Predator Control

Professional trappers were contracted to intensively trap each 36 square mile site from March 15, 2003 to July 10, 2003. The number of traps used per site ranged from 200 to 300 depending on trapper's necessity. Target predator species were striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), red fox (*Vulpes vulpes*), and Franklin's ground squirrel (*Spermophilus franklinii*). Predators were captured using 220 conibear cubby sets, 220 conibear trail sets, snares, and leg hold sets. All target species live captured were euthanized.

Results

Nest Success

Nest dragging results within both trap blocks indicated high productivity (Appendix C & D) with regard to nest success (a nest which hatches at least one egg). These results far exceed nest success rates of 15%-20% suggested as minimal levels for waterfowl population sustainability by prominent waterfowl researchers (Cowardin et al. 1985, Greenwood 1986, Klett et al. 1988, Greenwood et al. 1990). Species detected during the nesting season were typical for the Prairie Pothole Region (Appendix E & F) with mallard (*Anas platyrhynchos*), gadwall (*A. strepera*) and blue-winged teal (*A. discors*) being most common. Other interesting species were observed during the nesting season and were likewise reported in Appendices E & F.

Predator Control

Trappers in both trap blocks showed similar results (Appendix G & H) with the major difference occurring in the number of Franklin's ground squirrels trapped within the Kellys Slough NWR trap block. Ground squirrels appeared to play a major role with respect to some of the failures in nest productivity. Future trapping efforts at this site will include specialized equipment to increase the number of squirrels trapped.

Discussion

Increased exposure to predators decreases production of upland-nesting waterfowl in the northern prairie region of North America. Studies conducted in this region during the last several decades revealed nest success rates of only 10 to 20%. Predation may be sufficiently intense to depress recruitment below replacement levels for mallards (Cowardin et al. 1985), and other species of ducks (Klett et al. 1988) in much of the Prairie Pothole Region. Recently, Devries et al. (2003) found that 50% of the mortality in nesting mallard females occurs while they are known to be nesting, despite the fact that they only spend 20% of the nesting season on the nest. Hoekman et al. (2002) found that hen survival, nest success and duckling survival were the most important factors in sustaining recruitment rates of mallards. Predator management has direct impacts with respect to these three variables.

Nest depredation and hen mortality in the DLWMD are caused by small to medium sized mammals including the red fox, striped skunk, raccoon, and mink. These predators mainly destroy duck eggs but some species take ducklings and incubating hens. Sargeant et al. (1984), estimate that foxes annually take (on average) approximately 90,000 adult ducks in the mid-continent area.

In areas where habitat has become fragmented and predator populations are high, as is the case in much of the Prairie Pothole Region, nest success of waterfowl is limited. Cowardin et al. (1985) reported that mallard nest success averaged only 8% in central North Dakota during 1977-80 and concluded that this rate was insufficient to maintain the local breeding population without immigration. Klett et al. (1988) also concluded that nest success was too low for population stability of mallards, gadwall, blue-winged teal, northern shoveler, and northern pintail in North Dakota, South Dakota, and Minnesota. The nest success reported by Cowardin et al. (1985) and Klett et al. (1988) fell well below the suggested 15-20% necessary to maintain stable waterfowl populations (Cowardin et al. 1985, Greenwood 1986, Klett et al. 1988, Greenwood et al. 1990). Fox have had greater impacts on waterfowl nesting success in eastern North Dakota, and therefore it is likely that predation is increased by factors such as those consistent with fragmentation (i.e., concentrated nesting).

Conclusion

Waterfowl managers throughout the Prairie Pothole Region can improve waterfowl nesting success utilizing predator control. Delta Waterfowl Foundation, the U. S. Fish and Wildlife Service and other organizations have conducted numerous studies in the region that have shown nest success to be substantially higher with predator control. This project is another example of the positive effects that predator control can have on waterfowl production.

Literature Cited

Cowardin, L. M., D . S. Gilmer and C.W. Shaffer. 1985. Mallard Recruitment in the Agricultural Environment of North Dakota. Wildlife Monographs 92.

Greenwood, R. J. 1990. Importance of Individual Species of Predators on Nesting Success of Ducks in the Canadian Prairie Pothole Region. Canadian Journal of Zoology 67:291-297.

Greenwood, R. J. 1986. Influence of Striped Skunk Removal on Upland Duck Nest Success in North Dakota. Wildlife Society Bulletin. 14:6-11

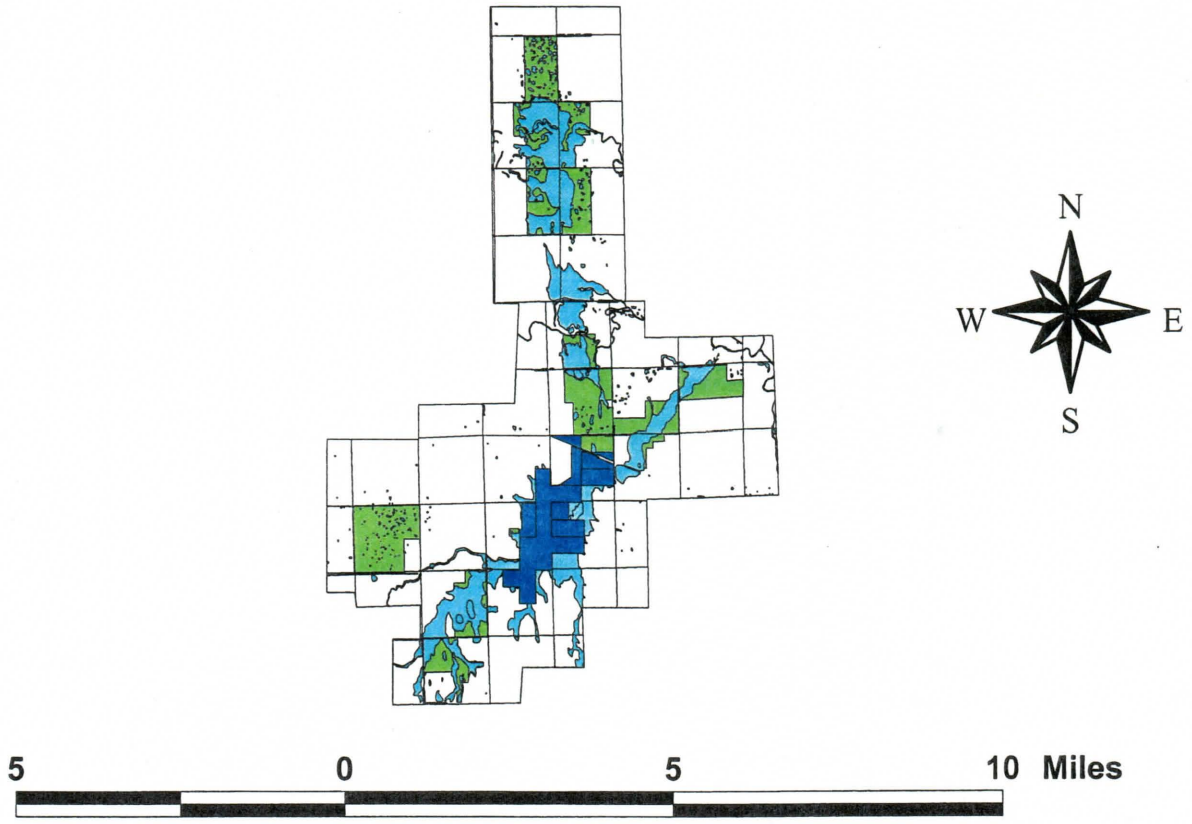
Klett, A. T., H. F. Duebbert, C. A. Faanes and K. F. Higgins. 1986. Techniques for Studying Nest Success of Ducks in Upland Habitats in the Prairie Pothole Region. U.S. Fish and wildlife Service Resour. Bulletin. 158. 24pp.

Sargeant, A. B., S. H. Allen, and R. T. Eberhardt. 1984. Red Fox Predation on Breeding Ducks in Mid-continent North America. Widlife Monographs 89.

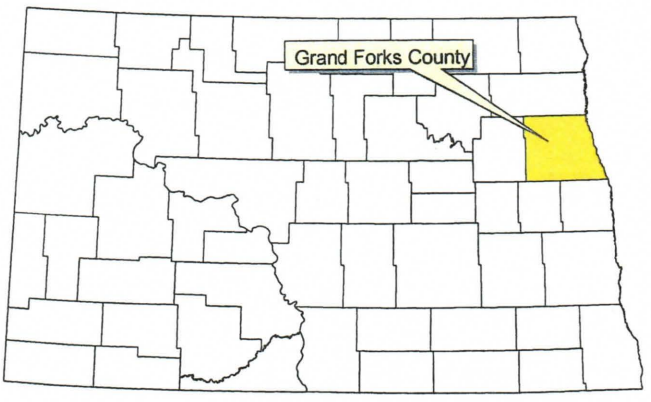
Hoekman, S. T., L. Scott Mills, David W. Howerter, James H. Devries, I. J. Ball. 2002. Sensitivity Analysis of the Life Cycle of Mid-continent Mallards. Journal of Wildlife Management 66(3):833-900.

Devries, J. H., J.J. Citta, M.S. Lindberg, D. W. Howerter, M. G. Anderson. 2003. Breeding-Season Survival of Mallard Females in the Prairie Pothole Region of Canada. Journal of Wildlife Management 67(3):551-563.

Appendix A.
Kelly's Slough Predator Management Trap Block, Grand Forks County, North Dakota, 2003

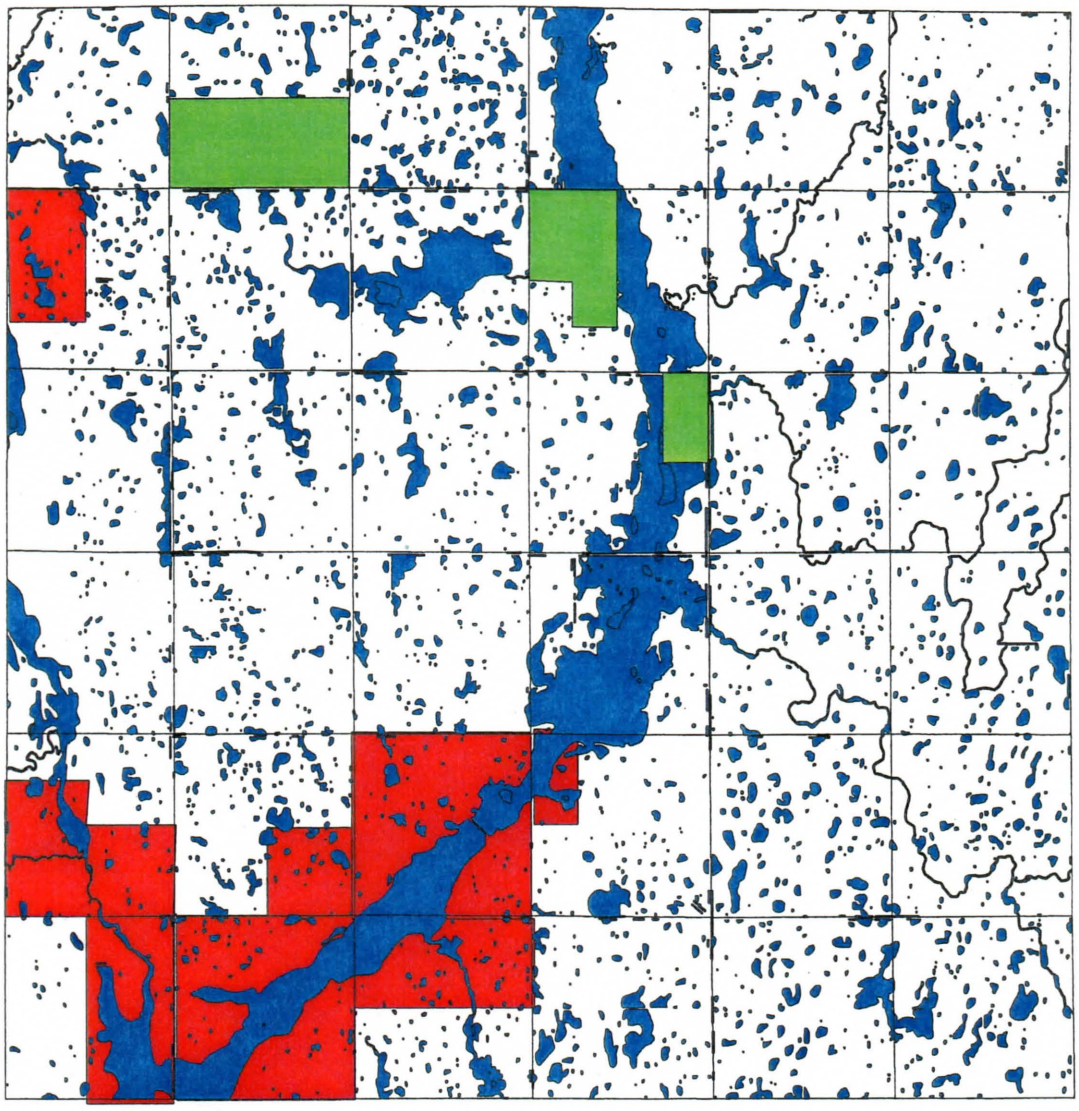


Wetland Basins
Waterfowl Production Areas
Kellys Slough NWR



Map prepared by
Mark R. Fisher
USFWS

Appendix B. Rock Lake Township Predator Management Block, Towner County, North Dakota, 2003



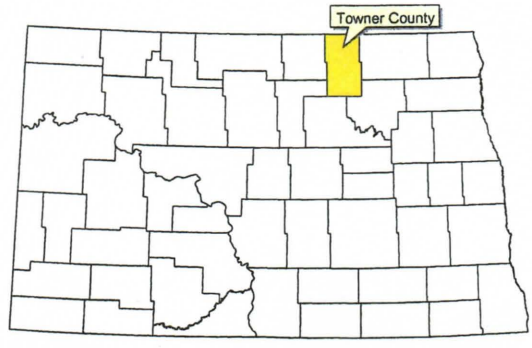
0 2 4 Miles

Waterfowl Production Areas

Rock Lake Township Wetland Basins

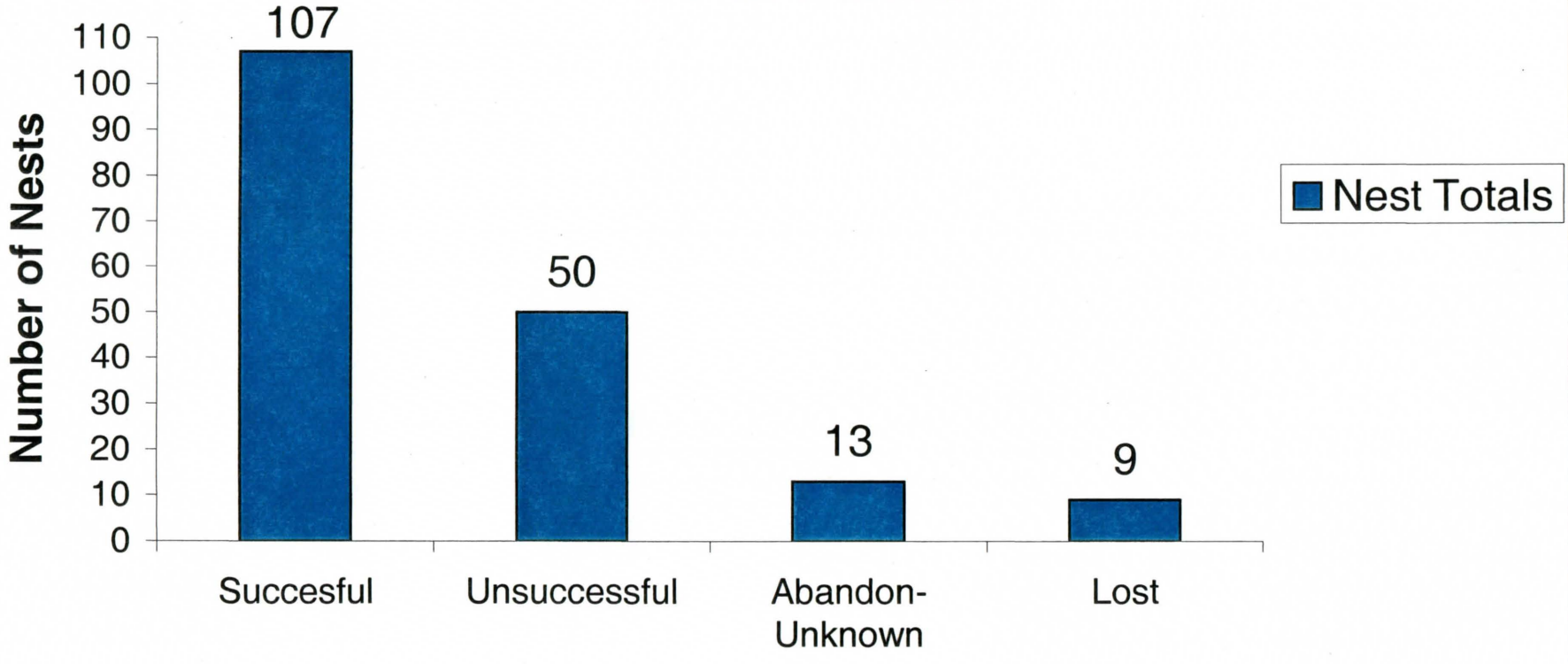
USFWS Easement Refuge Boundary

N
W E
S



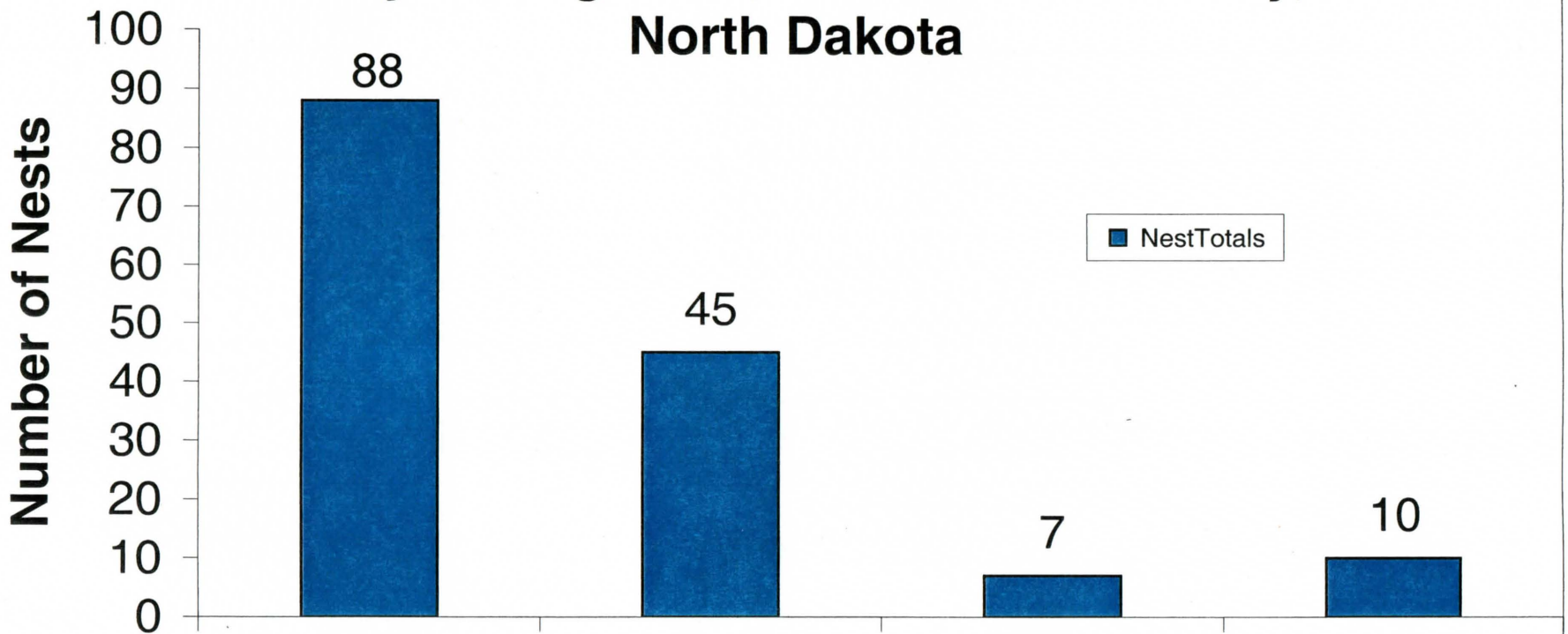
Map preapred by
Mark R. Fisher
Devis Lake WMD
USFWS

Appendix C
Predator Management Results
Rock Lake Site, Towner County, North Dakota



68.1% Apparent Nest Success
60.7% Mayfield Nest Success

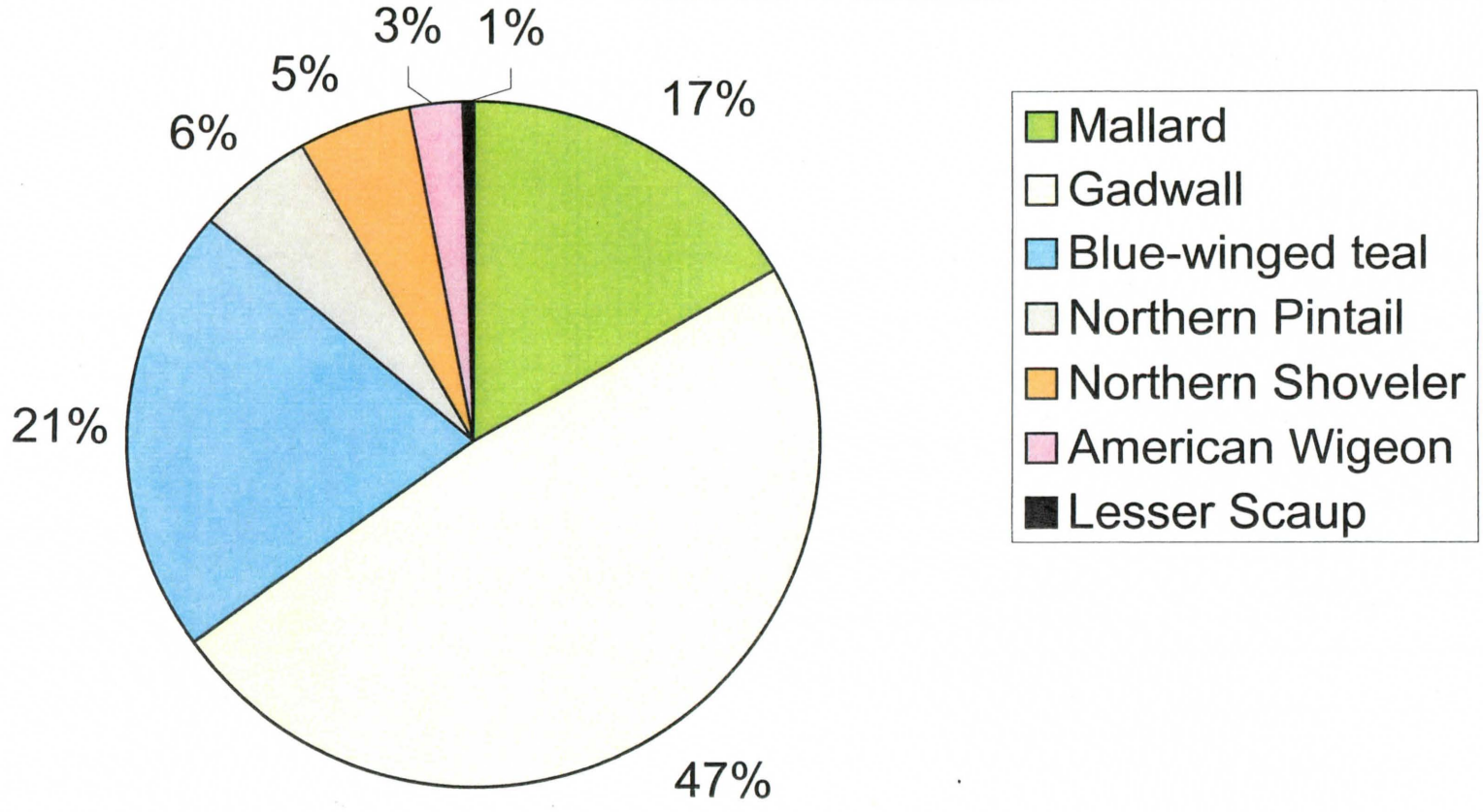
Appendix D
Predator Management Results
Kellys Slough Site, Grand Forks County, North Dakota



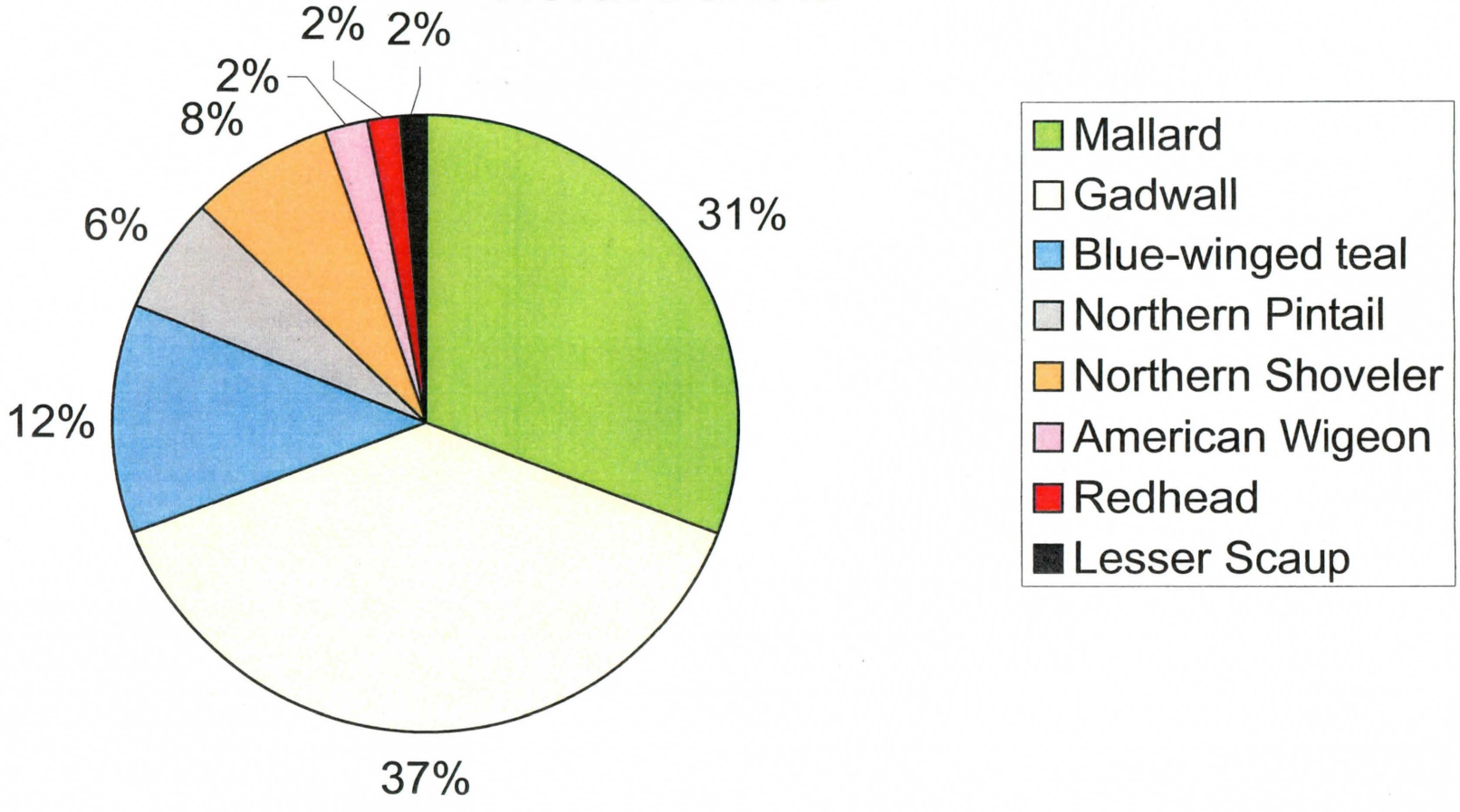
66.1% Apparent Nest Success

57.4% Mayfield Nest Success

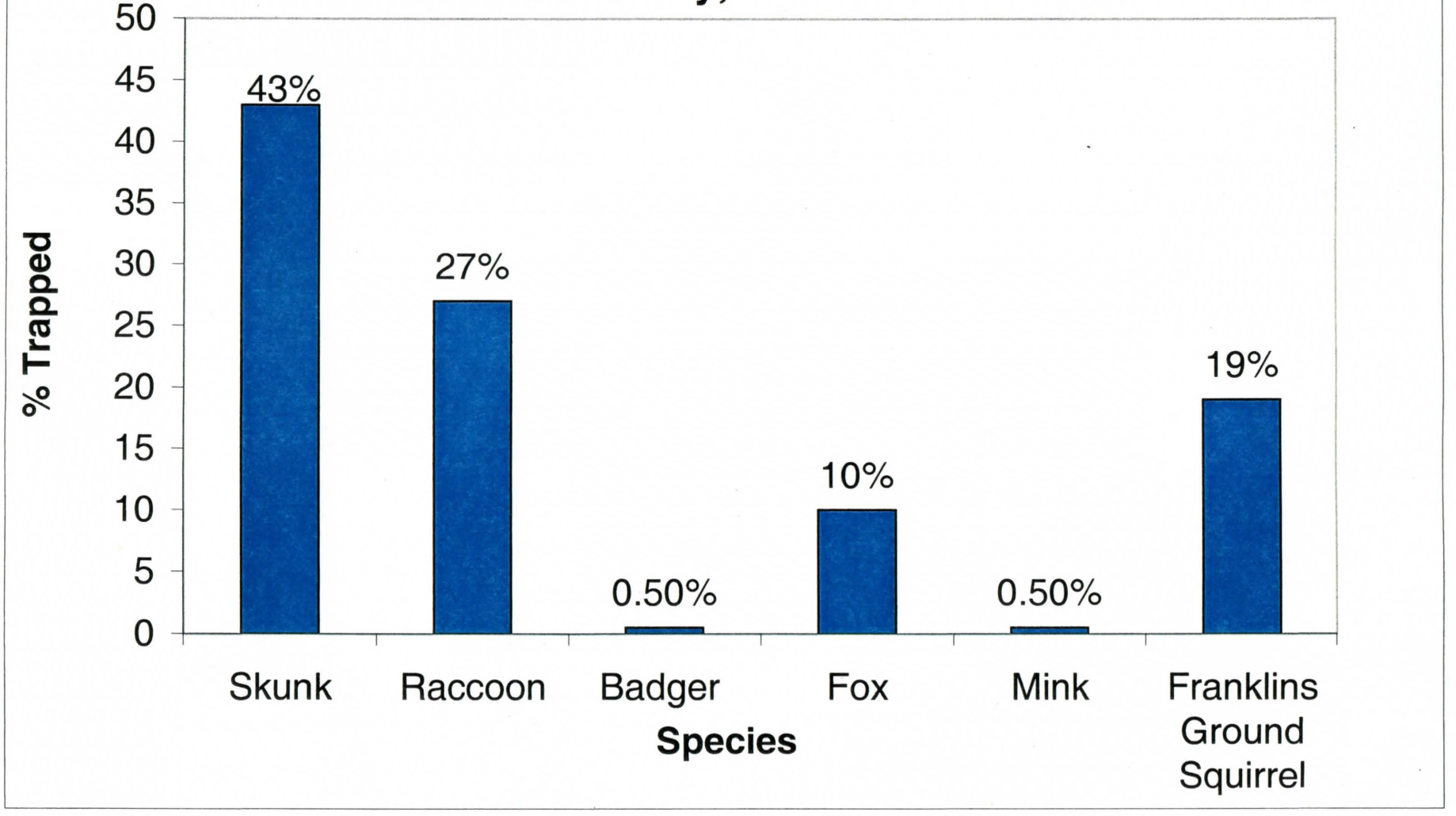
Appendix E
Species Composition of Nests
Rock Lake Site,Towner County, North Dakota



Appendix F
Species Composition of Nests
Kellys Slough Site, Grand Forks County, North Dakota



Appendix G
Predator Trapping Results, Kellys Slough Site, Grand Forks County, North Dakota-2003



Appendix H
Predator Trapping Results, Rock Lake Site, Towner County, North Dakota-2003