WOLVES AND SPORT HUNTING IN THE CONTINENTAL UNITED STATES

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ABSTRACT — Over the past two decades there has been considerable comment in Congressional hearings, popular literature and other non-scientific venues regarding the potential negative impacts of wolves on sport hunting. However, the vast majority of these comments have been made in the absence of any corroborating research. In our analyses of wolf populations and harvest figures in diverse geographic areas of the continental United States, we did not detect a negative relationship between wolf numbers and wild ungulate harvest, hunter participation, or hunter success.

INTRODUCTION

The reintroduction and recovery of gray (*Canis lupus*) and red (*Canis rufus*) wolves in the continental United States has been wrought with both emotion and controversy. A major component of that controversy has been the question of the wolves' impact on game populations, particularly ungulates such as deer (*Odocoileus sp.*) and elk (*Cervus elaphus*), and consequently, on recreational hunting opportunities.

Specifically, wolf opponents have suggested that hunting opportunities and sport hunter participation will decline with the recovery or reintroduction of wolves and that wolf predation will negatively affect the harvest of trophy animals and limit the number of antlerless hunting permits available in western states (Kay 1993).

Only by quantitatively assessing empirical data can we determine if wolves affect sport hunting. We believe that this study will serve as the first step in achieving that goal.

METHODS

In 1995, we surveyed state game agencies in five states with wolf populations (Michigan, Minnesota, Montana, North Carolina and Wisconsin) to obtain estimates of wolf populations, hunter harvest of ungulates and hunter participation (license sales). While reported harvests tend to be lower than actual harvests, these figures indicate trends and are the only readily available measure of harvest by licensed hunters.

We purposely excluded Alaska and Canada from our analyses because of a variety of unmeasurable factors including lack of definite prey population data and wolf control programs. Both of these factors would preclude an accurate analysis. In addition, while Alaska has the largest population of wolves in any state, the geographic area was simply too large to obtain the data included in this study.

We obtained data sets covering a variety of periods during the years 1973-1994. Management units and methods of keeping records change over time. This twenty year period was selected for its data availability in terms of management zones and harvest figures. Ungulate data generally consisted of total deer harvests, antlered and antlerless deer harvests and elk harvests where applicable. Deer harvest data were usually divided into discrete management units established by the respective states. Data contained harvest information for all methods of take with the exceptions of Michigan and Minnesota, where harvest figures were restricted to those taken by firearms. Hunting license data were submitted by license type (resident and nonresident) for Michigan, Minnesota and Wisconsin and similarly separated into state designated regions for Montana and North Carolina. Wolf population estimates were derived from survey data in the cases of Michigan, Montana, North Carolina and Wisconsin and were derived from periodic population estimates or interpolation in Minnesota.

We tested for relationships between the wolf populations and variables associated with ungulate hunting using analysis of covariance. Response variables included antlered and antlerless harvest and the number of hunting licenses sold (deer license for MI, MN, NC and WI, big game licenses for NC and number of hunters for MT). Predictor variables included region-within-state (categorical), year (continuous), region*year interaction, which allowed each region a separate pattern over time, and wolf population within each region (except for MN and WI where only statewide estimates of wolf populations were available). All analyses included regions with and without wolf populations. When no regional differences in harvest characteristics over time were found (p-value associated with year*region > 0.10), analyses were repeated with the main effects only. Analyses resulting in probability factors less than the significance level(p-value < 0.10) for the independent variable wolf populations were subjected to further analysis to determine the nature of that relationship.

To address the issue of how wolves impact hunter success, we looked at a single state, in this case Minnesota, and examined the relationship between wolf population levels and a hunter success index(# of deer harvested/# of hunting licenses sold).

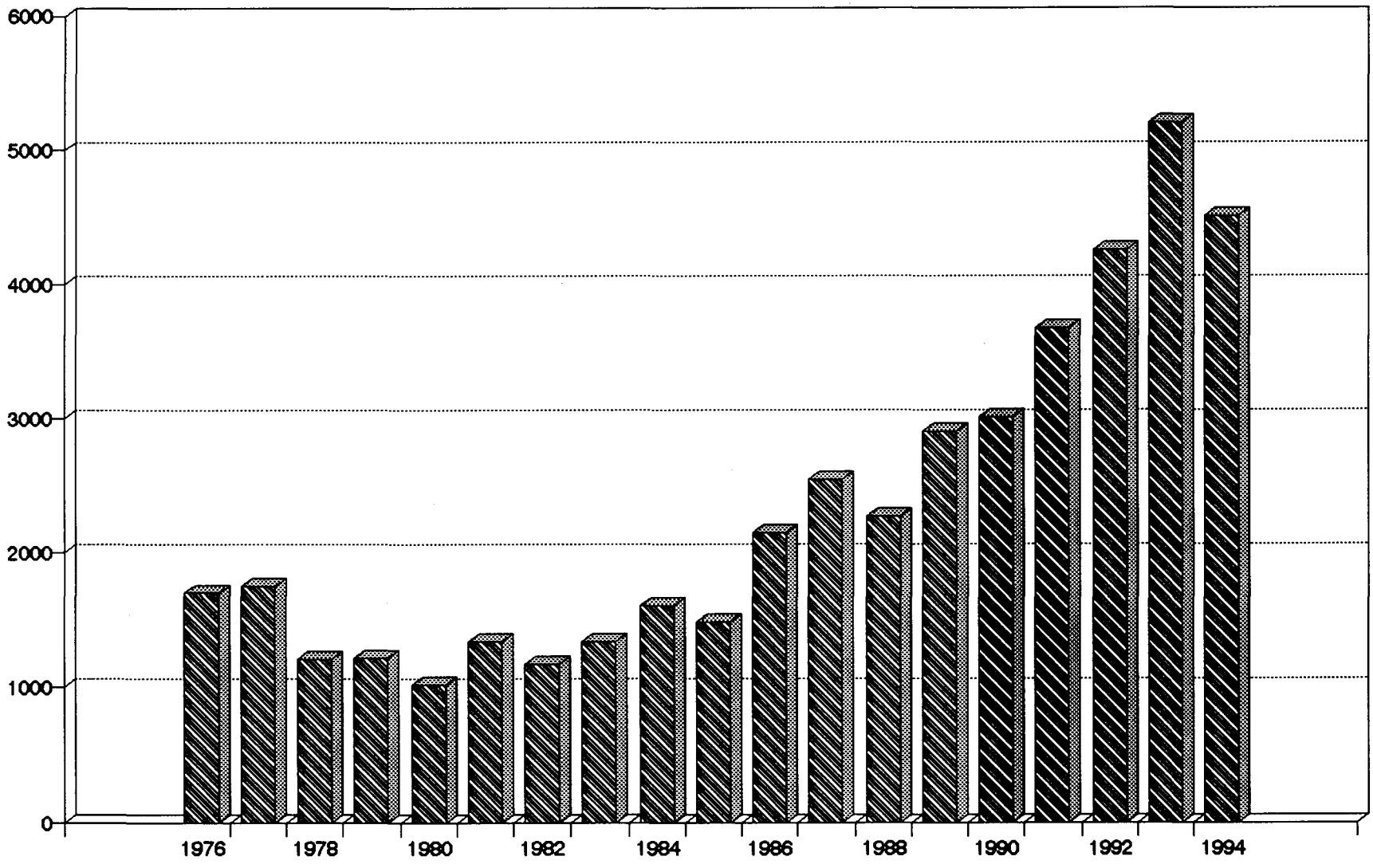
The null hypothesis for this study stated that reintroduced or recovering wolf populations in the five states examined have no effect on sport hunting harvest figures or participation. Our alternative hypothesis stated that recovering wolf populations have reduced sport hunting harvest figures and/or participation.

RESULTS

In states with small, expanding wolf populations, Michigan ($n = 57$), Montana($n = 54$) and Wisconsin($n > 80$ wolves), analyses yielded p-values

Figure I

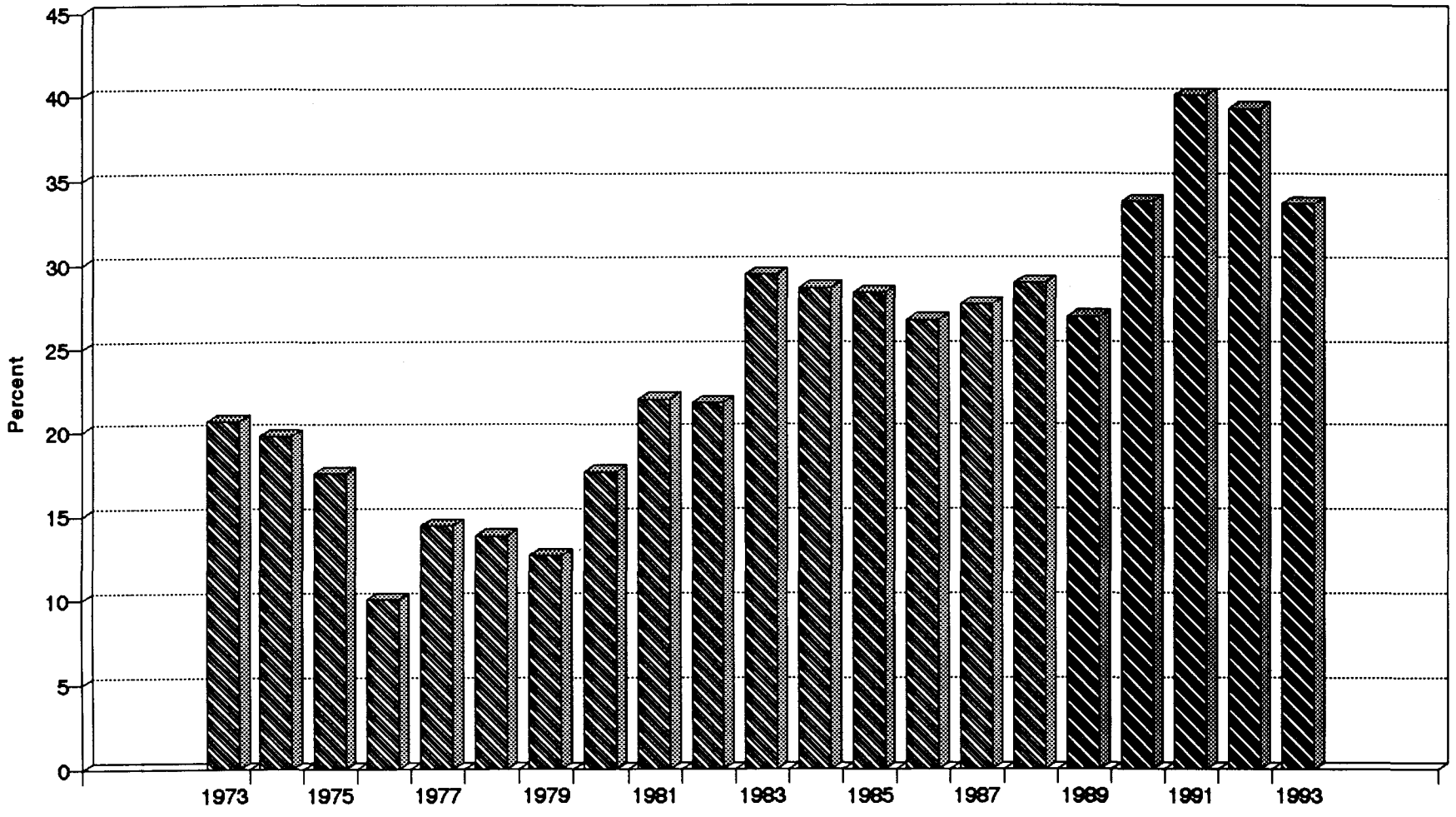
Total Deer Harvest by Hunters in Counties With Wolves in North Carolina 1976-1994



This graph depicts changes in annual deer harvest for Dare, Hyde, Tyrrell and Washington counties. Red wolves were reintroduced into northeastern North Carolina in 1987. Annual Harvest figures were obtained from the NC Wildlife Resources Commission.

Figure 2

Deer Hunter Success in Minnesota 1973-1993



This graph depicts changes in hunter success rates per hunting license sold.

Deer harvest figures and license sales were obtained from the Minnesota Department of Natural Resources.

that exceeded the significance level (P = 0.6041 MI, P = 0.2904, P = 0.9114 WI). Similarly, in Minnesota, which has a large, established wolf population, no relationship was found between wolf population size and harvest characteristics (P = 0.2932). However, the analyses for Minnesota and Wisconsin were conducted on a statewide rather than regional basis and, therefore, could be less sensitive in detecting a relationship between wolf populations and hunting.

We found a relationship between wolf population size and harvest variables only in North Carolina. Further analysis of the individual components of hunter harvest indicated that this relationship was limited exclusively to the harvest of antlered deer (P = 0.0044). The harvest of antlered deer, however, was not negatively related to wolf population size. Deer harvest and license data for the four counties occupied by wolves show steady increases (Figure 1). This does not imply that the presence of wolves caused the higher harvests, but confirms the patterns of the other states where there is no evidence of decreasing harvest in the presence of wolf populations.

The analysis of wolf population levels and hunter success for the state of Minnesota also did not indicate a negative relationship between these two variables. Hunter success rates increased from 21 percent in 1973 to 39 percent in 1992 (Figure 2). The other four states also experienced increased harvest success over the same twenty year period. Therefore, in this study, we failed to reject the null hypothesis.

DISCUSSION

The recent debate on wolves and their effect on sport hunting in the continental United States has been based on few data. Our analyses did not detect a pattern of declining hunting opportunities in the presence of wolves. The game population crash predicted as a result of growing wolf populations has not occurred in the five states analyzed. In contrast, overall trends in harvest numbers and hunter participation increased steadily in the five wolf-occupied states we examined over the period studied. Although it would be dangerous to attribute any causation to these trends, it would be equally ill-advised to continue to claim that wolves are negatively impacting sport hunting.

Several factors could account for the differences between our results and the claims of others. These could include the small size of most of the wolf populations in the continental United States, factors not included in our analyses that allow deer populations to increase even in the presence of wolf predation or differences in prey selection between wolves and hunters.

Certainly, an important underlying factor is that deer populations (the principal prey for wolves in the states we analyzed) have grown dramatically in many areas (Porter 1992). Additional factors in these increases might include enforcement of hunting regulations and changes in land-use patterns. Because of these increases, deer populations in the areas of our analysis might be able to support wolf predation along with the increasing harvest apparent in many states.

In summary, we found no evidence of declining hunter harvest, participation, or success in areas within the continental United States where wolves are present. We would encourage continued study of this topic including collection of data on a more narrow geographic scale. As we embark on restoring wolves to other areas of the continental United States, wolf recovery should continue to be guided only by the best science available.

ACKNOWLEDGEMENTS

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