2025 MINNESOTA RUFFED GROUSE SURVEY

Charlotte Roy
Forest Wildlife Populations and Research Group
Minnesota Department of Natural Resources
Grand Rapids, Minnesota
13 June 2025

SUMMARY OF FINDINGS

The Minnesota DNR coordinates ruffed grouse (*Bonasa umbellus*) drumming surveys each spring with the help of wildlife staff and cooperating federal, tribal, and county biologists. Mean ruffed grouse drums per stop (dps) were 1.8 statewide (95% confidence interval = 1.6 – 2.2), which is lower than last year and consistent with the peak in the population cycle occurring last year. This declining pattern was observed in the Northeast and Central Hardwoods survey regions, which comprise the majority of survey routes (120 of the 134 routes surveyed this year), but patterns varied among survey regions. The ruffed grouse drumming survey assumes that only the number of grouse varies among years. However, a substantial turnover in observers has occurred in recent years, with many retirements and hiring of new staff that may differ in their ability to hear low frequency drums, which could influence counts to some degree. We have also had numerous extreme weather conditions the last few years, including an extreme summer drought in 2021, spring flooding in 2022, good snow roosting conditions in winters 2021–2022 and 2022–2023, and a very mild winter with warmer than average temperatures in 2023–2024. These conditions may have increased production and overwinter survival of ruffed grouse as the population index was increasing through spring 2024. A very wet June in 2024 and less snowfall than normal throughout much of the range in winter of 2024–2025 may be contributing to the lower dps this year compared to last year. The drumming survey is useful for monitoring long-term population trends, but interpretation of a few years of data or less can be tenuous.

INTRODUCTION

The ruffed grouse (*Bonasa umbellus*) is the most popular game bird in Minnesota, with an annual harvest of 200,000 – 500,000 birds. Ruffed grouse hunter numbers have been as high as 92,000 during the last decade, although hunter numbers did not peak with recent peaks in grouse numbers, as they did historically.

The Minnesota DNR coordinates grouse surveys each year to monitor changes in grouse populations through time. These surveys provide a reasonable index to population trends when the primary source of variation in counts among years is change in grouse densities. However, weather, habitat conditions, observer ability, and grouse behavior also vary over time and can influence survey counts. Thus, making inferences from survey data over short time periods (e.g., a few years) can be tenuous. Nevertheless, over longer time periods and when large changes in index values occur, these surveys can provide a reasonable index to long-term grouse population trends. Spring surveys provide evidence that the ruffed grouse population

cycles at approximately 10-year intervals. The spring survey data also correlated strongly with the fall hunter harvest before the early 2000s, but in recent decades this relationship has weakened.

The first surveys of ruffed grouse in Minnesota occurred in the mid-1930s, and the first spring survey routes were established along roadsides in 1949. By the mid-1950s, ~50 routes were established with ~70 more routes added during the late-1970s and early-1980s. Since then, staff and cooperators have conducted spring drumming counts annually to survey ruffed grouse in the forested regions of the state where ruffed grouse habitat occurs. Drumming is a low sound produced by males as they beat their wings rapidly at an increasing rate to signal the location of their territory. These drumming displays also attract females that are ready to begin nesting, so the frequency of drumming increases in the spring during the breeding season. The sound produced when male grouse drum is easy to hear, so drumming counts are a convenient way to survey ruffed grouse populations in the spring.

METHODS

Observers conducted ruffed grouse surveys along established routes throughout the state. Each route consisted of 10 listening stops at approximately 1.6-km (1-mile) intervals. The placement of routes on the landscape was determined from historical survey routes, which were originally placed near ruffed grouse habitat in low-traffic areas. Annual sampling of these historical routes provides information about temporal changes along the routes but may not be representative of the counties or regions where the routes occurred, especially in areas with a small number of routes.

I engaged survey observers from among state, federal, tribal, and private biologists that had a professional background in wildlife science. Most observers had previously participated in the survey. I provided each observer a set of instructions and route location information but did not provide formal survey training; however, new observers usually accompanied experienced observers on $\geq$1 survey route prior to surveying alone. I asked participants to conduct surveys at sunrise during peak drumming activity (in April or May) on days that had little wind and no precipitation. I provided guidance about the timing of the usual peak in drumming but allowed flexibility in timing to match the peak if it occurred outside the usual survey windows (e.g., due to an unusually early or late onset of spring weather conditions). Each observer drove the survey route once and listened for drumming at each stop for 4 minutes. Observers recorded the number of drums heard at each stop (not necessarily the number of individual grouse), along with information about phenology and weather at the time of the survey.

I used the number of drums heard per stop (dps) as the survey index value. I determined the mean dps for each route, for each survey region (Figure 1), and for the entire state. For each survey region, I calculated the mean of route-level means for all routes partially or entirely within each Ecological Classification Section (ECS). Routes that traversed regional boundaries were included in the means for both regions. Because the number of routes within regions was not related to any proportional characteristic, I used the weighted mean of index values for the 4 ECS sections in the Northeast region and the 7 ECS sections in the state. I used the geographic area of the section as the weight for each section mean (i.e., Lake Agassiz, Aspen Parklands = 11,761 km^2, Northern Minnesota and Ontario Peatlands = 21,468 km^2, Northern Superior Uplands = 24,160 km^2, Northern Minnesota Drift and Lake Plains = 33,955 km^2, Western Superior Uplands = 14,158 km^2, Minnesota and Northeast Iowa Morainal (MIM) = 20,886 km^2, and Paleozoic Plateau (PP) = 5,212 km^2). I reduced the area used to weight drum index means for the MIM and PP sections to reflect the portion of these areas within ruffed grouse range (~50%) using subsection boundaries. I calculated a 95% confidence interval (CI) to convey the

uncertainty of each mean index value using 10,000 bootstrap samples of route-level means for survey regions and the whole state. I defined confidence interval boundaries as the 2.5th and 97.5th percentiles of bootstrap frequency distributions.

RESULTS & DISCUSSION

Observers from 12 cooperating organizations surveyed routes between 2 April and 22 May 2025. Many observers reported an earlier spring than usual and completed surveys when they believed the peak of drumming occurred in their local area. Most routes (96%) were surveyed between 11 April and 10 May, with a median survey date of 30 April, which is similar to most years (median survey date close to May 3). Observers reported Excellent (56%), Good (39%), and Fair (6%) survey conditions for 124 routes reporting conditions.

Statewide ruffed grouse drums were down from last year and averaged 1.8 dps (95% confidence interval = 1.6 – 2.2 dps; Figure 2). Drum counts were 2.0 (1.7 – 2.5) dps in the Northeast (*n* = 106 routes), 2.3 (1.3 – 3.3) dps in the Northwest (*n* = 6), 1.0 (0.5 – 1.6) dps in the Central Hardwoods (*n* = 14), and 0.7 (0.4 – 1.2) dps in the Southeast region (*n* = 8; Figure 3a-d). Thus, in the Northeast and Central Hardwoods regions dps were down compared to last year, whereas dps were similar to last year in the Southeast. However, in the Northwest, dps were unexpectedly higher this year after an unexplained low year, although only 6 of 8 routes were surveyed this year.

The ruffed grouse population in Minnesota cycles on average every 10 years, but peaks in the cycle vary from 8 to 11 years apart (Figure 2). Declining statewide dps after multiple years of increases indicate that the cycle may have peaked in 2024, which is a little earlier than expected. The last 2 peaks occurred during 2009 (2.1 dps) and 2017 (2.1 dps), with lows occurring during 2005 (0.8 dps) and 2013 (0.9 dps).

The ruffed grouse population survey assumes that the only variable changing among years is the number of ruffed grouse. However, several variables have changed in recent years. We hired many new staff to fill positions vacated by retirements, and these new hires may differ in hearing ability from the recently retired staff. We also had numerous extreme weather events including prolonged summer drought in 2021, spring flooding in 2022, good snow roosting conditions in 2021–2022 and 2022–2023, and warmer than average winter conditions in 2023–2024 that may have influenced production and overwinter survival. The summer of 2024 was wet throughout much of the ruffed grouse range, and winter 2024–2025 had less snow than usual throughout much of the survey area. Warm temperatures and summer drought conditions may produce strong production of young birds (Bump et al. 1947, Dorney and Kabat 1960), whereas wet conditions have the opposite effect. Winter conditions favorable for snow roosting in much of the core of ruffed grouse range may improve overwinter survival (Thompson and Fritzell 1988) but require adequate snowfall.

ACKNOWLEDGEMENTS

The ruffed grouse survey was accomplished this year through the combined efforts of staff and volunteers at the 1854 Treaty Authority; Blandin Paper; Beltrami County Land Department; Camp Ripley; Chippewa National Forest (NF); Fond du Lac, Leech Lake, Red Lake, and White Earth Reservations; Superior NF; Tamarac National Wildlife Refuge; and DNR staff at Aitkin, Baudette, Bemidji, Brainerd, Cloquet, Detroit Lakes, Erskine, Fergus Falls, Grand Rapids, Karlstad, Little Falls, Mille Lacs WMA, Park Rapids, Red Lake WMA, Rochester, Roseau River WMA, Sauk Rapids, Thief Lake WMA, Thief River Falls, Tower, Two Harbors, Whitewater WMA, and Winona wildlife work areas and Itasca State Park. G. Drotts, J. Erb, and R. Horton organized entry of 1982–2004 survey data, with D. Mailhot and another volunteer prior to 2013.

J. Bates and N. Dotson entered 1979–1981 data in 2020; L. Spann entered 1972–1978 data in 2021; J. Hanrahan entered 1968–1971 data in 2022. L. Gilbert entered survey data this year. M. Larson reviewed this report. This work was funded in part by the Federal Aid in Wildlife Restoration Act.

Literature cited

Bump, G., R. W. Darrow, F. C. Edminster, W. F. Crissey. 1947. The ruffed grouse—life history, propagation, management. New York State Cons. Dept. Albany 915 pp.

Dorney, R. S., C. Kabat. 1960. Relation of weather, parasitic disease and hunting to Wisconsin ruffed grouse populations. Wisconsin Cons. Dept. Technical Bulletin 20.

Thompson, F. R., and E. K. Fritzell. 1988. Ruffed grouse winter roost site preference and influence on energy demands. Journal of Wildlife Management 52:454-460.

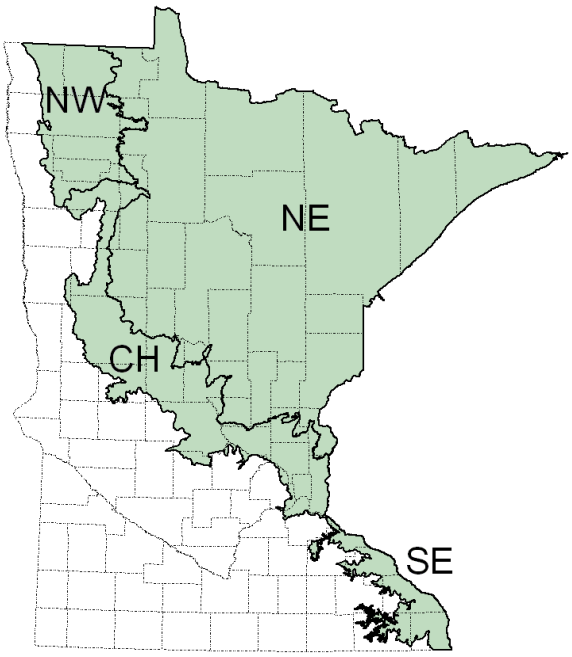


Figure 1. Survey regions for ruffed grouse in Minnesota. Northwest (NW), Northeast (NE), Central Hardwoods (CH), and Southeast (SE) survey regions are depicted relative to county boundaries (dashed lines) and influenced by the Ecological Classification System.

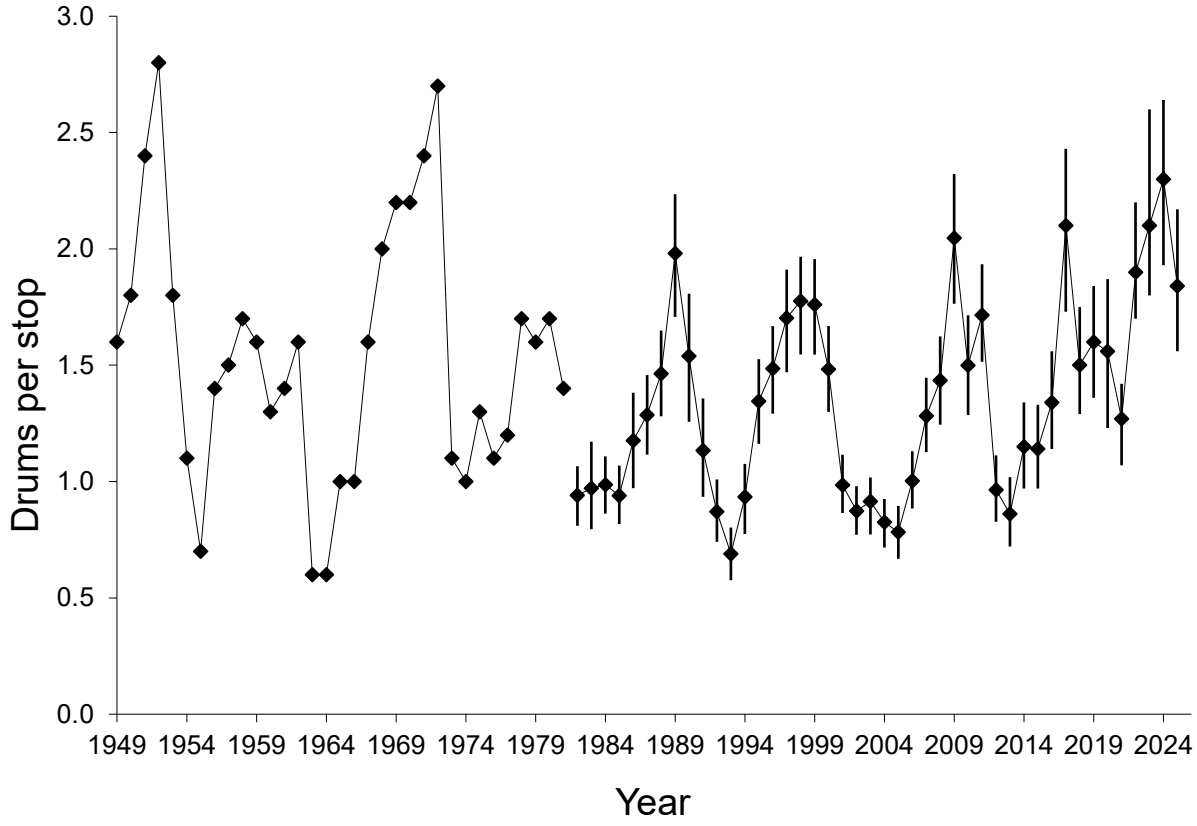
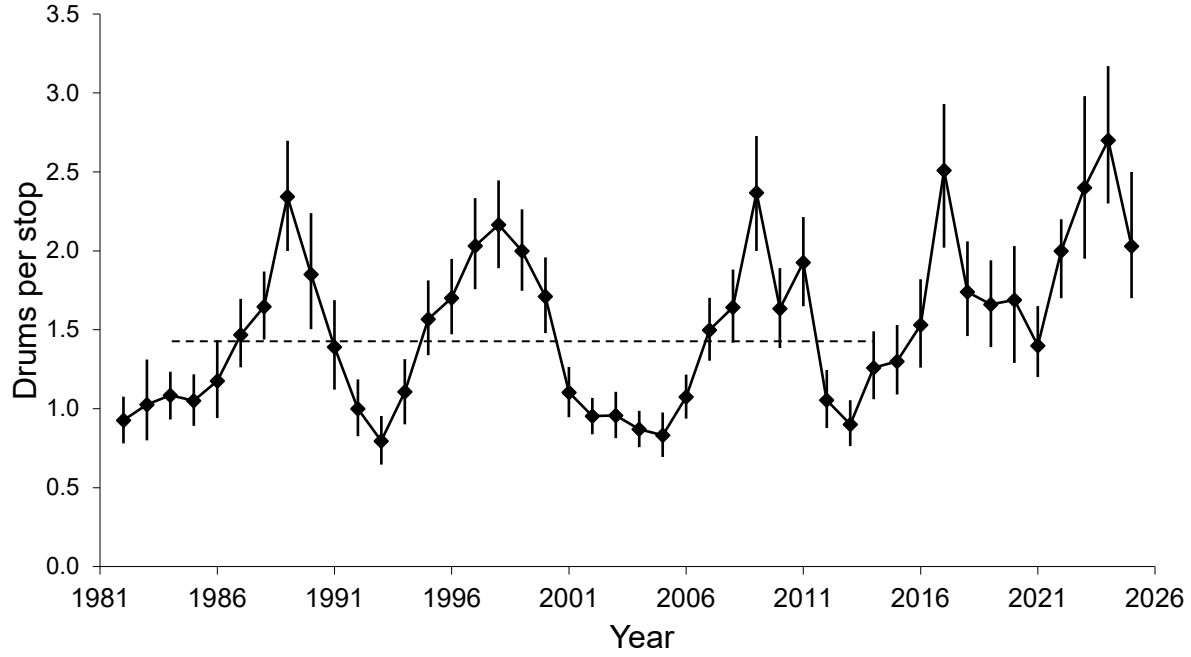
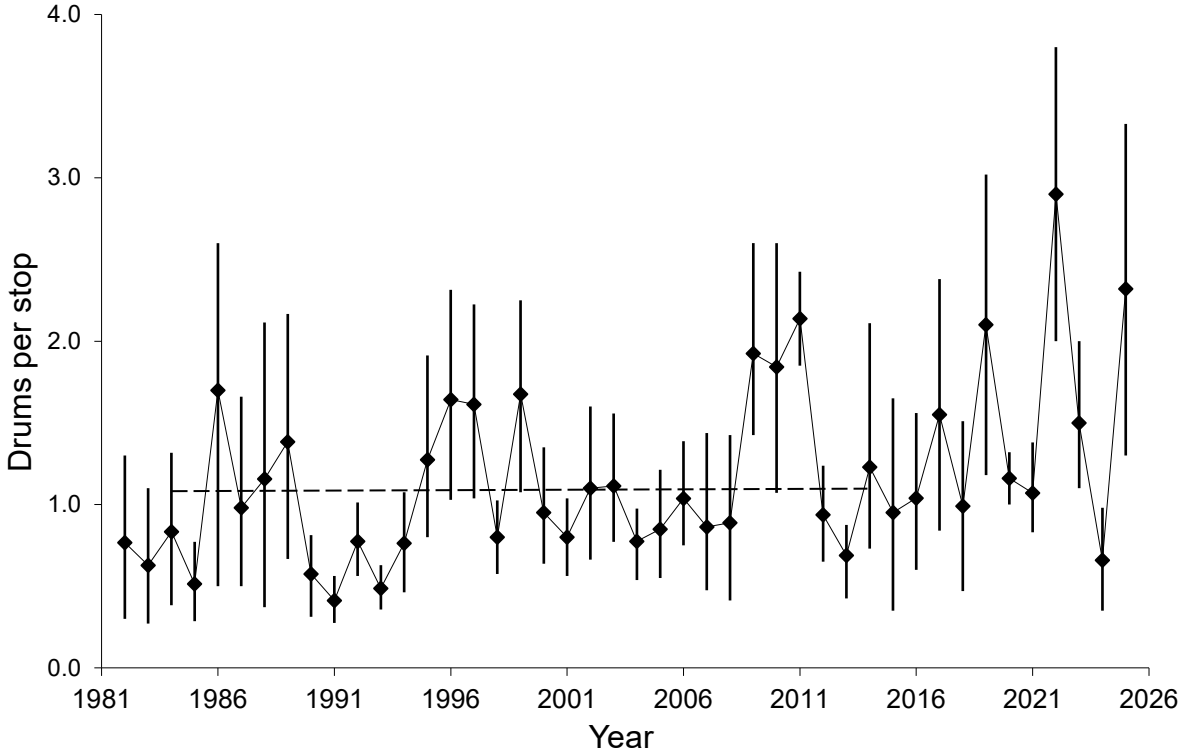


Figure 2. Statewide ruffed grouse population index values in Minnesota. Bootstrap (95%) confidence intervals (CIs) are provided after 1981, but different analytical methods were used prior to this and thus CIs are not available for earlier years. The difference between 1981 and 1982 is biological and not an artifact of the change in analysis methods.

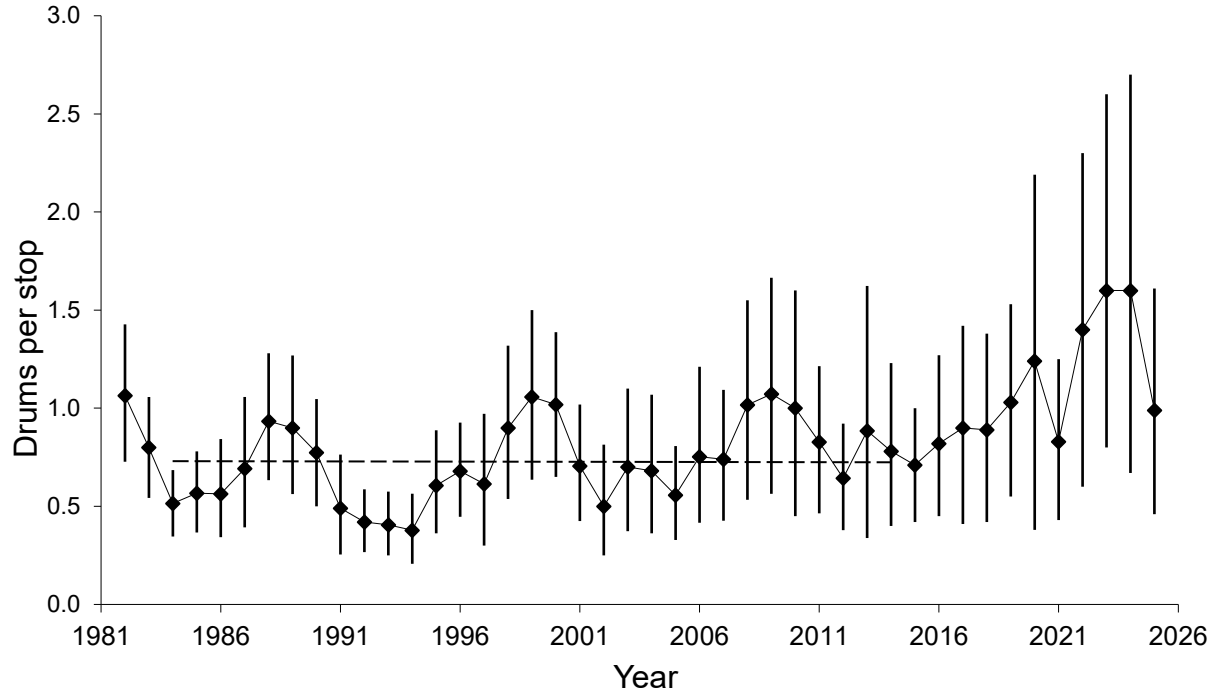
a.


3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Drums per stop
1981
1986
1991
1996
2001
2006
2011
2016
2021
2026
Year

b.


4.0
3.0
2.0
1.0
0.0
Drums per stop
1981
1986
1991
1996
2001
2006
2011
2016
2021
2026
Year

c.



d.

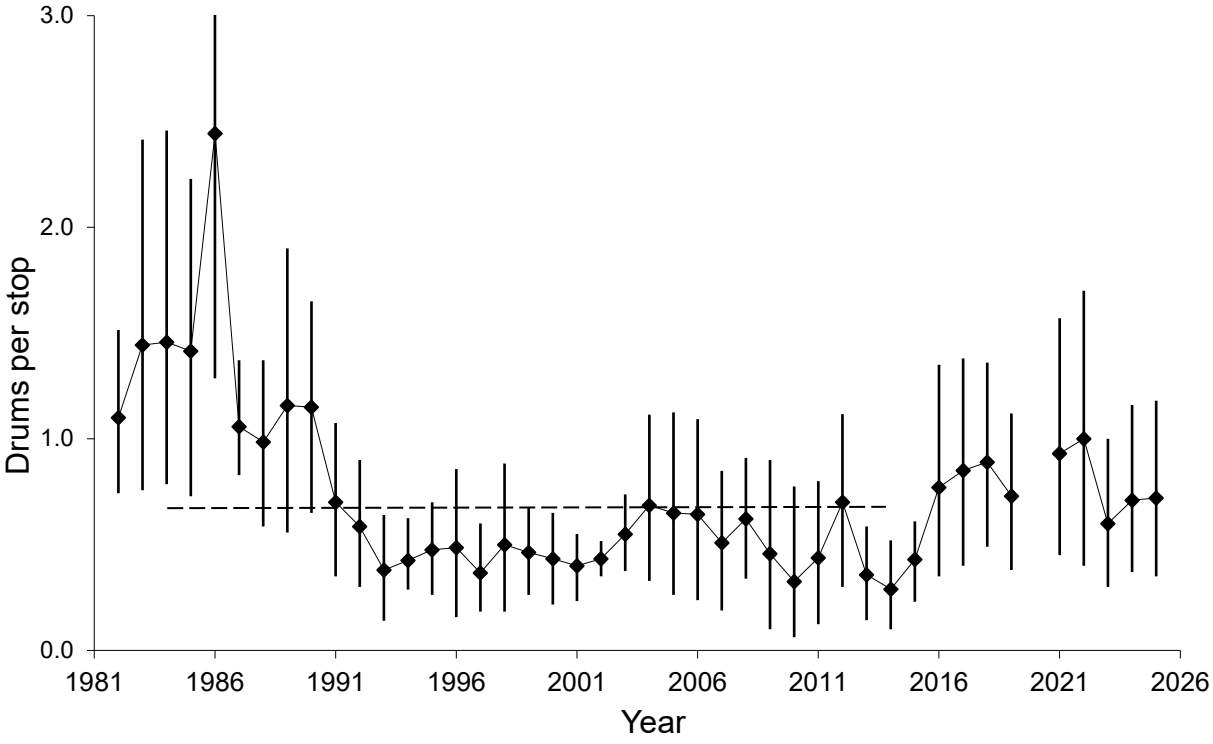


Figure 3a,b,c,d. Ruffed grouse population index values in the **Northeast** (a), **Northwest** (b), **Central Hardwoods** (c), and **Southeast** (d) survey regions of Minnesota. The mean for 1984-2014 is indicated by the dashed line. Bootstrap (95%) confidence intervals are provided for each mean. In the bottom panel, the CI for 1986 extends beyond area depicted in the figure. Data were not collected during the survey window in the Southeast during the COVID-19 pandemic in 2020.