# Iowa Bow Hunter Observation Survey: 2022 summary

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**ABSTRACT** Each year, the Iowa Department of Natural Resources (DNR) solicits responses from bow hunters as part of the Bow Hunter Observation Survey conducted from 1 October to early December. We randomly select ~9,000 individual bow hunters who purchase an archery hunting license in each of the preceding three years for participation. Each participant receives a diary for recording the number of hours hunted during each hunting trip, as well as the number of deer, wild turkey, and select furbearer species seen during each trip. To standardize observations, we estimate the mean number of animals seen per 1,000 hours hunted statewide and by survey region for 12 species. In 2022, we collected responses from 1,813 bow hunters (20% response rate) totaling 22,930 hunting trips and 76,433 hours of total observation time (mean = 3.31, 95% CI = 3.14, 3.48). Total deer observations increased in every region except north-central and southwest Iowa between 2021 and 2022. Between 2021 and 2022, wild turkey observations increased in 5 regions mostly in eastern Iowa but decreased in the western Iowa regions. The 10-year trends for bobcat, river otter, raccoon, and opossum are mostly increasing statewide and are mostly stable statewide for coyote and red fox. Data from this survey are extremely valuable in monitoring population trends for harvested species such as white-tailed deer and raccoon and serve as the only index for monitoring population trends for uncommon species such as gray fox.

## INTRODUCTION

Reliable long-term wildlife population trends are critical for making informed decisions on management of harvested species such as white-tailed deer (*Odocoileus virginianus*) and bobcat (*Lynx rufus*) and for monitoring the population status of rare or secretive species such as gray fox (*Urocyon cinereoargenteus*). Data to generate such indices, however, can be logistically challenging to collect at a statewide scale. Hunter observation surveys have been implemented by several natural resource agencies throughout the U.S. as a means for collecting data to successfully monitor population trends for a variety of species, including white-tailed deer (Winchcombe and Ostfeld 2001, Haskell 2011), moose (*Alces alces*; Ericsson and Wallin 1999, Crum et al. 2017), and gray wolf (*Canis lupus*; Rich et al. 2013). These community-science surveys provide a wealth of information at broad spatial scales for a small cost relative to other standardized surveys using paid staff. Therefore, hunter observation surveys are an extremely cost-effective approach for obtaining quality data to guide management decisions for both harvested species and species of conservation concern.

In 2004, the Iowa Department of Natural Resources (DNR) implemented the annual Iowa Bow Hunter Observation Survey. Designed in cooperation with Iowa State University, the survey had two primary objectives: 1) to collect observations of white-tailed deer to serve as an independent supplement to other deer indices used by the DNR, and 2) to develop a database of long-term observations for other select species to monitor trends in relative abundance. Since the development of the Iowa survey, several other Midwest states have implemented similar surveys, including Illinois (Bluett 2013), Indiana, Missouri, Minnesota (Norton et al. 2017), Ohio (Ohio DNR 2015), and Wisconsin (Rees Lohr 2017). Bow hunters are ideal for collecting wildlife observational data because they typically employ stationary hunting methods (e.g., camouflage, scent masks, etc.) from a ground blind or tree stand which is conducive to observing wildlife in an undisturbed state and because they have access to privately-owned lands that may not be accessible by agency staff, therefore increasing the coverage area of the survey. Furthermore, the archery season in Iowa (October 1 to early December and mid-December to January 10) is longer than any other deer hunting season and, as a result, bow hunters often spend more time in the field than other types of hunters. This allows for collection of repeated observations that can be used for a variety of purposes related to monitoring both short- and long-term wildlife population trends.

The purpose of this report is to summarize results from the 2022 survey and relative abundance trends of surveyed species for the past 10 years.

## STUDY AREA

The Iowa Bow Hunter Observation Survey was conducted statewide and administered to participants in each of nine regions in Iowa (Figure 1).
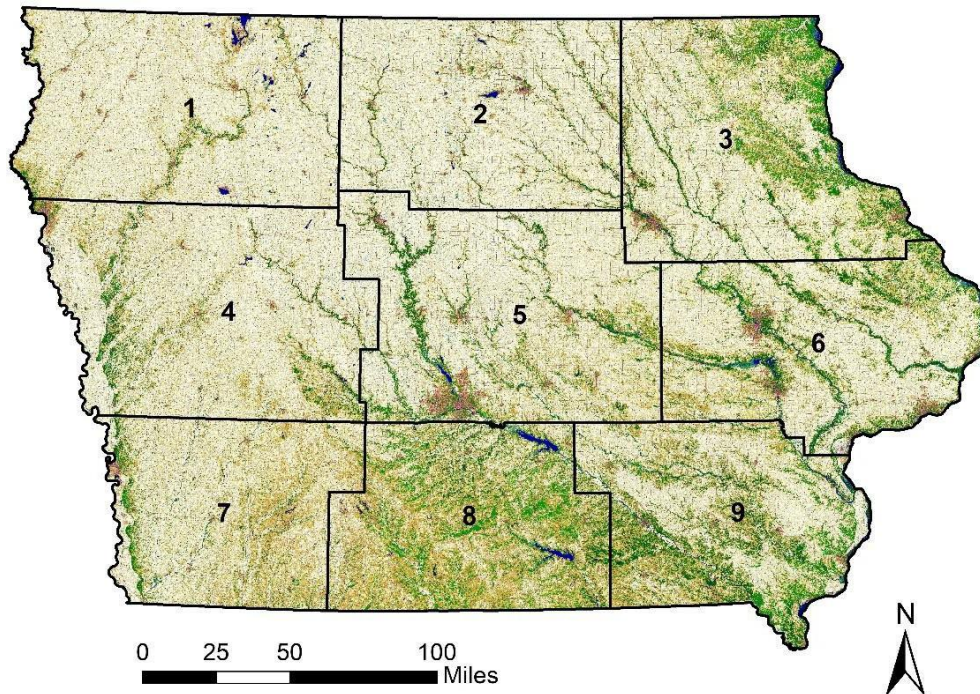


**Figure 1. Survey regions in Iowa used for distributing the Iowa Bow Hunter Observation Survey, 2022.**

## METHODS

We selected survey participants using a two-stage, stratified random sampling design (Figure 2). The first stage of the sampling process involved selecting a list of bow hunters that 1) indicated interest in participating on a pre-survey sent to all avid Iowa bow hunters in 2019 (i.e., individuals who purchased an archery hunting license in Iowa for each of the past three years) or 2) responded to the survey in one of the last two years ("core" sample; Figure 2). The core sample is refreshed every three years to maintain a consistent response rate and was refreshed prior to the 2019 survey. For the second sampling stage, we selected individuals from a list of bow hunters who were not on either of the aforementioned lists as a "supplemental" sample (Figure 2). We selected a total of 999 individuals from the combined core and supplemental samples for each of the nine regions in Iowa (Figure 1) which resulted in approximately 91 survey participants selected for each of Iowa's 99 counties. Our final statewide sample size was 8,988, which is approximately 15% of the population of all archery hunters in recent years ($N$ = ~60,000 individual hunters annually).
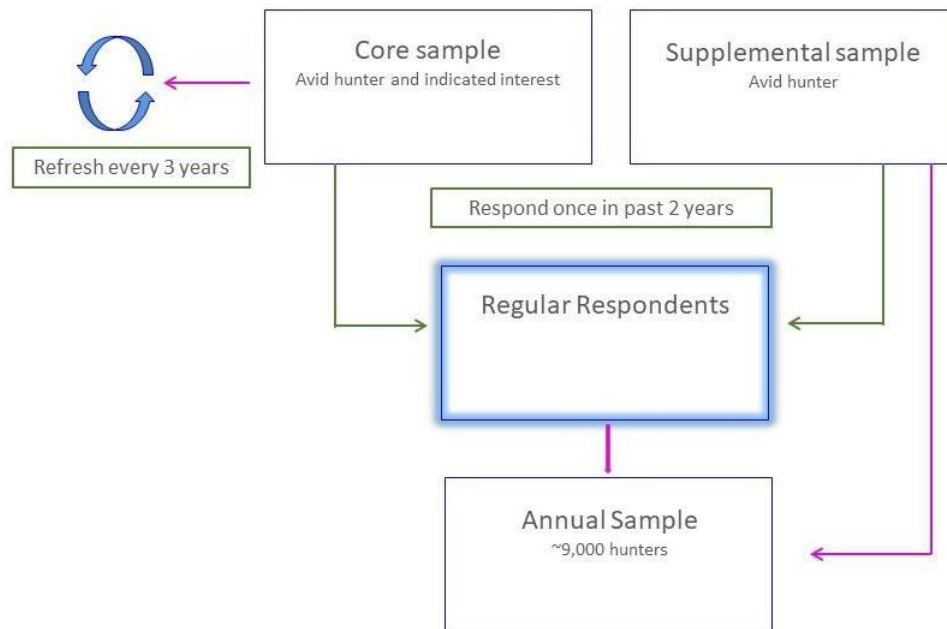
**Figure 2. Sampling process schematic for Iowa Bow Hunter Observation Survey, 2022.**

The survey consisted of a two-page diary in which hunters were asked to record the four counties in which they most frequently hunted, and subsequently the date, county (one of the four already listed above), number of hours spent hunting, and the number of individuals of 12 different species observed during each hunting trip (see Appendix for species surveyed). For white-tailed deer, hunters were asked to record the number of antlered (i.e., buck) and antlerless (i.e., doe or fawn) deer observed during each hunting trip, as well as the number of deer in which sex could not be determined (i.e., unknown). We mailed surveys, along with a cover letter explaining the purpose of the survey, to hunters prior to the start of the Iowa archery season on October 1 each year. We did not mail reminder postcards to hunters in 2022 due to unforeseen constraints. Hunters were asked to return their survey by December 3 or when they were finished hunting, whichever came first.

We standardized observations for each species by 1,000 hours hunted to account for differences in the number of hunting trips taken and number of hours per hunting trip by region of the state. We reported the mean observations per 1,000 hours hunted and 95% confidence intervals (CI) for each species and summarized 10-year trends for each species.

## RESULTS
A total of 125 surveys were returned as undeliverable in 2022 resulting in a realized sample of 8,863 hunters. We obtained responses from 1,813 bow hunters statewide for a response rate of 20%. Statewide, participants spent a total of 76,433 hours hunting on 22,930 trips for an average of 3.31 (95% CI = 3.14, 3.48) hours per trip. Participants reported a median of 11 trips during the hunting season. The number of trips and hours hunted varied by region and ranged from 1,556 trips (5,043 total hours) in northwest Iowa (Region 1) to 3,665 trips (12,042 total hours) in southeast Iowa (Region 9; Appendix).

White-tailed deer was the most frequently observed species with an average of 1,827 (95% CI = 1,634, 2,020) observed per 1,000 hours hunted across all regions, which included an average of 515 (95% CI = 456, 574) antlered deer and 1,195 (95% CI = 1,055, 1,335) antlerless deer observed per 1,000 hours hunted. Total deer observed per 1,000 hours hunted ranged from a low of 1,536 (95% CI = 1,396, 1,676) in east-central Iowa (Region 6) to a high of 2,063 (95% CI = 1,813, 2,315) in northwest Iowa (Region 1). The 10-year trend for total deer, antlered deer, and antlerless deer observations is increasing in all regions except southwest Iowa (Region 7; Appendix).

Wild turkey (*Meleagris gallopavo*) are the second-most frequently observed species on the survey with an average of 545 birds (95% CI = 406, 684) observed per 1,000 hours hunted across all regions in 2022. Wild turkey observations ranged from 283 birds (95% CI = 219, 347) per 1,000 hours hunted in southeast Iowa (Region 9) to 833 birds (95% CI =535, 1,131) per 1,000 hours hunted in northwest Iowa (Region 1). Between 2021 and 2022, wild turkey observations

increased in six of nine regions. However, the regional 10-year trends show long-term decreases in wild turkey observations in seven of nine regions, mostly in southern and eastern Iowa (Appendix).

Bobcat (*Lynx rufus*) observations stabilized in south-central Iowa but are increasing in all other regions according to the 10-year trends (Appendix). An average of 5 bobcats (95% CI = 2, 7) were observed per 1,000 hours hunted in 2022. Observations of badger (*Taxidea taxus*) increased substantially in north-central Iowa between 2021 and 2022 (Region 2; Appendix) and are increasing slowly in 6 additional regions (Appendix). River otter (*Lontra canadensis*) observations also increased substantially in north-central Iowa between 2021 and 2022 (Region 2; Appendix) and continue to steadily increase in northeast Iowa (Region 3; Appendix). The regional 10-year trends continue to show increasing otter observations in five of nine regions, mostly in northern and eastern Iowa (Appendix). The 10-year trend across all regions shows a statewide increase in observations of raccoon (*Procyon lotor*) and opossum (*Didelphis virgiana*; Appendix).

## DISCUSSION

Total white-tailed deer observations continue to increase in all regions except southwest Iowa (Region 7). These trends largely coincide with trends observed in the annual Spring Spotlight Survey (Kaminski et al. 2022). Lingering effects of a recent Epizootic Hemorrhagic Disease (EHD) outbreak in counties along the Missouri River could be a contributing factor to decreasing white-tailed deer observations in western Iowa observed in both this survey as well as the Spring Spotlight Survey.

Wild turkey observations are decreasing in all regions except northwest and west-central Iowa (Regions 1 and 4, respectively) according to 10-year trends. The strongest decreases are occurring across southern Iowa (Regions 7, 8, and 9), where preliminary results from an ongoing Iowa DNR study suggest extremely low nest success and fecundity rates. The statewide average poult-to-hen ratio increased to 2.6 between 2021 and 2022, a ratio needed to sustain wild turkey populations according to an earlier study in Wisconsin (Rolley et al. 1998). The 5-year average, however, remains below 2.6 suggesting wild turkey observations will continue to decrease.

Bobcat and river otter observations continue to increase across much of the state, a trend that coincides with reported harvest of these two species within their respective harvest zones. This survey continues to provide one of the only indices for monitoring population trends and informing harvest management of these two species.

Raccoon observations increased statewide between 2021 and 2022 and the 10-year trends also indicate a statewide increase. Kaminski et al. (2022) noted similar increasing trends in the annual Spring Spotlight Survey, likely the result of reduced furharvester effort and low pelt prices in recent years (Kaminski et al. 2022).

Opossum observations have been highly variable in recent years but the 10-year trends show strong increases statewide. After severe declines in opossum observations in 2021 likely due to harsh winter conditions (Kaminski et al. 2022), opossum observations increased significantly statewide in 2022.

Trends in observations of coyote, red fox, and gray fox are highly variable statewide, though 10-year trends remain mostly stable for each species statewide. Gray fox continue to be rare and likely declining in Iowa according to both survey and harvest data. More research is needed to determine the causative factors for the decline of this once-common species in Iowa.

## MANAGEMENT IMPLICATIONS

Effective management of wildlife populations must be based on sound science. This survey provides a consistent, long-term data set for monitoring trends and spatial distribution of Iowa wildlife populations.

## ACKNOWLEDGEMENTS

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**Appendix**: Summary of trips, hours hunted, hours per trip, and species observations per 1,000 hours hunted (95% confidence interval) by region from the Iowa Bow Hunter Observation Survey, 2022.
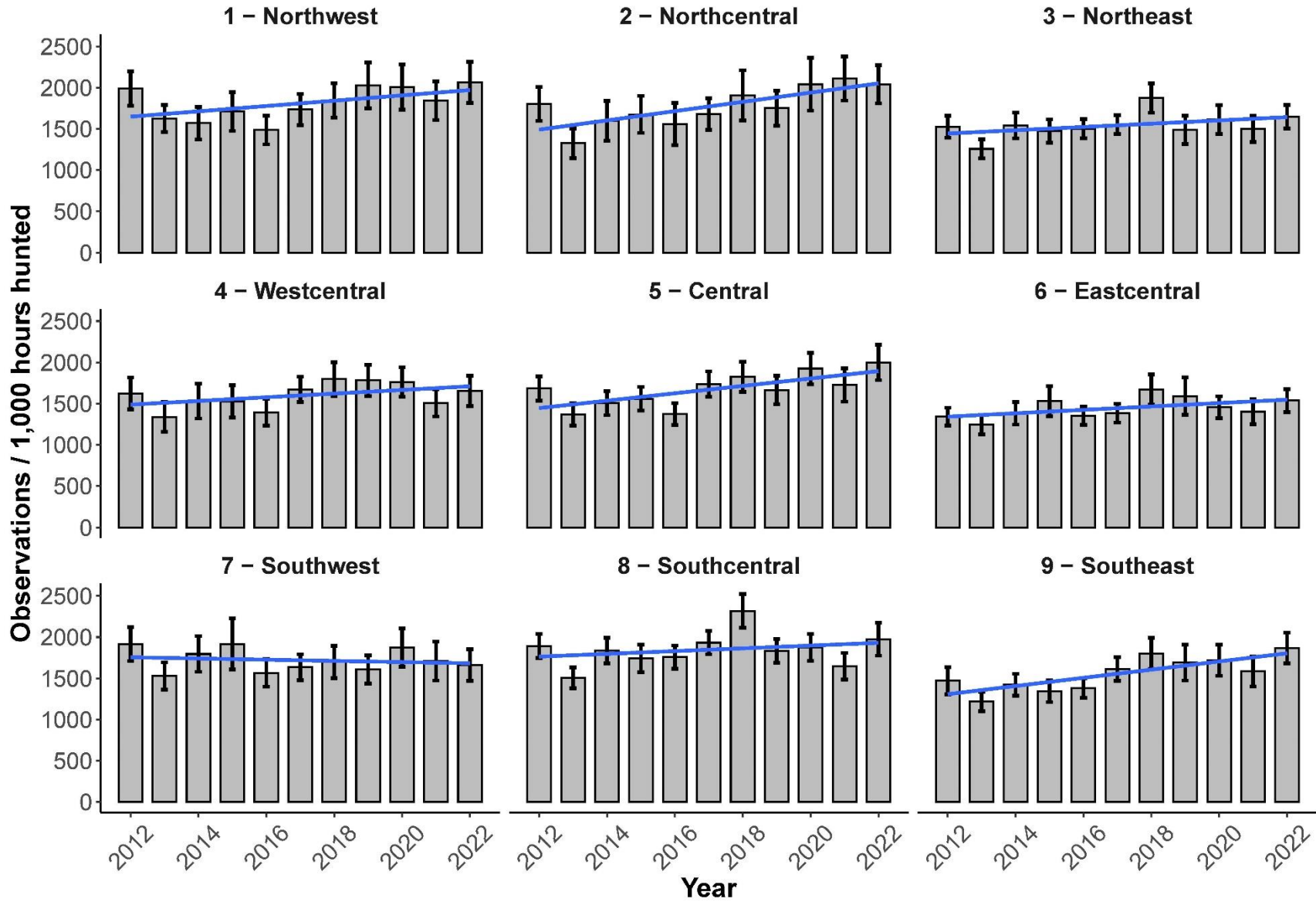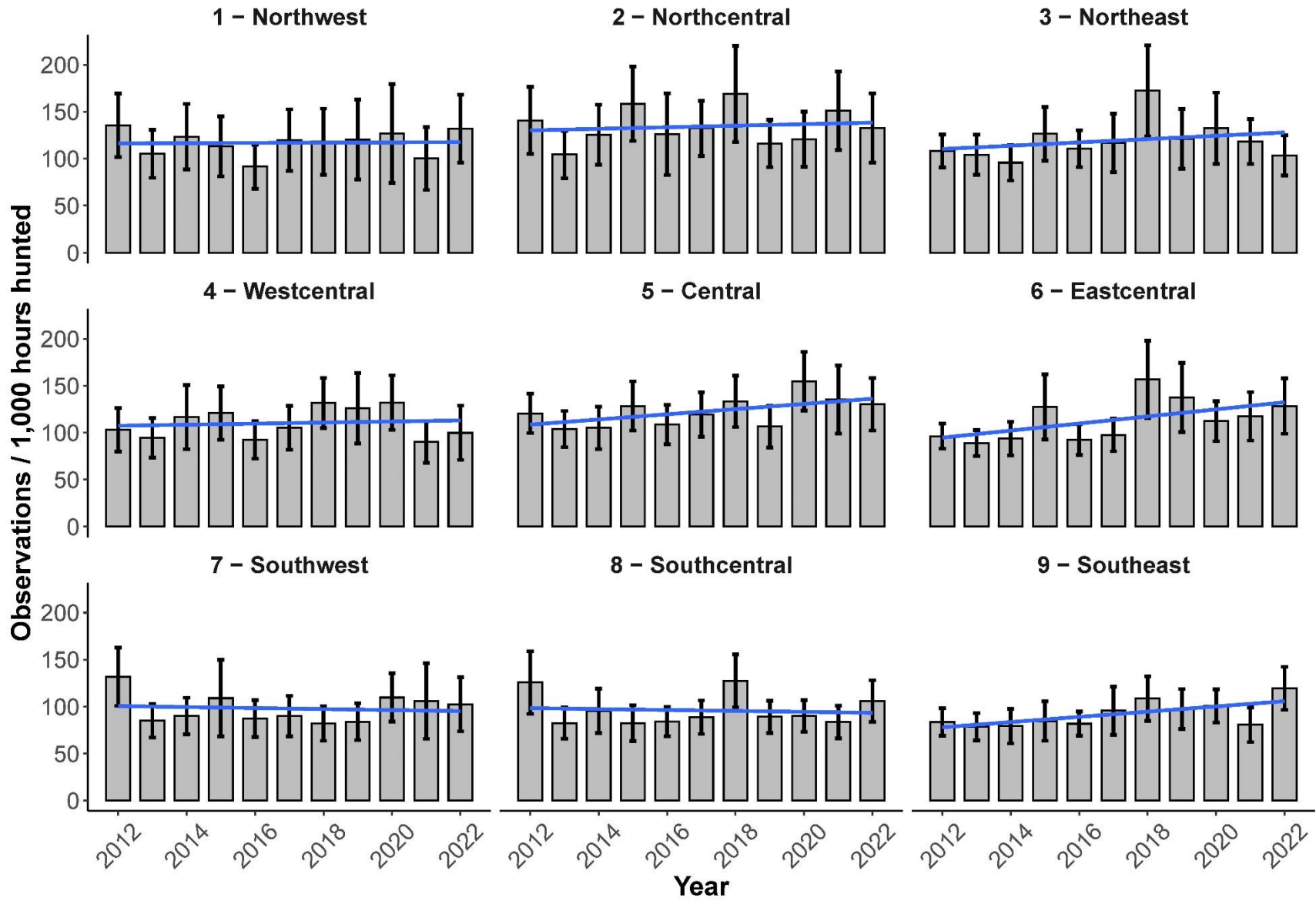
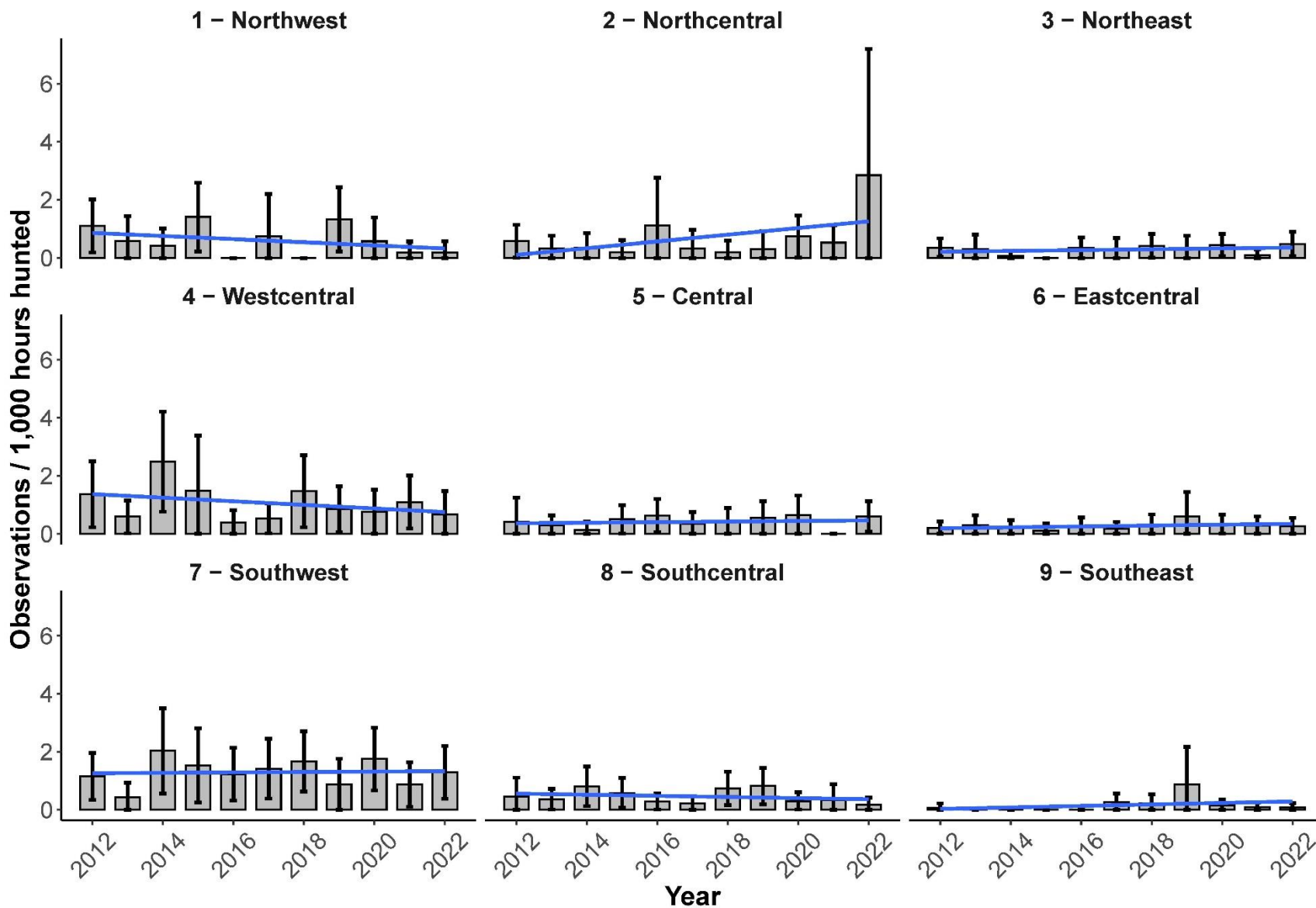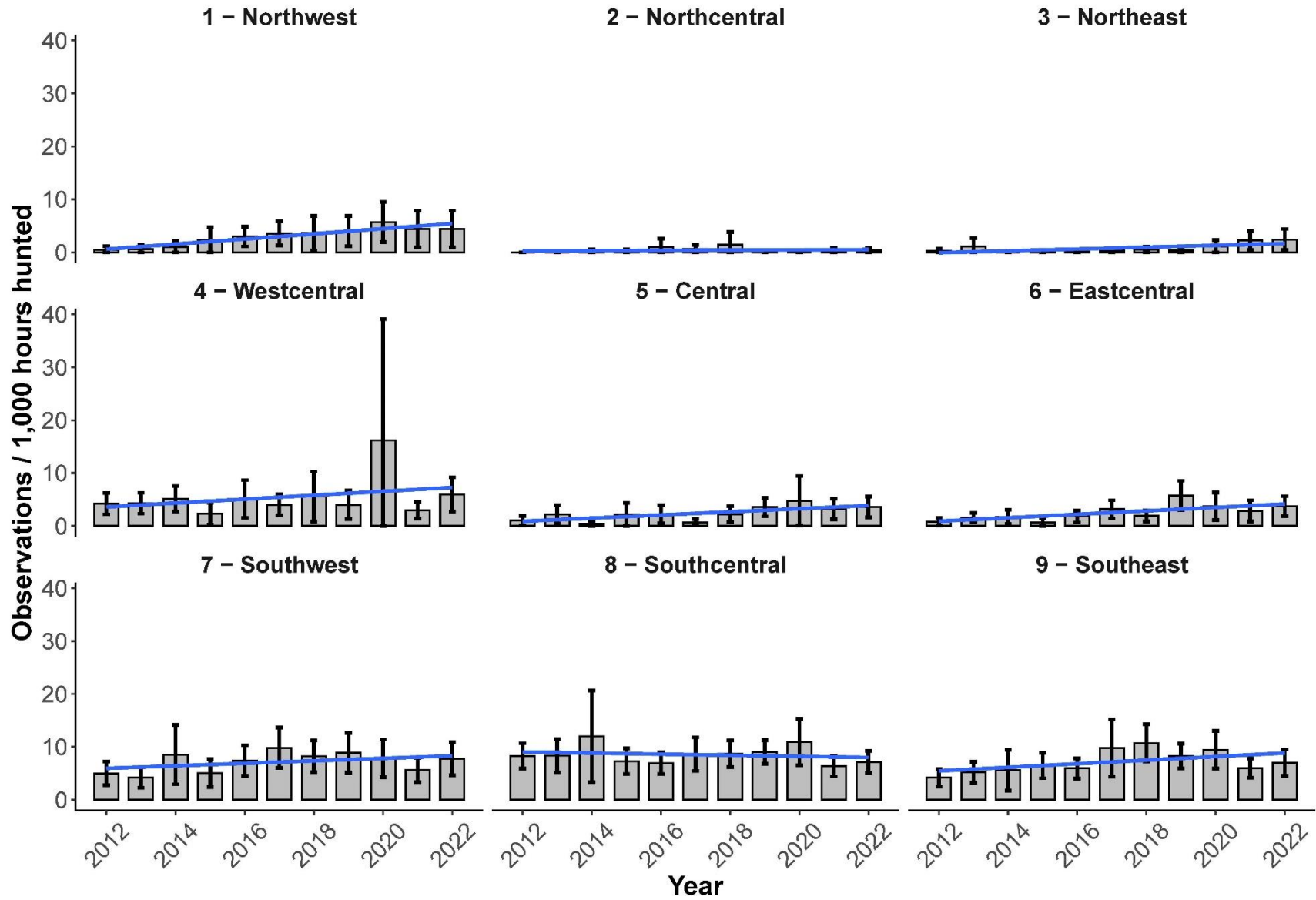# Antlered Deer

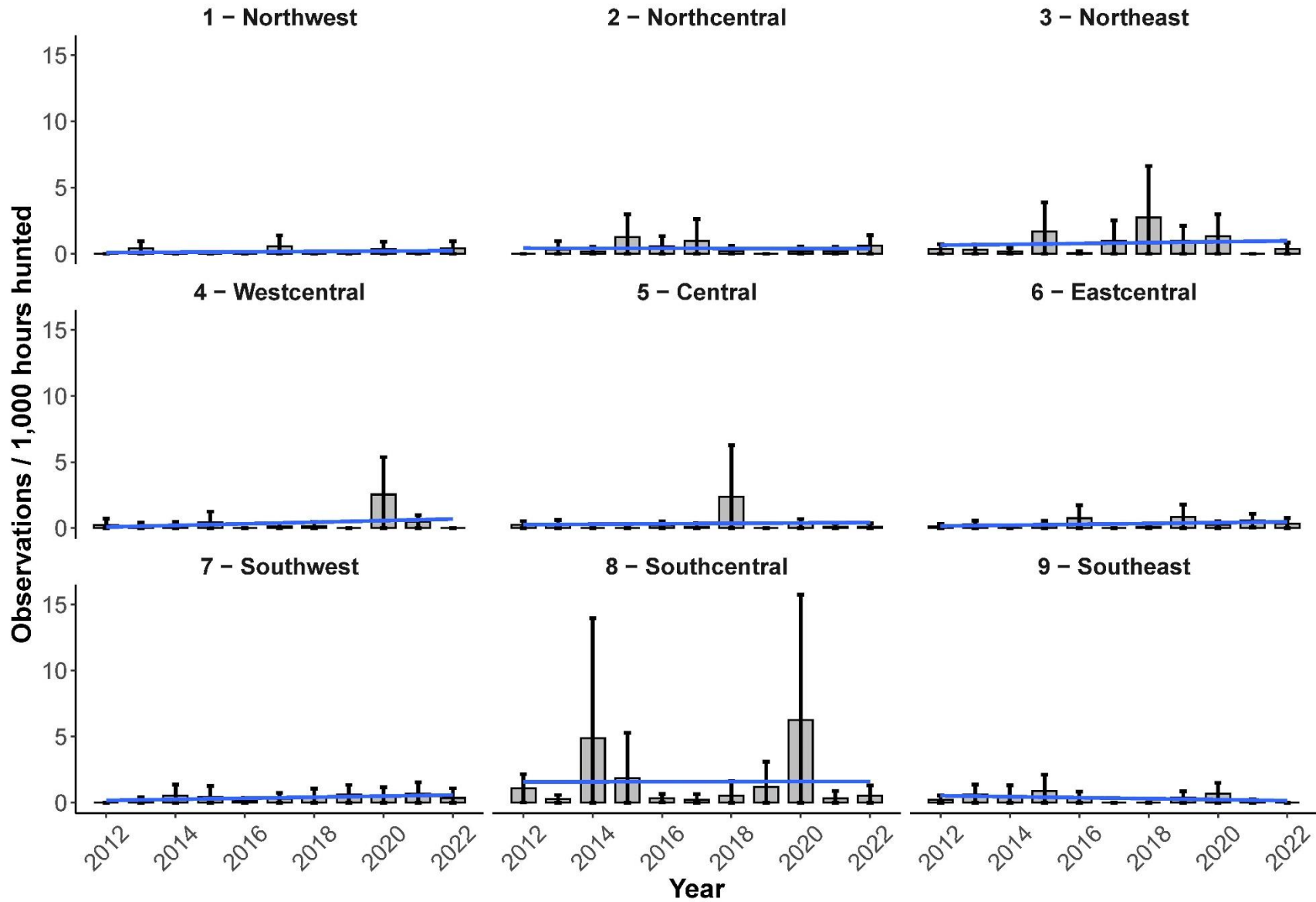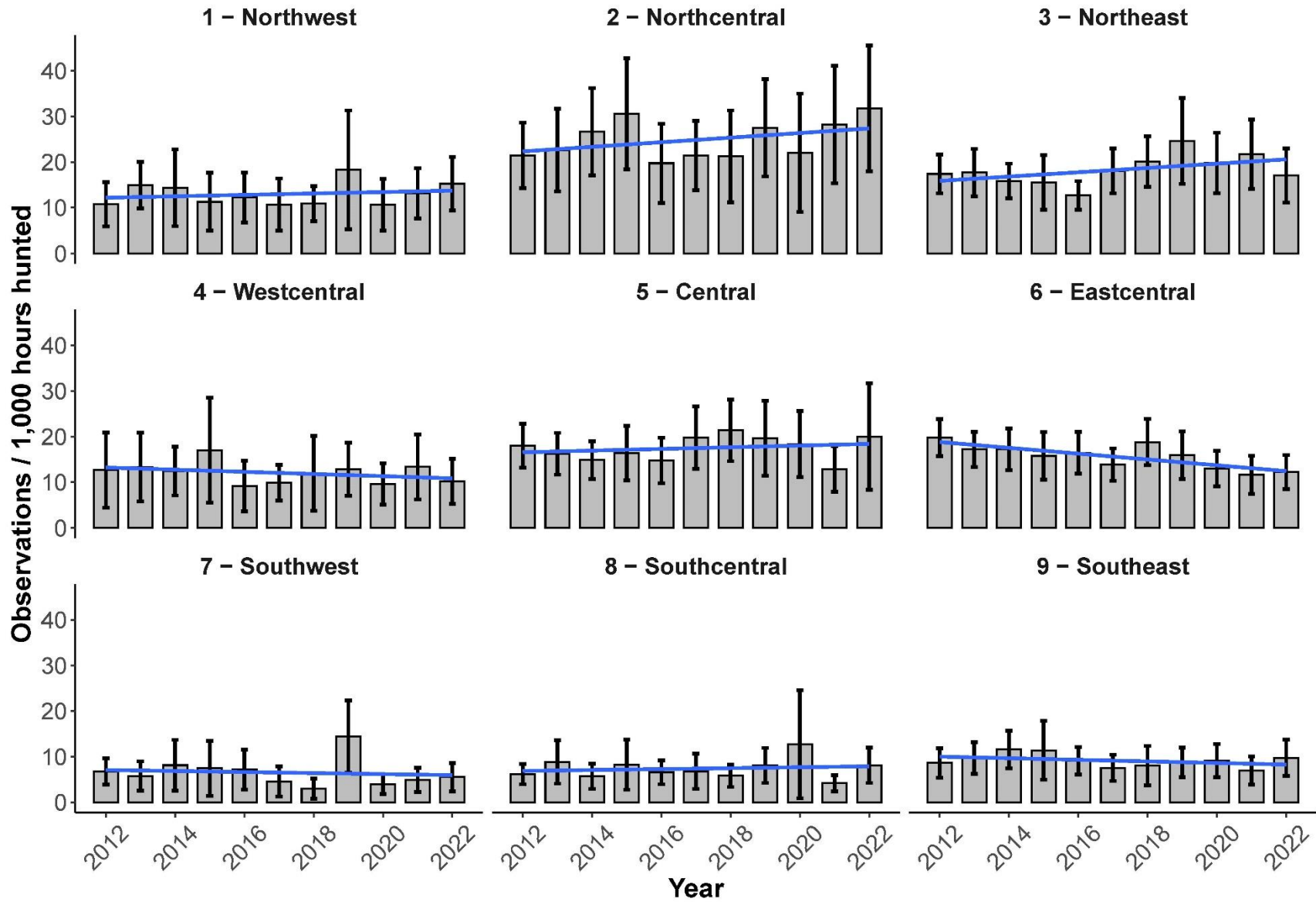Observations / 1,000 hours hunted vs. Year
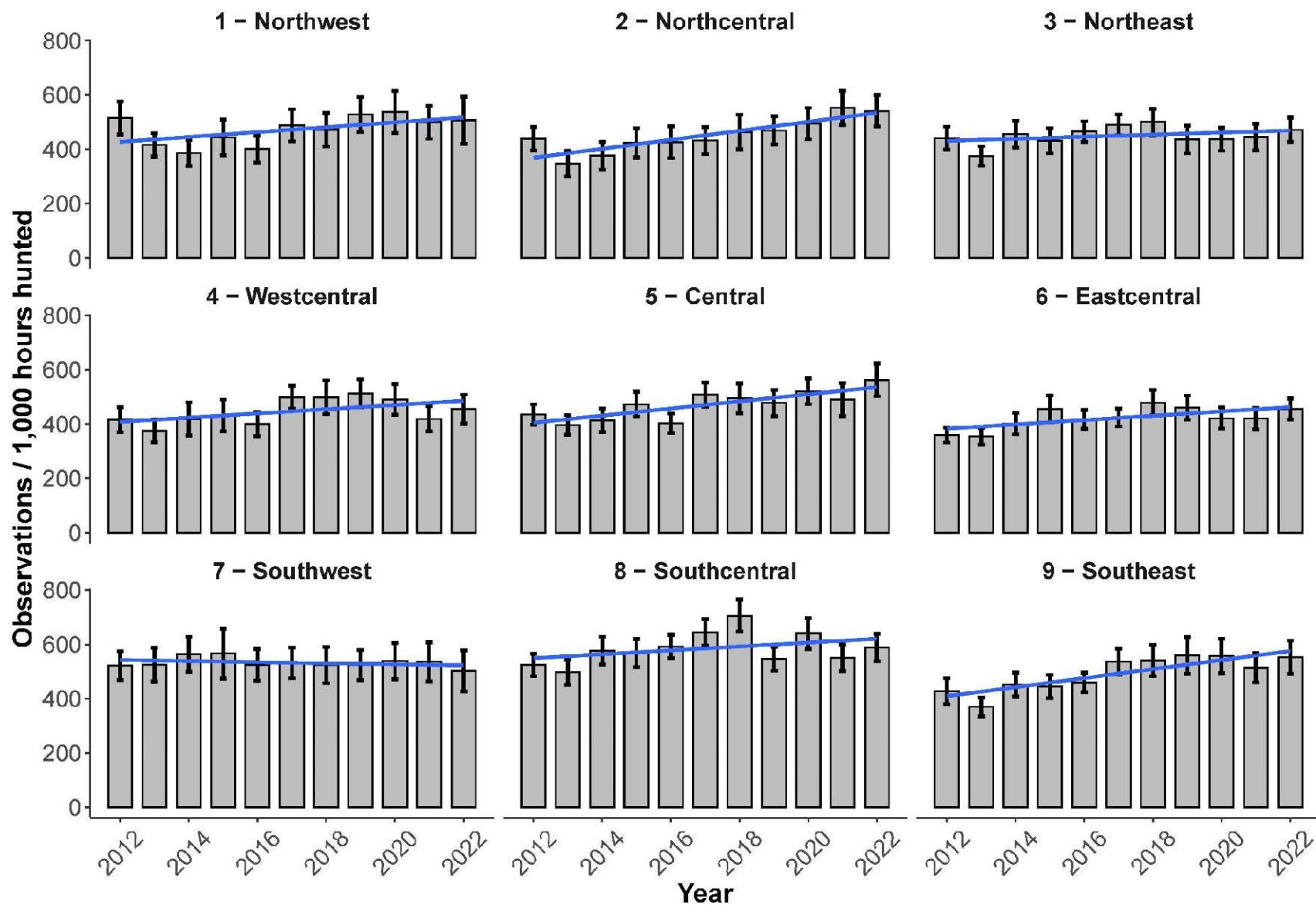
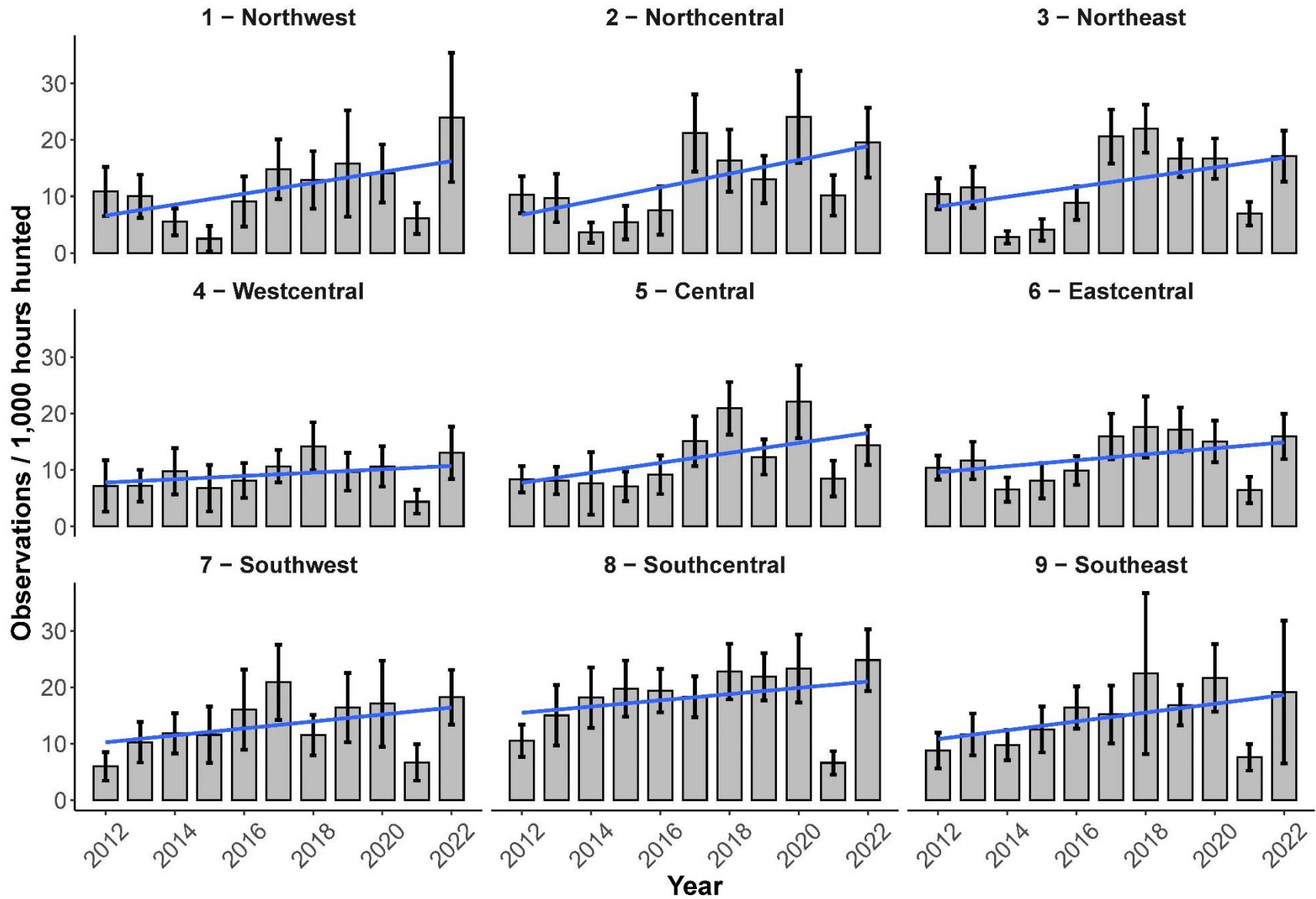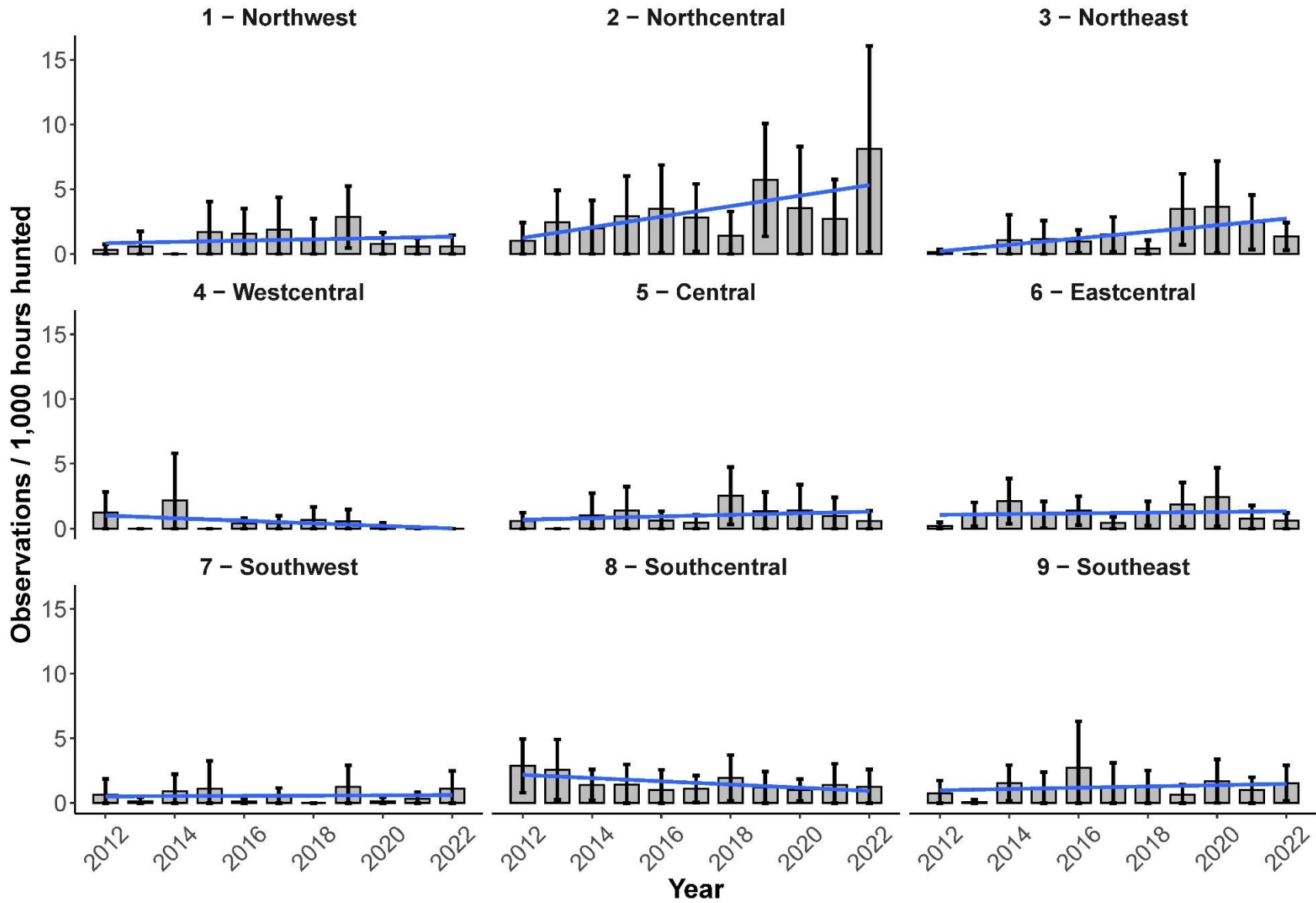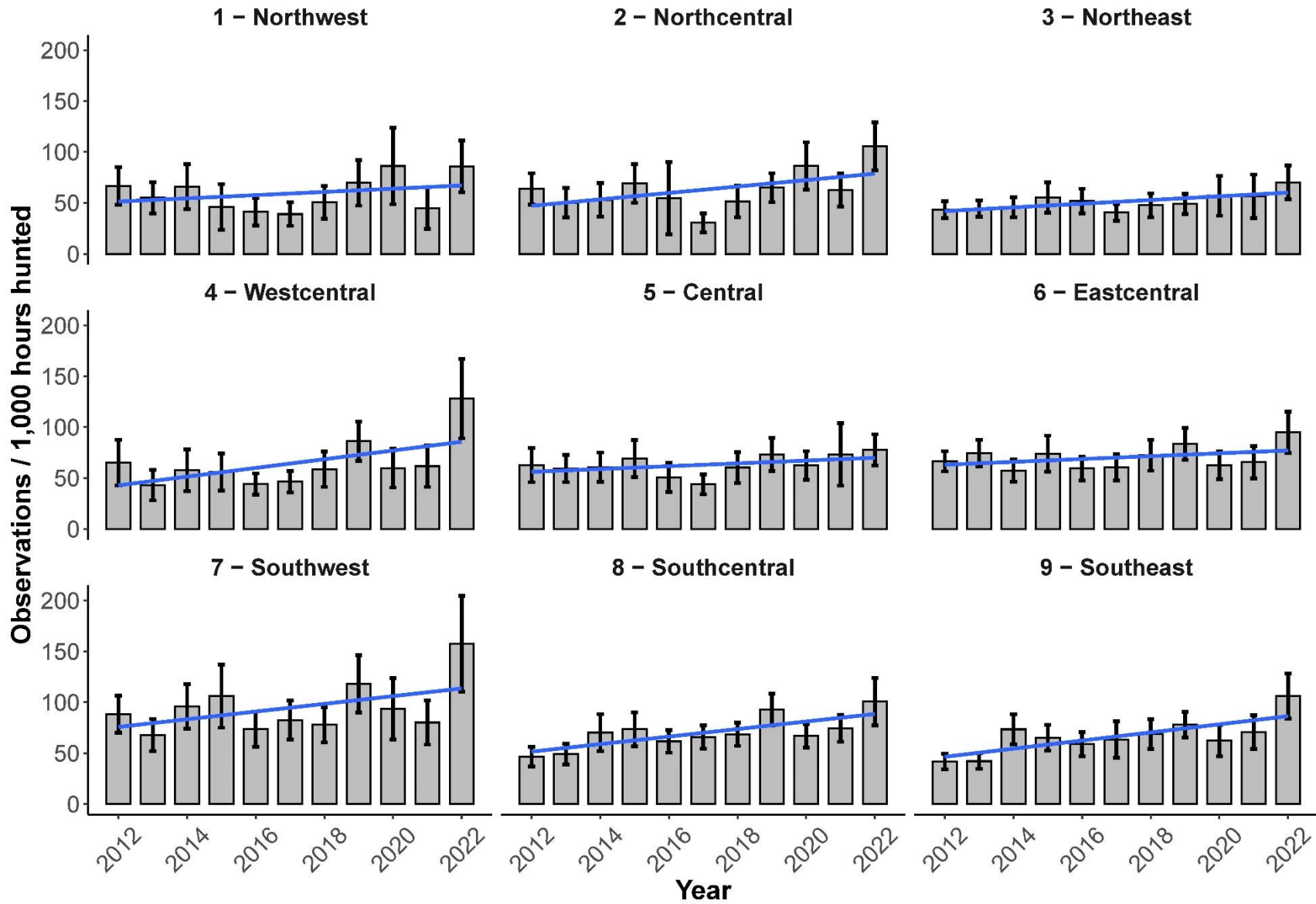**Antlerless Deer**
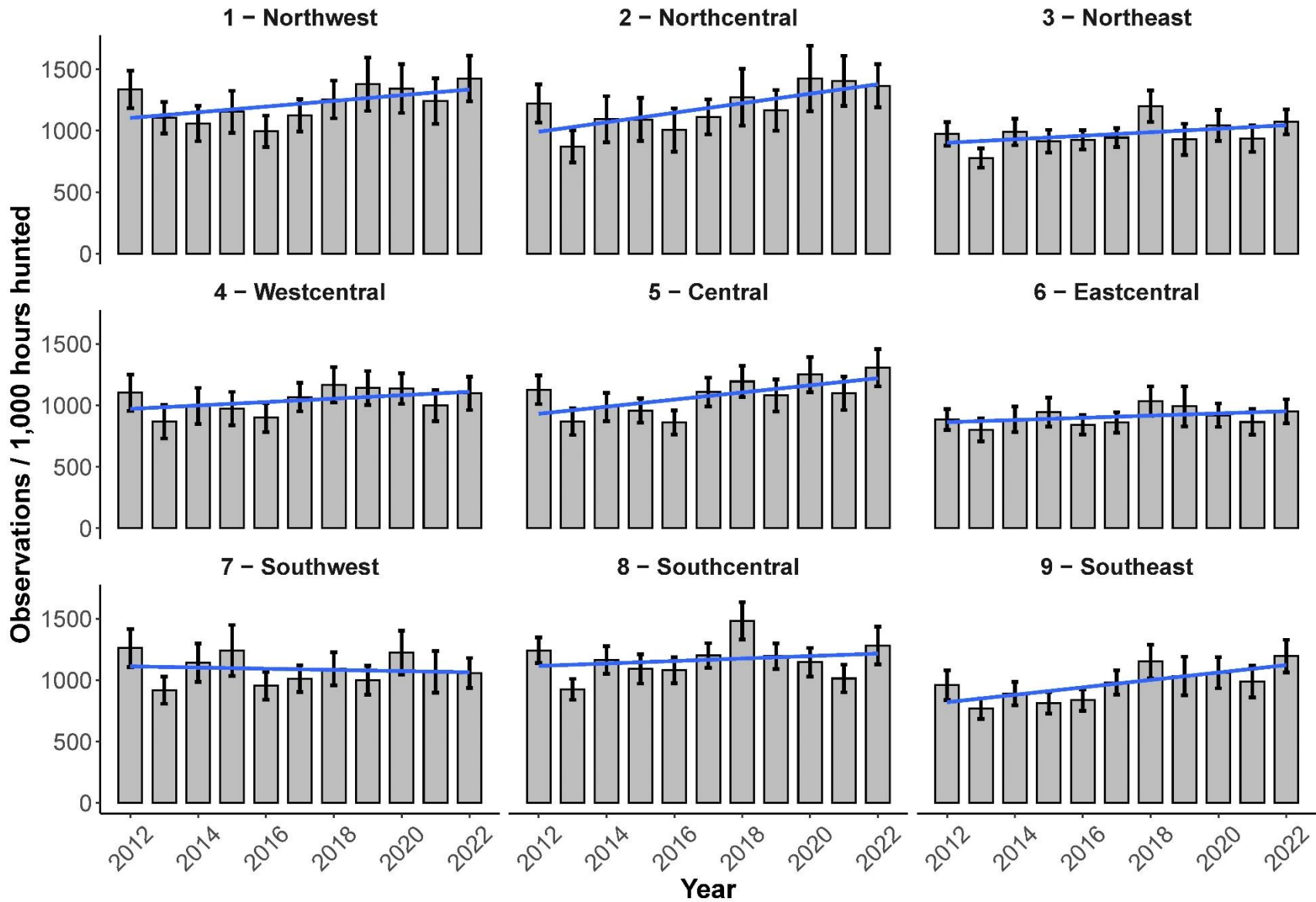
Total Deer

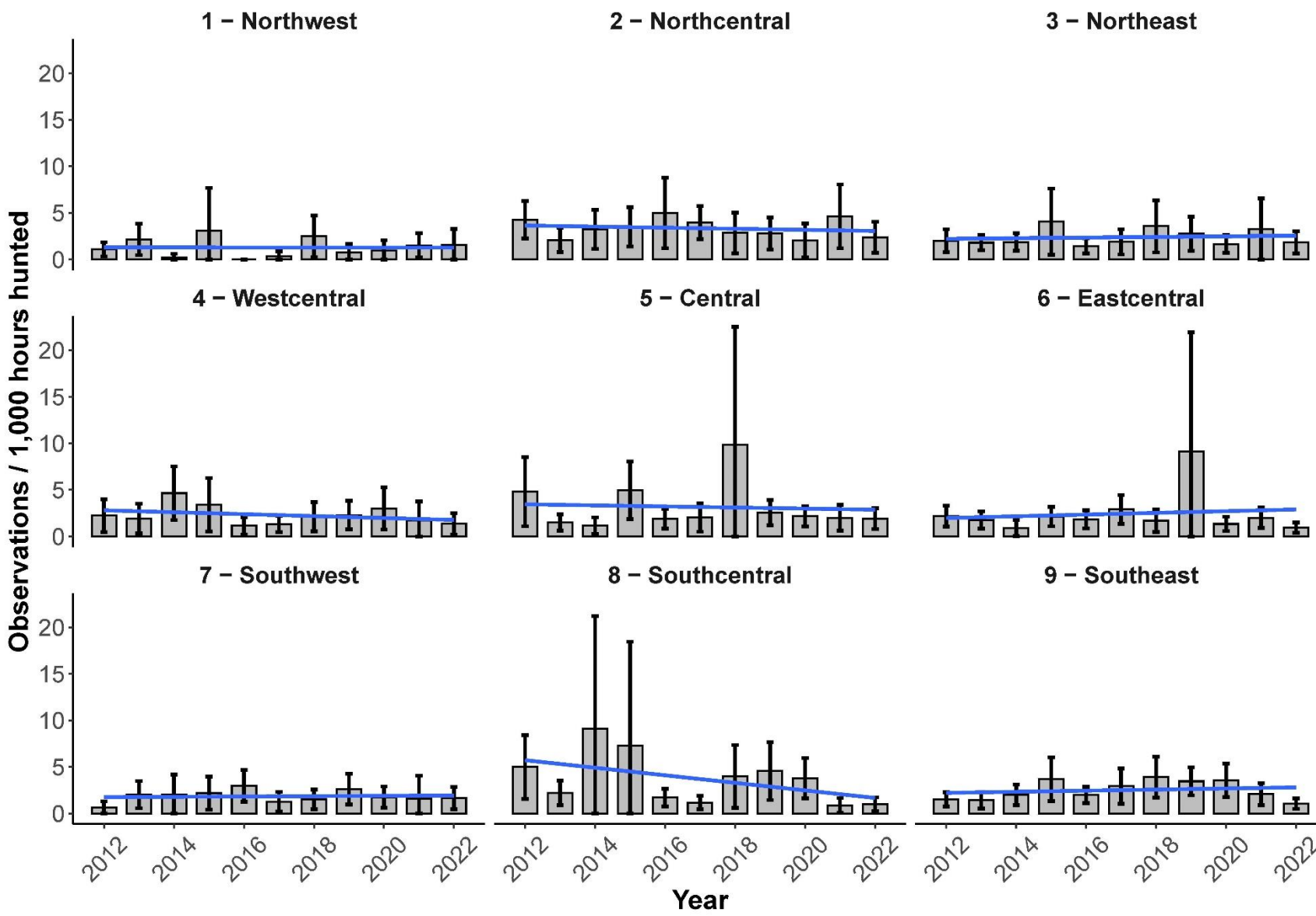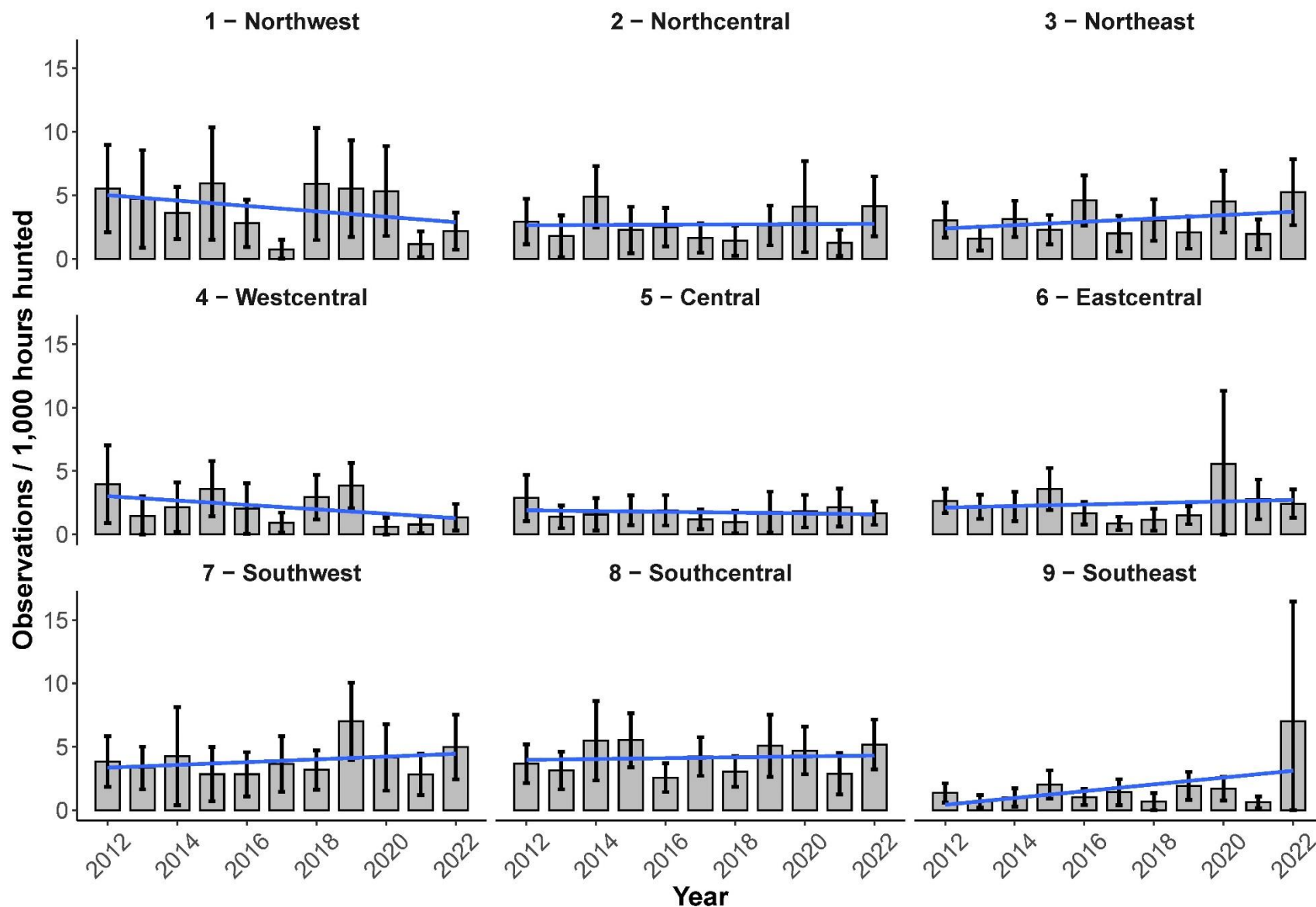Unknown Deer

Badger

# Bobcat

# Coyote
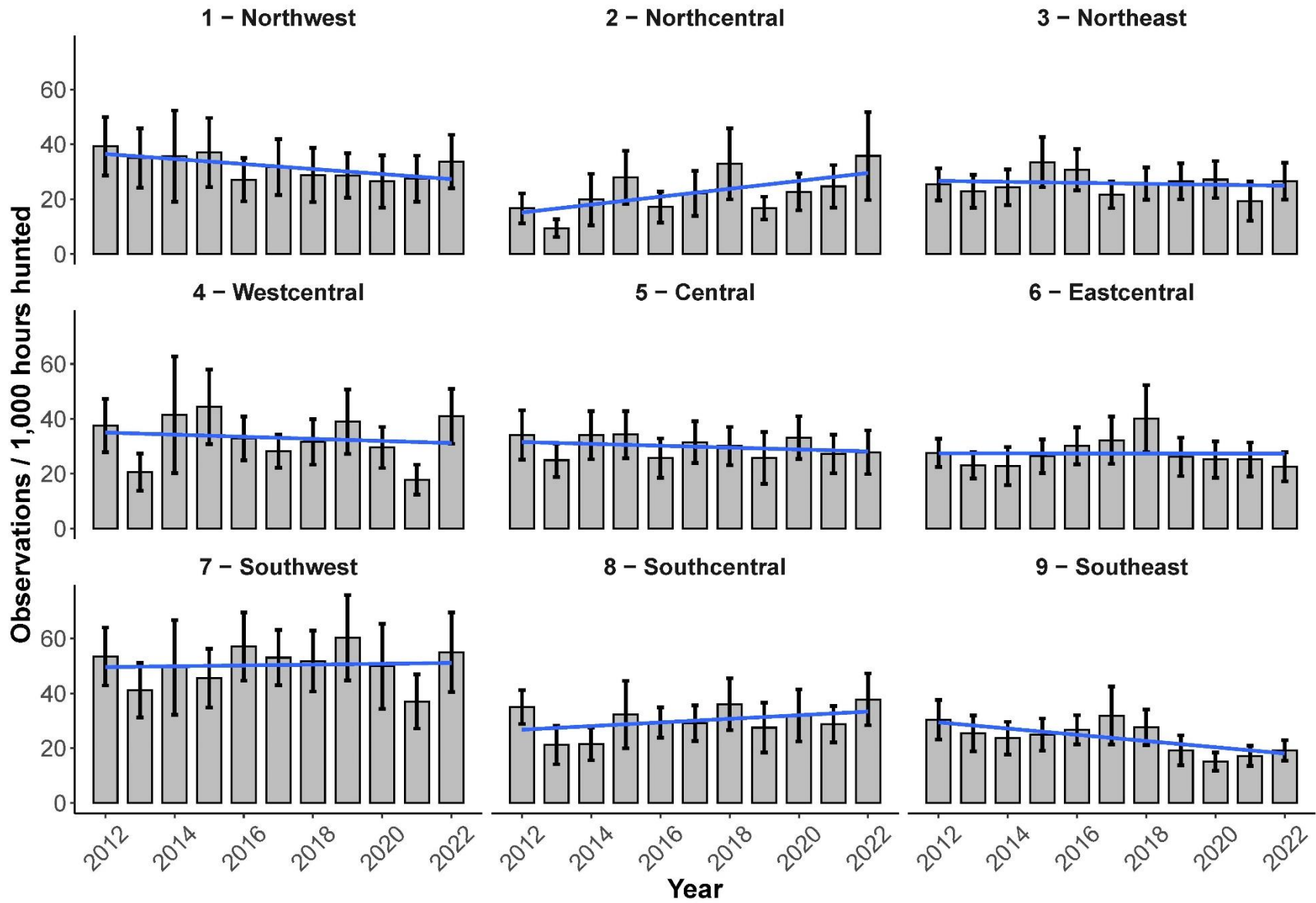
# Gray Fox

House Cat
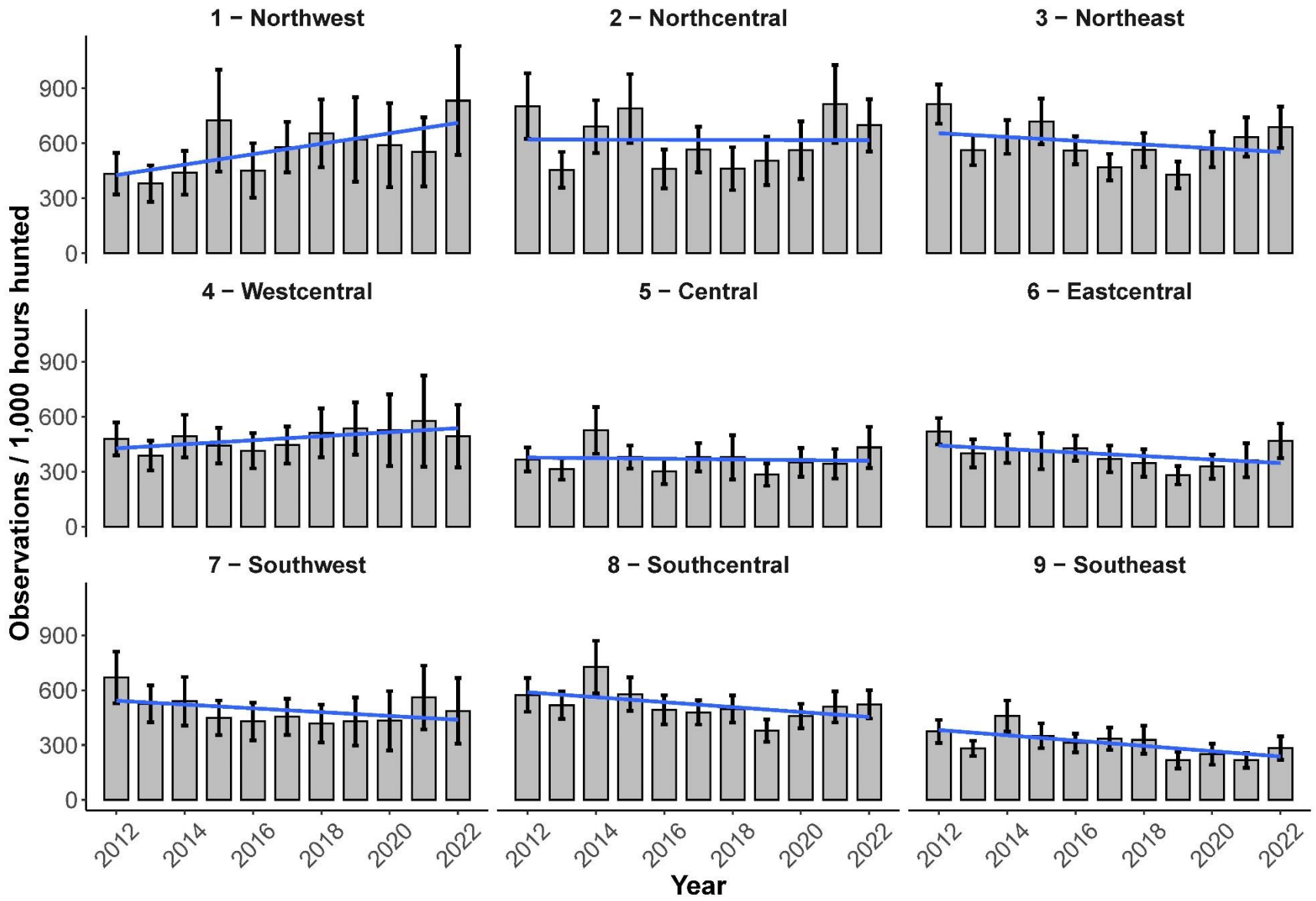
Opossum
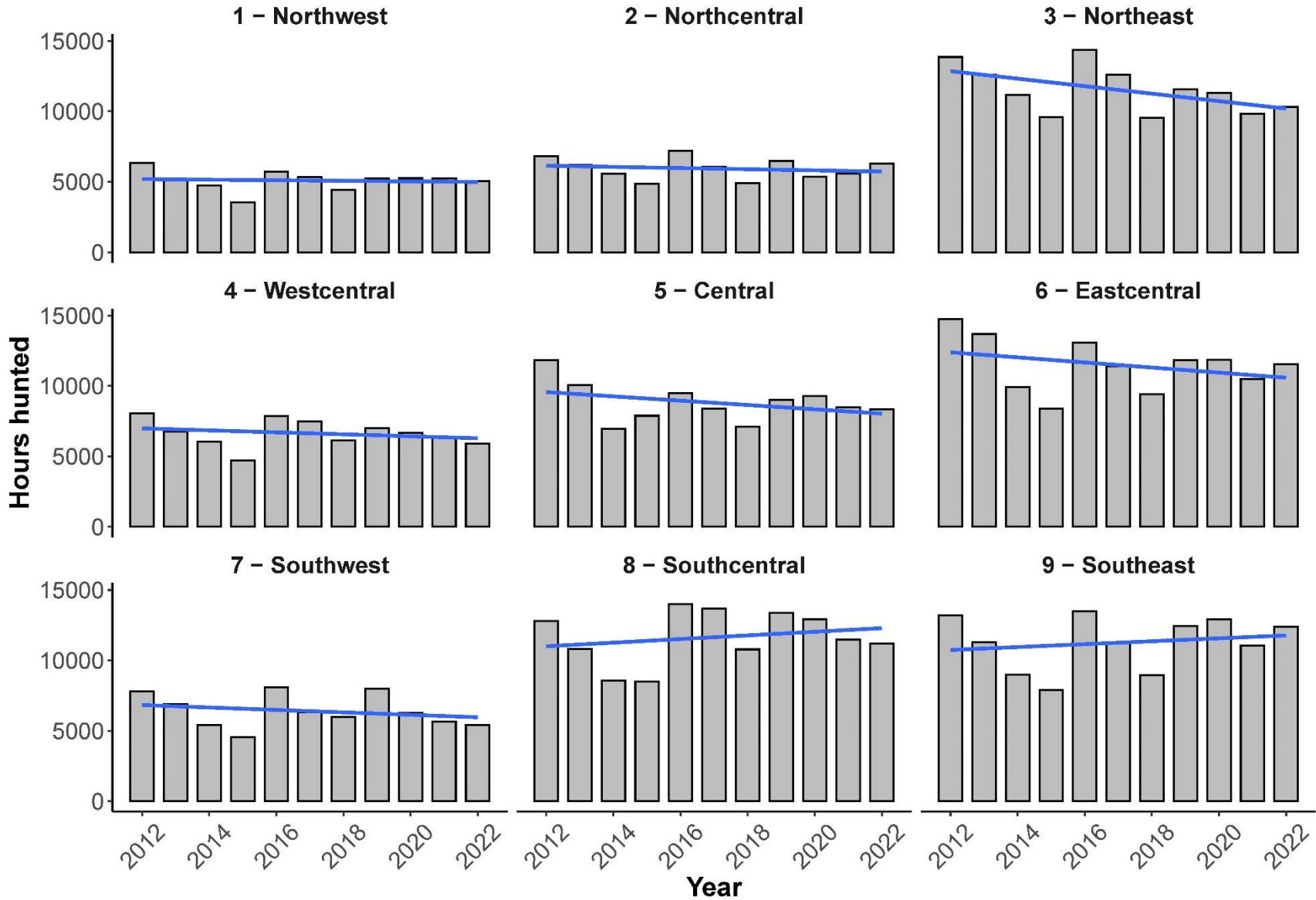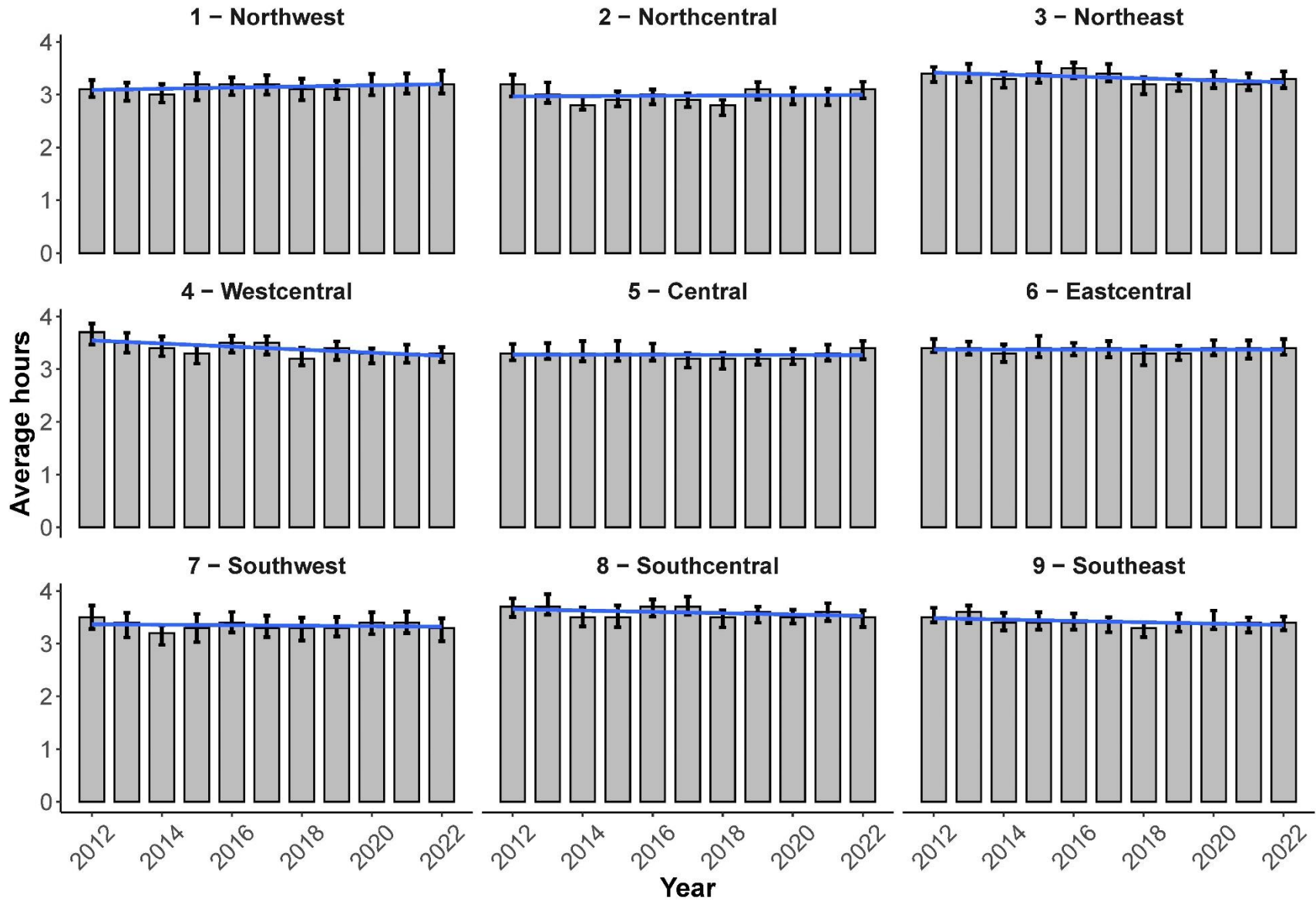
# River Otter

Raccoon

# Red Fox

# Striped Skunk

Wild Turkey

**Total Hours Hunted by Survey Participants**

# Average Hours Hunted Per Trip

# Total Trips by Survey Participants



1 − Northwest
2 − Northcentral
3 − Northeast
4 − Westcentral
5 − Central
6 − Eastcentral
7 − Southwest
8 − Southcentral
9 − Southeast

Trips

Year