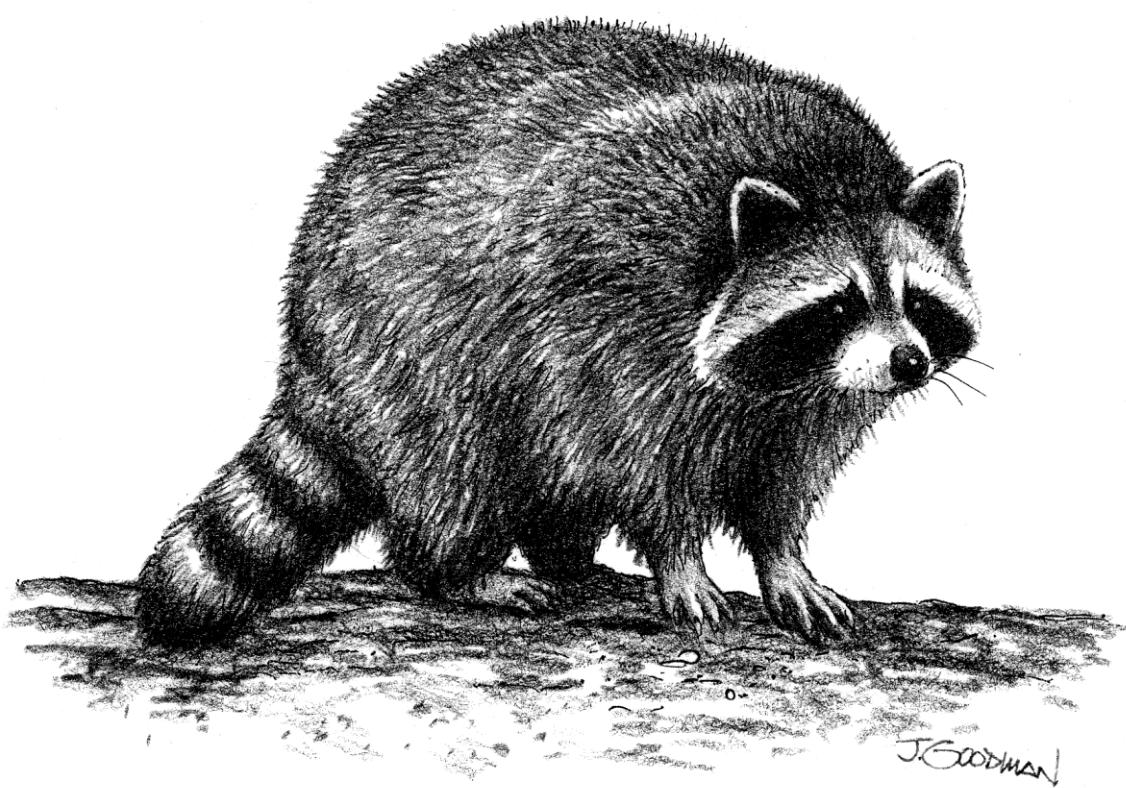


**NORTH CAROLINA
RACCOON FIELD TRIAL SURVEY REPORT
1987 THROUGH 2019
32nd Year**

N. C. WILDLIFE RESOURCES COMMISSION

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Funding for the raccoon field trial survey report was partially provided through a Pittman-Robertson Wildlife Restoration Grant. The Federal Aid in Wildlife Restoration Act, popularly known as the Pittman-Robertson Act, was approved by Congress on September 2, 1937, and began functioning July 1, 1938. The purpose of this Act was to provide funding for the selection, restoration, rehabilitation and improvement of wildlife habitat, wildlife management research, and the distribution of information produced by the projects. The Act was amended October 23, 1970, to include funding for hunter training programs and the development, operation and maintenance of public target ranges.

Funds are derived from an 11 percent Federal excise tax on sporting arms, ammunition, and archery equipment, and a 10 percent tax on handguns. These funds are collected from the manufacturers by the Department of the Treasury and are apportioned each year to the States and Territorial areas (except Puerto Rico) by the Department of the Interior on the basis of formulas set forth in the Act. Funds for hunter education and target ranges are derived from one-half of the tax on handguns and archery equipment.

Each state's apportionment is determined by a formula which considers the total area of the state and the number of licensed hunters in the state. The program is a cost-reimbursement program, where the state covers the full amount of an approved project then applies for reimbursement through Federal Aid for up to 75 percent of the project expenses. The state must provide at least 25 percent of the project costs from a non-federal source



INTRODUCTION

The Black Bear and Furbearer Biologist with the North Carolina Wildlife Resources Commission (NCWRC) monitors raccoon harvest and average pelt price through annual licensed fur dealer reports. Hunter numbers and effort are determined through a statewide mail survey every three years. Although information on harvest and effort is provided through the hunter mail surveys, the small sample size of survey respondents limits the use of this information for detecting population trends in raccoons. Also, the relationship between number of raccoons harvested and population trends is difficult to determine when small fluctuations in pelt prices occur.

More recently, trapper harvest of raccoons has been monitored via a voluntary mail survey. Attempts to monitor populations using bridge-crossing and scent station surveys in the past resulted in unreliable data at extremely high costs. In 1987, a Raccoon Field Trial Survey (RFTS) of United Kennel Club (UKC) raccoon field trial events was initiated to examine trends in hunting success rates by region. The index is expressed in number of raccoons seen or treed per hour, and can provide an idea of whether raccoon populations are increasing or decreasing, though they cannot provide an estimate on the actual numbers of animals.

Methods

Raccoon field trials are conducted in North Carolina by established raccoon hunting clubs in all regions of the state. These hunts are conducted under very exacting guidelines. Each competing hunt party or "cast" is accompanied by a judge who insures that the hunt is conducted strictly by the rules. Each cast is composed of 2 to 4 hounds, each with a handler, and for a specific period of time. During field trials, raccoons may not be killed, but treed raccoons must be seen before points are awarded.

For the first 10 years of the survey, Furbearer Project personnel contacted the UKC to obtain a list of scheduled hunts for the coming year. Beginning in 1997, copies of all raccoon field trial permits issued by wildlife enforcement officers were sent to the Furbearer Biologist and included in the survey; in addition to UKC field trials, these permits included both PKC and AKC field trials. A database is created with each club contact's name and address as well as the scheduled hunt date. Each club is mailed a RFTS form with instructions approximately 2 weeks prior to the scheduled hunt date. As each hunt club returns the survey form, it is checked off of the list of hunts to allow calculation of response rates. Participation in the survey has been voluntary for clubs in the hope that response rates would be sufficiently high enough to provide valid information on raccoon populations across North Carolina.

Upon receipt of the completed survey, data are recorded and used to calculate regional success rates expressed as raccoons treed or seen per hour. For the purposes of the raccoon field trial survey, North Carolina is divided into 3 furbearer management units (FMUs) based on landform, land use, and broad habitat type (Figure 1). The RFTS year begins March 1 of each year, because this date represents the end of the annual legal raccoon harvest and the beginning of raccoon population recruitment. The survey was adopted by the NCWRC Furbearer Biologist for several reasons: (1) relatively large sample size, (2) low cost, (3) immediately available data, (4) ability to analyze data at the regional level, (5) data available for all times of the year,

(6) data available for most areas of the state, (7) the high value of raccoons as a sport and furbearing animal, and (8) the positive relationship afforded by additional contact with raccoon hunt clubs.

Results

Summary: During the 32 years of the RFTS (March 1, 1987 - February 28, 2019), data were received from raccoon hunting clubs and special events. The number of casts for which hunting success (raccoons seen) was reported has averaged 743/year over the life of the survey. Since 1987, raccoon hunting clubs have reported 23,786 field trial casts with 42,794 raccoons observed. Figure 2 shows the annual number of casts and the number of hunt clubs submitting data (range from 21 to 62) over the 32 years of the survey. This past year, 25% of surveys were returned by 31 raccoon hunt clubs, which was similar to last year's survey (25% participation, 36 raccoon hunt clubs; Figure 3).

Hunter Success: The statewide hunting success (0.99 raccoons seen per hour) was above the 32-year average (0.93), but a decrease from last year's results (1.02; Figure 4). The number of raccoons seen per hour decreased in two of three FMUs (Figure 5). Raccoons seen per hour increased from 0.95 to 0.96 in the Coastal FMU, decreased from 1.19 to 1.17 in the Piedmont FMU, and decreased from 0.84 to 0.91 in the Mountain FMU (Figure 5). After a sharp decline in 2012-13, success in the Coastal FMU has remained relatively stable to slightly increasing, while the Piedmont FMU has shown an increase and stabilization since the 2014 season. Success in the Mountain FMU has declined the past 3 seasons, and has shown an overall decline since a peak in the 2003-04 season (Figure 5). Success in the Piedmont FMU is still higher than what was reported in the late 1980's through mid-1990's, while success in the Mountain FMU is below that reported in the late 1990's through late 2000's.

Thirty-two years of data indicate that hunting success (raccoons seen per hour) by month varies among the three regions (Figure 6). In the Coastal FMU, hunting success was highest in August (1.06), followed by March (0.98) and November (0.95). In the Piedmont FMU, hunting success was highest in February (1.08), March (1.05) and January (1.04). In the Mountain FMU, hunting success was highest in September (1.06), followed by July (0.99) and August (0.98).

The peaks in hunting success coincided with the time of year when either breeding has begun (February-March), when young raccoons have left their mother, and are more active as they disperse. Hunting success in all regions declined through the spring months, as breeding season ends and young are born. Though peak hunting success occurred in August, February, and September for the Coastal, Piedmont, and Mountain FMUs, respectively (Figure 6), raccoon hunt clubs in all FMUs were most active during March and April, based on number of casts conducted (Figure 7).

Casts: We have received data from 98 of the 100 North Carolina counties during the entire survey (Figure 8). Figure 8 shows that many casts are clumped due to the locations of raccoon hunting clubs who chose to participate in the survey. While at first

glance it would seem that the data would provide a representative sample for analysis on a county basis, many counties had only a few field trial casts reported ($n=1$) while other counties had large numbers of casts ($n=884$). The number of casts per county for the entire survey has ranged from 0 to 884. Randolph County has recorded the highest number of casts ($n=884$), followed by Orange County ($n=883$ casts), Madison County ($n=753$), Stokes County ($n=707$) and Alamance County ($n=698$). We have received no data on casts from Dare and Gates counties. The lowest number of recorded casts occurred in Chowan ($n=1$ cast), Graham ($n=1$ cast), Washington ($n=2$ casts), Hertford and New Hanover ($n=4$ casts) counties.

Rabies: Raccoon rabies appeared in North Carolina four years after the inception of the RFTS. All but 3 western North Carolina counties have had positive terrestrial rabies cases at the end of 2011 (Figure 9). Skunks and raccoons are the primary species of wildlife in which rabies is observed in North Carolina, excluding bats. Rabies cases do not always show up uniformly across the state from year to year; often, in any given year, several counties will report a greater number of rabies cases than other counties. This gives the impression that rabies is only in certain regions of the state. There are several reasons for these yearly “hotspots”: 1) The cycling of rabies in the wild animal population. 2) The number of animals submitted by each county. 3) The selective submission of animals more likely to be infected. 4) The human population of the county; more densely populated areas are more likely to encounter a sick-acting animal.

Despite the presence of rabies in the raccoon population, there has been an increase in statewide hunting success over the life of this survey (Figure 10). The number of positive raccoon rabies cases peaked in 1997 ($n=660$) followed by a sharp decline the following year ($n=354$). There was also a decline in statewide hunting success from 1.05 in 1997 to 0.92 in 1998, the largest year-to-year decline recorded in 30 years. The decline in positive rabies cases and in statewide hunting success likely reflected a decline in the raccoon population due to the rabies outbreak. Since 1997, the number of positive raccoon rabies cases fluctuated, with a peak again in 2003. Since 2003, positive rabies cases continue to decline, while statewide hunting success has plateaued. (Figure 10).

Peaks in positive raccoon rabies cases occurred in different years for each region (Figure 11). In the Coastal, Piedmont, and Mountain FMUs, positive raccoon rabies cases peaked in 1996, 1997, and 2003, respectively. The Piedmont FMU accounts for a majority of positive raccoon rabies case; during the 2018-2019 survey year, 90% of positive raccoon rabies cases occurred in the piedmont, followed by the coastal plains (22%) and the mountains (9%). More densely populated areas are more likely to encounter a sick-acting animal, which partially explains the number of positive cases that occur in the Piedmont FMU.

Hunter Harvest Survey: About every 3 years since the 1950s the NCWRC has conducted a mail survey of licensed hunters to estimate population numbers of hunters, hunter effort and hunter harvest. Starting after the 2010-11 hunting season, the hunter harvest survey is now conducted annually. The latest survey for which we have results was conducted after the 2018-2019 hunting season. The 2018-19 hunter harvest survey indicates a slight decline in the number of hunters ($n=8,250$) who harvested a raccoon

(n=8,986 hunters in 2017-2018), but an increase in the number of raccoons harvested (n=65,353; Figure 12). Overall, there has been a decline in raccoon hunters since the late 1960's. The number of raccoons harvested per hunter has fluctuated since the late 1980's, likely reflecting variability in both weather and local raccoon populations (Figure 13). There was an increase in the number of raccoons harvested per hunter during the 2018-19 season (Figure 13).

Deer Hunter Observation Survey: During the 5 deer hunting seasons from 2014-2018, volunteer deer hunters recorded wildlife observations on 132,247 hunting trips encompassing 452,429 observation hours. While deer, gray squirrels, and turkeys were the most commonly observed animals, deer hunters also recorded other species, including raccoons. Results include annual state and regional observation rates, including the effects of baiting and location types (private and game lands).

Observations of raccoon have generally followed their statewide range and were recorded in 97 of the 100 counties. Statewide raccoon observation rates were the highest for any furbearer species, but were still relatively rare (28.3 raccoons per 1,000 hours), especially when compared to other game species, including deer, gray squirrel and turkey (Figure 14). Significantly more raccoons were observed on stand locations with bait (38.9 raccoons per 1,000 hours), than without bait (18.2 raccoons per 1,000 hours). Baited sites likely attract raccoons since they provide a direct food source. Location type was also significant with more raccoons observed on private lands (20.1 raccoons per 1,000 hours), than on game lands (10.4 raccoons per 1,000 hours).

Observation rates were significantly higher in the Coastal Plain Furbearer Management Unit (FMU; 44.8 raccoons per 1,000 hours), and lowest in the Mountain FMU (12.0 raccoons per 1,000 hours). There is no significant evidence that statewide observation rates have changed within the past 5 years, and regional trends appear stable in all 3 FMUs. These results are similar to survey results from the RFTS for each furbearer region (Figure 5). Annual county estimates maintained relatively consistent observation rates, reliable enough to estimate ratios for most counties (Figure 15).

Discussion

It will be important to maintain a relatively high level of reporting by raccoon hunting clubs and to submit surveys for non-UKC hunting events through information obtained from copies of enforcement officer issued permits. It is hoped that distribution of this report with an accompanying letter encouraging all raccoon hunt clubs to submit surveys and reminding enforcement officers to submit copies of raccoon field trial survey permits will result in increased reporting. Possible changes in the field trial permit process that might increase reporting by raccoon hunt clubs include both mandatory reporting and centralizing the permitting so that all permits are issued from one location.

Since the RFTS began, both raccoon fur prices and harvest have remained at historically low levels. This may explain the increases in hunting success observed statewide, especially in the mountain and piedmont regions where harvest may have suppressed raccoon populations prior to initiation of the RFTS. Prior to the occurrence

of raccoon rabies in the state in 1991, the most likely non-harvest cause of raccoon mortality was canine distemper virus (CDV) which tended to impact local raccoon populations in a 3-year cycle. It is possible that raccoon rabies and/or CDV may be causing localized fluctuations in raccoon populations since both are density-dependent diseases. Another possible influence on hunting success levels over time is whether a hunt club elected to use bait; the use of bait may artificially increase hunting success data over time.

It will be important to continue to monitor the raccoon hunting success using the RFTS to document any fluctuations in raccoon populations due to either change in disease, hunter mortality or other factors in the future. Other measures of regional raccoon population densities, such as the deer hunter observation survey, will continued to be used to provide another independent measure of population changes over time.

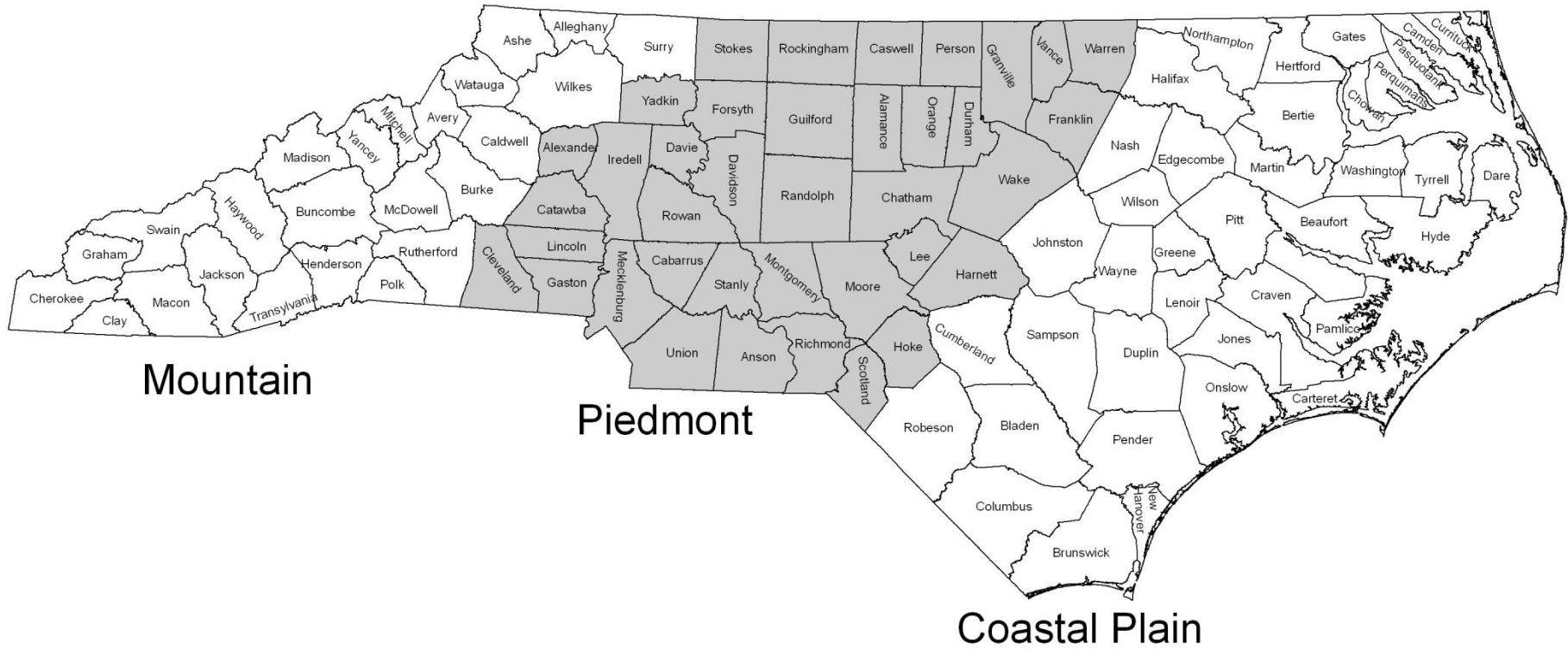


Figure 1. Furbearer management units (FMUs) of North Carolina.

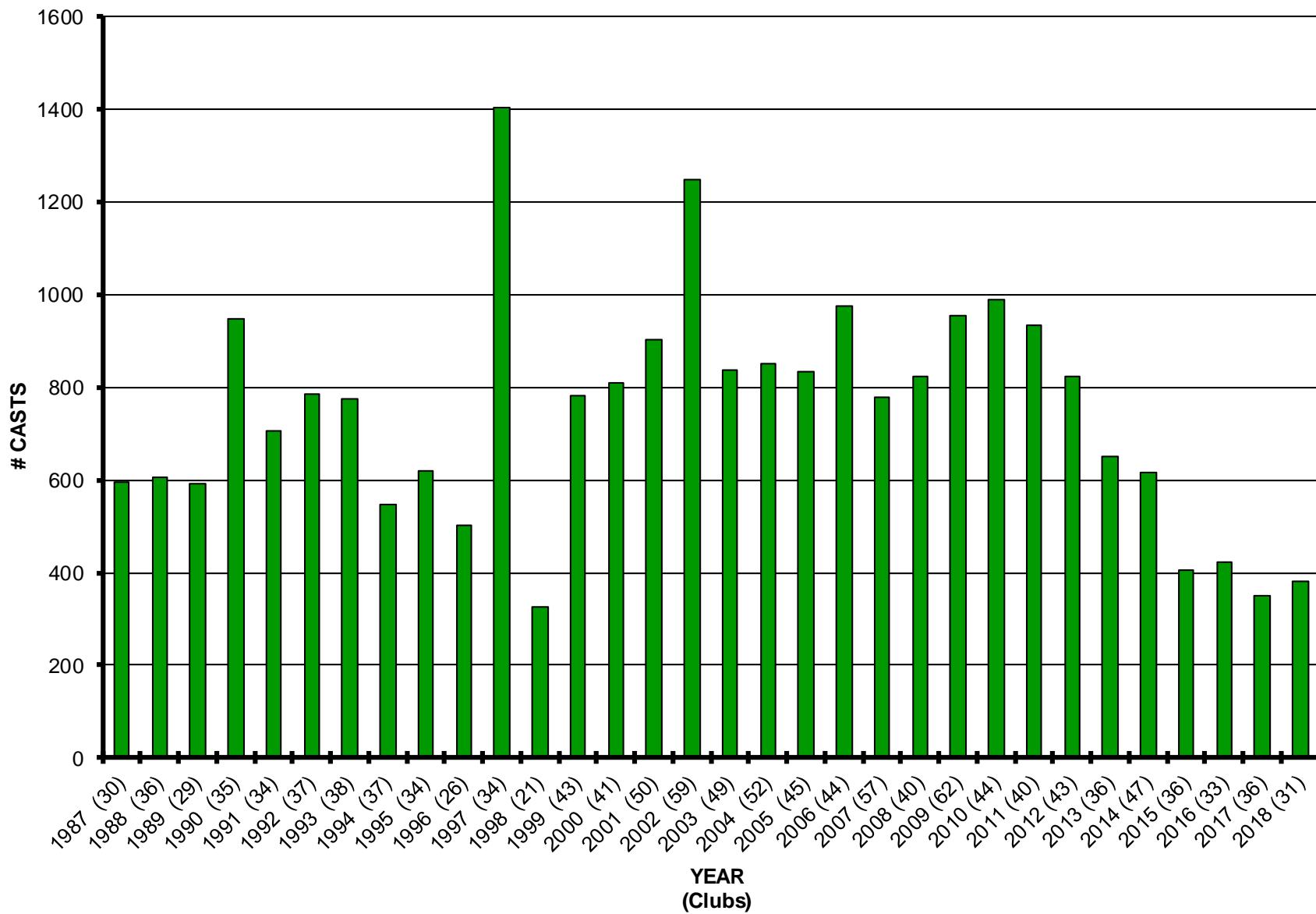


Figure 2. Annual number of casts and clubs participating in the North Carolina RFTS, 1987 through February 2019.

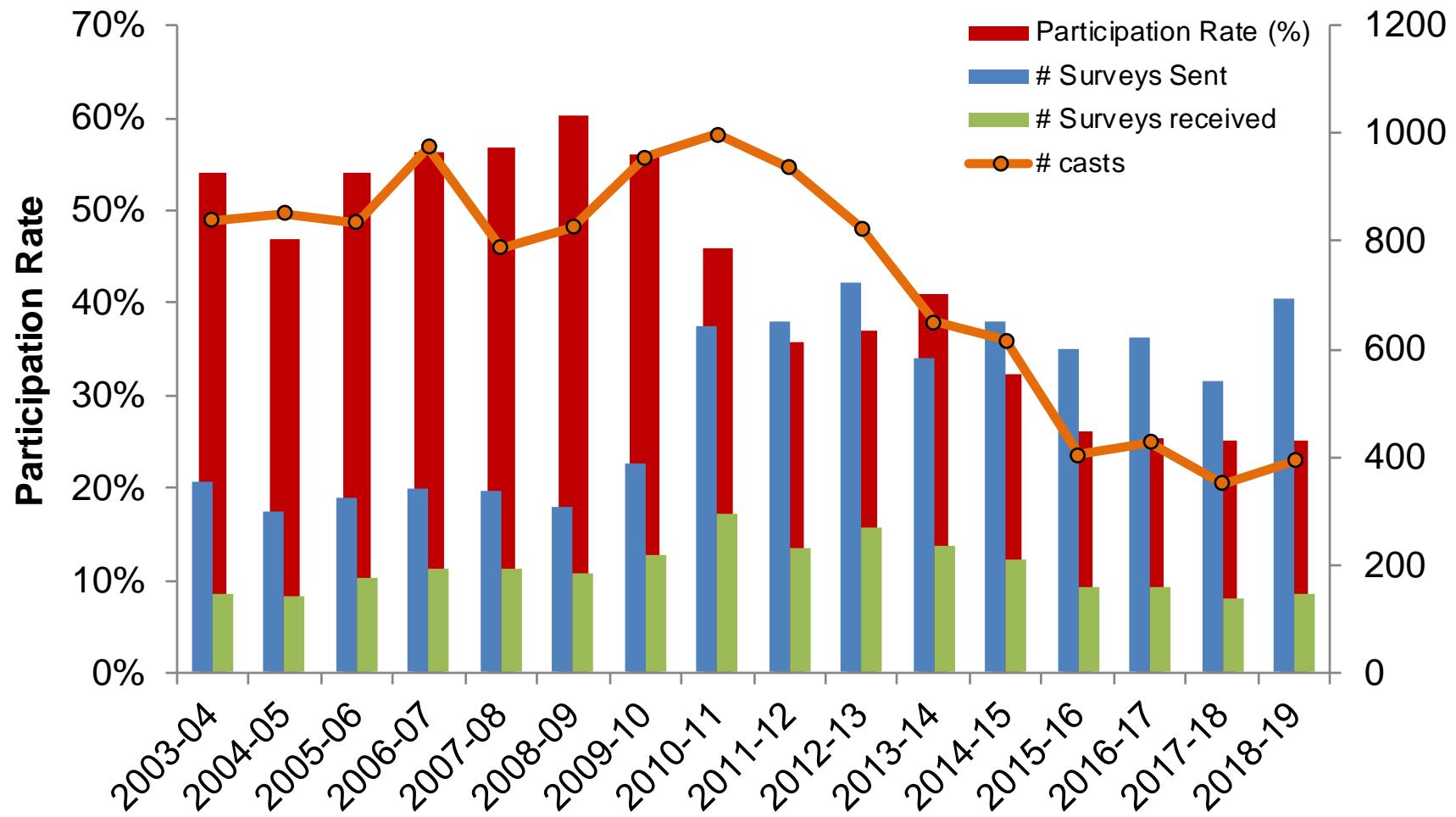


Figure 3. Participation rate (red), number of surveys sent (blue), number of surveys received (green), and number of casts reported (orange) from March 2003 through February 2019.

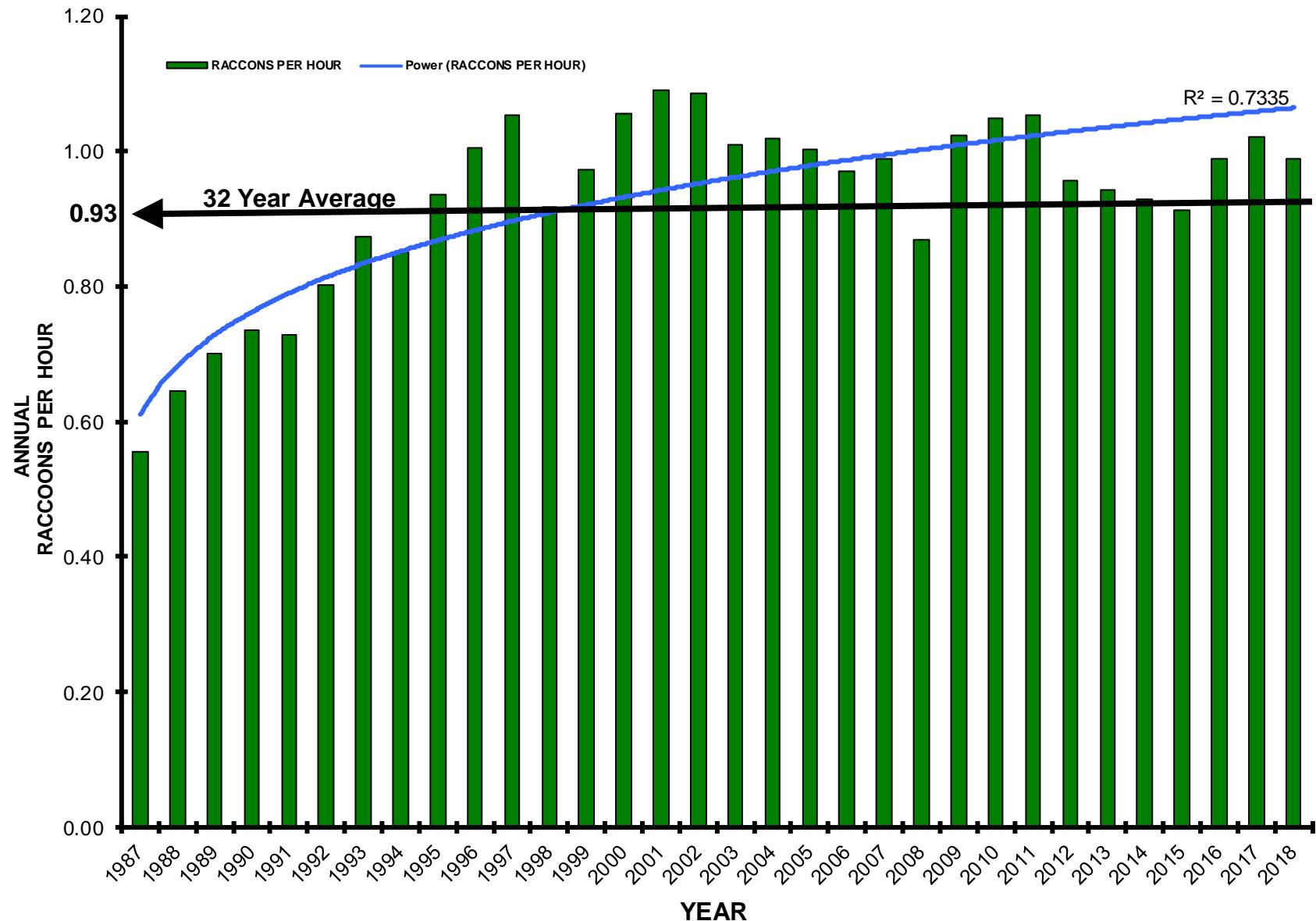


Figure 4. Statewide annual North Carolina RFTS results and 30-year average, 1987 through February 2019.

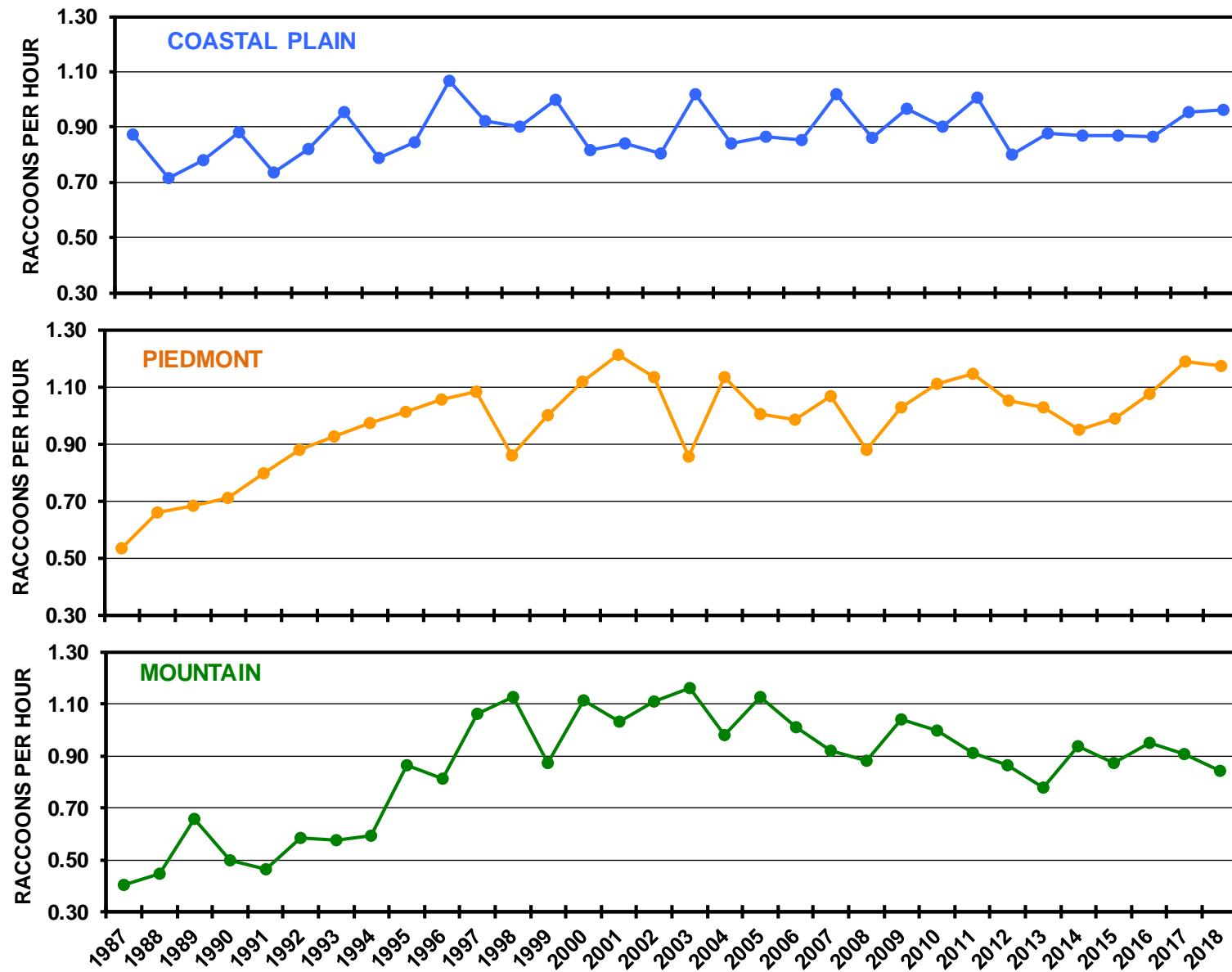


Figure 5. Regional annual raccoons seen per hour (hunter success) from the North Carolina RFTS, 1987 through February 2019.

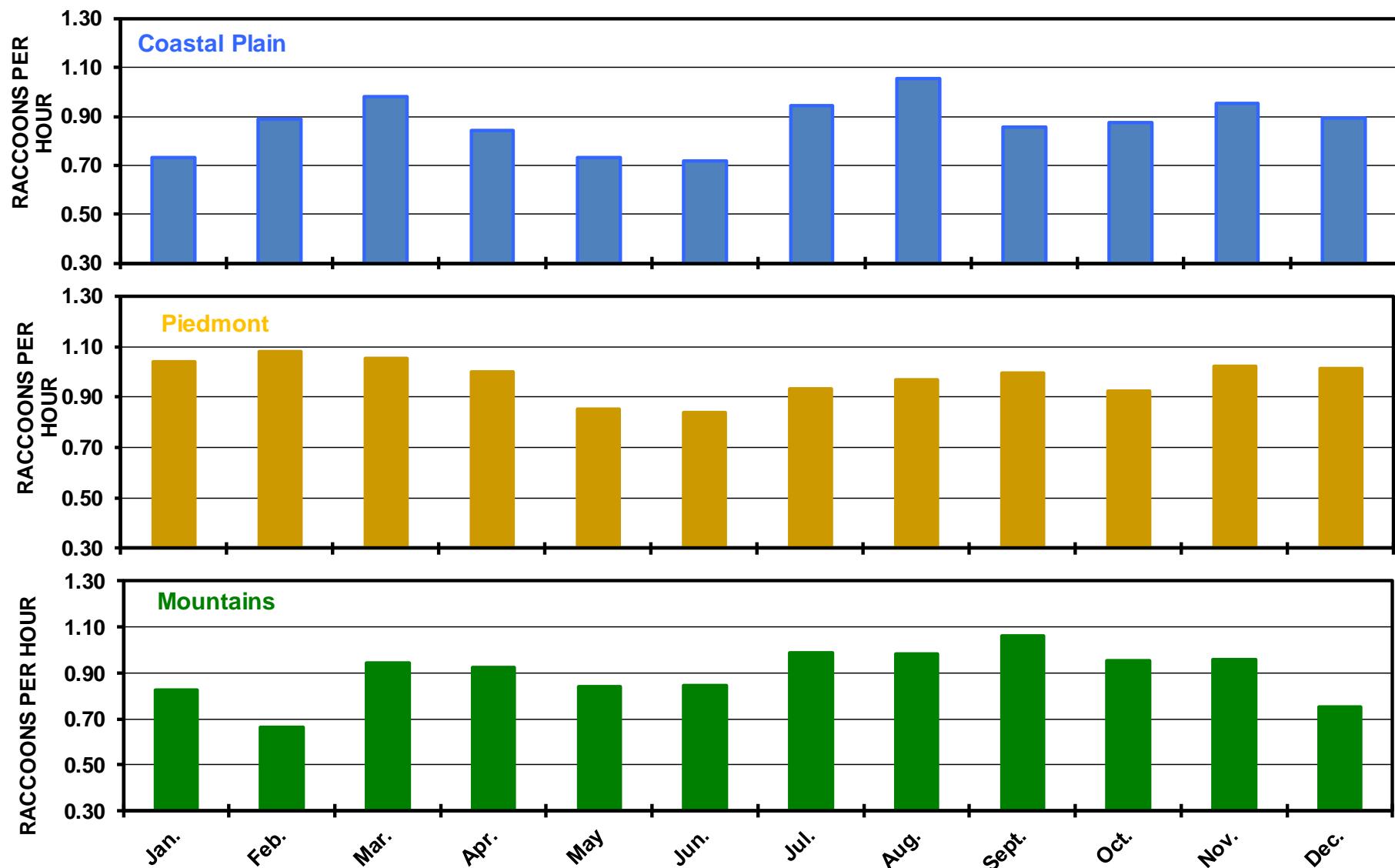


Figure 6. Regional raccoons seen per hour (hunter success) reported by month from the North Carolina RFTS, 1987 through February 2019.

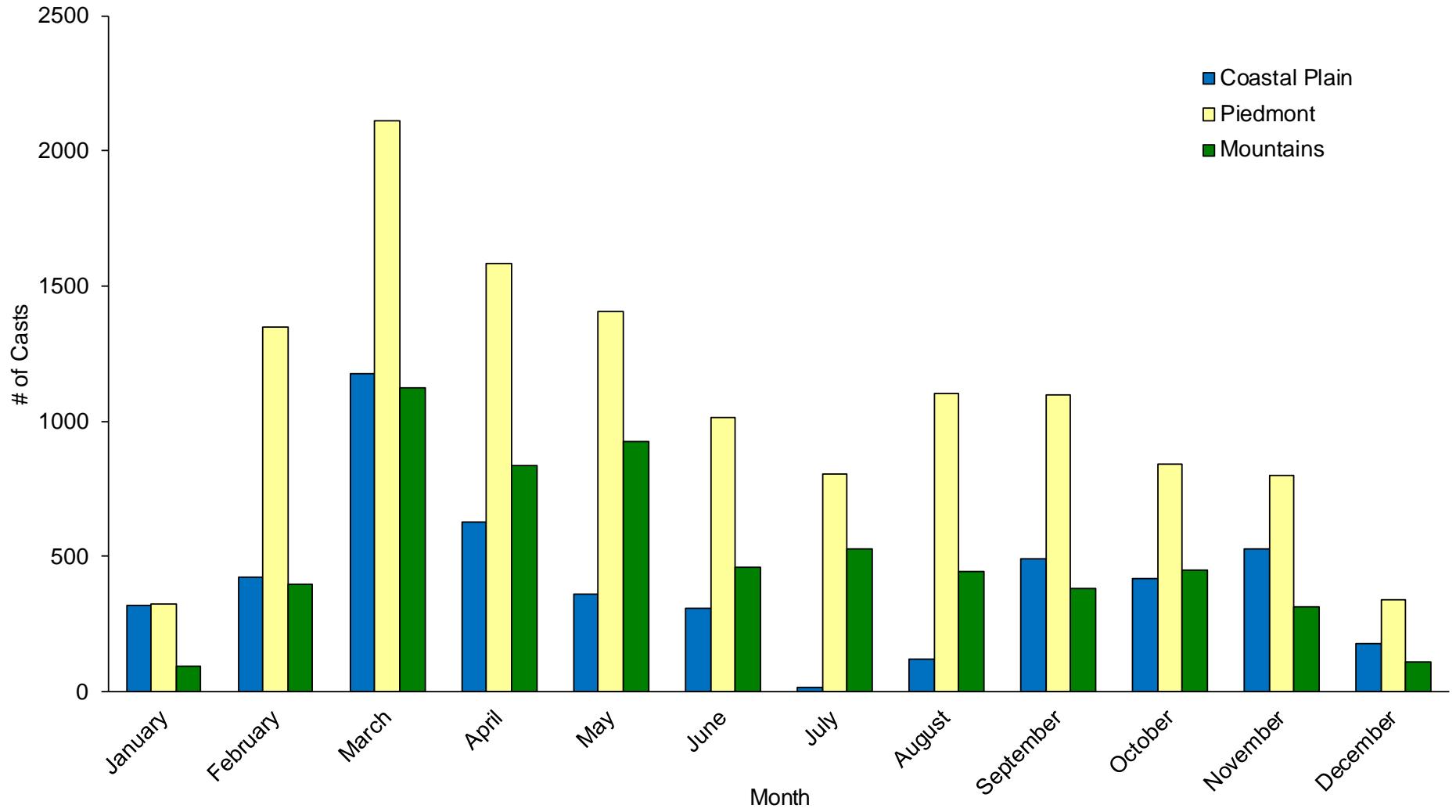


Figure 7. Number of casts reported by month and by region from the North Carolina RFTS, 1987 through February 2019.

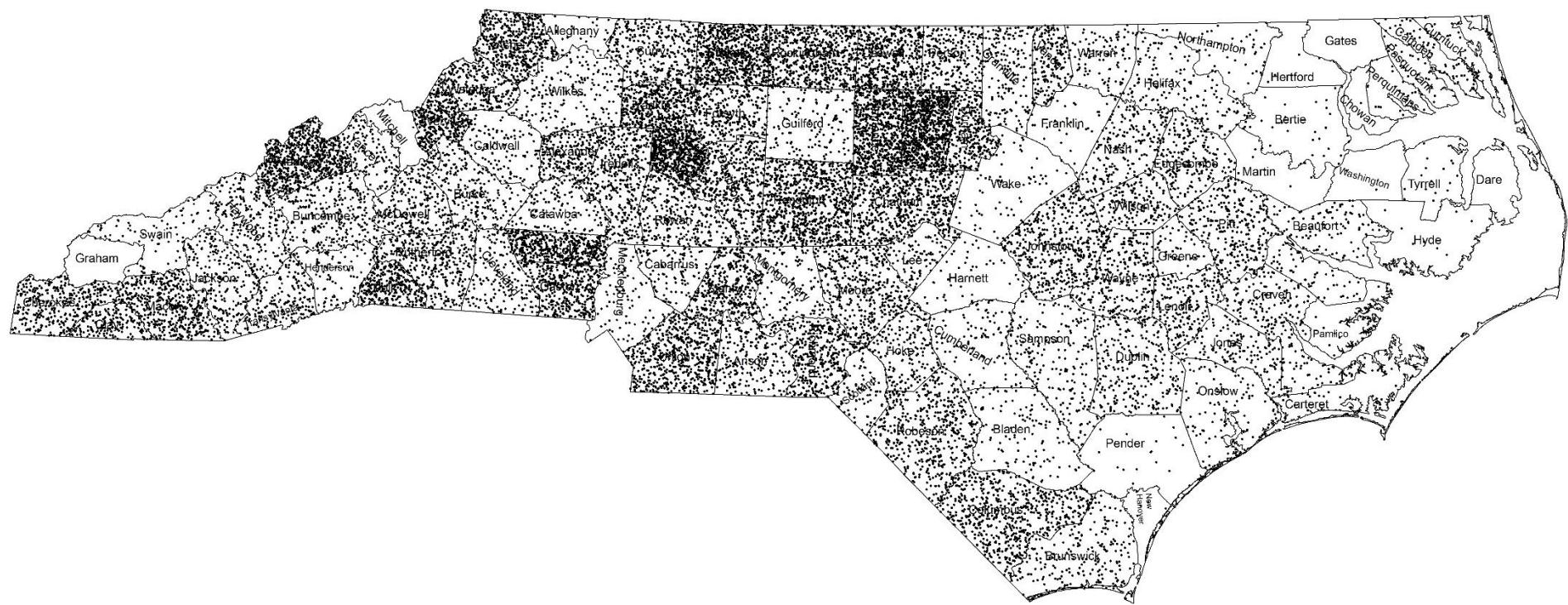


Figure 8. Number of casts reported by county from the North Carolina RFTS, 1987 through February 2019 (each dot represents one cast).

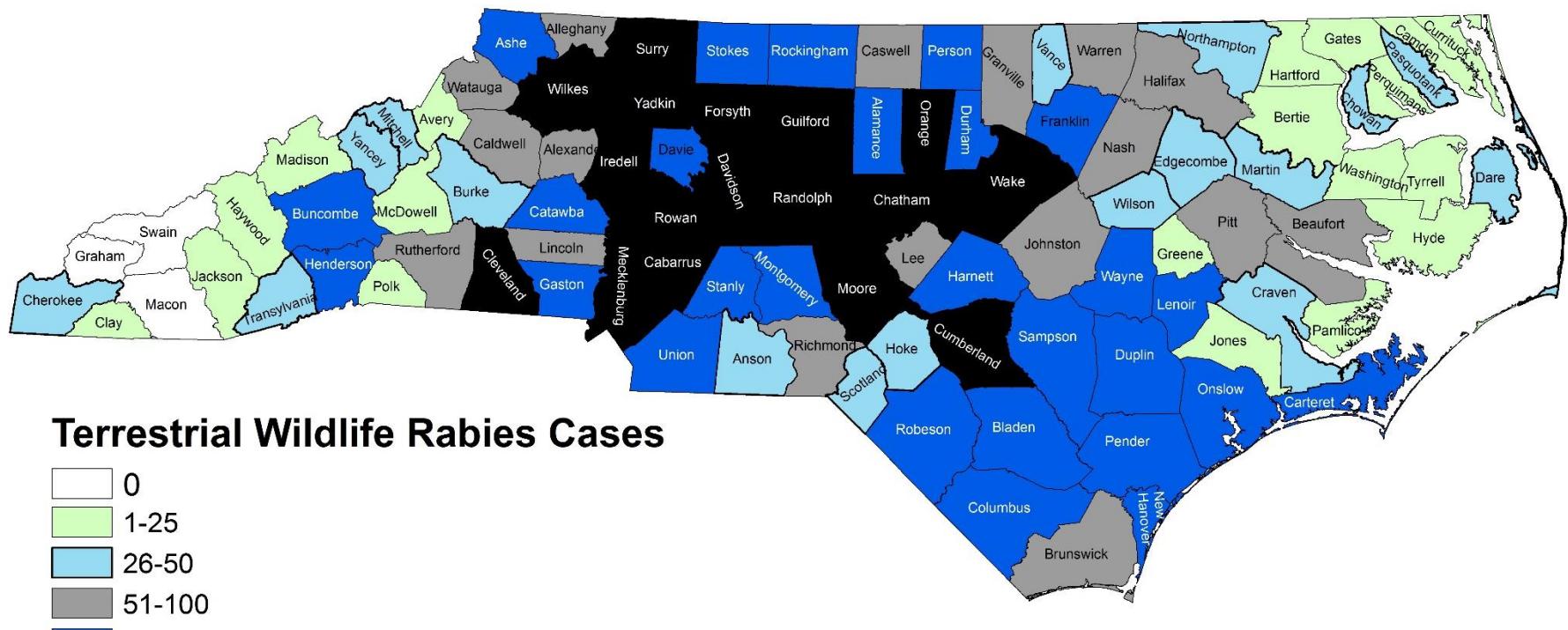


Figure 9. Number of positive terrestrial wildlife rabies cases reported by county, 1991-2018.

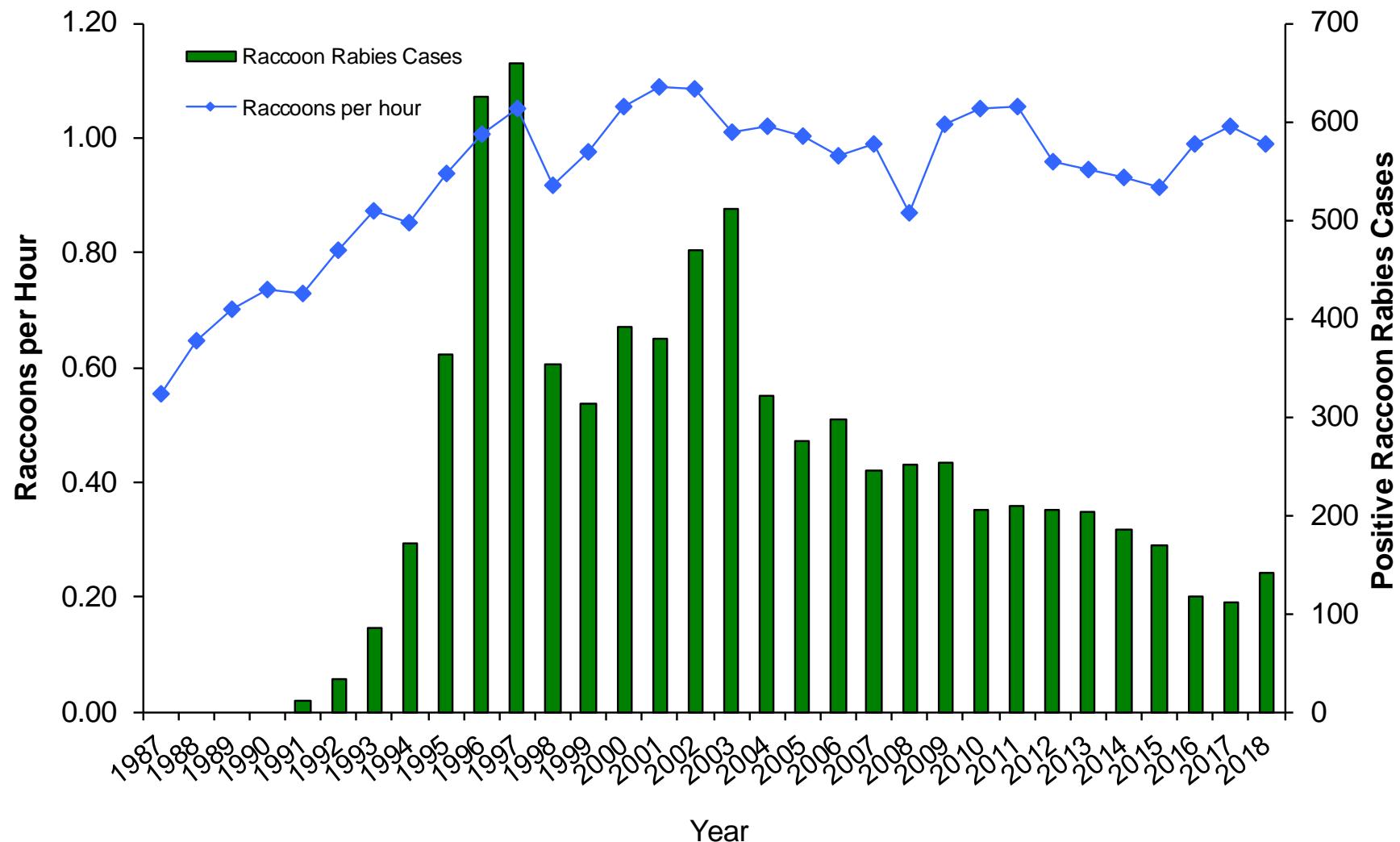


Figure 10. Annual statewide raccoons seen per hour (hunter success) from the North Carolina RFTS and annual number of positive raccoon rabies cases.

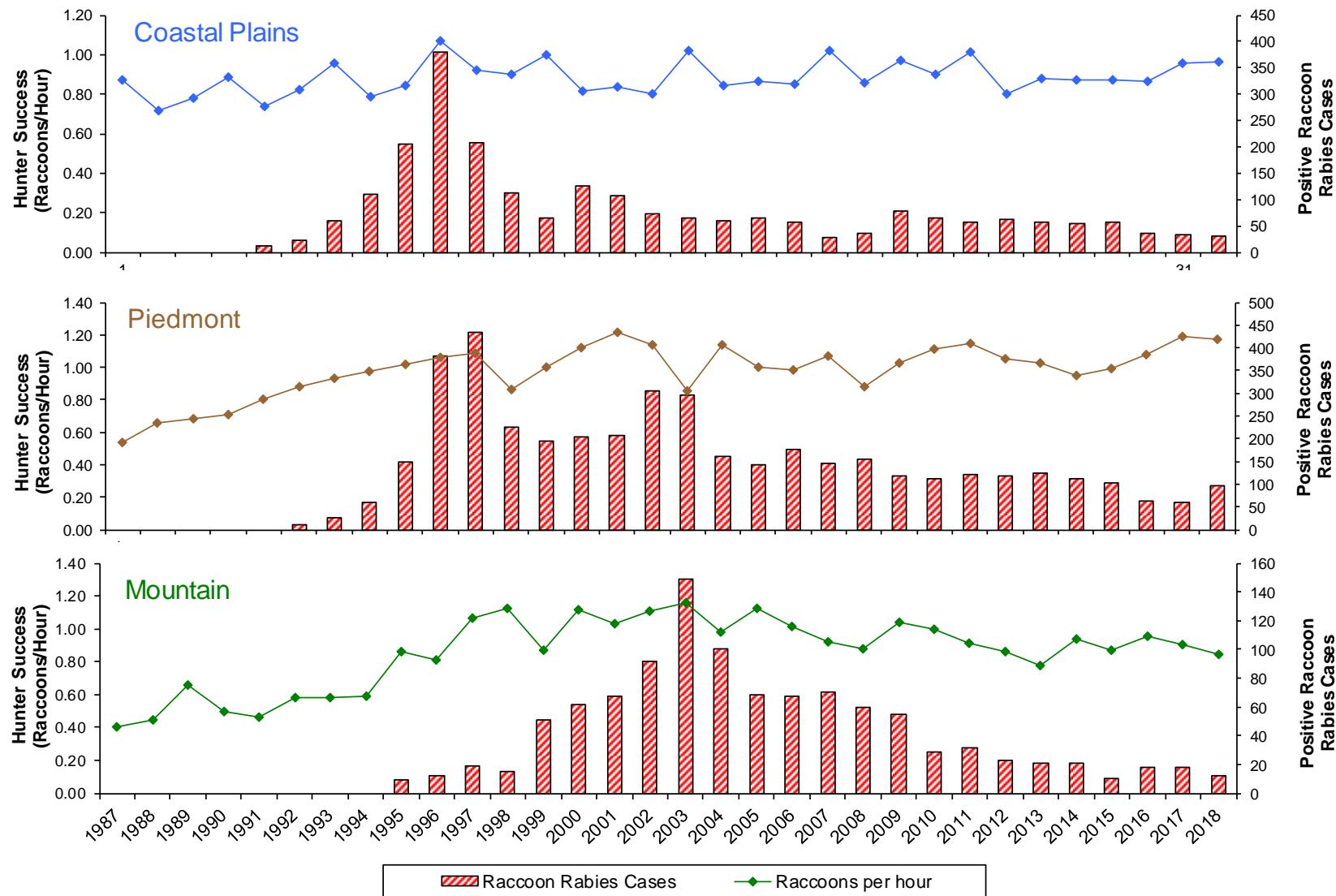


Figure 11. Annual regional raccoons seen per hour (hunter success) from the North Carolina RFTS and annual number of positive raccoon rabies cases.

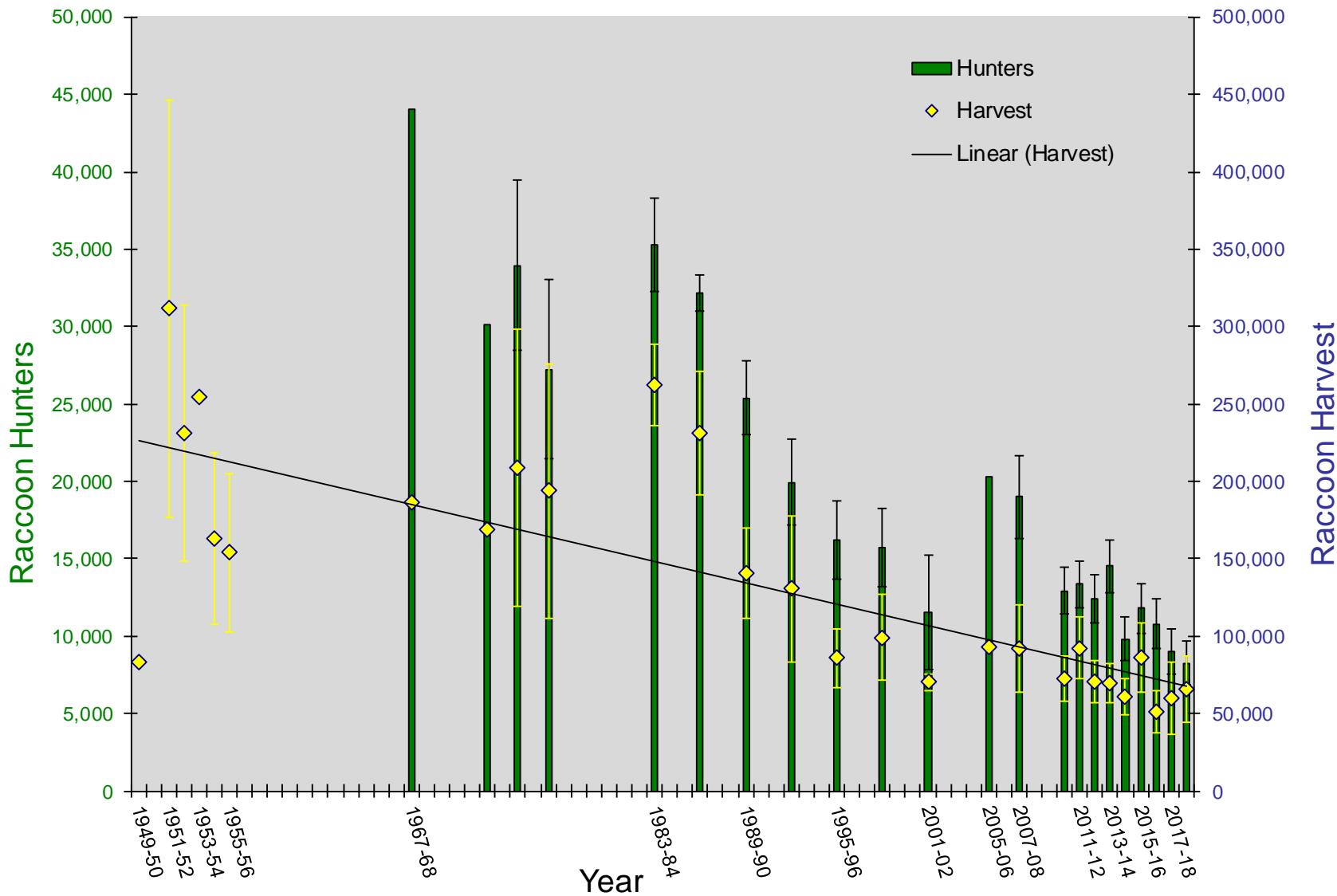


Figure 12. Number of raccoons harvested and number of raccoon hunters, with standard error bars, based on NCWRC Hunter Harvest Surveys, 1967 through Feb. 2019.

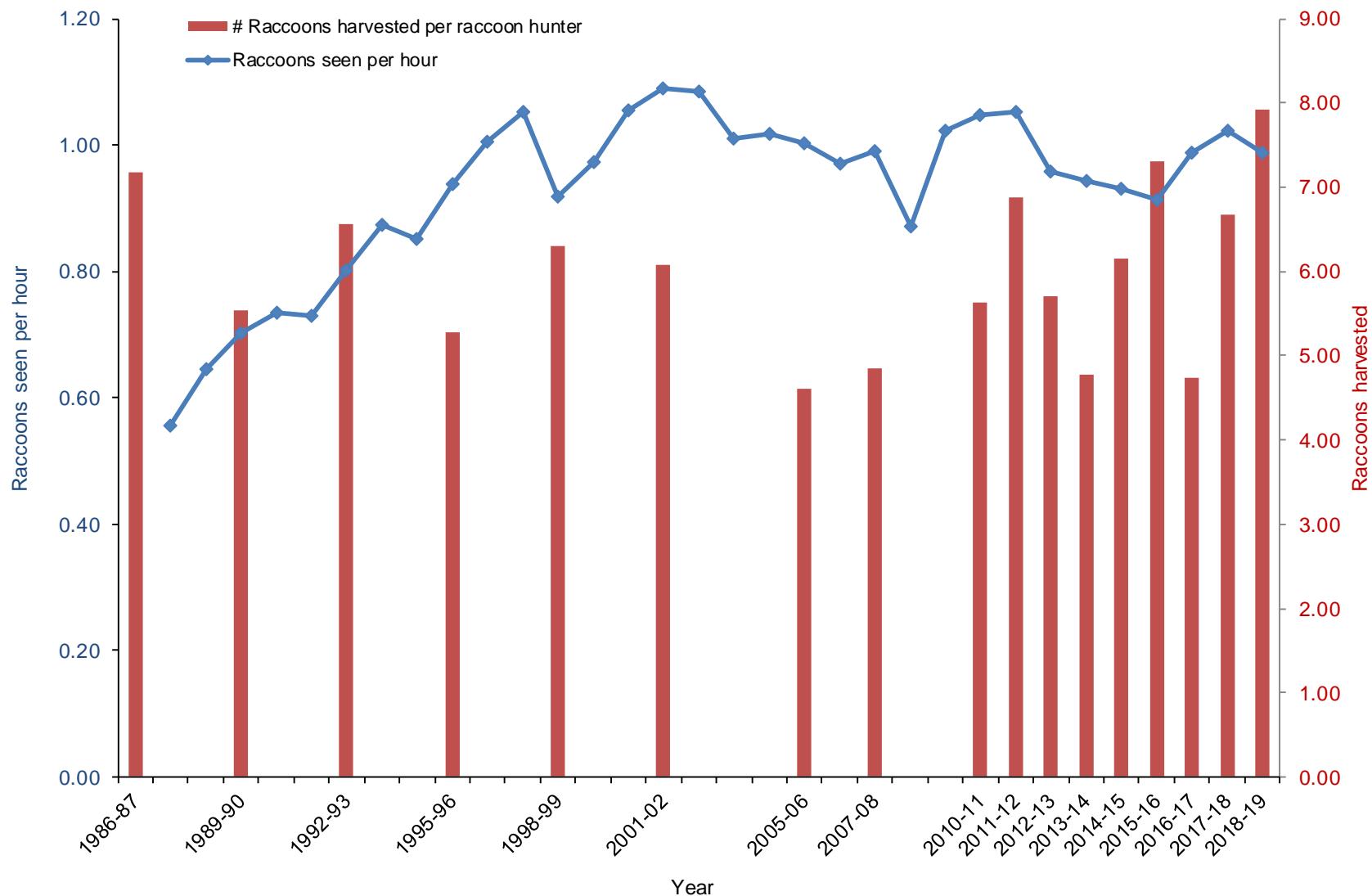


Figure 13. Number of raccoons harvested per hunter based on NCWRC Hunter Harvest Surveys, and raccoons seen per hour (hunter success), 1986 through Feb. 2019.

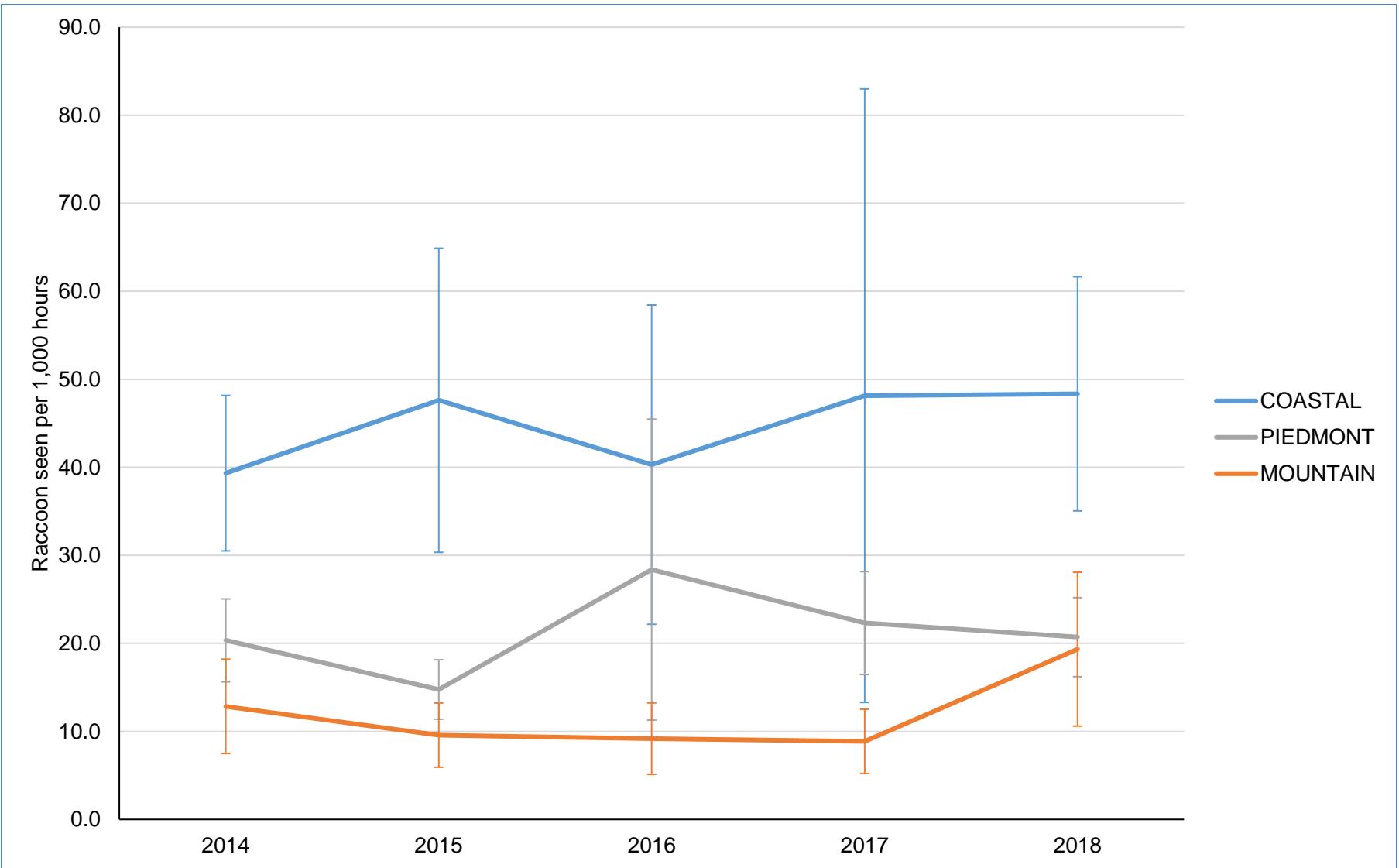


Figure 14. Annual raccoon observation rates by furbearer management unit with 95% confidence intervals, North Carolina Deer Hunter Observation Survey, 2014-2018.

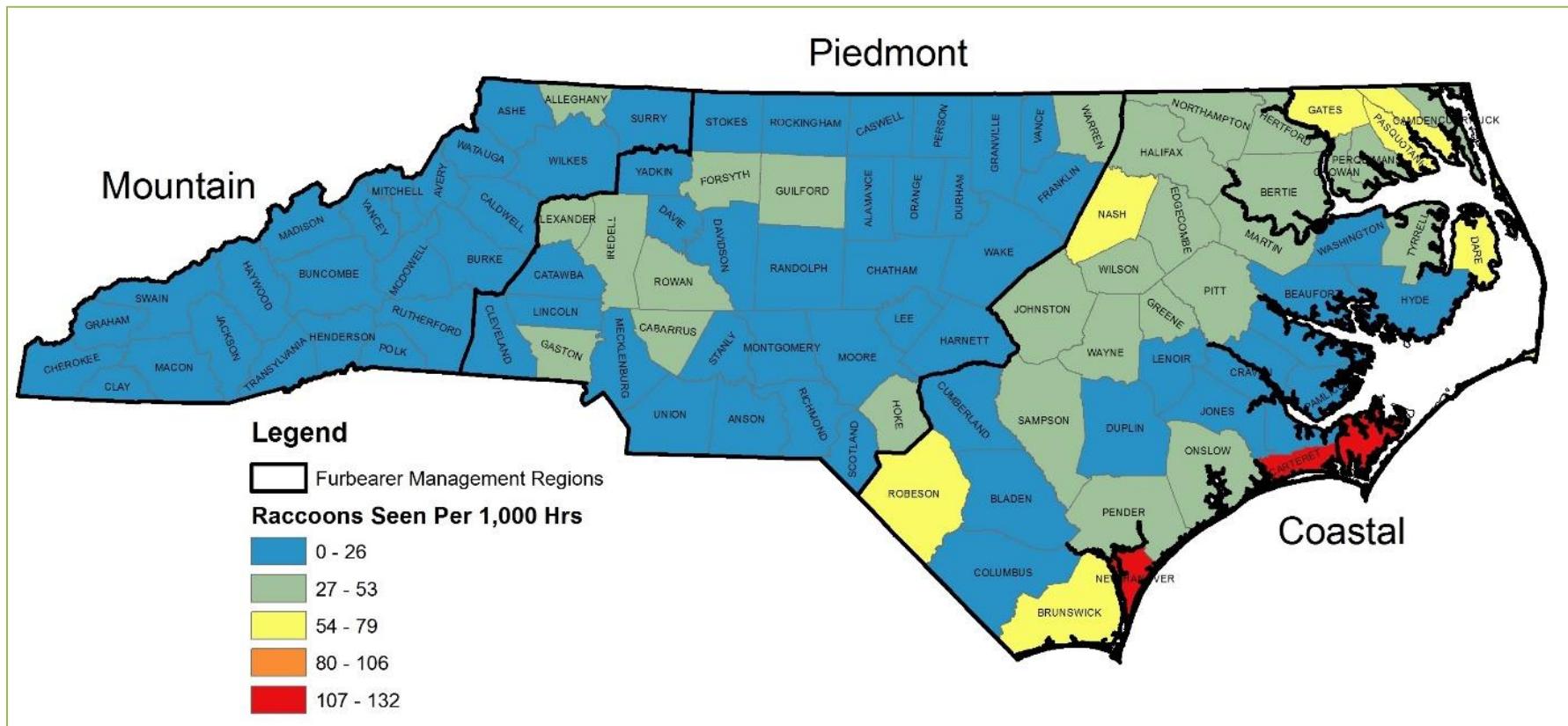


Figure 15. North Carolina raccoon observation rates by county, North Carolina Deer Hunter Observation Survey, 2014-2018.