NORTH CAROLINA
ARMADILLO RANGE EXPANSION
2007 THROUGH 2024


Source: Adobe Stock, Alicia

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION

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Funding for monitoring armadillo range expansion 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 begin 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 based on 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.

Background on Nine-banded Armadillos

There are over 20 different armadillo species alive today, most of which are only native to Central and South America. The nine-banded armadillo (*Dasypus novemcinctus*), however, is unique in that it has expanded its range into North America, including much of the southeastern United States over the past few centuries. The nine-banded armadillo was first recorded in Texas in 1849, but the species has since expanded north and east, crossing the Mississippi River sometime in the early 1940's, appearing in western Tennessee in 1980, and reaching North Carolina in the late 2000s. This is the only armadillo species that can be found in the wild in North America, so it may be locally referred to (including in this report) simply as 'armadillo' rather than 'nine-banded armadillo.'


Source: Adobe Stock; Alizada Studios

Armadillo is a Spanish name meaning "little armored one," referencing the characteristic armor-like skin, plated tail, and the protective but flexible bony shell (called a carapace) that covers most of the armadillo's body. 'Nine-banded' refers to the roughly nine (ranging from 7-11) bands across its midsection. They have small eyes, deer-like ears, and long tapered noses which are well-adapted for foraging by smell. Armadillos have strong limbs and sturdy claws which allow them to dig burrows and forage in the soil, sticky tongues to help capture invertebrate prey, and small peg-like teeth to mash and grind their food. Their diet is almost exclusively comprised of invertebrates – including beetles, ants, caterpillars, spiders, worms, snails, insect eggs and larvae – though they may also consume vertebrates, fungi, and plant material.

Contrary to popular media representations, nine-banded armadillos are not necessarily desert dwelling creatures but rather inhabit a variety of landcover types within temperate and tropical regions alike. This species does not roll into a ball as a defense mechanism (like some of their close relatives can) but they may jump straight up into the air when startled. This is unfortunately an ineffective defense against vehicle collisions, and may contribute to the number of road-killed armadillos throughout their range. They are often seen foraging in a slow, meandering, seemingly oblivious manner, but they can move quickly towards cover if they feel threatened. They are excellent burrowers and can even swim and climb fences.

Armadillo range expansion into North Carolina is believed to have occurred primarily due to natural dispersal from growing populations in Georgia, South Carolina, and Tennessee (rather than by human introduction). Their overall range expansion has been facilitated by several factors, likely including land cover change and increasingly mild winter temperatures. Armadillos lack thick insulation (i.e., fur, body fat), do not hibernate, and must dig for most foods – all traits which make them ill-equipped for surviving freezing conditions. However, like

many places, North Carolina is experiencing fewer stretches of below freezing weather each year, which has allowed armadillo populations to continue expanding northward.

Armadillo Observations in North Carolina

The North Carolina Wildlife Resources Commission (NCWRC) received its first credible report of a nine-banded armadillo in NC in Macon County in 2007. Since then, the agency has monitored, verified, and compiled observations to help track range expansion and population establishment in the state. The NCWRC actively seeks observations from the public to help with this effort, and to date has reviewed over 1,500 reports (not all confirmed) across 84 counties.

To participate, volunteers who spot an armadillo in the wild are asked to upload and share their photos on the NC Armadillo Project via the free online platform iNaturalist. Volunteers can upload their photos via a computer at iNaturalist.org or they can download the free iNaturalist app, which is available for iPhone and Android. People who want to report observations but do not want to use iNaturalist can send their armadillo observations to armadillo@ncwildlife.gov. The email should include a photo of the armadillo (if available), when it was observed (date and time), the disposition (alive or dead), and the location where it was found (GPS coordinates are best, but a detailed location description or pin link is acceptable). While photo or video evidence is needed to confirm the observation, this is not necessary for submitting an observation to our database, as we are interested in all observations.


Source: Adobe Stock; Irina K.

Armadillo observations are reviewed by NCWRC staff and classified into one of three categories (unconfirmed, credible, and confirmed) based on the reliability of available information (Table 1). The NCWRC has these categories as we do get reports of armadillos that turn out to be a misidentification (e.g. vehicle-killed snapping turtles or live opossums captured on Ring-type video cameras). Misidentifications are removed from our observation database.

Table 1. Three categories for armadillo observations in North Carolina.

Confirmed observations	a photograph, video, or carcass was available to confirm species identification and location of observation
Credible observations	a photograph, video, or carcass was not available but based on other information provided and the observer (e.g., biologist, researcher), the observation was determined to be an armadillo
Unconfirmed observations	reports in which no evidence is provided or available, and the NCWRC cannot confirm that the observation was an armadillo

Armadillo Observation Monitoring 2007-2024

Through December 31, 2024, a total of 1,562 armadillo observation reports across 84 counties were compiled and reviewed. Of these, 48% were unconfirmed (n=757), 12% were credible (n=189), and 39% were confirmed (n=616). Confirmed armadillo sightings have now been reported in 40 counties in North Carolina, including new confirmed observations in Anson, Iredell, Richmond, and Stanly counties in 2023, and Harnett and Lee counties in 2024. An additional 17 counties have credible (but no confirmed) reports, and 26 counties have unconfirmed (but no credible or confirmed) reports. The remaining 17 counties have not yet had any reports of armadillo observations, with most of these counties located in the far northern and eastern parts of the state (Figure 1).

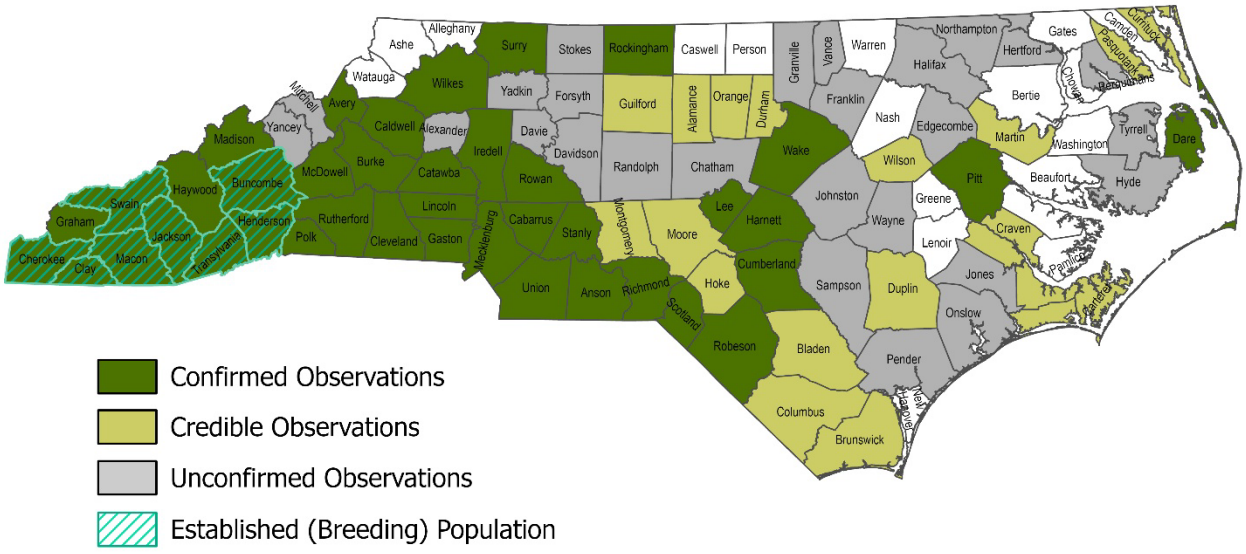


Figure 1. Nine-banded armadillo reports received by county from 2007 through 2024 in North Carolina. Reports include unconfirmed (gray), credible (yellow-green), and confirmed (dark green) observations, as well as counties with established breeding populations (hatched).

Based on reports collected through the end of 2024, we have determined that armadillo populations are established in 8 western North Carolina counties: Buncombe, Cherokee, Clay, Henderson, Jackson, Macon, Swain, and Transylvania. This assessment is based on confirmed observations of multiple armadillos observed together, with group sizes of 2-6 recorded in each of these counties. It is likely, though not yet confirmed, that populations will become established in adjacent counties, such as Graham, Haywood, and Polk in coming years.

Reports of armadillo sightings have increased significantly over the past 18 years, with over 300 observations recorded in each of the past 2 years (Figure 2). The overall increase in reports may be partially due to increased interest in reporting over time, but primarily

represents an increase in the distribution and number of armadillos in the state. See Pages 9-10 for observation maps over time. Observations generally increase in the spring and summer months of May through September which likely reflects increased movements and activity by armadillos, as well as more members of the public spending time outdoors (Figures 3 and 4).

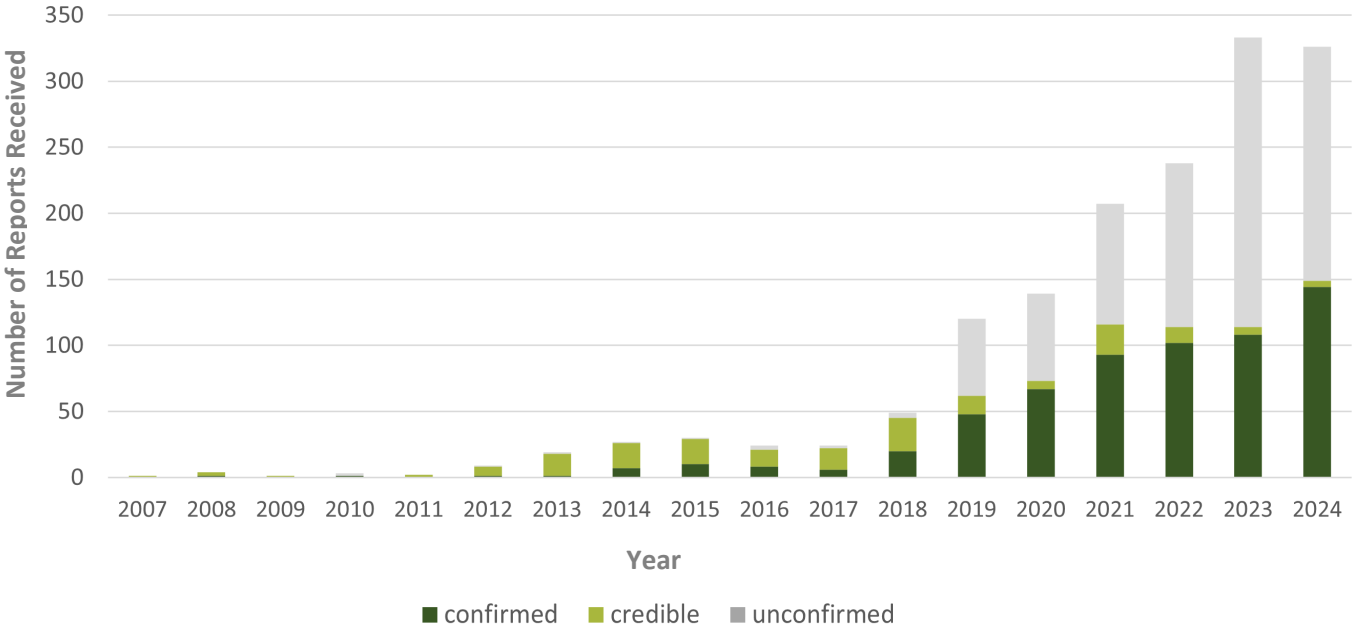


Figure 2. Number of nine-banded armadillo reports received by year from 2007 through 2024 in North Carolina. Reports include unconfirmed, credible, and confirmed observations.

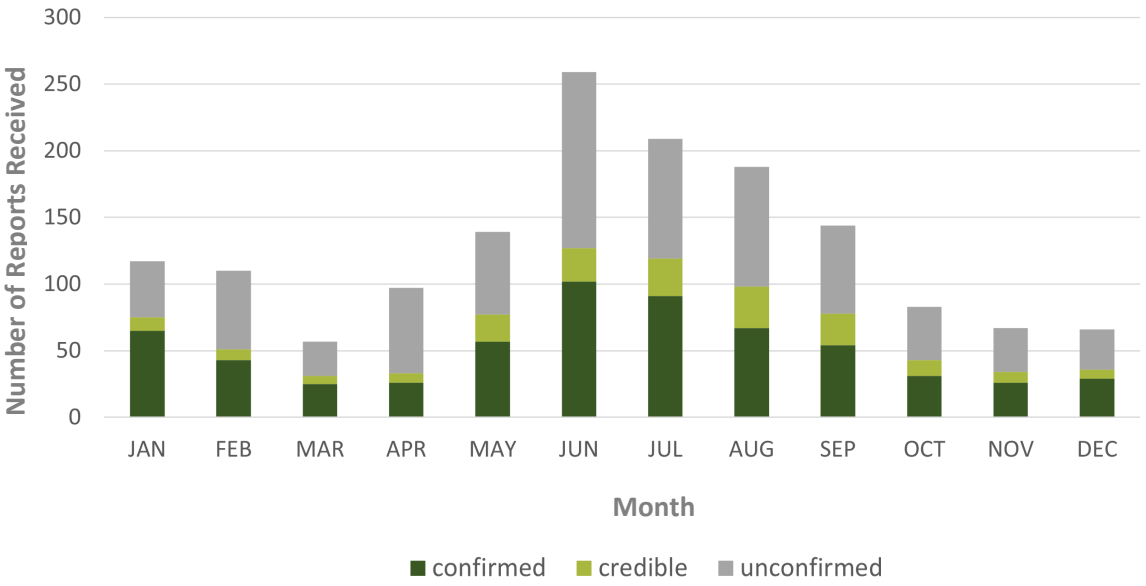


Figure 3. Number of nine-banded armadillo reports received by month from 2007 through 2024 in North Carolina. Reports include unconfirmed, credible, and confirmed observations.

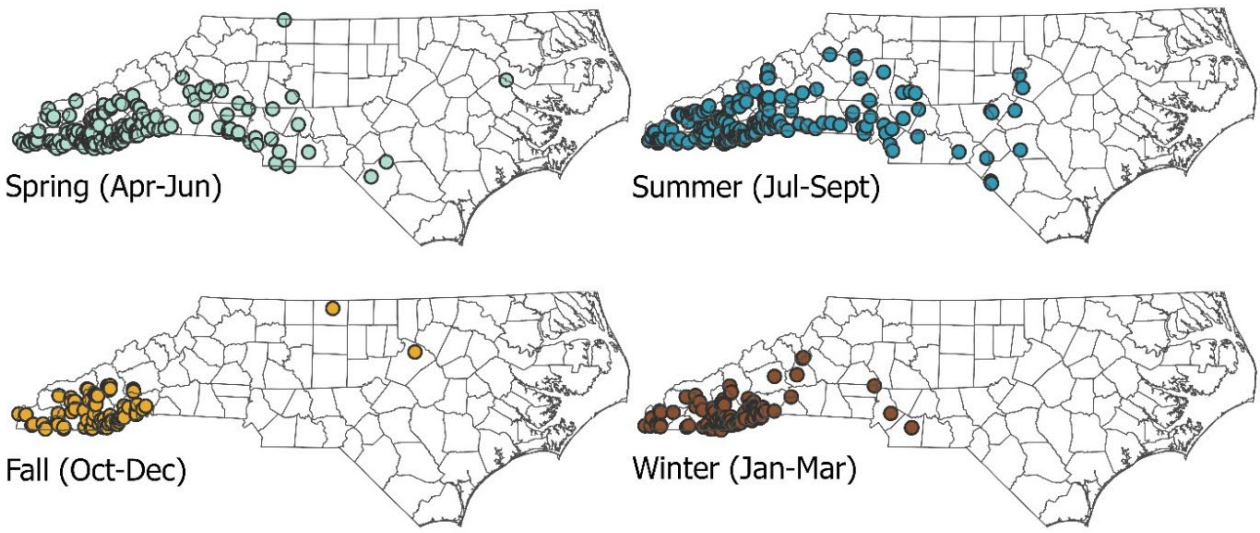


Figure 4. Nine-banded armadillo reports received by season from 2007 through 2024 in North Carolina. Reports include confirmed observations with specific location coordinates available.

Just over half (51%) of all reported observations were of live armadillos, whereas 43% were of dead armadillos (disposition was not reported in the remaining 6%). Vehicle collisions likely accounted for at least 93% of known mortality, based on location (i.e. distance to primary or secondary roads) or report details (i.e. photo or description) in confirmed reports where location could be verified. Other reported causes of mortality have occasionally included dogs, humans, or suspected cold weather. Vehicle-killed and live armadillo sightings on roadways may be overreported compared to the general population, given the increased likelihood of human activity on or near travel corridors. However, it is also possible that armadillos are especially prone to vehicle-caused mortality due to travel or foraging preferences (i.e. favoring roadsides), behavior (e.g. jumping when startled) or sensory capabilities (e.g. poor eyesight).

Co-existing with Armadillos


Credit: Jason Bullard, Wildlife Control Agent

As armadillos expand their range in North Carolina, the number of interactions between people and armadillos will increase. While most of these interactions will be harmless and involve observations, some conflicts may occur. When armadillos forage for food, such as grubs, insects, earthworms, and larvae, they will dig into the ground, which may be at odds with the owner's goal for their property. The most common type of conflict reported is damage to lawns and landscaping as a result of their burrowing and foraging habits (see picture to right). Armadillo activity can be identified by the presence of shallow holes that are 1 to 3 inches deep and 3 to 5 inches wide.

What can you do if you experience property damage?

- Call the Wildlife Helpline at 1-866-318-2401 for guidance on resolving the damage.
- There are no known effective repellents. Poisoning is illegal and would kill other wild and domestic animals.
- Trapping:
  - It is illegal to relocate an armadillo. If you trap an armadillo, you can either release it on the property of capture or euthanize it.
  - Armadillos can be trapped during the regulated trapping season (October 1, 2025 – February 28, 2026). If you are not trapping on your property, you will need a trapping license. All applicable trapping laws and regulations must be followed.
  - Outside the trapping season, armadillos causing property damage can be trapped with a depredation permit issued by the NC Wildlife Resources Commission or a licensed Wildlife Control Agent.
  - Trapping can be challenging due to the movement pattern of armadillos. In one study, unbaited cage traps had similar capture success as baited cage traps. To increase effectiveness, place a cage trap along pathways leading to a burrow or along a fence line or house line. Adding structures that funnel the armadillo to the entrance of an unbaited cage trap may increase capture success.


Source: Adobe Stock: Carl Banks

- Hunting:
    - Armadillos can be hunted year-round and shooting may be a more effective solution if an armadillo is causing property damage.
    - Be sure to check your city's ordinances before discharging weapons.
- Exclusion:
    - Creating barriers around smaller areas, such as flower beds and gardens, can discourage armadillos.

Armadillo Disease Monitoring – Call for Carcasses!

The NCWRC is collecting armadillo carcasses to conduct a study on the prevalence of various diseases within the growing North Carolina population.

We are seeking:

- Trappers or Wildlife Control Agents who can collect, temporarily store (freeze), and submit carcasses to assist with the study
- Reports of road-killed armadillos in good condition (i.e. <1 day old, minimal damage to head/carapace/internal organs)

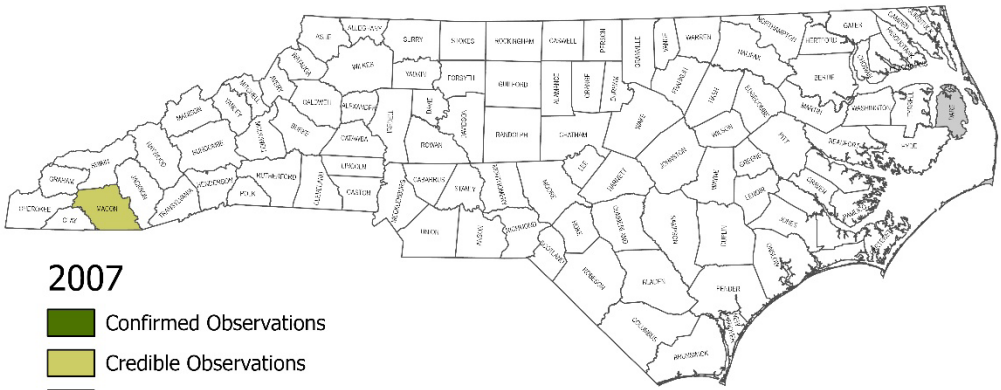

Credit: Kristi Fulbright

To report or provide carcasses (2025-2026 only), please email us at:
armadillo@ncwildlife.gov
Subject line: "CARCASS COLLECTION"

Leprosy has been associated with armadillos, but it is relatively uncommon, with one study showing 0% to 10% of armadillos were infected in the southeast. To reduce exposure to diseases, the Commission recommends that gloves be worn when in direct contact with any wild animal, including armadillos. When working in the garden, gloves should be worn to prevent exposure to various diseases and parasites that can persist in the soil.

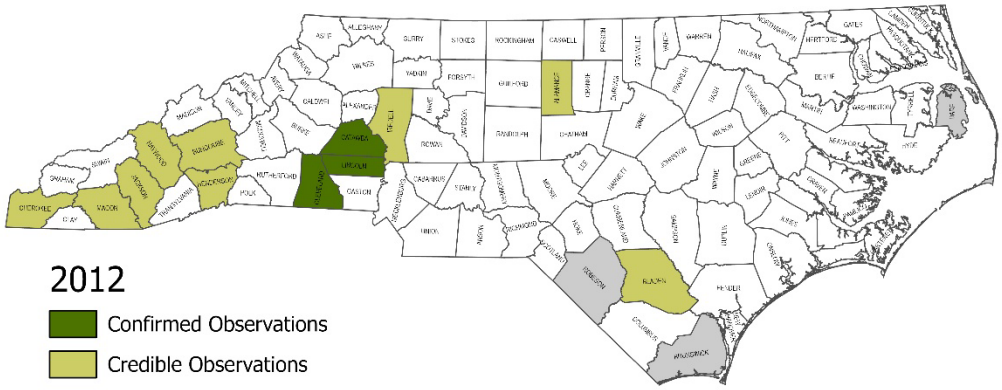
To learn more about this new addition to North Carolina's diversity of wildlife, please visit ncwildlife.gov/armadillo. If you see an armadillo in North Carolina, please e-mail the location, photo, and date of the observation to armadillo@ncwildlife.gov, call the Wildlife Helpline (866-318-2401), or upload your photo to the NC Armadillo project on iNaturalist.

Nine-banded Armadillo
Range Expansion in North Carolina



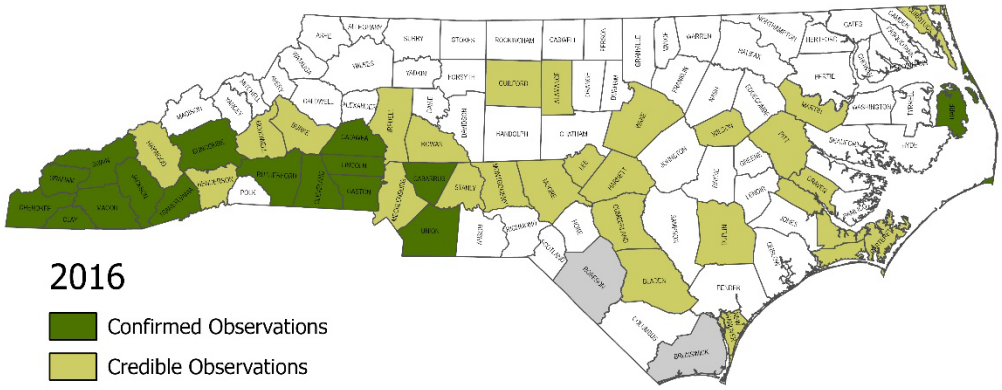
2007

- Confirmed Observations
- Credible Observations
- Unconfirmed Observations



2012

- Confirmed Observations
- Credible Observations
- Unconfirmed Observations



2016

- Confirmed Observations
- Credible Observations
- Unconfirmed Observations

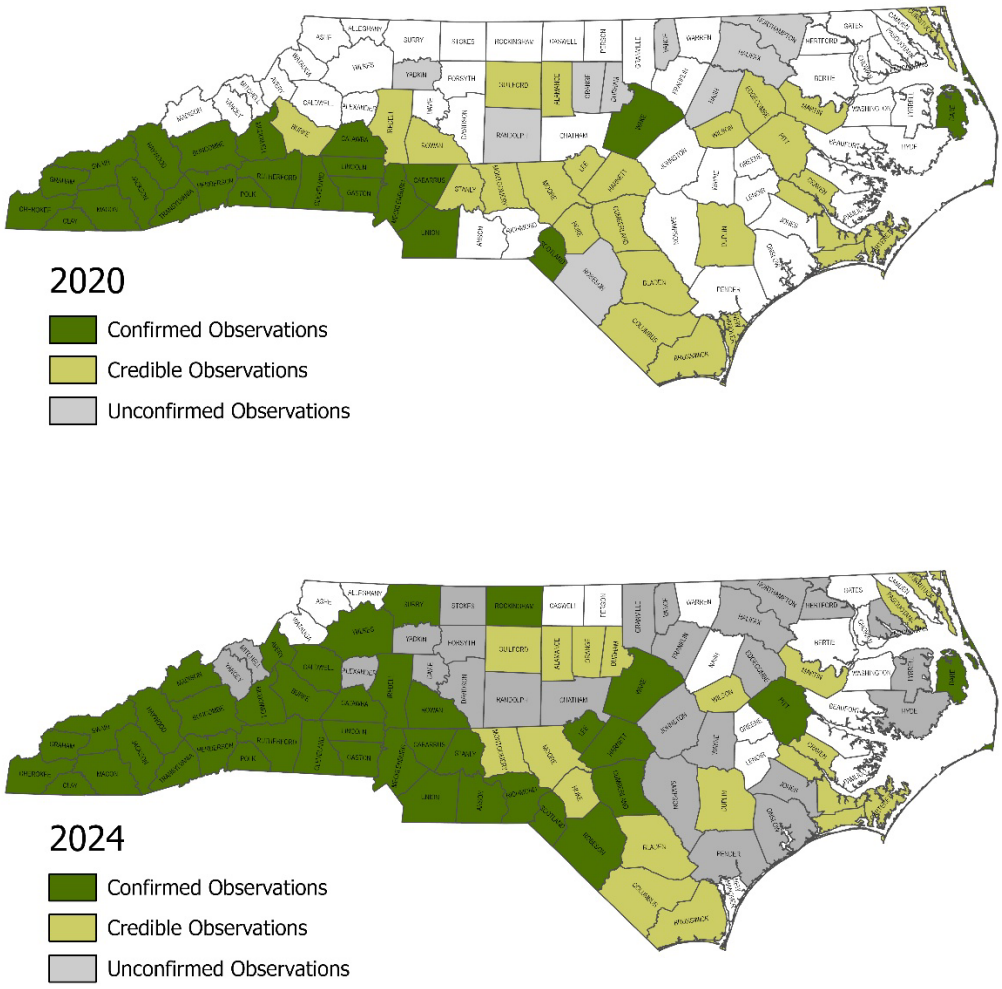


Figure 5. Nine-banded armadillo reports received by county through 2007, 2012, 2016, 2020, and 2024 in North Carolina. Reports include unconfirmed (gray), credible (yellow-green), and confirmed (dark green) observations.