NORTH CAROLINA ARAMADILLO RANGE EXPANSION 2007 THROUGH 2022

N. C. WILDLIFE RESOURCES COMMISSION

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Funding for the 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 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.

The Black Bear and Furbearer Biologist with the North Carolina Wildlife Resources Commission (NCWRC) has monitored, verified, and compiled observations of the Nine-banded Armadillo (*Dasypus novemcinctus*) since the first credible observation was received in 2007. The NCWRC actively seeks observations from the public to help determine range expansion and population establishment in North Carolina. To participate, volunteers who spot an armadillo in the wild are asked to upload and share their photos on the NC Armadillo project, which is on 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.org. 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 is acceptable). While photos help us confirm the observation, they are not necessary and we are interested in all observations.

In 2007, the agency received the first confirmed sighting of a nine-banded armadillo in North Carolina (Macon County) and in the last 16 years, has received 898 reports (unconfirmed, credible, and confirmed) in 70 counties (see page 8).

Confirmed observations are those in which a photograph or carcass was available to confirm species identification and location of observation. Credible observations are those in which a photograph or carcass was not available but based on other information provided and the observer (e.g., biologist, researcher), the observation was determined to be that of an armadillo. Unconfirmed observations are reports in which no evidence is provided or available, and the NCWRC cannot confirm that the observation was definitively an armadillo. For example, the NCWRC has determined some reports of vehicle-killed armadillos were in fact misidentification of vehicle-killed snapping turtles. When we determine an unconfirmed armadillo observation was a misidentification, it is removed from our armadillo observation database. Based on observations, it appears the armadillo is naturally expanding its range throughout North Carolina, rather than being helped by human intervention (e.g., brought in illegally).

Update from 2022 Observations

The number of counties with confirmed observations increased from 26 in 2021 to 28 counties in 2022. The additional counties were Madison and Wilkes counties. In Madison County, the confirmed observation was a vehicle-struck armadillo reported by two independent individuals. In Wilkes County, a NC Forest Service ranger found a vehicle-struck armadillo near his home and took photos. The nine-banded armadillo is likely in more counties, based on both

credible and unconfirmed observations. Confirmed observations stretch from Cherokee to Dare counties (see page 8). There are 23 counties with credible observations and unconfirmed observations of armadillos from 19 other counties, with 3 counties added in 2022. There are 30 counties in which there have been no observations of armadillos, with most of these counties in the far eastern and northern regions of the state (see page 8).

Through 2022, we had determined that armadillo populations were established in 6 western counties (Cherokee, Clay, Jackson, Macon, Swain, Transylvania counties), based on the description provided in confirmed reports from those counties. We can verify population establishment, in which breeding and reproduction is occurring, through confirmed reports of multiple armadillos observed together. During 2022, 4 armadillos were observed and photographed in the backyard of a home in Swain County. In addition, based on the number of confirmed and credible reports of individual armadillos we have received from Buncombe County (n=71), we suspect the armadillo population is becoming established in that county.

The NCWRC now has enough data to be able to detect trends within our expanding armadillo population. Reports of armadillos in North Carolina have increased in frequency since 2007 (Figure 1). While the increase in reports the last few years partly reflects increased efforts by the NCWRC to promote our interest in armadillo observations (NC Armadillo project), overall the increase since 2007 likely reflect both armadillo range expansion and an increase in the armadillo population.

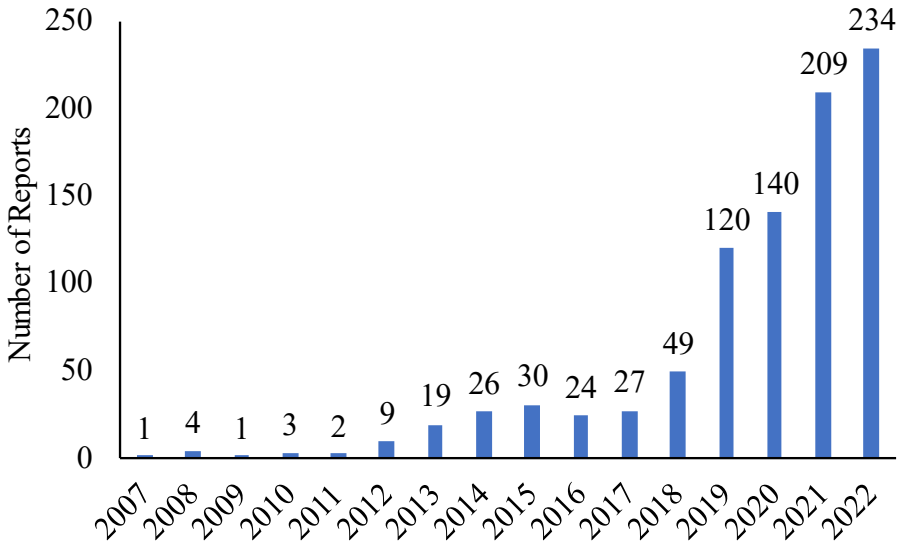


Figure 1. Number of nine-banded armadillo reports received by year from 2007 through 2022 in North Carolina. Reports include unconfirmed, credible, and confirmed observations.

Most reports are received in the summer months from June through September, which likely reflects increased movements and activity by armadillos, as well as more members of the public

spending time outdoors (Figure 2). Observations decline in winter months, but armadillos will remain active during this time period, primarily during the day when it is warm.

When the disposition of the armadillo is reported by the public, a majority of all armadillo reports received through 2021 were of dead armadillos, with motor vehicle collisions the primary cause of mortality. But in 2022, more reports were received about live armadillos. From 2007 to 2022, 49% of armadillo reports were of dead armadillos, with vehicle collisions being the primary cause (98%) of known mortality. For the remaining reports of dead armadillos, the cause of death is due to dogs or unknown, though cold weather is suspected for a few of these reports, based on the location, time of year, and appearance of the armadillo.

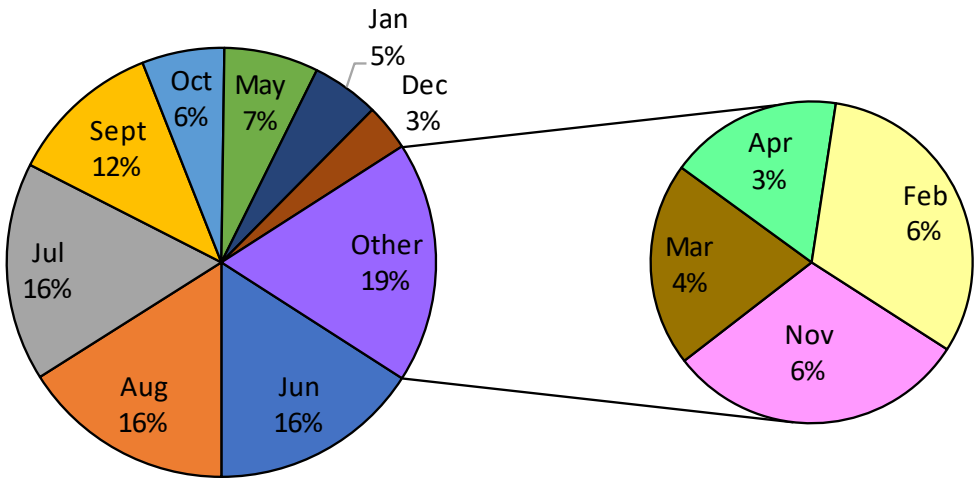


Figure 2. Number of nine-banded armadillo reports received by month from 2007 through 2022 in North Carolina. Reports include unconfirmed, credible, and confirmed observations.

Brief Background on Nine-banded Armadillos:

Armadillos are native to Central and South America but have gradually expanded their range into the southeastern United States. There are 20 species of armadillos, but only the Nine-banded Armadillo lives in the southeastern United States. The Nine-banded Armadillo was first recorded in Texas in 1849, but have since expanded their range 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, primarily from natural dispersal from adjacent states. They often travel slowly, in an erratic, wandering pattern as they forage, and sometimes can be heard grunting like a pig. Armadillos have small, peg-like teeth that are used to mash and grind their food, capturing most of their prey with their long, sticky and flexible tongue.

Mild winter temperature conditions are good for armadillos. Since they lack thick insulation (i.e., fur, body fat) and must dig for most foods, freezing conditions can cause them to starve or freeze to death. However, North Carolina is experiencing fewer long stretches of below freezing weather, which is allowing armadillos to expand northward. The expansion northward

also reflects the increased abundance of the Nine-Banded Armadillo population in neighboring states and in North Carolina.

To learn more about our newest North Carolina wildlife resident, please visit ncwildlife.org/armadillo. And if you observe an armadillo in North Carolina, please e-mail armadillo@ncwildlife.org, call the Wildlife Helpline (866-318-2401), or upload your photo to the NC Armadillo project.

Co-existing with Armadillos


Credit: Jason Bullard, Wildlife Control Agent

The Nine-banded Armadillo is a unique mammal, with its armor-like skin and long, scaly tail. They are the only mammal species that has a shell and the common name, armadillo, is derived from a Spanish term meaning "little armored one". It is named for the bands (range from 7-11) across its midsection. It has deer-like ears and has also been nicknamed "Armored pig" for its long, pig-like snout, which it keeps to the ground to forage by smell.

But 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). Their burrowing can damage tree roots and may uproot ornamental plants. 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?

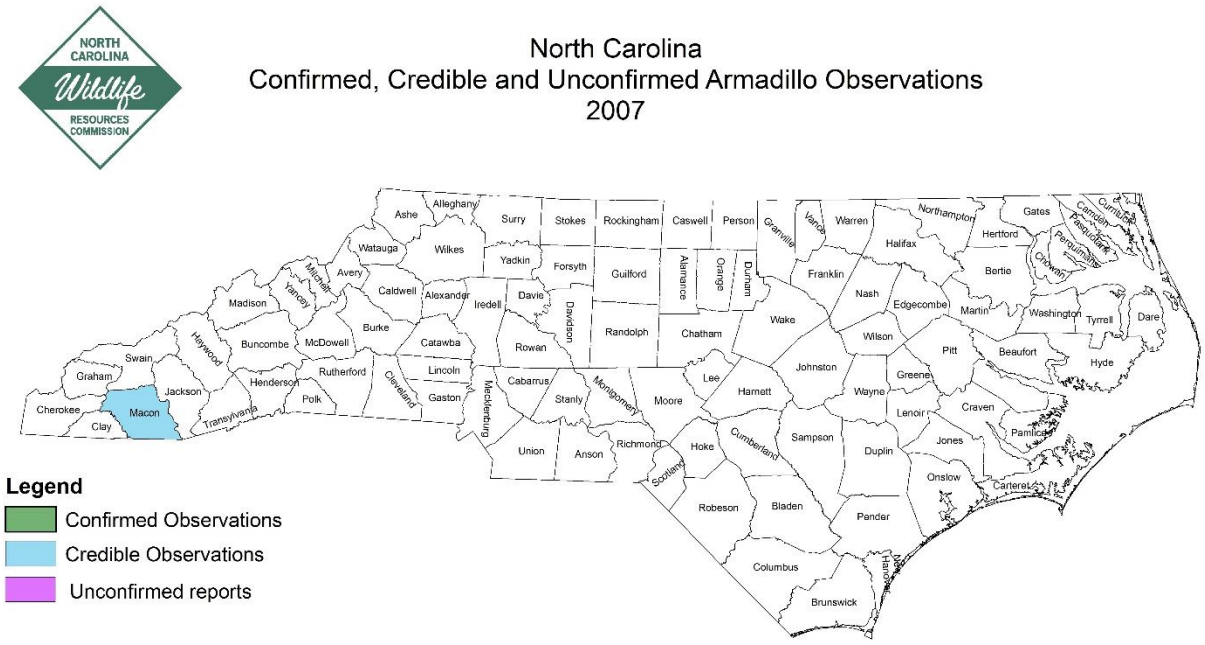
1. Call the Wildlife Helpline at 1-866-318-2401 for guidance on resolving the damage.
2. There are no effective repellents. Poisoning is illegal and would kill other wild and domestic animals.
3. Trapping
    - It is illegal to relocate an armadillo and armadillos cannot be rehabilitated. If you trap an armadillo you can either release it on the property of capture or euthanize it.
    - Armadillos can be trapped during the regulated trapping season (Nov. 1 through end of February). 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.

- Note that trapping can be ineffective 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 wings, such as 6-foot long boards, that funnel the armadillo to the entrance of an unbaited cage trap may increase capture success.

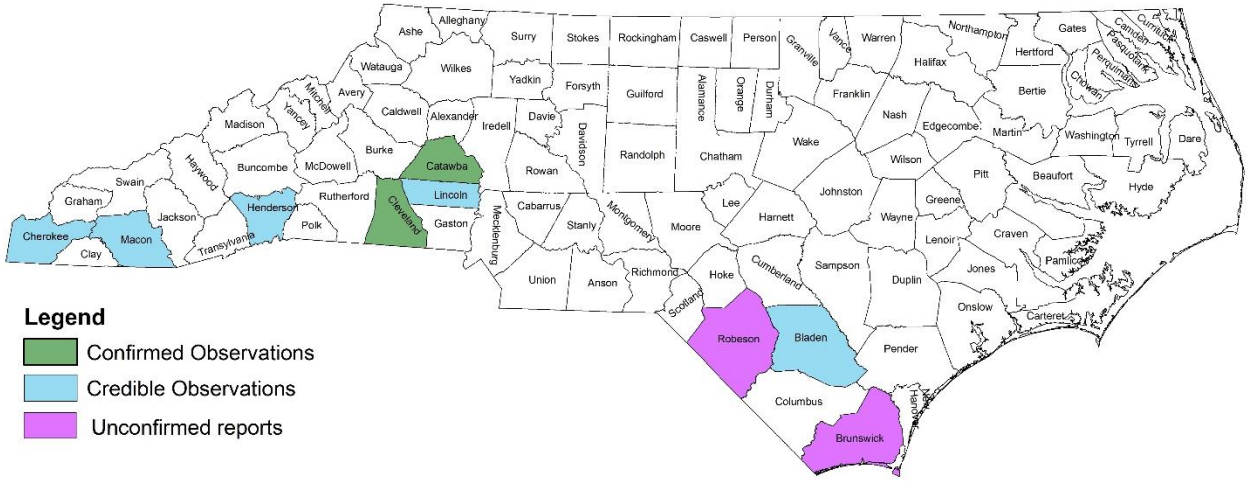
4. Hunting:
    - Armadillos can be hunted year-round and shooting may be a more effective solution if an armadillo is causing property damage.
    - Be sure to check your city's ordinances before discharging weapons.
5. Exclusion:
    - Creating barriers around smaller areas, such as flower beds and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

What can I do to prevent catching leprosy?

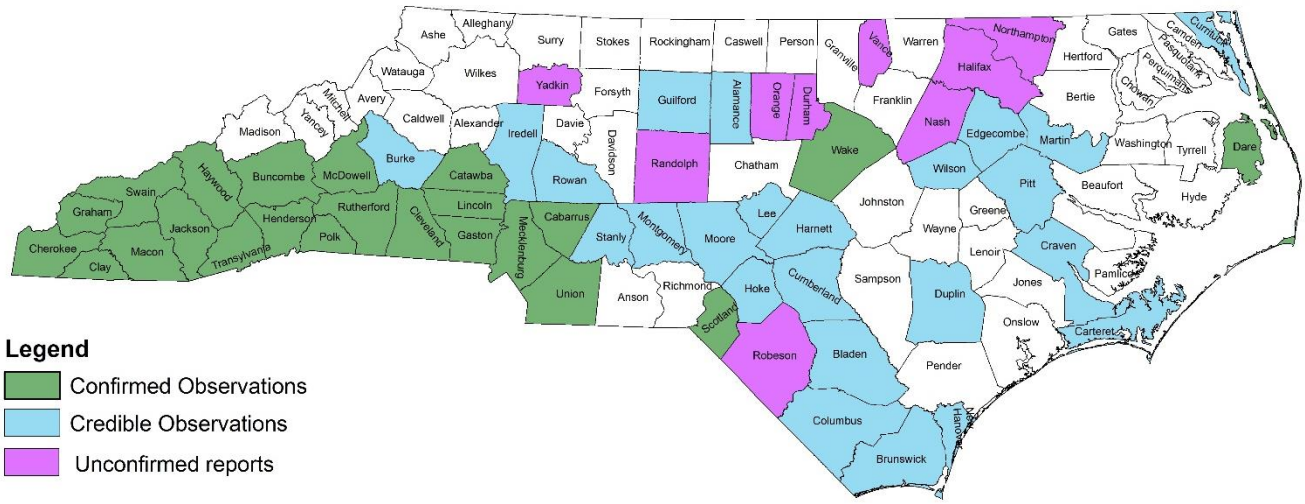
Leprosy has been associated with armadillos, but it is relatively uncommon, with one study showing 0% to 10% of armadillos were infected in the southeast. To reduce exposure to diseases, the Commission recommends that gloves be worn when in direct contact with any wild animal, including armadillos. When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



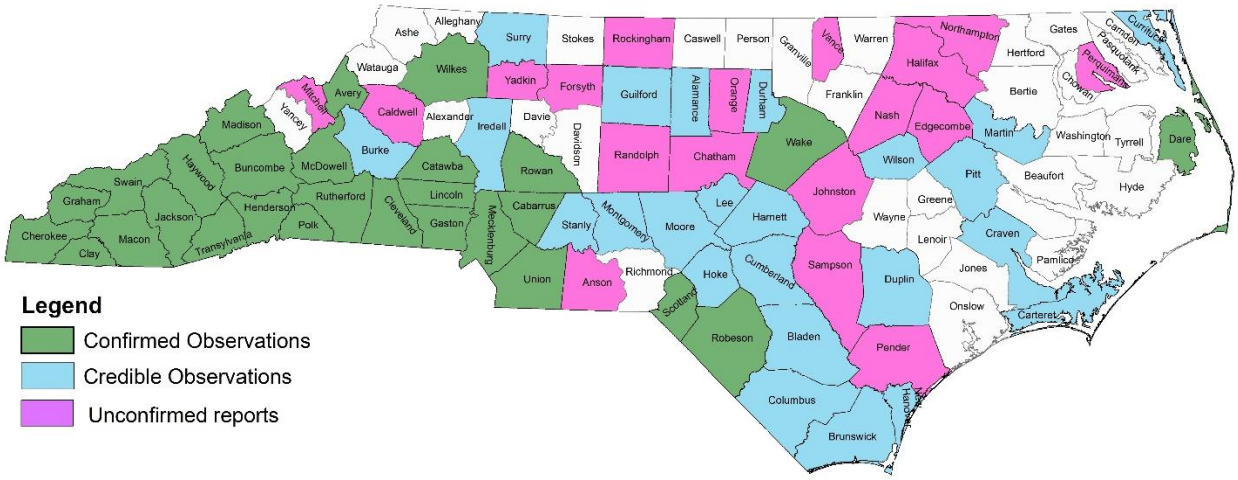
North Carolina
Confirmed, Credible, and Unconfirmed Armadillo Observations
2010



North Carolina
Confirmed, Credible, and Unconfirmed Armadillo Observations
2020



North Carolina
Confirmed, Credible, and Unconfirmed
Armadillo Observations by County
2007 through 2022



North Carolina
Number of Confirmed, Credible, and Unconfirmed Reports of
Armadillo Observations by County
2007 through 2022