

Foliage Roosting Bats Guild

Hoary Bat (*Lasiurus cinereus*)

Northern Yellow Bat (*Lasiurus intermedius*)

Red bat (*Lasiurus borealis*)

Seminole Bat (*Lasiurus seminolus*)

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DESCRIPTION

Taxonomy and basic description

Foliage roosting bats (also called tree bats) roost by hanging under leaves and branches, or often in the case of Northern yellow bats (*Lasiurus intermedius*), under Spanish moss (*Tillandsia usneoides*). Tree bats rarely, if ever, roost in caves although they have sometimes been captured with colonial bats during fall swarming at cave entrances. These species have been documented roosting on the outside of buildings and behind shutters. The Genus name *Lasiurus* refers to the fact that these bats have hairy tail membranes (the membrane between the hind legs encompassing the tail). These are South Carolina's more colorful bat species. In addition to the Northern yellow bat, South Carolina has the Eastern red bat (heretofore, "red bat") (*Lasiurus borealis*), the Seminole (*Lasiurus seminolus*) bat and the hoary bat (*Lasiurus cinereus*). These latter three species have fur to the tip of the tail membrane. The Northern yellow bat tail membrane is not well furred entirely to the tip and the ears are somewhat pointed, not rounded like those of red, Seminole and hoary bats. All these bats typically have 2-4 young in a single birth per year. These bats exhibit sexual dimorphism; the females are larger than the males, and females tend to have a frosted appearance to their fur. Photo of Northern yellow bat (above, right) provided by BCI.



The Northern yellow bat was once known as *Dasypterus floridanus*, but is currently accepted as *Lasiurus intermedius* as described by H. Allen in 1862. The subspecies recognized in South Carolina is *Lasiurus intermedius floridanus*. The red bat was described by Gray in 1831, and the closely related Seminole bat was first described in 1895 by Rhoads. Palisot de Beauvois described the hoary bat in 1796.

The second largest bat in South Carolina, the Northern yellow bat weighs 14-20 g (0.49-0.7 oz.) and has a total length of 127.6 mm (5 in.). The forearm measures 51-53 mm (2-

2.1 in.) and foot measures 8-12 mm (0.3-0.47 in.). The fur is a silky yellow-orange with a faint wash of brown or gray on the tips.



Male red bats are a brick red color; the females tend to have a lighter red base color with hairs frosted at the tips so their general appearance is lighter and have a more chestnut appearance than that of males. Both sexes have a crisp white patch at the wrist and shoulder. Individuals have an average weight of 15 g (0.529 oz.), and a body length of 13 cm (5.1 in). Ears are rounded and furred. The coloration of red bats and Seminole bats gives them the appearance of dead leaves. Photo of red bat (left) by USGS.

Male Seminole bats are a rich mahogany and the larger females also have a mahogany base color but with frosted hairs. Like red bats they have distinct white patches at the wrist and shoulder. Sizes vary from 8.8 -12.1 cm (3.5-4.8 in.) body length and weighing 9-14g (0.3- 0.49 oz.). They have furry rounded ears. Photo of Seminole bat (right) by USGS.



Hoary bats are the largest bat in South Carolina weighing 25 g (0.9 oz.) on average, and their wingspan approaches 40 cm (16 in.). They are very attractive with distinct black ear margins and a dark muzzle, contrasted by yellow on the head and under the chin. The rest of the bat is a rich mahogany base color with light frosted tips. Females are larger than males but are not colored differently. This coloration allows a hoary bat to visually blend in with tree bark. The species is the most well-furred bat in South Carolina. Like the red and the Seminole bat, the hoary bat has white wrist and shoulder patches.

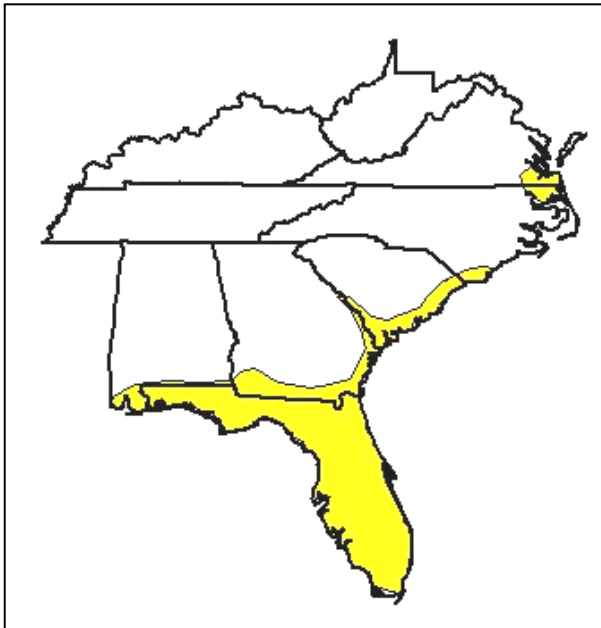
Photo of hoary bat (above, left) by BLM.

Status

The status of the Northern yellow bat in North Carolina and South Carolina is Unknown (S?). Georgia and Mississippi regard the species as Imperiled. Alabama ranks the Northern yellow bat as Critically Imperiled. The species has a global status of Apparently Secure (G4/G5).

Red, Seminole, and hoary bats are ranked as Globally Secure (G5). In South Carolina the state rank for hoary bats is Undetermined (S?) but they are tracked by the Heritage Trust database. Georgia ranks hoary bats as apparently secure (S4), whereas North Carolina lists them as S3/S4. Neither the red or Seminole bat are currently tracked in the SC Heritage Trust database, but the Southeastern Bat Biodiversity network does keep a database that includes all of these species. North Carolina ranks the Seminole bat breeding population as Vulnerable to Apparently Secure (S3/S4B), and in Georgia they are ranked Secure (S5). Red bats are ranked as Secure (S5) in Georgia, Alabama, and North Carolina. In Virginia, red bats are Apparently Secure (S4).

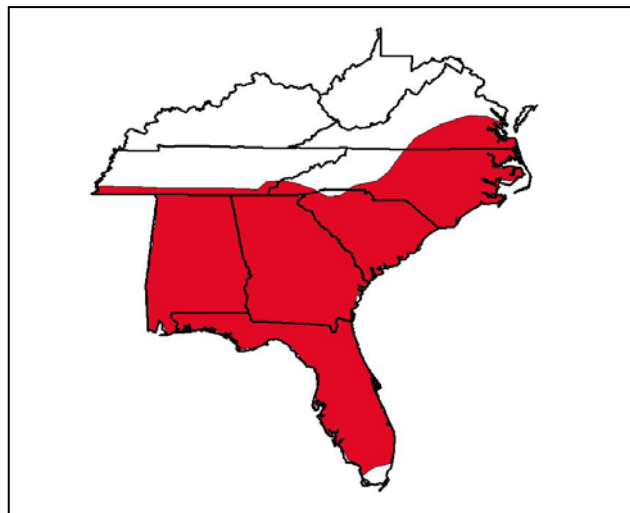
POPULATION SIZE AND DISTRIBUTION



The distribution of Northern yellow bats is poorly known. They have been found in coastal New Jersey and Virginia, but the accepted range is typically farther south. They occur in the Outer Coastal Plain of South Carolina and into the Inner Coastal Plain along the Savannah River, and southward in the Coastal Plain of Georgia and Alabama and into Florida (Figure 1). North Carolina reports two records near South Carolina from New Hanover and Brunswick Counties.

Figure 1. Distribution of the *Lasiurus intermedius* in the South.

Density estimates are not available. In some locations in Florida, the Northern yellow bat is the predominant species. There, feeding aggregations of more than 100 individuals, (mostly females) have been reported in mid to late summer. Males may congregate in the winter in Florida; the behavior in the Carolinas is unknown. The home range of an individual bat in Georgia was reported as 10.5 ha (25.9 acres) in oak and pine habitat. The species is not known to be migratory. Figure 2. Distribution of the *Lasiurus seminolus* in the South.



Red and hoary bats are distributed statewide in winter. Red bats are year round residents, but their numbers increase in the late fall and winter due to the arrival of winter migrants from the north. Hoary bats are more difficult to detect than red bats because they typically forage higher than most net and harp trap sets, but they have been detected in breeding condition in summer in the mountains. An adult hoary bat was found in the Piedmont, July 3, 2012. Little is known about red bat and hoary bat migration. High mortality is seen in red and hoary bats at wind energy facilities, particularly in spring and fall in forested regions of the Eastern United States.

Seminole bats are common in South Carolina's pine-dominated Inner and Outer Coastal Plains and Piedmont, but summer and fall records of Seminole bats from Oconee County also exist. They are non-migratory. Like Northern yellow bats, Seminole bats will roost in clumps of Spanish moss. These bats can also roost behind loose bark. Roosts are typically 1-4.5 meters above the ground.

HABITAT AND NATURAL COMMUNITY REQUIREMENTS

Northern yellow bats are one of the least understood mammalian species in South Carolina. They occur in the Coastal Plains of South Carolina. Most of what is known about the species was derived from Florida. These bats forage over open areas such as fields, pastures, golf courses, marshes, and along lake and forest edges. Roosting habitat includes oak forests, long-leaf pine stands (*Pinus palustris*) in Florida sandhills, and live oak (*Quercus virginiana*) hammocks. Roosting sites are usually in clumps of Spanish moss or under old palm fronds.

Seminole and red bat calls are too similar to differentiate using acoustic detectors so it is difficult to estimate relative abundance or habitat use where the species overlap without using radio telemetry. Red bats prefer foraging in uncluttered stands (those which have been thinned). They roost on smaller branches or twigs, often in the hardwood tree canopy. They often prefer the dominant or co-dominant live hardwoods, and they may not use trees near forest margins. However, in North Carolina, males select roosts that are close to forest roads. Red bats sometimes roost in the leaf litter, particularly during very cold periods, with their furry tail membrane pulled around their body up to their face. Thus, they may be vulnerable to predation and any activity involving disturbance of the leaf litter during winter periods.

Seminole bats roost in pine-dominated stands in summer. Preferred roost trees tend to be large pines located near forested corridors. Reproductive females choose the largest trees. Non-reproductive bats will use smaller trees (they are not limited to use of large pines only). During winter, Seminole bats are more likely to use both hardwood and pine stands for roosting. Like red bats, Seminole bats use the leaf litter of the forest floor for winter roosting as well as overstory and understory trees.

Both Seminole and red bats exhibit low roost site fidelity (i.e. they frequently switch trees) but have high site fidelity (they roost among different trees located within the same general area).

Seminole bats typically do not use hardwood forested streamside corridors for foraging but use upland forested corridors which typically have a pine component. Red bats in managed forests in Mississippi show no preference for habitat types. Although red bats are often in urban areas, at the landscape level they avoid areas with greater development.

Hoary bats typically roost 3-5 m (10-16 ft.) above the ground and will use tree cavities, trunks, tree foliage, squirrel nests, and Spanish moss. They inhabit coniferous and deciduous forests near clearings. [NatureServe 2012]

Studies on habitat use of these bats have not been abundant and evenly spread among physiographic regions or habitat types. Therefore, one cannot presume the information herein to be comprehensive and typical to all areas.

CHALLENGES

- Loss of habitat due to development (man-made alterations and anthropogenic changes).
- Loss of roost sites in the form of removal of old palm fronds (for cosmetic reasons) and harvest of Spanish moss.
- Loss of habitat and direct mortality from natural causes such as hurricanes.
- Collisions with wind turbines or injury from active turbines.
- Collisions with towers.

CONSERVATION ACCOMPLISHMENTS

None of the experts contacted in the mammal review process had any knowledge of any funded projects dealing specifically with Northern yellow bats in South Carolina. They were not detected in several bat surveys on coastal military installations.

CONSERVATION RECOMMENDATIONS

Management

- Retain Spanish moss and old palm fronds on public lands to benefit Northern yellow bats.
- Encourage retention of Spanish moss and old palm fronds on private lands to benefit Northern yellow bats.
- Retain upland forest corridors to prevent isolation of Seminole bats.
- In the Piedmont region, timber management that creates uncluttered forest, such as pine thinning or controlled burns may benefit foraging bats.
- Work with wind energy development companies to mitigate impacts of wind turbines (e.g. increasing the cut-in speed of turbines to reduce mortalities).

- Advise forestry professionals to conduct controlled burns when minimum night temperatures are $>4^{\circ}\text{C}$ (39°F) and temperatures at the time of ignition are $>10^{\circ}\text{C}$ (50°F).

Priority research and survey needs

- Identify priority areas for field surveys for Northern yellow bats.
- Determine Northern yellow bat distribution, via surveys, in the Carolinas.
- Determine summer and winter roost site and habitat requirements for all lasiurine species.
- Gather migration information for red and hoary bats.
- Determine the extent of off-shore foraging and commuting and its seasonality to assess vulnerability of lasiurine bats to off-shore wind development.
- Determine vulnerability of lasiurine bats to coastal wind energy development, particularly during fall migration.
- Conduct molecular research to determine the validity of the yellow bat subspecies designation and the variation within the species across its known distribution.
- Determine if Northern yellow bats are threatened by pesticide and / or heavy metal contamination.

Monitoring

- Monitor significant Northern yellow bat roost sites, located by survey efforts, for continued usage.
- Maintain capture and location information for all lasiurine bats.
- Use vehicular acoustic surveys to monitor lasiurine bats occupancy rates on a seasonal and annual basis.

Education, public outreach and cooperative efforts

- Educate home and landowners about the importance of Northern yellow and other bats and discourage the practice of removing roosting habitat such as old palm fronds and large amounts of Spanish moss from trees.
- Create demonstration areas on publicly owned site(s), leaving old fronds uncut on palms in a highly visible area with prominent signage explaining that old fronds provide important roosting habitat for Northern yellow bats.

MEASURES OF SUCCESS

As research and management needs are identified, projects should be proposed and prioritized by those with the greatest conservation applicability. Surveys and density estimates in the southern region should provide some population estimations that will be used to more accurately rank the species and prioritize future management needs. It is imperative to determine important roost site locations to provide long-term habitat for the species. Currently, very little is known about Northern yellow bats in South Carolina.

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