



Wildlife Information Guide

BAT (Order-Chiroptera)

Common Species in New England

- Little Brown Bat (*Myotis lucifugus*)
- Big Brown Bat (*Eptesicus fuscus*)
- Red Bat (*Lasiurus borealis*)
- Hoary Bat (*Lasiurus cinereus*)
- Silver-haired Bat (*Lasionycteris noctivagans*)
- Tricolored Bat (*Perimyotis subflavus*)

DESCRIPTION

Bats are the only mammals capable of true flight, distinguished by their wing structure consisting of a thin membrane of skin stretched between elongated finger bones. New England hosts several bat species, each with distinct characteristics adapted to specific ecological niches.

PHYSICAL CHARACTERISTICS

Size Variations New England bats range considerably in size. The little brown bat, one of the most common species, has a wingspan of 8-11 inches and weighs 5-14 grams. In contrast, the hoary bat is much larger, with a wingspan reaching 15-17 inches and weighing 20-35 grams. **Wing Structure** Bat wings consist of a flexible membrane (patagium) that extends from the body to the arms, hands, and fingers, and often to the legs and tail. This membrane is highly sensitive and contains numerous blood vessels and nerve endings, making it essential for both flight and sensory functions. **Fur and Coloration** Most New England bats have brown fur ranging from light tan to dark chocolate brown. The red bat displays reddish-orange fur with white-tipped hairs, while the hoary bat has frosted gray-brown fur with white tips giving it a distinctive hoary appearance. The silver-haired bat shows blackish-brown fur with silver-white tips. **Facial Features** Bats possess large ears relative to their body size, essential for echolocation. Their eyes are small but functional, contrary to the common misconception that bats are blind. Most New England species have simple nose structures, unlike the complex nose leaves found in some tropical species.

ANATOMICAL ADAPTATIONS

Echolocation System Most New England bats use sophisticated echolocation systems, producing ultrasonic calls through their mouth or nose and interpreting the returning echoes to navigate and locate prey. This biological sonar system is so precise that bats can distinguish between objects differing by mere millimeters. **Specialized Limbs** Bat forearms are modified into wings, while their hind limbs are adapted for hanging upside down. Their feet have curved claws that automatically lock when relaxed, allowing them to hang effortlessly without muscle effort. **Metabolic Adaptations** Bats have extremely high metabolic rates when active, with heart rates reaching 400-1000 beats per minute during flight. However, they can dramatically slow their metabolism during rest periods and hibernation.

BEHAVIOR

Bat behavior is characterized by remarkable adaptations to nocturnal life, seasonal climate variations, and specialized feeding strategies. **Flight Patterns and Navigation** Bats are capable of sophisticated flight maneuvers, including rapid direction changes, hovering, and precise landing approaches. Their flight speeds vary by species, with most New England bats flying at 10-20 mph during foraging, though they can reach speeds of 25-30 mph when traveling between roosts. Navigation combines echolocation with visual landmarks, magnetic field detection, and memorized flight paths. Bats often follow regular foraging routes, known as "commuting corridors," between roosts and feeding areas. These corridors frequently follow landscape features such as streams, forest edges, and roadways.

ROOSTING BEHAVIOR

Day Roosts During daylight hours, bats seek secure roosting sites that provide protection from predators and weather. Natural roosts include tree cavities, rock crevices, and caves. In human-modified landscapes, bats commonly roost in buildings, particularly attics, barns, and church steeples. **Night Roosts** Between foraging bouts, bats may use temporary night roosts for resting and digesting prey. These sites are typically less secure than day roosts and may include covered porches, bridges, or dense vegetation. **Communal vs. Solitary Roosting** Some species, like little brown bats, form large communal roosts containing hundreds or thousands of individuals, particularly during the maternity season. Others, like red bats, are typically solitary and roost alone in tree foliage.

SOCIAL BEHAVIOR

Bat social structures vary significantly among species. Colonial species exhibit complex social behaviors including communication through vocalizations, chemical signals, and



physical interactions. Social grooming is common within roosts, helping maintain group cohesion and hygiene. Maternal colonies of female bats form during the breeding season, providing communal care for young and thermal benefits through clustering. Males often roost separately during this period, either alone or in small bachelor groups.

SEASONAL ACTIVITY PATTERNS

Active Season New England bats are most active from April through October, with peak activity during warm summer months when insect prey is abundant. **Hibernation** Most New England bat species hibernate through winter, entering a state of prolonged torpor where body temperature drops to near-ambient levels and metabolic rate decreases by 90-95%. Hibernation sites, called hibernacula, must maintain stable temperatures just above freezing and high humidity. **Migration** Some species, particularly red bats and hoary bats, migrate south for winter rather than hibernating locally. These migrations can cover hundreds of miles and follow predictable routes along mountain ridges and coastlines.

REPRODUCTION

Bat reproductive strategies are highly adapted to their seasonal lifestyle and the energy demands of flight and echolocation. **Mating Systems** Most New England bats mate in late summer or early fall, just before entering hibernation. However, fertilization is delayed until spring through a process called delayed fertilization or sperm storage. Females store sperm in their reproductive tract throughout hibernation, with fertilization occurring upon spring emergence. Mating typically occurs at hibernation sites or during swarming behavior at cave entrances. During these swarming events, hundreds or thousands of bats may gather, facilitating genetic exchange between populations.

Pregnancy and Birth Gestation: Active pregnancy lasts approximately 50-60 days, beginning with spring emergence and fertilization. Pregnancy timing is closely synchronized with insect emergence and favorable weather conditions. Birth Season: Most New England bats give birth in June or early July, timing that ensures adequate insect prey for lactating females and growing young. The timing also allows sufficient time for young bats to reach adult size and develop flying skills before winter.

Litter Size: Most New England bat species produce one or two young per year, with twins being common in some species like the big brown bat. The small litter size reflects the high energy investment required for each offspring. **Maternal Care** Maternity Colonies: Pregnant females form maternity colonies in warm, secure roosts that provide optimal conditions for raising young. These colonies may contain dozens to thousands of individuals, depending on the species and available roost sites. Lactation Period: Young bats nurse for 4-6 weeks, during which time they grow rapidly and develop



flight muscles. Mothers must consume large quantities of insects to support milk production, often eating 50-100% of their body weight in insects nightly. **Flight Development:** Young bats begin attempting flight at 3-4 weeks of age, gradually developing the strength and coordination necessary for independent foraging. They may continue to nurse occasionally even after beginning to fly. **Juvenile Development** Young bats reach adult size by 6-8 weeks of age but may remain with maternity colonies through late summer. They must develop echolocation skills, learn foraging techniques, and build fat reserves for hibernation or migration. First-year mortality is high, with many young bats failing to survive their first winter due to insufficient fat reserves or inexperience with hibernation sites.

DIET

All New England bats are insectivorous, playing crucial roles in ecosystem pest control and demonstrating remarkable feeding adaptations. **Prey Species** Primary Insects: New England bats consume a diverse array of flying insects, with preferences varying by species and habitat

- **Moths and Butterflies:** Comprise a significant portion of the diet for most species, particularly during peak summer months
- **Beetles:** Various beetle species are important prey, especially for larger bats like the big brown bat
- **Flies:** Mosquitoes, midges, and other flies are frequently consumed, making bats valuable natural pest controllers
- **Mayflies:** During emergence events, mayflies can comprise up to 90% of local bat diets
- **Caddisflies and Other Aquatic Insects:** Bats foraging over water sources target these emerging insects

Foraging Strategies **Aerial Hawking:** Most New England bats employ aerial hawking, capturing insects in flight using echolocation to locate and track prey. This requires precise timing and coordination between echolocation, flight control, and prey capture. **Gleaning:** Some species occasionally glean insects from surfaces such as leaves, bark, or water. This behavior is less common in New England species but may occur when prey is abundant on surfaces. **Water Foraging:** Many bats prefer foraging over water bodies where insects are abundant, particularly during evening emergence events. They can capture insects from the water surface or just above it. **Feeding Ecology** **Nightly Consumption:** Bats consume enormous quantities of insects relative to their body size. A single little brown bat can catch and consume 600-1000 mosquito-sized insects per hour during peak foraging periods. **Seasonal Variation:** Diet composition changes seasonally based on insect availability. Spring diets may focus on emerging caddisflies and



mayflies, while summer diets become more diverse as insect communities peak. **Habitat Specialization:** Different bat species often specialize in different habitats and associated insect communities. Some prefer foraging along forest edges, others over open water, and still others in dense forest canopies.

DEFENSIVE MECHANISMS

Bats possess numerous defensive adaptations that have evolved to protect them from predators, environmental hazards, and human persecution. **Physical Defenses** **Flight Capability:** The ability to fly provides bats with their primary escape mechanism from ground-based and arboreal predators. Their agility in flight, including rapid direction changes and three-dimensional maneuvering, makes them difficult targets for most predators. **Echolocation Jamming:** Some bats can adjust their echolocation calls to avoid interference from other bats or to make themselves less detectable to predators that might home in on their calls. **Cryptic Coloration:** Most New England bats have brown coloration that provides camouflage against tree bark, rock surfaces, and building materials where they roost. **Behavioral Defenses** **Nocturnal Activity:** Being active primarily at night reduces exposure to many diurnal predators, particularly hawks and other raptors that hunt by sight. **Roost Selection:** Careful selection of secure roosts provides protection during vulnerable daylight hours. Bats often choose roosts with multiple entrance/exit points and locations that are difficult for predators to access. **Vigilance and Alertness:** Bats maintain high levels of alertness even while roosting, capable of rapid arousal and flight when threatened. **Social Defenses** **Group Roosting:** Colonial species benefit from group vigilance, with multiple individuals monitoring for threats. The confusion effect of many bats taking flight simultaneously can overwhelm predators. **Information Transfer:** Bats can communicate alarm calls and other information about threats, allowing colony members to respond appropriately to danger. **Mobbing Behavior:** Some species engage in mobbing behavior against predators, with multiple bats harassing threats to drive them away from roost sites. **Physiological Defenses** **Torpor:** The ability to enter daily torpor reduces energy expenditure and makes bats less active and potentially less detectable to predators during rest periods. **Hibernation:** Extended hibernation allows bats to avoid the harsh winter period when they would be most vulnerable to starvation and cold-related mortality. **Immune System:** Bats possess unusually robust immune systems that allow them to carry various pathogens without showing disease symptoms, though this can make them important reservoir hosts for diseases transmissible to other mammals. **Predator Relationships** **Natural Predators:** Bats face predation from various sources including hawks, owls, snakes, raccoons, and domestic cats. Hawks and owls are the primary aerial predators, while raccoons and cats may take bats at roost sites. **Predator Avoidance:** Bats time their



emergence from roosts to minimize overlap with peak predator activity periods. They often emerge in large groups to overwhelm predators and frequently use circuitous flight paths to avoid predictable routes.

CONSERVATION CONCERNS

Several New England bat species face significant conservation challenges, particularly from White-nose Syndrome, habitat loss, and wind energy development.

White-nose Syndrome This fungal disease has caused severe population declines in hibernating bat species across the Northeast, with some populations declining by over 90%. The disease disrupts hibernation, causing bats to exhaust their fat reserves and starve before spring. **Habitat Protection** Protecting both summer roosts and hibernation sites is crucial for bat conservation. This includes maintaining older buildings that serve as maternity roosts and protecting caves and mines used for hibernation. **Human Interactions** Understanding bat behavior and biology is essential for managing human-bat conflicts while supporting conservation efforts. Professional exclusion techniques that allow bats to leave but prevent reentry are preferable to lethal control methods.

MANAGEMENT CONSIDERATIONS

Effective bat management depends on seasonal biology and legal timing in New Hampshire. Before mid-May and after mid-August are the appropriate periods to address bat conflicts, while mid-May through mid-August is a maternity period when improper action creates biological, legal, and interior-intrusion risks. Understanding these windows is critical, and situations involving occupied structures, repeated entry, or timing constraints are best handled with professional assistance.

SCIENTIFIC REFERENCES

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This document represents current scientific understanding of bat biology and behavior as of 2025. Information should be used in conjunction with local wildlife management guidelines and regulations.

