Eastern Red Bat

Lasiurus borealis

REGULATORY STATUS

USFWS: No special status
USFS R2: No special status
USFS R4: No special status
Wyoming BLM: No special status
State of Wyoming: Nongame Wildlife

CONSERVATION RANKS

USFWS: No special status
WGFD: NSS4 (Bc), Tier III
WYNDD: G3G4, S3
Wyoming Contribution: LOW
IUCN: Least Concern

STATUS AND RANK COMMENTS

Eastern Red Bat (*Lasiurus borealis*) has no additional regulatory status or conservation rank considerations beyond those listed above.

NATURAL HISTORY

Taxonomy:

No subspecies of Eastern Red Bat are currently recognized [1]. Formerly, Eastern Red Bat was considered a subspecies of Red Bat [2]. Genetic evidence led to the separation of Red Bat into two unique species: Eastern Red Bat and Western Red Bat (*L. blossevillii*) [3]. These taxonomic designations are currently accepted [1].

Description:

Eastern Red Bat is easily identified in the field. It is a medium sized bat. As indicated by its name, Eastern Red Bat has distinctively red pelage. More specifically, it has a brick red or rusty red dorsum with buffy white patches on the shoulders. The venter is similar in color but slightly paler. Eastern Red Bat has a long tail and a fully furred tail membrane [2, 4]. The ears are short and rounded with a triangular tragus [2]. Eastern Red Bat is similar in appearance to Western Red Bat, but only Eastern Red Bat occurs in Wyoming. Where sympatric, Eastern Red Bat is distinguished by its slightly larger size, long tail, and frosted appearance [4].

Distribution & Range:

Eastern Red Bat is widely distributed east of the Continental Divide from southern Canada to northern Mexico. The species migrates from northern portions of its range, including Wyoming, and winters in northeastern Mexico and the southeastern United States [5]. Wyoming marks the far western margin of the species' range, and Eastern Red Bat is limited to the eastern half of the state. Evidence suggests that the species' range may be expanding north and west as far as northern Alberta, perhaps as a result of warming temperatures associated with global climate change [6].

Habitat:
Eastern Red Bat has been documented in a variety of habitats but is typically associated with forested areas. The species prefers large tracts of mature deciduous forests but has also been documented in shelterbelts and riparian and urban areas with large trees [7]. Habitat associations of Eastern Red Bat in Wyoming are poorly understood, but the species is probably restricted to mesic sites with deciduous tree cover [7]. The species forages in riparian areas, above the forest canopy, near forest edges, and in open areas near forest habitats. In summer, the species roosts in the canopy of deciduous trees and shrubs. Roost selection of males and females is similar [8]. Roosting sites are typically surrounded by dense foliage but are open below [2, 4]. Additionally, Eastern Red Bat roosts in trees that are taller and have a larger diameter at breast height than other trees in the forest stand [8]. Eastern Red Bat does not hibernate and migrates out of Wyoming in winter. Habitat use during migration is poorly understood. Within winter range, when winter ambient temperatures remain above freezing, the species roosts on the south side of trees on slopes with southerly aspects. When ambient temperatures fall below freezing, Eastern Red Bat roosts on the ground in leaf litter and enters into torpor until temperatures increase [9, 10].

Phenology:
Phenology of Eastern Red Bat in Wyoming is largely unknown but is assumed to be similar to other portions of the species' range. Eastern Red Bat breeds in August or September, but fertilization of the egg does not occur until the following spring [2]. One to five young are born in late May to mid-June after an 80- to 90-day gestation. Juveniles can fly between three and four weeks of age and are fully weaned at five to six weeks [2, 4]. Timing of migration is poorly understood, but evidence suggests that the species migrates south and east in September and October [5]. In other northerly portions of its range, Eastern Red Bat has been documented in late May through June, suggesting it migrates north in late spring [11, 12].

Diet:
Eastern Red Bat is insectivorous and consumes a wide variety of insects. Soft-bodied moths in the order Lepidoptera comprise the majority of the diet, but insects in the orders Coleoptera, Diptera, Ephemeroptera, and Hymenoptera, among others, have also been identified as prey items [2, 4, 13].

CONSERVATION CONCERNS

Abundance:
Continental: WIDESPREAD
Wyoming: RARE
Estimates of abundance for Eastern Red Bat in Wyoming are not available. Survey data from portions of Wyoming where the species occurs indicate that Eastern Red Bat comprises only a small proportion of mist-net captures and acoustic recordings, suggesting the species is rare, even where suitable habitat exists in the state [14-16].

Population Trends:
Historic: UNKNOWN
Recent: UNKNOWN
Population trends of Eastern Red Bat are unknown in Wyoming. Evidence from other parts of North America suggest large declines in abundance over the past four decades [17]. It is unclear if these trends are applicable to Wyoming.

Intrinsic Vulnerability:
LOW VULNERABILITY
Eastern Red Bat has low fecundity. On average, two offspring are born each spring (range 1–5) [2, 4]. The species also requires suitable roosting habitat, which may be limited in Wyoming. Eastern Red Bat has tested positive for the pathogenic fungus *Pseudogymnoascus destructans* that causes White-Nose Syndrome (WNS). Because the species is usually active during winter, it is hypothesized that Eastern Red Bat is not likely to be negatively affected by WNS [18].

Extrinsic Stressors:
MODERATELY STRESSED
Eastern Red Bat is heavily impacted by wind turbines. The species is one of the most frequently recovered bats during mortality surveys at wind power facilities across North America [19]. A small number of Eastern Red Bat mortalities have been documented at wind power facilities in Wyoming. Several large-scale wind power facilities have been proposed within the predicted range of the species in the state. Eastern Red Bat will likely be increasingly impacted by wind energy in Wyoming and range-wide as new facilities are constructed. Timber harvest of deciduous trees may reduce the availability of suitable roost locations for Eastern Red Bat [20], but it is unknown how this may affect the species in Wyoming. Pesticide use to control insects may adversely affect Eastern Red Bat by reducing food availability and by causing acute and chronic toxicity from the pesticide itself.

KEY ACTIVITIES IN WYOMING

Bats have recently received increasing research attention in Wyoming, and several studies have been completed or are underway that have increased our understanding of bat species in the state, including Eastern Red Bat. Pre-construction and post-construction bat monitoring are being conducted at wind energy facilities across Wyoming. In 2011, the Wyoming Game and Fish Department (WGFD) conducted a bat inventory within forested habitats in northeastern Wyoming using mist nets and acoustic recording units. Only four Eastern Red Bats were captured during this investigation [14]. In 2010 and 2011, the Wyoming Natural Diversity Database (WYNDD) conducted a bat inventory at Devils Tower National Monument, where one Eastern Red Bat was captured in mist nets, and a small number of acoustic recordings were made [21]. WYNDD began a bat monitoring effort in southern Wyoming in 2011 and captured two Eastern Red Bats along the Little Snake River in extreme south-central Wyoming in 2012 [15]. In 2014, WYNDD initiated a bat inventory in northeastern Wyoming. One Eastern Red Bat was captured in both 2014 and 2015, and a small number of acoustic detections of the species were made in each year [22, 23].

ECOLOGICAL INFORMATION NEEDS

Distribution and habitat use of Eastern Red Bat in Wyoming is poorly understood. Little is known about reproductive or migratory phenology of the species, particularly in the Rocky Mountain region. Estimates of abundance and population trends for this species are largely unknown range-wide. While Eastern Red Bat has been impacted by wind energy facilities in other portions of its range, it is unknown to what degree the species is affected in Wyoming.

MANAGEMENT IN WYOMING

This section authored solely by WGFD; Nichole L. Bjornlie. Little is known about Eastern Red Bat in Wyoming. Consequently, management priorities for the species in the short-term will

focus on addressing these data deficiencies, including data on presence, trends, and distribution. In 2016, the WGFD will begin a project in collaboration with the state of Nebraska to evaluate occurrence, abundance, and reproductive status of bats in eastern Wyoming, which represents an important zone of overlap between eastern and western bat species, including Eastern Red Bat. Mist-net surveys will continue to implement WNS protocols and assessment in an effort to assist with early detection should the disease reach the state. Habitat assessments will also be incorporated with survey efforts to better understand what influences species presence and distribution at a finer scale. In addition to inventory projects, WGFD, in collaboration with the Wyoming Bat Working Group and other state-wide partners, will implement the North American Bat Monitoring Program that will use acoustic monitoring to assist with state and region-wide assessments of bat trends. The WGFD has also developed baseline data collection and monitoring recommendations for bats at sites of wind energy development [24], which are provided to industry personnel for all current and proposed wind energy facilities. Furthermore, WGFD, in collaboration with the Wyoming Bat Working Group, published "A Conservation Plan for Bats in Wyoming" in 2005 that provides additional recommendations to minimize bat mortality at wind energy facilities [7]. Additional priorities will include updating and revising the "Conservation Plan as well as the Strategic Plan for WNS in Wyoming". Finally, outreach and collaboration with private landowners will remain a priority to ensure conservation of bats and bat habitat.

CONTRIBUTORS

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Figure 1: Adult female Eastern Red Bat captured in Goshen County, Wyoming. (Photo courtesy of Leah H. Yandow, WGFD)

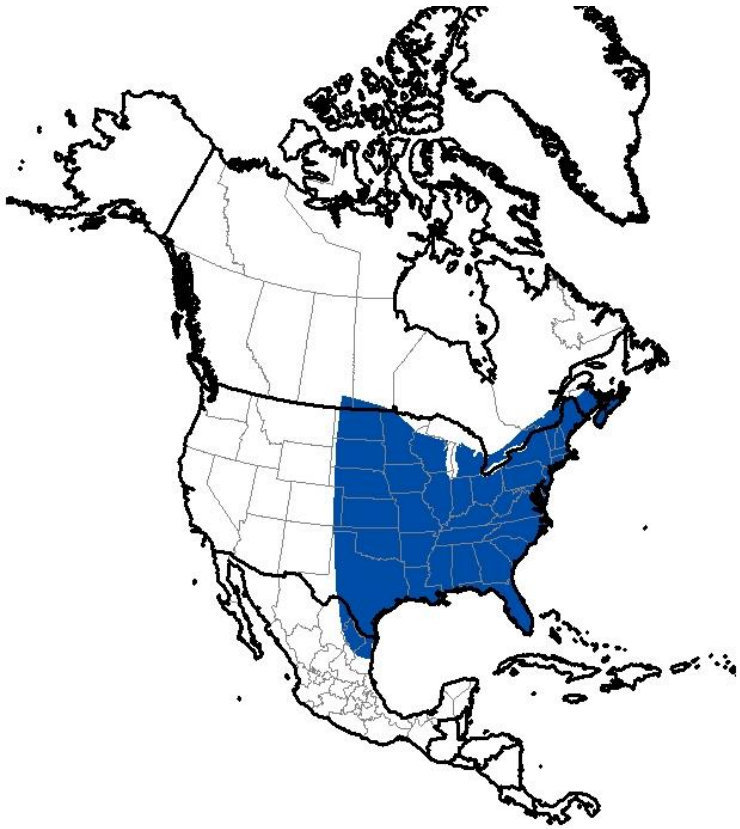

Figure 2: North American range of *Lasiurus borealis*. This map does not accurately show the species' range in Wyoming. (Map from: Patterson, B. D., et al. (2007) Digital Distribution Maps of the Mammals of the Western Hemisphere, version 3.0, NatureServe, Arlington, Virginia.)

Figure 3: Eastern Red Bat habitat near Devils Tower National Monument in Crook County, Wyoming. (Photo courtesy of WYNDD)

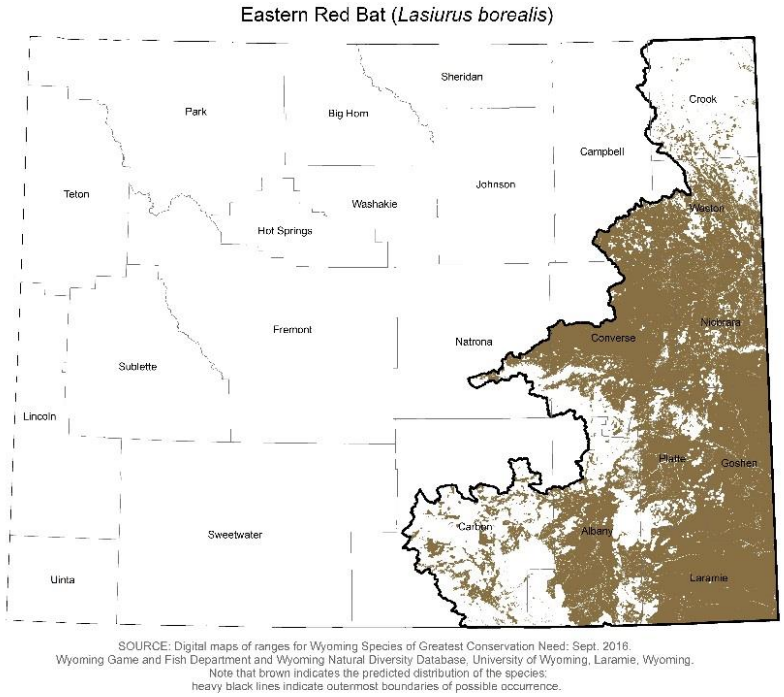

Figure 4: Range and predicted distribution of *Lasiurus borealis* in Wyoming.

Figure 5: Eastern Red Bats at a day roost underneath oak (*Quercus* spp.) leaves in southeastern Missouri. (Photo courtesy of Michael T. Wickens)