1. **Species:** Fringed Myotis (*Myotis thysanodes*)

2. **Status:** Table 1 summarizes the current status of this species or subspecies by various ranking entity and defines the meaning of the status.

Table 1. Current status of *Myotis thysanodes*

Entity	Status	Status Definition
NatureServe	G4	*Species is Apparently Secure* At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
CNHP	S3	*Species is Vulnerable* At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
Colorado State List Status	SGCN, Tier 1	Species of Greatest Conservation Need
USDA Forest Service	R2 Sensitive	Region 2 Regional Forester's Sensitive Species
USDI FWS[b]	None	N/A

[a] Colorado Natural Heritage Program.
[b] US Department of Interior Fish and Wildlife Service.

The 2012 U.S. Forest Service Planning Rule defines Species of Conservation Concern (SCC) as "a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area" (36 CFR 219.9). This overview was developed to summarize information relating to this species' consideration to be listed as a SCC on the Rio Grande National Forest, and to aid in the development of plan components and monitoring objectives.

3. Taxonomy

Genus/species *Myotis thysanodes* is accepted as valid (ITIS 2015).

4. Distribution, abundance, and population trend on the planning unit [12.53.2,3,4]:

Fringed myotis ranges from south-central British Columbia, south to Chiapas Mexico, and from Santa Cruz Island, California, east to the Black Hills of South Dakota (WBWG 2005). In Colorado, species records are associated are scattered at moderate elevations (below 7,500 feet) on the Western Slope, along the foothills of the Front Range, and the mesas of the southeast (CDOW 2015).

One fringed myotis roost site is reported within the planning area (2008), consisting of an underground mine occurring at 8,941 ft. elevation. Acoustic surveys also positively identified the species at a low elevation ponderosa pine stand within the Hot Creek RNA, Conejos Ranger District in 2013.

Myotis thysanodes appear to be relatively rare rangewide, but trends in abundance are largely unknown (Keinath 2004). Abundance, distribution, and trend information for this species within the planning area is not available.

Table 2. Known Occurrence Frequency within the Planning Area

Known Occurrences in the past 20 years	2
Year Last Observed	2013

5. Brief description of natural history and key ecological functions [basis for other 12.53 components]:

Rangewide, fringed myotis is mostly found in dry habitats where open areas (e.g., grasslands and deserts) are interspersed with mature forests (usually ponderosa pine, pinyon-juniper, or oak), creating complex mosaics with ample edges and abundant snags (Keinath 2004). The most common habitats reported for fringed myotis are oak, pinyon, and juniper woodlands or ponderosa pine forest at middle elevations (Davis 1966, Barbour and Davis 1969, O'Farrell and Studier 1980, Cockrum et al. 1996, Wilson and Ruff 1999, Ellison et al. 2004, all cited in Keinath 2004). They also appear to use deserts, grasslands, and other types of woodlands. Most reported occurrences are at elevations between roughly 3,900 and 6,900 ft, with New Mexico occurrences in spruce-fir forest reported at over 9,000 ft (Barbour and Davis 1969, Arizona Game and Fish Department 1997 cited in Keinath 2004).

Fringed myotis is a colonial-roosting species with colonies ranging from 10 to 2000 individuals, although large colonies are exceedingly rare. Roost structures utilized varies widely. Caves, underground mines, and buildings are used for maternity, nocturnal, and diurnal roosts, as well as hibernacula, while solitary day and night roost sites may include bridges and rock crevices (Musser and Durrant 1960, Davis 1966, Easterla 1966, Judd 1967, O'Farrell and Studier 1980, Perkins et al. 1990, Ellison et al. 2004, all cited in Keinath 2004). Hibernation has only been documented in buildings and underground mines (Ellison et al. 2004). Tree roosting has also been documented in large conifer snags in Oregon, in ponderosa pine snags in New Mexico, and in hollow redwood and giant sequoia trees in California (Ellison et al. 2004). Fringed myotis are known to utilize pinyon-juniper cavities at lower elevations for roosting locally on the RGNF (R. Ghormley, pers. comm. 2015).

Breeding occurs in the fall following break-up of the maternity colony. Ovulation, fertilization, and implantation occur from April to May, with gestation averaging 55 days. One young per female is born from May to July. Young are fully capable of flight at 20 days (Ellison et al. 2004).

Food items consist largely of beetles and moths, but diet may vary regionally and locally. Foraging is known to occur along forest edges and over open water, and likely occurs in forest interiors as well (Keinath 2004).

6. Overview of ecological conditions for recovery, conservation, and viability [12.53 7, 9?, 10, 11, 12]:

Keinath (2004) identified the following management considerations for conservation of fringed myotis:

Protection of roost sites: Bats are very sensitive at roosts, and any disturbance to a roost site (e.g., cave, cliff, building, snag; see Roost section) can potentially extirpate bats from that site or even the locale. Protection of maternity roosts and hibernacula is particularly important. Where tree roosting is prevalent, factors including structural characteristics, microclimate, and spatial distribution of current and future snags must be considered. On the Rio Grande National Forest, natural cave habitat is rare. However, the Forest contains several historic mining districts and adequate assessment of abandoned mines often involving underground investigations prior to closure is essential to the conservation and management of bat species that utilize abandoned mines locally.

Protection of foraging areas: It can be assumed that any decrease in insect abundance, particularly of beetles and moths, will have a direct negative effect on fringed myotis, although the "critical level" below which insect numbers must fall before significant declines in bat use are likely is unknown. Elimination of cover altogether over larger areas (e.g. in large clearcuts) will likely have a negative impact on clutter-adapted bats like *M. thysanodes*.

Protection of water sources: Three aspects of water sources must be maintained: presence, faunal character, and water quality.

Maintenance of a landscape mosaic: Ideal areas for M. thysanodes (and many other bats) will contain a mosaic of foraging habitat, still water sources, and roost structures that are proximate to each other over a large enough area to accommodate shifts in local prey abundance.

Elimination of exposure to toxic chemicals: Man-made water sources are often used by bats, so it is important to prevent bat use of toxic impoundments, such as cyanide ponds, oil reserve pits, and wastewater facilities (Rainey and Pierson 1996, Pierson et al. 1999 cited in Keinath 2004). Also, it is necessary to identify and eliminate use of modern pesticides that may be detrimental to fringed myotis both through direct poisoning and through reduction of prey.

7. Threats and Risk Factors

Keinath (2004) identified the following factors as extrinsic threats to fringed myotis:

- Roost destruction including removal of large diameter cavity forming trees, closure of mines without consideration of bat access, and uniformed building or bridge modification. CBWG (2015) rates AML closures as substantial, imminent threat factor for this species.
- Modification of structure in or surrounding roosts that leads to alteration of roost thermal regime or microclimate.
- Removal of riparian vegetation and mature forest through commercial and residential development, agriculture, and logging.
- Roost disturbance via human activity in caves.
- Non-roost habitat alteration resulting in reduced altered habitat suitability or prey availability, including timber harvest, vegetation conversion, livestock grazing, suburban expansion, water development, avalanche blasting, road construction, toxic waste impoundment, pesticide use, wildland fires, stream channelization, flood control, recreational activities, and invasive vegetation.

White Nose Syndrome:

White-nose syndrome (WNS) is a disease affecting hibernating bats. Named for a cold-loving white fungus that appears on the muzzle and other parts of bats, WNS is associated with the mortality of an estimated 5.5 million or more bats in eastern and mid-western North America. In some areas, 90 to 100 percent of bats have died. Although investigations are under way to better understand and potentially treat the disease, there is currently no known First documented in New York in the winter of 2006-2007, WNS has spread rapidly across the eastern and Midwestern United States and eastern Canada and as of July 2015 has been detected in 26 states and 5 Canadian provinces. A newly discovered fungus, *Pseudogymnoascus destructans*, has been demonstrated to cause WNS (USDI Fish and Wildlife Service 2015).

In April 2013, USFS Region 2 finalized an Environmental Assessment to analyze options for management of caves and abandoned mines in response to the potential for human introduction and spread of the fungal spores associated with WNS (USDA Forest Service 2013). The management strategy uses an adaptive management approach to preventing WNS on 11 National Forests in USFS Region 2, including the Rio Grande National Forest. Currently, WNS has not been detected in Colorado and the closest known detection of fungal spores occurs in eastern Oklahoma. However, the introduction and spread of WNS in Colorado remains a critical concern for the conservation of several cave-dwelling bat species and warrants integration into the local Abandoned Mine Lands (AML) closure program in regards to assessing underground bat population prior to (and potentially after) closure work and in relationship to periodic monitoring in collaboration with other partners.

8. Key literature:

Colorado Bat Working Group (CBWG). 2015. The Colorado bat matrix. Accessed online at: http://www.cnhp.colostate.edu/batmatrix/speciesDisplay.aspx?SpeciesID=4 [07/27/2015].

Colorado Parks and Wildlife. 2015. Species profiles. Accessed online at: http://cpw.state.co.us/learn/Pages/SpeciesProfiles.aspx [07/18/2015]

Keinath, D.A. 2004. Fringed myotis (*Myotis thysanodes*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: http://www.fs.fed.us/r2/projects/scp/assessments/fringedmyotis.pdf [07/18/2015].

Ellison, L. E., M. B. Wunder, C. A. Jones, C. Mosch, K. W. Navo, K. Peckham, J. E. Burghardt, J. Annear, R. West, J. Siemers, R. A. Adams, and E. Brekke. 2003. Colorado bat conservation plan. Colorado Committee of the Western Bat Working Group. 90 pp. +appendices.

Ghormley, R. 2015. Randy Ghormley, Forest Wildife Biologist, Rio Grande National Forest. Personal Communication.

USDA Forest Service. 2013. Environmental assessment for cave and abandoned mine management for white-nosed syndrome. Rocky Mountain Region, Lakewood, Colorado. April 2013. 20 pp.

USDI Fish and Wildlife Service. 2015. White-nose syndrome fact sheet. July 2015. 2 pp.

Western Bat Working Group (WBWG). 2005. *Myotis thysanodes*. Accessed online at: http://wbwg.org/western-bat-species/ [07/18/2005].

9. Map of Known Occurrences and Modeled Suitable Habitat

Fringed myotis utilize a wide variety of habitat types for roosting and foraging. Common habitat associations described above include oak, pinyon-juniper, and ponderosa pine types, and probably includes Douglas-fir forests as reported for other areas. Therefore, oak, pinyon-juniper, ponderosa pine, and Douglas-fir forested stands of all structural stages were modeled to represent potential suitable habitat (Figure 1). These areas total 258,975 acres. Grass or shrub-dominated open areas were not modeled, but likely add to suitable habitats where interspersed among forested stands.

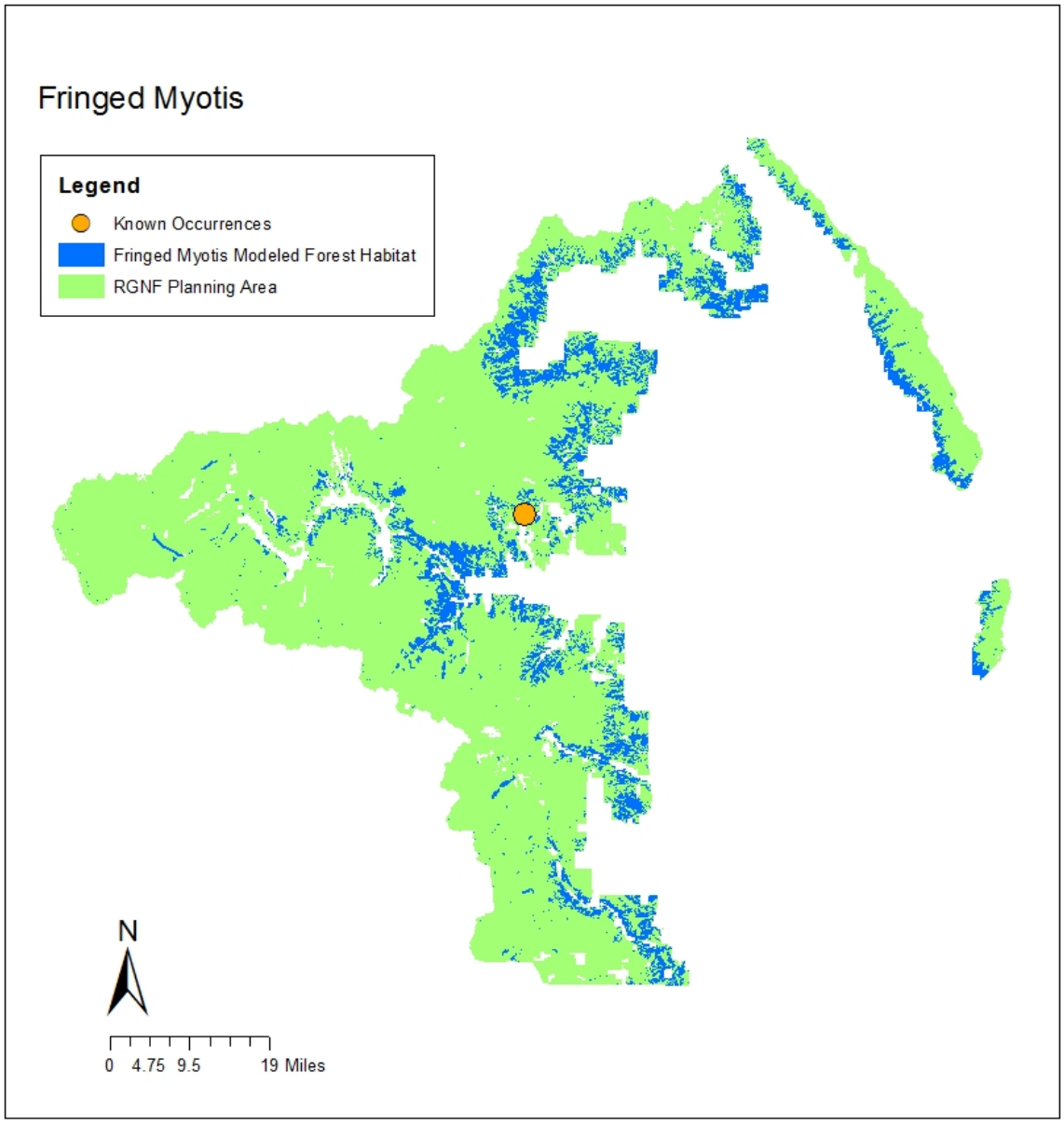

Figure 1. Fringed Myotis Modeled Forest Habitat and Known Occurrences.