1. **Species:** Boreal Toad (*Anaxyrus (=Bufo) boreas*)

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 *Anaxyrus (=Bufo) boreas*

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	S1	*Species is Critically Imperiled* At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
Colorado State List Status	SE	State Endangered
USDA Forest Service	R2 Sensitive	Region 2 Regional Forester's Sensitive Species
USDI FWS[b]	Under Review	Currently under FWS review subsequent to a positive 90-day finding.

[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 *Anaxyrus boreas* is accepted as valid (ITIS 2015).

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

The range of the Southern Rocky Mountain (SRM) boreal toad population includes southeastern Wyoming through the mountainous region of central to west-central Colorado, and into extreme north-central New Mexico. In Colorado, the boreal toad was historically known to occur in 25 counties, and was common throughout the higher elevations, except for the Sangre de Cristo Mountains, Wet Mountains, and Pikes Peak region (summarized in USDI Fish and Wildlife Service 2012).

Within the planning area, boreal toads have been reported at a total of 10 sites within the past 20 years with the most recent observations occurring in 2014 (Table 2). Boreal toad habitat on the RGNF has been assessed at a variety of scales, to include breeding and upland habitats. Suitable

habitat is expected to occur at elevations at or above 7,500 ft. based on characteristics described by Keinath and McGee (2005) of known and historic sites within the planning area. Muths (2003) reported that mean maximum distance traveled by female boreal toads from breeding sites was 905 meters (0.56 mi), and maximum overall distance traveled from breeding sites for all toads in the study was 2.3 kilometers (1.43 mi). Total RGNF acres within areas buffered from water bodies above 7,500 feet are presented in Table 3, and shown in Figure 1.

Table 2. Known Occurrence Frequency within the Planning Area (NRIS database)

Known Occurrences in the past 20 years	10
Year Last Observed	2014

Table 3. Modeled Boreal Toad Suitable Habitats in the Planning Area

Model	**RGNF Lands (ac)**
Suitable Water bodies > 7,500 feet, 905 meter buffer	474,500
Suitable Water bodies > 7,500 feet, 2.3 kilometer buffer	1,165,233

Declines in abundance have been reported throughout the species' range, and large declines have been reported in many areas, especially the Southern Rocky Mountains (Corn et al. 1989, Carey 1993, summarized in Keinath and McGee 2005). Boreal toad populations have declined dramatically within Region 2 over the past 25 years. It appears that populations in the Southern Rocky Mountains (e.g., Colorado, New Mexico, southern Wyoming) have exhibited more drastic declines than populations to the north (e.g., northern Wyoming).

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

Breeding activity may begin soon after adult toads emerge from hibernation (usually May), or it may be delayed until later in the summer (July or later) depending on elevation, weather conditions, and the thermal and physical characteristics of the breeding site. Females deposit eggs in sunny, shallow water near shore from mid-May to mid-July. Hatching occurs between June and September, typically 10 to 14 days after eggs are deposited, depending on water temperature (Keinath and McGee 2005).

During the larval stage, boreal toads are limited to aquatic habitats until metamorphosis, which occurs approximately 75 days after hatching (Boreal Toad Recovery Team 1998). Following metamorphosis, juvenile boreal toads migrate away from aquatic areas into moist terrestrial habitats. Metamorphs have been documented sheltering under moist woody debris, in underground cavities, and under each other in large aggregations. Information on the habitat use of boreal toads between the juvenile and breeding adult stages is generally lacking (Keinath and McGee 2005).

In early fall, adults and young of the year migrate to terrestrial hibernacula, which are typically burrows made by other animals, such as rodents. Boreal toads also commonly over-winter beneath debris piles, such as rockslides or deadfall timber. In Colorado, boreal toads in Colorado have been observed using underground chambers near creeks, ground squirrel burrows, and beaver lodges/dams where flowing water keeps the air temperature above freezing (Boreal Toad Recovery Team 1998 summarized in Keinath and McGee 2005).

Table 4. Crucial periods in the life cycle of the boreal toad (Keinath and McGee 2005)

Period	Events	Timing
Breeding Period	Breeding begins 2 to 4 weeks after appearance of open water	Mid-May to mid-June (July at higher elevations)
Hatching	Eggs hatch 1 to 2 weeks after being laid	Late May to late June (late July at higher elevation)
Metamorphosis	Tadpoles metamorphose to toadlets in approximately 2 months	Late July to late August (late September at higher elevation)
Toadlet Dispersal	Toadlets leave natal area	Highly variable
Overwintering	Adults and juveniles occupy winter habitat	Late September to mid-May

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

Boreal toads require three main habitat components: 1) shallow wetlands for breeding, 2) terrestrial habitats with vegetative cover for foraging, and 3) burrows for winter hibernation (Loeffler 2001). The species inhabits a wide range of habitats in western North America including wetlands, forests, woodlands, sagebrush, meadows, and floodplains in the mountains and valleys . Wetland habitats constitute primary and breeding habitats; however, boreal toads may be found in terrestrial habitats during dispersal to and from breeding sites. In Colorado, they are known to occur from 7,500 and 12,000 ft. elevation (summarized in Keinath and McGee 2005).

Wetland types utilized by the species include aquatic bed, streambed, rocky shore, unconsolidated shore, emergent wetland (persistent and non-persistent), scrub-shrub wetland, and forested wetland. Upland habitats consist of Herbaceous, Forest, Woodland, and Shrubland types (Keinath and McGee 2005).

Recommended considerations pertaining to boreal toad population and habitat management, including those addressing disease, water quality, timber harvest, livestock grazing, fire management, chemicals, and non-indigenous species are fully described by Keinath and McGee (2005).

7. **Threats and Risk Factors**

Boreal toads are susceptible to a variety of bacterial and fungal pathogens that have been documented in Region 2, but the primary disease-causing pathogen is a specific form of the chytrid fungus *Batrachochytrium dendrobatidis*. There is evidence suggesting that chytrid fungus is possibly the most pervasive factor decreasing habitat quality at the range-wide scale (Keinath and McGee 2005).

Other threats specific to boreal toads on Region 2 National Forest System lands include decreased water and air quality, timber harvest, livestock grazing, fire and fire management activities, environmental pollutants, non-native species and their management, habitat development and fragmentation, harvest and commerce, and finally the lack of information on specific populations (Keinath and McGee 2005).

On the Rio Grande NF, the primary localized threats involve chytrid fungus with 4 of 5 known sites testing positive. Other local concerns involve water and air quality factors, non-native species, recreation management and perhaps fire and timber management in localized areas. In

2013, a monitoring emphasis on boreal toad continued on the Forest. On the Divide RD, all known and/or historic boreal toad sites were monitored, with occupancy documented at 3 of the 5 sites. A cooperative study with Colorado Parks and Wildlife resulted in the release of three adult toads from the Native Aquatic Species Hatchery in Alamosa to one site on the Divide RD to act as sentinels for chytrid fungus tests. These toads were fitted with radio collars and were being tracked by district personnel until the site was burned by the West Fork Fire Complex in June and all individuals perished.

8. Key literature:

Keinath, D. and M. McGee. 2005. Boreal toad (*Bufo boreas boreas*), a technical conservation assessment. USDA Forest Service, Rocky Mountain Region. Available: http://www.fs.fed.us/r2/projects/scp/assessments/borealtoad.pdf [06/03/2015].

Muths, E. 2003. Home range and movements of boreal toads in undisturbed habitat. Copeia 2003(1): 160-165,

USDI Fish and Wildlife Service. 2012. Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition To List the Eastern or Southern Rocky Mountain Population of the Boreal Toad as an Endangered or Threatened Distinct Population Segment. Federal Register 77 (71): 21920-21936.

9. Map of Known Occurrences and Modeled Suitable Habitat

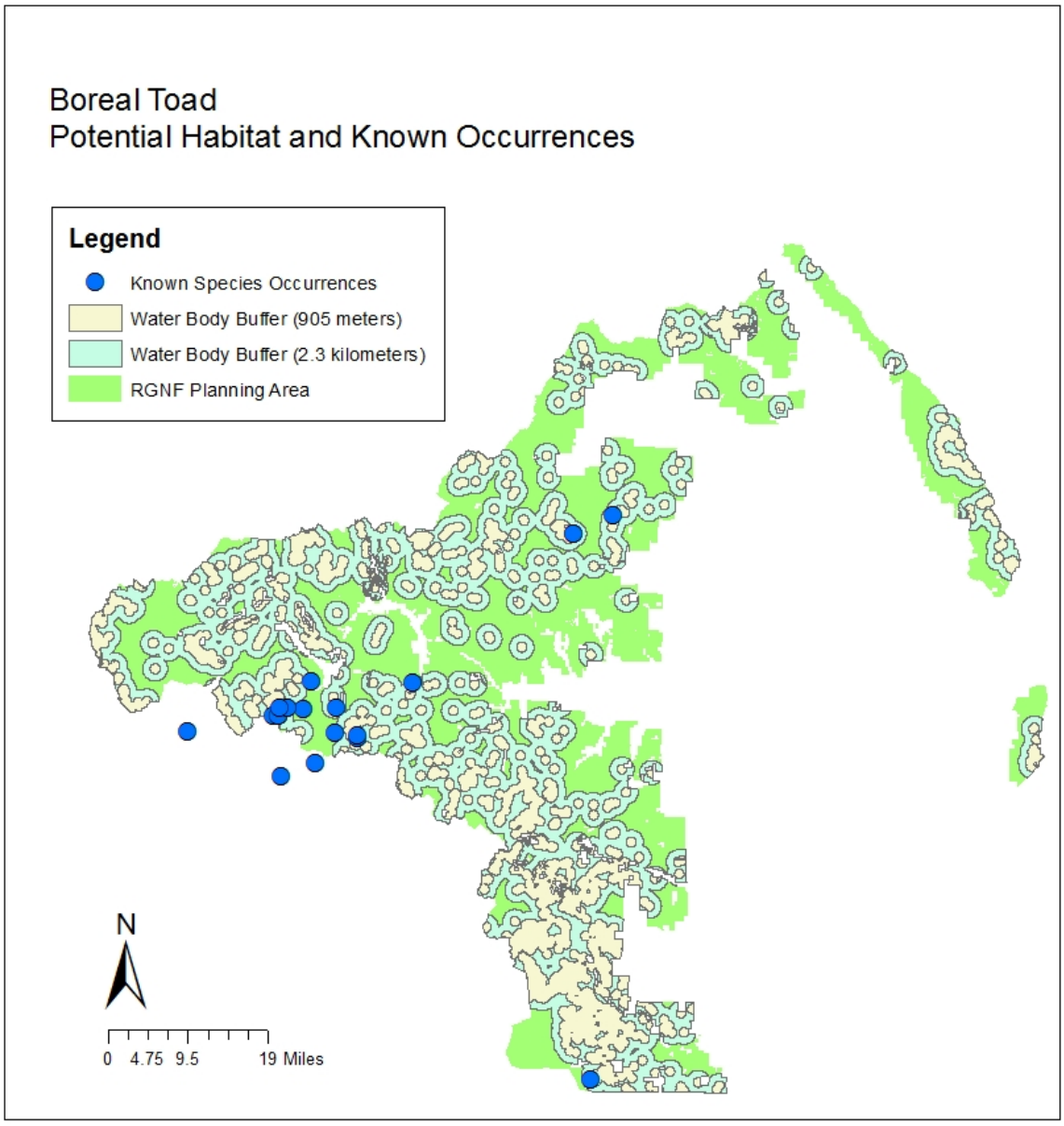

Figure 1. Boreal Toad Potential Habitat and Known Occurrences.