1. **Species:** Rio Grande Cutthroat Trout (*Oncorhynchus clarkii virginalis*)

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 *Oncorhynchus clarkii virginalis*

Entity	Status	Status Definition
NatureServe	G4T3	*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.
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	Sensitive	Region 2 Regional Forester's Sensitive Species
USDI FWS[b]	N/A	N/A
USDI FWS Critical Habitat	N/A	N/A
Species Conservation Agreement	Applicable	USFS R2 is a party to the Conservation Agreement for Rio Grande Cutthroat Trout *(Oncorhynchus clarkii virginalis)* in the states of Colorado and New Mexico (2013).

[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 *Oncorhynchus clarkii virginalis* is accepted as valid (ITIS 2015).

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

The Rio Grande cutthroat trout historically occurred in New Mexico and southern Colorado. Currently the subspecies is distributed in 122 populations across the four GMUs (ranging from 10 to 59 populations per GMU), and most of the populations are isolated from other populations. The total amount of currently occupied stream habitat is estimated to be about 11 percent of the historically occupied range (USDI Fish and Wildlife Service 2014). Currently, the Rio Grande

cutthroat trout occurs in the Rio Grande National Forest within USFS Region 2 and in the Carson and Santa Fe national forests within USFS Region 3. Apparent remnant populations of Rio Grande cutthroat trout occur in tributaries to the Rio Grande in Colorado and New Mexico; in the Carnero and Saguache drainages in Colorado, which are geologically part of the Rio Grande system but drain into the San Luis closed basin; in tributaries to the Canadian River in Colorado and New Mexico; and in tributaries to the Pecos River in New Mexico. (Pritchard and Cowley 2006).

As a result of ongoing management activities that have included reintroductions as well as protection of extant populations, the range-wide abundance and distribution of Rio Grande cutthroat trout appear to be stable. The maintenance of a stable or increasing population trend for Rio Grande cutthroat trout requires continued active management. Under current conditions, if such management activities were to cease, the subspecies would be expected to resume a declining trend as a result of invasion of populations by non-native salmonids, stochastic environmental events, and the demographic and genetic factors associated with small, isolated populations (Pritchard and Cowley 2006).

Rio Grande cutthroat trout currently occur on all ranger districts within the planning area and consist of both Core and Recreation populations. “Core Populations” consist of those populations with 10 percent or less introgression (hybridization) from nonnative trout. “Recreation populations” are defined as Rio Grande cutthroat trout populations managed primarily for sport fishing. Recreation populations are not included as Core populations. Core populations within the planning area occur in 27 streams (136.5 stream miles) and 2 lakes (15.2 surface acres) (Table 2). Recreation populations occupy a total of 30 streams and 54 lakes across the RGNF. Spatial distribution of populations is displayed in Figure 1.

Table 2. Rio Grande Cutthroat Trout Occupied Habitat on the RGNF

CORE POPULATION		**RECREATION POPULATION**	
Conejos Peak RD		Conejos Peak RD	
11 Streams	37.1 Miles	11 Streams	75.2 Miles
1 Lake	12.7 SA*	16 Lakes	361.4 SA
Divide RD		Divide RD	
4 Streams	21 Miles	13 Streams	112 Miles
1 Lake	2.5 SA	18 Lakes	497.1 SA
Saguache RD		Saguache RD	
12 Streams	78.4 Miles	6 Streams	51.4 Miles
0 Lakes	0 SA	20 Lakes	168.2 SA
Core Total		Recreation Total	
27 Streams	136.5 Miles	30 Streams	234.6 Miles
2 Lakes	15.2 SA	54 Lakes	1026.7 SA
FOREST TOTAL			
Streams 57		371.1 Miles	
Lakes 56		1041.9 SA	

SA=Surface Acres

Statistically reliable trend information for this species within the planning area is not available.

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

Rio Grande cutthroat trout are primarily found in clear cold streams but occasionally occur in lacustrine (lake or reservoir) habitats. They spawn as high water flows from snowmelt recede. Cutthroat trout are opportunistic feeders, eating both aquatic invertebrates and terrestrial insects that fall into the water. As they mature, fish become a larger part of the diet. Growth of cutthroat trout varies with water temperature and availability of food (RGCT Recovery Team 2013). Current populations show no migratory behavior. It is unknown whether Rio Grande cutthroat trout historically had a migratory form when there was greater connectivity among watersheds.

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

Rio Grande cutthroat trout require several types of habitat for survival: spawning habitat, nursery or rearing habitat, adult habitat, and refugium (microhabitats providing spatial or temporal protection from disturbances) (Keppel et al. 2012 cited in RGCT Recovery Team 2012). Spawning habitat consists of clean gravel (little or no fine sediment present) that ranges from 0.24-1.6 inches in diameter.

Areas of suitable gravels that are well-oxygenated by flowing water and relatively free of fine sediment are needed for successful spawning and egg development (Pritchard and Cowley 2006). Nursery habitat is usually at the stream margins where water velocity is low and water temperature is slightly warmer. Streams with mean daily temperature in July of less than 7.8 degrees Celsius (ºC) (46 degrees Fahrenheit (ºF)) may not have successful recruitment (survival of individuals to sexual maturity and joining the reproductive population) or reproduction in most years. Adult habitat consists of pools with cover and riffles for food production and foraging. The primary form of refugium habitat is deep pools that do not freeze in the winter and do not dry in the summer or during periods of drought (RGCT Recovery Team 2013).

7. Threats and Risk Factors

The historical range of Rio Grande cutthroat trout has been greatly reduced over the last 150 years. Populations have been lost because of water diversions, stream drying, dams, habitat degradation, changes in hydrology, hybridization with rainbow trout and other species of cutthroat trout, or competition with brown trout (*Salmo trutta*) and brook trout (*Salvelinus fontinalis*) (Pritchard and Cowley 2006). These changes in environmental conditions have resulted in many historical populations being lost and those that remain being restricted to headwater streams (RGCT Recovery Team 2013).

The primary threat to Rio Grande cutthroat trout today is the presence of non-native trout, which and now occupy most suitable habitat within the subspecies' native range. Rainbow trout (*Oncorhynchus mykiss*) and non-native subspecies of cutthroat trout (*O. clarkii* spp.) cause loss of Rio Grande cutthroat trout populations via hybridization while brook trout (*Salvelinus fontinalis*) and brown trout (*Salmo trutta*) appear to cause population declines via predation or competitive exclusion (Pritchard and Cowley 2006).

The extent to which climate change will affect Rio Grande cutthroat trout is currently unknown. Range-wide, streams currently capable of supporting Rio Grande cutthroat trout are at elevations above 6,000 feet. Currently, only about 1.6 percent of the conservation populations are in streams below 8,000 feet in elevation (Alves et al. 2008). In general, the effect of climate change may be

more pronounced for populations at lower elevations with individual streams reacting differently due to variables such as aspect, slope, and shading (RGCT Recovery Team 2013).

Whirling disease is a substantial risk factor for this species. Laboratory and field experiments have shown that Rio Grande cutthroat trout are very susceptible to whirling disease, but fewer than five streams have been documented as infected (DuBey et al. 2007, Thompson et al. 1999, Patten and Sloane 2007, Alves et al. 2008, all cited in RGCT Recovery Team 2013).
A number of anthropogenic activities have demonstrated negative impacts to habitat quality for trout. These include grazing, logging, road and trail construction, mining, and water diversion (Meehan 1991, Stumpff and Cooper 1996 cited in Pritchard and Cowley 2006). Multiple studies have reported habitat degradation resulting from grazing pressure, decreases in trout abundance with grazing or increases in trout abundance with cessation of grazing. Timber harvest can similarly impact riparian vegetation and hence stream morphology, habitat conditions, and availability of food. Removal of timber adjacent to the stream also removes a source of large woody debris, which is important in structuring stream morphology, causing the retention of sediments and organic matter, and providing nutrient inputs. Road construction, improper road maintenance, and mining are also associated with changes in hydrologic and erosional processes and often cause increased deposition of fine sediment in streams; however, mining is primarily associated with chemical pollution of water bodies (Platts 1991, Knapp and Matthews 1996, Chamberlin et al. 1991, Wipfli 1997, Furniss et al. 1991, Eaglin and Hubert 1993, Nelson et al. 1991, all cited in Pritchard and Cowley 2006).

8. Key literature:

RGCT Conservation Team. 2013. Rio Grande cutthroat trout *(Oncorhynchus clarkii virginalis)* Conservation Strategy. Colorado Parks and Wildlife, Denver, CO. 63 pp.

USDI Fish and Wildlife Service. 2014. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List Rio Grande Cutthroat Trout as an Endangered or Threatened Species. Federal Register 79(190): 59140-59150.

Pritchard, V.L. and D.E. Cowley. 2006. Rio Grande Cutthroat Trout (*Oncorhynchus clarkii virginalis):* a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: http://www.fs.fed.us/r2/projects/scp/assessments/riograndecutthroattrout.pdf [06/22/2015].

9. Map of Known Occurrences

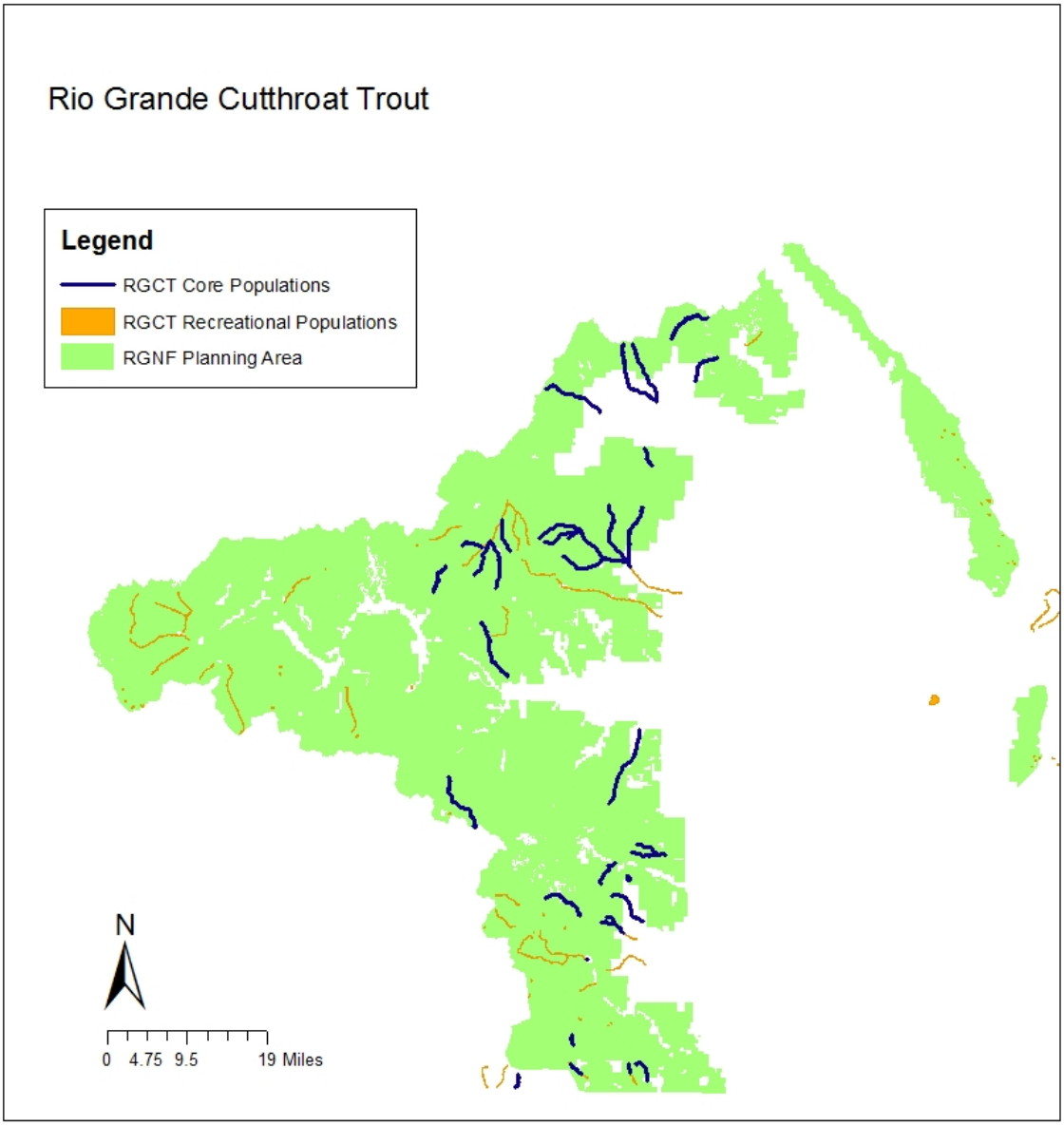

Figure 1. Rio Grande Cutthroat Trout Occupied Areas, RGNF.