1. **Species:** Western Bumble Bee (*Bombus occidentalis*)

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 *Bombus occidentalis*

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	SNR	Not Ranked in Colorado
Colorado State List Status	SGCN, Tier 2	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 *Bombus occidentalis* is accepted as valid (ITIS 2015).

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

Prior to 1998, the western bumble bee was both common and widespread throughout the western United States (including Colorado) and western Canada. Since 1998, this bumble bee has undergone a drastic decline throughout some areas of its former range. While viable populations still exist in Alaska and east of the Cascades in the Canadian and U.S. Rocky Mountains, the once common populations of central California, Oregon, Washington and southern British Columbia have largely disappeared (Xerces 2015). Cranshaw (2010 cited in NatureServe 2015) reports the species in decline in Colorado, essentially its southeastern limit which suggests the decline of this subspecies has probably become range-wide.

There are no occurrences documented in the NRIS database for the planning area. No status or trend has been identified for populations within the planning area. However, it just recently became a sensitive Species for USFS Region 2 (June 2015) and awareness of this species and most all pollinators has been rudimentary.

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

Known Occurrences in the past 20 years	0
Year Last Observed	N/A

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

The western bumble bee has three basic habitat requirements: suitable nesting sites for the colonies, nectar and pollen from floral resources available throughout the duration of the colony period (spring, summer and fall), and suitable overwintering sites for the queens (Jepson et al. 2014). Nests occur primarily in underground cavities such as old squirrel or other animal nests and in open west-southwest slopes bordered by trees, although a few nests have been reported from above-ground locations such as in logs among railroad ties (Hobbs 1968, MacFarlane et al. 1994, Plath 1922, Thorp et al. 1983, all cited in Jepson et al. 2014).

Bumble bees require plants that bloom and provide adequate nectar and pollen throughout the colony's life cycle, which is from early February to late November for *B. occidentalis* (although the actual dates likely vary by elevation). Very little is known about the hibernacula, or overwintering sites (Jepson et al. 2014).

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

Jepson et al. (2014) provide the following management considerations for western bumble bee:

- Protect known and potential sites from practices, such as livestock grazing, and threats such as conifer encroachment, that can interfere with the habitat requirements of this species (availability of nectar and pollen throughout the colony season and availability of underground nest sites and hibernacula).

7. Threats and Risk Factors

Declines in bumble bee species in the western U.S. appear to be related to a wide variety of factors including anthropogenic habitat change, nesting site availability, loss of overwintering habitat, and pesticide use (Kearns and Thomson 2001, Goulson et al. 2005, Evans et al. 2009, all cited in Kearns 2011). In North America, non-native parasites transmitted from commercially raised bumblebee pollinators have been implicated as well (Evans et al. 2009 cited in Kearns 2011). Most studies have focused on environmental factors as the cause of declines. Only recently has population genetics been employed to detect genetic vulnerability of bumblebees (Goulson et al. 2008, UN FAO 2008, Zayed 2009, all cited in Kearns 2011).

Bumble bees are particularly vulnerable to pathogens and parasites, notably the protozoans *Nosema bombi* Fartham & Porter (Microsporidia: Nosematidae) and *Crithidia bombi* Lipa and Triggiani (Kinetoplastida: Trypanosomatidae) and the tracheal mite *Locustacris buchneri* Stammer (Acari: Podapolipidae) (Shykoff and Schmid-Hempel 1991, Imhoof and Schmid-Hempel 1999, all cited in Rao and Stephen 2007). *Bombus occidentalis* was reared in the same rearing facility as other bumble bee species and *Nosema* and other pathogens infected the cultures (Thorp 2003 cited in Rao and Stephen 2007). Commercial rearing and export of *B. occidentalis* is speculated to have resulted in inadvertent transport of parasites and diseases, possibly causing its

apparent local extinction from the West coast of the United States in recent years (NAS 2006 cited in Rao and Stephen 2007).

Major threats that alter landscapes and habitat required by bumble bees include agricultural and urban development, livestock grazing (due to removal of flowering food sources, alteration of vegetation communities, and likely nest disturbance), and habitat fragmentation leading to decreased genetic diversity and increased risk of decline (Xerces Society 2015).

8. Key literature:

Kearns, C.A. 2011. Conservation status and population structure comparisons of abundant and declingin bumblebee species. Final report to the Audubon Society of Greater Denver. 13 pp.

Koch, J.B. 2011. The decline and conservation status of North American bumble bees. MS Thesis, Utah State University. 113 pp.

NatureServe. 2015. Explorer, an online encyclopedia of life. Accessed online at: http://explorer.natureserve.org/index.htm [07/13/2015].

Rao, S. and W.P. Stephen. 2007. Bombus (Bombus) occidentalis (Hymenoptera: Apiformes): In decline or recovery. Pan-Pacific Entomologist 83(4): 360-362.

Jepsen, S., S.F. Jordan, and R. Huff. . 2014. Species fact sheet: Western bumblebee (*Bombus occidentalis)*. 6 pp.

Xerces Society. 2015. Western bumblebee (Bombus occidentalis). Accessed online at: http://www.xerces.org/western-bumble-bee/# [07/14/2015].

9. Map of Known Occurrences and Modeled Suitable Habitat

There are no known occurrences documented in the planning area. Suitable western bumble bee habitat has not been modeled for the RGNF.