BEFORE THE SECRETARY OF THE INTERIOR

PETITION TO LIST SUCKLEY'S CUCKOO BUMBLE BEE (*Bombus suckleyi*) UNDER THE ENDANGERED SPECIES ACT AND CONCURRENTLY DESIGNATE CRITICAL HABITAT

Suckley's cuckoo bumble bee
Hadel Go, AMNH

CENTER FOR BIOLOGICAL DIVERSITY

April 23, 2020

NOTICE OF PETITION

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Pursuant to Section 4(b) of the Endangered Species Act ("ESA"), 16 U.S.C. § 1533(b); Section 553(e) of the Administrative Procedure Act, 5 U.S.C. § 553(e); and 50 C.F.R. § 424.14(a), the Center for Biological Diversity hereby petitions the Secretary of the Interior, through the United States Fish and Wildlife Service ("FWS," "Service"), to protect Suckley's cuckoo bumble bee (*Bombus suckleyi*) under the ESA.

FWS has jurisdiction over this petition. This petition sets in motion a specific process, placing definite response requirements on the Service. Specifically, the Service must issue an initial finding as to whether the petition "presents substantial scientific or commercial information indicating that the petitioned action may be warranted." 16 U.S.C. § 1533(b)(3)(A). FWS must make this initial finding "[t]o the maximum extent practicable, within 90 days after receiving the petition." *Id*.

Petitioner also requests that critical habitat be designated for Suckley's cuckoo bumble bee concurrently with the species being listed, pursuant to 16 U.S.C. § 1533(a)(3)(A) and 50 C.F.R. § 424.12.

Petitioner is The Center for Biological Diversity ("Center") is a nonprofit, public interest environmental organization dedicated to the protection of imperiled species and the habitat and climate they need to survive through science, policy, law, and creative media. The Center is supported by more than 1.6 million members and online activists throughout the country. The Center works to secure a future for all species, great or small, hovering on the brink of extinction. The Center submits this petition on its own behalf and on behalf of its members and staff with an interest in protecting the Suckley's cuckoo bumble bee and its habitat.

Submitted Thursday April 23, 2020

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Table of Contents

Executive Summary

Like other bumble bees, Suckley’s cuckoo bumble bee is a pollinator in ecological systems; however, Suckley’s cuckoo bumble bee is unique in that it is a social parasite of other bumble bees, known as a cuckoo bumble bee. Cuckoo bumble bees do not produce workers of their own but instead female cuckoo bumble bees take over colonies of host bumble bees by subduing the queen and controlling the worker bees. Workers from the host colonies then continue to gather pollen to provision the cuckoo bumble bee’s larvae, producing new reproductive females and males. Among a myriad of other threats, Suckley’s cuckoo bumble bee is especially at risk of decline and extinction because its host species is declining.

Suckley’s cuckoo bumble bee has significantly declined in abundance and range over the last half century. Specifically, Suckley’s cuckoo bumble bee has declined by 78% overall, losing more than 50% of its range and it is down by more than 90% in relative abundance compared to its historic abundance. Suckley’s cuckoo bumble bee was historically widespread and occurred in prairies, grasslands, meadows, savannahs, and agricultural landscapes throughout the northwestern United States.

Suckley’s cuckoo bumble bee is threatened by habitat loss and fragmentation, habitat degradation, disease, loss of host species, climate change, and inadequacy of existing regulatory mechanisms. Its remaining habitat is being degraded by livestock grazing, pesticides, and fire suppression. Suckley’s cuckoo bumble bee declines can at least partially be attributed to declines in its known host species, the western bumble bee (*Bombus occidentalis*), which has greatly lost abundance and range in recent years and is itself an imperiled species. Current federal and state regulations are insufficient to regulate and protect Suckley’s cuckoo bumble bee from these threats.

Suckley’s cuckoo bumble bee is particularly vulnerable to extinction due to its multiple threats acting synergistically, such as habitat loss that reduces both abundance of host bumble bees and available nutrition via floral resources, in turn reducing Suckley’s cuckoo bumble bee’s population and individual health, making it more susceptible to introduced disease and inbreeding depression. There are no existing state or federal regulatory mechanisms which are adequate to protect Suckley’s cuckoo bumble bee. Endangered Species Act protection is needed to save Suckley’s cuckoo bumble bee from extinction, and its conservation would also assist in the recovery of its imperiled host bumble bees. The Service must act promptly to protect Suckley’s cuckoo bumble bee and to designate critical habitat in order to prevent its extinction and reverse its precipitous decline.

Introduction

The health of natural ecosystems and humanity are intricately linked to the health of pollinators (Pollinator Health Task Force 2015 p. 1,8; IPBES 2016). Animal pollination is most often done by bees and required for successful production of around 90% of wild plants, 75% of leading global food crops, and 35% of the global food supply (Moissett & Buchanan 2011 p. 2; IPBES 2016 p. 16). Pollinators also play an important role in ensuring the natural production of medicines, biofuels, fibers, construction materials, as well as recreational, cultural, and aesthetic values (IPBES 2016 p. 18).

The United States is home to around 3,600 species of native bees that inhabit nearly every type of ecosystem, reflecting the vast diversity of flowering plants (Ascher & Pickering 2015; Aslan et al. 2016 p. 483; Winfree et al. 2018 p. 359). Native bees often provide more effective pollination (i.e. resulting in higher seed set) of native plants than the introduced honey bee (*Apis mellifera* Linnaeus) because they are adapted to specific flower shapes and sizes (Moissett & Buchanan 2011 p. 1; Garibaldi et al. 2013 p. 2). However, many species of native bees have declined in abundance and range in North America (IPBES 2016 pp. 21–22) and are imperiled by a multitude of interacting threats that include habitat loss, agricultural intensification, pesticide use, invasive non-native species, climate change, and pathogens (Pollinator Health Task Force 2015 p. 5; IPBES 2016 pp. 24–29).

Suckley's cuckoo bumble bee (*Bombus suckleyi* Green) is a generalist pollinator and represents a rare group of obligate parasitic cuckoo bumble bees. Parasitism is an important part of the biological community (Marcogliese 2004 p. 151). Evidence indicates that healthy ecosystems have a high diversity of parasitic species (Hudson et al. 2006 p. 384). Parasites drive biodiversity and increase ecosystem persistence and resilience by infecting dominant species (Hudson et al. 2006 p. 383). Suckley's cuckoo bumble bee is a social parasite (also known as a cuckoo bumble bee) because it invades the nests of a different species of bumble bee and relies on host workers to provision its larvae. Social parasites can maintain species diversity by decreasing competition by abundant, wide ranging species on available floral resources. Suckley's cuckoo bumble bee may also play a beneficial role for its host by reducing the virulence of bumble bee diseases (Horwitz & Wilcox 2005 p. 728). Suckley's cuckoo bumble bee and other cuckoo bumble bees are especially at risk of extinction because of their dependence on the success of separate, host species (Suhonen et al. 2015 pp. 238–239).

Suckley's cuckoo bumble bee has significantly declined in abundance and range over the last half century. This species faces significant threats from habitat loss and degradation, loss of host species, livestock grazing, conifer encroachment and fire suppression, climate change pesticide use, disease, and domesticated honey and bumble bees. Suckley's cuckoo bumble bee needs critical habitat designation and management of grazing, fire suppression, pesticide use, and domesticated bee species in its habitat. These protections can only be gained through listing the species under the Endangered Species Act and designating critical habitat.

Natural History

Taxonomy

Bombus suckleyi was first described by John Greene (Green 1860 p. 169) and named after George Suckley. Suckley's cuckoo bumble bee is a member of the bumble bee genus *Bombus* within the insect order Hymenoptera and family Apidae (Table 1). Suckley's cuckoo bumble bee and all cuckoo bumble bees are classified under the subgenus *Psithyrus* (Williams et al. 2008 p. 49). *Bombus suckleyi* is recognized as a valid species under the Integrated Taxonomic Information System (ITIS) (ITIS 2019 p. 1).

Table 1. Taxonomy of *Bombus suckleyi* (ITIS Report)

Kingdom	*Animalia*
Phylum	*Arthropoda*
Subphylum	*Hexapoda*
Class	*Insecta*
Subclass	*Pterygota*
Order	*Hymenoptera*
Family	*Apidae*
Genus	*Bombus*
Subgenus	*Psithyrus*
Species	*Suckleyi*

Description

This subgenus *Psithyrus* differs morphologically from other *Bombus* subgenera because its members do not have corbicula or pollen-carrying baskets on their hind leg tibiae. Cuckoo bumble bees also have traits that differ from non-parasitic bumble bees that protect them against host queen and worker attacks such as larger and stronger mandibles, a strongly sclerotized and incurved abdomen, and a more powerful stinger (Lhomme & Hines 2018 p. 11). *Psithyrus* females also have an enlarged chemical-producing Dufour's gland, more ovarioles per ovary, and lay more eggs per cell than other *Bombus* species (Lhomme & Hines 2018 p. 11). Suckley's cuckoo bumble bee is physically most similar to the Ashton cuckoo bumble bee (*Bombus bohemicus*), the indiscriminate bumble bee (*Bombus insularis*), and the Fernald cuckoo bumble bee (*Bombus flavidus*) (Williams et al. 2014 pp. 163–165) but can be distinguished from other bees based on physical characteristics and color patterns.

Suckley's cuckoo bumble bee females are 0.72-0.92in (18-23mm) in length and covered

in short hair of even length that is black, yellow, or white (Figure 1). Females have variable coloration with black faces and predominately yellow thorax. The hind tibiae have a round, convex shape with dense hairs and no pollen carrying basket. The abdomen consists of six tergal segments: T1 and T2 are black, T3 has some yellow laterally and posteriorly with no yellow centrally, T4 is predominately yellow with a black patch centrally and anteriorly, T5 is usually black but can have some yellow laterally, and T6 is black (Williams et al. 2014 pp. 163–164). Males are slightly smaller than females at 0.51-0.61in (13-16mm) in length and their hind legs are convex with few hairs. The male coloration is highly variable with consistently T1 and T4 yellow, some yellow on T2, T3, T5, T6, and T7 is black (Williams et al. 2014 p. 164).

Figure 1. Female *Bombus suckleyi* (illustration by Elain Evans and Rich Hatfield, Xerces Society of Invertebrate Conservation).

Life Cycle and Behavior

Suckley's cuckoo bumble bee is a cuckoo bumble bee or obligate social parasite of other *Bombus* species. All individual female Suckley's cuckoo bumble bees are able to reproduce but cannot provision their own offspring because they are unable to produce a worker caste, enough wax for nest construction, and have no pollen-collecting basket on their hind legs (Goulson 2010 p. 77; Lhomme & Hines 2018 p. 5). While specific methods are unknown, Suckley's cuckoo bumble bee mated females must enter a host colony by fighting or sneaking, kill or subdue the host queen, lay her own eggs, and control the workers to continue collecting pollen and nectar to provision her offspring, often via aggressive behavior and chemical cues (Lhomme & Hines 2018 pp. 12–14). Once developed, Suckley's adults leave the nest to mate; mated females feed on nectar and pollen prior to overwintering and males die after mating (Goulson 2010 p. 12). Females emerge in the spring and forage until they find a suitable host colony to invade.

Suckley's cuckoo bumble bee females emerge later in the season but shortly after host species (Lhomme & Hines 2018 p. 11). Little is known about their specific phenology, but in California, Suckley's cuckoo bumble bee females have been observed as active from late May to late October, with greatest activity in June while males were active from early July to late September (Thorp et al. 1983 p. 50).

Suckley's cuckoo bumble bee has been documented breeding only in colonies of *B. occidentallis* (Thorp et al. 1983 p. 50), but has been recorded present at colonies of *B. terricola*,

B. rufocinctus, B. fervidus, and *B. nevadensis*, and *B. appositus* (Williams et al. 2014 p. 165). The western bumble bee (*B. occidentallis*) as a host species was historically the most common bumble bee in western North America, but has seen range contractions and decreases in abundance throughout its range (Defenders of Wildlife 2015 pp. 9–10).

Habitat

Suckley's cuckoo bumble bee has historically inhabited meadows and grassland ecosystems at a wide range of elevations across the western U.S. Like all bumble bees, Suckley's cuckoo bumble bee requires suitable nesting sites for host colonies, nectar and pollen resources during the colony and rearing period (spring, summer, and fall), and suitable overwintering sites for mated females (Goulson 2010 pp. 5–12). The nests that host Suckley's cuckoo bumble bee are primarily underground cavities that have been created naturally or by other animals such as abandoned rodent nests (Williams et al. 2014 p. 13). Suckley's cuckoo bumble bee females also require sites where they hibernate during the winter after mating. Bumble bees are generally known to hibernate close to the ground surface an inch or two under loose soil or under leaf litter or other debris, in sites that are undisturbed and have adequate organic material to provide shelter (Williams et al. 2014 p. 15).

Bumble bee species richness is generally highest in areas that contain high floral diversity (Goulson 2010 p. 2). Suckley's cuckoo bumble bee and its host species rely on flowers through the entire growing season, as the amount of nectar and pollen during the early spring and late summer impact the growth of the host colony and the production of Suckley's cuckoo bumble bee individuals as well as the ability of females to successfully mate, build up fat reserves, and overwinter (Westphal et al. 2009 p. 192; Goulson 2010 pp. 208–210). Bumble bees in general require approximately 815-2500 acres of suitable habitat to sustain viable populations (Goulson 2010 p. 193) and, being relatively more mobile than other insects, are able to exploit scattered resources in meadows that often exist in patchy complexes (Hatfield & LeBuhn 2007 pp. 154, 156). Thus, quality and quantity of bumble bee habitat varies at a landscape scale and bumble bees routinely forage over distances of > 1.25 miles (> 2000 m) (Hatfield & LeBuhn 2007 p. 151). The quantity and quality of floral resources within Suckley's range varies greatly, and floral-rich meadows are often interspersed within forests or within a matrix of flower-poor developed or agricultural and range land.

Suckley's cuckoo bumble bee is a generalist forager and has been reported on a wide range of flowers mostly in the Asteraceae and Fabaceae families, with *Aster*, *Chrysothamnus*, *Cirsium*, and *Solidago* as examples (Williams et al. 2014 p. 165). The following are Suckley's floral associations (with number of observations): *Cirsium* (15), *Aster sp.* (11), *Centaurea repens* (10), and *Trifolium sp*. (4) (discoverlife.org 2019 p. 5). Suckley's cuckoo bumble bee depends on the success of its host species and its primary host, the western bumble bee, which feeds similarly on *Ceanothus, Centaurea, Chrysothamnus, Cirsium, Geranium, Grindellia, Lupinus, Melilotus, Monardella, Rubus, Solidago, and Trifolum* (Williams et al. 2014 p. 116). The western bumble bee is a short-tongued species that inhabits open grassy areas, chaparral and shrub areas,

and open mountain meadows (Williams et al. 2014 p. 116).

Historic and Current Distribution

Historic Distribution

There are historic records of Suckley's cuckoo bumble bee in 11 western states as well as 11 Canadian provinces (Figure 2) (Williams et al. 2014 p. 164). Colorado, Montana, Washington, and Utah have the largest number of historic records (Table 2). In Canada, the species was historically spread across the southern portions of British Columbia, Alberta, and Saskatchewan with a disjunct population in Newfoundland (Williams et al 2014 p. 164).

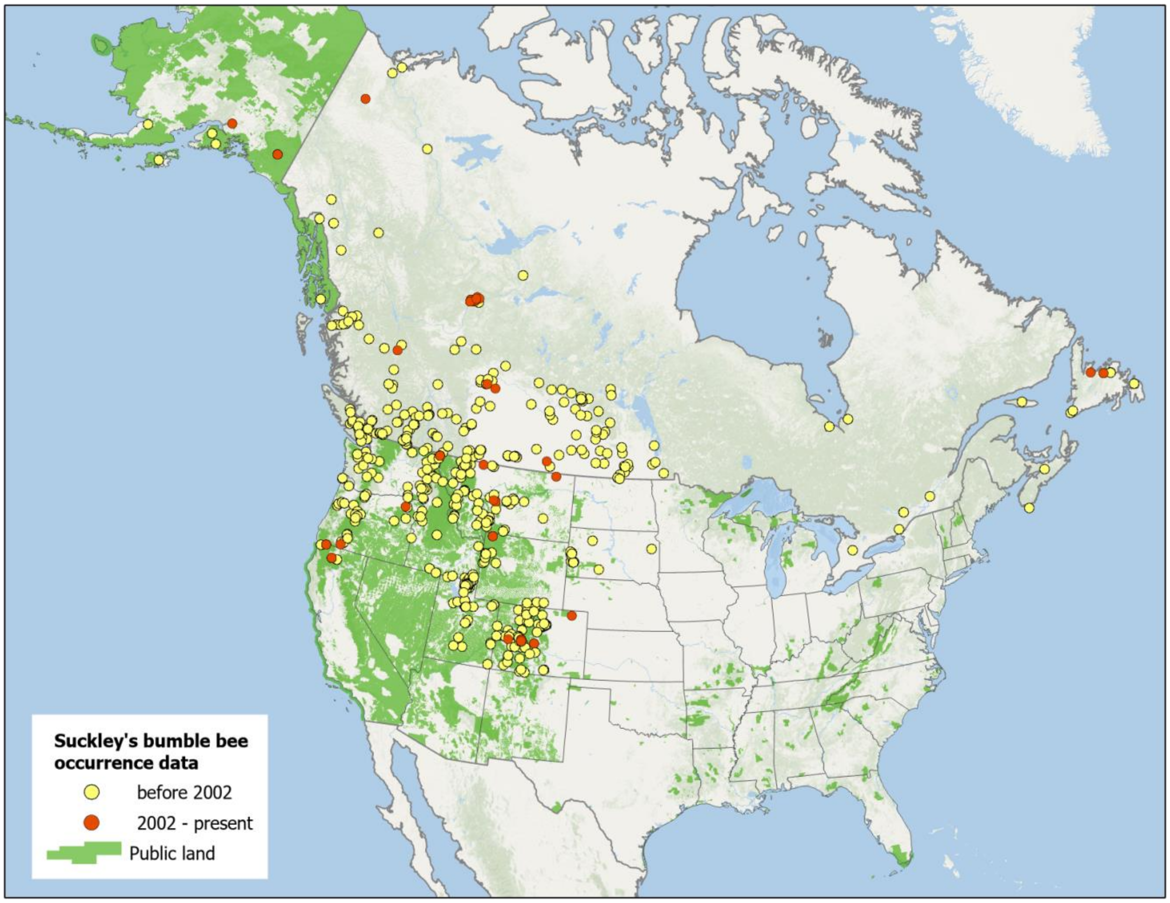

Figure 2. Historic (before 2002) and current records of Suckley's cuckoo bumble bee. Public land in Canada not shown.

Current Distribution

The historic abundance and range of Suckley's cuckoo bumble bee have greatly diminished (Table 2). The best available records indicate that Suckley's cuckoo bumble bee has experienced an overall decline of 78%, lost more than 50% of its range, and exhibits a relative

abundance of less than 10% of historic observations (Hatfield et al. 2015a p. 3). The number of observations has declined steadily since the 1950s (Figure 3). The majority of the observations in the past 20 years have been on public land in National Forests or National and State Parks (Figure 2), which could be a result of more sampling on public land. However, there has been substantial general bumble bee surveys throughout Suckley's cuckoo bumble bee's range in recent years.

Over that past 20 years, bumble bee surveys have provided information regarding the absence of Suckley's cuckoo bumble bee from certain areas. One extensive survey over 15 states in 2015 focused in agricultural areas and adjacent habitat throughout Suckley's historic range, including in the Pacific Northwest, Wasatch and Uinta Mountains of Utah, the Central Basin and Range, and the Colorado Plateau (Strange & Tripodi 2019 pp. 1063–1064); they collected 3,252 bumble bees representing 30 species, including two cuckoo bumble bees, but no Suckley's cuckoo bumble bees (Strange & Tripodi 2019 p. 1062,1064). In addition, during the October 2019 BOMBUSS 2.0 conference, a gathering of top North American bumble bee scientists, a working group discussed the previous year's survey effort for Suckley's cuckoo bumble bee and besides a few sightings in Alberta, Canada, Suckley's was absent from U.S. surveys and from areas with the Western bumble bee (Strange 2019 p. 2).

In sampling of the bumble bee community in Alaska in 2010, no Suckley's cuckoo bumble bees were reported, despite presence of the western bumble bee and other potential hosts (Koch & Strange 2012 p. 215). Surveys for Franklin's bumble bee (*Bombus franklini*) in southern Oregon have not recorded Suckley's cuckoo bumble bee since 1998 and observations of the western bumble bee have declined (Thorp 2010 p. 8). A 2016 Survey in the Rogue River-Siskiyou National Forest, potentially recorded Suckley's cuckoo bumble bee in two locations (Colyer 2016 p. 6), however these observations were likely misidentifications (Hatfield 2019). A 2018 targeted survey in Idaho in Lemhi and Custer Counties did not produce any observations despite visits to historic Suckley's sites (Baumann 2018 p. 1).

In 2018 conservation organizations and state agencies launched the Pacific Northwest Bumble Bee Atlas in Oregon, Washington, and Idaho. In 2018 and 2019 this project conducted over 900 formal standardized-effort surveys throughout the three-state area gathering more than 14,000 bumble bee observations from 24 different species (Hatfield et al. 2020). Suckley's cuckoo bumble bee has not been detected despite this significant survey effort throughout the core of its historic range. The Oregon Bee Atlas is a citizen science program started by Oregon State University to survey the bee fauna in the state of Oregon. In 2018 and 2019, trained volunteers collected 39,000 bee specimens from across the state. Specimens were identified to species at Oregon State University by taxonomist Lincoln Best. Over 2018 and 2019 volunteers recorded approximately 5000 bumble bee specimens from more than 1000 locations in Oregon, but there have been no recordings of Suckley's cuckoo bumble bee (Best 2020, pers. comm). The last expert confirmed sightings of Suckley's cuckoo bumble bee was in 2017 of one individual in the Wallowa-Whitman National Forest in Union County, Oregon (The Xerces Society et al. 2017; Richardson 2018).

Declines of Suckley's cuckoo bumble bee distribution are consistent with declines in host species. The western bumble bee has lost over 50% of its range and declined by 84% in relative to historic abundance (Hatfield et al. 2018 p. 19). Other potential host species have also declined including *B. terricola* (50% decline) (Hatfield et al. 2014 p. 49), *B. fervidus* (29% decline) (Hatfield et al. 2014 p. 22), *B. nevadensis* (15% decline) (Hatfield et al. 2014 p. 38), and *B. appositus* (28% decline) (Hatfield et al. 2014 p. 9).

Table 2. *Bombus suckleyi* distribution, historic and current records based on museum and other publicly available records of individuals observed (The Xerces Society et al. 2017; Richardson 2018), and conservation status, per State; see text for further citations.

State	Number of Historic Records (1896-2001)	Number of Recent Records (2002-2019)	Nature Serve State Ranking	State Conservation Status
Alaska	21	9	S1	BLM Special Status Species
California	27	10	S1	Species of Greatest Conservation Need; Candidate Species under the California Endangered Species Act
Colorado	317	11	NR	Species of Greatest Conservation Need
Idaho	126	22	S2	Species of Greatest Conservation Need Tier 1
Montana	190	7	NR	
North Dakota	1	0	NR	
Oregon	89	5	S1	Species of Greatest Conservation Need
South Dakota	53	0	NR	
Utah	166	0	NR	
Washington	342	0	S1	Species of Greatest Conservation Need
Wyoming	42	6	NR	
Total	**1374 (~13 per year)**	**70 (~4.4 per year)**		

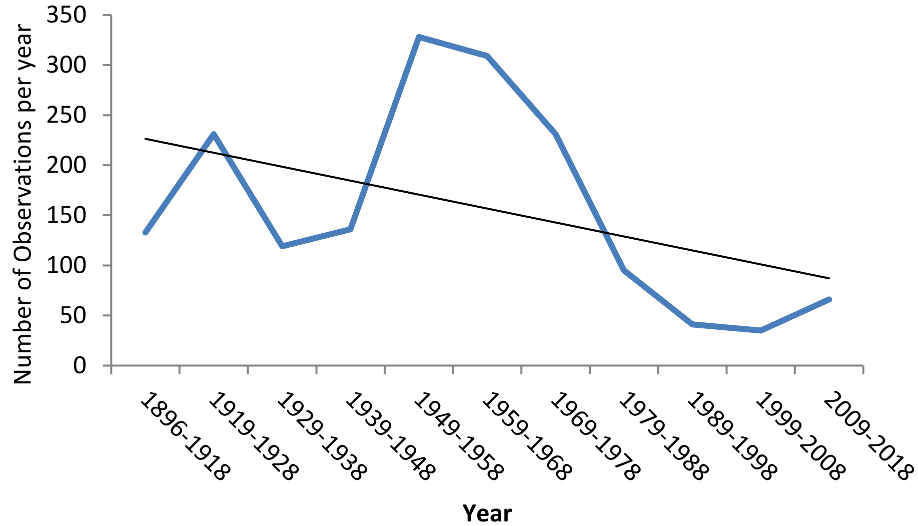

Figure 3. Relative abundance trend for Suckley's cuckoo bumble bee from 1896 to 2018. Black line represents best-fit line.

Conservation Status and Warranted ESA Protection

The ESA is a "comprehensive scheme with the 'broad purpose' of protecting endangered and threatened species." Ctr. for Biological Diversity v. U.S. Bureau of Land Mgmt., 698 F.3d 1101, 1106 (9th Cir. 2012) (quoting Babbitt v. Sweet Home, 515 U.S. 687, 698 (1995)). Congress' plain intent in enacting the ESA was "to halt and reverse the trend toward species extinction" Tenn. Valley Auth. v. Hill, 437 U.S. 153, 184 (1978). In doing so, the ESA requires that "all Federal departments and agencies *shall* seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of [these] purposes." 16 U.S.C. § 1531(c)(1) (2012). Endangered and threatened species are "afforded the highest of priorities" Tenn. Valley Auth., 437 U.S. at 174. Endangered species are species that are "in danger of extinction throughout all or a significant portion of its range," and threatened species and species that are "likely to become endangered species within the foreseeable future" throughout all or a significant portion of range and are listed for protection pursuant to section 4 of the ESA 16 U.S.C. § 1532(6), 1532(20), 1533. As demonstrated by the best available science, Suckley's cuckoo bumble bee meets the definition of endangered.

Suckley's cuckoo bumble bee has been recognized as imperiled or needing protection by international and state entities. It has a NatureServe ranking of G1 or critically imperiled from 2018 (NatureServe 2019 p. 1), is considered critically endangered by the International Union for the Conservation of Nature (IUCN) (Hatfield et al. 2015a p. 1), and is considered threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (COSEWIC 2019 p. 5). In the United States, Suckley's cuckoo bumble bee is considered a sensitive species by the Pacific Northwest Interagency Special Status/Sensitive Species Program (ISSSSP) (ISSSSP n.d.

p. 5) and at the state level it is also a species of 'great conservation need' in Washington (Washington Department of Fish and Wildlife 2015 pp. 3–39), Idaho (Idaho Department of Fish and Game 2017 p. xvii), Colorado (Colorado Parks and Wildlife 2015 p. B-1), and California (California Department of Fish and Wildlife (CDFW) 2015 pp. C–11), where it is also a candidate species under the California Endangered Species Act (Table 2).

The ESA states that a species shall be determined to be endangered or threatened based on any one of five factors (16 U.S.C. § 1533 (a)(1)): 1) the present or threatened destruction, modification, or curtailment of its habitat or range; 2) overutilization for commercial, recreational, scientific, or educational purposes; 3) disease or predation; 4) the inadequacy of existing regulatory mechanisms; and 5) other natural or manmade factors affecting its continued existence. Suckley's cuckoo bumble bee imperilment is known to be caused by factors one, three, four and five. The best available science shows Suckley's cuckoo bumble bee is in danger of extinction in a significant portion of its range, which has already declined significantly from its historical range. A prompt decision to move forward with listing Suckley's cuckoo bumble bee based on this petition is required to ensure that the bee does not go extinct.

Current and Potential Threats—Summary of Factors for Consideration

A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Habitat loss

Landscape changes that destroy or modify the presence of diverse flora and nesting and overwintering sites are detrimental to the survival of Suckley's cuckoo bumble bees. Habitat loss is the number one driver of insect declines worldwide (Sánchez-Bayo & Wyckhuys 2019 p. 19). Suckley's cuckoo bumble bee are generalist foragers that rely on a wide range of flowering plants throughout the growing season, and many types of human activities have the direct and indirect effects of decreasing native floral diversity and decreasing nesting habitat throughout their range (Goulson 2010 pp. 181–186). When florally diverse prairies and meadows are destroyed, bumble bees lose the diversity of floral resources they need to have adequate nutrition and calories through the entire growing season. Bumble bees need between 350,000 to 18 million floral units per month per ~250 acres (Dicks et al. 2015 p. 28). The overall quality of bumble bee habitat is directly related to the health of bumble bee colonies (e.g. Rotheray et al. 2017 pp. 6–7; Grab et al. 2019 p. 8; Woodard et al. 2019 pp. 5–6). Healthy populations of Suckley's cuckoo bumble bee and host colonies require nutrition from diverse nectar and pollen sources (Hatfield et al. 2017 p. 4).

Human development and activities in grassland and meadow ecosystems throughout the range of Suckley's cuckoo bumble bee has caused substantial habitat loss in low elevation grasslands in Montana, native grasslands in California, native shrub and grassland steppe in

Oregon and Washington, and sagebrush steppe in the intermountain west (Noss et al. 1996 pp. 80–83). The majority of the known remaining Suckley's habitat is montane meadows primarily on public lands, where the species is threatened by livestock grazing, forest management for bark beetles and fire, and adjacent agricultural uses and practices.

Livestock grazing

Ranchers graze their livestock across a large part of the American West which has direct and indirect harmful impacts on bumble bees. Historically, mountainous areas of the intermountain and pacific northwest did not have large herds of bison like the prairie ecosystems of the Midwest (Hart 2001 pp. 97–98). Domestic grazing animals can harm bumble bees by trampling soil, removing floral resources, and degrading bumble bee habitat (Hatfield & LeBuhn 2007 pp. 153, 156; Yoshihara et al. 2008 p. 2384) which can lead to a linear decline in bee abundance and richness (Yoshihara et al. 2008 p. 2384; Tadey 2015 p. 455; Lázaro et al. 2016 p. 408).

Grazing livestock have considerable, adverse effects on grassland ecosystems by altering plant species composition and reducing flowering forb species diversity (Fleischner 1994 p. 631; Black et al. 2011 p. 10). One important study conducted within Suckley's cuckoo bumble bee's range found that as cattle stocking rates increased to 50% utilization, a rate permitted in Suckley's cuckoo bumble bee's habitats (see below), vegetation community structure and abundance of bumble bees significantly declined (Kimoto et al. 2012 p. 7,8). Increasing cattle utilization also caused declines in bumble bee species richness and diversity, a result attributed to removal of floral resources by the grazing cattle (Kimoto et al. 2012 p. 10). Further, cattle feces and watering sites increase soil organic matter and moisture, creating microhabitats that favor nonnative plants that can then spread and outcompete forbs (Brooks 2009 p. 113). Grazing can also increase forest density and eliminate meadow habitat by reducing understory competition and thus helping the establishment of new tree seedlings (USFS 2008 p. 70).

Grazing also decreases soil surface stability, increases soil compaction, and can reduce ground-nesting rodents (Bueno et al. 2012 p. 5,6; Kimoto et al. 2012 p. 7,8), both of which degrade and limit nesting opportunities for Suckley's cuckoo bumble bees' hosts as well as potentially reducing overwintering sites for Suckley's cuckoo bumble bee females.

Promotion of annual grasses as livestock forage also presents a direct conflict with bumble bee habitat; in a report on a grazing allotment near a recent Suckley's cuckoo bumble bee sighting, the USFS indicates grasses (e.g. crested wheatgrass) are "desirable" forage plants while floral rich species (e.g. fringed sage, rabbitbrush, penstemon) are "least desirable " (USFS 2006); this preference is also expressed in other allotment reports (Clark & Villella 2013b p. 1). To protect grasses in grazing allotments, rangelands on public land are sprayed with insecticides toxic to bees, such as carbaryl and malathion, to control grasshoppers (Tepedino 2000 p. 3).

The US Government manages 229 million acres (139 million on USFS land) for grazing across the west (Glaser et al. 2015 p. 1), that supports more than 14.5 million animal unit months (AUMs) (6.8 million AUMs by USFS) (7.7 million AUMs by BLM) (USDA Forest Service 2017 p. 8; U.S. BLM 2019). Since 2002, 33% (23 out of 70) of all Suckley's cuckoo bumble bee

observations have been on or near grazing allotments (Figure 4) (Clauser 2019; USDA 2019). Suckley's cuckoo bumble bee was present in the Mill Creek allotment in the Klamath National Forest, California, and in the Gothic allotment in the Gunnison National Forest, Colorado (Clauser 2019; USDA 2019). Several recent Suckley's cuckoo bumble bee observations that are no more than 3.7 miles (6 km) from the following allotments in Colorado; Bassam (San Isabel NF), Butte North (Gunnison National Forest), and Point (Grand Mesa NF) and the Deadwood allotment in Oregon (Rogue-River Siskiyou NF) (Clauser 2019; USDA 2019).

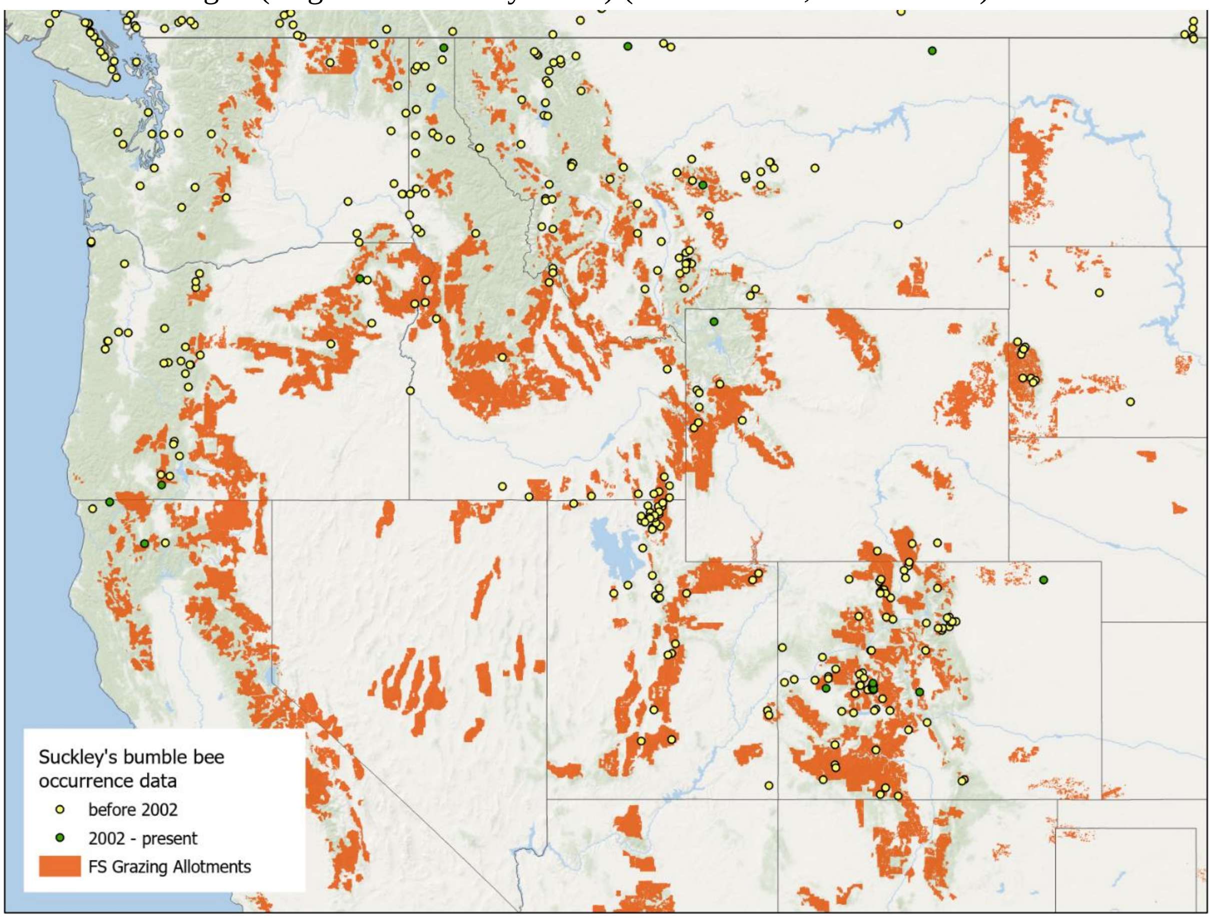

Figure 4. Forest Service (FS) grazing allotments (USDA 2019) overlaid with Suckley's cuckoo bumble bee occurrence data (excluding Alaska due to the lack of allotment data for the state).

These grazing allotments are heavily utilized and no plans or available Annual Operating Instructions (AOI) account for pollinator health let alone Suckley's cuckoo bumble bee. The Bassam allotment has a current maximum allowance of 270 cattle (equal to a cow/calf pair) from June 1st to October 31st over 41,940 acres (USFS 2019a; Outhier 2020). This allotment is governed by the Pike-San Isabel National Forest Land Resource Management Plan of 1984 and amendments which does not include information about protecting pollinators (USFS 1984, 2008). The 2019 AOI for the Bassam allotment includes standing forage guidelines that recommend 50% grazing intensity in upland rangeland and recent monitoring reports indicating Bassam is utilized between 20-60% (USFS 2015a, 2015b, 2017b, 2019h). A 50% utilization is a

high stocking rate and can lead to degradation of plant and bumble bee communities in montane prairies (Kimoto et al. 2012 p. 7). Further, cattle have been found to be left on parcels in the Bassam allotment for longer than allowed (USFS 2015a, 2015b).

The Klamath National Forest houses the Mill Creek allotment that permits 165 grazing cattle from July 15th to October 5th over 24,752 acres (USFS 2019g). The Mill Creek allotment's AOI considers satisfactory use standards as 30-60% depending on the ecosystem type (USFS 2019g p. 2). The average percent utilization over the last five years for each of the five allotment parcels were 51.2, 39, 49.2, 48.4, and 53, thus the allotment has been continually utilized at the high end of the satisfactory range stipulated in the AOI (USFS 2019g pp. 2–3). As such, despite allowing the least cattle per acre (equal to Bassam allotment) of all the allotments on which Suckley's cuckoo bumble bee is present, nearly 50% of the Mill Creek allotment is utilized by cattle, reducing available bumble bee forage.

The Deadwood allotment in the Rogue-River Siskiyou NF has a maximum allowance of 532 cattle from June 6th to October 15th over 14,282 acres under two 10 year permits granted in 2019 (USFS 2019b, 2019c). In the latest available Deadwood allotment reports, sampling indicated that "grazing pressure was very high" in two of the four parcels and photos revealed that the vegetation is greatly diminished and dominated by grasses (Clark & Villella 2013a p. 1, 2013b p. 1). A third parcel was in a "very poor" ecological condition due to the dominance of a non-native grasses; the authors indicated that overall vegetation diversity and ecological function in this allotment was low but could increase overtime (potentially decades) if grazing pressure was decreased (Clark & Villella 2013b p. 1).

The Gothic allotment has a maximum allowance of 500 cattle from July 16th to October 5th over 16,922 acres (Rosales 2019). The Butte North allotment has a maximum allowance of 130 cattle over two periods each, July 15-25th and October 6-20th over 4,388 acres (Rosales 2019). The Point allotment in the Grand Mesa NF has a maximum allowance of 293 cattle from June 16th to October 15th over 13,327 acres (Hydock 2019).Thus, these allotments are more heavily grazed and are governed by the Grand Mesa, Uncompahgre, and Gunnison National Forest LRMP that currently does not include any provisions for Suckley's cuckoo bumble bee or its hosts (USFS 1989a).

Grazing on these allotments occur during the active period of Suckley's cuckoo bumble bee and its hosts. As illustrated by the relatively lightly grazed Mill Creek and Bassam allotments, grazing on these allotments is heavy and removes at least 50% of potential forage available to Suckley's cuckoo bumble bee and its hosts. As such, grazing on these allotments is degrading upwards of 33% of Suckley's cuckoo bumble bee known current habitat, further threatening the rare bee with extinction. Grazing must be managed to reduce the severe harm it is causing to Suckley's cuckoo bumble bee specifically and this will only occur if the bee is listed as endangered under the ESA.

Fire management

Fire, both natural and managed, opens up areas for growth of flower-rich meadows which Suckley's cuckoo bumble bee and its host species rely on for nectar and pollen. Montane forests

and meadows of the western U.S. are adapted to occasional fire which acts as a disturbance to tree and shrub growth, prevents the canopy layer from maturing, and allows quick growing annual and perennial forbs to grow more readily (Finegan 1984 p. 109; Agee 1996 pp. 126–134; Schultz & Crone 1998 p. 244).

The USFS and landowners actively suppress fires in the forests of the western U.S. for the preservation of timber and to protect human-built structures (Radeloff et al. 2018 p. 3314). Fire suppression has occurred for more than 80 years in western forests and the USFS has only recently allowed for some natural wildfires to burn for forest management (Fellows & Goulden 2008 pp. 1–4; USFS 2008 pp. 87–88). Fire suppression has had significant effects on forest succession, compromising montane meadows in the process (Coop & Givnish 2007 pp. 924–925; Zald et al. 2012 pp. 1209–1210). Accumulation of fuel also increases the risk of large-scale, catastrophic fire (Huntzinger 2003 p. 1) which can have dire effects to isolated populations of Suckley's cuckoo bumble bee, especially by destroying nests (Schweitzer et al. 2012 pp. 9–10).

Fire is heavily managed in all of the National Forests within the current range of Suckley's cuckoo bumble bee (Figure 5). Fuels management is defined as "vegetative manipulation designed to create and maintain resilient and sustainable landscapes, including burning, mechanical treatments, and/or other methods that reduce the quantity or change the arrangement of living or dead fuel so that the intensity, severity, or effects of wildland fire are reduced within acceptable ecological parameters and consistent with land management plan objectives, or activities that maintain desired fuel conditions" (USDA 2020). The USFS manages fire for a multitude of goals but public safety and costs are the priorities, which may not coincide with best management practices for the conservation of bumble bees (Schweitzer et al. 2012 p. 9). For instance, downed logs and snags that might be removed could provide bumble bee nesting habitat (Fussell & Corbet 1992 p. 34; Hatfield et al. 2012 p. 15). The National Fire Plan of 2000 has four primary goals: improve fire prevention and suppression, reduce hazardous fuels, promote community assistance, and restore fire-adapted ecosystems (USFS 2019d p. 1), the last goal may benefit Suckley's cuckoo bumble bee but as outlined below, each forest is managed for specific goals as well that do not include specific management for Suckley's cuckoo bumble bee.

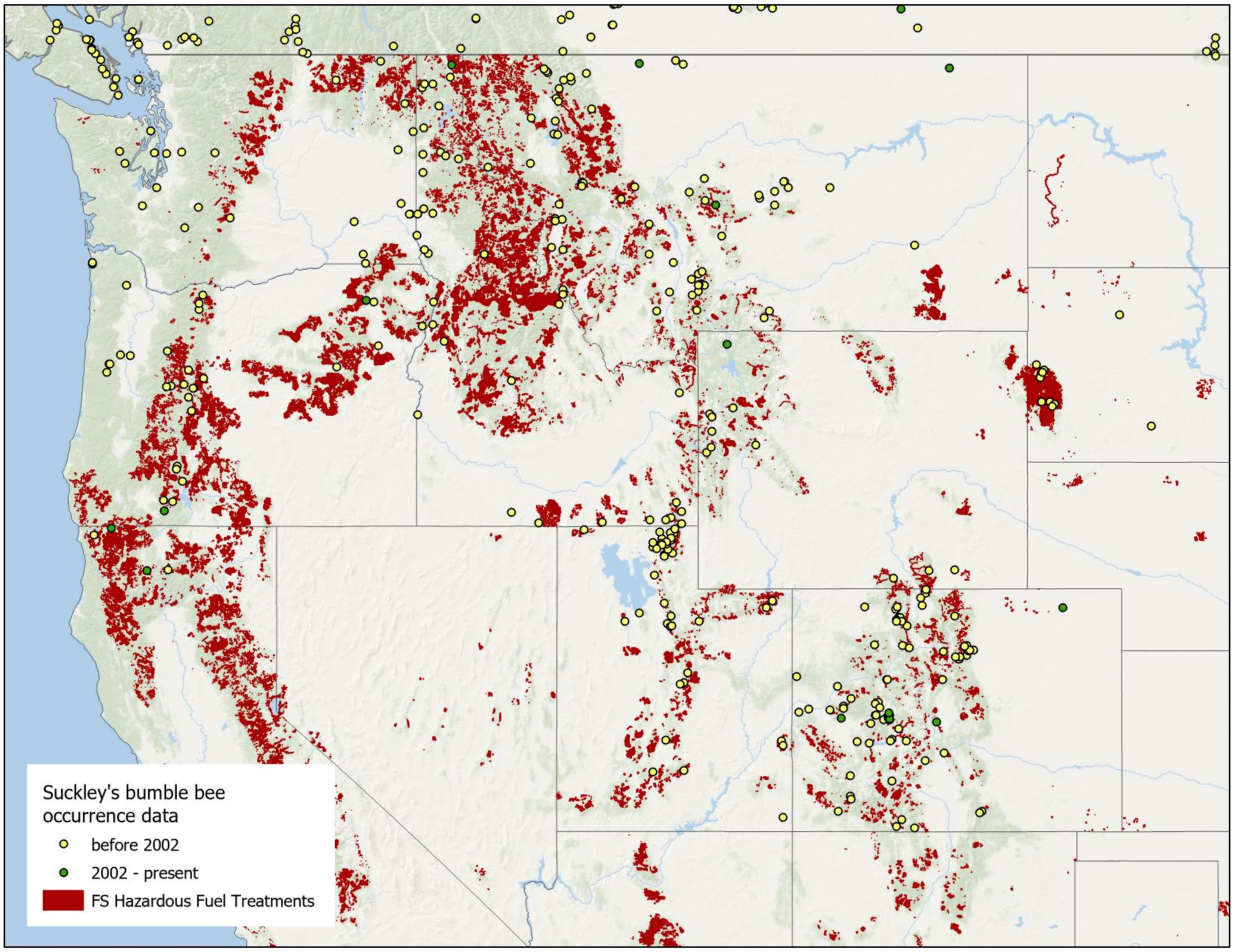

Figure 5. United States Forest Service (FS) fuels treatment (USDA 2020) overlaid with historic and recent observation records of Suckley's cuckoo bumble bee (excluding Alaska due to the lack of data available for the state).

Prescribed fires have become more common in recent years in National Forests and Parks as fire is recognized as an integral part of the western forest ecosystems. Suckley's cuckoo bumble bee benefits from a moderate, localized fire frequency to create floral rich meadows. However, fire management for wildlife is often a secondary goal and generally only for protected species. In Suckley's current range fires are primarily managed due to public safety and cost.

The San Isabel and Pike National Forests in Colorado are managed under the same plan with the direction to suppress wildfire and/or use prescribed fire "based on the least cost plus damages with consideration for public concerns" (USFS 1987 pp. 15–16). Similarly, the 2013 Grand Mesa, Uncompahgre, and Gunnison National Forests Fire Plan states "prescribed fire will be utilized as a vegetative and fuels management technique where it is the most cost efficient and acceptable alternative to achieve management objectives" (USFS 2019d p. 1). The fire management plan for the Helena-Lewis and Clark National Forests is being updated from the 1986 plan that appears to be still active (USFS 2019e). However, the more recent Annual Monitoring Report indicates the goal is to maintain less than 390 acres burned per year and

Helena National Forest spent over two million dollars on average during 2005-2009 to suppress fires (USFS 2012 pp. 196–198). Historically, the Klamath National Forest experienced natural wildfires every 8-16 years which kept the organic layer down and meadows open; modern fire suppression along with increasing human structures near forests have created a situation that requires continual fire suppression in the area (USFS 2014 pp. 1–2). Yellowstone National Park, within Suckley's current range, also balances fire management for ecosystem dynamics with the safety of park visitors, which is a mandate (National Park Service 2014 pp. 9, 13, 2019 p. 3).

Bark beetle management

Bark beetles are widespread throughout Suckley's current range in western forests and the Forest Service utilizes annual insecticide applications to control these beetles (USFS 2011 pp. 5, 10). The use of insecticides in forested environments to control bark beetles such as the western, spruce, and mountain pine beetles poses a threat to Suckley's cuckoo bumble bee. Due to climate change, bark beetles have and will continue to proliferate in forested lands in the western U.S. and Canada (Bentz et al. 2010 pp. 607–608) and resulting insecticide usage is detrimental to Suckley's cuckoo bumble bees.

The USFS is authorized to use any registered insecticide to address insect outbreaks (U.S. Forest Service 2014 p. 5) as are private timber companies; pine beetles are often controlled with carbaryl or pyrethroid insecticides (Fettig et al. 2011 p. 2) which are highly toxic to bumble bees (Gels et al. 2002 p. 725). Insecticides like carbaryl are typically applied using high pressure spray when treating individual, high-value trees (Hastings et al. 2001 p. 806). About 20% of these sprays drifts from individual trees (Fettig et al. 2006 p. 1693) and can end up in open areas where it contaminates potential forage plants and nesting soil of Suckley's cuckoo bumble bee. Widespread outbreaks of bark beetles have been treated with carbaryl sprayed by plane and helicopter because individual treatments are ineffective (Hastings et al. 2001 pp. 806–807). Aerial application greatly increases the amounts applied and the chances for drift. Rainy weather also increases the potential that carbaryl is washed off foliage and trunks of trees and into the soil at the base of trees, potentially exposing Suckley's cuckoo bumble bee via the soil or systemically via forage.

Bark beetles have been managed using insecticides in forests that are within Suckley's cuckoo bumble bee's range in forests in Idaho, California, Oregon, and Montana (Hastings et al. 2001 pp. 804–805). The most recently available monitoring report for Montana's Helena National Forest indicates that carbaryl treatments were applied to susceptible high-value sites that included "roughly 400 acres per year"; carbaryl is also applied to trees in Lewis and Clark National Forest in Montana (USFS 2012 p. 192; Great Falls Tribune 2014 p. 3). Forests in Colorado where Suckley's occurs have had extensive outbreaks of mountain pine beetles and use pesticides to treat affected areas. In recent years, carbaryl has been used to control bark beetles in Gunnison, Grand Mesa, Pike, and San Isabel National Forests in Colorado (USFS 2017a pp. 18, 22, 42). The USFS's Western Bark Beetle Strategy does not prioritize threatened species, but instead prioritizes human safety and hazardous fuel conditions, or fire suppression, adjacent to high value areas and "budget constraints require the Forest Service to respond to the highest

priority needs" (USFS 2011 pp. 1,3, 7). Thus, Suckley's cuckoo bumble bee is threatened by insecticide use to control bark beetles.

Agricultural intensification

Suckley's cuckoo bumble bee has been largely extirpated from low-elevation agricultural areas likely from the combination of habitat loss, disease transmission from managed honey and bumble bees, and from the increased use of pesticides. Historically, Suckley's cuckoo bumble bee was present in several now predominately agricultural areas such as the Willamette Valley in Oregon, the Bitterroot Valley in western Montana, and the Puget Sound area in Washington. Recent observations place Suckley's cuckoo bumble bee in and near agricultural areas in Daniels county, north-eastern, Montana Logan County, Colorado, and Boundary County, Idaho (Figure 6) (The Xerces Society et al. 2017; Richardson 2018); these areas exhibit recent intensified agriculture that involves increased pesticides use and loss of floral-rich habitat.

Agricultural intensification poses a threat to Suckley's cuckoo bumble bee populations in prairie ecosystems because it reduces the diversity of flowering plants through cultivation and herbicide usage (Goulson 2010 pp. 182–183). Three recent Suckley's cuckoo bumble bee observations are within agricultural counties and all three counties have seen an increase in the amount of land that is cultivated for crops: Logan County, Colorado (+116,393ac., +66%); Daniels County, Montana (+78,581ac., +44%); and Glacier County, Montana (+62,365ac., +33%)(USDA NASS 2019). This increase in the amount of land cultivated with commodity crops that are grown in monoculture reduces the natural and semi-natural habitat Suckley's cuckoo bumble bees and their hosts need to gain adequate nutrition for health and population growth. Monocultures of flowering plants such as alfalfa, canola, peas, and clover could potentially, without pesticides, provide nectar and pollen, but these crops alone do not improve the reproductive success of bumble bees (Westphal et al. 2009 pp. 190–191).

Pesticides

There is a diverse list of increasingly used pesticides classes that are legal in the U.S. and considered highly toxic to bees, such as the insecticides: Fipronil, Pyrethroids, and Neonicotinoids (DiBartolomeis et al. 2019 p. 3). Bumble bee exposure to insecticides occur in a variety of ways, including direct contact, through ingestion of residues in nectar or pollen, and via contact with soil contaminated by treated seeds and/or surface pesticide applications. Pesticides have direct, indirect, and cumulative effects on bumble bees. For example, in addition to having the serious effect of reducing flower diversity, exposure to the herbicide glyphosate was recently found to alter bee gut microbiota and resulted in increased susceptibility to pathogens and subsequent increased mortality (Motta et al. 2018 p. 3). Recent Suckley's cuckoo bumble bee observations have been in and near agricultural areas with high use of these pesticides (Figure 6), including Daniels County, Montana; Logan County, Colorado; and Boundary County, Idaho.

Neonicotinoids in particular have increased significantly in usage since 2014 and represent the largest contribution to toxic loading for bees in the landscape (DiBartolomeis et al.

2019 p. 11). The fastest growing use of neonicotinoids is as prophylactic seed treatment which greatly increases the toxic loading in the soil (DiBartolomeis et al. 2019 p. 4). Neonicotinoids have long half-lives of multiple years, are water soluble, travel in soil and are systemically distributed in plant tissue and thus are found in soil and non-crop plants within non-agricultural environments (Wood & Goulson 2017 pp. 17291–17300; Bredeson & Lundgren 2019 pp. 4–5). Neonicotinoids are applied on over half of the cropland in the U.S., including on cotton, wheat, soybeans, corn, and alfalfa (DiBartolomeis et al. 2019 p. 7). Wheat and alfalfa hay are grown in significant amounts within Suckley's cuckoo bumble bee's historic and current range (Figure 7). Despite fewer pounds of pesticide being applied the toxic loading in the environment has markedly increased with the popularity of neonicotinoids because they are more potent insecticides and are being applied over a larger area especially as seed treatment (DiBartolomeis et al. 2019 p. 19). Even with some countries banning or phasing out neonicotinoids, in July 2019, the EPA granted new approvals for sulfoxaflor to be used on a massive scale on ornamental plants and crops that are highly attractive to pollinators (U.S. EPA 2019 p. 2).

Suckley's cuckoo bumble bee produces only reproductive offspring which makes them more vulnerable to reproductive effects of pesticide exposure. At sub-lethal levels, neonicotinoids impair reproduction; specifically, thiamethoxam impairs ovary development in bumble bees (Baron et al. 2017 p. 4) and imidacloprid causes reductions in both reproductive success and production of reproductive females (Whitehorn et al. 2012 pp. 1–2; Raine 2018 p. 1; Wu-Smart & Spivak 2018, 2018 pp. 4–5). In addition to reproductive consequences, neonicotinoids impair normal functioning of colonies making them less social, less able to learn and remember (Siviter et al. 2018b p. 5), and can reduce their foraging motivation (Lämsä et al. 2018 p. 4). Bumble bees fed even low doses of sulfoxaflor produced significantly fewer workers and had a 54% reduction in males and future queens (Siviter et al. 2018a). Impacts to workers are also very relevant to Suckley's cuckoo bumble bee because invading females need host colony workers to provision offspring. Without healthy workers, Suckley's cuckoo bumble bee would not produce new females and thus have significant reductions in populations.

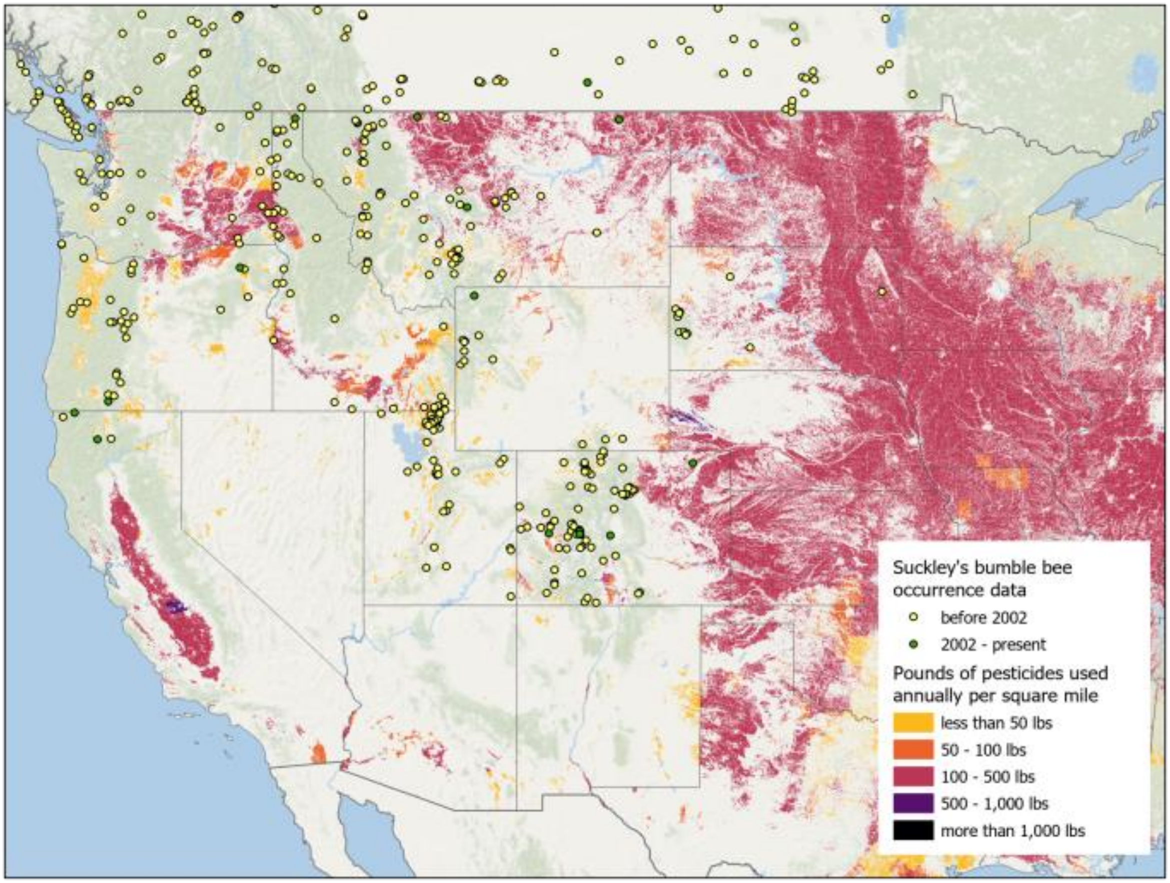

Figure 6. Pounds of pesticide applied per square mile for permethrin, carbaryl, fipronil, glyphosate, and five neonicotinoids (acetamiprid, clothianidin, imidacloprid, thiamethoxam, and sulfoxaflor) (does not include pesticide used in seed treatment) overlaid with historic and recent observation records of Suckley's cuckoo bumble bee (excluding Alaska due to the lack of pesticide usage data for the state). Pesticide data source: USGS Pesticide National Synthesis Project (https://water.usgs.gov/nawqa/pnsp/usage/maps/compound_listing.php).

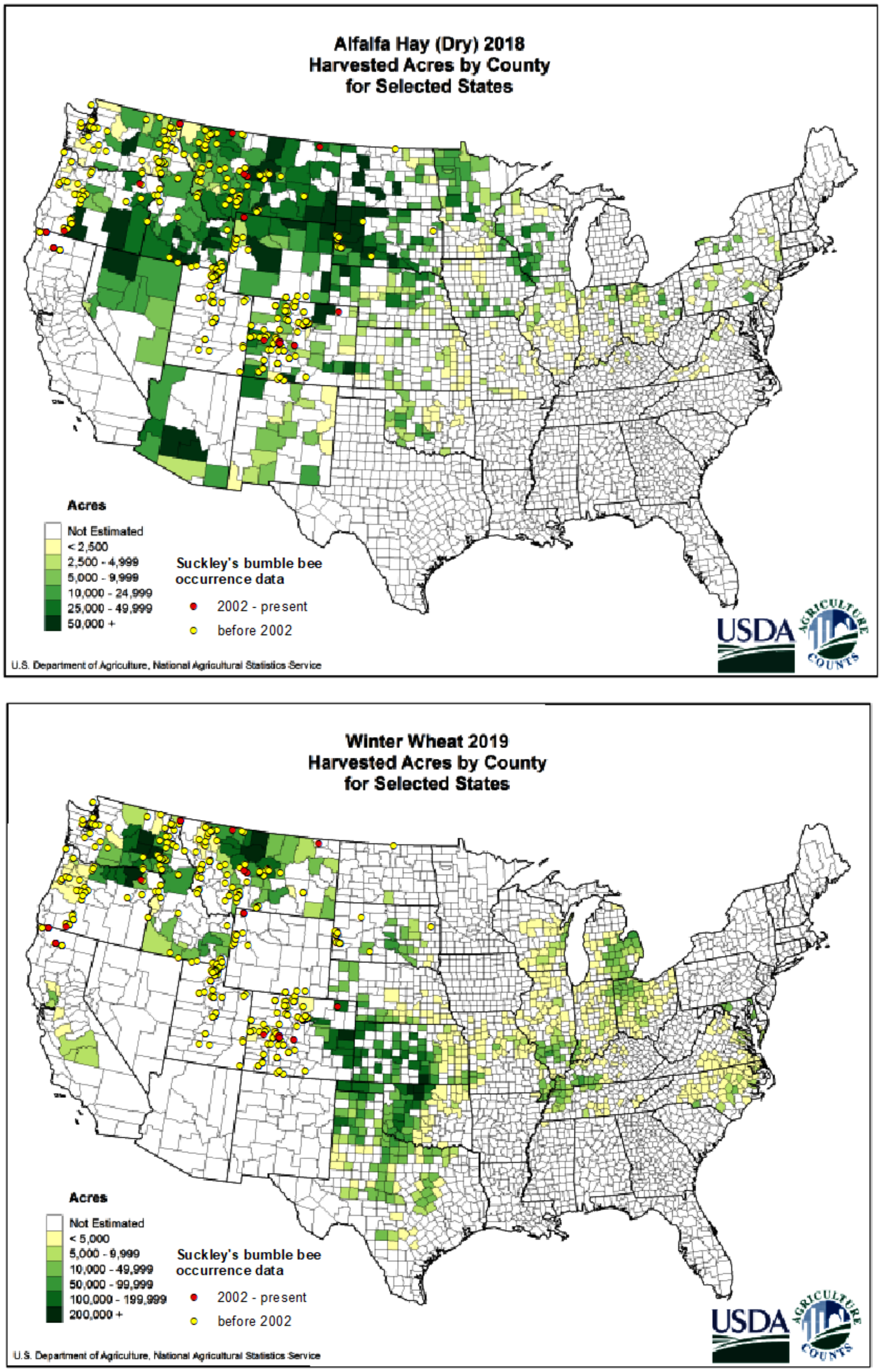

Figure 7. Harvested acres of alfalfa hay by county in 2018 (top) and harvested acres of winter wheat by county 2019 (bottom) overlaid with Suckley's cuckoo bumble bee observation data.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Overutilization pushes imperiled species towards extinction, especially in conjunction

with other threats. It is not known whether overutilization threatens Suckley's cuckoo bumble bee, but given its low population numbers, any utilization for commercial, recreational, scientific or educational purposes could pose a serious threat.

C. Declines Due to Disease or Predation

The documentation of bumble bee declines has increased greatly in the last 10 years, with many implicating pathogens as the cause or part of the cause leading to the declines (Cameron & Sadd 2019 pp. 10.2-10.3). Cuckoo bumble bees exist in smaller populations than their host species and thus have limited genetic variation, an increased risk of inbreeding, and reduced resistance to diseases (Suhonen et al. 2015 p. 238). Many diseases are particularly detrimental to reproductive females and males; this fact heightens the threat to Suckley's cuckoo bumble bee, as all individuals are reproductive.

Due to the rarity of Suckley's cuckoo bumble bee, only two studies have tested the species for pathogens; *Nosema bombi* has been found in Suckley's cuckoo bumble bee (Cordes 2010 pp. 18, 74; Stolter et al. 2010 p. 6). *Nosema bombi* is a microsporidian pathogen that was spread from commercially reared bumble bees into wild populations and infects *Bombus* species (Szabo et al. 2012 p. 232; Cameron & Sadd 2019 p. 10.10). *N. bombi* impacts bumble bee fitness by causing dysentery and reducing colony size and individual longevity (Koch & Strange 2012 p. 213; Cameron & Sadd 2019 p. 10.10).

Pathogen-induced reductions in host bumble bee populations also impact Suckley's cuckoo bumble bee through host reduction and disease transmission. *N. bombi* has been implicated specifically in the decline of the western bumble bee, which appears more susceptible to the effects and has higher infection rates than other bumble bees (Cordes et al. 2012 p. 213; Koch & Strange 2012 p. 216; Cameron et al. 2016 pp. 2–4). *N. bombi* has also been found in potential hosts *B. fervidus* and *B. terricola* (Cordes et al. 2012 p. 4).

The western bumble bee and *B. fervidus* have also been infected by *Crithidia bombi*, a gut trypanosome that impairs foraging, worker longevity, and queen hibernation and colony founding (Cordes et al. 2012 p. 4; Cameron & Sadd 2019 p. 10.10). Further, *C. bombi* can spread through flowers shared with honey bees and *B. impatiens* used commercially for agriculture (Colla et al. 2006 p. 461; Ruiz-Gonzalez & Brown 2006 p. 621), both of which have been utilized within the range of the western and Suckley's cuckoo bumble bee. *Locustacarus bucheri,* an internal tracheal mite that causes lethargic behavior and reduced lifespans, has also been found infecting the western bumble bee in southwestern Alberta, Canada (Otterstatter & Whidden 2004 pp. 353–355), where Suckley's cuckoo bumble bee is extirpated.

Thus, Suckley's cuckoo bumble bees are directly negatively impacted by disease, but also indirectly through loss of their hosts and potential host transmission. Listing Suckley's cuckoo bumble bee is necessary to jump start common-sense efforts to reduce the transmission of pathogens from managed bees to this and other native bee species.

D. Other Natural or Manmade Factors Affecting Suckley's cuckoo

bumble bee

Loss of host species

Suckley's cuckoo bumble bee is more at risk of extinction than other rare bumble bees because it is a social parasite dependent on a host species to rear its offspring (Suhonen et al. 2015 pp. 238–239). For rare parasitic species, declines in host species can create an extinction vortex where the parasitic species declines rapidly, especially for those that rely on one or few hosts (Suhonen et al. 2019 p. 10). Threats to Suckley's cuckoo bumble bee from habitat loss and disease are compounded because its primary host species, the western bumble bee, is also in steep decline. The declining western bumble bee is the primary host for Suckley's cuckoo bumble bee and is the only host species in whose colony it has been documented breeding as a parasite (Hatfield et al. 2015a p. 4). The western bumble bee has experienced serious declines in relative abundance across its range with an average decline of 57% (Hatfield et al. 2018 p. 17). Losses for the western bumble bee have been especially severe in the southern part of its range, from central California to southern British Columbia where Suckley's cuckoo bumble bee has also declined (Hatfield et al. 2015b p. 4).

Other potential hosts have not been confirmed as true hosts of Suckley's cuckoo bumble bee, as Suckley's has only been documented as present at colonies of these species, not breeding as parasite in their nests (Hatfield et al. 2015a p. 4). Still, these other potential host species have also greatly declined in recent years. The yellow-banded bumble bee (*B. terricola*) has experienced a 50% decline, continues to decline and is likely no longer found within Suckley's cuckoo bumble bee's current range (Hatfield et al. 2014 p. 49; USFWS 2018 pp. 39, 41, 80). The white shouldered bumble bee (*B. appositus*) and the Nevada bumble bee (*B. nevadensis*), have declined by 28% and 15%, respectively, but are still present in Suckley's current range (Hatfield et al. 2014 pp. 9, 38). Similarly the yellow bumble bee (*B. fervidus*) has declined by 29% and while it is still found within the range of Suckley's cuckoo bumble bee, its preferred habitats are open farmland and fields, urban parks, and gardens (Hatfield et al. 2015c p. 4).

Managed bees

Honey bees

Managed, non-native honey bees (often *Apis mellifera*) have a negative impact on native bees through direct competition for floral resources, exclusion of native bees from flowers, and the transmission of diseases (Mallinger et al. 2017 pp. 24–25). Honey bees often out-compete native bees for nectar and pollen resources on the landscape because they are active for longer and have the ability to recruit nest mates to floral resources. Over three summer months, a small 40 hive commercial apiary can remove enough nectar and pollen from an area that could provision 4,000,000 native, solitary bees (Cane & Tepedino 2016 pp. 206–207). Honey bees have a negative competitive effect on bumble bees specifically that can result in a bumble bee's lowered reproductive success, changes in forage behavior, and lowered average body size (Thomson 2004 pp. 463–464; Goulson & Sparrow 2009 pp. 7–8; Elbgami et al. 2014 p. 508).

Suckley’s cuckoo bumble bee and its hosts are likely to be foraging in areas near honey bee hives. Suckley’s cuckoo bumble bee has recently been found almost exclusively on public land and honey bee apiaries are increasingly placed on public land in the west, and indeed have even been mistakenly encouraged by the federal government for such placement (Obama 2014). For example, historic locations of Suckley’s near the Prairie Grasslands National Forest in the Dakotas have permitted apiaries (The Xerces Society et al. 2017; Richardson 2018; U.S. Forest Service 2019a). In addition, more recent observations of Suckley’s cuckoo bumble bee have been in Klamath National Forest (The Xerces Society et al. 2017; Richardson 2018) where there is at least one currently active apiary permit for 100 hive apiaries at four different locations or 12,000,000 honey bees (assuming 30,000 honey bees in each hive) within one area of Klamath National Forest alone (U.S. Forest Service 2019b).

Without protection of the Endangered Species Act and concurrent designation of critical habitat, the USFS will likely not be triggered to consult with the Service on placement of apiaries on their lands within Suckley’s cuckoo bumble bee’s range. Thus, the impacts of apiary placement on the health and survival of Suckley’s cuckoo bumble bee will not be assessed and continue to be a threat to the bee. Placing honey bee hives on public, protected land is inconsistent with protecting sensitive species like Suckley’s cuckoo bumble bee (Geldmann & González-Varo 2018 pp. 1–2).

Commercial bumble bees

Commercial bumble bees, particularly the common eastern bumble bee (*B. impatiens*), the only species currently commercially available in the United States, compete with and bring diseases to wild bumble bees (IUCN Bumble bee specialist group 2019 p. 1). Managed bumble bee colonies are often large and highly dense which makes pathogen transmission more likely (Velthuis & Van Doorn 2006 p. 12). The commercial use of the eastern bumble bee is widely permitted throughout Suckley’s cuckoo bumble bee’s range. Oregon is the only state that does not allow *B. impatiens* to enter the state, but regulations are not always enforced or widely known. For example, a 2007 news story discusses an Oregon farmer who purchased colonies of *B. impatiens* for strawberry pollination in Grants Pass, Oregon, well within the range of recent Suckley’s cuckoo bumble bee sightings (Associated Press 2007 pp. 2–3).

The eastern bumble bee is permitted in other western states and for use in greenhouses in California. Moreover, the eastern bumble bee has now become established outside of its native range, including in southwestern British Columbia and southern Alberta (Palmier & Sheffield 2019 p. 9), leading to potential competition with and disease spillover to Suckley’s cuckoo bumble bee. Further, there are reports of native bees entering commercial colonies and, as Suckley’s cuckoo bumble bee is a cuckoo and enters nests of other species, it has a higher likelihood of coming into contact with deadly pathogens from colonies within its range (Velthuis & Van Doorn 2006 pp. 10–12).

In addition to the eastern bumble bee, commercially produced colonies of the western bumble bee were used for field research between 1992 and 2000 in California, Washington, and Alberta (Thorp et al. 2010 p. 17). However, the western bumble bee suffered heavy losses due to

disease, particularly *N. bombi*, that was presumed to come from wild caught queens and then amplified during commercial rearing; thus, western bumble bee are no longer commonly reared commercially (Velthuis & Van Doorn 2006 p. 432). As such, Suckley's cuckoo bumble bee's primary host was utilized commercially and placed in the field for scientific research within its range, providing a mechanism for disease spillover to Suckley's cuckoo bumble bee. Further, with the western bumble bee no longer a viable option for commercial pollination, the eastern bumble bee became more commonly utilized, providing continued sources of disease and competition in Suckley's cuckoo bumble bee's range (Velthuis & Van Doorn 2006 p. 432).

Climate change

Human activities have increased global average temperatures 0.8-1.2°C above pre-industrial levels with a trend of about 0.2°C per decade due to past and current emissions (Intergovernmental Panel on Climate Change 2018 p. 4). At current emissions rates, global temperatures will increase by 1.5°C between 2030-2052, resulting in increased incidence of severe weather events and loss of ecosystems (Intergovernmental Panel on Climate Change 2018). Habitat loss and disease have reduced the Suckley's cuckoo bumble bee's range to primarily montane areas in the intermountain west, areas that climate models predict will be hotter and drier (Saunders et al. 2008 pp. 1–2, 7). The western United States is already warming faster than average having warmed +1.7°F (0.95°C) from just 2003-2007 as compared to the 1.0°F (0.56°C) global rise (Saunders et al. 2008 p. 3).

Bumble bees have evolved to fly and forage at lower temperatures than other bees and are found at higher latitudes and altitudes (Heinrich 1972 p. 185). Above 24°C, bumble bees lose the ability to maintain a stable body temperature (Heinrich 1972 p. 186) and they are unable to fly if their thorax temperature exceeds 42-44°C (Goulson 2010 p. 17). A reduction in the length of time bumble bees can fly results in fewer foraging trips and thus fewer resources to rear large colonies; indeed, bumble bees have been extirpated from areas with extreme temperatures, independent of land use in some cases (Kerr et al. 2015 p. 179; Soroye et al. 2020 p. 687).

Forest regions in southern Oregon and norther California will experience increased annual temperatures between 1.8-5.4°C with summer precipitation down by 30% by the end of this century, along with reduced snowpack and earlier peak stream flows (Halofsky et al. 2016). Hotter and drier summers could lengthen the growing season in these areas, but the increased risk of drought will increase the risk of reduced floral resources, stressing bee populations and resulting in lower reproductive rates. Hotter, drier summers increase the risk of extreme fires. These climate change induced changes are already leading to changing floral resources in the bee's habitat (United States Fish and Wildlife Service 2018 p. 37) and are leading to increased drought severity, wildfire risk, and earlier peak stream flows in winter and early spring (Halofsky et al. 2016). The winter and early flood risk may cause overwintering hibernating Suckley's cuckoo bumble bee females to emerge too early and miss vital floral resources or experience increased mortality due to inundation and disturbance.

Loss of genetic diversity and production of diploid males

Bumble bee colony locations are dynamic, as new reproductive individuals disperse to locations different from their colony of origin. Thus, bumble bee colonies exist in metapopulations dependent on connected populations and habitat patches to avoid inbreeding depression via dispersal (Hanski & Gyllenberg 1993). Bumble bees likely disperses up to 10 km (6.2 miles) (United States Fish and Wildlife Service 2018 p. 18). Currently known occupied sites of Suckley's cuckoo bumble bee are separated by an average distance of 137 km. This lack of connectivity between subpopulations of Suckley's cuckoo bumble bee reduces genetic diversity and increases risk of inbreeding depression.

Suckley's cuckoo bumble bee exhibits haplodiploidy and single loci sex determination in which haploid males develop from unfertilized eggs while diploid females develop from fertilized eggs (Zayed & Packer 2005 p. 239). This sex determination system in small populations with limited gene flow makes Suckley's cuckoo bumble bee particularly susceptible to inbreeding depression and is a major threat to population viability (Zayed 2009 p. 244). Small and inbred populations can produce sterile diploid males when females fertilize eggs with sperm that has the same allele at the sex-determination locus (Zayed 2009 p. 239). In addition, females fertilize eggs to produce females and thus waste reproductive effort when males are inadvertently produced, leading to increased male biased sex ratio and further reduced population sizes, creating a positive feedback loop that ultimately leads to extinction (Zayed & Packer 2005 pp. 10744–10745; Zayed 2009 pp. 239, 241). The production of diploid males in haplodiploid bees can increase extinction risk by 50-63%, an order of magnitude higher than extinction risk caused by inbreeding alone, making diploid male production a unique and serious threat to Suckley's cuckoo bumble bee (Zayed & Packer 2005 pp. 10744–10745).

Synergistic threats

The combination of threats from loss of host species, disease, pesticides, climate change, and habitat loss, enhance the extinction risk from any single threat for Suckley's cuckoo bumble bee (Brown et al. 2000 p. 425; Fauser-Misslin et al. 2014 pp. 453–455; Goulson et al. 2015a p. 6). Loss of the western bumble bee, Suckley's only confirmed host, from *N. bombi* infections have been correlated with use of fungicides, particularly the widely used chlorothalonil (McArt et al. 2017 pp. 5–6). Specifically, the western bumble bee's range loss has been strongly predicted by total chlorothalnil usage which, in turn, was the strongest predictor of *N. bombi* occurrence in the bee (McArt et al. 2017 p. 6). *N. bombi* infections have also been found to be more common at higher latitudes, introducing the possibility that *N. bombi* reduces Suckley's cuckoo bumble bee's ability to establish at higher latitudes in response to climate change (McArt et al. 2017 p. 6).

Habitat loss reduces nutrition available to Suckley's cuckoo bumble bees and their hosts, which is necessary to support healthy populations (Hatfield et al. 2017 p. 4). A lack of a diverse diet can weaken a bee's immune system which can make it more susceptible to disease (Brown et al. 2000 p. 425). Lack of nutrition compromises bumble bees' ability to fight off and survive

infections and, in turn, infected bumble bees themselves require increased nutrition (United States Fish and Wildlife Service 2018 p. 39). Neonicotinoid pesticides that threatened Suckley's cuckoo bumble bee and its hosts are well known to impair a bee's inability to find floral resources (Goulson et al. 2015b pp. 1255957–4). Thus, the threats of pathogens and pesticides require that Suckley's cuckoo bumble bee and its hosts have access to more, quality habitat to combat these threats and recover. Protecting Suckley's cuckoo bumble bee from these synergistic threats requires protection under the ESA and designation of critical habitat.

E. The Inadequacy of Existing Regulatory Mechanisms

The voluntary measures taken to promote pollinator habitat throughout the western United States are inadequate to address the threats across the range of Suckley's cuckoo bumble bee and its host species. To the extent that any voluntary, i.e. non-regulatory, mechanisms exist to protect Suckley's cuckoo bumble bee, FWS cannot rely on voluntary measures to deny listing of species. Voluntary and unenforceable conservation efforts are simply *per se* insufficient as "regulatory mechanisms" under 16 U.S.C. 1533(a)(1)(d):

> [T]he Secretary may not rely on plans for future actions to reduce threats and protect a species as a basis for deciding that listing is not currently warranted . . . . For the same reason that the Secretary may not rely on future actions, he should not be able to rely on unenforceable efforts. Absent some method of enforcing compliance, protection of a species can never be assured. Voluntary actions, like those planned in the future, are necessarily speculative . . . . Therefore, voluntary or future conservation efforts by a state should be given no weight in the listing decision (*Oregon Natural Resources Council v. Daley,* 6 F. Supp.2d 1139, 1154-155 (D. Or. 1998).

As demonstrated in this petition, the threats faced by Suckley's cuckoo bumble bee are not adequately addressed by any existing regulatory mechanisms and it continues to decline precipitously. The only adequate regulatory mechanism available to save Suckley's cuckoo bumble bee starts with listing it under ESA. Below we outline potential protective regulations but show that they are inadequate.

Federal Mechanisms

National Forest Management Act

Congress enacted the National Forest Management Act of 1976 ("NFMA") to reform Forest Service management of national forest system lands (16 U.S.C. § 1600 et seq). The NFMA requires that the Forest Service implement a Land and Resource Management Plan ("LRMP") for each national forest. The LRMP must include land allocations, desired conditions, objectives, and standards and guidelines with which site-specific projects must comply. In addition, among NFMA's substantive requirements is the duty to provide for the diversity of

plant and animal communities (16 U.S.C. § 1604(g)(3)(B)).

The NFMA regulations require species viability, but do not prohibit the Forest Service from carrying out actions that harm species or their habitat, stating only that "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area" (36 C.F.R. § 219.19). This regulation is inadequate for the conservation of Suckley's cuckoo bumble bee because it does not require the responsible agency to support the persistence of all species, including invertebrates.

None of the current LRMPs of the National Forests on which Suckley's occurs provide for the protection of Suckley's cuckoo bumble bee, its hosts, or pollinators in general. The Pike-San Isabel National Forest LRMP of 1984 and amendments does not include any protections for Suckley's cuckoo bumble bee or pollinators in general (USFS 1984, 2008). Neither the Rogue River nor Siskiyou LRMPs provide protections to Suckley's cuckoo bumble bee or pollinators in general (USFS 1989b, 1990). The Klamath National Forest LRMP contains no guidance or protective measure regarding Suckley's cuckoo bumble bee or its hosts or pollinators in general (USFS 2010). The current Grand Mesa, Uncompahgre, and Gunnison National Forest LRMP does not include any provisions for Suckley's cuckoo bumble bee or its hosts or pollinators in general (USFS 1989a); however, the plan is being revised and the working draft contains general provision to protect pollinators, including planting pollinator preferred native plants, create over 100,000 acres of pollinator habitat between the three forests, and avoid population-level pesticide impacts to pollinators (USFS 2019f p. 36). If implemented these guidelines could aid in protecting and creating habitat for Suckley's cuckoo bumble bee but they are not finalized and also not specific to Suckley's requirements, which would only be met if Suckley's cuckoo bumble bee was protected by the ESA.

The three major forest management threats to Suckley's cuckoo bumble bee, grazing, fire management, and bark beetle management are governed by the LRMPs of each National Forest and national or regional level management plans but, as outlined below, do not contain protective measures that would act to conserve Suckley's cuckoo bumble bee.

The individual grazing allotments do not provide for any protection of Suckley's cuckoo bumble bee but some contain vague language on protection of certain meadows. For instance, the 2019 Bassam AOI states that the permittee should spend "as much time as needed, weekly at a minimum, in moving livestock away from areas of concern (meadows, riparian, and concentration areas) and into areas of normally light use" (USFS 2019a p. 1). The Deadwood allotment is guided by a Decision Notice that does not contain any protection for pollinators or bees, but does discuss fencing around important meadows to protect them from grazing; it is unclear how those meadows are decided or the extent of the area to be fenced (USFS 2004 p. 3,7). The 2019 Mill Creek AOI in the Klamath National Forest requires that the rancher or permittee manage the cattle so that they do not over-utilize an area, enter highly favored areas, or graze outside of the permitted area (USFS 2019g p. 5). These provisions, however, do not regulate degradation of forage habitat and leave management decisions up to the rancher.

The USFS's Western Bark Beetle Strategy does not prioritize threatened species, but

instead prioritizes human safety and hazardous fuel conditions, or fire suppression, adjacent to high value areas and “budget constraints require the Forest Service to respond to the highest priority needs” (USFS 2011 pp. 1,3, 7). Thus, Suckley’s cuckoo bumble bee is not protected by the USFS’s bark beetle management strategy and threatened by insecticide use to control bark beetles. Similarly, the USFS’s National Fire Plan of 2000 has four primary goals: improve fire prevention and suppression, reduce hazardous fuels, promote community assistance, and restore fire-adapted ecosystems (USFS 2019d p. 1), the last goal may benefit Suckley’s cuckoo bumble bee, but is too general to be considered a mechanism that will reduce Suckley’s cuckoo bumble bee’s risk of extinction due to lack of fire or increased fire severity.

The regional Northwest Forest Management Plan that provides management guidance for parts of Suckley’s range and potential range in Washington, Oregon, and California does not allow for designation of any specific Arthropod species and instead groups all Arthropods into four functional groups (USFS & BLM 2001 p. 2). While the Plan calls for mitigation of any negative impact of land management on Arthropod species, the focus in on late successional, old growth specialists (USFS & BLM 2001 p. 84) of which Suckley’s cuckoo bumble bee is not one. Thus, this regional National Forest plan does not protect Suckley’s cuckoo bumble bee.

Interagency Special Status and Sensitive Species Program (ISSSSP)

Since 2005, The USFS and BLM in the pacific northwest region (FS Region 6 and BLM Oregon and Washington) have entered into an interagency agreement concerning sensitive and special status species that “centers on information sharing and compiling known information about the species in the programs” (USFS & BLM 2005 p. 1). The ISSSSP is primarily for the sharing of information relevant to conservation planning but provides no additional legal protections. Suckley’s cuckoo bumble bee and the western bumble bee are recognized as sensitive species under the ISSSSP, but there have been no conservation plans, management actions, strategies, or agreements associated with either of these species. The ISSSSP has not resulted in any conservation action besides producing fact sheets for this species and is therefore inadequate to protect the Suckley’s cuckoo bee.

National Environmental Policy Act

The forest planning process must comply with the National Environmental Policy Act (“NEPA”) which requires the preparation of an environmental impact statement with public review and input (42 U.S.C. § 4231 et seq). NEPA requires Federal agencies to consider the effects of their actions on the environment through the utilization of environmental assessments and environmental impact statements. These reports must disclose any adverse impacts to the environment including impacts to sensitive species. However, the law only requires agencies to disclose the impacts of their actions to the public; it does not prohibit agencies from choosing alternatives that will negatively affect individuals or populations of Suckley’s cuckoo bumble bee since it is not protected under the Endangered Species Act.

Further, placement of apiaries on National Forests on a short-term basis is categorically excluded from the NEPA process unless there are “extraordinary circumstances” such as

presence of an endangered species or designated critical habitat (36 CFR § 220.6). Without protection of the ESA and concurrent designation of critical habitat, NEPA will not protect Suckley's cuckoo bumble bee from non-native, managed bees.

National Parks management

Suckley's cuckoo bumble bee has been found in Yellowstone National Park in Wyoming and the Wrangell-St. Elias National Park in Alaska in recent years (since 2002). In regards to pollinators, the National Park Service indicates that they follow the White House Presidential Memorandum that established a task force and the resulting National Strategy to address declines in populations of honey bees and other pollinators, including native bees (Obama 2014; Pollinator Health Task Force 2015; National Park Service 2017). The National Strategy directs the National Parks Service to develop an outreach tool kit and host citizen science activities (Pollinator Health Task Force 2015 p. 20). The Memorandum and National Strategy do not constitute a regulatory mechanism to protect Suckley's cuckoo bumble bee.

Federal Land Policy and Management Act

The Federal Land Policy and Management Act (FLPMA) regulates the management of public lands administered by the BLM; specifically the "management, protection, development, and enhancement of public lands" with the intention to "…preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife…" (43 U.S.C. § 102). As there are no current observations of Suckley's cuckoo bumble bee on BLM land, this regulation does not protect Suckley's cuckoo bumble bee.

The Wilderness Act

The Wilderness Act of 1964 established the National Wilderness Preservation System and identified four federal agencies responsible for protecting wilderness areas. The Wilderness Act allows for the designation of protected wilderness areas on public land to "…retain its primeval character and influence, without permanent improvements or human habitation…" (16 USC §§ 1131). Wilderness areas protect many species from human impacts, however, Suckley's cuckoo bumble bee is not currently found in any designated wilderness areas; therefore the protection, offered by these lands this does not protect Suckley's cuckoo bumble bee.

Pesticide regulations

The U.S. Environmental Protection Agency (EPA) licenses the sale and use of the herbicides and insecticides under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA, 7 U.S.C. § 136 et seq). FIFRA directs EPA to register a pesticide only upon determining that "when used in accordance with widespread and commonly recognized practice it will not generally cause unreasonable adverse effects on the environment" (7 U.S.C § 136a(c)(5)(D)). The EPA evaluates the risk of pesticides to bees by using honey bees as a surrogate for all native bees. Bumble bee physiology, behavior, and life cycle characteristics differ from honey bees in ways that are not considered when tests are applied only to honey bees. For example, bumble bee larvae are fed raw pollen and nectar whereas honey bees process nectar

and pollen within nurse bees digestive systems before feeding larvae (Fischer & Moriarty 2014 p. 53). Bumble bee larvae are also in direct contact with raw nectar and pollen provisions rather than in individual cells like honey bees and therefore have a different exposure profile (Fischer & Moriarty 2014 p. 53). Further, the persistent residues of pesticides in soil can contaminate bumble bee nests and overwintering sites but this is not considered by the EPA when assessing risk of pesticides to bumble bees.

In 2013, the legal application of neonicotinoid insecticides to *Tilia* trees in Oregon killed massive numbers of bumble bees that contacted poisoned flowers (Hilburn 2013 p. 1). In response, the EPA now prevents foliar applications of nitroguanidine neonicotinoids on non-agricultural plants while plants are flowering (Bradbury 2013 pp. 2–5), providing limited protection to potential nectar resources for Suckley's cuckoo bumble bee. However, the EPA continues to permit, via pesticide and product registrations, the use of pesticides known to kill bumble bees on hundreds of millions of acres throughout the United States. Thus existing pesticide regulation does not provide an adequate regulatory mechanism for protecting this or any other native pollinator species.

Commercial honey and bumble bee regulations

Federal regulations regarding honey bees are insufficient to protect bumble bees from transmitted diseases. Honey bees are regulated by the United States Department of Agriculture (USDA) and the Animal and Plant Health Inspection Service (APHIS) as agricultural commodities. USDA has the power to slow the spread of honey bee diseases to native species through the Honey Bee Act of 1922 which is intended to restrict the importation and movement of honey bees into and around the country (7 U.S.C. § 281). However, this Act has not prevented honey bees from entering National Forests and other public lands as apiaries as a minor use are categorically excluded for NEPA purposes (36 CFR § 220.6).

The Honey Bee Act is specific to honey bees and does not regulate diseases in managed bumble bees; nor is there an equivalent act or law that would regulate bumble bees. The USDA allows the international movement of managed Canadian bumble bees into the United States which include: the eastern bumble bee (*B. impatiens*) and the western bumble bee (*B. occidentalis*) (7 CFR § 322.5). The current regulations do not require any imported bumble bees to be inspected or tested for diseases (7 CFR § 322.5). Managed bumble bees can easily escape greenhouses unless they are properly maintained and native bees can acquire pathogens after visiting the same flower as infected bees (Cameron & Sadd 2020 p. 10.9). This lack of regulation presents a continued threat of disease transmission and direct completion for floral resources to Suckley's cuckoo bumble bee and other native bumble bees.

State Designations

Across its range, Suckley's cuckoo bumble bee is recognized by several states as needing protection, but no state has official protection for this species. Suckley's cuckoo bumble Bee is listed as a species of greatest conservation need in the states of California, Idaho, and Washington, and Colorado and is on the BLM Sensitive Animal List in Alaska. These

designations, however, do not constitute adequate regulatory mechanisms.

Alaska

Suckley's cuckoo bumble bee is designated as a BLM sensitive species in Alaska which requires that "…the BLM shall manage Bureau sensitive species and their habitats to minimize or eliminate threats affecting the status of the species or to improve the condition of species habitat…" (U.S. BLM 2008 p. 2C). However, Suckley's cuckoo bumble bee has not been recently found on BLM land in Alaska.

California

Suckley's cuckoo bumble bee has been identified as a species of greatest conservation need in the state of California (CDFW 2015 pp. C–11). However, the California State Wildlife Action Plan (SWAP) makes clear that this designation "…carries no formal legal protection; the intent of the designation is to focus attention on animals of conservation risk, stimulate research of poorly known species, and achieve conservation and recovery of these animals before they meet criteria for listing…" (CDFW 2015 pp. 2–12). This designation is, therefore, inadequate for the protection of Suckley's cuckoo bumble bee.

Colorado

The Colorado Parks and Wildlife Department's 2015 SWAP lists Suckley's cuckoo bumble bee as an invertebrate species of greatest conservation need (Colorado Parks and Wildlife 2015 p. B-1). However, Colorado Parks and Wildlife does not have statutory authority over invertebrate species, with the exception of mollusks (Colorado Parks and Wildlife 2015 p. B-1). Colorado Parks and Wildlife must rely on organizations outside the government to collect data and conduct foundational conservation work for Suckley's cuckoo bumble, providing it no formal protection.

Idaho

Suckley's cuckoo bumble bee and the western bumble bee are listed as Tier 1 Species of Greatest Conservation Need in the SWAP which "provides voluntary guidance on conservation actions…" (Idaho Department of Fish and Game 2017 p. 24). To the best of our knowledge the state of Idaho has funded a recent survey in Lemhi and Custer Counties in 2018, but failed to detect Suckley's cuckoo bumble bee (Idaho Department of Fish and Game 2017 p. 24).

Oregon

Under Oregon's State Conservation Strategy, Suckley's cuckoo bumble bee has been determined to be a "data gap species" along with many other invertebrates. Suckley's cuckoo bumble bee receives no formal protection from the state of Oregon besides recognition that the species is in need of conservation. The western bumble bee is listed as a "species of greatest conservation need" in Oregon; however, this designation is for conservation planning purposes and does not implicate actual protective mechanisms.

Washington

The State of Washington classified Suckley's cuckoo bumble bee as a species of greatest conservation need based on its classification as critically endangered by the IUCN. Suckley's cuckoo bumble bee and the western bumble bee have been identified by the state of Washington as needing conservation action, but are not formally protected by the state.

State commercial honey bee and bumble bee regulation

Regulations on the transportation and inspection of honey bee hives for disease and other threats are inconsistent across states; for instance, honey bee hive registration is voluntary in Colorado (Mailander 2019 p. 36,40). Managed bumble bees for use as crop pollinators in green houses and for field crops is a growing industry yet only two states, Oregon and California, have restrictions on the importation of the eastern bumble bee, and registration records are not publicly available (State of California 1973 p. 1; Oregon Department of Agriculture 2019 p. 5). Interstate movement of managed bumble bees does not require a certification in any state. Thus, the risk from managed bees is not addressed in any substantial way by state regulations throughout the range of Suckley's cuckoo bumble bee.

In sum, no existing regulatory mechanisms exist to adequately protect Suckley's cuckoo bumble bee. As evidenced by its near 80% overall decline, federal management plans and state designations have failed to protect this unique cuckoo bumble bee and are wholly insufficient to overcome the myriad threats to the species. Suckley's cuckoo bumble bee faces threats that can only be adequately addressed through the comprehensive protections provided by the ESA.

Request for Critical Habitat Designation

We urge the Service to designate critical habitat for Suckley's cuckoo bumble bee concurrent with its listing. Critical habitat as defined by Section 3 of the ESA is: (i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) the specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species (16 U.S.C. § 1532(5)).

Congress recognized that the protection of habitat is essential to the recovery and/or survival of listed species, stating that: "classifying a species as endangered or threatened is only the first step in ensuring its survival. Of equal or more importance is the determination of the habitat necessary for that species' continued existence… If the protection of endangered and threatened species depends in large measure on the preservation of the species' habitat, then the ultimate effectiveness of the Endangered Species Act will depend on the designation of critical habitat." H. Rep. No. 94-887 at 3 (1976). Critical habitat is an effective and important

component of the ESA, without which Suckley's cuckoo bumble bee's chance for survival significantly diminishes. Petitioners thus request that the Service propose critical habitat for Suckley's cuckoo bumble bee concurrently with its listing.

Conclusion

In this petition we have reviewed the best scientific and commercial information available regarding the threats faced by Suckley's cuckoo bumble bee and have determined that the species has declined by nearly 80% overall in the last 50 years and is in imminent danger of extinction throughout its range. The ESA requires that the Service promptly issue an initial finding as to whether this petition "presents substantial scientific or commercial information indicating that the petitioned action may be warranted" (16 U.S.C. § 1533(b)(3)(A)).

There is no question that protecting Suckley's cuckoo bumble bee as endangered is warranted under the act as it is imperiled by 1) the present or threatened destruction, modification, or curtailment of its habitat or range; 3) disease or predation; 4) the inadequacy of existing regulatory mechanisms; and 5) other natural or manmade factors affecting its continued existence that includes loss of habitat, loss of host species, fire suppression, grazing, pesticides, climate change, inbreeding depression, and competition and disease from managed bees. There are no existing regulatory mechanisms which are adequate to protect Suckley's cuckoo bumble bee and its conservation is an umbrella for the recovery of its imperiled host bumble bees. The Service must act promptly to protect this species and to designate critical habitat in order to prevent its extinction and reverse its precipitous decline in range and habitat.

Please contact me at 971-717-6425 and/or tcornelisse@biologicaldiversity.org if you have any questions or need any clarification on the information in this petition.

Sincerely,

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