

BEFORE THE SECRETARY OF THE INTERIOR

Petition to list the Sacramento Mountains checkerspot butterfly (*Euphydryas anicia cloudcrofti*) as a Threatened or Endangered Species under the Endangered Species Act



Sacramento Mountains checkerspot butterfly visiting its preferred nectar source, orange sneezeweed, *Helenium hoopesii* A. Gray. Photo credit: USFWS

Center for Biological Diversity  
Petitioners

March 1, 2021

## **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 the Sacramento Mountains checkerspot butterfly (*Euphydryas anicia cloudcrofti* Ferris and Holland 1980) as a threatened or endangered species under the ESA.

Petitioners further request emergency listing of the checkerspot due to the precipitous decline and lack of detection of the Sacramento Mountains checkerspot butterfly in recent years. Petitioner also requests that critical habitat be designated concurrently with the listing, pursuant to 16 U.S.C. § 1533(a)(3)(A) and 50 C.F.R. § 424.12.

FWS has jurisdiction over this petition. This petition sets in motion a specific process, placing definite response requirements on the FWS. 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.”

The Center for Biological Diversity (“Center”) is a nonprofit, public interest environmental organization dedicated to the protection of imperiled species as well as the habitat and climate they need to survive through science, policy, law, and creative media. The Center is supported by more than 1.7 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 behalf of our staff and our members who hold an interest in protecting the Sacramento Mountains checkerspot butterfly and its habitat.

Submitted this 1<sup>st</sup> day of March 2021



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## Executive Summary

The Sacramento Mountains checkerspot butterfly (*Euphydryas chalcedona cloudcrofti*) is a rare butterfly found only in high elevation mountain meadows of the Sacramento Mountains in southern New Mexico. Despite checkerspot butterflies being easily observed and frequently collected historically, the Sacramento Mountains checkerspot butterfly was first documented in 1963 and is only found within a 33 mi<sup>2</sup> (85 km<sup>2</sup>) area around the Village of Cloudcroft in the Sacramento Mountains on the Lincoln National Forest.

The Sacramento Mountains checkerspot butterfly inhabits mountain meadows within mixed-conifer forest at high elevations between 8,000 and 9,000 feet. The red, orange, brown, and white checkered adult butterfly pollinates and feeds on a variety of plants, but favors orange sneezeweed, and is found associated with its larval host plant, the New Mexico penstemon, which itself is only found in the Sacramento and Capitan Mountains. The United States Forest Service began surveying regularly for both larvae and adults in the late 1990s and has documented its precipitous decline throughout the following decades and today, the butterfly is virtually undetected in its former range.

In response to a 1999 petition from the Center for Biological Diversity, FWS proposed to list the Sacramento Mountains checkerspot butterfly as endangered on September 6, 2001 due to threats from habitat loss, fragmentation, degradation, drought, wildfire, and over-collection. Unfortunately, FWS withdrew the proposal in 2004 and denied a subsequent listing petition in 2009, allowing threats to the butterfly to continue unabated. Despite recent and extensive surveys, no larvae and very few adults have been observed. In a 2020 report, the USFS concluded that the Sacramento Mountains checkerspot butterfly is “almost certainly the most endangered butterfly in the United States” and that results of surveys over the past 20 years “strongly suggest a non-trivial probability of imminent extinction” (Hughes 2020 pp. 1, 11). If the checkerspot should go extinct, some blame most certainly falls on the Service’s reticence to follow the science and law and to have listed the species before it got to this point.

As outlined in this petition, the Sacramento Mountains checkerspot butterfly remains severely threatened by habitat loss, fragmentation, and degradation via livestock grazing, motorized recreation and associated dispersed camping, invasive species, and fire suppression as well as climate change, small population size, and inadequacy of existing regulatory mechanisms. Given the lack of recent detection of larvae and adults and unmitigated, ongoing threats faced by the butterfly, federal protection is clearly required. All efforts by the FWS and USFS, including the 2005 Sacramento Mountains checkerspot butterfly Conservation Plan, have failed to conserve this imperiled butterfly and it requires immediate protection under the ESA to avoid extinction. The only hope to save this remarkable butterfly from extinction is for the U.S. Fish and Wildlife Service to list it as endangered under the Endangered Species Act and designate critical habitat immediately.

## Introduction and History of the Federal Listing Effort

The Sacramento Mountain checkerspot butterfly is a charismatic and relatively large butterfly with checkered wings of red, orange, white, and brown. Adult checkerspots feed on a variety of plants but favor orange sneezeweed, which flowers during the adult butterfly's six-week flight period during June and July (McIntyre 2010 pp. 2–3, 24–29). Female Sacramento Mountains checkerspots lay eggs on New Mexico penstemon and larvae aggregate by forming silken tents to feed before they enter diapause (McIntyre 2010 p. 3). The checkerspot inhabits mountain meadows with dense patches of New Mexico penstemon within mixed-conifer forest at elevations between 8,000 and 9,000 feet (McIntyre 2010 pp. 2–3, 16).

The Sacramento Mountains checkerspot butterfly exists in small, patchy populations that are part of a larger metapopulation structure within a 33 mi<sup>2</sup> (85 km<sup>2</sup>) area around the Village of Cloudcroft on the Lincoln National Forest (USFWS 2005 pp. 11–12). Prior to fire suppression and livestock grazing, fire and other natural disturbances likely drove plant succession, and, in turn, population turn over events for the butterfly (USFWS 2005 pp. 16–17). The United States Forest Service (USFS) began surveying regularly for both larvae and adults in the late 1990s throughout its range on the Lincoln National Forest and began to document consistent declines without recolonization in the subsequent two decades (USFWS 2005 p. 13; Hughes 2020).

The Center for Biological Diversity petitioned to list the checkerspot as endangered on January 28, 1999 (Suckling 1999). The petition included an emergency listing request, based on a proposed USFS land exchange involving butterfly habitat. The FWS published a positive 90-day finding and a subsequent court-ordered 12-month finding on September 6, 2001, proposing to list the subspecies as endangered and designating 54-square-miles as critical habitat (USFWS 2001). In the listing proposal, the FWS identified a multitude of threats to the checkerspot, including habitat loss and degradation, catastrophic wildfire, fire suppression, spread of non-native vegetation, collection, extreme weather, roads, and recreation. The situation described by FWS in the listing proposal was dire – so dire that the agency recommended endangered status and the designation of all suitable habitats, including unoccupied habitats and dispersal corridors, as critical habitat (USFWS 2001). In an abrupt shift, the FWS withdrew the listing proposal on December 21, 2004, describing the threats to the butterfly as reduced below the statutory definition of threatened or endangered and leaning heavily on actions taken by USFS as a rationale for not listing this critically imperiled species (USFWS 2004).

In 2007, the Center and Forest Guardians petitioned the Service a second time to protect the Sacramento Mountains checkerspot butterfly under the Endangered Species Act (Rosmarino & Greenwald 2007). The petition also requested emergency protection but the butterfly was denied endangered species protection again in 2009 (USFWS 2009).

The Sacramento Mountains checkerspot butterfly has continued to decline to the point where it is facing imminent extinction. It has not been detected in recent years beyond a few adults (Hughes 2020 pp. 1, 11). Specifically, in 2018, USFS staff made an incidental detection of one larval tent, detected no larval tents and a small number of adults in 2019 and no larval tents

and even fewer adults in 2020, despite expanded search efforts over the butterfly's entire range, including 60 patches in 2020 (Hughes 2020 pp. 1–10).

As outlined in this petition, the butterfly is still threatened by habitat loss, fragmentation, and degradation via livestock grazing, motorized recreation and associated dispersed camping, invasive species, and fire suppression as well as small population sizes and inadequacy of existing regulatory mechanisms. As a high elevation butterfly with low vagility and narrow habitat requirements, climate change threatens the Sacramento Mountains checkerspot, especially as it occupies the highest open meadows available within its known range (McIntyre 2010 pp. 35–36). Thus, recent evidence shows the butterfly is in imminent danger of extinction due to ongoing threats, a consistent decline over 20 years, and a precipitous decline to near non-detection in recent years. The only hope to save this remarkable butterfly from extinction is for the U.S. Fish and Wildlife Service to list it as endangered under the Endangered Species Act and designate critical habitat immediately.

## Natural History

### Taxonomy

*Euphydryas anicia cloudcrofti* Ferris and Holland 1980, commonly known as the Sacramento Mountains checkerspot butterfly, is a valid subspecies in the family and subfamily of true brush-footed butterflies, the Nymphalidae and Nymphalinae, respectively, and superfamily Papilionoidea (McIntyre 2010 p. 1; Integrated Taxonomic Information System 2020a). The butterfly was first described in the genus *Occidryas* based on 162 adults collected at Pines campground in 1980 but has since been classified in the genus *Euphydryas* (USFWS 2005 p. 7). The Sacramento Mountains checkerspot butterfly is the southern-most member of the 24 subspecies of *Euphydryas anicia*, thus it is geographically isolated and uses a regionally endemic host plant, the New Mexico penstemon (*Penstemon neomexicanus* Woot and Standl), use of which may have aided in speciation (McIntyre 2010 pp. 2, 14; Integrated Taxonomic Information System 2020b p. 1). The closest described sister taxa to the Sacramento Mountains checkerspot butterfly is the *E. a. chuskae* in San Juan County, New Mexico (McIntyre 2010 p. 1). The Sacramento Mountains checkerspot is distinguished from other *Euphydryas anicia* species by distinct adult and larval morphology, genetic differentiation, and unique behaviors, such as utilization of drainages as opposed to hill tops by mate-seeking males (McIntyre 2010 p. 2; Integrated Taxonomic Information System 2020b p. 1).

### Description

Adult Sacramento Mountain checkerspots have mainly black bodies and wings checkered with red, orange, white, dark brown with black spots on the top sides, and alternating orange and cream-colored checkered bands outlined in black on the bottom; antennae are clubbed and orange in color (Figure 1). The adults have a wingspan of about five cm and females are larger overall with more rounded abdomens compared to males (USFWS 2005 p. 7). In Nymphalinae,

the front legs are greatly reduced in both sexes and are often hairy and brush-like, hence the common name “brush-footed butterflies.” Eggs are yellow when deposited and turn reddish-brown as they develop. Pre-diapause larvae hatch as a small ~0.5 cm brownish caterpillar and grow to about 1.0 cm into a woolly black caterpillar with orange hairs (USFWS 2005 p. 7). Post-diapause larvae average 1.8 cm and are cream-colored with orange spots and black, bristly tubercles; pupae are whitish with symmetrical black, red, and yellow marks (Figure 2).



**Figure 1.** Sacramento Mountains checkerspot butterfly adults. Photos by J. Popp.



**Figure 2.** Sacramento Mountains checkerspot butterfly post-diapause larva (left) and pupa (right). Photos by T. Narahashi.

### Habitat and Host Plant

The Sacramento Mountains checkerspot butterfly lives at 2400-2750 m (7800-9000 ft) elevation in the Sacramento Mountains, which are isolated at 260 km and 120 km from the nearest mountains in the west and north, respectively (McIntyre 2010 pp. 2–3, 16). The Sacramento Mountains checkerspot occurs in meadows or grasslands in open, moist mountain drainages with less than five percent canopy cover and often fragmented by mix-conifer forest (McIntyre 2010 pp. 2–3, 14) (Figure 3). The checkerspot’s formally proposed critical habitat receives an average of 59.1 cm (23.3 inches) of precipitation, 40% of which falls during July and August, when the average temperature is 15.6°C (60°F) (McIntyre 2010 pp. 15–16).



Other important habitat factors include dense patches of its host plant, the New Mexico penstemon, a high percent of flowering forbs, and preferred adult nectar plants, like the orange sneezeweed (*Helenium hoopesii* A. Gray) which flowers during the adult butterfly's six week flight period (McIntyre 2010 pp. 2–3, 24–29). Although the flowers of *H. hoopesii* are most frequently used by adults for nectar, the Sacramento Mountains checkerspot butterfly has been observed sipping nectar at other plants including: New Mexico elder (*Sambucus cerulea*), yellow salsify (*Tragopogon dubius*), western yarrow (*Achillea millefolium*), spike verbena (*Verbena macdougalii*), dandelion (*Taraxacum officinale*), figwort (*Scrophularia montana*), short-rayed coneflower (*Ratibida tagetes*), cutleaf coneflower (*Rudbeckia laciniata*), musk thistle (*Carduus nutans*), Arizona rose (*Rosa woodsii*), Wheeler's wallflower (*Erysimum capitatum*), yellow salsify (*Tragopogon dubius*), and wild onion (*Allium spp.*) (Pittenger & Yori 2003 p. 40; USFWS 2005 pp. 9–10).

Adult females lay eggs on and larvae consume the New Mexico penstemon, a regional endemic and early successional, stress-tolerant perennial that grows on well-drained, sandy to rocky loam soil (USFWS 2005 p. 10; McIntyre 2010 p. 14). Adult females prefer to oviposit on large plants with many flowers and present in dense patches (McIntyre 2010 pp. 24–29). Adult females will also rarely oviposit on mountain valerian (*Valeriana edulis* Nutt. ex Torr and Gray), also known as tobacco root, and larvae will consume it if it is present in the meadow (McIntyre 2010 pp. 3, 5, 14). Early instar larvae form silken tents on the host plant for up to two months, after which they seek out places to overwinter in a state of diapause, such as under litter or bark, and are associated with a high percentage of bare ground (Pittenger & Yori 2003 p. 13). Gopher activity also seems to play a role in habitat and oviposition selection, as egg and larval density are high on gopher mounds, potentially as a result of increased nutrients conferred to host plants from gopher soil mixing (McIntyre 2010 p. 70). As such, adults and larvae utilize varying microhabitats that, take together, are important components of habitat suitability for the Sacramento Mountains checkerspot butterfly (McIntyre 2010 pp. 3–4).



**Figure 3.** General view of habitat at the type locality for Sacramento Mountains checkerspot butterfly. Photo by J. Popp.

## Life Cycle and Behavior

Adult Sacramento Mountains checkerspot butterfly flight period typically occurs for about six weeks from June through mid-July, peaking around July 4<sup>th</sup>; the butterfly has only one generation per year (is univoltine) and individual adults generally live for less than two weeks (McIntyre 2010 pp. 3, 14–15). Males eclose before females and mate with females within a few days of their emergence (USFWS 2005 p. 10). Females oviposit 20-100 eggs on the host plant, New Mexico penstemon; eggs hatch within two weeks and first instar larvae aggregate forming silken tents and feed for up to two months, going through four instars before entering diapause (McIntyre 2010 p. 3) (Figure 4). Some larger individual New Mexico penstemons can have up to 13 tents on a single plant, with an average of 73 larvae per tent (range of 21-98 larvae per tent) (McIntyre 2010 p. 62). Aggregating likely enhances the aposematic signal as well as increases body temperatures, which aids in movement and digestion; these benefits offsetting the increase incidence of predation due to visibility and increased intraspecific competition (McIntyre 2010 p. 102). In early fall, fourth instar larvae crawl under litter or bark to enter diapause, emerge in March-April to finish growing through three to four more instars, and then pupate until May or June when adults emerge (USFWS 2005 p. 11; McIntyre 2010 p. 4).



**Figure 4.** Aggregating larvae (pre-diapause) as seen in September 1998. Photo by T. Narahashi.

## Population Structure and Dispersal

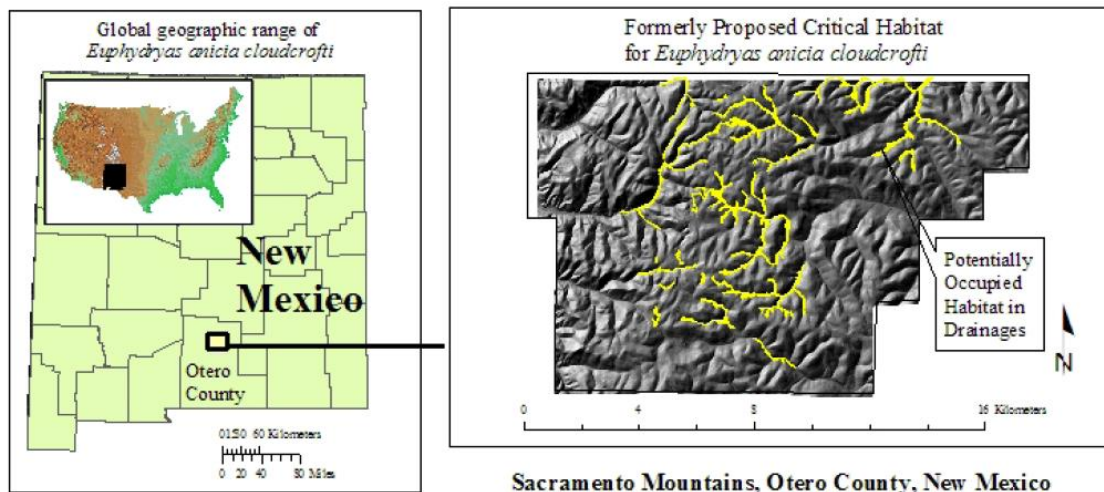
Checkerspot populations exhibit metapopulation dynamics and subpopulations are maintained through colonization and extirpation between habitat patches; the survival of each subpopulation is dependent on both the local habitat resources as well as the movement of individuals between patches (Hanski & Gyllenberg 1993). The Sacramento Mountains checkerspot butterfly exists in small, patchy subpopulations part of a larger metapopulation structure and has exhibited some extinction-colonization dynamics (Pittenger & Yori 2003 p. 39; USFWS 2005 pp. 15–16; McIntyre 2010 p. 3). Prior to fire suppression and grazing that began in the early 1900s, fire and other natural disturbances likely drove plant succession and, in turn, population turn over events for the butterfly (USFWS 2005 pp. 16–17). Adult Sacramento Mountain checkerspot butterflies are low flyers, flying close to the ground, and have limited

dispersal abilities, making movement between patches infrequent (USFWS 2005 pp. 15–16; McIntyre 2010 p. 3). In fact, when measured, 88.6% of adults remained within a small area of their natal meadow; the longest recorded distance of any adult was 890 meters over 14 days, but the vast majority travel no more than 500 meters (Pittenger & Yori 2003 p. 17; McIntyre 2010 p. 32). Larvae are restricted to within-patch movement and post-diapause larvae tend to move 2.6 m, on average, away from their natal tent (Pittenger & Yori 2003 pp. 8–9). Pre-diapause larvae tend to remain on the natal plant or patch of plants and thus are vulnerable to mortality by starvation when isolated host plants become defoliated (McIntyre 2010 p. 5).

### Species Distribution and Population Status

The Sacramento Mountains checkerspot butterfly was first documented 1.6 km north of the Village of Cloudcroft, NM, in 1963 (USFWS 2005 pp. 11–12). The butterfly was known within a 33 mi<sup>2</sup> (85 km<sup>2</sup>) area around the Village of Cloudcroft on both the Lincoln National Forest and private land from north to Mescalero Apache Nation lands, west to Bailey Canyon, east to Spud Patch Canyon, and south to Cox Canyon (Figure 5) (USFWS 2005 p. 12). According to FWS (2005 p. 12) in 2004:

[T]he total suitable habitat available to the butterfly consisted of 1,096 ha (2709 ac) located on Forest Service and private lands, with 484 ha (1,196 ac) occupied by the butterfly on Forest Service lands and 314 ha (777 ac) occupied on private lands... Thus the total suitable habitat is divided into the following proportions: 44% consists of occupied Forest Service lands, 29% consists of occupied private lands, 7% remains unoccupied on Forest Service lands, and 20% remains unoccupied on private lands.



**Figure 5.** Geographic range of the Sacramento Mountains checkerspot butterfly (left) and its 2001 proposed critical habitat (right), showing meadow drainages that are potential habitat in yellow (USFWS 2001 pp. 46586–46589). Source: McIntyre (2010 pp. 17, Fig. 1).

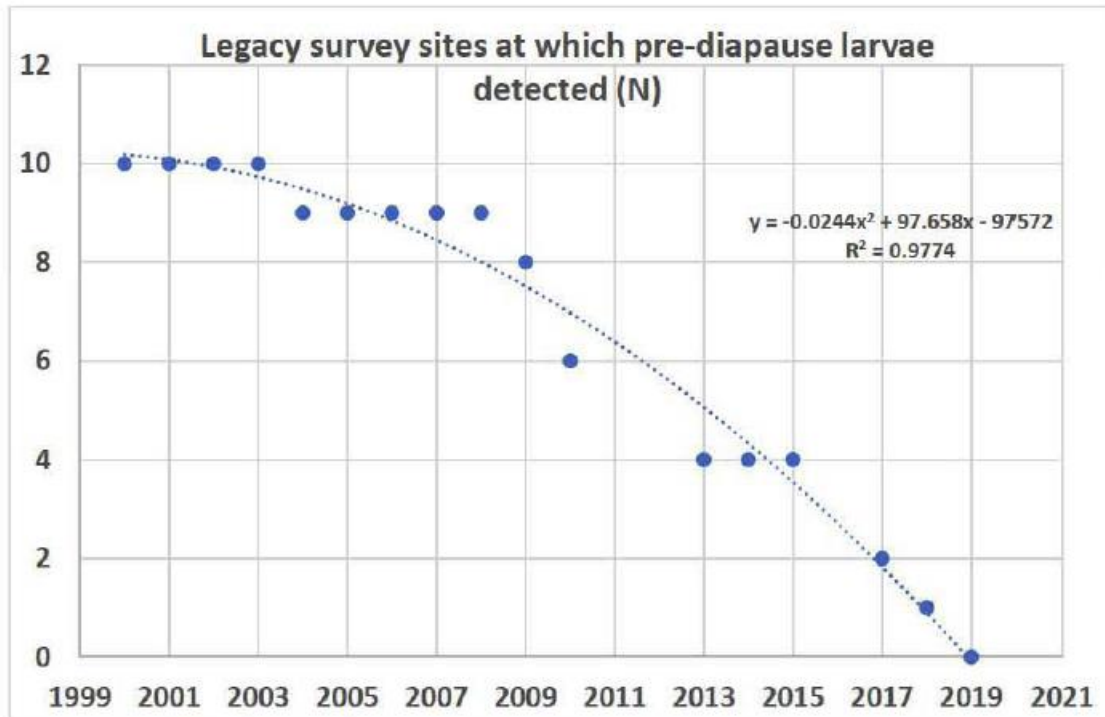
In the late 1990s, the USFS established butterfly survey plots in 10 localities the butterfly was known to occupy (Bailey Canyon, Cloudcroft Horse Pasture, Cloudcroft Yard, Cox Canyon, Deer head Canyon, Pines Campground, Pumphouse Canyon, Silver Springs Canyon, Sleepy Grass Canyon, and Spud Patch Canyon) (USFWS 2005 p. 13; Hughes 2020 p. 18). The USFS counted pre-diapause larval tents and adults along transects within plots and found the total numbers decreasing over time (USFWS 2005 p. 13); in later surveys, the number of larval tents and individual larvae also decline by 2008 (McIntyre 2010 p. 21) (Table 1). Further, the number of occupied reference sites halved from 2000 to 2012 (Figure 6) (Hughes 2020 pp. 2–3). The last larval tents from 2014–2017 were found at Pines Campground, Bailey Canyon, and potentially Spud Patch Canyon, with the Pines and Bailey areas the only sites with recent butterfly activity (Hughes 2020 pp. 8, 11). Estimated total adult occupancy of the 10 legacy transect sites was 30% in 2019 and only 20% in 2020 (Hughes 2020 p. 10).

**Table 1.** Total number of larval tents, adults, and individual larvae counted at the 10 USFS reference sites from 1999 to 2008.

Year	Larval tents	Adults	Individual larvae	Source
1998		595		USFWS 2005 p. 13
1999	139	1629		USFWS 2005 p. 13
2000	138	1000		USFWS 2005 p. 13
2001	65			USFWS 2005 p. 13
2002	74	60		USFWS 2005 p. 13
2003	52	222		USFWS 2005 p. 13
2004	46	221		USFWS 2005 p. 13
	88			McIntyre 2010 p. 21
2005	75		2457	McIntyre 2010 p. 21
2007	59		1862	McIntyre 2010 p. 21
2008	7		151	McIntyre 2010 p. 21

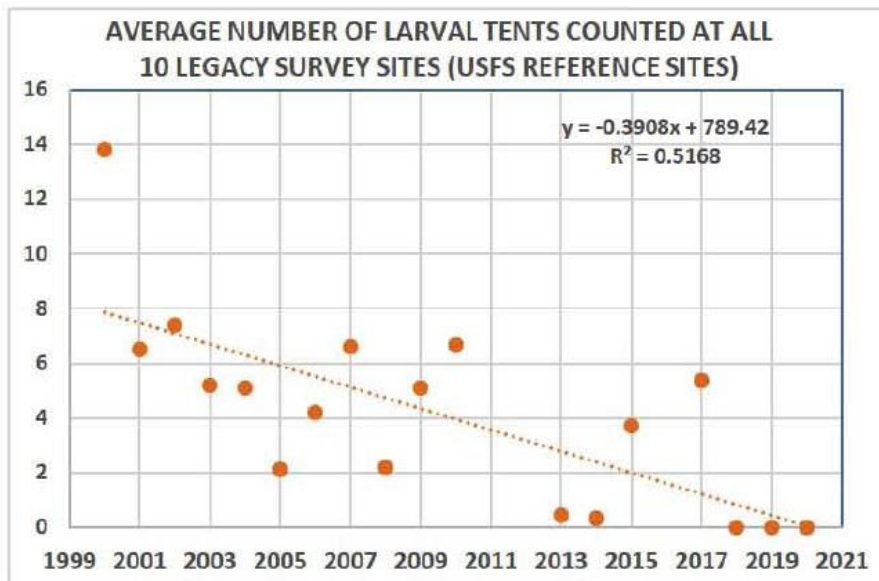
The Sacramento Mountains checkerspot butterfly has declined “precipitously” in recent years and, beyond a few adults, was undetected in the last two survey years (Figures 6 and 7) (Hughes 2020 pp. 1–3). Despite conducting probability-based sampling in all distinct meadows in the known and potential range of the butterfly (not solely in the USFS legacy or reference sites), the USFS staff made an incidental detection of one larval tent in the Pines Campground in 2018, detected no larval tents and a small number of adults in 2019, and no larval tents and even fewer adults in 2020, despite expanded search efforts increasing over time, including 60 patches in 2020 (Figure 7) (Hughes 2020 pp. 1–10). The non-detection of larval tents and adults over all survey years are thought to represent potential extinction, as recolonization was very rare over the 20 years of observations (Hughes 2020 p. 9). In addition to the population declines, the USFS team observed poor environmental conditions in 2019 and 2020, concluding that their “concern

over the extinction threat was accentuated” and despite the preliminary nature of their report “are confident that major trends are generalized correctly” (Hughes 2020 pp. 2–3).



**Figure 1.** Number of meadow patches at which at least one SMCB larval tent was found, 2000 to 2020 (all numbers are draft approximations). Tents are inhabited by a group of caterpillars in the Fall. Each of the (10) patches encompasses one of the 10 legacy plots at which USFS monitored pre-diapause larvae (USFS legacy survey sites). There were originally 10 occupied sites. The data is structured such that, for each given year, the graph depicts the cumulative count of legacy patches at which there were detections (occupancy confirmed) in that year and or subsequent years. In other words, temporary non-detections (or extinctions) at a given site are ignored for a given site-year combination, if the site was found to be occupied in a subsequent year. Accordingly, a site doesn't evaluate as extinct until the first year in a sequence of years (that extends to 2020) with no detections (in affect curve is smoothed). Note that subpopulations survived (occupancy was still detected) at approximately 60 percent (6 out of 10) of the patches as of 2010, and they persisted at a minimum of 40% of the 10 original locations as of 2013. Based on this index of subpopulation survival at legacy sites, the initial population (initial set of reference subpopulations) roughly halved from 2000 to about 2012 or 2013. There may be a couple/few detections (site-year data points) prior to 2019 that are not yet represented in the plot. If so, this would only serve to push portions of the earlier (upper) part to the slope to the right, and result in a yet steeper decline in the more recent (lower) part of the slope for larvae, since it declines to zero.

**Figure 6.** Number of USFS survey sites with larval tents from 1999 to 2019. No larval tents were found in 2019 or 2020, despite an expanded search effort. See figure text for details of the methods. Source: Hughes (2020 pp. 2–3).



**Figure . Average count of SMCB pre-diapause larval tents found in 10 larval tent survey plots (legacy plots) originally identified in 1999 and then monitored from 2000 to 2017. From 2018 to 2020, multiple methods provided extensive searches encompassing those original legacy plot areas plus the larger meadow patch surrounding each legacy plot (and many other meadow patches elsewhere, beyond those that contained legacy sites). No surveys yielded tents, but in 2018 a single tent was found in one patch (Pines) incidentally. Draft results. Not every plot was surveyed in every year.**

**Figure 7.** The average number of larval tents found at the 10 reference, or legacy, sites from 1999 to 2020. See figure text for details of the methods. Source: Hughes (2020 p. 8)

## Conservation Status

Under the ESA, endangered species are species that are “in danger of extinction throughout all or a significant portion of its range,” and threatened species, species that are “likely to become endangered species within the foreseeable future” and are listed for protection pursuant to section four of the ESA. 16 U.S.C. § 1532(6), 1532(20), 1533. The Sacramento Mountains checkerspot butterfly is recognized as imperiled or needing protection by international and state entities. The checkerspot butterfly has a NatureServe rank of “critically imperiled” at the global, national, and state levels (T1, N1, and S1, respectively) with an overall threat of “very high to high” (NatureServe Explorer 2021 pp. 2–3).

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. On September 6, 2001, the USFWS proposed to list the Sacramento Mountains checkerspot butterfly as endangered with critical habitat under the authority of the ESA due to threats from habitat loss, fragmentation, degradation, drought, wildfire, and over-collection

(USFWS 2005 p. 5). After withdrawing their proposal, the FWS now classifies the Sacramento Mountains checkerspot butterfly as a species of concern (McIntyre 2010 p. 2). Recent evidence shows the butterfly is in danger of extinction due to a very restricted range with low abundances in the last decade and a precipitous decline in recent years. The butterfly is still threatened by habitat fragmentation and degradation via invasive species, fire suppression, livestock grazing, and motorized recreation, as well as climate change, small population sizes, and inadequacy of regulatory mechanisms.

## **Present or Threatened Destruction, Curtailment, or Modification of Habitat or Range**

The losses in occupancy reported by the USFS are said to be consistent with “ongoing or accelerating deterioration of environmental conditions for the butterfly, and or small number sampling effects on demography and genetics due to small population size following deterioration of conditions for the butterfly” (Hughes 2020 p. 10). The poor conditions included dryness, grazing of penstemon with little seed production, and limited prevalence of adult nectar plants (Hughes 2020 p. 11). These threats are expanded on below.

### **Private Lands Development**

The Sacramento Mountains checkerspot butterfly has historically been found on private land in the Village of Cloudcroft (USFWS 2005 p. 12). Population growth and housing construction have continued to increase in Cloudcroft, NM with the population increasing from 636 in 1990 to 701 in 2019, and housing units increasing from 781 to 1,075 over the same years (U.S. Census Bureau 2012 p. 15, 2019 pp. 2–3; Wikipedia 2021 p. 2). The increases in housing units corresponds to FWS’s estimate of eight to 10 homes developed annually, or 160 to 200, over 20 years within the boundary of the previously proposed critical habitat (USFWS 2009 p. 45399).

In its 2009 rejection of the listing proposal, FWS estimated that development would only impact about 2% of suitable *occupied* habitat and thus concluded that private housing development is not a significant threat to the butterfly (USFWS 2009 p. 45399). However, the FWS neglected to consider the importance of unoccupied habitat, which would have, according to their own calculations, more than doubled the impact of private housing development. Further, FWS’s development impact analysis was completed in 2004, a time when the butterfly population was higher and the number of housing units lower, thus the magnitude of the threat of housing development is greater today than when the FWS neglected to protect the Sacramento Mountains checkerspot (USFWS 2009 p. 45399). Indeed, there has been an increase in the conversion of private inholdings within the national forest from ranching to development (USFS 2019d p. 95).

Development directly destroys Sacramento Mountain checkerspot butterfly habitat, reducing host plant availability and density and, in turn, larval survival. Since the butterfly does

not often leave its natal meadow, it requires contiguous resources of host and nectar plants throughout a habitat patch as well as between patches for connectivity (McIntyre 2010 p. 114). The number and density of the New Mexico penstemon is linked to butterfly presence and survival; in contrast, sparsely dispersed patches with low average plant densities may act as sinks to early instar larvae (McIntyre 2010 p. 34). Specifically, it has been noted that “a large proportion of the larvae died as a result of starvation on isolated penstemon hostplants, presenting a need for an increased number of adjacent *P. neomexicanus* plants” (McIntyre 2010 p. 90). Also, larval abundance and size are greater when hostplants are larger in diameter, abundant, and accessible at the local scale (McIntyre 2010 pp. 94–104). Thus, destruction of habitat via development impacts Sacramento Mountains checkerspot butterfly.

Development within the Sacramento Mountains checkerspot butterfly’s critical habitat area also increases habitat fragmentation. The Sacramento Mountains checkerspot butterfly occupies larger and more connected, or less isolated, meadows, with connectivity being an important component of occupancy (McIntyre 2010 pp. 22–23). Past and current development in suitable habitat decreases connectivity among potential habitat sites and increases the distance beyond the typical dispersal range, making recolonization unlikely (USFWS 2005 p. 17). As the Sacramento Mountains checkerspot butterfly exhibits relatively common local extirpation, maintaining both habitat in unoccupied sites and connections between those sites and occupied meadows is critical to its survival in a region (Pittenger & Yori 2003 p. 40).

In addition to the private development, there is an expected increase in the use of Lincoln National Forest roads due to increasing demand for recreational opportunities, development, and restoration projects, which could in turn lead to reopening of previously closed roads and construction of new roads and infrastructure (USFS 2019d pp. 271, 317). For instance, the recently proposed South Sacramento Restoration Project includes planned road construction or rehabilitation involving 125 miles of roads in the National Forest (USFS 2019c p. iv). Increased construction and use of roads will further destroy and fragment the Sacramento Mountains checkerspot butterfly habitat.

## Livestock grazing

In 2019, nearly 957,000 acres (87%) of the Lincoln National Forest’s 1.1 million acres were grazed under permit with a total of 13,000 head of livestock (USFS 2019e p. 20). Livestock grazing is “permitted on all vegetation types found on the Lincoln National Forest” and the Lincoln “is unique in that it is one of the few national forests in the west that permits a high percentage of year-long grazing” (USFS 2019d pp. 107–109). The primary allotments that are active and overlap with the Sacramento Mountains checkerspot butterfly are the, Sacramento, Russia Canyon and Pumphouse allotments (USFWS 2009 p. 45401; USGS 2010a).

Within the Sacramento Mountains checkerspot butterfly’s habitat, the USFS manages livestock to obtain “moderate-intensity” grazing, which sets a minimum of 10-20.3 cm (4-8 inches) “end-of-season stubble height” at 35% (30-40%) forage utilization rate (USFWS 2009 pp. 45401–45402; Millsap 2018 p. 8). Stubble height requirements may work to avoid soil



erosion and preserve forage but do little to ensure forbs like the penstemon and sneezeweed the butterfly needs to survive are present and abundant. Indeed, one study indicated that grazers consume upwards of 60% of New Mexico Penstemons (USFWS 2009 p. 45403; McIntyre 2010 p. 71). Such reductions directly impact the butterfly because its presence and survival depends on the size, number, and density of the New Mexico penstemon (McIntyre 2010 pp. 94–104).

Grazing cattle can directly trample and kill diapausing larvae and pupae, alter microclimates, and reduce the richness and abundance of host and nectar plants (USFWS 2003 pp. 59–60, 2005 pp. 29–32, 2009 p. 45401; Preston et al. 2012 pp. 285–288; USFS 2019e p. 21). Livestock grazing may result in increased mortality of post-diapause larvae and reduced quality of New Mexico penstemons, particularly during dry years (Pittenger & Yori 2003 p. 51). Further, cattle feces and watering sites increase soil organic matter and moisture, creating microhabitats that favor invasive plant spread (Brooks 2009 p. 113). For example, moderate to intensive grazing also promotes the formation of dense grass sods, which outcompete and reduce the density of New Mexico penstemon, degrading the habitat for the Sacramento Mountains checkerspot butterfly (Pittenger & Yori 2003 p. 45). Grazing can also eliminate meadow habitat by reducing understory competition and accelerating the establishment of new tree seedlings (USFS 2008 p. 70, 2019e p. 21). Grazing also decreases soil surface stability, increases soil compaction, and can reduce ground-nesting rodents that maintain open meadows and corridors between suitable habitats necessary for the butterfly's persistence (McIntyre 2010 pp. 76–77; Bueno et al. 2012 p. 5,6; Kimoto et al. 2012 p. 7,8; USFS 2019e p. 21).

FWS noted in 2001 that “overgrazing in the Lincoln National Forest has likely eliminated or reduced larval host plant and adult nectar sources of the Sacramento Mountains checkerspot butterfly”, “herbaceous plants and grasses have been effectively removed from the Sacramento Ranger District by intensive overgrazing”, and “grazing levels in the known range of the Sacramento Mountains checkerspot butterfly continue to degrade the quantity and quality of suitable habitat” (USFWS 2001 p. 46582). FWS further notes that USFS has failed to adjust grazing levels during drought, resulting in extensive resource damage from livestock grazing and potentially overgrazing host and nectar plants (USFWS 2001 p. 46582; Millsap 2018 pp. 71–73). Cattle grazing is worsened by horse grazing, whether they are permitted, such as on the Sacramento allotment, or feral (Cadwallader 2006; USFWS 2009 p. 45403; USGS 2010b). These conditions remain true today and directly threaten the survival and recovery of the butterfly.

### **Off Highway Vehicles (OHVs)**

Off highway vehicle (OHV) use is popular in the Sacramento Ranger District of the Lincoln National Forest and OHV recreationists are drawn to the openness of the Sacramento Mountains Checkerspot butterfly habitat (USFWS 2005 p. 26). The Lincoln National Forest permits motorized travel on designated routes but, despite regulations, experiences illegal OHV activity in the meadows and riparian areas, areas important to the Sacramento Mountains checkerspot butterfly (USFWS 2005 p. 26). For example, the official USFS 2016 trail list includes 56 motorized trails covering about 162 miles in the Sacramento Ranger District of

which 31 trails covering 58 miles permit four-wheel OHVs (all permit motorized bikes), but an OHV rider magazine from December 2015 states there are 102 trails covering 235 miles, almost double the area (UTV Action 2015 p. 2; U.S. Forest Service 2016).

OHV use can directly kill all Sacramento Mountains checkerspot butterfly life stages, but especially late instar larvae and adults that frequently bask in open areas and on bare ground, such as OHV tracks (Osborne & Ballmer 2019 p. 5). Further, eggs are deposited on penstemon leaves only 7-40 cm above the ground, making them susceptible to direct crushing as well as exposure to predators if knocked to the ground; destruction of pre-diapausing larval tents on low lying plants also could occur, significantly reducing population viability of the butterfly (USFWS 2005 p. 27).

Frequent OHV use also destroys host and nectar plants and increases erosion and fire frequency (USFWS 2003 p. 59). As few as 1-10 passes by an OHV can result in soil compaction and damage, leading to water runoff and alteration of the soil biotic community (Lei 2009 p. 159). OHV tracks, even single passes, can facilitate the spread of invasive plants by creating areas that trap and shelter seeds (Brooks 2009 pp. 112–113). OHV tracks and areas with increased OHV track density exhibit high levels of invasive plant biomass and species richness (Brooks 2009 p. 116). OHVs also expel significant amounts of fine and coarse dust particles (Goossens & Buck 2009 pp. 118, 134) that can cause insect mortality by increased desiccation due to cuticle abrasion and excessive salivary grooming, respiratory stress by blocking spiracles, and disruption of digestion if ingested (Edwards & Schwartz 1981 p. 715).

## Dispersed Camping

Recreational tourism and overall use of the Lincoln National Forest is on the rise (UTV Action 2015; USFS 2019d p. 95; Wikipedia 2021 p. 1). Historically, the Sacramento Mountains checkerspot butterfly was located in the Sacramento Ranger District at Bailey Canyon, Cloudcroft Horse Pasture, Cloudcroft Yard, Cox Canyon, Deer head Canyon, Pines Campground, Pumphouse Canyon, Silver Springs Canyon, Sleepy Grass Canyon, and Spud Patch Canyon (USFWS 2005 p. 13; Hughes 2020 p. 18). These areas permit multiple forms of recreation including hiking, mountain biking, horseback riding, off-highway vehicle use, and as well as dispersed camping (U.S. Forest Service 2016, 2020). All activities that could trample the Sacramento Mountains butterfly, potentially destroying multiple larvae in larval tents, as well as their host and nectar plants or modify habitat through soil compaction and invasive species introduction (USFWS 2005 pp. 26–27).

The Lincoln National Forest permits motorized travel to access dispersed camp sites within 91 meters of designated routes for free and without permit (USFWS 2005 p. 26; U.S. Forest Service 2020). In 2008, the USFS reported over 477 dispersed camping sites within the Sacramento Ranger District (but failed to report how many were in butterfly habitat) and planned to reduce the distance of dispersed camping to within 30 meters of roads and thus the number of camp sites to 305 (USFWS 2009 p. 45400). The FWS concluded that reducing dispersed campsites would benefit the Sacramento Mountains checkerspot butterfly individuals and host

plants, but the USFS current website indicates that 91 meters is still permitted (USFWS 2009 p. 45400; U.S. Forest Service 2020), thus there is still extensive impact butterfly habitat caused by disperse camping.

## Invasive Species

Aggressive non-native plants such as Russian knapweed (*Acroptilon repens*), musk thistle (*Carduus nutans*), Canada thistle (*Cirsium arvense*), teasel (*Dipsacus fullonum*) and leafy spurge (*Euphorbia esula*) that can form dense stands and out compete other plants are prevalent and increasing within the mountain meadows of the Sacramento Ranger District (USFWS 2005 p. 34; USFS 2019e p. 23). The most common invasive plants in the Lincoln National Forest are musk thistle and teasel and “these two species, along with grazing-tolerant grasses such as Kentucky blue grass, contribute to the departed condition of riparian areas, meadows, and other sensitive areas” (USFS 2019e p. 24). Nonnative plants can affect plant community structure by reducing native plant production and changing habitat structure and composition; invasive plants outcompete and thus reduce the abundance of checkerspot host and nectar plants (USFWS 2003 pp. 57–58, 2005 p. 34). According to the USFS, no significant treatments have been implemented since 2014 and so infestations continue to spread, potentially increasing at a rate of 5-30% per year (USFS 2019e p. 24).

## Fire Suppression

Fire and subsequent plant community succession were likely natural drivers of Sacramento Mountains checkerspot butterfly metapopulation recolonization events prior to fire suppression efforts in the Sacramento Mountains (USFWS 2005 pp. 16–17). Prior to 1900, frequent (3-10 years), low intensity, surface fires cleared flammable organic material within the forest without killing old growth trees but preventing tree encroachment into open areas and thus maintaining the Sacramento Mountains checkerspot meadow habitat (USFWS 2005 p. 22). Natural fire regimes clears areas in a way that stimulates establishment of the New Mexico penstemon, creating butterfly habitat, thus fire suppression has allowed unchecked conifer encroachment into formerly suitable habitat (USFWS 2005 pp. 16–17). Extreme wildfires can occur when fuel builds up over a long period of time, these fires burn hotter and longer than natural fires pre-suppression. When fires occur too frequently, native vegetation is replaced by non-native plants that burn more frequently and more easily, ultimately eliminating native habitats and biodiversity while increasing fire threat over time (Keeley 2005, 2006; Syphard et al. 2009; Safford & Van de Water 2014).

The USFS has worked to reduce hazardous fuel on the Lincoln National Forest, including in Otero County and several locations adjacent to occupied butterfly habitat have been progressively thinned since 2002 (USFWS 2005 p. 25, 2009 p. 45403; USFS 2019c). There are currently plans to thin and conduct prescribed burns in the Lincoln National Forest, which could increase the butterfly’s habitat, but the plans are not specific to the butterfly and it is unknown

how the butterfly will respond to thinning and burns, thus these actions could also pose a threat (USFS 2019c, 2019e p. 532). In addition, fire suppression combined with grazing enables woody encroachment, yielding dense stands of small-diameter trees and altered fire patterns in meadows with otherwise infrequent fires and high moisture availability (USFS 2019e p. 532).

## **Other Natural or Manmade Factors Affecting the Continued Existence of the Species**

### **Small Population and Inbreeding Depression**

Due to the extreme reduction in Sacramento Mountains checkerspot butterfly population abundances, it is likely that genetic diversity is low relative to historical levels (Miller et al. 2014 p. 86). The lack of connectivity between butterfly populations, due to their small size and lack of migrating individuals, results in low gene flow, lower effective population size, and subsequent extinction (Nieminen et al. 2001 p. 237; Miller et al. 2014). Inbreeding depression (the increased incidence of mating among relatives leading to an increase in homozygosity of deleterious alleles) also occurs in small butterfly populations and is a major threat to population viability (Nieminen et al. 2001 pp. 240–243). Inbreeding depression increased the extirpation probability of a related, similar butterfly species, the Glanville fritillary, which is also found in isolated populations (Nieminen et al. 2001 pp. 242–243).

The losses in occupancy reported by the USFS are said to be consistent with “ongoing or accelerating deterioration of environmental conditions for the butterfly, and or small number sampling effects on demography and genetics due to small population size” (Hughes 2020 p. 10). Due to the extreme small population size of any remaining individuals, the Sacramento Mountains checkerspot butterfly is likely not viable and most definitely experiencing reduced fitness (e.g. genetic disorders, susceptibility to disease), and reduced resilience to stochastic events (e.g. flooding, wildfire) and climate change.

### **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 (Intergovernmental Panel on Climate Change 2018 p. 4,8). At a warming of 1.5°C, temperature and precipitation extremes will be exacerbated (Intergovernmental Panel on Climate Change 2018 pp. 8–9).

Localized projections show the Southwest United States will experience more heat waves and temperature extremes, increased water shortages, and increased flooding due to early and rapid snowmelt (USFWS 2009 p. 45407; USFS 2019e p. 30). Specifically, local temperatures are

expected to rise 5-8 degrees Fahrenheit by the end of the century with five times the number of extremely hot days compared to 1961-1985, and heat waves last long than two weeks (USFS 2019e p. 31). Extreme weather events can kill individual butterflies at various life stages (Hellmann 2001 p. 99). Temperatures also impacts adult flight time, thus impacting the number of eggs laid, reproductive output, and ability to colonize unoccupied habitat (Hellmann 2001 p. 101). Drought is also increasing in the Sacramento Mountains and drought can cause larval death by desiccation (USFWS 2005 p. 37; Ganey et al. 2020 p. 226). Drought conditions may also reduce growth and nutritional content of the Sacramento Mountains checkerspot butterfly's host and nectar plants, which could stunt the butterfly's growth and reproductive output and prohibit the completion of its life cycle (USFWS 2005 p. 37; Ganey et al. 2020 p. 226).

Climate change is especially detrimental the Sacramento Mountains checkerspot due to its low vagility, narrow habitat requirements and range, and dependence on one host plant (USFWS 2005 p. 37). While other checkerspot butterflies have been documented to shift their ranges to higher latitudes and altitudes in response to regional warming (Parmesan et al. 2015 p. 3), the Sacramento Mountains checkerspot butterfly occupies the highest open meadows available within its known range and has not utilized host plants in suitable habitat at lower elevations (McIntyre 2010 pp. 35–36). Since the New Mexico penstemon is restricted to the Sacramento Mountains and the Capitan Mountains to the north (New Mexico Rare Plant Technical Council 2021), a shift in either the checkerspot's or the plant's distribution, productivity, or other factors could further imperil the checkerspot.

The life cycle of the Sacramento Mountains checkerspot is closely tied to the phenology of its host plants; larval development and adult oviposition must precede host plant senescence (Osborne & Redak 2000 p. 114). In arid climates, host plant senescence is determined by solar insolation and total precipitation, thus increased temperatures and drought with climate change cause accelerated host plant senescence at a rate faster than the impact to larval development (Parmesan et al. 2015 pp. 14–15). When host plants senesce before checkerspot larvae feed and enter diapause, they starve and suffer high levels of mortality and subsequent loss of populations (Parmesan et al. 2015 pp. 2–3).

Further, climate change exacerbates the threats of grazing, fire, development, invasive species, and recreation to the survival of the Sacramento Mountains checkerspot butterfly within the Lincoln National Forest (USFS 2019d pp. 85, 104, 138, 148, 2019e pp. 32–37). These impacts from climate change underscore the need for expeditious listing of the Sacramento Mountains checkerspot butterfly.

## **Overutilization for Commercial, Recreation, Scientific, or Educational Purposes**

As a rare and charismatic butterfly in the widely collected checkerspot group, the Sacramento Mountains checkerspot butterfly is likely threatened by collection (USFWS 2005 p. 34). In 2000, the USFS restricted collection of the butterfly without a permit; pursuant to 36 C.F.R., § 261.58(s). Violation of these prohibitions is punishable by a fine of up to \$5,000 for an

individual or \$10,000 for an entity other than an individual, or imprisonment for not more than six months or both (16 U.S.C. § 551) (USFWS 2005 pp. 34–35). Due to extremely low numbers of the butterfly in recent years, any amount of collecting is a threat to its survival.

## Disease or Predation

It is unknown the extent to which disease or predation threatened the Sacramento Mountains checkerspot butterfly; however, for species like the Sacramento Mountains checkerspot butterfly that have experienced steep declines in a limited range, natural rates of predation and disease can compound threats.

## Inadequacy of Existing Regulatory Mechanisms

To the extent that any voluntary, non-regulatory, mechanisms exist to protect the Sacramento Mountains checkerspot butterfly, 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)).

The threats faced by the Sacramento Mountains checkerspot butterfly are not adequately addressed by any existing regulatory mechanisms and it continues to decline precipitously. The only adequate regulatory mechanism available to save the butterfly is listing it under the ESA.

## National Forest Management Act

Congress enacted the National Forest Management Act of 1976 (“NFMA”) to reform USFS management of national forest system lands (16 U.S.C. § 1600 et seq). NFMA requires the USFS to 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)). NFMA regulations do not prohibit the USFS 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 the Sacramento Mountains checkerspot butterfly and does not require the USFS to support the persistence of invertebrates.

The three major forest management threats to the Sacramento Mountains checkerspot butterfly are grazing, OHV recreation, and fire suppression. The LRMP for the Lincoln National Forest fails to mention the butterfly as well as provide protective measures sufficient to conserve the butterfly or its habitat (USFS 2019a). The LRMP’s goals for rangeland conditions in the 2019 draft LRMP require grazing to be “compatible” with ecological processes, including wildlife habitat, but do not provide specific protections for the butterfly’s habitat from livestock grazing. It also encourages permitting grazing on vacant or “understocked allotments” (USFS 2019a pp. 80–82). These vague prescriptions do not protect the butterfly from the direct and indirect threats of grazing described above at the National Forest level or on the active allotments that could overlap with the butterfly; the Sacramento, Russia Canyon, and Pumphouse allotments (USFWS 2009 p. 45401; USGS 2010a).

The Sacramento Mountains checkerspot butterfly is not mentioned in the 2006 Allotment Management Plan (AMP) nor in the 2018 Biological Opinion on the continuation of livestock grazing in the Sacramento Allotment; although the later does include a measure to treat non-native plants, such as the musk thistle (Cadwallader 2006; Millsap 2018 p. all, 14). The 2006 Sacramento AMP permits grazing of 200-412 cattle and five horses in the summer (5/15 to 10/31) and 200-335 cattle and five horses in the winter (11/1 to 5/14) on 45,090 ha (111,213 acres) (Cadwallader 2006 p. 2,4; Millsap 2018 p. 8). The goals of the AMP include initially increasing the “vigor and production of Kentucky bluegrass” and then transitioning to “increases in brome, orchard grass, and intermediate wheatgrass,” which are goals in direct contrast with the Sacramento Mountains checkerspot butterfly habitat needs of dense stands of their host and nectar plants (Cadwallader 2006 pp. 4–3). Further, despite recent overgrazing evidence, including greater than 50% utilization, soil instability, and watershed degradation, the USFS has not reduced grazing levels and continues to permit the standard 35% utilization and herbaceous ground cover height at 10.2 cm (Millsap 2018 pp. 71–72), which is detrimental to the Sacramento Mountains checkerspot butterfly as outlined in the threat section.

Both the Pumphouse and Russia Canyon Allotments currently have no AMP in place and thus no language to address grazing threats to the Sacramento Mountain checkerspot butterfly (Chavez 2019a, 2019b). A 2006 Biological Opinion on reauthorization of a 10-year grazing permit on the Pumphouse Allotment showed the USFS was continuing to allow grazing of 288 head months (64 head of cattle for 4.5 months) at a 30-40% utilization rate and did not consider grazing threats to the Sacramento Mountains checkerspot butterfly (Murphy 2006 p. all, 1). Construction of a cattle handling facility and watering facilities were recently approved on the Pumphouse and Russia Canyon Allotments, respectively, but both projects were deemed categorically excluded from environmental assessments and impact statements because the actions fall “under 36 Code of Federal Regulations (CFR) §220.6(e)(9): *Implementation or*

*modification of minor management practices to improve allotment condition or animal distribution when an allotment management plan is not yet in place” (Chavez 2019a, 2019b). Thus, grazing threats are not adequately regulated to protect the Sacramento Mountains checkerspot butterfly in the Lincoln National Forest.*

OHV use is particularly popular in the Sacramento Ranger District where they are “drawn to the openness of the Sacramento Mountains Checkerspot butterfly habitat” (USFWS 2005 p. 26; U.S. Forest Service 2020). The Lincoln National Forest permits motorized access and dispersed camping for free and without permit. The LRMP includes the guideline that trails that adversely impact “at-risk species should be mitigated, closed, or alternative travel routes should be developed” (USFS 2019a p. 86). However, these guidelines are not a regulatory mechanism and thus inadequate to enforce legal and illegal OHV use and specific impacts to the Sacramento Mountains checkerspot butterfly. No designated wilderness areas occur on the Sacramento Ranger District and all areas are open to recreation (USFWS 2005 p. 40; USFS 2019a p. 83). Thus, there are no adequate regulatory mechanisms to protect the Sacramento Mountains checkerspot butterfly from OHV recreation and associated dispersed camping.

The USFS’s National Fire Plan of 2000 regulates fire management and has four primary goals: improve fire prevention and suppression, reduce hazardous fuels, promote community assistance, and restore fire-adapted ecosystems (USFS 2019b p. 1), the last goal may benefit the Sacramento Mountains checkerspot butterfly, but is too general to be considered a mechanism that will reduce the butterfly’s risk of extinction due to fire suppression.

## **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). These reports must disclose any adverse impacts to the environment including impacts to sensitive species. As a species of conservation concern on the Regional Forester’s Sensitive Species List (USFS 2019e p. 532), the Sacramento Mountains checkerspot butterfly is included in impact analyses by the USFS in all applicable NEPA documents to ensure its continued viability and preclude the need for Federal listing (USFWS 2009 p. 45404). 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 the butterfly, since it is not protected under the Endangered Species Act. Thus, NEPA and sensitive species status provides none of the binding protections of ESA listing and future federal projects will entail no FWS consultations, as the butterfly currently has no status under the ESA. The Sacramento Mountains checkerspot butterfly’s status as a sensitive species has not protected it in the past and it is now facing imminent extinction. It requires immediate protection under the ESA.



## Conservation Plan of 2005 and Current USFS Plans

In the early 2000s, after the first petition, proposal, and withdrawal of ESA protections for the Sacramento Mountains checkerspot butterfly, representatives from federal and local agencies prepared a Conservation Plan, published in 2005, as an overarching strategy to protect the butterfly (USFWS 2005). The Conservation Plan is organized like a FWS recovery plan for a protected species and a Memorandum of Understanding was signed by the involved parties (“cooperators”) to confirm commitments to its implementation to ensure regular meetings and adaptive management (USFWS 2005 pp. 3, 5). The cooperators that signed the plan are as follows: The Village of Cloudcroft, Otero County, Lincoln National Forest, and the USFWS (USFWS 2005 pp. 39–40). The primary goal of the Conservation plan was to alleviate threats to the butterfly and manage occupied and unoccupied habitat on both public and private lands (USFWS 2005 p. 5).

The Conservation Plan is voluntary with unspecified funding sources (USFWS 2005 pp. 78–79). The Village of Cloudcroft committed to funding public outreach and education, while Otero County was “expected to contribute \$100,000 towards threatened and endangered species and the butterfly” for science and monitoring, which, while worthy and necessary endeavors, are not regulatory mechanisms (USFWS 2005 p. 41). The Plan outlines that the USFS has already allocated funds to general management as well as to a butterfly study; further, the plan states that the USFS has funds for general restoration and community protection projects but these are not specific to the Sacramento Mountains checkerspot butterfly (USFWS 2005 pp. 41–42). Thus, the Conservation Plan largely relies on research and adaptive management that includes reduction of threats, such as recreation and fire, but does not provide regulatory mechanisms (USFWS 2005 pp. 41–59). As outlined above, the Sacramento Mountains checkerspot butterfly has declined precipitously since the Conservation Plan was agreed upon. It has failed to recover the butterfly. The Conservation Plan is not and has not served as an adequate regulatory mechanism.

After determining that the Sacramento Mountains checkerspot butterfly had a “non-trivial probability of imminent extinction” due to no larval tents being found in 2019 and 2020, and very few adults (Hughes 2020 p. 11), the USFS convened a working group that developed plant propagation plans and initiated seed collection of host and nectar plants in fall 2020 with the goal to enhance habitat in the butterfly’s known range for any surviving butterflies in 2021 (Hughes 2020 p. 12). However, past attempts to revegetate and create suitable habitat for Sacramento Mountains checkerspot were unsuccessful: the revegetation site was dominated by grasses and transplanted New Mexico penstemons suffered at least 80% mortality (Pittenger & Yori 2003 p. 45). Pittenger and Yori (2003 p. 45) concluded “Even with establishment of larval and adult food plants, colonization of the site by Sacramento Mountains checkerspot still may not occur if suitable habitat conditions do not persist at the site.” Future and voluntary attempts to restore checkerspot habitat cannot be considered a protective regulatory mechanism. As part of reviewing this petition, we ask that the Service conduct an analysis of the conservation plan under their policy for evaluating conservation efforts in the context of listing and strongly

believe that such an analysis will show the plan inadequate to ensuring the survival and recovery of the butterfly.

### **New Mexico State Regulations**

The Sacramento Mountains checkerspot butterfly is not listed as threatened or endangered under the New Mexico Wildlife Conservation Act because New Mexico Department of Game and Fish does not recognize insects as wildlife (USFWS 2005 p. 35, 2009 p. 45404). Thus, the Sacramento Mountains checkerspot butterfly receives no protection at the state level.

### **County Regulations**

In June 2005, Otero County passed a county-wide protective ordinance to require land subdividers to consider specific effects to the butterfly in development plans (Otero County 2005). The subdivision ordinance amendment required a survey for the butterfly, its host and nectar plants and, if the butterfly and its plants occurred within the boundary of the proposed subdivision, the ordinance required a plan minimizing impacts to the butterfly and its plants and restoring any affected occupied habitat (USFWS 2005 pp. 20–21, 51). These plans were to be submitted to the County and FWS and violations were to be investigated by the Board of County Commissioners and subjected to fine and/or penalties if warranted (USFWS 2005 pp. 91–92). This ordinance expired on July 1, 2011 and thus is not in effect. Although the threat of development decreased following the proposed rule, it still has continued and, combined with other threats, remains significant. Without listing and immediate ESA protection, there is no adequate regulatory mechanism to protect the Sacramento Mountains checkerspot butterfly from development or other activities on private land within its range.

### **Request for critical habitat**

We urge the Service to designate critical habitat for the Sacramento Mountains checkerspot butterfly concurrent with its listing. 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 the Sacramento Mountains checkerspot butterfly’s chance for survival significantly diminishes.

## Conclusion

In this petition, we have carefully assessed the best scientific information regarding the Sacramento Mountains checkerspot butterfly and have determined that it is in imminent danger of extinction throughout its range and recent surveys have found no larval tents and very few to zero adults. Thus, we urge immediate listing of this imperiled butterfly. 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 the Sacramento Mountains checkerspot butterfly is warranted under the Act as it is imperiled by 1) the present or threatened destruction, modification, or curtailment of its habitat or range; 4) the inadequacy of existing regulatory mechanisms; and 5) other natural or manmade factors affecting its continued existence as well as potentially threatened by 2) overutilization for commercial, recreational, scientific, or educational purposes; 3) disease or predation. A prompt decision to move forward with the listing of the butterfly with critical habitat is required to save the Sacramento Mountains checkerspot butterfly from extinction.

Please contact me at the number and email address below if you have any questions or need any clarification on the information in this petition.

Sincerely,



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