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FOREST GUARDIANS

June 28, 2007

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BY CERTIFIED MAIL & FAX

Re: Emergency Endangered Species Act listing request for the Sacramento Mountains Checkerspot Butterfly

Dear Secretary Kempthorne and Director Hall:

Forest Guardians and the Center for Biological Diversity hereby petition for listing of the Sacramento Mountains Checkerspot Butterfly (*Euphydryas anicia cloudcrofti*) under the Endangered Species Act as described in 16 U.S.C. § 1531 et seq. This petition is filed under 5 U.S.C. § 553(e), 16 U.S.C. § 1533(b)(3)(A) and 50 C.F.R. § 424.19, which give interested persons the right to petition for the issuance of a rule.

Petitioners also request the Service emergency list the butterfly, which is threatened with imminent extinction. The Service has the authority to promulgate an emergency listing rule for any species when an emergency exists that poses a significant risk to the species. 16 U.S.C. §1533(b)(7). In this case, the spraying of pesticides over this buttefly subspecies' narrow range poses such as emergency. Such rule shall take effect immediately upon publication in the Federal Register and shall be effective for a maximum of 240 days. *Id.*

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Ongoing and proposed widespread insect control activities in and around Cloudcroft, New Mexico pose a high-magnitude, imminent threat to the Sacramento Mountains checkerspot butterfly ("butterfly" or "checkerspot"). Continued loss and degradation of the butterfly's habitat, proliferation of non-native weeds, fire suppression, climate change, and other factors also contribute to the need to list this subspecies. Because of its extremely limited range, its susceptibility to local extirpations, and specific life history traits, all of the threats we describe may pose an imminent danger to the very existence of this butterfly.

History of the federal listing effort

The Center for Biological Diversity petitioned for listing of the checkerspot as endangered on January 28, 1999. The petition included an emergency listing request, based on a proposed U.S. Forest Service (USFS) land exchange involving butterfly habitat.[1] The U.S. Fish and Wildlife Service (USFWS) published a positive 90-day finding on December 27, 1999. USFWS then published a court-ordered 12-month finding on September 6, 2001, proposing to list the subspecies as Endangered and designating 54-square-miles as critical habitat. In the listing proposal, USFWS identified a multitude of threats to the checkerspot, including private and federal land habitat loss and degradation, catastrophic wildfire, fire suppression, spread of non-native vegetation, insect control, herbicide application, collection, extreme weather, roads, and recreation. The situation described by USFWS 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. *See* 66 *Fed. Reg.* 46575-95.

In an abrupt shift, USFWS 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 also dismissed the impact of private land habitat modification. *See* 69 *Fed. Reg.* 76428-76445.

USFWS erred in withdrawing the listing proposal, failing to consider the checkerspot's extremely narrow distribution, small and isolated populations, and the fact that it is vulnerable to so many threats, many of which the USFS exerts little control over, such as drought, climate change, private lands development, and noxious weed proliferation. USFWS also failed to consider private land insect control efforts that are currently underway in the Village of Cloudcroft, and erroneously assumed that USFS would not spray for insects on the Lincoln, as demonstrated by the current proposal to spray.

[1] We have attached the 1999 listing petition and subsequent Center for Biological Diversity correspondence to the U.S. Fish and Wildlife Service concerning the need to list the checkerspot as Endangered under the Endangered Species Act and designate critical habitat for this subspecies. *See* Exhibits 1-2.

New information mandating emergency listing

In both the listing proposal and withdrawal, USFWS did not foresee the magnitude of the current threat from insect control. The agency stated in the listing proposal:

> The application of carbaryl and Bacillus thuringensis (BT) to control insects poses a threat to the Sacramento Mountains checkerspot butterfly. The petitioner reported that the entire Douglas-Fir forest in the Sacramento Mountains was treated in 1984 with either carbaryl or BT to control an outbreak of forest insects. Carbaryl is considered moderately to highly toxic and is lethal to many non-target insects, whereas BT can kill the larval stage of many insects, including butterflies (Cornell University 1998a, 1998b). These insecticides were applied during months when butterfly larvae were not in diapause; however, the areas which were treated with carbaryl or BT were heavily wooded and are not areas that were inhabited by the butterfly. Nevertheless, drift of these insecticides into areas used [by] the butterfly could have occurred. It is unknown what affect these treatments may have had on the Sacramento Mountains checkerspot butterfly because we have no pretreatment data for comparison. There has been a recent outbreak of tussock moth (*Orgyia pseudotsugata*) in the Sacramento Mountains (G. Garcia, pers. comm. 2000). The FS may attempt to control the outbreak using a virus specific to the tussock moth, BT, or an application of insecticide (G. Garcia, pers. comm. 2000). Future applications of carbaryl or BT may pose a potential risk for the viability of Sacramento Mountain checkerspot butterfly localities" (66 *Fed. Reg.* 46583).

The listing proposal considered future insect control a risk to the butterfly, but focused on national forest spraying.

In the listing withdrawal, USFWS reversed their previous conclusion that insect control was a significant threat:

> In the proposed rule, we also determined that the application of carbaryl and Bacillus thuringensis (BT) to control insects poses a threat to the butterfly. Carbaryl is considered moderately to highly toxic and is lethal to many non-target insects, whereas BT can kill the larval stage of many insects, including butterflies (Cornell University 1998a, 1998b). The Forest Service stated that any future proposed treatments would need to be analyzed under NEPA, and the suggestion that carbaryl or BT would be used to control these or other forest insects was premature. Although future applications of carbaryl or BT may pose a potential risk to the butterfly, there are no proposals to spray for insect outbreaks currently or in the future (Forest Service 2001, Service 2004b). This action is no longer considered a significant threat to the species (69 *Fed. Reg.* 76443).

This conclusion was not based on any new information or assurances from either the Village of Cloudcroft or the Lincoln National Forest that they would not spray and indeed, that is what both entities now intend to do.

Insect control underway on private lands

Private landowners are currently conducting insect control in the Village of Cloudcroft, using a product called "Confirm 2F," which can kill all Lepidoptera and threatens the survival of the butterfly. There is widespread participation by residents in current insecticide applications. The Village and Otero County governments are considering a plan to conduct even more extensive insect control. Residents and municipal government officials are pressuring USFS to spray adjacent national forest land. There is every indication that control efforts will be repeated in the fall, when newly-hatched checkerspot larvae are actively feeding and therefore most vulnerable.

Articles from the *Alamogordo Daily News* and *Albuquerque Journal* have reported this effort:

> Members of a group that has started spraying private property in the village encouraged village leaders not to rely on the U.S. Forest Service and not to wait for the Forest Service to act. *ADN* 6/13/2007.
>
> Jim Maynard, owner of Green Mountain Real Estate and developer of The Woodlands subdivision, said spraying on private property will continue as soon as Wednesday when a replacement pump arrives. *ADN* 6/13/2007.
>
> A group of residents in Cloudcroft began spraying their properties Sunday morning in an effort to quell further devastation by the spruce budworm and looper caterpillar, the two primary insect species that have been destroying trees in the Lincoln National Forest and on private lands for the past year or longer. *ADN* 6/12/2007.
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> Organized by Cloudcroft residents Dr. Laurel Walters, John Cronin, Jim Maynard, Frank Starns and John Bennett, the group quickly drew 15 volunteers who have been manning phones for the past two weeks in an effort to notify residents and property owners. *ADN* 6/12/2007.
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> "We know that with the other properties in Cloudcroft not being sprayed yet, and with the Forest Service not spraying the surrounding forest at the same time, that we are going to have to spray several times in order for this to be effective," Maynard said. "We care about our properties, and if that is what it takes, we will do whatever it takes." *ADN* 6/12/2007.
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> "When Dr. Walters, with 25 years of field work as an entomologist, tells us that the spruce budworm is the biggest immediate threat to our lands, and Otero County agrees with that, we're putting ourselves in that corner,"

> Maynard said. "The majority of loopers have [sic] already pupated and will not be affected by spraying now. We know we will have to wait until the next generation comes out as larvae in late September or early October to have the biggest impact on the loopers. *ADN* 6/12/2007.
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> "The Forest Service has finally seen the light on that issue," he said. "What we don't understand is that they can't see the immediate threat that the budworm is to the forest, and why they don't act on this now, as they should. If the other property owners up here don't act now to save what they have, they may very well be living on lots with no trees in the not-too-distant future. *ADN* 6/12/2007.
>
> Cloudcroft Village and Otero County leaders expect to announce their plans within the next week or so to spray pesticide in the village to kill insect larvae that are damaging trees. *ADN* 6/13/2007.

See Exhibit 3: 2007 news articles regarding Cloudcroft spraying. The spray reportedly being used in these private efforts is Confirm 2F, which targets lepidopterous larvae and will therefore kill the checkerspot if it is in a larval phase.[2]

Insect control planned on federal lands

Insect control proposed by the U.S. Forest Service would likely impact butterflies.[3] While USFWS remarked in the listing proposal that, "The Sacramento Ranger District in the Lincoln National Forest has been instrumental in avoiding or minimizing some recent potential impacts to the butterfly on their lands" (66 *Fed. Reg.* 46577), USFS may now be presenting a direct threat to the butterfly by conducting insect control. The insect control would target budworms, looper caterpillars, and tussock moths. A June 8, 2007, USFS press release states that the county, village, and USFS will "work together on a proposal for an aerial spray application of a biological agent, Bacillus thuringiensis (Btk)," likely in September or October 2007. Furthermore, USFS would skip the National Environmental Policy Act review process:

> The Lincoln National Forest (LNF) will be seeking alternative arrangements from the Council on Environmental Quality to streamline procedures required by the National Environmental Policy Act (NEPA) in order to meet the October schedule. The Forest will be focusing on National Forest System (NFS) lands within a mile to a mile and a half around the VOC [Village of Cloudcroft]. *See* Exhibit 4: USFS 6/8/2007 press release.

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[2]*See* http://pmep.cce.cornell.edu/profiles/insect-mite/propetamphos-zetacyperm/tebufenozide/tebufenozide_let_402.html.

[3]We have attached as Exhibit 5 comments submitted by Forest Guardians to USFS on the proposed insect control, dated June 24, 2007.

The preferred control method of spraying *Bacillus thuringiensis* var. *kurstaki* (Btk), a bacterium, will harm non-target Lepidoptera such as the checkerspot.[4] The Environmental Protection Agency considers the risk of Btk "minimal to nonexistent to nontarget organisms including endangered species except endangered insect species."[5] Swadener (1994) writes,

> Large scale applications of B.t. can have far reaching ecological impacts. B.t. can reduce dramatically the number and variety of moth and butterfly species, which in turn impacts birds and mammals that feed on caterpillars. In addition, a number of beneficial insects are adversely impacted by B.t...
>
> In Washington, B.t. applications in King and Pierce counties to kill gypsy moths reduced spring moth populations by almost 90 percent...In addition, one rare species appeared to have been eradicated from the treatment zone...[6]

Miller (1990) found a significant reduction in species richness among uncommon species in a site treated with Btk. Six species which occurred in an untreated site were not present in the treated site. He writes,

> ...if any of the species had been limited in its distribution, or a unique genotype of the species was locally endemic, then the population/species would be at high risk of becoming extinct.[7]

USFWS has recognized the danger of Btk to the Karner Blue butterfly, listed as Endangered under the ESA. The recovery plan for that subspecies states,

> In laboratory tests, even the relatively specific insecticide, Bacillus thuringiensis kurstaki (Btk), used to control the gypsy moth killed about 80 percent of the Karner blue larvae fed Btk treated lupine leaves (Herms 1997). Because the timing of Btk applications for gypsy moth control typically coincides with the larval stage of the Karner blue, application of this insecticide results in Karner blue mortality (Herms 1997). Individuals and agencies (e.g. U.S. Forest Service) wishing to use Btk for gypsy moth suppression are encouraged by the Service to use alternative, non-lethal control methods in Karner blue butterfly areas (Recovery Plan at p. 40).[8]

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[4]Other inert chemicals are in Btk, such as surfactants and emulsifiers to spread it and keep it evenly dispersed. These may pose additional risks.

[5]*See* Environmental Protection Agency. 2006. "*Bacillus thuringiensis* subspecies *kurstaki* strain M-200 (006452) Fact Sheet." Online at: www.epa.gov/pesticides/biopesticides/ingredients/factsheets/factsheet_006452.htm.

[6]*See* Swadener, Carrie. 1994. "Bacillus Thuringiensis (B.T.)." *Journal of Pesticide Reform* 14(3):13-20.

[7]See Miller, Jeffrey C. 1990. "Effects of a Microbial Insecticide, *Bacillus thuringiensis kurstaki*, on nontarget Lepidoptera in a Spruce Budworm-infested Forest." *Journal of Research on the Lepidoptera* 29(4):267-276 at p. 275.

[8]The Karner Blue butterfly's recovery plan is at: http://ecos.fws.gov/docs/recovery_plans/2003/030919.pdf.

> Avoid using insecticides in association with the Karner blue. Most insecticides are toxic to Karner blue butterfly larvae. Even though some insecticides may be used to maintain or improve habitat, use of insecticides is discouraged. One example of an insecticide used in Karner blue habitat is Bacillus thuringiensis var. kurstaki (Btk) used to control the gypsy moth which causes defoliation of trees. Experimental testing of the effect of Btk on Karner blues found it caused mortality of Karner blue larvae (Herms et al. 1997). If insecticide use is necessary, it should be used at a time when Karner blue larvae and adults are not susceptible to the insecticide, its residues, or its metabolic by-products. The Service recommends that no aircraft broadcasting of Btk should occur within one-half mile of any Karner blue butterfly sites. Distances of less than one-half mile may be acceptable on a case by case basis by building in precautions to minimize drift (refer also to APPENDIX G). Other insect control tactics might be substituted for insecticides, but the potential detrimental effects of these other control tactics should be considered before they are used (Recovery Plan at Appendix G-83).

Given the narrow distribution of the checkerspot, USFS's proposed spraying could result in the extinction of this butterfly. Moreover, it would be difficult for any insect control to discriminately target budworms and loopers and not impact checkerspots, since their feeding stages generally overlap. The insects being targeted all belong to the order Lepidoptera, which includes all moths and butterflies. Moths and butterflies are closely related, more to each other than any other type of insect (such as bees or flies) and generally share the same biological responses to threats such as insect control.

In addition, the Lincoln National Forest is advising private landowners that it is "fine" to spray:

> Lou Woltering, forest supervisor for the Lincoln, was asked Friday for his reaction to the spraying effort by the residents.
>
> "It's certainly within their rights to do that," Woltering said. "I think that's great if that is what they have chosen to do. The Forest Service has no restrictions on private lands and on what property owners can do on their lands. If they want to spray, that is fine." *ADN* 6/12/2007 (Exhibit 3).

It is not fine to spray. Rather, it places the checkerspot at grave risk.

We are encouraged that USFS and USFWS have been discussing impacts to the checkerspot from spraying. Lou Woltering, comm. to Forest Guardians, dated 6/13/2007. However, there is no assurance that USFS will not spray because there are inadequate regulatory protections for the butterfly, given its unlisted status. This is a particular

danger given the enormous political pressure USFS is receiving from the county, village, and Rep. Steve Pearce (R-NM) to address the insect outbreak.[9]

Climate change in the Southwest

Scientific information not considered in, or subsequent to, the withdrawal indicates that the impacts of climate change will be especially severe in New Mexico and the southwestern U.S.[10], and the harms from climate change to butterflies have been particularly well documented. Impacts include, but are not limited to: dependence on particular plants can make butterflies very habitat specific and thus vulnerable to climate conditions affecting habitats they occupy; altered growing seasons of plant hosts can shift under climate change, leading to starvation of larvae; extreme weather can kill individual butterflies at various life stages; weather can impact adult flight time, thus impacting the number of eggs laid and consequent reproduction; and altered flight times can also affect butterflies' ability to colonize unoccupied habitat.[11]

Butterflies with limited dispersal abilities and specialized habitat needs are at significant risk.[12] Climate change impacts on other checkerspots have been documented.[13] The Edith's checkerspot, was found to shift its range northward by approximately 100 miles.[14] However, New Mexico penstemon (*Penstemon neomexicanus*), is the Sacramento Mountains checkerspot butterfly's primary host plant and the only plants known for egg-laying sites, and it is restricted to the Sacramento Mountains and the Capitan Mountains to the north.[15] Just a slight shift in either the checkerspot's or the plant's distribution, productivity, or other factors could further imperil the checkerspot. These impacts from climate change underscore the need for expeditious listing of this butterfly subspecies.

Ongoing threats to the checkerspot

The listing proposal reported a desperate biological situation:

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[9]*See* Exhibit 3 (news articles) and Pearce's questioning of Mark Rey, Under Secretary for Natural Resources and Environment at the US Department of Agriculture, at: http://www.pearce.house.gov/newscenter.html.

[10]*See* http://www.nmclimatechange.us/background-impacts.cfm. We incorporate this website and links by reference.

[11]*See* Hellmann, Jessica J. 2001. "Butterflies as model systems for understanding and predicting climate change." In Wildlife Responses to Climate Change. Eds. Stephen H. Schneider and Terry L. Root. Washington: Island Press; Hellman, Jessica J. 2002. "The effect of an environmental change on mobile butterfly larvae and the nutritional quality of their hosts." *The Journal of Animal Ecology* 71(6):925-936; Parmesan, Camille. 1996. "Climate change and species' range." *Nature* 382:765-6; Murphy, D.D., and S.B. Weiss. 1992. "Effects of climate change on biological diversity in Western North America: Species losses and mechanisms." Chapter 26 in *Global Warming and Biodiversity.* Eds. R.L. Peters and T.E. Lovejoy. Castleton, NY: Hamilton Printing. Online at: http://www.ciesin.org/docs/002-262/002-262.html. We incorporate these sources by reference.

[12]*See* Hellmann 2001, 2002.

[13]*See* Parmesan 1996, Murphy and Weiss 1992.

[14]*See* Parmesan 1996.

[15]See http://nmrareplants.unm.edu/rarelist_single.php?SpeciesID=137.

> Many of the remaining Sacramento Mountains checkerspot butterfly populations are likely small and/or not viable (i.e., are likely to become extirpated in the near future). The isolated localities and limited geographic range of the butterfly indicate that the species is particularly vulnerable to perturbations (disturbances that impact the habitat and host plants associated with the species), which could lead to extinction (Ehrlich et al. 1972; Thomas et al. 1996). (66 *Fed. Reg.* 46577)
>
> Given the low probability of improving the status of the Sacramento Mountains checkerspot butterfly in the next few years (e.g., the high risk of a catastrophic wildfire in the next few years, the continued elimination of suitable habitat by development, the likelihood of an extreme weather event occurring, the reduction or elimination of larval or adult food plants by grazing and/or nonnative plants), this species is vulnerable to extinction throughout all or a significant portion of its range (66 *Fed. Reg.* 46586).

The state of the butterfly - small, isolated populations within an extremely limited geographic range subject to a multitude of threats - has not changed since the proposal. To the contrary: the suitable habitat estimate in the 2004 withdrawal was 2,709 acres, which is only 52% of the estimate provided in the 2001 proposal (5,198 acres). The estimate of total occupied habitat was under 2,000 acres in both the proposal and withdrawal.

Some threats to the checkerspot may have decreased due to new information or tangible conservation measures between the proposal and withdrawal, while many others did not:

- *USFS land transfer*: 3 of the 81 acres to be transferred to Cloudcroft are butterfly habitat. The majority of the five parcels to be transferred would be greenbelts and not developed or mowed and therefore less of a threat to the checkerspot than previously thought.

- *Development limits in Cloudcroft*: the withdrawal reports that development is no longer being encouraged by the Village of Cloudcroft due to a lack of water. In addition, the projected development amounts to much less direct disturbance of butterfly habitat than was estimated in the listing proposal. The Village is also no longer planning a 9-hole golf course due to lack of water. USFWS also reports that mowing is not a threat, given that butterflies (in various life stages) and food plants were found in areas that had been mowed. Overall, development was no longer considered by USFWS to be a significant threat to the butterfly.

  While Otero County amended the Subdivision Ordinance on July 29, 2005, to direct the use of best management practices to minimize effects from future subdivisions, including a biological investigation of private property before any construction, this ordinance is set to expire in four years, on July 1, 2011. Although the threat of development decreased following the proposed rule, it still has continued and combined impacts and, combined with other threats such as

spraying, remains significant. If the butterfly is listed, this threat can be addressed. Without listing, there is no certainty that development activities will not harm the butterfly.

- *Modification of USFS campground projects*: the withdrawal reported that improvements at Pines Campground reduced the capacity of the campground, and USFS installed a barrier to butterfly habitat. Improvements at the Fir Campground included a boundary fence to reduce visitor impacts on butterflies. Measures proposed by USFS at five other campgrounds would reduce current impacts to butterflies by reducing the number of camping sites and condensing the campgrounds into smaller areas.

  While the campground projects may have helped reduce impacts to butterflies at particular localities, the listing withdrawal does not address all of the evidence provided in the listing proposal that increasing recreation demands, including off-road vehicle use, camping, mountain biking, and other recreational uses, can result in harm to butterflies in various life stages and to their food plants.

  In the listing withdrawal, USFWS spuriously points to century-old railroad and logging activities on the Lincoln to argue that, "it appears that the butterfly and its foodplants can tolerate a certain amount of natural and man-made disturbance." (p. 76434). This is a general and poorly evidenced assertion that ignores the bulk of scientific data presented in the listing proposal. USFWS uses anecdotal evidence to argue that, "the species and its foodplants have been demonstrated to be resilient to some disturbances (e.g., edges of the football field, campgrounds, and railroad)," thereby abandoning the science-based, precautionary reasoning in the listing proposal to consider whether populations co-existing with deleterious land uses were actually population sinks.

- *Roads, corridors, and powerlines*: the listing withdrawal discusses impacts from these projects as temporary and of limited area. The listing proposal, conversely, discusses the dangers to small populations from larvae, adult butterflies, and host plants from being killed. In addition, the listing proposal discusses the problems of road mortality, fragmentation of habitat, and erosion and dust impacts to adjacent habitat. The listing withdrawal presents no new scientific evidence to justify its disregard of the impacts considered in the listing proposal.

- *Livestock grazing*: USFWS relies on USFS utilization rates of 35% to argue that livestock grazing does not present a threat to the butterfly. In the listing withdrawal, USFWS states, "the Forest Service manages these allotments consistent with existing range management standards and guidelines under their Forest Plan, and when management adjustments are necessary to meet the forage levels, adjustments are made through the permit administration process (Forest Service 2002d, 2004i, 2004l, United States District Court 2002). The existing forage utilization (i.e., 35 percent) is adequate for the protection of the butterfly to limit adverse effects (Service 2004c)" (69 *Fed. Reg.* 76437).

However, those utilization rates are continually exceeded by permittees, and USFS is doing little about it. USFWS noted in the listing proposal that the Sacramento Allotment has suffered excessive utilization rates since 1991 and states, "herbaceous plants and grasses have been effectively removed from the Sacramento Ranger District by intensive overgrazing" (66 *Fed. Reg.* 46582). The agency states, "Grazing levels in the known range of the Sacramento Mountains checkerspot butterfly continue to degrade the quantity and quality of suitable habitat" (66 *Fed. Reg.* 46582). USFWS further notes that USFS has failed to adjust grazing levels during drought, resulting in extensive damage. This candid assessment is missing from the listing withdrawal. Instead, USFWS depends on USFS regulations and policies that it knows are being chronically and regularly violated by permittees, to the detriment of the butterfly and its habitat. For example, in 2003, the CC Walker, James, Russia Canyon, and Sacramento Allotments – which are all allotments containing checkerspot habitat – had overall leaf-lengths of less than 4 inches, indicating overgrazing. *See* Exhibit 6: 2003 USFS Monitoring Data. In addition, herds of escaped and breeding horses are using the northern third of the checkerspot's formerly proposed critical habitat, compounding grazing effects.

- *Catastrophic wildfire and fire suppression*: based on observations from the Scott Able fire in May 2000, USFWS concludes in the withdrawal that catastrophic wildfire may not be as great of a threat as suspected in the listing proposal. USFWS also argues that thinning projects are increasing butterfly habitat, including corridors for dispersal. The Scott Able fire hopped over drainage bottoms, presumably because they were more moist, and burned hillsides in a mosaic. The checkerspot's range did not overlap with that of the fire's, as the fire was too low in elevation.

The Service's reasoning in the withdrawal on fire is highly speculative, particularly in contrast with the discussion in the listing proposal. In the proposal, USFWS stated that, "we believe that fire exclusion has substantially affected the species and will likely continue to significantly degrade the quality and quantity of suitable habitat" (66 *Fed. Reg.* 46579). The agency noted that both cattle grazing and fire suppression have led to high-density ponderosa pine and mixed-conifer forests, thereby increasing the threat of catastrophic wildfire. The contribution of livestock grazing to dense forest conditions is not noted in the withdrawal. In addition, the withdrawal drops consideration of the fact that, alongside the increase in woody plants, there has been a decrease in herbaceous vegetation used by butterflies: "the quality and quantity of the available butterfly habitat is decreasing range wide." *Id.* It ignores the difficulties in restoring natural fire ecology given soil loss, non-native vegetation, and need to protect homes and businesses. Also, in the listing proposal, USFWS noted that it is unknown whether proposed thinning projects will reduce the threat of catastrophic wildfire to the butterfly and its habitat.

The November 2005 conservation plan is also more circumspect about the benefits of thinning than the listing withdrawal. The plan states, "neither the butterfly nor its host plants have been observed in the thinned forest edges," and "Given the novelty of the extensive thinning approach in the Lincoln National Forest, there exists no data to make adequate predictions concerning the response of the butterfly to the increase in thinning" (p. 25).

- *Recreational impacts*: while off-road vehicle (ORV) use is increasing on the Lincoln and occurs in approximately half of butterfly habitat, USFWS relies on conservation measures by USFS, along with an outdated (1983) estimate of areal impacts of ORVs to conclude that this threat is not significant. However, illegal, off-trail OHV use is increasing, in spite of signs designating trails. ORVs routinely go around signs on the Lincoln and cruise through pristine meadows far from any roads. USFWS admits that, "some temporary OHV-related impacts will continue to affect the butterfly and its habitat. OHV impacts will likely result in the temporary crushing or possible destruction of foodplants in localized areas and mortality of individual butterflies" (69 *Fed. Reg.* 76440). FWS does not consider soil erosion, habitat fragmentation, and exotic weed proliferation that results from ORVs, only the extent of the tracks created. A USFS report dated October 18, 2004 documented ORV use in the butterfly's habitat. *See* Conservation Plan at p. 56.[16]

- *Noxious weed management*: USFS has shifted to a manual weed-pulling program to control noxious weeds in butterfly habitat. While this alleviates the threat of herbicidal control to checkerspots, it does not fully address the threat of noxious weeds. The listing withdrawal curtly states, "nonnative vegetation and the application of herbicides are currently being managed" (69 *Fed. Reg.* 76441). This contrasts sharply with the more accurate assessment in the listing proposal that non-native vegetation is an enormous problem on the Lincoln National Forest, with 30% of mountain meadows and nearly half of some individual meadows dominated by noxious weeds in 1995.

- *Insect control*: as discussed in more detail above, large-scale insect control spraying is currently taking place in the Village of Cloudcroft, and USFS may spray on federal lands in the range of the butterfly. Neither the listing proposal nor the withdrawal considered the full magnitude of this threat.

- *Collection*: while the listing proposal reviews in detail a strong basis for considering this a threat, including the butterfly's life history characteristics, attractiveness of a rare taxon to collectors, and newspaper publications promoting collection, USFWS relies on a 2000 closure order to dismiss this threat in the

[16]We have attached the 2005 Conservation Plan as Exhibit 7. USFWS stated in the listing withdrawal that it did not depend on the Conservation Plan as a basis for withdrawing the listing proposal. We agree with this statement, as USFWS legally cannot depend on voluntary, speculative, and unfunded plans to avoid ESA listing. *See* Exhibit 8, Center for Biological Diversity Comments on Sacramento Mountains checkerspot butterfly Conservation Plan, dated October 21, 2004.

listing withdrawal and presents no evidence to indicate this closure will be effective.

- *Inadequacy of regulatory mechanisms*: in the withdrawal, USFWS argues that the butterfly's status as a USFS sensitive species is providing adequate protection and cites a National Forest Management Act regulation requiring the maintenance of viable populations of existing native and desirable non-native species (36 C.F.R. § 219.19). However, sensitive species status provides none of the binding protections of ESA listing. In addition, the Bush Administration has passed new regulations that remove the viability standard previously provided in 36 C.F.R. § 219.19.

  While USFWS describes conservation measures that resulted from conferencing with USFS, these measures no longer apply, as the checkerspot is no longer proposed for listing. Future federal projects will entail no conferencing, as the butterfly currently has no status under the ESA. Nor does it have any State protection, since NM does not recognize insects as "wildlife." This unlisted status means there are inadequate regulatory mechanisms to prevent the butterfly's extinction.

- *Extreme weather*: while USFWS recognized in the listing proposal that habitat loss and fragmentation impeded the butterfly's ability to sustain extreme weather events, the listing withdrawal cryptically and without any scientific basis dismissed this threat:

  "In the proposed rule we identified periodic droughts and atypical weather events as a threat to the butterfly. As noted in our response to comment 3 above, we believe that the species can survive and has persisted despite natural events such as drought since the butterfly evolved in an environment subject to periodic atypical weather events" (69 *Fed. Reg.* 76443).

  Climate change: the "comment 3" referred to above concerns climate change. The listing withdrawal reads:

  "(3) Comment: If global warming is really a threat to the butterfly, are you going to get the whole planet to change its habits to protect this one butterfly?

  Our response: We agree that we cannot address an issue of this magnitude and complexity on a species by species basis. However, we recognized in the proposal that the butterfly may be vulnerable to changes in climate. We also note that this does not imply that the species cannot survive natural events such as drought since the butterfly evolved in an environment subject to periodic atypical weather events.

  When a species has specific and limited habitat requirements, it is reasonable to assume that climate shifts occurring more rapidly than evolutionary timeframes might have an impact on the species in the future. Even if we cannot address these issues on a species by species basis, we believe it is important,

where possible, to document the extent of any problems, to spur research or collaborative solutions. The U.S. Geological Survey (USGS) and the Service recently launched our Future Challenges Project with a scientific workshop at the National Conservation Training Center. At this workshop, we explored four environmental drivers that will affect our work and missions in the future. We examined the issues of water resources, invasive species, climate change, and biotechnology for their potential long-term impacts in managing biological resources and the systems that support them over the next 10 to 20 years. For example, we know the importance of coordinating research, monitoring, and risk assessment efforts so that human and financial resources are used effectively and directed at the highest priority needs. Closely related is the importance of accessing and sharing research and results so that the best information available is used by all decision-makers" (p. 76429).

While USFWS's response is largely evasive to the issue of whether climate change presents a threat to the butterfly, the agency does admit that, with specific and limited habitat requirements, climate change can adversely impact a species. The listing petition points out, and the listing proposal agrees, that climate change is a significant threat to the butterfly. The listing withdrawal provided no science to disregard this threat. As we discuss above, new information indicates that climate change is likely a greater threat to the checkerspot than previously considered in the listing proposal.

As demonstrated above, there are many ongoing threats that were recognized in the listing proposal but which the withdrawal dismissed without adequate scientific basis. These threats contribute to the need to list the checkerspot under the ESA.

Peer-review supports listing

Of the six peer-reviewers for the listing proposal, only one responded. That scientist supported the listing. We do not believe that USFWS provided peer reviewers with the opportunity to review the withdrawal.

The need for emergency listing

An emergency listing can provide interim protection while USFWS finalizes a listing rule through the standard listing process.

While the listing proposal recognizes the extreme risks to small, isolated populations, particularly given the butterfly's limited range, the listing withdrawal presents an about-face. The proposal makes clear that protection of suitable habitat, including corridors for dispersal, as well as prevention of harm to individual butterflies in their various life stage, are pivotal for maintaining the metapopulation, particularly given limited butterfly dispersal abilities. The proposal recognizes that the butterfly's small isolated populations are vulnerable to extirpation, and some of the highest density populations at high elevations may be most susceptible. USFWS notes that butterflies in this genus can

protecting flora, fauna, natural processes, and native habitats in the greater American Southwest. Forest Guardians is interested in the conservation of species that face high levels of imperilment, especially those who play important umbrella and keystone functions within their ranges. In addition, Forest Guardians strives for the restoration and preservation of *all* naturally occurring components and processes within native ecosystems.

Petitioner Center for Biological Diversity is a non-profit environmental organization dedicated to protecting endangered species and wild places through science, policy, education, and environmental law. The Center submits this petition on its own behalf and on behalf of its members and staff, with an interest in protecting the Sacramento Mountains checkerspot and its habitat.

Requested designation

Forest Guardians and the Center for Biological Diversity hereby petition the U.S. Fish and Wildlife Service to emergency list the Sacramento Mountains checkerspot butterfly as an Endangered species pursuant to the Endangered Species Act. This listing action is warranted, given the acute and imminent risk of extinction currently faced by this subspecies. We further request that you immediately begin the standard listing process to grant this butterfly Endangered status and provide it with critical habitat.

Sincerely,

Nicole J. Rosmarino

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Conservation Director
Forest Guardians
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505-988-9126x156
On behalf of:

Noah Greenwald, M.S.
Conservation Biologist
Center for Biological Diversity
PO Box 11374
Portland, OR 97211
503-484-7495

List of Exhibits

Exhibit 1: Center for Biological Diversity listing petition, dated January 28, 1999.
Exhibit 2: Center for Biological Diversity comments on draft environmental assessment and draft economic analysis for checkerspot proposed critical habitat, dated November 15, 2004.
Exhibit 3: 2007 news articles regarding Cloudcroft spraying.
Exhibit 4: USFS 6/8/2007 press release.
Exhibit 5: Forest Guardians comments on proposed Lincoln National Forest insecticide application, dated June 24, 2007.
Exhibit 6: 2003 USFS Monitoring Data.
Exhibit 7: Sacramento Mountains Checkerspot Butterfly 2005 Conservation Plan.
Exhibit 8: Center for Biological Diversity Comments on Sacramento Mountains checkerspot butterfly Conservation Plan, dated October 21, 2004.

PETITION TO LIST CLOUDCROFT CHECKERSPOT BUTTERFLY

Euphydryas chalcedona cloudcrofti
***(Occidryas anicia cloudcrofti* Ferris and R. W. Holland)**

AS A FEDERALLY ENDANGERED SPECIES

November, 1998

Southwest Center for Biological Diversity
Box 710
Tucson, Arizona 85702

Endangered Species Report Number 41

Exhibit 1

Presented to:

Habitat for *E. c. cloudrofti* on private and federal land in the Sacramento Mountains is steadily being developed primarily for residential use. Federal proposals in 1997 to relinquish public lands to the Village of Cloudcroft, pursuant to the Townsite Act of 1958, would affect critical components of the subspecies' habitat range. The effects of urbanization through Village expansion would contribute to cumulative effects of habitat loss and may foreclose options later determined to be important to butterfly persistence.

These impacts are in addition to those posed by habitat loss from rural development, highways, campgrounds, and administrative sites. They also add to the effects of less obvious ecosystem disruptions by historic farming practices, past insecticide use, the advent and expansion of non-native, aggressive weeds, global climate change, fire suppression and continued livestock grazing.

The majority of acres of the habitat type used by the Cloudcroft checkerspot butterfly is located within privately owned lands. This renders the available federal habitat to be of disproportionately high value for the ultimate conservation of the taxon and its habitat. Of the roughly 6,000 acres of meadow habitat in the known range, only 25 to 30% is within federal jurisdiction (Galeano-Popp, 1997).

The Cloudcroft checkerspot butterfly is vulnerable due to its limited range and distribution in a single small population within a single isolated mountain range. Furthermore, the majority of the subspecies' habitat is not subject to protections such as those available on federal land. Based on examination of past, present and potential habitat losses, disruptions, and vulnerabilities, the subspecies appears to be threatened with extinction throughout all or a significant portion of its range.

Emergency listing is prompted by the imminent potential for a significant portion of the species' limited range to be converted to a heavy equipment maintenance yard, ballfields, and sewage treatment plants. The Forest Service's Townsite Act decision would commit irretrievable resources that may preclude future options for avoiding jeopardy to the species. The timeframe required for precluding this possibility through normal listing procedures is approximately 1-2 years. By all indications, the Forest Service is ready to formally propose the overdue transfer through the NEPA process now. All efforts to have the Forest Service conserve the species prior to listing have failed.

TAXONOMY

Class:	Insecta
Order:	Lepidoptera
SubOrder:	Macrolepidoptera
Superfamily:	Ditrysia
Family:	Nymphalidae
Subfamily:	Nymphalinae
Genus:	*Euphydryas*
Species:	*chalcedona*
Subspecies:	*cloudcrofti*
Synonomy:	*Occidryas anicia cloudcrofti*
	Euphydryas anicia cloudcrofti

Since the original description of *E. c. cloudcrofti* in 1980 (Ferris and Holland), there have been numerous changes in the nomenclature and classification of the genus and closely allied genera. The genus *Occidryas* is no longer acknowledged by

most Lepidopterists and is instead recognized as being within the concept of *Euphydryas.*

Furthermore, some lepidopterists have merged *E. chalcedona, E. colon* and *E. anicia* into a "superspecies" or species "complex" (Brussard et. al. 1989; NABA 1995; Scott, 1986; Opler, pers.comm.). Thus, based on the most recent publications in the literature, the subspecies *cloudcrofti* is referred to as *Euphydryas chalcedona cloudcrofti.* However, not all lepidopterists agree with this concept and prefer to view *E. chalcedona, E. colon* and *E. anicia* as separate species. These experts would classify the Cloudcroft entity as *E. anicia cloudcrofti.*

Regardless of nomenclature used, all experts concur that the Cloudcroft checkerspot is unique and taxonomically valid at the subspecies level (Opler, pers. comm. Pratt, pers. comm; Emmel, pers. comm.). Furthermore, experts believe that it's geographic isolation makes the subspecies "a species in the making".

The geographically closest known relatives to *E. c. cloudcrofti* are the subspecies *E. c. capella* in southern Colorado and *E. c. chuskae* in northwestern New Mexico (Ferris and Holland, 1980). The restricted distribution (within a small area above 8000' elevation) and genetic isolation of *E. c. cloudcrofti* from all other populations of the genus and species is notable. The smallest distance between *E. c. cloudcrofti* and the two neighboring subspecies may be as great as several hundred miles (Ferris and Holland, 1980). The evolutionary significance of its restricted distribution and isolation is high, relative to other members of the genus, because it represents the very building blocks of an allopatric speciation model, which could be perceived as the major mechanism of evolution within the genus (Pratt, pers. comm.).

DESCRIPTION

TECHNICAL:

Foreward wing costal margin length in males ranges 21 - 24 mm and 22 - 28 mm in females. Ferris and Holland (1980) described the subspecies *E. c. cloudcrofti* as generally similar to *E. c. chuskae* but differs from it in ground color and more extensive black maculation dorsally. The ventral forward wing (VFW) postmarginal pale spotband is heavily outlined in black as is the VHW basal anal margin region. The two quadrate VFW cells spots nearly touch while they are clearly separated in *E. c. chuskae.* The distal hindwing (DHW) postdiscal band is slightly darker than the ground color while in *E. c. chuskae* it is concolorous.

Figure 1. Adult Cloudcroft checkerspot butterfly. observed in late July, 1997. Photo by J. Popp.

Figure 2. Underwing of Cloudcroft checkerspot butterfly. Photo by J. Popp

The sexes are similar dorsally. However, the DHW pale markings are evident in the females of *E. c. cloudcrofti* but generally subdued in the males, which is the opposite of *E. c. chuskae.* Ventrally, both sexes of *E. c. cloudcrofti* are similar to *E. c. capella.* Ferris and Holland (1980) described it as boldly marked and the dorsal ground color is repeated. The principal VFW maculation consists of a repetition of the dorsal subapical white-spot rows and black outlines of the cell quadrate spots. On the VHW, the three (basal-discal, postdiscal, marginal) dark orange spot-bands are clearly defined and lack the cream-buff intrusion found in *E. c. carmentis* and *E. c. chuskae.* The veins and spot borders are strongly defined in black (Figures 1 and 2).

NON-TECHNICAL

The Cloudcroft checkerspot is classified in the Family Nymphalidae, the "brush-footed butterflies (Scott, 1986; Ferris and Brown 1981). This is one of the largest family of butterflies. In nymphalids, the front legs are greatly reduced in both sexes and are often hairy and brushlike, hence the common name. The antennae are scaled and clubbed. Most species' larvae lack branching spines on the head but have many on the body, including mid-dorsal spines (Figure 3). The pupae (chrysalis) have conspicuous projections and hang from the cremaster (abdominal appendage) alone (Figure 4).

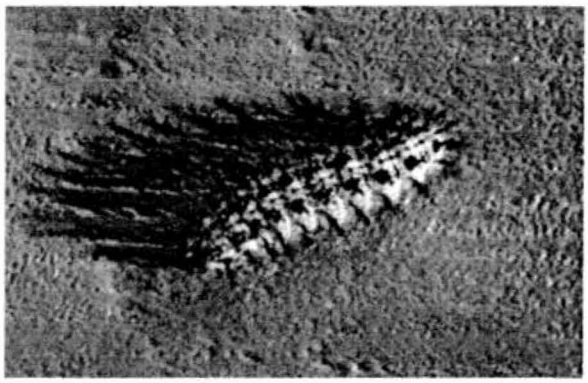

Figure 3. Cloudcroft checkerspot post-diapause larva observed late June, 1998. Photo by T. Narahashi.

Figure 4. Cloudcroft checkerspot pupa attached to the wood siding of a building in late June, 1998. Photo by T. Narahashi.

The *E. chalcedona-anicia* checkerspot is extremely variable. Adult butterflies are small to medium sized (approximately 2

inches across). They are predominantly red to orange brown in color with black bands. Species are determined based on examination of male genitalia. Eggs are yellow when deposited, turning reddish-brown later.

HABITAT

The habitat used by the Cloudcroft checkerspot is moist, mountain meadows within the mixed-conifer forest (typical Lower Canadian Zone) at 8000-9000' feet elevation (Figure 5). Ferris and Holland (1980) reported that the butterflies frequent cleared areas and forest openings. Common species in these grass-dominated meadows are Kentucky bluegrass (*Poa pratensis*), yarrow (*Achillea* sp.), wormwood (*Artemisia ludoviciana*), skyrocket (*Ipomopsis* sp.), beardstongue, sneezeweed, and cutleaf coneflower (*Rudbeckia laciniata*) (Galeano-Popp, pers.comm.).

Mountain meadows containing the food plants of Cloudcroft checkerspot are key to the species' survival. Thus suitable habitat (as currently understood) is mountain meadow habitat types above 8,000 feet elevation within the Sacramentos that contain *Penstemon neomexicanus*, *Valeriana edulis*, and/or *Helenium hoopesii*. Pratt (pers. comm.) observed that there were more meadows and forest openings than contained these host plants, making the habitat relatively specific and limited in distribution.

The surrounding forest in the vicinity of the type locality for this subspecies (Pines Campground) is the best known old-growth or late seral Douglas-fir forest on the Lincoln National Forest. This has major implications for ecosystem-based management since it is not just the mountain meadow for the butterfly and the old growth forest for the Mexican spotted owl that are important. The entire forest-meadow-riparian matrix on the landscape is what is biologically significant.

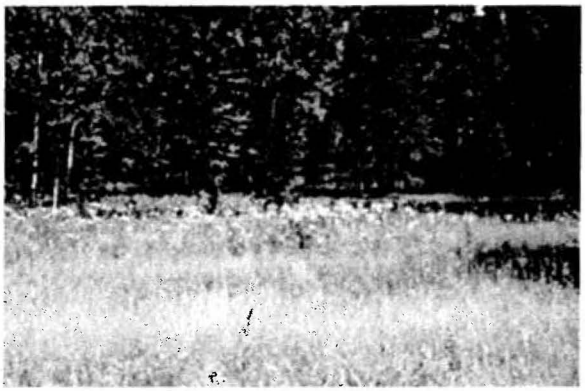

Figure 5. General view of habitat at the type locality for Cloudcroft checkerspot butterfly. Photo by J. Popp.

According to Pratt (pers.comm.), most checkerspots prefer dry open habitats or are known to use wind-swept slopes. The association with the mesic meadows of the Sacramentos may also be relatively unique within the species complex and therefore of further biological significance.

GEOGRAPHIC DISTRIBUTION

Habitat Range

The *chalcedona-anicia* superspecies complex ranges from northern Baja California north to British Columbia and Alaska.

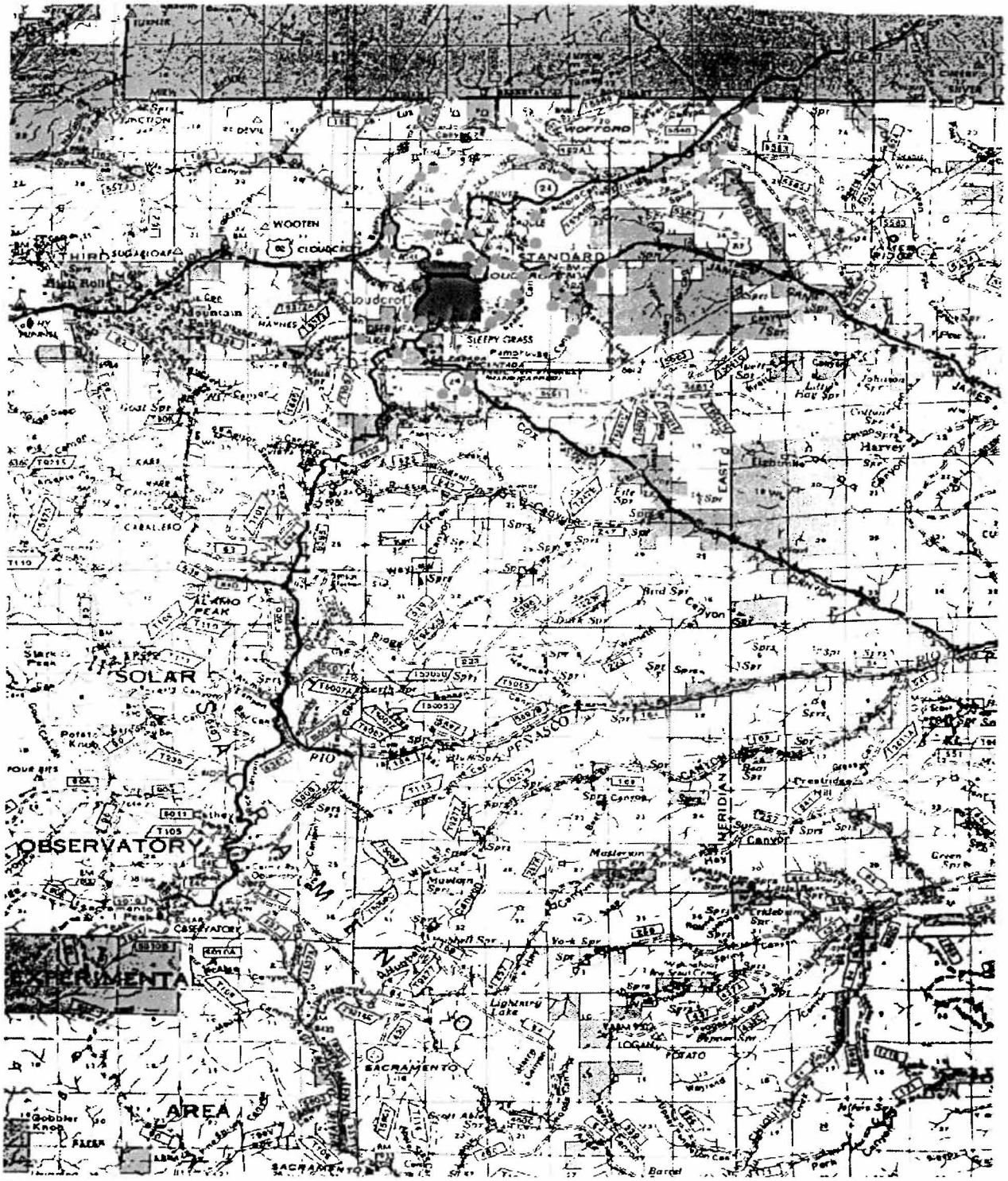

Figure 6. Known range of Cloudcroft checkerspot in the Sacramento Mountains of southern New Mexico. The Village of Cloudcroft is highlighted in blue. Approximate location records of adults or larvae are shown in red (courtesy U.S.Forest Service). Scale approximately 1 centimeter = 1 mile.

The Cloudcroft subspecies is known only from a single population around the Village of Cloudcroft, in the Sacramento Mountains of southeastern New Mexico. Extensive surveys elsewhere throughout the Sacramento Mountains failed to produce any additional *E. c. cloudcrofti* specimens (Ferris and Holland, 1980). In 1994 and 1995, S. Hager (pers. comm.) conducted an intensive butterfly inventory in Young Canyon, (a tributary of James Canyon) appproximately 4 miles east of Cloudcroft. He recorded several dozen species but found no *E. c. cloudcrofti,* despite the presence of apparently suitable habitat there.

Field surveys conducted by the Forest Service in 1997 confirmed species presence within a 2 mile radius of Cloudcroft, mainly to the east in James, Cox, and Pierce Canyons. In 1998, Forest Service biologists reported extending the known range by several miles to the north, northeast, and slightly west of previous records (Salas, pers. comm.). This was evidently due to improved survey techniques in 1998.

The distribution known in 1998 encompasses an area 6-7 miles long (north to south) and 7 - 8 miles wide (east to west), or approximately 45-55 square miles. The occupied range includes meadows within Silver Springs, Spud Patch, Zinker, James, Sleepygrass, Bailey, Pierce, Cox, and Russia Canyons (Figure 6).

The known range is contained within Forest Service Management Areas 2G (Silver prings), 2H (Upper James) and a portion of 2E (Upper Penasco) (USDA-FS, 1986).

Habitat Abundance

Because forested areas are expected to act as barriers to movement (Opler, pers. comm.) and are not used by butterflies, the actual suitable occupied habitat within this range is quite small. These 3 management areas contain a total of about 6,000 acres of non-forested lands, mainly grasslands and meadows. These non-forested acres constitute less than 1%, 5%, and 10% of the management areas respectively, or an average of 9% grassland (USDA-FS, 1986).

The known range of Cloudcroft checkerspot is contained in all of Management Area 2G and roughly half of Management Areas 2H and 2E. Using half of the non-forest acres for those 2 management areas, there could be as much as 3,000 acres of habitat in its verified range. Pratt (pers. comm.) reported that not all meadows in the area contain the host plants used by the Cloudcroft checkerspot and therefore total suitable habitat is estimated to be even less, e.g. 1,000 - 2,000 acres of federal land.

Habitat Quality

Of the federal habitat available, almost 1,000 acres are dedicated to campgrounds, highways, ski areas and miscellaneous uses, e.g. gravel pits and observatories (USDA-FS, 1986). In addition, meadow habitat in the Sacramentos is disproportionately contained within private ownership (Galeano-Popp, 1997) as are riparian habitats in the area. This non-federal habitat is valuable and yet unprotected. Privatized areas within the known checkerspot range include about 600 acres in Cloudcroft itself , two golf courses, a ski area and numerous homes and rural subdivisions. Potentially, over half of the

species habitat has already been developed for some type of anthropogenic utilization.

SYMPATRY WITH OTHER RARE AND ENDEMIC TAXA

The Cloudcroft checkerspot population in the Sacramentos is sympatric with the following federally listed species: *Strix occidentalis lucida* (Mexican spotted owl) and *Cirsium vinaceum* (Sacramento Mountain thistle). Sympatric local endemics include *Ashmunella rhyssa* (Sacramento Mountain land snail), *Automeris zephyria* (silkmoth), *Aneides hardyi* (Sacramento Mountain Salamander), *Penstemon neomexicanus* (New Mexico Beardstongue), and *Lesquerella aurea* (golden bladderpod). This has major implications regarding the need for ecosystem-based management.

NATURAL HISTORY/PHENOLOGY

As with other nymphalids, the Cloudcroft checkerspot butterfly has specific food preferences. The larval host is a species of *Penstemon* (beardstongue) most likely *P. neomexicanus,* a locally abundant endemic to the Sacramentos (New Mexico Native Plant Advisory Committee, 1984; Martin and Hutchins, 1980). Adult butterflies are attracted to *Helenium (Dugaldia) hoopesii* or sneezeweed, and probably other yellow composites for nectar. Secondary host plants for adults are likely but have not been identified by fieldworkers to date. Narahashi (pers.comm.) reported larval use of *Valeriana edulis.*

Ferris and Holland (1980) reported the first week of July is the putative peak of the annual flight of adult Cloudcroft checkerspots. However males have been recorded as early as June 16 and females as late as July 22. In general, butterflies can fly only in tolerable temperatures ranging from 20 to 42 degrees C. (68-107 deg. F), with an optimum of 32-38 degrees C. (89 - 100 deg. F.) (Ferris and Brown, 1981). Pratt (pers. comm.) reported sunlight levels may actually be more important than ambient temperature. On average, adult life span of related butterflies is 9 to 10 days (Scott, 1986).

The reproductive strategy of "hilltopping" has been identified within the *E. chalcedona* complex. This involves the aggregation of male butterflies on sunlit ridges and peaks and subsequent visitation by unmated females who orient to the peaks looking for males (Ehrlich and Wheye, 1986; Baughmann et. al. 1988a and 1988b.) Pratt (pers.comm.) saw no evidence of hilltopping while examining habitat of *E. c. cloudcrofti* in 1998.

The adult checkerspots lay eggs in masses and larvae emerge soon after. They are laid in large clusters mainly on the underside of leaves on sunlit host plants. Larval host plants are typically members of the Scrophulariaceae (Snapdragon Family), usually *Penstemon*, *Castilleja*, or *Besseya.* Young larvae live singly or in aggregations (Figure 7) in a silk nest or "tent" before winter. Cloudcroft checkerspot larvae were reportedly abundant in some areas visited by Pratt (pers. comm.) who suggested each female may lay as many as 1000 eggs in 20 or more egg masses on the host plants. High fecundity is important due to the number of factors that can cause mass mortality of larvae such as pathogens, severe weather events, predation, etc.

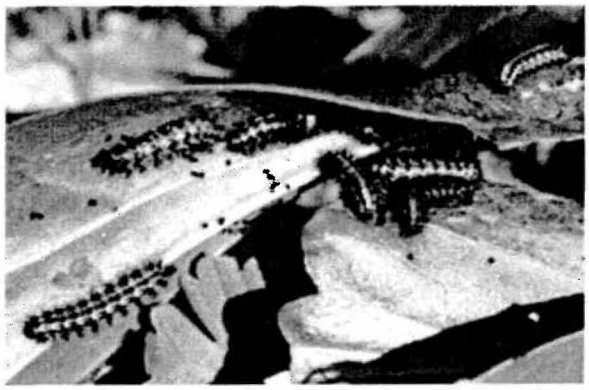

Figure 7. Aggregating larvae (pre-diapause) as seen in September 1998. Photo by T. Narahashi.

After hatching, larvae feed on host plants and undergo metamorphosis and diapause (inactive) stages prior to completing growth. Whether full development is reached in one year or requires more than one year in the subspecies *cloudcrofti* is not certain at this time. Butterflies associated with alpine habitats often undergo multiple year diapause prior to completion of growth due to the short growing season there. Although *E. c. cloudcrofti* is found in a subalpine environment rather than a true alpine zone, it may have multiple year diapause. Pratt (pers.comm.) observed larvae in multiple stages of development on his 1998 field visit to the type locality. He also reported observing large and very small larvae entering diapause, suggesting they require 2 years to complete their development.

Many facets of this species' ecology are speculative and require confirmation or are simply unknown and require species-specific research. Marking studies to track movements of individuals might provide useful information about habitat utilization. Floristic assessment of the occupied and unoccupied meadows would help identify potential factors limiting distribution.

STATUS THREATS

Biological Setting

Butterflies are highly visible insects and serious population declines have been recognized in many regions of the world. Losses in diversity and numbers are generally attributed to loss of habitat through major changes in land use (Gaskin 1995). British scientists have tracked rapid declines in butterfly distribution and abundance which have been linked to widespread habitat destruction (Pullin, 1996). In Japan, all butterfly species there are reportedly in decline and threatened by recent urbanization (Ishii, 1996). In the Netherlands, scientists report 24% of the native butterflies have been extirpated and 43% are threatened (Veling, 1996). Clearly, butterflies are vulnerable to environmental changes and are of concern world-wide.

As an insect, the Cloudcroft Checkerspot has many adaptive features that have helped it survive and evolve through time. For example, with large populations, frequent generations and high fecundity of females, insect populations can rebound quickly if their numbers are decreased. However, decreases in habitat quantity or quality could be disastrous for a local endemic. Habitat protection is thus critical to conservation of the Cloudcroft checkerspot and its protection is needed now before critical thresholds are reached.

There is only one known population of Cloudcroft Checkerspot butterfly, and it is relatively small in area, which renders the entire subspecies to be highly vulnerable to localized threats. The Cloudcroft subspecies

has evolutionary significance due to its extreme genetic isolation from any close relatives.

The Cloudcroft checkerspot is presently threatened by development for residential use on private land and for administrative and community development on federal land. Potential threats include pesticides, noxious weeds and herbicide use, highway and campground development and reconstruction, land exchanges, global warming and livestock grazing. Lack of knowledge about this subspecies renders the population especially vulnerable to imminent and ongoing habitat modifications because of the potential to foreclose future options.

HISTORICAL DECLINES AND CURRENT INSTABILITY

Historic Habitat Losses and Conversions

There is no known information regarding the status or trend of Cloudcroft checkerspot populations. Habitat conversions have taken place to develop the Cloudcroft area including roads, houses, schools, ballfields, golf courses, ski areas, etc. In recent history, at least 80 acres have been transferred from the Lincoln National Forest to the Village of Cloudcroft and the Board of Education pursuant to the Sisk Act (USDA-FS, 1996). The recently transferred lands have been converted to a ballfield in one instance and a new High School is planned on the other.

These conversions along with expansive golf courses, mowed areas, and road systems remove native flora depended on by the species and, thus, are decimating. Most roadsides in the range of Cloudcroft checkerspot butterfly are dominated by non-native grasses seeded in for erosion control, e.g. *Bromus inermis* (smooth brome) and *Dactylis glomerata* (orchard grass) which are unlikely to serve as butterfly habitat due to their abundance and persistence.

Historic Population Declines

Past history includes the possible adverse effects of insecticide use to control western spruce budworm in the 1950's through the 1980's. In 1984, the entire Douglas-fir forest in the Sacramento's, including private and Mescalero Apache Indian lands, was treated. Spraying was conducted over 240,000 acres wirh carbaryl (SEVIN) over most acres, however *Baccillus thuringensis* (BT) was used in sensitive areas. These sensitive areas were Cloudcroft, La Luz watershed, and the Rio Penasco drainage. The entire known range of *E. c. cloudcrofti* today lies within the BT treated areas. This may mean that the more general and damaging insecticide SEVIN could have reduced the Cloudcroft checkerspots range and distribution. Opler and Pratt (pers. comm.) both agree that the widespread use of insecticide in 1984 probably had an adverse effect on the Cloudcroft checkerspot and other invertebrates. However, the extent to which the population declined and has potentially rebounded in the past 15 years is unknown.

As a multiple year diapauser, *E. c. cloudcrofti* could have had larvae in a variety of stages when the spraying occurred. Those in diapause might not have been affected thus leaving individuals to perpetuate the population. Even if local colonies were extirpated as a result of the treatments, both Opler and Pratt (pers. comm.) believe that dispersing females should have repopulated such habitats in the past 15 years.

PRESENT OR THREATENED DESTRUCTION, MODIFICATION, OR CURTAILMENT OF HABITAT OR RANGE

Community Development

The area thought to be critical to the species (the type locality) is located within a National Forest campground scheduled for reconstruction in the imminent future (FY99). This campground is within a recreational complex adjacent to the Village of Cloudcroft and a State Highway. Picnic and campgrounds in the complex include Pine, Fir, Silver, Saddle, Slide, Sleepygrass, Deerhead, and Trestle Depot. The Cloudcroft (Snow Canyon) Ski Area also operates within the known range of the Cloudcroft checkspot on federal land. All of these facilities have removed habitat and with continued maintenance will continue to remove habitat for the species.

The Village of Cloudcroft, New Mexico is roughly 600 acres in size and has proposed to acquire up to 550 acres of National Forest pursuant to the Townsite Act of 1958. In their application (Venable, 1996), the Village proposed to use the meadow and forest matrix in occupied butterfly habitat for the purpose of constructing a 40 acre maintenance yard, additional ballfields, and sewage plants. Adjacent forests in the proposed land acquisition are planned for development of recreational trails as part of a Village greenbelt project.

The Village proposal originally included all of Pines Campground and most of the best known butterfly habitat but later was reduced to approximately 215 acres. At present, approximately 5 to 10% of the federal meadow habitat in the checkerspot's known range would be directly affected if the proposal is approved. The central location of these acres within the species range make them critical to the future population dynamics of this local population. This would affect the Village boundaries in 3 of 4 directions (north, west and east). Further, there is enough evidence to be concerned about any further habitat conversions or reductions in federal habitat in the area, due to the threat of adverse cumulative effects from past, present, and future foreseeable actions combined.

The Forest Service has also proposed the same area for use as a new administrative (Ranger Station) site. This need could be hastened by Village acquisition of lands with existing FS facilities in Cloudcroft. The land acquisition by the Village would also force the Forest Service to look for alternative locations in the same general area for the administrative site. This would further the trend for habitat modification to proceed eastward where the only contiguous Federal land in James Canyon would be diminished. This narrow corridor of public land (approx. 1 mile wide) begins immediately adjacent (east) to the present Cloudcroft Village Boundaries.

The Village Townsite proposal has been under consideration for approximately 10 years. The most recent NEPA schedule from the Lincoln National Forest (Forest Supervisor, November 25, 1998) specifies a decision will be announced April of 1999 with estimated date of implementation May of 1999.

Forest Service lack of concern about this species during the process is evident, despite

knowledge of the butterfly and concerns about its continued viability and the need for federal listing if development were to proceed east of Cloudcroft (Galeano-Popp, 1997), the Lincoln National Forest has prepared an EA rather than acknowledge the significance of the proposed action by preparing an EIS. Furthermore, the Lincoln National Forest has never required Cloudcroft to exhaust private options first and has not proposed alternative sites for the Village's proposed uses. Instead, it has relied solely on the Village's judgement of what land is best suited for their use. With so little meadow habitat in federal jurisdiction and a predominance of private lands within James Canyon to the east of the Village, this type of continued and unjustified trend in habitat conversions constitutes the most serious and imminent threat to the species.

On private lands, residential development is expected to continue in the Sacramento's. This contributes to the potential for cumulative habitat reductions that could eventually add up to a significant threshold.

Noxious Weeds

Aggressive non-native plants are prevalent within the mountain meadows and alluvial bottoms of the Sacramento mountains (USDA-Forest Service, 1993). The Forest Service inventoried an estimated 3,000 acres of noxious weeds in the Sacramento's alone. At least 30% of these were in grasslands and meadows not including road corridors though forested habitats.

Noxious weeds are exotic species that are aggressive pioneers that often form monocultures which displace native plants and alter the community composition and functioning of the local ecosystem. Examples include musk thistle (*Carduus nutans),* teasel (*Dipsacus sylvestris*), and sleepygrass (*Stipa sp.*) in James Canyon. Combined with past disturbances, such as farming in the meadows, these non-native plants may have adversely affected habitat quality for the Cloudcroft checkerspot butterfly. Their introduction and expansion are likely important factors limiting the species distribution within the Sacramento's. Forest Service actions since 1993 to control these plants have not been shown to be effective to date.

Herbicide Use

Herbicides have been used to manage noxious weeds in the Sacramento's over the last few years. Both Lincoln and Otero Counties routinely apply herbicides along state and county roads for this purpose. The Lincoln National Forest and the Mescalero Indian Tribe have active spraying programs as well (USDA-FS 1996). These chemicals could potentially affect larval or nectar producing plants of value to this subspecies. It could also affect adult butterflies within the spraying zones, especially where Clopyralid, Dicamba, or other toxic compounds are employed. The Forest Service evaluated the effects of their noxious weed program to some species, however it did not address the Cloudcroft checkerspot butterfly and no re-analysis has been initiated.

Livestock Grazing

The floristic composition and functioning of the meadow ecosystems in the Sacramento's have been subjected to alterations mainly through historic and on-going livestock grazing (Kaufmann et. al. 1998). Livestock grazing negatively affects butterfly habitat

quality by reducing plant community diversity, richness, and structure. Heavy grazing has reduced some meadows in the Sacramentos to erosive conditions dominated by Kentucky bluegrass (Kaufmann et.al. 1998) which degrades checkerspot habitat quality and quantity in the long term. In fact, most grazing allotments on the Sacramento District are in poor vegetative condition relative to their ecological potential (Kaufmann et. al. 1998). Portions of the Checkerspot butterfly's range, particularly at the southern end in Pierce and Russia Canyons are heavily grazed, and in very poor condition (e.g. Russia, Pumphouse, and Sacramento Allotments).

Global Climate Change

Butterflies are particularly sensitive to small changes in microclimates, such as fluctuations in moisture, temperature, or sunlight (Raloff, 1996). Studies of Edith's checkerspot *(E. chalcedona edithi)* have confirmed speculations that whole ecosystems may move northward or shift elevationally as the Earth's climate warms.

The Uncompahgre fritillary butterfly (*Boloria acronema*) in Colorado is restricted to the coolest, moistest habitat available in the southern latitudes it inhabits. The hot dry summers of the 1980's were reportedly devastating for this federally threatened species (Mlot, 1991). These examples imply that other specialized butterfly species at the southern edge of a given habitat may meet a similar fate if the weather patterns continue. Cloudcroft checkerspot is restricted to the highest elevation, coolest, moistest habitats of the southern Sacramento Escarpment. At the northern end of the mountain range, Sierra Blanca could offer refuge if Cloudcroft became inhospitable due to global climate change, however the species' ability to traverse the significant distances to Sierra Blanca would appear to be formidable.

OVERUTILIZATION FOR COMMERCIAL, RECREATIONAL, SCIENTIFIC, OR EDUCATIONAL PURPOSES

Collection of rare species, especially butterflies, is a threat and the Cloudcroft checkerspot has potential to attract interested parties. To date, all indications are that the population is locally abundant and can withstand its current level of collecting activity.

DISEASE OR PREDATION

Many endemic diseases e.g. viruses, bacteria and fungi, attack butterflies especially in the larval stage. Natural predators such as ants, spiders, birds, rodents lizards and toads take advantage of both larval and adult butterflies. None of these appear to constitute a threat to the Cloudcroft checkerspot.

INADEQUACY OF EXISTING REGULATORY MECHANISMS

The Cloudcroft checkerspot butterfly is not protected under any federal, state or local laws. It is on the New Mexico state list as sensitive (BISON-M, 1998), which means that New Mexico Department of Game and Fish biologists have identified a need for special consideration during habitat management and planning. This status affords no protection but can serve to bring early attention to little known taxa before they

are extirpated. *E. c. cloudcrofti* is not contained on the most recent candidate list for federal protection (USDI-FWS, 1996). Similarly, the subspecies is not included on the Forest Service list of Sensitive species (USDA-FS, 1988) for which policy in Forest Service Manual Chapter 2670 would apply.

These mechanisms could collectively serve as a good basis for conservation of the Cloudcroft checkerspot butterfly and its habitat, however they have not been put into operation. This is true despite the knowledge of the species' plight by all affected parties and agencies with the capabilities to implement these mechanisms. The longstanding proposal by the Village of Cloudcroft for Village expansion (and the Forest Services's tacit acceptance) signifies the urgency of the need for protections to be implemented through the Endangered Species Act.

EMERGENCY LISTING STATEMENT

The time to act is now. The existing mechanisms have not been effective in protecting this species. The Forest Service's imminent decision under the Townsite Act would compromise future options to avoid jeopardy to this extremely rare, unique and valuable butterfly. Petitioners request emergency listing consideration in order to preclude this devastating action and subsequent trend from proceeding.

CRITICAL HABITAT STATEMENT

Due to the predominance of privately-owned habitat within the species range, it is essential that critical habitat be designated. This is the only feasible option for the world's only population of this subspecies to be conserved in a holistic, coordinated and effective way.

Respectfully submitted,

Kieran Suckling

LITERATURE CITED

Baughman, J. and D. Murphy, 1988. What consitutes a hill to hilltopping butterflies? American Midland Naturalist 120 (2): 441-443.

Baughman, J. Murphy D. and P.Ehrlich 1988. Population structure of a hilltopping butterfly. Oecologia 75(4): 593-600

Bennett, D. and J. Linnane, 1985. Western Spruce Budworm Suppresion Project 1984. Forest Pest Management Report. USDA Forest Service Albuquerque, New Mexico

BISON-M, New Mexico Department of Game and Fish, Santa Fe, NM 1998

Borror, D.J. and R.E. White. 1970. A Field Guide to the Insects of America North of Mexico (The Peterson Field Guide Series). Houghton Mifflin Company, Boston.

Brussard, P. F. ,Baughman, J. F. ,Murphy, D.D,.Ehrlich, P. R., and Wright, J. 1989. Complex population differentiation in checkerspot butterflies (*Euphydryas* sp.) Canadian J. of Zoology 67 (2): 330-335

Cary, S. J., and R. Holland. 1992. New Mexico Butterflies: Checklist, Distribution and Conservation. Journal of Research on the Lepidoptera. 31(1-2):57-82.

Ehrlich, P. and D. Wheye 1986. Nonadaptive hilltoppping behavior in male checkerspot butterflies (*Euphydryas editha*). American Naturalist 127 (4): 477-483

Ferris, C.D. and F. M. Brown, 1981. Butterflies of the Rocky Mountain States. University of Oklahoma. Norman, Oklahoma.

Ferris, C.D. and R.W.Holland, 1980. Two new subspecies of *Occidryas anicia* (Doubleday) from New Mexico. Bulletin fo the Allyn Museum No. 57, Allyn Musem of Entomology, Sarasota, Florida.

Galeano-Popp, R. 1997. Fish, Wildlife and Rare Plants Report addressing the Application by the Village of Cloudcroft. Sacramento Ranger District, Lincoln National Forest. Unpublished administrative report. Lincoln National Forest. Alamogordo, New Mexico.

Gaskin, D. 1995. Butterfly conservation programs must be based on apprpriate ecological information.. Proceedings of the Entomological Society of Ontario 126 (0): 15-27.

Ishii, M. 1996. Decline and conservation of butterflies in Japan. In: S. Ae, T. Hirowaton, M. Ishii, and L. Brower editors. Decline and conservation of butterflies in Japan III, Proceedings of the Lepidopterological Society of Japan, Osaka, Japan pp: 157-167.

Kaufmann, M., L. Huckaby, C. Regan, and J. Popp. 1998. Forest Reference Conditions for Ecosystem Management in the Sacramento Mountains, New Mexico. General Technical Report RMRS-GTR-19. USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

Martin, W. and C. Hutchins. 1980. A Flora of New Mexico. A. R. Gantner Verlag, Germany.

Miller, J. Y. 1992. The Common Names of North American Butterflies. Smithsonian Institution Press. Washington and London.

Mlot, C. 1991. Extinction by Global Warming? BioScience 42 (11).

NABA, 1995. Checklist and Engkish Names of North American Butterflies. North American Butterfly Association..

New Mexico Native Plant Protection Advisory Committee, 1984. A Handbook of Rare and Endemic Plants of New Mexico. University of New Mexico Press, Albuquerque, New Mexico.

Opler, P.A. 1995. Species richness and trends of western butterflies and moths. Pgs 172-174, In: LaRoue, E. T., G.S. Farris, C.E. Puckett, P.D. Doran,and M.J. Mac, editors. Our Living Resources. U.S. Geological Survey, Washington, D.C.

Pullin, A. 1996. Restoration of butterfly populations in Britain. Restoration Ecology 4 (1): 71-80.

Raloff, J. 1996. Butterfly Displacement by Climate Change? Science News 150 (9).

Schrader, C. 1997. Memo (11/12/97) from Cloudcroft Village Administrator to Forest Recreation/Lands Staff Officer re: Village of Cloudcroft proposed land acquisition . Administrative document. Lincoln National Forest, Alamogordo, New Mexico.

Scott, J. 1986. The Butterflies of North America: A Natural History and Field Guide. Stanford University Press. Stanford, CA. pp.583.

Stanford,R., and P. Opler. 1993. Atlas of Western USA Butterflies, Including Adjacent Parts of Canada and Mexico. Denver and Fort Collins, Colorado. October 1995 Supplement.

Swengel, A. 1996. Effects of fire and hay management on abundance of prairie butterflies. Biological Conservation 76 (1): 73-85.

Toliver, M., R. Holland, and S. Cary. 1994. Distribution of Butterflies in New Mexico (Lepidoptera: Hesperioidea and Papilionoidea).Second Edition. Published by R. Holland, Albuquerque, New Mexico.

USDA-Forest Service, 1986. Lincoln National Forest Plan. USDA-Forest Service, Southwestern Region , Albuquerque, New Mexico.

USDA-Forest Service, 1988. Regional Forester's Sensitive Species List. Adminsitrative document. Albuquerque, New Mexico.

USDA-Forest Service, 1996. Environmental assessment for noxious weed management, Lincoln National Forest.. Administrative document, Alamogordo, New Mexico.

USDA-Forest Service, 1996. Revised scoping report: Village land acquisition proposal. Administrative document. Lincoln National Forest, Alamogordo, New Mexico.

USDI-FWS, 1996. Endangered and threatened wildlife and plants; Review of plant and animal taxa that are candidates for listing as endangered and threatened

species. Federal Register. 50 CFR Part 17. 61 (40): 7595-7613. February 28, 1996.
Veling, K. 1996. Protection of butterflies, from nationwide to the backyard. Levende Natuur 97 (5): 225-228.

Venable, D. 1996. Memo (9/10/96) from Cloudcroft Mayor to Lincoln National Forest Supervisor re: Application for convenyance of land for townsite purposes. Administrative record, Lincoln National Forest. Alamogordo, New Mexico.

Venable, D. 1997. Memo (5/22/97) from Cloudcroft Mayor to Lincoln National Forest Supervisor re: Village of Cloudcroft proposed land acquisition. Administrative record. Lincoln National Forest, Alamogordo, New Mexico.

APPENDIX A- KNOWLEDGEABLE PERSONS

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CENTER FOR BIOLOGICAL DIVERSITY

Protecting endangered species and wild places through science, policy, education, and environmental law

November 15, 2004

Mr. Erik Hein
Threatened and Endangered Species Division
Fish and Wildlife Service, Ecological Services
P.O. Box 1306
Albuquerque, New Mexico, 87103-1306

Exhibit 2

Dear Eric,

We are writing to comment on the draft environmental assessment (EA) and draft economic analysis for designation of critical habitat for the Sacramento Mountains checkerspot. These comments are in addition to the previous comments we submitted on the draft conservation plan and listing of the Sacramento Mountains checkerspot butterfly. In these comments, we detailed factors demonstrating that listing of the butterfly is warranted regardless of the draft plan, including the limited and patchy distribution of the butterfly, small population size, occurrence on unprotected private lands and continued vulnerability to habitat loss. These same factors demonstrate that designation of critical habitat is necessary regardless of the draft conservation plan and including areas covered by the plan. We will not discuss the need for listing further, instead focusing on the draft environmental assessment and economic assessment.

Only Alternative I will ensure the survival and recovery of the Sacramento Mountains checkerspot butterfly

Of the alternatives for critical habitat presented in the draft environmental assessment, only Alternative I protects sufficient essential habitat to ensure survival and recovery of the Sacramento Mountains checkerspot butterfly. As described in the proposed rule to list the Sacramento Mountains checkerspot butterfly, Alternative I designates all habitat in a 54 mile square area encompassing the known range of the butterfly as critical habitat. Within this area, only habitats with the primary constituent elements are considered part of the designation, which includes only somewhat more than 5,000 acres, reflecting the limited available habitat for the butterfly.

In contrast, the No Action Alternative would designate no critical habitat and Alternative II would only designate critical habitat on federal lands. As detailed in the EA, almost half of the butterfly's known habitat is on private lands. Given the small amount of butterfly habitat, its patchy distribution, and small population size, habitat on private lands is clearly essential to the survival and recovery of the butterfly and failure to include it in critical habitat would violate the ESA. In support of this conclusion, FWS concludes in the EA:

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> "The spatial configuration of suitable habitat patches (both occupied and unoccupied by the checkerspot) and their habitat quality are critical factors influencing the probability of the checkerspot persisting or going extinct (Erlich and Hanski, 2004). Critical habitat designation would contribute substantially to assessing landscape structure relative to the threshold required for persistence of the checkerspot. Such an assessment of changes in both occupied and unoccupied habitat patches is critical for conservation of the butterfly. The benefit to conservation of the checkerspot would be highest with the most comprehensive designation (Alternative I)."

Because FWS continues to improperly define adverse modification as impacting both the survival and recovery of critical habitat, the agency underestimates the benefits of critical habitat for the butterfly and differences between Alternatives I and II

In a 1986 policy, President Reagan defined adverse modification as habitat destruction that affects both the survival and recovery of a threatened or endangered species. This policy limited the impact of critical habitat beyond the impact of listing itself by largely making adverse modification synonymous with jeopardy. Recently, three separate court decisions have determined this policy to be illegal (get cites). Despite these decisions, FWS has continued to analyze the benefits of critical habitat for species using the old definition. The EA, for example, states:

> "Adverse effects on primary constituent elements or segments of critical habitat generally do not result in an adverse modification determination unless that loss, when added to the environmental baseline, is likely to appreciably diminish the capability of the critical habitat designation to satisfy essential requirements of the species. In other words, activities that may destroy or adversely modify critical habitat include those that alter the primary constituent elements to an extent that the value of critical habitat for conservation of the species is appreciably reduced. *Actions that would be expected to both jeopardize the continued existence of Sacramento Mountains checkerspot and destroy or adversely modify its critical habitat would include those that significantly and detrimentally alter its habitat over an area large enough that the likelihood of its survival or recovery is appreciably reduced.*"

Improperly defining critical habitat causes FWS to underestimate the benefits of critical habitat for the butterfly and the differences between Alternatives I and II in terms of their ability to reduce threats to the Sacramento Mountains checkerspot. For nearly every threat, FWS concludes that "consultations under the adverse modification standard are likely to result in discretionary conservation recommendations in most cases" because the probability that an action will "result in a determination of adverse modification or destruction of designated critical habitat is low." This conclusion is only true under the illegal definition of adverse modification and thus the benefits of critical habitat for the butterfly and differences between Alternatives I and II need to be re-analyzed.

The draft economic analysis failed to consider the economic benefits of designation of critical habitat

In considering the economic impacts of critical habitat, FWS' contractor, Industrial Economics, decided not to analyze the economic benefits of critical habitat designation, acknowledging:

> "The published economics literature has documented that real social welfare benefits can result from conservation and recovery of endangered and threatened species. Such benefits have also been ascribed to preservation of open space and biodiversity, both of which can be associated with species conservation, but which are not the purpose of critical habitat. Likewise, regional economies and communities can benefit from the preservation of healthy populations of endangered and threatened species, and the habitat on which these species depend."

But ultimately punted to FWS:

> "Given the limitations associated with estimating the benefits of proposed critical habitat designation for the butterfly, the Service believes that the benefits of proposed critical habitat designation are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking."

This conclusion contradicts the former and fails to properly assess the tangible economic benefits that may stem from designation of critical habitat and survival and recovery of the Sacramento Mountains checkerspot. For example, the Village of Cloudcroft is planning to obtain lands through the Townsite Act. The Village originally planned to develop these lands, but largely because of concern over the butterfly has committed to leaving these areas as greenspace. This greenspace has a potential economic value that should have been estimated. Likewise, healthy meadow habitat that is not torn-up by ORVs has a value for recreation and tourism. The butterfly itself likely has value as a species that people are likely to travel to see, particularly if the Village advertises it and other natural assets as a reason to visit. These economic benefits should have been considered.

In sum, only Alternative I will ensure the survival and recovery of the Sacramento Mountains checkerspot butterfly and FWS needs to redo their analyzes of the benefits and impacts of critical habitat designation. Should FWS seriously consider a more in-depth analysis of critical habitat including a benefits analysis, we are potentially willing to extend the deadline for listing. Please feel free to contact me with questions or comments.

Sincerely,

D. Noah Greenwald
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Village plans to spray

Exhibit 3

Alamogordo Daily News
By Darrell J. Pehr, For the Daily News
Alamogordo Daily News

Article Launched:06/13/2007 12:00:00 AM MDT

CLOUDCROFT Village and Otero County leaders expect to announce their plans within the next week or so to spray pesticide in the village to kill insect larvae that are damaging trees.

Mayor Dave Venable announced at Tuesday's meeting of the Cloudcroft trustees that a public meeting would take place within a week or two when a final plan for aerial spraying was in place. He said the village and county are ready to move forward, but logistics, such as funding arrangements, still need to be handled.

"We have all the science; we know what we're facing," Venable said.

Residents will be notified of the spraying plan by registered letter. Area Boy Scouts also have volunteered to go door to door to notify residents of the plans.

Venable said representatives from the community have gone to Washington, D.C., to meet with members of the congressional delegation on this issue and plan another trip soon to seek assistance.

Members of a group that has started spraying private property in the village encouraged village leaders not to rely on the U.S. Forest Service and not to wait for the Forest Service to act.

"We're interested in killing the bugs," resident Bob McCullough said after Venable spoke about the regulations and lawsuits the Forest Service must face. McCullough pointed out that residents don't really care what internal or other problems the Forest Service has to deal with.

"I hope in the future we don't rely on what the Forest Service tells us," he said. "Let's anticipate the problem by having knowledgeable people look at it."

Venable said the Forest Service plans to spray for insects in a one-mile buffer around the village in late September or October, in a seven- to 10-day application.

Jim Maynard, owner of Green Mountain Real Estate and developer of The Woodlands subdivision, said spraying on private property will continue as soon as Wednesday when a replacement pump arrives.

He said the cost to spray is about $100 to $200 per lot, but the cost would drop to $20 per acre if done from the air.

In other business Tuesday, village trustees approved an amendment to a village ordinance that will now permit the use of horses in special public events. The timing of the vote was important, coming just in time to allow organizers of a jousting class and demonstration to apply for such a permit for their activity, which will coincide with the annual Renaissance Fantasy Faire at Zenith Park June 30-July 1.

Editor's note: Darrell J. Pehr is editor of the Mountain Monthly in Cloudcroft.

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Residents take matters into their own hands

Property owners not waiting on Forest Service

Alamogordo Daily News
By Karl Anderson, Staff Writer
Alamogordo Daily News

Article Launched:06/12/2007 12:00:00 AM MDT

A group of residents in Cloudcroft began spraying their properties Sunday morning in an effort to quell further devastation by the spruce budworm and looper caterpillar, the two primary insect species that have been destroying trees in the Lincoln National Forest and on private lands for the past year or longer.

Organized by Cloudcroft residents Dr. Laurel Walters, John Cronin, Jim Maynard, Frank Starns and John Bennett, the group quickly drew 15 volunteers who have been manning phones for the past two weeks in an effort to notify residents and property owners.

"We worked on the logistics of this for the past two weeks, to determine how we, as property owners, could initiate spraying to save what we have spent our lives working for," Maynard said.

The area sprayed is known as the Woodlands subdivision, a 90-acre tract on the southeast corner of Cloudcroft that borders the Lincoln National Forest on its east and south borders.

The Woodlands tract encompasses 257 lots and 32 homes. All land owners in the tract agreed to share the expense of the pesticide, Confirm 2F, and its application.

"It only cost between $100 and $200 for each lot," Maynard said. "That is very affordable and a lot cheaper than the alternative of having to pay for the removal of dead trees."

"We're the victim of a very bad neighbor, the Forest Service," Maynard added. "And we decided that we can't just sit around and wait to spray because we have a bad neighbor. It came down to the simple fact that if our own government isn't going to do anything, whether it be for lack of will or ability, we needed to do something."

Following lengthy discussions with Walters and Cronin, Maynard approached the Otero County extension office for help in deciding which pesticide should be used.

"They initially told me that we should use Sevin dust," said Maynard. "But Dr. Walters told us that would not be a good idea, because that pesticide kills beneficial insects in addition to the harmful ones. She had done a lot of research on Btk and Confirm 2F. We decided to go with Confirm 2F because it is so safe that it is not even regulated."

The group was then given a list of three companies in the area that are licensed and experienced with the application of pesticides. The group decided to use a company called Wasser and Wasser Inc. in Las Cruces.

The company has a number of orchards in Otero and Do a Ana counties that are clients.

On Friday, Maynard personally delivered a letter to the village of Cloudcroft, informing it of the group's intent to spray and the name of the company that would be doing it.

"Of all the calls our group made to residents and property owners, we did not get even one negative response," Maynard said. "The village notified us of one resident who felt they would have an adverse reaction to pesticide, based on past experiences. We contacted that person directly to make sure their concerns were addressed."

Maynard spoke of the two insect species and the affect that the pesticide will have on both.

"We know the budworm is the most active right now and in much greater numbers than the looper, which has already been going into its pupa stage," Maynard said. "So we know this will affect more budworms than loopers, but it will kill some loopers."

Lou Woltering, forest supervisor for the Lincoln, was asked Friday for his reaction to the spraying effort by the residents.

"It's certainly within their rights to do that," Woltering said. "I think that's great if that is what they have chosen to do. The Forest Service has no restrictions on private lands and on what property owners can do on their lands. If they want to spray, that is fine."

Maynard is well aware that one application of the insecticide is not going to be enough to save their properties.

"We know that with the other properties in Cloudcroft not being sprayed yet, and with the Forest Service not spraying the surrounding forest at the same time, that we are going to have to spray several times in order for this to be effective," Maynard said. "We care about our properties, and if that is what it takes, we will do whatever it takes."

In a recent interview with the Forest Service regarding suggestions that a full-time entomologist needs to be assigned to the Lincoln, Woltering said, "I can't afford to hire an entomologist to be here full-time. Our budget won't support that. We feel that our entomologists in Albuquerque are doing a fine job for us and we are very pleased with the work they do for us when they come down here."

But many Cloudcroft residents reiterated their displeasure with the Forest Service's actions regarding the current infestation in the Lincoln.

"When Dr. Walters, with 25 years of field work as an entomologist, tells us that the spruce budworm is the biggest immediate threat to our lands, and Otero County agrees with that, we're putting ourselves in that corner," Maynard said. "The majority of loopers have already pupated and will not be affected by spraying now. We know we will have to wait until the next generation comes out as larvae in late September or early October to have the biggest impact on the loopers.

"The Forest Service has finally seen the light on that issue," he said. "What we don't understand is that they can't see the immediate threat that the budworm is to the forest, and why they don't act on this now, as they should. If the other property owners up here don't act now to save what they have, they may very well be living on lots with no trees in the not-too-distant future.

"Our group decided we don't want that. It's based on what we know to be good science. It's a no-brainer."

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Exhibit 4

NEWS RELEASE

USDA Forest Service
Lincoln National Forest
1101 New York Avenue
Alamogordo, NM 88310

Contact: Joe Garcia
(505) 434-7200

LINCOLN NATIONAL FOREST AND COUNTY AGREE ON BTK PROPOSAL

Alamogordo, NM (June 8, 2007) – County Commissioner Mike Nivison, Lincoln National Forest Supervisor Lou Woltering, Village of Cloudcroft (VOC) Mayor Dave Venable, and State Forester Butch Blazer met with a committee of scientists, county and agency experts on June 6, 2007, to discuss the defoliation of the Sacramento Mountains caused by an outbreak of a fir-looper species, *Nepytia janetae*. The outbreak was first noted by the Forest Service in the spring of 2006.

The meeting was to discuss short- and long-term alternatives for addressing the insect outbreak. The results of the committee's meeting is an agreement to work together on a proposal for an aerial spray application of a biological agent, Bacillus thuringiensis (Btk), commonly used in organic agriculture and for Gypsy Moth control since the 1980's. Btk is not a chemical pesticide but a bacteria that is a natural disease agent of caterpillars such as the fir-looper and normally exists in soil. This is the safest spray available for treating this fir-looper species. Btk, properly applied, is not toxic to mammals, birds, fish, bees, etc. Specific information on the Btk can be found on the internet at the following websites: www.metrokc.gov/health/env, www.doh.wa.gov/ehp/ts/pest/egm

and www.agr.wa.gov. The project is proposed for late September to early October 2007, the first and best window of opportunity to treat the insect according to the scientists.

The Lincoln National Forest (LNF) will be seeking alternative arrangements from the Council on Environmental Quality to streamline procedures required by the National Environmental Policy Act (NEPA) in order to meet the October schedule. The Forest will be focusing on National Forest System (NFS) lands within a mile to a mile and a half around the VOC. Pre-treatment monitoring would be completed to verify the presence and location of the insects prior to any application. Forest Supervisor Woltering advised the committee that there is considerable work to be completed before the project can be implemented this coming fall.

The LNF is completing the NEPA process for salvaging hazardous dead trees along roads, highways, power lines, and campgrounds in the vicinity of Cloudcroft and along the southeast and eastern boundary of Cloudcroft. Plans call for the project to hopefully begin in August of this year. The LNF has an Interdisciplinary Team working on a proposal for salvaging dead trees within the 12,000 plus acres currently infested by the insect. A decision on this proposal should be completed by early spring 2008.

The VOC is working with village officials and community members to make a decision on spraying within the village boundaries while county and state officials are working with private land owners in Otero County to determine their willingness to spray their lands that are infested by the insect outbreak.

Forest Supervisor Woltering requests that all individuals, agencies and organizations that are interested in the aerial application proposal on NFS lands immediately around Cloucroft, please submit written letters as soon as possible but no

later than June 23, 2007, to the Lincoln National Forest Supervisor's Office, 1101 New York Avenue, Alamogordo, NM, 88310.

FOREST GUARDIANS

Exhibit 5

June 24, 2007

Lincoln National Forest Supervisor's Office
Attn: Lou E. Woltering
1101 New York Avenue
Alamogordo, NM, 88310
Email: lwoltering@fs.fed.us

VIA EMAIL & POSTAL MAIL

Re: Insect Control on the Lincoln National Forest

Dear Mr. Woltering,

We hereby submit comments on behalf of Forest Guardians and our members regarding the Lincoln National Forest's proposal to spray insecticides near the village of Cloudcroft. We strongly object to this proposal, given the severe threat it presents to the Sacramento Mountains checkerspot butterfly, a critically imperiled subspecies.

Background on Sacramento Checkerspot Butterfly

The Sacramento Checkerspot Butterfly (*Euphydryas anicia cloudcrofti*) is found only on approximately 2,000 acres in the Sacramento Mountains, centered around Cloudcroft, New Mexico.[1] This butterfly subspecies was petitioned by the Center for Biological Diversity for federal Endangered Species Act protection in January 1999. It was proposed by the US Fish and Wildlife Service for listing as Endangered in September 2001, but that proposal was withdrawn in December 2004 due to the perception that threats had been reduced.

The 2001 listing proposal recognized the following as threats to the butterfly: destruction and fragmentation of habitat from private and commercial development, potential future catastrophic wildfire, habitat degradation and loss of host plants from grazing, some recreational activities, encroachment of conifers and nonnative vegetation into non-

[1]More specific distribution information: "Currently, the total suitable habitat available to the butterfly consists 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 (Forest Service 2004b). Approximately 298 ha (736 ac) of the 1,096 ha (2,709 ac) of suitable habitat are unoccupied, with 79 ha (736 ac) on Forest Service lands and 219 ha (542 ac) on private lands (Forest Service 2004b). 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" (2005 Conservation Plan at p. 12).

FOREST GUARDIANS MAIN OFFICE
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forested openings, over collection, and vulnerability to local extirpations from climate changes such as drought. Insect control was recognized as a threat in the listing proposal, but the scale of insect control proposed by the U.S. Forest Service and underway in the Village of Cloudcroft indicates a new significant threat to the butterfly that may warrant emergency federal Endangered Species Act listing for this subspecies.

A conservation plan was issued by the FWS, the Village of Cloudcroft, the US Forest Service, and Otero County on November 1, 2005. The purpose of the plan is to alleviate threats to the butterfly via management of occupied and unoccupied habitat on both private and public lands. Any insect control proposals targeting Lepidoptera will likely adverse impact the butterfly and undermine the conservation plan. Specific to the threat of insect control, the background portion of the plan states,

> As stated in the 2001 proposed rule, large portions of the Sacramento Mountains were treated in 1984 with carbaryl or *Bacillus thuringensis* to control an outbreak of forest insects. Carbaryl is considered moderately to highly toxic and is lethal to many non-target species. *Bacillus thuringensis* can kill larval stages of many insects, including butterflies (Cornell University 1998). However, it is unknown what affect these treatments may have had on the Sacramento Mountains checkerspot butterfly from the 1984 application because no data on pre-treatment exists. *According to the Forest Service, there are no proposals to spray for insect outbreaks currently or in the future. Any future plans to control insect pests would involve consulting with the US Fish and Wildlife Service if any listed species were to be affected and NEPA regulations*" (Conservation Plan at p. 34, emphasis added).

The plan states as a conservation measure,

- "**1.1 Apply appropriate weed and pest control practices in or near occupied meadows.** On May 1, 2001, the Forest Service signed a decision notice to implement management for noxious weed control Forest-wide (Forest Service 2001 *in lit*). This management included using manual methods and herbicides to treat all noxious weed acres on the Forest. An additional measure being used for construction projects includes specifications that address the spread of weeds by requiring washing of construction equipment before moving on to the Forest. According to the Forest Service, *no spraying or application of herbicides shall occur within occupied Sacramento Mountains checkerspot butterfly habitat.* In occupied Sacramento Mountains checkerspot butterfly habitat, manual hand pulling of noxious weeds will occur during the adult flight period (i.e., from June 20 to July 31). *Currently, the Forest Service has no proposals to spray for insect outbreaks currently or in the future*" (Conservation Plan at p. 46, emphasis added).

The currently proposed spraying by the U.S. Forest Service for budworm and looper caterpillars in checkerspot habitat would conflict with the conservation plan, to which the USFS is a signatory.

Furthermore, the extensive insect efforts currently underway in the Village of Cloudcroft are likely harming the checkerspot and could provide a basis for emergency federal listing for this animal, given its extreme imperilment and limited range.

The listing proposal stated:

> Insect Control: The application of carbaryl and Bacillus thuringensis (BT) to control insects poses a threat to the Sacramento Mountains checkerspot butterfly. The petitioner reported that the entire Douglas-Fir forest in the Sacramento Mountains was treated in 1984 with either carbaryl or BT to control an outbreak of forest insects. Carbaryl is considered moderately to highly toxic and is lethal to many non-target insects, whereas BT can kill the larval stage of many insects, including butterflies (Cornell University 1998a, 1998b). These insecticides were applied during months when butterfly larvae were not in diapause; however, the areas which were treated with carbaryl or BT were heavily wooded and are not areas that were inhabited by the butterfly. Nevertheless, drift of these insecticides into areas used the butterfly could have occurred. It is unknown what affect these treatments may have had on the Sacramento Mountains checkerspot butterfly because we have no pretreatment data for comparison. There has been a recent outbreak of tussock moth (Orgyia pseudotsugata) in the Sacramento Mountains (G. Garcia, pers. comm. 2000). The FS may attempt to control the outbreak using a virus specific to the tussock moth, BT, or an application of insecticide (G. Garcia, pers. comm. 2000). *Future applications of carbaryl or BT may pose a potential risk for the viability of Sacramento Mountain checkerspot butterfly localities* (66 Fed. Reg. 46583, emphasis added).

Between direct applications around Cloudcroft and the issue of insecticidal drift, the dangers to the checkerspot from both the village and potential Lincoln National Forest spraying are significant.

There is much talk about catastrophic fire danger from the insect-killed trees. While one could cite the threat to the butterfly from catastrophic wildfire as an argument for insect control, we have three responses: 1) it is not clear that forest conditions will lead to catastrophic wild fire; 2) the insect infestations will reduce the potential for catastrophic wildfire; and 3) wildfire is important for creating openings which checkerspots can inhabit or use as corridors.

<u>Insect Control Agents Proposed Will Harm the Checkerspot</u>

We have grave concerns about the insect control agent to be used. The preferred control method of spraying Bacillus thuringiensis kurstaki (BtK), a bacteria, will harm non-target Lepidoptera such as the checkerspot. The Environmental Protection Agency considers the

risk of BtK "minimal to nonexistent to nontarget organisms including endangered species except endangered insect species."[2] Swadener (1994) writes,

> Large scale applications of B.t. can have far reaching ecological impacts. B.t. can reduce dramatically the number and variety of moth and butterfly species, which in turn impacts birds and mammals that feed on caterpillars. In addition, a number of beneficial insects are adversely impacted by B.t...
>
> In Washington, B.t. applications in King and Pierce counties to kill gyspsy moths reduced spring moth populations by almost 90 precent...In addition, one rare species appeared to have been eradicated from the treatment zone...[3]

Miller (1990) found a significant reduction in species richness among uncommon species in a site treated with BtK. Six species which occurred in an untreated site were not present in the treated site. He writes,

> ...if any of the species had been limited in its distribution, or a unique genotype of the species was locally endemic, then the population/species would be at high risk of becoming extinct.[4]

Given the narrow distribution of the checkerspot, USFS's proposed spraying could result in the extinction of this butterfly.

It would be difficult for any insect control to discriminately target budworms and loopers and not impact checkerspots, since their feeding stages overlap. Furthermore, Btk is not specific to particular worms or moths, it will target entire genera or related groups of insects and thus unintended death of beneficial insects may result. Insects are often a primary part of the food chain serving fish, birds, and even bats as a major source of nutrition.

Regarding human health, there have been few experimental studies assessing the toxicity to humans but there have been cases in which people have been hospitalized or died from Btk infection introduced through open wounds. A small number of persons have reported symptoms including skin rash, irritation of the eyes, nose and throat, and hay fever-like symptoms after exposure to Btk. People also suffer from allergies to the "inert" (secret) ingredients in the Btk solution. People with compromised immune systems may be particularly susceptible to Btk.

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[2]*See* Environmental Protection Agency. 2006. "*Bacillus thuringiensis* subspecies *kurstaki* strain M-200 (006452) Fact Sheet." Online at: www.epa.gov/pesticides/biopesticides/ingredients/factsheets/factsheet_006452.htm.

[3]*See* Swadener, Carrie. 1994. "Bacillus Thuringiensis (B.T.)." *Journal of Pesticide Reform* 14(3):13-20.

[4]See Miller, Jeffrey C. 1990. "Effects of a Microbial Insecticide, Bacillus thuringiensis kurstaki, on nontarget Lepidoptera in a Spruce Budworm-infested Forest." *Journal of Research on the Lepidoptera* 29(4):267-276 at p. 275.

Spraying any biocide like Btk or Confirm 2f has inherent risks that need to be weighed carefully with the current damage from the insect epidemic in and around Cloudcroft. We have a weighty burden to not inflict undue harm on the animals and plants we share the forest with and live in harmony with naturally occurring events, especially on federal forests owned and managed for the benefit of all Americans.

Spraying is Not Necessary

Leading scientists agree that insect infestation is nothing new to southwestern forests; these forests have withstood the epidemics over millennium. What is unusual are temperatures, the American Southwest has been warming for nearly 30 years. The one-two punch of warm drought is giving insects an upper hand. But we do not see that as cause to put the entire fragile ecosystem at risk from spraying. Indeed, the potential impacts of climate change on the checkerspot must not be compounded by the catastrophic impacts of insect control.

We believe that the forests around Cloudcroft will endure this insect outbreak, and we know from forest science that fire risk is actually reduced as the insects naturally thin dense forest stands and needles fall to the forest floor. The surviving trees actually demonstrate greater health and vigor as a result of the reduced competition. We should be embracing these forest defoliators as nature's cost-efficient thinning mechanism.[5]

We are encouraged that USFS and USFWS have been discussing impacts to the checkerspot from spraying. However, we are concerned that this threat has not disappeared, as the USFS has issued no public statement to this effect, and given the enormous political pressure USFS is receiving enormous from the county, village, and Rep. Steve Pearce (R-NM) to address the insect outbreak.

Sincerely,

Nicole J. Rosmarino

Nicole J. Rosmarino, Ph.D.
Conservation Director, Forest Guardians

Additional resources

2001 Butterfly listing proposal: http://www.cdpr.ca.gov/docs/es/estext/fr090601.txt
2004 Butterfly withdrawal of proposal: http://www.fws.gov/policy/library/04-27841.pdf
2005 Butterfly conservation plan:
http://www.fws.gov/southwest/es/NewMexico/documents/SMCB_Final_11_1_05.pdf
Other FWS documents on Butterfly:
http://www.fws.gov/southwest/es/library/ListDocs.cfm

[5] *See* http://www.cfri.colostate.edu/docs/cfri_insect.pdf.

End-of-Season Leaf Lengths
2003

Allotment	Key Area Location	Date	Average Leaf Length (")		
			Shortgrass	Midgrass	Overall
Aqua Chiquita 00411	Upper Pendleton Canyon 00411-003-1	11/7/2003	3.42	3.68	3.47
	Jim Lewis Canyon 00411-004-1	11/7/2003	2.98	4.39	3.48
	Bluewater Canyon 00411-001-1	11/10/2003	2.85	3.68	3.4
Bear Creek 00400	Bear Creek 00400-001-1	11/8/2003	>4.00	>6.00	>4.00
Bell Canyon 00401	West Pasture 00401-004-1	11/5/2003	>4.00	>6.00	>4.00
	South Pasture 00401-003-1	11/5/2003	>4.00	>6.00	>4.00
Burnt Canyon 00403	Long Canyon 00403-001-1	10/29/2003	>4.00	>6.00	>4.00
C C Walker 00423	Baird Canyon 00423-002-1	11/5/2003	3.21	4.29	3.59
	Board Tree Canyon 00423-001-1	11/5/2003	>4.00	>6.00	>4.00
EK 00431	Hay Canyon 00431-004-1	10/31/2003	>4.00	>6.00	>6.00
	Potato Canyon 00431-004-2	10/31/2003	n/a	5.19	5.19
	Spring Canon 00431-004-3	10/31/2003	5.10	6.25	5.42
E-Hart 00430	Seep Canyon 00430-002-1	10/31/2003	>4.00	>6.00	>6.00
Hyatt 00230	Cotton Canyon 00230-002-1	10/14/2003	4.20	6.44	4.40
	Hyatt Canyon 00230-003-1	10/14/2003	3.87	n/a	3.87
James 00228	Beard Canyon 00228-002-1	11/5/2003	2.60	3.53	2.90
	George Canyon 00228-005-2				
	Spud Patch 00228-005-1				
	Wofford KA 00228-003-1				
	Zinker Canyon 00228-				
Perk 00437	Perk Canyon 00437-001-2	11/6/2003	2.63	3.58	2.94
	Hughes Canyon 00437-001-1	11/6/2003	2.75	4.89	3.52
Pinon Draw 00438	Pinon Draw 00438-003-2	10/21/2003	>4.00	>6.00	>4.00
	Lick Ridge 00438-003-1	10/21/2003	>4.00	>6.00	>4.00
Pumphouse 00215	Eightmile Canyon 00215-001-1	10/15/2003	4.40	7.25	4.51
	Pumphouse Canyon 00215-002-1	10/15/2003	4.70	n/a	4.70
Russia Canyon 00216	Goodsell Canyon 00216-001-1	10/20/2003	3.85	5.50	3.89
Sacramento (north)	Benson Canyon 00217-001-1	11/4/2003	2.00	4.00	2.16
00217	Dark Canyon 00217-001-	11/4/2003	2.75	4.48	2.9
	Upper Kerr Canyon 00217-001-2	11/3/2003	1.61	2.03	1.86
	Lower Lucas Canyon 00217-001-3	11/4/2003	2.25	5.00	2.28
	Upper Lucas Canyon 00217-001-4	11/4/2003	2.05	2.70	2.23
Sacramento (south)	Brown Canyon 00217-003-1	11/3/2003	3.01	4.29	3.17
	Hay Canyon 00217-003-2	11/3/2003	2.73	3.44	2.99
	McAfee Canyon (river) 00217-003-3	11/3/2003	2.46	3.19	2.77
	Rice Canyon 00217-003-4	11/3/2003	2.14	3.00	2.17
	Wills Canyon 00217-003-5	11/4/2003	2.06	3.42	2.23

Exhibit 6

End-of-Season Leaf Lengths
2003

Allotment	Key Area Location	Date	Average Leaf Length (")		
			Shortgrass	Midgrass	Overall
Scott Able 00223	East of Tower 00223-003-1	10/30/2003	3.29	5.25	3.38
	Harris Canyon 00223-002-1	10/30/2003	2.77	4.70	3.35
	Sacramento River 00223-001-1	10/30/2003	5.20	5.33	5.20
Sixteen Springs 00422	Sixteen Springs Canyon 00422-001-1	10/29/2003	n/a	8.06	8.06
	Wet Burnt Canyon 00422-001-2	10/29/2003	>4.00	>6.00	>4.00
Upper Burnt / Lewis	Latham Canyon 00412-003-1	11/6/2003	>4.00	>6.00	>4.00
00424 / 00412	Claim Canyon 00424-005-1	11/6/2003	>4.00	>6.00	>4.00

Allotment	Key Area Location	Date	Average Leaf Length (")		
			Shortgrass	Midgrass	Overall
Sacramento	Benson Canyon	5/4/04	2.07	n/a	2.07
(north)	Dark Canyon	5/4/04	2.53	3.95	2.84
	Upper Kerr Canyon	5/4/04	1.79	2.79	2.21
	Lower Lucas Canyon	5/4/04	2.00	n/a	2.00
	Upper Lucas Canyon	5/4/04	2.09	3.41	2.51
Sacramento	Brown Canyon	5/5/04	2.39	3.42	2.51
(south)	Hay Canyon	5/5/04	2.50	3.18	2.77
	McAfee Canyon (river)	5/5/04	2.02	2.59	2.27
	Rice Canyon	5/5/04	1.62	n/a	1.62
	Wills Canyon	5/5/04	2.12	2.57	2.18
Sacramento (Winter pastures)	Jakes Ridge KA# 2	6/8/04	1.70	3.13	1.93
Pasture Ridge	Sid West KA# 1	6/8/04	2.03	4.25	2.12