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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R8–ES–2017–0053; 4500030113]

RIN 1018–BC57

Endangered and Threatened Wildlife and Plants; Threatened Species Status for the Hermes Copper Butterfly with 4(d) Rule and Designation of Critical Habitat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list the Hermes copper butterfly (*Lycaena [Hermelycaena] hermes*), a butterfly species from San Diego County, California, and Baja California, Mexico, as a threatened species and propose to designate critical habitat for the species under the Endangered Species Act (Act). If we finalize this rule as proposed, it would extend the Act's protections to this species as described in the proposed rule provisions issued under section 4(d) of the Act, and designate approximately 14,249 hectares (35,211 acres) of critical habitat in San Diego County, California. We also announce the availability of a draft economic analysis (DEA) of the proposed designation of critical habitat for the Hermes copper butterfly.

DATES: We will accept comments received or postmarked on or before [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*]. Comments submitted electronically using the Federal eRulemaking Portal (see **ADDRESSES** below) must be received by 11:59 p.m. Eastern Time on the closing date. We must receive requests for public hearings, in writing, at the address shown in **FOR**

FURTHER INFORMATION CONTACT by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE *FEDERAL REGISTER*].

ADDRESSES: You may submit comments by one of the following methods:

(1) *Electronically*: Go to the Federal eRulemaking Portal: *http://www.regulations.gov*. In the Search box, enter FWS–R8–ES–2017–0053, which is the docket number for this rulemaking. Then, in the Search panel on the left side of the screen, under the Document Type heading, click on the Proposed Rules link to locate this document. You may submit a comment by clicking on "Comment Now!"

(2) *By hard copy*: Submit by U.S. mail or hand-delivery to: Public Comments Processing, Attn: FWS–R8–ES–2017–0053; U.S. Fish and Wildlife Service Headquarters, MS: BPHC, 5275 Leesburg Pike, Falls Church, VA 22041–3803.

We request that you send comments **only** by the methods described above. We will post all comments on *http://www.regulations.gov*. This generally means that we will post any personal information you provide us (see *Public Comments* below for more information).

FOR FURTHER INFORMATION CONTACT: Scott Sobiech, Acting Field Supervisor, Carlsbad Fish and Wildlife Office, 2177 Salk Avenue, Suite 250, Carlsbad, CA 92008; telephone 760–431–9440. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Relay Service at 800–877–8339.

Document availability: The draft economic analysis and the Species Status Assessment for the Hermes Copper Butterfly are available at *http://www.fws.gov/carlsbad*, at *http://www.regulations.gov* at Docket No. FWS–R8–ES–

2017–0053, and at the Carlsbad Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

For the proposed critical habitat designation, the coordinates or plot points or both from which the maps are generated are included in the decisional file and are available at *http://www.fws.gov/carlsbad*, *http://www.regulations.gov* at Docket No. FWS–R8–ES–2017–0053, and at the Carlsbad Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**). Any additional tools or supporting information that we may develop for this critical habitat designation will also be available at the U.S. Fish and Wildlife Service website and Field Office set out above, and may also be included in the preamble and/or at *http://www.regulations.gov*.

SUPPLEMENTARY INFORMATION:

Executive Summary

Why we need to publish a rule. Under the Act, if a species is determined to be an endangered or threatened species throughout all or a significant portion of its range, we are required to promptly publish a proposal in the *Federal Register*. When we determine that a species is endangered or threatened, we must designate critical habitat to the maximum extent prudent and determinable. Listing a species as an endangered or threatened species and designations of critical habitat can only be completed by issuing a rule.

What this document does. This rule, if finalized, would add the Hermes copper butterfly *(Lycaena [Hermelycaena] hermes*) to the List of Endangered and Threatened Wildlife in title 50 of the Code of Federal Regulations as a threatened species (50 CFR 17.11(h)) and extend the Act's protections to this species through specific regulations

issued under section 4(d) of the Act (50 CFR 17.47(d)). The Hermes copper butterfly is currently a candidate species for which we have on file sufficient information on biological vulnerability and threats to support preparation of a listing proposal but for which development of a listing regulation had previously been precluded by other higher priority listing activities. This proposed rule reassesses all available information regarding the status of and threats to the Hermes copper butterfly.

This document also includes a proposed rule to designate critical habitat for the Hermes copper butterfly. We have determined that designating critical habitat is both prudent and determinable for the Hermes copper butterfly, and we propose a total of approximately 14,249 ha (35,211 ac) for the species in San Diego County, California.

The basis for our action. Under the Act, we can determine that a species is an endangered or threatened species based on any of five factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or manmade factors affecting its continued existence. We have determined that the Hermes copper butterfly and its habitat are threatened primarily by wildfire and to a lesser extent by habitat fragmentation, isolation, land use change, and climate change and drought, and by those threats acting in concert.

Under the Endangered Species Act, any species that is determined to be a threatened or endangered species shall, to the maximum extent prudent and determinable, have habitat designated that is considered to be critical habitat. Section 4(b)(2) of the Act states that the Secretary shall designate and make revisions to critical habitat on the basis

of the best available scientific data after taking into consideration the economic impact, the impact on national security, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species.

*Economic analysis***.** In order to consider economic impacts, we prepared an analysis of the economic impacts of the proposed critical habitat designation. We hereby announce the availability of the draft economic analysis and seek public review and comment.

Peer review. We requested comments on the Species Status Assessment for the Hermes Copper Butterfly (*Lycaena [Hermelycaena] hermes*) (SSA) from independent specialists to ensure that we based our designation on scientifically sound data, assumptions, and analyses. Comments from our peer reviewers were incorporated into the SSA and informed this proposed rule. We invite any additional comment from the peer reviewers on the revised SSA during the public comment period.

Information Requested

We intend that any final action resulting from this proposed rule will be based on the best scientific and commercial data available and be as accurate and as effective as possible. Therefore, we request comments or information from the public, other concerned governmental agencies, Native American Tribes, the scientific community,

industry, or any other interested parties concerning this proposed rule. We particularly seek comments concerning:

(1) The Hermes copper butterfly's biology, range, and population trends, including:

(a) Biological or ecological requirements of the species, including habitat requirements for feeding, breeding, and sheltering;

(b) Genetics and taxonomy;

(c) Historical and current range including distribution patterns;

(d) Historical and current population levels, and current and projected trends; and

(e) Past and ongoing conservation measures for the species, its habitat, or both.

(2) Factors that may affect the continued existence of the species, which may include habitat modification or destruction, overutilization, disease, predation, the inadequacy of existing regulatory mechanisms, or other natural or manmade factors.

(3) Biological, commercial trade, or other relevant data concerning any threats (or lack thereof) to this species and existing regulations that may be addressing those threats.

(4) Information on activities or areas that might warrant being exempted from the section 9(a)(1) take prohibitions proposed in this rule under section 4(d) of the Act. The Service will evaluate ideas provided by the public in considering the extent of prohibitions that are necessary and advisable to provide for the conservation of the species.

(5) Any additional conservation opportunities, such as mitigation banks, candidate conservation agreements with assurances, or habitat conservation plans that could provide for conservation and regulatory certainty for the development community.

(6) Any additional information on Hermes copper butterfly occurrence locations or threats impacting Hermes copper butterfly habitat in northern Baja California, Mexico, particularly impacts of wildfire or development.

(7) The reasons why we should or should not designate habitat as "critical habitat" under section 4 of the Act (16 U.S.C. 1531 *et seq.*) including information to inform the following factors such that a designation of critical habitat may be determined to be not prudent:

(a) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(b) The present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or threats to the species' habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(c) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States;

(d) No areas meet the definition of critical habitat.

(8) Specific information on:

(a) The amount and distribution of Hermes copper butterfly habitat;

(b) What areas within the geographical area currently occupied by the species, that contain the physical or biological features essential to the conservation of the species, should be included in the designation and why;

(c) Special management considerations or protection that may be needed for the physical or biological features essential to the conservation of the species in critical habitat areas we are proposing, including managing for the potential effects of climate change; and

(d) What areas not occupied at the time of listing are essential for the conservation of the species. We particularly seek comments regarding:

(i) Whether occupied areas are inadequate for the conservation of the species; and,

(ii) Specific information that supports the determination that unoccupied areas will, with reasonable certainty, contribute to the conservation of the species and, contain at least one physical or biological feature essential to the conservation of the species.

(9) Land use designations and current or planned activities in the subject areas and their possible impacts on proposed critical habitat.

(10) Any probable economic, national security, or other relevant impacts of designating any area that may be included in the final designation, and the benefits of including or excluding areas that may be impacted.

(11) Information on the extent to which the description of probable economic impacts in the draft economic analysis is a reasonable estimate of the likely economic impacts.

(12) Whether any specific areas we are proposing for critical habitat designation should be considered for exclusion under section 4(b)(2) of the Act, and whether the benefits of potentially excluding any specific area outweigh the benefits of including that area under section 4(b)(2) of the Act.

(13) The likelihood of adverse social reactions to the designation of critical habitat, as discussed in the associated documents of the draft economic analysis, and how the consequences of such reactions, if likely to occur, would relate to the conservation and regulatory benefits of the proposed critical habitat designation.

(14) Whether we could improve or modify our approach to designating critical habitat in any way to provide for greater public participation and understanding, or to better accommodate public concerns and comments.

You may submit your comments and materials concerning this proposed rule by one of the methods listed in **ADDRESSES**. We request that you send comments **only** by the methods described in **ADDRESSES**.

Please include sufficient information with your submission (such as scientific journal articles or other publications) to allow us to verify any scientific or commercial information you include. All comments submitted electronically via *http://www.regulations.gov* will be presented on the website in their entirety as submitted. For comments submitted via hard copy, we will post your entire comment—including your personal identifying information—on *http://www.regulations.gov*. You may request at the top of your document that we withhold personal information such as your street address, phone number, or e-mail address from public review; however, we cannot guarantee that we will be able to do so.

Comments and materials we receive, as well as supporting documentation we used in preparing this proposed rule, will be available for public inspection on *http://www.regulations.gov*, or by appointment, during normal business hours, at the U.S.

Fish and Wildlife Service, Carlsbad Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Please note that submissions merely stating support for or opposition to the action under consideration without providing supporting information, although noted, will not be considered in making a determination, as section 4(b)(1)(A) of the Act directs that determinations as to whether any species is a threatened or endangered species must be made "solely on the basis of the best scientific and commercial data available."

Public Hearing

Section 4(b)(5) of the Act provides for one or more public hearings on this proposal, if requested. Requests must be received within 45 days after the date of publication of this proposed rule in the *Federal Register*. Such requests must be sent to the address shown in **FOR FURTHER INFORMATION CONTACT**. We will schedule public hearings on this proposal, if any are requested, and announce the dates, times, and places of those hearings, as well as how to obtain reasonable accommodations, in the *Federal Register* and local newspapers at least 15 days before the hearing.

Peer Review

In accordance with our joint policy on peer review published in the *Federal Register* on July 1, 1994 (59 FR 34270) and our August 22, 2016, memorandum updating and clarifying the role of peer review of listing actions under the Act, we have sought the expert opinions of appropriate and independent specialists on the SSA report to ensure that our listing and critical habitat proposals are based on scientifically sound data, assumptions, and analyses. We sent the SSA report to eight independent peer reviewers and received six responses. The peer reviewers we selected have expertise in butterfly

biology, habitat, genetics, and threats (factors negatively affecting the species), and their comments on the SSA helped inform our proposals. These comments will be available along with other public comments in the docket for this proposed rule.

Previous Federal Actions

The Hermes copper butterfly was included as a Category 2 candidate species in our November 21, 1991 (56 FR 58804), and November 15, 1994 (59 FR 58982), Candidate Notices of Review (CNOR). Category 2 included taxa for which information in the Service's possession indicated that a proposed listing rule was possibly appropriate, but for which sufficient data on biological vulnerability and threats were not available to support a proposed rule. In the CNOR published on February 28, 1996 (61 FR 7596), the Service announced a revised list of plant and animal taxa that were regarded as candidates for possible addition to the Lists of Endangered and Threatened Wildlife and Plants. The revised candidate list included only former Category 1 species. All former Category 2 species were dropped from the list in order to reduce confusion about the conservation status of these species and to clarify that the Service no longer regarded these species as candidates for listing. Since the Hermes copper butterfly was a Category 2 species, it was no longer recognized as a candidate species as of the February 28, 1996, CNOR.

On October 26, 2004, we received a petition dated October 25, 2004, from the Center for Biological Diversity (CBD) and David Hogan requesting that Hermes copper butterfly be listed as endangered under the Act and that critical habitat be designated. On August 8, 2006, we published a 90-day finding for the Hermes copper butterfly in the *Federal Register* (71 FR 44966). The finding concluded that the petition and information

in our files did not present substantial scientific or commercial information indicating that listing Hermes copper butterfly may be warranted. For a detailed history of Federal actions involving Hermes copper butterfly prior to 2004, please see the August 8, 2006, *Federal Register* document (71 FR 44966).

On March 17, 2009, CBD and David Hogan filed a complaint for declaratory and injunctive relief challenging the Service's decision not to list Hermes copper butterfly as endangered or threatened under the Act. In a settlement agreement dated October 23, 2009 (Case No. 09-0533 S.D. Cal.), the Service agreed to submit a new 90-day petition finding to the *Federal Register* by May 13, 2010, for Hermes copper butterfly. On May 4, 2010, we published a 90-day finding in the *Federal Register* (75 FR 23654) that found the petition did present substantial scientific or commercial information indicating that listing the Hermes copper butterfly may be warranted.

On April 14, 2011, we published a 12-month finding stating that the Hermes copper butterfly was warranted for listing as threatened or endangered under the Act (76 FR 20918). However, we also found that listing the Hermes copper butterfly was precluded by higher priority listing actions. Based on species-level taxonomic classification and on high-magnitude but non-imminent threats, we assigned the Hermes copper butterfly a listing priority number of 5 and added it to the list of candidate species. Candidate species are those fish, wildlife, and plants for which we have on file sufficient information on biological vulnerability and threats to support preparation of a listing proposal, but for which development of a listing regulation is precluded by other higher priority listing activities. We reaffirmed the Hermes copper butterfly's candidate status in the annual CNOR in subsequent years (76 FR 66370, October 26, 2011; 77 FR 69994,

November 21, 2012; 78 FR 70104, November 22, 2013; 79 FR 72450, December 5, 2014; 80 FR 80584, December 24, 2015).

In the 2016 CNOR (81 FR 87246, December 2, 2016), we announced that, although listing Hermes copper butterfly continued to be warranted but precluded at the date of publication of the notice, we were working on a thorough review of all available data. This proposed listing rule constitutes completion of our status review for this candidate species.

Background

A thorough review of the taxonomy, life history, and ecology of the Hermes copper butterfly is presented in the Species Status Assessment for the Hermes Copper Butterfly (*Lycaena [Hermelycaena] hermes*) Version 1.1 (Service 2018a), which is available at *https://regulations.gov/* at Docket No. FWS–R8–ES–2017–0053).

The Hermes copper butterfly is a small-sized butterfly historically found in San Diego County, California, and northwestern Baja California, Mexico (Service 2018a, Figure 4). There are 95 known historical or extant Hermes copper butterfly occurrences in the United States and northwestern Baja California, Mexico; 45 are extant or presumed extant (all in the United States), 40 are presumed extirpated, and 10 are permanently extirpated (Table 1).

While most recent scientific studies support recognition of Hermes copper butterfly as belonging to the monotypic genus *Hermelycaena*, Hermes copper butterfly was recognized as *Lycaena hermes* (subgenus *Hermelycaena*) in the most recent peer-reviewed taxonomic treatment (Pelham 2008, p. 191). Therefore, we recognize Hermes copper butterfly as *Lycaena hermes* throughout the SSA (Service 2018a), this proposed

rule, and subsequent documents.

Hermes copper butterfly individuals diapause (undergo a low metabolic rate resting stage) as eggs during the late summer, fall, and winter (Deutschman *et al.* 2010, p. 4). Adults are active May through July, when females deposit single eggs exclusively on *Rhamnus crocea* shrubs (spiny redberry; Thorne 1963, p. 143; Emmel and Emmel 1973, p. 62) in coastal sage scrub and chaparral vegetation. Adult occupancy and feeding are also associated with presence of their primary nectar source, the shrub *Eriogonum fasciculatum* (California buckwheat), although other nectar sources may provide equivalent or supplemental adult nutrition. Hermes copper butterflies are considered poor dispersers, but they appear to have limited directed movement ability and have been recaptured up to 0.7 mi (1.1 km) from the point of release (Marschalek and Klein 2010, pp. 727–728). More information is needed to fully understand movement patterns of Hermes copper butterfly, especially across vegetation types; however, dispersal is likely aided by winds but inhibited by lack of dispersal corridor-connectivity areas in many areas (Deutschman *et al.* 2010, p. 17).

There are two types of "habitat connectivity" important to the Hermes copper butterfly. Hermes copper butterflies need within-habitat patch connectivity—an unfragmented habitat patch where reproduction occurs. Habitat patches are a collection of host plants and host plant patches among which adult butterflies readily and randomly move during a flight season (any given butterfly is just as likely to be found anywhere within that area). Butterflies must be free and likely to move among individual host plants and patches of host plants within a habitat patch. They also require dispersal corridor-connectivity areas, which are undeveloped wildlands with suitable vegetation

structure between habitat patches close enough that recolonization of a formerly occupied habitat patch is likely. We refer to both types of connectivity in this proposed rule.

Table 1. Hermes copper butterfly occurrences in the United States and Mexico. Year is given for any known megafire that impacted an occurrence. Approximate percent of occurrence affected by last fire is given if occurrence is extant or presumed extant (see also Service 2018a, Figure 12).

Map #	Occurrence name	EU[1]	Size[2]	Last record	Accu-racy[3]	Status[4]	Megafire Year (%)	Reason Extirpated
1	Bonsall	WGF	NC	1963	3	Presumed Extirpated		Development Isolation
2	East San Elijo Hills	CH	NC	1979	2	Presumed Extirpated		Development Isolation
3	San Elijo Hills	CH	NC	1957	3	Extirpated		Development Isolation
4	Elfin Forest	CH	NC	2011	1	Extant		
5	Carlsbad	CH	NC	Pre-1963	3	Extirpated		Development
6	Lake Hodges	CH	NC	1982	3	Presumed Extirpated	2007	Development Isolation Fire
7	Rancho Santa Fe	CH	NC	2004	1	Presumed Extirpated	2007	Development Isolation Fire
8	Black Mountain	CH	NC	2004	1	Presumed Extant		
9	South Black Mountain	CH	NC	Pre-1963	3	Extirpated		Development
10	Van Dam Peak	CH	NC	2011	1	Extant		
11	Sabre Springs	CH	NC	2001	1	Presumed Extirpated		Development Isolation
12	Lopez Canyon	CT	Core	2011	1	Extant		
13	Mira Mesa	CT	NC	Pre-1963	3	Extirpated		Development
14	West Mira Mesa	CT	NC	Pre-1963	3	Extirpated		Development
15	Northeast Miramar	CH	Core	2000	1	Presumed Extirpated	2003	Fire
16	Southeast Miramar	CH	NC	1998	2	Presumed Extirpated	2003	Fire
17	Miramar	CH	Core	2000	1	Presumed Extirpated	2003	Fire
18	West Miramar	CT	NC	1998	2	Presumed Extirpated	2003	Fire
19	Miramar Airfield	CT	NC	Pre-1963	3	Presumed Extirpated	2003	Fire

20	South Miramar	CH	NC	2000	1	Presumed Extirpated	2003	Fire
21	Sycamore Canyon	WGF	Core	2003	1	Presumed Extirpated	2003	Fire
22	South Sycamore Canyon	WGF	NC	2000	1	Presumed Extirpated	2003	Fire
23	North Santee	CH	Core	2005	1	Presumed Extant	2003 (60%)	
24	Santee	CH	NC	1967	3	Extirpated		Development
25	Santee Lakes	CH	NC	2001	1	Presumed Extirpated	2003	Development Fire
26	Mission Trails	CH	Core	2010	1	Extant	2003 (60%)	Fire (pre-2003, recolonized)
27	North Mission Trails	CH	NC	2003	1	Presumed Extirpated	2003	Fire
28	Cowles Mountain	CH	NC	1973	2	Presumed Extant		
29	South Mission Trails	CH	NC	1978	3	Presumed Extirpated		Development Isolation
30	Admiral Baker	CH	NC	2015	1	Extant		
31	Kearny Mesa	CT	NC	1939	3	Extirpated		Development
32	Mission Valley	CT	NC	Pre-1963	3	Extirpated		Development
33	West Mission Valley	CT	NC	1908	3	Extirpated		Development
34	San Diego State University	CT	NC	Pre-1963	3	Presumed Extirpated		Development
35	La Mesa	CH	NC	Pre-1963	3	Presumed Extirpated		Development
36	Mt. Helix	CH	NC	Pre-1963	3	Presumed Extirpated		Development
37	East El Cajon	CH	NC	Pre-1963	3	Presumed Extirpated		Development
38	Dictionary Hill	CT	NC	1962	2	Presumed Extant		
39	El Monte	CH	NC	1960	2	Presumed Extirpated	2003	Development Fire
40	BLM Truck Trail	WGF	Core	2006	1	Presumed extant	2003 (90%)	Fire (recolonized?)
41	North Crestridge	WGF	NC	1981	2	Presumed Extirpated	1970, 2003	Fire
42	Northeast Crestridge	WGF	NC	1963	2	Presumed Extant	2003 (25%)	
43	East Crestridge	WGF	NC	2003	1	Presumed Extant	1970, 2003 (50%)	
44	Crestridge	WGF	Core	2014	1	Extant	1970, 2003 (80%)	
45	Boulder Creek	PC	Core	2017	1	Extant	2003	Fire

	Road						(100%)	(recolonized?)
46	North Guatay Mountain	PC	NC	2004	1	Presumed Extant	2003 (10%)	
47	South Guatay Mountain	PC	NC	2010	1	Extant	1970	
48	Pine Valley	PC	NC	Pre-1963	3	Presumed Extant		
49	Descanso	PC	Core	2017	1	Extant	1970, 2003 (50%)	
50	Japutal	WGF	Core	2012	1	Extant	1970	
51	East Japutal	WGF	NC	2010	1	Extant	1970	
52	South Japutal	WGF	Core	2010	1	Extant	1970	
53	Corte Madera	PC	NC	Pre-1963	3	Presumed Extant	1970	
54	Alpine	WGF	Core	2011	1	Extant	1970	
55	East Alpine	WGF	NC	Pre-1963	3	Presumed Extant	1970	
56	Willows (Viejas Grade Road)	WGF	NC	2003	1	Presumed Extirpated	2003	Fire
57	Dehesa	CH	NC	Pre-1963	3	Presumed Extant	1970	
58	Loveland Reservoir	WGF	Core	2012	1	Extant	1970	
59	East Loveland Reservoir	WGF	NC	2011	1	Extant	1970	
60	West Loveland Reservoir	CH	NC	2009	1	Extant	1970	
61	Hidden Glen	WGF	NC	2010	1	Extant	1970	
62	McGinty Mountain	CH	Core	2014	1	Extant	1970	
63	East McGinty Mountain	WGF	NC	2001	2	Presumed Extant	1970	
64	North Rancho San Diego	CH	NC	Pre-1963	3	Extirpated	1970	Development Isolation
65	Rancho San Diego	CH	Core	2011	1	Extant	1970, 2007 (5%)	
66	South Rancho San Diego	CH	NC	2007	1	Presumed Extant	1970, 2007 (50%)	
67	San Miguel Mountain	CH	Core	2007	1	Presumed Extirpated	1970, 2007	Fire
68	South San Miguel Mountain	CH	NC	2004	1	Presumed Extant	1970, 2007 (50%)	
69	North Jamul	CH	Core	2004	1	Presumed Extant	1970, 2003 (5%)	
70	North Rancho	CH	NC	2007	1	Presumed	2003,	Fire

	Jamul					Extirpated	2007	
71	Rancho Jamul	CH	Core	2003	1	Presumed Extirpated	2003, 2007	Fire
72	East Rancho Jamul	CH	NC	2007	1	Presumed Extant	1970, 2003, 2007 (5%)	
73	Sycuan Peak	WGF	Core	2016	1	Extant	1970	
74	Skyline Truck Trail	WGF	Core	2017	1	Extant	1970	
75	Lyons Peak	WGF	NC	2003	1	Presumed Extant	1970, 2007 (50%)	
76	Gaskill Peak	WGF	NC	2010	1	Extant	1970	
77	Lawson Valley	WGF	Core	2017	1	Extant	1970, 2007 (40%)	
78	Bratton Valley	WGF	NC	Pre-1963	3	Presumed Extirpated	1970, 2007	Fire
79	Hollenbeck Canyon	WGF	Core	2016[5]	1	Presumed Extirpated[5]	1970, 2007	Fire
80	Southeast Hollenbeck Canyon	WGF	NC	2007	1	Presumed Extirpated	1970, 2007	Fire
81	South Hollenbeck Canyon	CH	NC	Pre-1963	3	Presumed Extirpated	1970, 2003, 2007	Fire
82	West Hollenbeck Canyon	CH	NC	2007	1	Presumed Extirpated	1970, 2007	Fire
83	Otay Mountain	WGF	NC	1979	2	Presumed Extirpated	2003, 2007	Fire
84	South Otay Mountain	WGF	NC	Pre-1963	3	Presumed Extirpated	2003, 2007	Fire
85	Dulzura	WGF	NC	2005	1	Presumed Extirpated	2007	Fire
86	Deerhorn Valley	WGF	NC	1970	3	Presumed Extirpated	2007	Fire
87	North Hartley Peak	WGF	NC	2010	1	Extant	2007 (100%)	Fire (recolonized?)
88	South Hartley Peak	WGF	NC	2010	1	Extant	2007 (50%)	
89	North Portrero	WGF	Core	2010	1	Extant	2007 (25%)	
90	South Portrero	WGF	Core	2012	1	Extant		
91	Tecate Peak	WGF	NC	1980	3	Presumed Extirpated	2007	Fire
92	Otay Mesa	CT	NC	Pre-1920	3	Presumed Extirpated		Development Isolation
	Mexico[6]							

93	Salsipuedes	n/a	NC	1983	3	Presumed Extirpated	2014	Fire
94	Santo Tomas	n/a	NC	Pre-1920	3	Presumed Extirpated	2003	Fire
95	North Ensenada	n/a	NC	1936	3	Presumed Extirpated	2005 2014	Fire

[1] California Ecological Units: CH = Coastal Hills; CT = Coastal Terraces; WGF = Western Granitic Foothills; PC = Palomar-Cuyamaca Peak.

[2] NC means "non-core." "Core"/large geographic footprint defined by a total area within ½ km of Hermes copper butterfly records greater than 176 hectares (435 acres).

[3] Geographic accuracy categories: 1 means recorded GPS coordinates or accurate map; 2 means relatively accurate specimen collection site label or map; 3 means site name record or map only accurate enough for determining species' range (not used to determine size, or in mapping if within 1.5 km of a higher accuracy record).

[4] "Extirpated" means associated habitat has all been developed. "Presumed extirpated" means the record location is developed but there is a significant amount of remaining undeveloped habitat, or all records within a 2003 or later fire footprint and no post-fire butterfly records. "Presumed extant" means unburned or post-fire record > 10 years old. "Extant" means there is a record < 10 years old in unburned habitat.

[5] At least one adult observed after 2015 translocation, may not represent breeding.

[6] Although records are low accuracy, extirpation of populations in Mexico is presumed due to numerous large fires in the area between 2003 and 2014 (NASA imagery).

Summary of Analysis

To assess Hermes copper butterfly viability, we used the three conservation biology principles of resiliency, redundancy, and representation (together, the 3Rs) (Shaffer and Stein 2000, pp. 306–310). Briefly, resiliency supports the ability of the species to withstand environmental stochasticity (for example, wet or dry, warm or cold years); representation supports the ability of the species to adapt over time to long-term changes in the environment (for example, climate changes); and redundancy supports the ability of the species to withstand catastrophic events (for example, droughts, hurricanes). In general, the more redundant, representative, and resilient a species is, the more likely it is to sustain populations over time, even under changing environmental conditions. Using these principles, we identified the species' ecological requirements for survival and

reproduction at the individual, population, and species levels, and described the beneficial and risk factors influencing the species' viability.

The assessment process used to develop the SSA (Service 2018a) can be categorized into three sequential stages. During the first stage, we used the principles of resiliency, redundancy, and representation to evaluate the Hermes copper butterfly's life-history needs. The next stage involved an assessment of the historical and current condition of the species' demographics and habitat characteristics, including an explanation of how the Hermes copper butterfly arrived at its current condition. The final stage involved making predictions about the species' response to positive and negative environmental and anthropogenic influences. This process used the best scientific and commercial data available to characterize viability as the ability of the Hermes copper butterfly to sustain populations in the wild over time.

In the SSA (Service 2018a), we describe the ecological needs of the Hermes copper butterfly at the hierarchical levels of individual, population, and species. There are also spatial and temporal components to hierarchical resource needs, reflected in the average area occupied by and "life expectancy" of each ecological entity. Individual needs are met and resource availability should be assessed at the adult male territory scale on an annual basis, reflecting the life span of an individual (from egg to adult). Population-level resilience needs are met and resource availability should be assessed on the habitat patch or metapopulation (interconnected habitat patches) scale over a period of decades. Populations or subpopulations persist in intact habitat until they are extirpated by stochastic events such as wildfire, to eventually be replaced as habitat is recolonized (18 years is the estimated time it took for the Mission Trails occurrence recolonization).

Species-level viability needs are assessed and must be met at a range-wide scale if the species is to avoid extinction. The following list describes the Hermes copper butterfly's ecological needs:

(1) Individual Resource Needs:

(a) Egg: suitable spiny redberry stems for substrate.

(b) Larvae: suitable spiny redberry leaf tissue for development.

(c) Pupae: suitable leaves for pupation.

(d) Adults: suitable spiny redberry stem tissue for oviposition; nectar sources (primarily California buckwheat); mates.

(2) Population Needs:

(a) Resource needs and/or circumstances: Habitat elements required by populations include spiny redberry bushes (quantity uncertain, but not isolated individuals) and associated stands of California buckwheat or similar nectar sources.

(b) Population-level redundancy: Populations must have enough individuals (population growth) in "good years" that after reproduction is limited by poor environmental conditions such as drought in intervening "bad years," individuals can still find mates. Alternatively, there need to be enough diapausing eggs to wait out a bad year and restore the average population size or greater in the subsequent year. That is, populations are always large enough to persist through expected periods of population decline.

(c) Population-level representation: It is unclear how susceptible the Hermes copper butterfly is to inbreeding depression. A mix of open, sunny areas should be present within habitat patches and stands of California buckwheat for nectar in the

vicinity of spiny redberry host plants. Additionally, individuals must be distributed over a large enough area (population footprint/distribution) that not all are likely to be killed by stochastic events such as wildfire.

(3) Species Needs:

(a) Resource needs and/or circumstances: dispersal corridor-connectivity areas among subpopulations to maintain metapopulation dynamics. For Hermes copper butterfly, this means suitable corridor habitat with suitable intervening vegetation structure and topography between habitat patches that are close enough so that recolonization of habitat patches where a subpopulation was extirpated is likely. Apparent impediments to dispersal include forested, riparian, and developed areas.

(b) Species-level redundancy: 95 known historical or extant Hermes copper butterfly occurrences have been documented in southern California, United States, and northwestern Baja California, Mexico: 45 are extant or presumed extant (all in the United States), 40 are presumed extirpated, and 10 are permanently extirpated (Table 1). In order to retain the species-level redundancy required for species viability, populations and temporarily unoccupied habitats must be distributed throughout the species' range in sufficient numbers and in a geographic configuration that supports dispersal corridor-connectivity areas described in (a) above.

(c) Species-level representation: Populations must be distributed in a variety of habitats (including all four California Ecological Units; Service 2018a, p. 58) so that there are always some populations experiencing conditions that support reproductive success. In especially warm, dry years, populations in wetter habitats should experience the highest population growth rates within the species' range, and in colder, wetter years

populations in drier habitats should experience the highest growth rates. Populations should be represented across a continuum of elevation levels from the coast to the mountain foothills. There is currently only one known extant occurrence remaining with marine climate influence, four with montane climate influence, and the remainder at intermediate elevations with a more arid climate (Service 2018a, p. 55). Those populations in higher elevation, cooler habitats, and coastal habitats with more marine influence are less susceptible to a warming climate and are, therefore, most important to maintain.

Summary of Factors Affecting the Species

The Act directs us to determine whether any species is an endangered species or a threatened species because of any factors affecting its continued existence. We completed a comprehensive assessment of the biological status of the Hermes copper butterfly and prepared a report of the assessment, which provides a thorough account of the species' overall viability. We generally define viability as the ability of the species to sustain populations in the natural ecosystem for the foreseeable future.

The SSA (Service 2018a) documents the results of our comprehensive biological status review for the Hermes copper butterfly, including an assessment of the potential threats to the species. The SSA does not represent a decision by the Service on whether the Hermes copper butterfly should be proposed for listing as an endangered or threatened species under the Act. The SSA does, however, provide the scientific basis that informs our regulatory decision, which involves the further application of standards within the Act and its implementing regulations and policies. In this section, we summarize the conclusions of the SSA report, which can be accessed at Docket No.

FWS–R8–ES–2017–0053 on *http://www.regulations.gov* and at http://www.fws.gov/carlsbad.

To evaluate the current and future viability of the Hermes copper butterfly, we assessed a range of conditions to allow us to consider the species' resiliency, redundancy, and representation. We use the terms "stressor" and "threat" interchangeably as any action or condition that is known to or is reasonably likely to negatively affect individuals of a species. This includes those actions or conditions that have a direct impact on individuals, as well as those that affect individuals through alteration of their habitat or required resources. The mere identification of "threats" is not sufficient to compel a finding that listing is warranted. Describing the negative effects of the action or condition (i.e., "threats") in light of the exposure, timing, and scale at the individual, population, and species levels provides a clear basis upon which to make our determination. In determining whether a species meets the definition of an "endangered species" or a "threatened species," we have considered the factors under section 4(a)(1) and assessed the cumulative effect that the threats identified within the factors—as ameliorated or exacerbated by any existing regulatory mechanisms or conservation efforts—will have on the species now and in the foreseeable future.

The following sections include summary evaluations of five threats impacting the Hermes copper butterfly or its habitat, including wildfire (Factor A), land use change (Factor A), habitat fragmentation and isolation (Factor A), climate change (Factor E), and drought (Factor E); as well as evaluating the cumulative effect of these on the species, including synergistic interactions between the threats and the vulnerability of the species resulting from small population size. We also consider the impacts of existing regulatory

mechanisms (Factor D) on all existing threats (Service 2018a, pp. 33–54). We also note that potential impacts associated with overutilization (Factor B), disease (Factor C), and predation (Factor C) were evaluated but found to have minimal to no impact on the species (Service 2018a, pp. 33–54).

For the purpose of this analysis, we generally define viability as the ability of the species to sustain populations in the natural ecosystem for the foreseeable future—in this case, 30 years. We chose 30 years because it is within the range of the available hydrological and climate change model forecasts, fire hazard period calculations, and the fire-return interval estimates for habitat-vegetation associations that support the Hermes copper butterfly.

Current Condition

Wildfire

Wildfire impacts both Hermes copper butterfly and its habitat. The vegetation types that support Hermes copper butterfly—chaparral and coastal sage scrub—are prone to relatively frequent wildfire ignitions, and many plant species that characterize those habitat types are fire-adapted. The Hermes copper butterfly's host plant, spiny redberry, resprouts after fires and is relatively resilient to frequent burns (Keeley 1998, p. 258). The effect of wildfire on Hermes copper butterfly's primary nectar source California buckwheat is more complicated. California buckwheat is a facultative seeder that has minimal resprouting capability (approximately 10 percent) for young individuals (Keeley 2006, p. 375). Wildfires cause high mortality in California buckwheat, and densities are reduced the following year within burned areas (Zedler *et al.* 1983, p. 814); however, California buckwheat recolonizes relatively quickly (compared to other coastal sage

scrub species) if post-fire conditions are suitable.

The historical fire regime in southern California likely was characterized by many small, lightning-ignited fires in the summer and a few infrequent large fires in the fall (Keeley and Fotheringham 2003, pp. 242–243). These infrequent, large, high-intensity wildfires, so-called "megafires" (defined in the SSA as those fires greater than 16,187 hectares (ha) (40,000 acres (ac)) in size) (Service 2018a, p. 33), burned the landscape long before Europeans settled the Pacific coast (Keeley and Zedler 2009, p. 90). As such, the current pattern of small, low-intensity fires with large infrequent fires is consistent with that of historical regimes (Keeley and Zedler 2009, p. 69). Therefore, habitat that supports Hermes copper butterfly is naturally adapted to fire and has some natural resilience to impacts from wildfire.

However, in recent decades, wildfire has been increasing in both frequency and magnitude (Safford and Van de Water 2014, pp. i, 31–35). Annual mean area under extreme fire risk has increased steadily in California since 1979, and 2014 ranked highest in the history of the State (Yoon *et al.* 2015, p. S5).

For the historical range of the Hermes copper butterfly, the fire rotation interval decreased from 68 (1910–2000) to 49 years (1925–2015) (Service 2017, entire). In other words, the amount of time it took for all burned areas to add up to the total range decreased when the last 15 years of data were added to the analysis. A change in only 17 percent of the time period analyzed resulted in a 28 percent decrease in fire rotation interval (Service 2017, entire).

Increasing fire frequency and size is of particular concern for the Hermes copper butterfly because of how long it can take for habitat to be recolonized after wildfire. For

example, in Mission Trails Park the 2,596-ha (7,303-ac) “Assist #59” Fire in 1981 and the smaller 51-ha (126-ac) “Assist #14” Fire in 1983 (no significant overlap between acreages burned by the fires), resulted in an approximate 18-year extirpation of the Mission Trails Park Hermes copper butterfly occurrence (Klein and Faulkner 2003, pp. 96, 97).

To assess the impacts of fire on the Hermes copper butterfly, we examined maps of recent high-fire-hazard areas in San Diego County (Service 2018a, Figure 8). Almost all remaining habitat within mapped Hermes copper butterfly occurrences falls within the “very high” fire hazard severity zone for San Diego County (Service 2018a, Figure 8). Areas identified in our analysis as most vulnerable to extirpation by wildfire include most occupied and potentially occupied Hermes copper butterfly habitats in San Diego County within the southern portion of the range. Twenty-eight potential source occurrences for recolonization of recently burned habitat fall within a contiguous area that has not recently burned (Service 2018a, Figure 7), and where the fire hazard is considered high (Service 2018a, Figure 8).

Although habitat that supports Hermes copper butterfly is adapted to fire, increased fire frequency can still have detrimental effects. Frequent fires open up the landscape, making the habitat more vulnerable to invasive, nonnative plants and vegetation type-conversion (Keeley *et al*. 2005, p. 2117). The extent of invasion of nonnative plants and type conversion in areas specifically inhabited by Hermes copper butterfly is unknown. However, wildfire clearly results in at least temporary reductions in suitable habitat for Hermes copper butterfly and may result in lower densities of California buckwheat (Zedler *et al.* 1983, p. 814; Keeley 2006, p. 375; Marschalek and

Klein 2010, p. 728). Although Keeley and Fotheringham (2003, p. 244) indicated that continued habitat disturbance, such as fire, will result in conversion of native shrublands to nonnative grasslands, Keeley (2004, p. 7) also noted that invasive, nonnative plants will not typically displace obligate resprouting plant species in mesic shrublands that burn once every 10 years. Therefore, while spiny redberry resprouts, the quantity of California buckwheat as a nectar source necessary to support a Hermes copper butterfly occurrence may be temporarily unavailable due to recent fire impacts, and nonnative grasses commonly compete with native flowering plants that would otherwise provide abundant nectar after fire.

Extensive and intense wildfire events are the primary recent cause of direct mortality and extirpation of Hermes copper butterfly occurrences. The magnitude of this threat appears to have increased due to an increased number of recent megafires created by extreme "Santa Ana" driven weather conditions of high temperatures, low humidity, strong erratic winds, and human-caused ignitions (Keeley and Zedler 2009, p. 90; Service 2018a, pp. 33–41). The 2003 Otay and Cedar fires and the 2007 Harris and Witch Creek fires in particular have negatively impacted the species, resulting in or contributing to the extirpation of 33 occurrences (Table 1). Only 3 of the 31 U.S. occurrences thought to have been extirpated in whole or in part by fire since 2003 appear to have been naturally re-established, or were not entirely extirpated (Table 1; Service 2018a, Figure 7; Winter 2017, pers. comm.).

Wildfires that occur in occupied Hermes copper butterfly habitat result in direct mortality of Hermes copper butterflies (Klein and Faulkner 2003, pp. 96–97; Marschalek and Klein 2010, pp. 4–5). Butterfly populations in burned areas rarely survive wildfire

because immature life stages of the butterfly inhabit host plant foliage, and spiny redberry typically burns to the ground and resprouts from stumps (Deutschman *et al.* 2010, p. 8; Marschalek and Klein 2010, p. 8). This scenario results in at least the temporal loss of both the habitat (until the spiny redberry and nectar source regrowth occurs) and the presence of butterflies (occupancy) in the area.

Wildfires can also leave patches of unburned occupied habitat that are functionally isolated (further than the typical dispersal distance of the butterfly) from other occupied habitat. Furthermore, large fires can eliminate source populations before previously burned habitat can be recolonized, and can result in long-term or permanent loss of butterfly populations. Historically, Hermes copper butterfly persisted through wildfire by recolonizing extirpated occurrences once the habitat recovered. However, as discussed below, ongoing loss and isolation of habitat has resulted in smaller, more isolated populations than existed historically. This isolation has likely reduced or removed the ability of the species to recolonize occurrences extirpated by wildfire.

Our analysis of current fire danger and fire history illustrates the potential for catastrophic loss of the majority of remaining butterfly occurrences should another large fire occur prior to recolonization of burned habitats. As discussed by Marschalek and Klein (2010, p. 9) and Deutschman *et al.* (2010, p. 42), one or more wildfires could extirpate the majority of extant Hermes copper butterfly occurrences. Furthermore, no practical measures are known that could significantly reduce the impact of megafires on the Hermes copper butterfly and its habitat. In a 2015 effort to mitigate the impact of wildfires on Hermes copper butterfly, Marschalek and Deutschman (2016c) initiated a translocation study, funded by the San Diego Association of Governments (SANDAG),

to assist recolonization of habitat formerly occupied by the large Hollenbeck Canyon occurrence. While it is not clear that this attempt was successful, in 2016 there were signs of larval emergence from eggs and at least one adult was observed, indicating some level of success (Marschalek and Deutschman 2016c, p. 10). Regulatory protections, such as ignition-reduction measures, do exist to reduce fire danger; however, large megafires are considered resistant to control (Durland, pers. comm., in Scauzillo 2015).

The current fire regime in Mexico is not as well understood. Some researchers claim chaparral habitat in Mexico within the Hermes copper butterfly's range is not as affected by megafires because there has been less fire suppression activity than in the United States (Minnich and Chou 1997, pp. 244–245; Minnich 2001, pp. 1,549–1,552). In contrast, Keeley and Zedler (2009, p. 86) contend the fire regime in Baja California mirrors that of Southern California, similarly consisting of "small fires punctuated at periodic intervals by large fire events." Local experts agree the lack of fire suppression activities in Mexico has reduced the fuel load on the landscape, subsequently reducing the risk of megafire in Mexico (Oberbauer 2017, pers. comm.; Faulkner 2017, pers. comm.). However, examination of satellite imagery from the 2000s indicates impacts from medium-sized wildfire in Mexico are similar to those in San Diego County, as evidenced by two large fires in 2014 that likely impacted habitats associated with the Hermes copper butterfly records near Ensenada (NASA 2017a; 2017b; Service 2018a p. 37).

Although the level of impact may vary over time, wildfires cause ongoing degradation, destruction, fragmentation, and isolation of Hermes copper butterfly habitat as well as direct losses of Hermes copper butterfly that have contributed to the extirpation

of numerous populations. As discussed above, only 3 of the 31 U.S. occurrences thought to have been extirpated in whole or in part by fire since 2003 appear to have been naturally re-established. This threat affects all Hermes copper butterfly populations and habitat across the species' entire range.

Land Use Change

Urban development within San Diego County has resulted in the loss, fragmentation, and isolation of Hermes copper butterfly habitat (CalFlora 2010; Consortium of California Herbaria 2010; San Diego County Plant Atlas 2010) (see the Habitat Isolation section below). Of the 50 known Hermes copper butterfly occurrences confirmed or presumed extirpated, loss, fragmentation, and isolation of habitat as a result of development contributed to 23 of those (46 percent; Table 1). In particular, habitat isolation is occurring between the northern and southern portions of the species' range and in rural areas of the southeastern county; this loss of dispersal corridor-connectivity areas is of greatest concern where it would impact core occurrences in these areas (Service 2018a, p. 41).

To quantify the remaining land at risk of development, we analyzed all existing habitat historically occupied by the Hermes copper butterfly based on specimens and observation records. We then removed lands that have been developed and examined the ownership of remaining, undeveloped land. Currently, approximately 64 percent of the remaining undeveloped habitat is protected from destruction by development because it is conserved (Service 2018a, p. 41).

The County of San Diego has two ordinances in place that restrict new development or other proposed projects within sensitive habitats. The Biological

Mitigation Ordinance of the County of San Diego Subarea Plan and the County of San Diego Resource Protection Ordinance regulate development within coastal sage scrub and mixed chaparral habitats that currently support extant Hermes copper butterfly populations on non-Federal land within the County's jurisdiction (for example, does not apply to lands under the jurisdiction of the City of Santee or the City of San Diego). Additionally, County regulations mandate surveys for Hermes copper butterfly occupancy and habitat, and to the extent it is a significant impact under the California Environmental Quality Act (Cal. Pub. Res. Code 21000 *et seq.*), mitigation may be required. These local resource protection ordinances may provide some regulatory measures of protection for the remaining 36 percent of extant Hermes copper butterfly habitat throughout the species' occupied range, when occurring within the County's jurisdiction. Additionally, presence of Hermes copper butterflies has on occasion been a factor within San Diego County for prioritizing land acquisitions for conservation from Federal, State, and private funding sources due to the focus of a local conservation organization. However, there is no coordinated effort to prioritize Hermes copper butterfly conservation efforts within the species' range. SANDAG has provided funding for Hermes copper butterfly surveys and research since 2010, as well as grants for acquisition of two properties that have been (or are) occupied by Hermes copper butterfly.

There is uncertainty regarding the Hermes copper butterfly's condition within its southernmost known historical range in Mexico; however, one expert estimated that development pressure in known occupied areas near the city of Ensenada was similar to that in the United States (Faulkner 2017, pers. comm.).

We conclude that development is a current, ongoing threat contributing to reduction and especially isolation of remaining Hermes copper butterfly habitat in limited areas on non-Federal lands at this time. However, some regulatory protections are in place, and 64 percent of historically occupied habit is on conserved lands. Therefore, although the rate of habitat loss has been reduced relative to historical conditions, regulations have not served to protect some key populations or dispersal corridor-connectivity areas, and development continues to increase isolation of the northern portion from the southern portion of the species' range (Service 2018a, pp. 40–44).

Habitat Isolation

Habitat isolation directly affects the likelihood of Hermes copper butterfly population persistence in portions of its range, and exacerbates other effects from fire and development. Hermes copper butterfly populations have become isolated both permanently (past and ongoing urban development) and more temporarily (wildfires). Habitat isolation separates extant occurrences and inhibits movement by creating a gap that Hermes copper butterflies are not likely to traverse. Any loss of resources on the ground that does not affect butterfly movement, such as burned vegetation, may degrade but not fragment habitat. Therefore, in order for habitat to be isolated, movement must either be inhibited by a barrier, or the distance between remaining suitable habitat must be greater than adult butterflies will typically move to mate or to deposit eggs. Thus, a small fire that temporarily degrades habitat containing host plants is not likely to support movement between suitable occupied habitat patches and could cause temporary isolation. It is important to note that, although movement may be possible, to ensure successful recolonization, habitat must be suitable at the time Hermes copper butterflies

arrive.

Effects from habitat isolation in the northern portion of the species' range have resulted in extirpation of at least four Hermes copper butterfly occurrences (see Table 1 above). A historical Hermes copper butterfly occurrence (Rancho Santa Fe) in the northern portion of the range has been lost since 2004. This area is not expected to be recolonized because it is mostly surrounded by development and the nearest potential "source" occurrence is Elfin Forest, 2.7 mi (4.3 km) away, where at least one adult was last detected in 2011 (Marschalek and Deutschman 2016a, p. 8). Farther to the south, Black Mountain, Lopez Canyon, Van Dam Peak, and the complex of occurrences comprising Mission Trails Park, North Santee, and Lakeside Downs are isolated from other occurrences by development. Because a number of populations have been lost, and only a few isolated and mostly fragmented ones remain, the remaining populations in the northern portion of the range are particularly vulnerable to the effects of further habitat isolation. These populations may already lack the dispersal corridor-connectivity areas needed to recolonize should individual occurrences be extirpated. Reintroduction or augmentation may be required to sustain the northern portion of the species' range. No information is available on the potential impacts of habitat isolation in the species' range in Mexico.

Overall, habitat isolation is a current, ongoing threat that continues to degrade and isolate Hermes copper butterfly habitat across the species' range.

Climate Change and Drought

Scientific measurements spanning several decades demonstrate that changes in climate are occurring, and that the rate of change has increased since the 1950s. Global

climate projections are informative, and, in some cases, the only or the best scientific information available. However, projected changes in climate and related impacts can vary across and within different regions of the world (IPCC 2013, pp. 15–16). To evaluate climate change for the region occupied by the Hermes copper butterfly, we used climate projections "downscaled" from global projection models, as these provided higher resolution information that is more relevant to spatial scales used for analyses of a given species (Glick *et al*. 2011, pp. 58–61).

Southern California has a typical Mediterranean climate. Summers are typically dry and hot while winters are cool, with minimal rainfall averaging about 25 centimeters (10 inches) per year. The interaction of the maritime influence of the Pacific Ocean combined with inland mountain ranges creates an inversion layer typical of Mediterranean-like climates. These conditions also create microclimates, where the weather can be highly variable within small geographic areas at the same time.

We evaluated the available historical weather data and the species' biology to determine the likelihood of effects assuming the climate has been and will continue to change. The typical effect of a warmer climate, as observed with Hermes copper butterfly in lower, warmer elevation habitats compared to higher, cooler elevations, is an earlier flight season by several days (Thorne 1963, p. 146; Marschalek and Deutschman 2008, p. 98). Marschalek and Klein (2010, p. 2) noted that past records suggest a slightly earlier flight season in recent years compared to the 1960s. The historical temperature trend in Hermes copper butterfly habitats for the month of April (when larvae are typically developing and pupating) from 1951 to 2006 can be calculated with relatively high confidence (p values from 0.001 to 0.05). The mean temperature change in occupied

areas ranged from 0.07 to 0.13 ^{o}F (0.04 to 0.07 ^{o}C) per year (Climate Wizard 2016), which could explain the earlier than average flight seasons. Nevertheless, given the temporal and geographical availability of their widespread perennial host plant, and exposure to extremes of climate throughout their known historical range (Thorne 1963, p. 144), Hermes copper butterfly and its host and nectar plants are not likely to be negatively affected throughout the majority of the species' range by phenological shifts in development of a few days.

Drought has been a major factor affecting southern California ecosystems, starting with the driest 12-month period on record in 2013–2014 (Swain *et al.* 2014, p. S3) extending through 2016. The exact mechanism by which drought impacts Hermes copper butterflies is not known. However, other butterfly species in southern California have shown declines caused by drought stress on their perennial host plants (Ehrlich *et al.* 1980, p. 105). Spiny redberry shows decreased health and vegetative growth during drought years (Marschalek 2017, pers. comm.).

Though limited, existing data suggest that drought is contributing to the decline of Hermes copper butterflies. Systematic monitoring of adult abundance at five sentinel sites indicates that the past 4 years of warm, dry drought conditions negatively affected habitat suitability and suppressed adult population sizes. At the Sycuan Peak occurrence, where the highest ever maximum adult daily count was recorded in 2013 (41), the population dropped in number with decreased precipitation and has remained at record low numbers for the past 4 years (1, 1, 0, and 0; Service 2018a, Figure 10; Marschalek and Deutschman 2017, p. 9; Marschalek 2018 pers. comm.). The highest elevation occurrence (Boulder Creek Road) was the largest of the monitored sites in 2017 following years of

drought and high temperatures with a maximum daily count of 14 (down from 20 in 2013; Service 2018a, Figure 10; Marschalek and Deutschman 2017, p. 9). This higher elevation site received more rain than lower sites. Therefore, though population data are limited, drought appears to negatively impact Hermes copper butterfly populations.

The Hermes copper butterfly is a rare species with limited abundance at all sites across its range, many of which are also isolated by habitat isolation, and population counts have gone down at all sites where surveys are occurring. Temperatures have significantly increased from 1951 to 2016; these changes may be influencing the timing of the Hermes copper butterfly's flight season as well as their phenology (Service 2018a, pp. 47–48). Through increased evapotranspiration and soil drying, high temperatures increase the indirect negative effects of drought on average quality of the host plant and nectar resources. Still, we are unaware of any direct negative impacts on Hermes copper butterfly life history due to these temperature changes. Drought appears to be having a more pronounced indirect negative effect, as the mean maximum daily adult counts have decreased in recent years with a decrease in precipitation that may be more of a concern at low-elevation sites.

Combined Effects

Threats working in concert have a much greater effect than threats working individually; for example, habitat loss and isolation due to land use change combined with wildfire together have a greater impact on the species than wildfire alone. Multiple threats at a given hierarchical level have combined effects that emerge at the next higher level. For example, at the population level, habitat loss significantly reducing the resilience of one population combined with wildfire affecting resilience of another has a

greater effect on Hermes copper butterfly species-level redundancy and, therefore, species viability than either threat would individually.

Threats that alone may not significantly reduce species viability have at least additive, if not synergistic, effects on species viability. For example, wildfire and habitat modification (type conversion) typically have a synergistic effect on habitat suitability in Mediterranean-type climate zones (Keeley and Brennon 2012, entire; California Chaparral Institute 2017, entire). Wildfire increases the rate of nonnative grass invasion, a component of the habitat modification threat, which in turn increases fire frequency. Overall, these factors increase the likelihood of megafires on a landscape/species range-wide scale.

The relationship between habitat fragmentation and type conversion is in part synergistic, particularly for Hermes copper butterflies, which are typically sedentary with limited direct movement ability. Fragmentation increases the rate of nonnative plant species invasion and type conversion through increased disturbance, nitrogen deposition, and seed dispersal, and type conversion itself reduces habitat suitability and, therefore, habitat contiguity and dispersal corridor-connectivity areas (increasing both habitat fragmentation and isolation). Another example of combined impacts is climate change. Although not a significant threat on its own, the increased temperature resulting from climate change significantly exacerbates other threats, especially wildfire and drought.

Small population size, low population numbers, and population isolation are not necessarily independent factors that threaten a species. Typically, it is the combination of small size and number and isolation of populations in conjunction with other threats (such as the present or threatened destruction and modification of the species' habitat or

range) that may significantly increase the probability of species' extinction. Considering reduced numbers in recent surveys and historically low population numbers relative to typical butterfly population sizes, the magnitude of effects due to habitat fragmentation and isolation, drought, and wildfire are likely exacerbated by small population size.

Therefore, multiple threats are acting in concert to fragment, limit, and degrade Hermes copper butterfly habitat and decrease species resiliency, redundancy, and representation. The effects of these threats are evidenced by the loss and isolation of many populations throughout the range; those remaining extant populations fall within very high fire-hazard areas.

Future Condition

To analyze species' viability, we consider the current and future availability or condition of resources. The consequences of missing resources are assessed to describe the species' current condition and to project possible future conditions.

As discussed above, we generally define viability as the ability of the species to sustain populations in the natural ecosystem for the foreseeable future, in this case, 30 years. We chose 30 years because it is within the range of the available hydrological and climate change model forecasts, fire hazard period calculations, habitat-vegetation association, and fire-return intervals.

Threats

To consider the possible future viability of Hermes copper butterfly, we first analyzed the potential future conditions of ongoing threats. Possible development still in the preliminary planning stage (Service and CDFW 2016) could destroy occupied or suitable habitat on private land within the North Santee occurrence. Similar concerns

apply to habitat in the Lyons Valley, Skyline Truck Trail area. Habitat isolation is a continuing concern for Hermes copper butterfly as lack of dispersal corridor-connectivity areas among occupied areas limits the ability of the species to recolonize extirpated habitat. Development outside of occupied habitat can also negatively affect the species by creating dispersal corridor-connectivity barriers throughout the range.

Anticipated severity of effects from future habitat development and isolation varies across the range of the species. Within U.S. Forest Service (USFS) lands (2,763 ha (6,829 ac)), we anticipate future development, if any, will be limited. As it implements specific activities within its jurisdiction, the USFS has incorporated measures into the Cleveland National Forest Plan to address threats to Hermes copper butterfly and its habitat (USFS 2005, Appendix B, p. 36). The limited number of Hermes copper butterfly occurrences within BLM lands is also unlikely to face future development pressure. Based on our analysis, we conclude land use change, while significant when combined with the stressor of wildfire**,** will not be the most significant future source of Hermes copper butterfly population decline and loss. Some habitat areas vulnerable to development are more important than others to species' viability. Of particular concern are potential extirpations due to development of the North Santee, Loveland Reservoir, Skyline Truck Trail, North Jamul, and South Japutal core occurrences (26 percent of the core occurrences considered or presumed extant; Service 2018a, pp. 23–28, 41). Absent additional conservation of occupied habitat and dispersal corridor-connectivity areas, effects of habitat loss, fragmentation, and isolation will continue to extirpate occurrences, degrade existing Hermes copper butterfly habitat, and reduce movement of butterflies among occurrences, which reduces the likelihood of natural recolonizations following

extirpation events (Service 2018a, p. 53 and Figure 9).

As discussed above, wildfire can permanently affect habitat suitability. If areas are reburned at a high enough frequency, California buckwheat may not have the time necessary to become reestablished, rendering the habitat unsuitable for Hermes copper butterfly (Marschalek and Klein 2010, p. 728). Loss of nectar plants is not the only habitat effect caused by wildfire; habitat type conversion increases flammable fuel load and fire frequency, further stressing Hermes copper butterfly populations. Therefore, habitat modification due to wildfire is cause for both short- and long-term habitat impact concerns.

We expect that wildfire will continue to cause direct mortality of Hermes copper butterflies. In light of the recent drought-influenced wildfires in southern California, a future megafire affecting most or all of the area burned by the Laguna Fire in 1970 (40-year-old chaparral) could encompass the majority of extant occurrences and result in significantly reduced species viability (Service 2018a, Figures 7 and 8).

In the case of Hermes copper butterfly, the primary limiting species-level resource is dispersal corridor-connectivity areas of formerly occupied to currently occupied habitats, on which the likelihood of post-fire recolonization depends, is a limiting factor. We further analyzed fire frequency data to determine the effect on occurrence status and the likelihood of extirpation over the next 30 years. Our analysis concluded that the probability of a megafire occurring in Hermes copper butterfly's range has significantly increased. During the past 15 years (2002–2017), there were six megafires within Hermes copper butterfly's possible historical range (Poomacha, Paradise, Witch, Cedar, Otay Mine, and Harris; all prior to 2008), a significant increase compared to none during the

two previous 15 years (1987–2001 and 1972–1986), and only one during the 15-year period prior to 1972 (Laguna). This represents a more than six-fold increase in the rate of megafire occurrence over the past 15 years. While fires meeting our megafire definition of greater than 16,187 ha (40,000 ac) have not occurred in the past 10 years, several relatively large fires occurred in the Hermes copper butterfly's range in 2014 and 2017. The Cocos and Bernardo fires burned approximately 809 ha (2,000 ac) and 607 ha (1,500 ac) of potentially occupied Hermes copper butterfly habitat near the Elfin Forest and the Black Mountain occurrences (Service 2018a, Figure 5). A smaller unnamed fire burned approximately 38 ha (95 ac) of potential habitat near the extant core Mission Trails occurrence (Burns *et al.*, 2014; City News Source 2014). In 2017, the Lilac Fire burned 1,659 ha (4,100 ac) of potentially occupied habitat between the Bonsall and Elfin Forest occurrences. At the current large-fire return rate, multiple megafires could impact Hermes copper butterfly over the next 30 years, and that assumes no further increase in rate. If the trend does not at least stabilize, the frequency of megafires could continue to increase with even more devastating impacts to the species.

Combined effects increase the likelihood of significant and irreversible loss of populations, compared to individual effects. If fewer source populations are available over time to recolonize burned habitat when host and nectar plants have sufficiently regenerated, the combined effects of these threats will continue to reduce resiliency, redundancy, and representation, resulting in an increase in species extinction risk.

Species Viability Index

In order to quantify population viability for the Hermes copper butterfly, we calculated a viability index in our SSA (Service 2018a, pp. 58–62). In our index

calculations, the contribution of a population to species-level redundancy depends on population-level resiliency, and contribution to species-level representation depends on how rare populations are in the habitat type (California Ecological Unit) it occupies (Service 2018a, Figure 12). Species redundancy and representation are assumed to equally influence species' viability. We assign a 100 percent species viability index value to the baseline state of all known historical population occurrences in the United States. For this index calculation, we do not consider Mexican occurrences, because there are only 3 (possibly 2) out of a total of 95, and all are presumed extirpated.

Our index of species viability is proportional to, but not equal to, the ability of a species to sustain populations in the wild (in other words, it is an index that should change proportionally with the likelihood of persistence, but is not itself a probability value). As such, our viability index uses population resilience, species redundancy, and species representation to quantify changes in species viability, but does not predict probability of persistence. For a detailed description of our methodology and of viability index results, see the Species Viability Index section of the SSA (Service 2018a, pp. 58–62).

To estimate species viability, we first estimated species redundancy and species representation. To estimate a current species redundancy value, we ranked each occurrence's resiliency value using a scale of 0–4, with 0 being extirpated, and 4 being connected core occurrences (Service 2018a, p. 53; Appendix III). We estimate there are currently 18 presumed extant occurrences (rank sum of 18), 3 extant non-core isolated (rank sum of 6), 11 extant non-core connected or core isolated (rank sum of 33), and 13 extant core connected (rank sum of 52) occurrences for a total current species redundancy

value of 109 (Service 2018a, p. 57). Based on our calculations, the species currently retains 30 percent of its historical population redundancy.

In order to model species representation, we used California Ecological Units (Goudey and Smith 1994 [2007]; see Table 1 above) as a measure of habitat diversity (Service 2018a, Figure 10). Using those units, occupancy in the Coastal Terraces (CT) ecological unit has been reduced to 18 percent (2/11 occurrences not extirpated), in the Coastal Hills (CH) unit to 40 percent (16/40 not extirpated), in the Western Granitic Foothills (WGF) unit to 63 percent (22/35 not extirpated), while the Palomar-Cuyamaca Peak Coastal Terraces (PC) unit remains at 100 percent (none extirpated). Based on these proportional values, the species retains 55 percent of its historical species representation (Service 2018a, p. 57).

Species viability was calculated by summing the results of the redundancy and representation calculations (Service 2018a, p. 57); we estimate the species currently retains no more than 43 percent of its estimated historical viability.

Future Scenarios

Given climate change predictions of more extreme weather, less precipitation, and warmer temperatures, and the recent trend of relatively frequent and large fires, we can assume the primary threats of drought and wildfire will continue to increase in magnitude. If land managers work to conserve and manage all occupied and temporarily unoccupied habitat, and maintain habitat contiguity and dispersal corridor-connectivity, this should prevent further habitat loss. Although fire and drought are difficult to control and manage for, natural recolonization and assisted recolonization through translocation in higher abundance years (e.g., Marschalek and Deutschman 2016b) should allow

recolonization of extirpated occurrences.

All scenarios described below incorporate some change in environmental conditions. However, it is important to keep in mind that even if environmental conditions remain unchanged, the species may continue to lose populations so that viability declines by virtue of maintaining the current trend. Given that there is uncertainty as to exact future trends of many threats, these future scenarios are meant to explore the range of uncertainty and examine the species' response across the range of likely future conditions. For more detailed discussions of the future scenarios, see the Possible Future Conditions section of the SSA (Service 2018a, pp. 60–62).

Scenario 1: Conditions worsen throughout the range, resulting in increased extinction risk.

Due to a combination of increased wildfire and drought frequency and severity, no habitat patches are recolonized, and all Hermes copper butterfly occurrences with a resilience score of less than 4 are extirpated (without reducing the redundancy weight of remaining occurrences based on changed size or isolation status). These losses would reduce the species redundancy value from 109 to 52. Based on the resulting redundancy value ratio of 52/368, the species would retain 14 percent of its historical baseline population redundancy. There would be no occupancy remaining in the CT ecological unit (0 percent), CH ecological unit occupancy would be reduced from 40 to 8 percent (3/40 not extirpated), WGF unit from 63 to 26 percent (9/35 not extirpated), and PC unit from 100 to 17 percent (1/6 not extirpated). Based on these proportional values, the species would retain approximately 13 percent of its historical representation. Resulting changes to the population redundancy and representation values would cause an

approximate drop from 43 to 14 percent species viability relative to historical conditions. We judge this scenario about as likely as not to occur in the next 30 years.

Scenario 2: A megafire comparable to the 1970 Laguna Fire increases extinction risk.

If there was a megafire comparable to the 1970 Laguna Fire, many occurrences would likely be extirpated, and, due to the number of occurrences already lost, the likelihood of any being recolonized would be low. With regard to redundancy, these losses would result in the additional loss of four unknown status occurrences; no small isolated occurrences; three small, connected or large, isolated occurrences; and five large, connected occurrences.

In this scenario, the species would retain 18 percent of its historical baseline redundancy and 30 percent of its historical representation. These changes to population redundancy and representation values would result in an approximate drop in species viability relative to historical conditions from the current 43 percent to 24 percent. We judge this scenario more likely than not to occur in the next 30 years.

Scenario 3: Conditions stay the same, resulting in extinction risk staying the same.

While environmental conditions never stay the same, changes that negatively affect populations may be offset by positive ones—for example, continued habitat conservation and management actions such as translocations to recolonize burned habitats. In this scenario, the risk of wildfire remains high. Occurrence extirpations and decreased resiliency of some populations in this scenario are balanced by habitat recolonizations and increased resiliency in others. Species viability would thus remain at

approximately 43 percent relative to historical conditions. Even if environmental conditions remain unchanged, the species may continue to lose populations so that viability declines by virtue of maintaining the current trend. We judge this scenario about as likely as not to occur in the next 30 years.

Scenario 4: Conditions improve, resulting in decreased extinction risk.

In this scenario, environmental threats such as fire and drought decrease in frequency and magnitude relative to the past 30 years, and management actions such as continued conservation and translocation efforts are successful. Due to favorable climate conditions and proactive management and conservation, all fire-extirpated occurrence habitats are recolonized, no further occurrences are extirpated, and at least half the "unknown status" occurrences are determined to be extant. This scenario would result in an increase to 62 percent species viability relative to historical conditions. We judge this scenario unlikely to occur in the next 30 years.

Determination of Hermes Copper Butterfly Status

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of "endangered species" or "threatened species." The Act defines an "endangered species" as a species that is "in danger of extinction throughout all or a significant portion of its range," and a "threatened species" as a species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The Act requires that we determine whether a species meets the definition of "endangered species" or "threatened species" because of any of the following factors: (A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes; (C) Disease or predation; (D) The inadequacy of existing regulatory mechanisms; or (E) Other natural or manmade factors affecting its continued existence.

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats to the Hermes copper butterfly, and we have determined the following factors are impacting the resiliency, redundancy, and representation of the species: wildfire (Factor A), land use change (Factor A), habitat fragmentation and isolation (Factor A), climate change (Factor E), and drought (Factor E); as well as the cumulative effect of these on the species, including synergistic interactions between the threats and the vulnerability of the species resulting from small population size. We also considered the effect of existing regulatory mechanisms (Factor D) on the magnitude of existing threats. We also note that potential impacts associated with overutilization (Factor B), disease (Factor C), and predation (Factor C) were evaluated but found to have little to no impact on species viability (Service 2018a, p. 50); thus, we did not discuss them in this document.

Individually, land use change (Factor A), habitat fragmentation and isolation (Factor A), climate change (Factor A), and drought (Factor E) are impacting the Hermes copper butterfly and its habitat. Although most impacts from land use change have occurred in the past, and some existing regulations are in place to protect remaining occurrences, 36 percent of historically occupied habitat is not protected and remains at risk from land use change. As a result of past development, which has contributed to the loss of 23 occurrences (Table 1), species representation has been reduced through loss of most occurrences in ecological units closest to the coast, while redundancy has decreased

through loss of overall numbers of occurrences. Remaining habitat has been fragmented, decreasing species resiliency by removing habitat corridors and thus decreasing the species' ability to recolonize previously extirpated occurrences. Climate change is currently having limited effects on the species; however, drought is a significant threat resulting in degradation of habitat and decreased numbers of Hermes copper butterflies at all monitored occurrences, with the exception of the highest elevation occurrence that receives the most rainfall.

Wildfire (Factor A) is the most substantial threat currently impacting Hermes copper butterfly and is the most significant source of ongoing population decline and loss of occurrences. Large fires can eliminate source populations before previously burned habitat can be recolonized, and can result in long-term or permanent loss of butterfly populations. Since 2003, wildfire is estimated to have caused or contributed to the extirpation of 31 U.S. occurrences (and 3 in Mexico), only 3 of those are known to have been apparently repopulated. Wildfire frequency has significantly increased in Hermes copper butterfly habitat since 1970, and the likelihood of additional megafires occurring over the next 30 years is high. Frequent wildfire degrades available habitat through conversion of suitable habitat to nonnative grasslands, and we anticipate that fire will continue to modify and degrade Hermes copper butterfly habitat into the foreseeable future. Furthermore, though fuel-reduction activities are ongoing throughout much of the species' range, megafires cannot be controlled through regulatory mechanisms. We expect the ongoing effects of wildfire will continue to result in substantial reductions of species resiliency, redundancy, and representation for the Hermes copper butterfly.

Combined effects of threats have a greater impact on the Hermes copper butterfly

than each threat acting individually. Wildfire increases the rate of nonnative grass invasion, which in turn increases fire frequency. Overall, these factors increase the likelihood of megafires on a range-wide scale now and in the foreseeable future. The combination of habitat fragmentation and isolation (as a result of past and potential limited future urban development), existing dispersal barriers, and megafires (that encompass vast areas and are increasing in frequency) that limit, and degrade Hermes copper butterfly habitat, results in substantial reduction in species resiliency, redundancy, and representation. Furthermore, remaining extant populations fall within very high fire-hazard areas, increasing the risk that a single megafire could result in the extirpation of the majority of extant occurrences. Additionally, effects from habitat fragmentation and isolation, megafire, and drought are exacerbated by the small population size and isolated populations of the Hermes copper butterfly. Overall, the combined effects of threats are currently decreasing the resiliency, redundancy, and representation of the Hermes copper butterfly, and we expect that they will continue to decrease species viability into the foreseeable future.

After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we find that that the Hermes copper butterfly meets the definition of a threatened species. Multiple threats are impacting Hermes copper butterfly across its range, and the most probable future scenarios predict that species viability will either remain at 43 percent of historical levels, or decrease to 24 percent or 14 percent of historical viability within the foreseeable future. Thus, after assessing the best available information, we conclude that the Hermes copper butterfly is likely to become in danger of extinction within the foreseeable future throughout all of its

range. We find that the Hermes copper butterfly is not currently in danger of extinction, because although a megafire has the potential to extirpate a high number of occurrences, it is not likely that a single megafire would impact all occurrences, particularly given the urban area separating the most northern and southern occurrences. Furthermore, even the future scenarios resulting in the lowest species viability do not predict that the species is currently in danger of extinction. Therefore, threatened status is the most appropriate for the species.

Determination of Status Throughout a Significant Portion of Its Range

Under the Act and our implementing regulations, a species may warrant listing if it is in danger of extinction or likely to become so in the foreseeable future throughout all or a significant portion of its range. Because we have determined that the Hermes copper butterfly is likely to become an endangered species within the foreseeable future throughout all of its range, we find it unnecessary to proceed to an evaluation of potentially significant portions of the range. Where the best available information allows the Services to determine a status for the species rangewide, that determination should be given conclusive weight because a rangewide determination of status more accurately reflects the species' degree of imperilment and better promotes the purposes of the Act. Under this reading, we should first consider whether the species warrants listing "throughout all" of its range and proceed to conduct a "significant portion of its range" analysis if, and only if, a species does not qualify for listing as either an endangered or a threatened species according to the "throughout all" language. We note that the court in *Desert Survivors* v. *Department of the Interior*, No. 16-cv-01165-JCS, 2018 WL

4053447 (N.D. Cal. Aug. 24, 2018), did not address this issue, and our conclusion is therefore consistent with the opinion in that case.

Determination of Status

Our review of the best available scientific and commercial information indicates that the Hermes copper butterfly meets the definition of a threatened species. Therefore, we propose to list the Hermes copper butterfly as a threatened species in accordance with sections 3(20) and 4(a)(1) of the Act.

Critical Habitat

Background

Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Our regulations at 50 CFR 424.02 define the geographical area occupied by the species as: An area that may generally be delineated around species' occurrences, as determined by the Secretary (i.e., range). Such areas may include those areas used throughout all or part of the species' life cycle, even if not used on a regular basis (e.g.,

migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals).

Conservation, as defined under section 3 of the Act, means to use and the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Such designation does not allow the government or public to access private lands. Such designation does not require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the consultation requirements of section 7(a)(2) of the Act would apply, but even in the event of a destruction or adverse modification finding, the obligation of the Federal action agency and the landowner is not to restore or recover the species, but to implement

reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those physical or biological features that occur in specific areas, we focus on the specific features that are essential to the life-history needs of the species, including but not limited to, water characteristics, soil type, geological features, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. When designating critical habitat, the Secretary will first evaluate areas occupied by the species. The Secretary will only consider unoccupied areas to be

essential where a critical habitat designation limited to geographical areas occupied by the species would be inadequate to ensure the conservation of the species. In addition, for an unoccupied area to be considered essential, the Secretary must determine that there is a reasonable certainty both that the area will contribute to the conservation of the species and that the area contains one or more of those physical or biological features essential to the conservation of the species.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the *Federal Register* on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R. 5658)), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. They require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

When we are determining which areas should be designated as critical habitat, our primary source of information is generally the information from the species status assessment (SSA) report and information developed during the listing process for the species. Additional information sources may include any generalized conservation strategy, criteria, or outline that may have been developed for the species, the recovery plan for the species, articles in peer-reviewed journals, conservation plans developed by

States and counties, scientific status surveys and studies, biological assessments, other unpublished materials, or experts' opinions or personal knowledge.

Habitat is dynamic, and species may move from one area to another over time. We recognize that critical habitat designated at a particular point in time may not include all of the habitat areas that we may later determine are necessary for the recovery of the species. For these reasons, a critical habitat designation does not signal that habitat outside the designated area is unimportant or may not be needed for recovery of the species. Areas that are important to the conservation of the species, both inside and outside the critical habitat designation, will continue to be subject to: (1) conservation actions implemented under section 7(a)(1) of the Act, (2) regulatory protections afforded by the requirement in section 7(a)(2) of the Act for Federal agencies to ensure their actions are not likely to jeopardize the continued existence of any endangered or threatened species, and (3) section 9 of the Act's prohibitions on taking any individual of the species, including taking caused by actions that affect habitat. Federally funded or permitted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. These protections and conservation tools will continue to contribute to recovery of this species. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans (HCPs), or other species conservation planning efforts if new information available at the time of these planning efforts calls for a different outcome.

Prudency Determination

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12), require that, to the maximum extent prudent and determinable, the Secretary shall designate critical habitat at the time the species is determined to be an endangered or threatened species. Our regulations (50 CFR 424.12(a)(1)) state that the Secretary may, but is not required to, determine that a designation would not be prudent in the following circumstances:

(i) The species is threatened by taking or other human activity and identification of critical habitat can be expected to increase the degree of such threat to the species;

(ii) The present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or threats to the species' habitat stem solely from causes that cannot be addressed through management actions resulting from consultations under section 7(a)(2) of the Act;

(iii) Areas within the jurisdiction of the United States provide no more than negligible conservation value, if any, for a species occurring primarily outside the jurisdiction of the United States;

(iv) No areas meet the definition of critical habitat; or

(v) The Secretary otherwise determines that designation of critical habitat would not be prudent based on the best scientific data available.

We did not identify any of the factors above to apply to the Hermes copper butterfly. Therefore, we find designation of critical habitat is prudent for the species.

Critical Habitat Determinability

Having determined that designation is prudent, under section 4(a)(3) of the Act we must find whether critical habitat for the Hermes copper butterfly is determinable. Our regulations at 50 CFR 424.12(a)(2) state that critical habitat is not determinable when one or both of the following situations exist:

(i) Data sufficient to perform required analyses are lacking, or

(ii) The biological needs of the species are not sufficiently well known to identify any area that meets the definition of "critical habitat."

When critical habitat is not determinable, the Act allows the Service an additional year to publish a critical habitat designation (16 U.S.C. 1533(b)(6)(C)(ii)).

We reviewed the available information pertaining to the biological needs of the species and habitat characteristics where the species is located. This and other information represent the best scientific data available and led us to conclude that the designation of critical habitat is determinable for the Hermes copper butterfly.

Physical or Biological Features

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12(b), in determining which areas within the geographical area occupied by the species at the time of listing to designate as critical habitat, we consider the physical or biological features that are essential to the conservation of the species and which may require special management considerations or protection. For example, physical features might include gravel of a particular size required for spawning, alkali soil for seed germination, protective cover for migration, or susceptibility to flooding or fire that maintains necessary early-successional habitat characteristics. Biological features might

include prey species, forage grasses, specific kinds or ages of trees for roosting or nesting, symbiotic fungi, or a particular level of nonnative species consistent with conservation needs of the listed species. The features may also be combinations of habitat characteristics and may encompass the relationship between characteristics or the necessary amount of a characteristic needed to support the life history of the species. In considering whether features are essential to the conservation of the species, the Service may consider an appropriate quality, quantity, and spatial and temporal arrangement of habitat characteristics in the context of the life-history needs, condition, and status of the species. These include, but are not limited to:

(1) Space for individual and population growth and for normal behavior;

(2) Food, water, air, light, minerals, or other nutritional or physiological requirements;

(3) Cover or shelter;

(4) Sites for breeding, reproduction, or rearing (or development) of offspring; and

(5) Habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

As discussed above, we conducted a Species Status Assessment (SSA) for Hermes copper butterfly, which is an evaluation of the best available scientific and commercial data on the status of the species. The SSA provides the scientific information upon which this proposed critical habitat determination is based (Service 2018a).

Space for Individual and Population Growth and for Normal Behavior

Patches of spiny redberry host plants, including post-fire stumps that can resprout, are required to support Hermes copper butterfly populations and subpopulations; the

number of plants in a patch required to support a subpopulation is unknown. Because we know that Hermes copper butterflies are periodically extirpated from patches of host plants by wildfire, and subsequently re-colonize these patches (Table 1), we can assume functional metapopulation dynamics are important for species viability. The time-scale for recolonization from source subpopulations may be 10–30 years. Spiny redberry is often associated with the transition between sage scrub and chaparral vegetation associations, but may occur in a variety of vegetation associations. Such host plant patches occur between 30–1,341 m (100–4,400 ft) above sea level.

Food, Water, Air, Light, Minerals, or Other Nutritional or Physiological Requirements

Adults require relatively abundant nectar sources associated with patches of their host plants, spiny redberry. Plants specifically identified as significant nectar sources include *Eriogonum fasciculatum* (California buckwheat) and *Eriophylum confirtiflorum* (golden yarrow). Any other butterfly nectar source (short flower corolla) species found associated with spiny redberry that together provide nectar similar in abundance to that typically provided by California buckwheat would also meet adult nutritional requirements. Larvae feed on the leaves of the host plant.

Sites for Breeding, Reproduction, or Rearing (or Development) of Offspring

All immature life-cycle stages develop on the host plant, spiny redberry. Eggs are deposited on branches, caterpillars are sheltered on and fed by leaves, and chrysalides are attached to live host plant leaves.

Habitats That Are Protected from Disturbance and Representative of the Historic Geographical and Ecological Distributions of a Species

Corridor (connective) habitat areas containing adult nectar sources are required

among occupied (source subpopulations) and formerly occupied host plant patches, in order to maintain long-term the number and distribution of source subpopulations required to support resilient metapopulation species viability.

Protected spiny redberry host plants must be distributed in four California Ecological Units to maintain species representation.

Summary of Essential Physical or Biological Features

We derive the specific physical or biological features essential to the conservation of the Hermes copper butterfly from studies of this species' habitat, ecology, and life history as described above and in the Species Status Assessment for the Hermes Copper Butterfly (Service 2018a).

We have determined that the physical or biological features essential to the conservation of the Hermes copper butterfly consist of the following components when found between 30 m and 1,341 m above sea level, and located in habitat providing an appropriate quality, quantity, and spatial and temporal arrangement of these habitat characteristics in the context of the life-history needs, condition, and status of the species (see *Criteria Used to Identify Critical Habitat* below):

(1) Spiny redberry host plants.

(2) Nectar sources for adult butterflies.

Special Management Considerations or Protection

When designating critical habitat, we assess whether the specific areas within the geographical area occupied by the species at the time of listing contain features which are essential to the conservation of the species and which may require special management considerations or protection.

The features essential to the conservation of this species may require special management considerations or protection to reduce or mitigate the following threats: wildfire, land use change, habitat fragmentation and isolation, and climate change and drought. In particular, habitat that has at any time supported a subpopulation will require protection from land use change that would permanently remove host plant patches and nectar sources, and habitat containing adult nectar sources that connects such host plant patches through which adults are likely to move. These management activities will protect from losses of habitat large enough to preclude conservation of the species.

Additionally, when considering the conservation value of areas proposed as critical habitat within each unit, especially among subpopulations within the same California Ecological Unit, maintenance of dispersal corridor-connectivity among them should be a conservation planning focus for stakeholders and regulators (such connectivity was assumed by the criteria used to delineate proposed critical habitat units).

Criteria Used To Identify Critical Habitat

As required by section 4(b)(2) of the Act, we use the best scientific data available to designate critical habitat. In accordance with the Act and our implementing regulations at 50 CFR 424.12(b), we review available information pertaining to the habitat requirements of the species and identify specific areas within the geographical area occupied by the species at the time of listing and any specific areas outside the geographical area occupied by the species to be considered for designation as critical habitat. We are not currently proposing to designate any areas outside the geographical area occupied by the species.

Sources of data for this species and its habitat requirements include multiple databases maintained by universities and by State agencies in San Diego County and elsewhere in California, white papers by researchers involved in conservation activities and planning, peer-reviewed articles on this species and relatives, agency reports, and numerous survey reports for projects throughout the species' range.

The current distribution of the Hermes copper butterfly is much reduced from its historical distribution. We anticipate that recovery will require continued protection of existing subpopulations and habitat, protection of dispersal corridor connectivity areas among subpopulations, as well as re-establishing subpopulations where they have been extirpated within the species' current range in order to ensure adequate numbers of subpopulations to maintain metapopulations. This activity will help to ensure future catastrophic events, such as wildfire, cannot simultaneously affect all known populations.

Geographical Area Occupied at the Time of Listing

The following meets the definition of the geographical area currently occupied by the Hermes copper butterfly in the United States: between approximately 33° 20' 0" North latitude and south to the international border with Mexico, and from approximately 30 m (100 ft) in elevation near the coast, east up to 1,340 m (4,400 ft) in elevation near the mountains (Service 2018a, Figure 5). This includes those specific areas within the geographical area occupied by the species at this time or the currently known range of the species.

The proposed critical habitat designation does not include all areas within the geographical area occupied by the species at this time. Rather, it includes those lands with physical and biological features essential to the conservation of the species which

may require special management or protections. We also limited the proposal to specific areas historically or currently known to support the species. This proposal focuses on maintaining areas that are known to have supported those known occurrences we consider required for survival and recovery of the species. That is, areas required to maintain species' viability by virtue of occurrence contribution to species' redundancy (core status, or subpopulation contribution to metapopulation dynamics/resilience), and contribution to continued species representation within all California Ecological Units. Hermes copper butterflies may be found in areas without documented populations (and perhaps even some areas slightly beyond that range), and would likely be important to the conservation of the species.

In summary, we delineated critical habitat unit boundaries using the following criteria:

(1) We started by considering all high-accuracy record-based occurrences mapped in the SSA (accuracy codes 1 and 2 in Table 1; Service 2018a, p. 20) within the geographical area currently occupied by the species. Occurrences were mapped as intersecting areas within 0.5 km (0.3 mi) of high geographic accuracy records, and areas within 0.5 km (0.3 mi) of any spiny redberry record within 1 km (0.6 mi) of these butterfly records. These distances are based on the maximum recapture distance of 1.1 km (0.7 mi) recorded by Marschalek and Klein's (2010, p. 1) intra-habitat movement study.

(2) We removed seven non-core occurrences that were more than 3 km (1.9 mi) from a core occurrence, or otherwise deemed not-essential for metapopulation resilience or continued species representation within all California Ecological Units.

(3) We added habitat contiguity areas between occurrences that were 0.5 km (0.3 mi) or less apart that are likely to be within a single subpopulation distribution. To do this, we included the area within 0.5 km (0.3 mi) of the midpoint of the tangent between the two closest butterfly records in each occurrence (to capture likely unrecorded physical or biological features).

(4) Using the best available vegetation association GIS database, we removed areas within 95 sub-categories (out of 177) not likely to contain host plants, such as those associated with streams.

(5) We removed by visual review of the best available satellite imagery all clearly developed areas, areas of disturbed vegetation such as nonnative grasslands, and granitic formations not likely to contain host plants, at the scale of approximately 1.2 ha (3 ac).

When determining proposed critical habitat boundaries, we made every effort to avoid including developed areas such as lands covered by buildings, pavement, and other structures because such lands lack physical or biological features necessary for the Hermes copper butterfly. The scale of the maps we prepared under the parameters for publication within the Code of Federal Regulations may not reflect the exclusion of such developed lands. Any such lands inadvertently left inside critical habitat boundaries shown on the maps of this proposed rule have been excluded by text in the proposed rule and are not proposed for designation as critical habitat. Therefore, if the critical habitat is finalized as proposed, a Federal action involving these lands would not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification within mapped areas unless the land contained Hermes copper butterfly

physical or biological features, or the specific action would affect the physical or biological features in adjacent critical habitat.

We are proposing for designation of critical habitat lands that we have determined are within the geographical area currently occupied by the species and contain one or more of the physical or biological features that are essential to support life-history processes of the species. Three units are proposed for designation.

The critical habitat designation is defined by the map or maps, as modified by any accompanying regulatory text, presented at the end of this document in the **Proposed Regulation Promulgation** section. We include more detailed information on the boundaries of the critical habitat designation in the preamble of this document. We will make the coordinates or plot points or both on which each map is based available to the public on *http://www.regulations.gov* at Docket No. FWS–R8–ES–2017–0053, on our Internet sites *http://www.fws.gov/carlsbad*, and at the field office responsible for the designation (see **FOR FURTHER INFORMATION CONTACT**).

Proposed Critical Habitat Designation

We are proposing three units as critical habitat for the Hermes copper butterfly. The critical habitat areas described below constitute our current best assessment of areas that meet the definition of critical habitat for the Hermes copper butterfly. The three units we propose as critical habitat are: (1) Lopez Canyon; (2) Miramar/Santee; and (3) Southeast San Diego. Table 2 shows the land ownership and approximate areas of the proposed designated areas for Hermes copper butterfly.

Table 2—Proposed critical habitat units for Hermes copper butterfly.

[Area estimates reflect all land within critical habitat unit boundaries.]

Critical Habitat Unit	Land Ownership by Type in Hectares (Acres)	Approximate Size of Unit in Hectares (Acres)
1. Lopez Canyon	Federal: 0 State: 0 Local Jurisdiction: 88 (218) Private: 77 (191)	166 (410)
2. Miramar/Santee	Federal: 0 State: 111 (275) Local Jurisdiction: 1,113 (2,750) Private: 1,646 (4,068)	2,870 (7,092)
3. Southeast San Diego	Federal: 4,213 (10,411) State: 2,074 (5,124) Local Jurisdiction: 1,162 (2,871) Private: 3,765 (9,303)	11,213 (27,709)
Total	Federal: 4,213 (10,411) State: 2,185 (5,399) Local Jurisdiction: 2,363 (5,839) Private: 5,488 (13,562)	14,249 (35,211)

Note: Area sizes may not sum due to rounding or unit conversion.

We present brief descriptions of all proposed critical habitat units, and reasons why they meet the definition of critical habitat for the Hermes copper butterfly, below. Although conservation and management of dispersal corridor connectivity areas among occurrences proposed for designation as critical habitat will also be required for species survival and recovery (occurrence isolation was a factor that eliminated occurrences in Criterion (2) above), the best available data do not provide sufficient information to identify the specific location of these lands at this time. Therefore, we did not include dispersal corridor connectivity areas among occurrences in the proposed critical habitat units.

Unit 1: Lopez Canyon

Unit 1 consists of 166 ha (410 ac) within the geographical area currently occupied by the species and contains all of the essential physical or biological features. The

physical or biological features may require special management to protect them from wildfire and land use change, although the latter is less likely in this unit (see *Special Management Considerations and Protection* above). This area encompasses the core Lopez Canyon occurrence, the only known extant occurrence that falls within the Coastal Terraces Ecological Unit (Table 1), and is therefore required to maintain species representation. Unit 1 is within the jurisdiction of the City of San Diego, associated with the communities of Sorrento Valley and Mira Mesa. This unit is surrounded by development. Habitat consists primarily of canyon slopes. The majority of this unit falls within the Los Peñasquitos Canyon Preserve jointly owned and managed by the City and County of San Diego. The primary objective of Los Peñasquitos Canyon Preserve is the preservation and enhancement of natural and cultural resources. The preserve master plan states that recreational and educational use by the public is a secondary objective, development should be consistent with these objectives, and public use should not endanger the unique preserve qualities. Land use in this unit is almost entirely recreation and conservation.

Unit 2: Miramar/Santee

Unit 2 consists of 2,870 ha (7,092 ac) within the geographical area currently occupied by the species and contains all of the essential physical or biological features. The physical or biological features may require special management to protect them from land use change and wildfire, although wildfire will be challenging to manage for in this unit because of its size and risk of megafire (see *Special Management Considerations and Protection* above). This area encompasses the core Sycamore Canyon, North Santee, and Mission Trails occurrences, as well as non-core occurrences connected to core

occurrences also required for metapopulation resilience and continued species representation in two California Ecological Units (Coastal Hills and Western Granitic Foothills). This unit includes half of the extant/presumed extant core occurrences in the Coastal Hills California Ecological Unit (the other half are in Unit 3). Unit 2 mostly surrounds the eastern portion of Marine Corps Air Station Miramar (lands encompassing areas that also meet the definition of critical habitat and would be included in this unit but are exempt from designation), falling primarily within the jurisdictions of the City of San Diego, but also within the City of Santee and unincorporated areas of San Diego County. In this unit, the City of San Diego owns and manages the over 2,830-ha (7,000-ac) Mission Trails Regional Park (887 ha (2,192 ac) in this unit) and the County owns and manages the 919-ha (2,272-ac) Gooden Ranch/Sycamore Canyon County preserve (198 ha (488 ac) included in this unit).

Unit 3: Southeast San Diego

Unit 3 consists of 11,213 ha (27,709 ac) within the geographical area currently occupied by the species and contains all of the essential physical or biological features. The physical or biological features may require special management to protect them from land use change and wildfire, although wildfire will be challenging to manage in this unit because of its size and risk of megafire (see *Special Management Considerations and Protection* above). This unit configuration would conserve the essential contiguous habitat patches and dispersal corridor connectivity among the occurrences. This area encompasses the majority of extant and connected occurrences within the species' current range that are required for metapopulation resilience and continued species representation in two California Ecological Units. This unit includes all of the extant/presumed extant

core occurrences in the Western Granitic Foothills and Palomar-Cuyamaca Peak California Ecological Units. The majority of the Crestridge core occurrence falls within the Crestridge Ecological Reserve jointly managed by the Endangered Habitats Conservancy and the California Department of Fish and Wildlife. The majority of the Alpine core occurrence falls within the Wright's Field preserve owned and managed by the Back Country Land Trust. Thirty-eight percent of this unit (4,213 ha (10,411 ac)) is owned and managed by the U.S. Fish and Wildlife Service, the U.S. Forest Service, and the Bureau of Land Management.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a)(2) of the Act requires Federal agencies, including the Service, to ensure that any action they fund, authorize, or carry out is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of designated critical habitat of such species. In addition, section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed under the Act or result in the destruction or adverse modification of proposed critical habitat.

We published a final regulation with a revised definition of destruction or adverse modification on August 27, 2019 (84 FR 44976). Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species.

If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency (action agency) must enter into consultation with us. Examples of actions that are subject to the section 7 consultation process are actions on State, Tribal, local, or private lands that require a Federal permit (such as a permit from the U.S. Army Corps of Engineers under section 404 of the Clean Water Act (33 U.S.C. 1251 *et seq*.) or a permit from the Service under section 10 of the Act) or that involve some other Federal action (such as funding from the Federal Highway Administration, Federal Aviation Administration, or the Federal Emergency Management Agency). Federal actions not affecting listed species or critical habitat, and actions on State, Tribal, local, or private lands that are not federally funded, authorized, or carried out by a Federal Agency, do not require section 7 consultation.

As a result of section 7 consultation, we document compliance with the requirements of section 7(a)(2) through our issuance of:

(1) A concurrence letter for Federal actions that may affect, but are not likely to adversely affect, listed species or critical habitat; or

(2) A biological opinion for Federal actions that may affect, and are likely to adversely affect, listed species or critical habitat.

When we issue a biological opinion concluding that a project is likely to jeopardize the continued existence of a listed species and/or destroy or adversely modify critical habitat, we provide reasonable and prudent alternatives to the project, if any are identifiable, that would avoid the likelihood of jeopardy and/or destruction or adverse modification of critical habitat. We define “reasonable and prudent alternatives” (at 50 CFR 402.02) as alternative actions identified during consultation that:

(1) Can be implemented in a manner consistent with the intended purpose of the action,

(2) Can be implemented consistent with the scope of the Federal agency's legal authority and jurisdiction,

(3) Are economically and technologically feasible, and

(4) Would, in the Director's opinion, avoid the likelihood of jeopardizing the continued existence of the listed species and/or avoid the likelihood of destroying or adversely modifying critical habitat.

Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate formal consultation on previously reviewed actions. These requirements apply when the Federal agency has retained discretionary involvement or control over the action (or the agency's discretionary involvement or control is authorized by law) and, subsequent to the previous consultation, we have listed a new species or designated critical habitat that may be affected by the Federal action, or the action has been modified in a manner that affects the species or critical habitat in a way not considered in the previous consultation. In such situations, Federal agencies sometimes may need to request reinitiation of consultation with us, but the regulations also specify some exceptions to the requirement to reinitiate consultation on specific land management plans after subsequently listing a new species or designating new critical habitat. See the regulations for a description of those exceptions.

Application of the "Adverse Modification" Standard

The key factor related to the destruction or adverse modification determination is whether implementation of the proposed Federal action directly or indirectly alters the designated critical habitat in a way that appreciably diminishes the value of the critical habitat as a whole for the conservation of the listed species. As discussed above, the role of critical habitat is to support physical or biological features essential to the conservation of a listed species and provide for the conservation of the species.

Section 4(b)(8) of the Act requires us to briefly evaluate and describe, in any proposed or final regulation that designates critical habitat, activities involving a Federal action that may violate 7(a)(2) of the Act by destroying or adversely modifying such designation.

Activities that the Services may, during a consultation under section 7(a)(2) of the Act, find are likely to destroy or adversely modify critical habitat include, but are not limited to:

Actions that would remove spiny redberry host plants or a significant amount of nectar source plants. Such activities could include, but are not limited to, residential and commercial development, and conversion to agricultural orchards or fields. These activities could permanently eliminate or reduce the habitat necessary for the growth and reproduction of Hermes copper butterflies.

Exemptions

Application of Section 4(a)(3) of the Act

The Sikes Act Improvement Act of 1997 (Sikes Act) (16 U.S.C. 670a) required each military installation that includes land and water suitable for the conservation and

management of natural resources to complete an integrated natural resources management plan (INRMP) by November 17, 2001. An INRMP integrates implementation of the military mission of the installation with stewardship of the natural resources found on the base. Each INRMP includes:

(1) An assessment of the ecological needs on the installation, including the need to provide for the conservation of listed species;

(2) A statement of goals and priorities;

(3) A detailed description of management actions to be implemented to provide for these ecological needs; and

(4) A monitoring and adaptive management plan.

Among other things, each INRMP must, to the extent appropriate and applicable, provide for fish and wildlife management; fish and wildlife habitat enhancement or modification; wetland protection, enhancement, and restoration where necessary to support fish and wildlife; and enforcement of applicable natural resource laws.

The National Defense Authorization Act for Fiscal Year 2004 (Pub. L. 108-136) amended the Act to limit areas eligible for designation as critical habitat. Specifically, section 4(a)(3)(B)(i) of the Act (16 U.S.C. 1533(a)(3)(B)(i)) provides that: "The Secretary shall not designate as critical habitat any lands or other geographic areas owned or controlled by the Department of Defense, or designated for its use, that are subject to an integrated natural resources management plan prepared under section 101 of the Sikes Act (16 U.S.C. 670a), if the Secretary determines in writing that such plan provides a benefit to the species for which critical habitat is proposed for designation."

We consult with the military on the development and implementation of INRMPs for installations with listed species. Marine Corps Air Station Miramar is the only military installation located within the range of the proposed critical habitat designation for the Hermes copper butterfly that has a completed, Service-approved INRMP. As discussed below, we analyzed the INRMP to determine if it meets the criteria for exemption from critical habitat under section 4(a)(3) of the Act.

Approved INRMP

Marine Corps Air Station Miramar—Unit 2 (967 ha (2,389 ac))

Marine Corps Air Station (MCAS) Miramar has an approved INRMP completed in June 2018. The U.S. Marine Corps is committed to working closely with the Service and California Department of Fish and Wildlife to continually refine the existing INRMP as part of the Sikes Act's INRMP review process. The MCAS Miramar INRMP overall strategy for conservation and management is to: (1) limit activities, minimize development, and perform mitigation actions in areas supporting high densities of vernal pool habitat, threatened or endangered species, and other wetlands; and (2) manage activities and development in areas of low densities, or no regulated resources, with site-specific measures and programmatic instructions.

The MCAS Miramar INRMP contains elements that benefit the Hermes copper butterfly, such as mitigation guidance for projects which may impact Hermes copper butterfly or its habitat (MCAS Miramar 2018, p. 6-13) and natural resources management goals and objectives which support both Hermes copper butterfly conservation and military operational requirements. Identified management actions within the INRMP include restoring degraded sites, restricting access to sensitive areas, training military

personnel to recognize and avoid sensitive areas, invasive species removal, surveys to identify areas suitable for habitat restoration or enhancement, and long-term ecosystem monitoring (MCAS Miramar 2018, p. 7-17). The INRMP also includes measures to avoid or minimize the effects of planned actions, such as limiting training and land management activities during flight season, as well as minimizing off-road activities to avoid damage to host plants and crushing eggs and larval butterflies (MCAS Miramar 2018, p. 5-7). It further provides guidance for project planners on required impact avoidance, minimization, and compensation of occupied and unoccupied habitat. Overall, these measures will protect Hermes copper butterflies from impacts such as loss of spiny redberry and nectar plants from direct and indirect effects of planned actions and will minimize conflicts with military operational needs. In total, 967 ha (2,389 ac) on MCAS Miramar meet the definition of critical habitat for the Hermes copper butterfly.

Based on our review of the Hermes copper butterfly habitat on MCAS Miramar, the MCAS Miramar INRMP, and the above considerations, and in accordance with section 4(a)(3)(B)(i) of the Act, we have determined that the identified lands are subject to the Marine Corps Air Station Miramar INRMP and that conservation efforts identified in the INRMP will provide a benefit to the Hermes copper butterfly. Therefore, lands within this installation are exempt from critical habitat designation under section 4(a)(3) of the Act. We are not including approximately 967 ha (2,389 ac) of habitat in this proposed critical habitat designation because of this exemption.

Consideration of Impacts Under Section 4(b)(2) of the Act

Section 4(b)(2) of the Act states that the Secretary shall designate and make revisions to critical habitat on the basis of the best available scientific data after taking

into consideration the economic impact, national security impact, and any other relevant impact of specifying any particular area as critical habitat. The Secretary may exclude an area from critical habitat if he determines that the benefits of such exclusion outweigh the benefits of specifying such area as part of the critical habitat, unless he determines, based on the best scientific data available, that the failure to designate such area as critical habitat will result in the extinction of the species. In making that determination, the statute on its face, as well as the legislative history, are clear that the Secretary has broad discretion regarding which factor(s) to use and how much weight to give to any factor.

We have not considered any areas for exclusion from critical habitat. However, the final decision on whether to exclude any areas will be based on the best scientific data available at the time of the final designation, including information obtained during the comment period and information about the economic impact of designation. Accordingly, we have prepared a draft economic analysis concerning the proposed critical habitat designation, which is available for review and comment (see **ADDRESSES**).

Consideration of Economic Impacts

Section 4(b)(2) of the Act and its implementing regulations require that we consider the economic impact that may result from a designation of critical habitat. To assess the probable economic impacts of a designation, we must first evaluate specific land uses or activities and projects that may occur in the area of the critical habitat. We then must evaluate the impacts that a specific critical habitat designation may have on restricting or modifying specific land uses or activities for the benefit of the species and its habitat within the areas proposed. We then identify which conservation efforts may be the result of the species being listed under the Act versus those attributed solely to the

designation of critical habitat for this particular species. The probable economic impact of a proposed critical habitat designation is analyzed by comparing scenarios both "with critical habitat" and "without critical habitat." The "without critical habitat" scenario represents the baseline for the analysis, which includes the existing regulatory and socio-economic burden imposed on landowners, managers, or other resource users potentially affected by the designation of critical habitat (e.g., under the Federal listing as well as other Federal, State, and local regulations). The baseline, therefore, represents the costs of all efforts attributable to the listing of the species under the Act (i.e., conservation of the species and its habitat incurred regardless of whether critical habitat is designated). The "with critical habitat" scenario describes the incremental impacts associated specifically with the designation of critical habitat for the species. The incremental conservation efforts and associated impacts would not be expected without the designation of critical habitat for the species. In other words, the incremental costs are those attributable solely to the designation of critical habitat, above and beyond the baseline costs. These are the costs we use when evaluating the benefits of inclusion and exclusion of particular areas from the final designation of critical habitat should we choose to conduct a discretionary 4(b)(2) exclusion analysis.

For this particular designation, we developed an Incremental Effects Memorandum (IEM) considering the probable incremental economic impacts that may result from this proposed designation of critical habitat (Service 2018b). The information contained in our IEM was then used to develop a screening analysis of the probable effects of the designation of critical habitat for the Hermes copper butterfly (IEc 2018, entire). We began by conducting a screening analysis of the proposed designation of

critical habitat in order to focus our analysis on the key factors that are likely to result in incremental economic impacts. The purpose of the screening analysis is to filter out the geographic areas in which the critical habitat designation is unlikely to result in probable incremental economic impacts. In particular, the screening analysis considers baseline costs (i.e., absent critical habitat designation), including probable economic impacts where land and water use may be subject to conservation plans, land management plans, best management practices, or regulations that protect the habitat area as a result of the Federal listing status of the species. The screening analysis filters out particular areas of critical habitat that are already subject to such protections and are, therefore, unlikely to incur incremental economic impacts. Ultimately, the screening analysis allows us to focus our analysis on evaluating the specific areas or sectors that may incur probable incremental economic impacts as a result of the designation. The screening analysis also assesses whether units are unoccupied by the species and, as a result of the critical habitat designation for the species, may require additional management or conservation efforts that may incur incremental economic impacts. This screening analysis and the information contained in our IEM are what we consider our draft economic analysis of the proposed critical habitat designation for the Hermes copper butterfly and are summarized in the narrative below.

Executive Orders 12866 and 13563 direct Federal agencies to assess the costs and benefits of available regulatory alternatives in quantitative (to the extent feasible) and qualitative terms. Consistent with the E.O. regulatory analysis requirements, our effects analysis under the Act may take into consideration impacts to both directly and indirectly affected entities, where practicable and reasonable. If sufficient data are available, we

assess to the extent practicable the probable impacts to both directly and indirectly affected entities. As part of our screening analysis, we considered the types of economic activities that are likely to occur within the areas likely affected by the critical habitat designation. In our evaluation of the probable incremental economic impacts that may result from the proposed designation of critical habitat for the Hermes copper butterfly, first we identified probable incremental economic impacts associated with the following categories of activities: (1) agriculture, (2) development; (3) forest management; (4) grazing; (5) mining; (6) recreation; (7) renewable energy; (8) transportation; and (9) utilities (Service 2018b, p. 2). We considered each industry or category individually. Additionally, we considered whether their activities have any Federal involvement. Critical habitat designation only requires consideration of potential project effects when there is an action conducted, funded, permitted, or authorized by Federal agencies. If listed, in areas where the Hermes copper butterfly is present, Federal agencies would already be required to consult with the Service under section 7 of the Act on activities they fund, permit, or implement that may affect the species.

In our IEM, we attempted to clarify the distinction between the effects that will result from the species being listed and those attributable to the critical habitat designation (i.e., difference between the jeopardy and adverse modification standards) for the Hermes copper butterfly's critical habitat. Because the designation of critical habitat for Hermes copper butterfly is proposed concurrently with the listing, it is difficult to discern which conservation efforts are attributable to the species being listed and those which will result solely from the designation of critical habitat. The essential physical or biological features identified for Hermes copper butterfly critical habitat are the same

features essential for the life requisites of the species. In particular, because the Hermes copper butterfly is closely associated with the plant species essential for its conservation, and because it is a non-migratory species that remains on spiny redberry plants during all immature stages, and on the plant as an adult, reasonable and prudent alternatives needed to avoid jeopardy from impacts to the species' life-requisite habitat features would also likely serve to avoid destruction or adverse modification of critical habitat resulting from those impacts. Additionally, measures to avoid or minimize take of the species (attributable to listing) would also likely serve to address impacts to critical habitat.

The proposed critical habitat designation for the Hermes copper butterfly totals approximately 14,249 ha (35,211 ac) in three units, all of which are occupied by the species. The screening memo found that incremental costs associated with section 7 consultations would likely be low for the Hermes copper butterfly for several reasons (IEc 2018, p. 9). First, the majority of the critical habitat designation is on State, private, and local lands where a Federal nexus is unlikely (although there are a few areas where the Army Corps of Engineers has jurisdiction). Secondly, given that all the proposed units are occupied, should a Federal nexus exist, any proposed projects would need to undergo some form of consultation due to the presence of the butterfly regardless of critical habitat designation.

Additionally, as previously stated, we expect that any project modifications identified to avoid jeopardy that would result from project-related effects to habitat features required by the species would be similar to those identified to avoid destruction or adverse modification of the critical habitat's physical or biological features essential to the conservation of the species. Furthermore, all critical habitat units overlap to some

degree with critical habitat for other listed species or with various conservation plans, State plans, or Federal regulations. These protections may also benefit the Hermes copper butterfly, even in the absence of critical habitat for the species.

When an action is proposed in an area of occupied designated critical habitat, and the proposed activity has a Federal nexus, the need for consultation is triggered. Any incremental costs associated with consideration of potential effects to the critical habitat are a result of this consultation process. Overall, we expect that agency administrative costs for consultation, incurred by the Service and the consulting Federal agency, would be minor (less than $6,000 per consultation effort) and, therefore, would not be significant (IEc 2018, p. 10). In addition, based on the non-inclusion of lands likely to have a Federal nexus (such as riparian vegetation associations), and coordination efforts with State and local agencies, we expect the overall incremental costs will be minor.

Therefore, incremental costs would be limited to additional administrative efforts by the Service and consulting Federal agencies to include consideration of potential effects to the designated critical habitat in otherwise needed consultations. These future costs are unknown, but expected to be relatively small given the projections by affected entities and are unlikely to exceed $100,000 in any given year. Consequently, future probable incremental economic impacts are not likely to exceed $100 million in any single year and would therefore not be significant.

Consideration of National Security Impacts or Homeland Security Impacts

Section 4(b)(2) of the Act and its implementing regulations require that we consider the impact to national security that may result from a designation of critical habitat. For this proposed rule, we considered whether there are lands owned or managed

by the Department of Defense within proposed critical habitat where a national security impact might exist. In this case, we are exempting under section 4(a)(3) of the Act all lands that meet the definition of critical habitat owned by the Department of Defense. Additionally, in preparing this proposal, we have determined that the lands within the proposed designation of critical habitat for Hermes copper butterfly are not owned or managed by the Department of Homeland Security. Therefore, we anticipate no impact on national security.

Consideration of Other Relevant Impacts

Section 4(b)(2) of the Act and its implementing regulations require that we also consider any other relevant impacts that may result from a designation of critical habitat. In conducting that analysis, we consider a number of factors including whether there are permitted conservation plans covering the species in the area such as HCPs, safe harbor agreements, or candidate conservation agreements with assurances, or whether there are non-permitted conservation agreements and partnerships that would be encouraged by designation of, or exclusion from, critical habitat. In addition, we look at the existence of any Tribal conservation plans and partnerships and consider the government-to-government relationship of the United States with Tribal entities. We also consider any social impacts that might occur because of the designation.

In preparing this proposal, we have determined that there are currently no HCPs or other management plans for the Hermes copper butterfly, and the proposed designation does not include any Tribal lands or trust resources. We anticipate no impact on Tribal lands, partnerships, or HCPs from this proposed critical habitat designation.

As we stated earlier, we are soliciting data and comments from the public on the draft economic analysis, as well as all aspects of the proposed rule and our required determinations. We may revise the proposed rule or supporting documents to incorporate or address information we receive during the public comment period. In particular, we may exclude an area from critical habitat if we determine that the benefits of excluding the area outweigh the benefits of including the area, provided the exclusion will not result in the extinction of this species.

Exclusions

At this time, the Secretary does not intend to exercise his discretion to exclude any areas from the final designation of critical habitat under section 4(b)(2) of the Act. During the development of the final designation, we will consider any additional information related to the economic impacts, national security impacts, or any other relevant impacts of specifying any particular area as critical habitat that is received through the public comment period, and as such areas may be excluded from the final critical habitat designation under section 4(b)(2) of the Act and our implementing regulations at 50 CFR 424.19.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened species under the Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness and in conservation by Federal, State, Tribal, and local agencies, as well as private organizations and individuals. The Act encourages cooperation with the States and other countries and calls for recovery actions to be carried out for listed

species. The protection required by Federal agencies and the prohibitions against certain activities are discussed, in part, below.

The primary purpose of the Act is the conservation of endangered and threatened species and the ecosystems upon which they depend. The ultimate goal of such conservation efforts is the recovery of these listed species, so that they no longer need the protective measures of the Act. Subsection 4(f) of the Act calls for the Service to develop and implement recovery plans for the conservation of endangered and threatened species. The recovery planning process involves the identification of actions that are necessary to halt or reverse the species' decline by addressing the threats to its survival and recovery. The goal of this process is to restore listed species to a point where they are secure, self-sustaining, and functioning components of their ecosystems.

Recovery planning includes the development of a recovery outline shortly after a species is listed and preparation of a draft and final recovery plan. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new substantive information becomes available. The recovery plan also identifies recovery criteria for review of when a species may be ready for downlisting or delisting, and methods for monitoring recovery progress. Recovery plans also establish a framework for agencies to coordinate their recovery efforts and provide estimates of the cost of implementing recovery tasks. Recovery teams (composed of species experts, Federal and State agencies, nongovernmental organizations, and stakeholders) are often established to develop recovery plans. When completed, the recovery outline, draft recovery plan, and the final recovery plan for the

Hermes copper butterfly, if listed, will be available on our website (*http://www.fws.gov/endangered*), or from our Carlsbad Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Implementation of recovery actions generally requires the participation of a broad range of partners, including other Federal agencies, States, Tribes, nongovernmental organizations, businesses, and private landowners. Examples of recovery actions include habitat restoration (e.g., restoration of native vegetation), research, captive propagation and reintroduction, and outreach and education. The recovery of many listed species cannot be accomplished solely on Federal lands because their range may occur primarily or solely on non-Federal lands. To achieve recovery of these species requires cooperative conservation efforts on private, State, and Tribal lands.

If this species is listed, funding for recovery actions will be available from a variety of sources, including Federal budgets, State programs, and cost share grants for non-Federal landowners, the academic community, and nongovernmental organizations. In addition, pursuant to section 6 of the Act, the State of California would be eligible for Federal funds to implement management actions that promote the protection or recovery of the Hermes copper butterfly. Information on our grant programs that are available to aid species recovery can be found at: *http://www.fws.gov/grants*.

Although the Hermes copper butterfly is only proposed for listing under the Act at this time, please let us know if you are interested in participating in recovery efforts for this species. Additionally, we invite you to submit any new information on this species whenever it becomes available and any information you may have for recovery planning purposes (see **FOR FURTHER INFORMATION CONTACT**).

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as an endangered or threatened species and with respect to its critical habitat, if any is designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with the Service on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. If a species is listed subsequently, section 7(a)(2) of the Act requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of the species or destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into consultation with the Service.

Federal agency actions within the species' habitat that may require conference or consultation or both as described in the preceding paragraph include activities that may affect the species, land management, and any other landscape-altering activities that may affect the physical or biological features essential to the conservation of the species.

Proposed Rule Provisions

Under section 4(d) of the Act, the Service has discretion to issue regulations that we find necessary and advisable to provide for the conservation of threatened species (hereafter referred to as a "4(d) rule"). Through a 4(d) rule, we may prohibit by regulation with respect to threatened wildlife any act prohibited by section 9(a)(1) of the Act for endangered wildlife. Exercising this discretion, the Service has developed a 4(d) rule for the Hermes copper butterfly containing all the general prohibitions and

exceptions to those prohibitions that is tailored to the specific threats and conservation needs of this species.

As discussed above in the **Summary of Factors Affecting the Species** section of this proposed listing rule and the SSA (Service 2018a, pp. 15 and 16), factors limiting the distribution of Hermes copper butterfly are not entirely understood, since the species' distribution is much more restricted than its host plant. The highest magnitude threats to the Hermes copper butterfly include extirpation of populations by wildfire and loss and isolation of populations due to development.

This 4(d) rule describes how and where the prohibitions of section 9(a)(1) of the Act will be applied. As described in more detail later in this section, this proposed 4(d) rule identifies a certain portion of the species' range that would not be subject to the take prohibitions under section 9(a)(1) of the Act (Figure 1). Outside of the area delineated in Figure 1, this proposed 4(d) rule would prohibit all acts described under section 9(a)(1) of the Act, except take resulting from the activities listed below when conducted within habitats occupied by the Hermes copper butterfly. All of the activities listed below must be conducted in a manner that (1) maintains contiguity of suitable habitat for the species within and dispersal corridor connectivity among populations, allowing for maintenance of populations and recolonization of unoccupied, existing habitat; (2) does not increase the risk of wildfire in areas occupied by the Hermes copper butterfly while preventing further habitat fragmentation and isolation, or degradation of potentially suitable habitat; and (3) does not preclude efforts to augment or reintroduce populations of the Hermes copper butterfly within its historical range with management of the host plant. Some exempted activities must be coordinated with and reported to the Service in writing and

approved to ensure accurate interpretation of exemptions (for example, that activities do not adversely affect the species' conservation and recovery). Questions regarding the proposed application of these requirements should be directed to the Carlsbad Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

This proposed 4(d) rule would exempt from the prohibitions in section 9(a)(1) of the Act take resulting from any of the following activities when conducted within habitats occupied by the Hermes copper butterfly:

(1) Survey and monitoring work in coordination with and reported to the Service as part of scientific inquiry involving quantitative data collection (such as population status determinations).

(2) Habitat management or restoration activities, including removal of nonnative, invasive plants, expected to provide a benefit to Hermes copper butterfly or other sensitive species of the chaparral and coastal sage scrub ecosystems, including removal of nonnative, invasive plants. These activities must be coordinated with and reported to the Service in writing and approved the first time an individual or agency undertakes them.

(3) Activities necessary to maintain the minimum clearance (defensible space) requirement of 30 m (100 ft) from any occupied dwelling, occupied structure, or to the property line, whichever is nearer, to provide reasonable fire safety and comply with State of California fire codes to reduce wildfire risks.

(4) Fire management actions on protected/preserve lands to maintain, protect, or enhance coastal sage scrub and chaparral vegetation. These activities must be coordinated with and reported to the Service in writing and approved the first time an individual or

agency undertakes them.

(5) Maintenance of existing fuel breaks identified by local fire authorities to protect existing structures.

(6) Firefighting activities associated with actively burning fires to reduce risk to life or property.

(7) Collection, transportation, and captive-rearing of Hermes copper butterfly for the purpose of population augmentation or reintroduction, maintaining refugia, or as part of scientific inquiry involving quantitative data collection (such as survival rate, larval weights, and post-release monitoring) approved by, in coordination with, and reported to the Service. This does not include activities such as personal "hobby" collecting and rearing intended for photographic purposes and re-release.

(8) Research projects involving collection of individual fruits, leaves, or stems of the Hermes copper butterfly host plant, spiny redberry, approved by, in coordination with, and reported to the Service.

We believe these actions and activities, while they may result in some minimal level of mortality, harm, or disturbance to the Hermes copper butterfly, are not expected to adversely affect the species' conservation and recovery. In fact, we expect they would have a net beneficial effect on the species. Across the species' range, suitable habitat has been degraded or fragmented by development and wildfire, including megafires. The activities covered by this proposed 4(d) rule will address some of these problems, creating more favorable habitat conditions for the species and helping to stabilize or increase populations of the species. Like the proposed listing rule, this proposed 4(d) rule will not be finalized until we have reviewed comments from the public and peer

reviewers.

Additionally, we are proposing under section 4(d) of the Act to delineate a certain portion of the species' range that would not be subject to the take prohibitions under section 9(a)(1) of the Act (Figure 1). Areas inside this portion of the species' range capture all remnant habitat areas where there is any possibility of Hermes copper butterfly occupancy and where we are confident they would not contribute significantly to species' recovery because of limited available habitat and connectivity. They are unlikely to contribute to recovery because any occupied areas within the boundary are too small and isolated to support a population in the long term. The intent is to provide regulatory relief to those who might otherwise be affected by the species being listed as threatened, and to encourage and strengthen conservation partnerships among Federal, State, and local agencies; and other partners and other public we serve.

The areas where the section 9(a)(1) prohibitions would not apply are shown in Figure 1. These areas were designed in the following way: the southern edge is the Mexican border and the western edge is the Pacific coast. The eastern and northern edges of the boundary follow the development that would isolate any extant populations found within the boundaries. We did not include areas where we believed there was any chance of future dispersal corridor connectivity among extant populations, including habitat that could potentially be managed or restored to act as suitable connecting habitat. For a more detailed map of the areas where the section 9(a)(1) prohibitions would not apply, please contact the Carlsbad Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

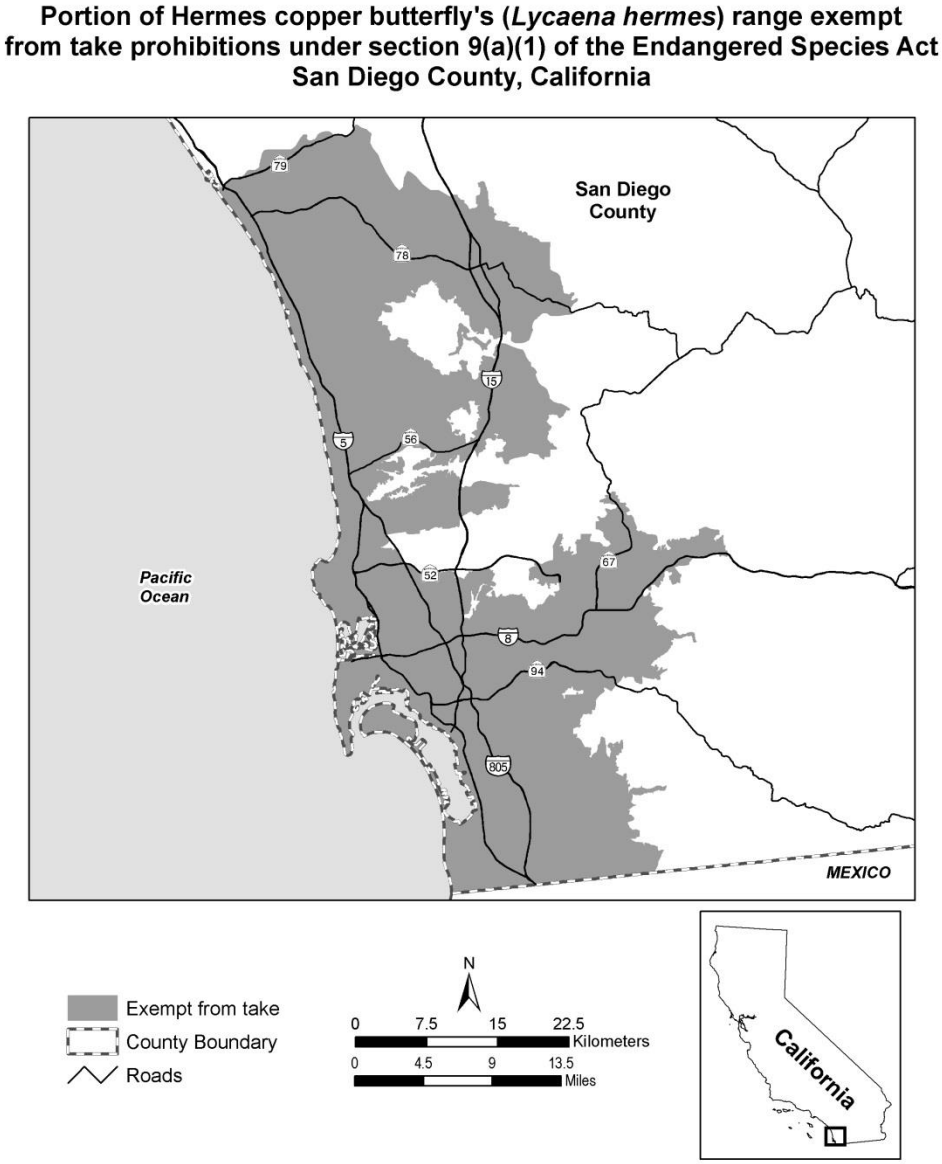


Figure 1. Portion of the Hermes copper butterfly's current range that is proposed to be exempt from take prohibitions under section 9(a)(1) of the Act.

Based on the rationale above, the provisions included in this proposed 4(d) rule are necessary and advisable to provide for the conservation of the Hermes copper

butterfly. Nothing in this proposed 4(d) rule would change in any way the recovery planning provisions of section 4(f) of the Act, the consultation requirements under section 7 of the Act, or the ability of the Service to enter into partnerships for the management and protection of the Hermes copper butterfly.

Activities Subject to Take Prohibitions

We may issue permits to carry out otherwise prohibited activities involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32. There are also certain statutory exemptions from the prohibitions, which are found in sections 9 and 10 of the Act.

It is our policy, as published in the *Federal Register* on July 1, 1994 (59 FR 34272), to identify to the maximum extent practicable at the time a species is listed, those activities that would or would not constitute a violation of section 9 of the Act. The intent of this policy is to increase public awareness of the effect of a proposed listing on proposed and ongoing activities within the range of the species proposed for listing.

Based on the best available information, the following actions are unlikely to result in a violation of section 9, if these activities are carried out in accordance with existing regulations and permit requirements or within the portion of the species' range described above that would not be subject to the take prohibitions; this list is not comprehensive:

(1) Normal agricultural and silvicultural practices, including pesticide use, which are carried out in accordance with any existing regulations, permit and label requirements, and best management practices;

(2) Normal residential and urban landscape activities, such as mowing, edging,

fertilizing, etc.; and

(3) Recreation and management at National Forests that is conducted in accordance with existing USFS regulations and policies.

Based on the best available information, the following activities may potentially result in violation of section 9 of the Act; this list is not comprehensive:

(1) Unauthorized collecting, handling, possessing, selling, delivering, carrying, or transporting of the species (adults, eggs, larvae, or pupae), including transport across State lines and international boundaries, except for properly documented antique specimens of these taxa at least 100 years old, as defined by section 10(h)(1) of the Act;

(2) Unauthorized modification, removal, or destruction of spiny redberry within the species' range that is known to be occupied by Hermes copper butterfly and that may result in death or injury of adults, eggs, larvae, or pupae; and

(3) Illegal pesticide applications (i.e., in violation of label restrictions) in or adjacent to (due to spray drift concerns) habitat known to be occupied by Hermes copper butterfly that may result in death or injury of adults, eggs, larvae, or pupae.

Questions regarding whether specific activities would constitute a violation of section 9 of the Act should be directed to the Carlsbad Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT).**

Required Determinations

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

(1) Be logically organized;

(2) Use the active voice to address readers directly;

(3) Use clear language rather than jargon;

(4) Be divided into short sections and sentences; and

(5) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in **ADDRESSES**. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the numbers of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

Executive Order 13771

We do not believe this proposed rule is an E.O. 13771 ("Reducing Regulation and Controlling Regulatory Costs") (82 FR 9339, February 3, 2017) regulatory action because we believe this rule is not significant under E.O. 12866; however, the Office of Information and Regulatory Affairs has waived their review regarding their E.O. 12866 significance determination of this proposed rule.

Regulatory Planning and Review (Executive Orders 12866 and 13563)

Executive Order 12866 provides that the Office of Information and Regulatory Affairs (OIRA) will review all significant rules. The Office of Information and Regulatory Affairs has waived their review regarding their significance determination of this proposed rule.

Executive Order 13563 reaffirms the principles of E.O. 12866 while calling for improvements in the nation's regulatory system to promote predictability, to reduce

uncertainty, and to use the best, most innovative, and least burdensome tools for achieving regulatory ends. The executive order directs agencies to consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public where these approaches are relevant, feasible, and consistent with regulatory objectives. E.O. 13563 emphasizes further that regulations must be based on the best available science and that the rulemaking process must allow for public participation and an open exchange of ideas. We have developed this rule in a manner consistent with these requirements.

Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

Under the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq*.), as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA; 5 U.S.C. 801 *et seq.*), whenever an agency is required to publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that describes the effects of the rule on small entities (i.e., small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. The SBREFA amended the RFA to require Federal agencies to provide a certification statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities.

According to the Small Business Administration, small entities include small organizations such as independent nonprofit organizations; small governmental jurisdictions, including school boards and city and town governments that serve fewer

than 50,000 residents; and small businesses (13 CFR 121.201). Small businesses include manufacturing and mining concerns with fewer than 500 employees, wholesale trade entities with fewer than 100 employees, retail and service businesses with less than $5 million in annual sales, general and heavy construction businesses with less than $27.5 million in annual business, special trade contractors doing less than $11.5 million in annual business, and agricultural businesses with annual sales less than $750,000. To determine if potential economic impacts to these small entities are significant, we considered the types of activities that might trigger regulatory impacts under this designation as well as types of project modifications that may result. In general, the term "significant economic impact" is meant to apply to a typical small business firm's business operations.

The Service's current understanding of the requirements under the RFA, as amended, and following recent court decisions, is that Federal agencies are only required to evaluate the potential incremental impacts of rulemaking on those entities directly regulated by the rulemaking itself, and therefore, not required to evaluate the potential impacts to indirectly regulated entities. The regulatory mechanism through which critical habitat protections are realized is section 7 of the Act, which requires Federal agencies, in consultation with the Service, to ensure that any action authorized, funded, or carried out by the Agency is not likely to destroy or adversely modify critical habitat. Therefore, under section 7, only Federal action agencies are directly subject to the specific regulatory requirement (avoiding destruction and adverse modification) imposed by critical habitat designation. Consequently, it is our position that only Federal action agencies will be directly regulated by this designation. There is no requirement under the

RFA to evaluate the potential impacts to entities not directly regulated. Moreover, Federal agencies are not small entities. Therefore, because no small entities are directly regulated by this rulemaking, the Service certifies that, if promulgated, the proposed critical habitat designation will not have a significant economic impact on a substantial number of small entities.

Energy Supply, Distribution, or Use—Executive Order 13211

Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare Statements of Energy Effects when undertaking certain actions. In our economic analysis, we did not find that the designation of this proposed critical habitat will significantly affect energy supplies, distribution, or use. Furthermore, although it does include areas where powerlines and power facility construction and maintenance may occur in the future, it will not produce a Federal mandate of $100 million or greater in any year, that is, it is not a "significant regulatory action" under the Unfunded Mandates Reform Act. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

Unfunded Mandates Reform Act (2 U.S.C. 1501 et seq.)

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 *et seq*.), we make the following findings:

(1) This rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or Tribal governments, or the private sector, and includes both "Federal intergovernmental mandates" and "Federal private sector mandates." These terms are

defined in 2 U.S.C. 658(5)–(7). “Federal intergovernmental mandate” includes a regulation that “would impose an enforceable duty upon State, local, or Tribal governments” with two exceptions. It excludes “a condition of Federal assistance.” It also excludes “a duty arising from participation in a voluntary Federal program,” unless the regulation “relates to a then-existing Federal program under which $500,000,000 or more is provided annually to State, local, and Tribal governments under entitlement authority,” if the provision would “increase the stringency of conditions of assistance” or “place caps upon, or otherwise decrease, the Federal Government’s responsibility to provide funding,” and the State, local, or Tribal governments “lack authority” to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; Aid to Families with Dependent Children work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. “Federal private sector mandate” includes a regulation that “would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program.”

The designation of critical habitat does not impose a legally binding duty on non-Federal Government entities or private parties. Under the Act, the only regulatory effect is that Federal agencies must ensure that their actions do not destroy or adversely modify critical habitat under section 7. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the

legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency. Furthermore, to the extent that non-Federal entities are indirectly impacted because they receive Federal assistance or participate in a voluntary Federal aid program, the Unfunded Mandates Reform Act would not apply, nor would critical habitat shift the costs of the large entitlement programs listed above onto State governments.

(2) We do not believe this rule would significantly or uniquely affect small governments because it will not produce a Federal mandate of $100 million or greater in any year, that is, it is not a "significant regulatory action" under the Unfunded Mandates Reform Act. The designation of critical habitat imposes no obligations on State or local governments and, as such, a Small Government Agency Plan is not required.

Takings—Executive Order 12630

In accordance with E.O. 12630 (Government Actions and Interference with Constitutionally Protected Private Property Rights), we have analyzed the potential takings implications of designating critical habitat for the Hermes copper butterfly in a takings implications assessment. The Act does not authorize the Service to regulate private actions on private lands or confiscate private property as a result of critical habitat designation. Designation of critical habitat does not affect land ownership, or establish any closures, or restrictions on use of or access to the designated areas. Furthermore, the designation of critical habitat does not affect landowner actions that do not require Federal funding or permits, nor does it preclude development of habitat conservation programs or issuance of incidental take permits to permit actions that do require Federal funding or permits to go forward. However, Federal agencies are prohibited from

carrying out, funding, or authorizing actions that would destroy or adversely modify critical habitat. A takings implications assessment has been completed and concludes that this designation of critical habitat for the Hermes copper butterfly does not pose significant takings implications for lands within or affected by the designation.

Federalism—Executive Order 13132

In accordance with E.O. 13132 (Federalism), this proposed rule does not have significant Federalism effects. A Federalism assessment is not required. In keeping with Department of the Interior and Department of Commerce policy, we request information from, and coordinated development of this proposed critical habitat designation with, appropriate State resource agencies in California. From a federalism perspective, the designation of critical habitat directly affects only the responsibilities of Federal agencies. The Act imposes no other duties with respect to critical habitat, either for States and local governments, or for anyone else. As a result, the rule does not have substantial direct effects either on the States, or on the relationship between the national government and the States, or on the distribution of powers and responsibilities among the various levels of government. The designation may have some benefit to these governments because the areas that contain the features essential to the conservation of the species are more clearly defined, and the physical or biological features of the habitat necessary to the conservation of the species are specifically identified. This information does not alter where and what federally sponsored activities may occur. However, it may assist these local governments in long-range planning (because these local governments no longer have to wait for case-by-case section 7 consultations to occur).

Where State and local governments require approval or authorization from a Federal agency for actions that may affect critical habitat, consultation under section 7(a)(2) would be required. While non-Federal entities that receive Federal funding, assistance, or permits, or that otherwise require approval or authorization from a Federal agency for an action, may be indirectly impacted by the designation of critical habitat, the legally binding duty to avoid destruction or adverse modification of critical habitat rests squarely on the Federal agency.

Civil Justice Reform—Executive Order 12988

In accordance with Executive Order 12988 (Civil Justice Reform), the Office of the Solicitor has determined that the rule does not unduly burden the judicial system and that it meets the requirements of sections 3(a) and 3(b)(2) of the Order. We have proposed designating critical habitat in accordance with the provisions of the Act. To assist the public in understanding the habitat needs of the species, the rule identifies the elements of physical or biological features essential to the conservation of the species. The designated areas of critical habitat are presented on maps, and the rule provides several options for the interested public to obtain more detailed location information, if desired.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain any new collections of information that require approval by OMB under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 *et seq*.). This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or

sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

It is our position that, outside the jurisdiction of the U.S. Court of Appeals for the Tenth Circuit, we do not need to prepare environmental analyses pursuant to the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq.*) in connection with listing a species as an endangered or threatened species or with designating critical habitat under the Act. We published a notice outlining our reasons for this determination in the *Federal Register* on October 25, 1983 (48 FR 49244). This position was upheld by the U.S. Court of Appeals for the Ninth Circuit (*Douglas County* v. *Babbitt*, 48 F.3d 1495 (9th Cir. 1995), cert. denied 516 U.S. 1042 (1996)).]

References Cited

A complete list of references cited in this proposed rulemaking is available on the Internet at *http://www.regulations.gov* and upon request from the Carlsbad Ecological Services Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this proposed rule are the staff members of the Fish and Wildlife Service's Species Assessment Team and the Carlsbad Ecological Services Field Office.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245; unless otherwise noted.

2. Amend § 17.11(h) by adding an entry for "Butterfly, Hermes copper" to the List of Endangered and Threatened Wildlife in alphabetical order under "INSECTS" to read as set forth below:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Common name	Scientific name	Where Listed	Status	Listing Citations and Applicable Rules
* * * * * * *				
INSECTS				
* * * * * * *				
Butterfly, Hermes copper	*Lycaena hermes*	Wherever found	T	[*Federal Register* citation when published as a final rule]; 50 CFR 17.47(d)[4d;] 50 CFR 17.95(i)[CH].
* * * * * * *				

3. Amend § 17.47 by adding paragraph (d) to read as follows:

§ 17.47 Special rules—insects.

* * * * *

(d) Hermes copper butterfly (*Lycaena hermes*)--(1) *Prohibitions.* Except as noted in paragraph (d)(2) of this section, all prohibitions and provisions of 16 U.S.C. 1538(a)(1) and 50 CFR 17.32 apply to the Hermes copper butterfly.

(2) *Exceptions from prohibitions.* (i) All of the activities listed in paragraph (d)(2)(ii) of this section occurring outside the area delineated in paragraph (d)(2)(iii) of this section must be conducted in a manner that:

(A) Maintains contiguity of suitable habitat for the species within and dispersal corridor connectivity among populations, allowing for maintenance of populations and recolonization of unoccupied, existing habitat;

(B) Does not increase the risk of wildfire in areas occupied by the Hermes copper butterfly while preventing further habitat fragmentation and isolation, or degradation of potentially suitable habitat; and

(C) Does not preclude efforts to augment or reintroduce populations of the Hermes copper butterfly within its historical range with management of the host plant.

(ii) Take of the Hermes copper butterfly outside the area delineated in paragraph (d)(2)(iii) of this section will not be considered a violation of section 9 of the Act if the take results from any of the following activities when conducted within habitats occupied by the Hermes copper butterfly:

(A) Survey and monitoring work in coordination with and reported to the Service as part of scientific inquiry involving quantitative data collection (such as population status determinations).

(B) Habitat management or restoration activities, including removal of nonnative, invasive plants, expected to provide a benefit to Hermes copper butterfly or other

sensitive species of the chaparral and coastal sage scrub ecosystems, including removal of nonnative, invasive plants. These activities must be coordinated with and reported to the Service in writing and approved the first time an individual or agency undertakes them.

(C) Activities necessary to maintain the minimum clearance (defensible space) requirement of 30 m (100 ft) from any occupied dwelling, occupied structure, or to the property line, whichever is nearer, to provide reasonable fire safety and comply with State of California fire codes to reduce wildfire risks.

(D) Fire management actions on protected/preserve lands to maintain, protect, or enhance coastal sage scrub and chaparral vegetation. These activities must be coordinated with and reported to the Service in writing and approved the first time an individual or agency undertakes them.

(E) Maintenance of existing fuel breaks identified by local fire authorities to protect existing structures.

(F) Firefighting activities associated with actively burning fires to reduce risk to life or property.

(G) Collection, transportation, and captive-rearing of Hermes copper butterfly for the purpose of population augmentation or reintroduction, maintaining refugia, or as part of scientific inquiry involving quantitative data collection (such as survival rate, larval weights, and post-release monitoring) in coordination with and reported to the Service. This does not include activities such as personal “hobby” collecting and rearing intended for photographic purposes and re-release.

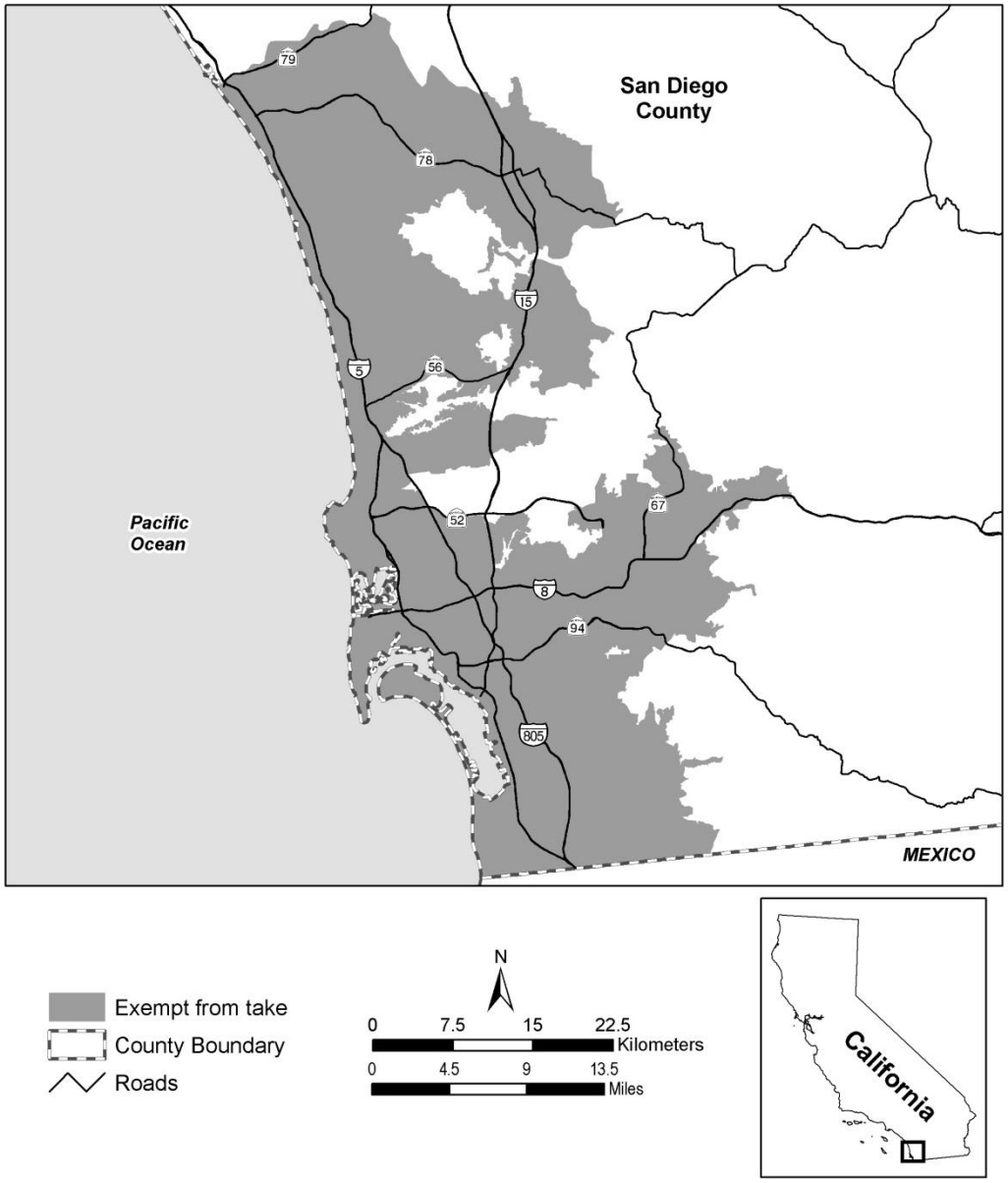
(H) Research projects involving collection of individual fruits, leaves, or stems of the Hermes copper butterfly host plant, spiny redberry, in coordination with and reported to the Service.

(iii) A portion of the range of the Hermes copper butterfly is exempt from all take prohibitions under section 9(a)(1) of the Act.

(A) The southern edge is the Mexican border, and the western edge is the Pacific coast. The eastern and northern edges of the boundary follow the development that would isolate any extant populations found within the boundaries.

(B) *Note:* The map of areas exempted from take prohibitions follows:

Portion of Hermes copper butterfly's (*Lycaena hermes*) range exempt from take prohibitions under section 9(a)(1) of the Endangered Species Act San Diego County, California



(3) *Contact information.* To contact the Service, see 50 CFR 2.2 for a list of the addresses for the Service regional offices.

4. Amend § 17.95(i) by adding an entry for "Hermes copper butterfly (*Lycaena hermes*)," in alphabetical order to read as follows:

§ 17.95 Critical habitat—fish and wildlife.

* * * * *

(i) *Insects*.

* * * * *

Hermes Copper Butterfly (*Lycaena hermes*)

(1) Critical habitat units are depicted for San Diego County, California, on the maps below.

(2) Within these areas, the physical or biological features essential to the conservation of the Hermes copper butterfly consist of the following components when found between 30 m and 1,341 m above sea level:

(i) Spiny redberry host plants.

(ii) Nectar sources for adult butterflies.

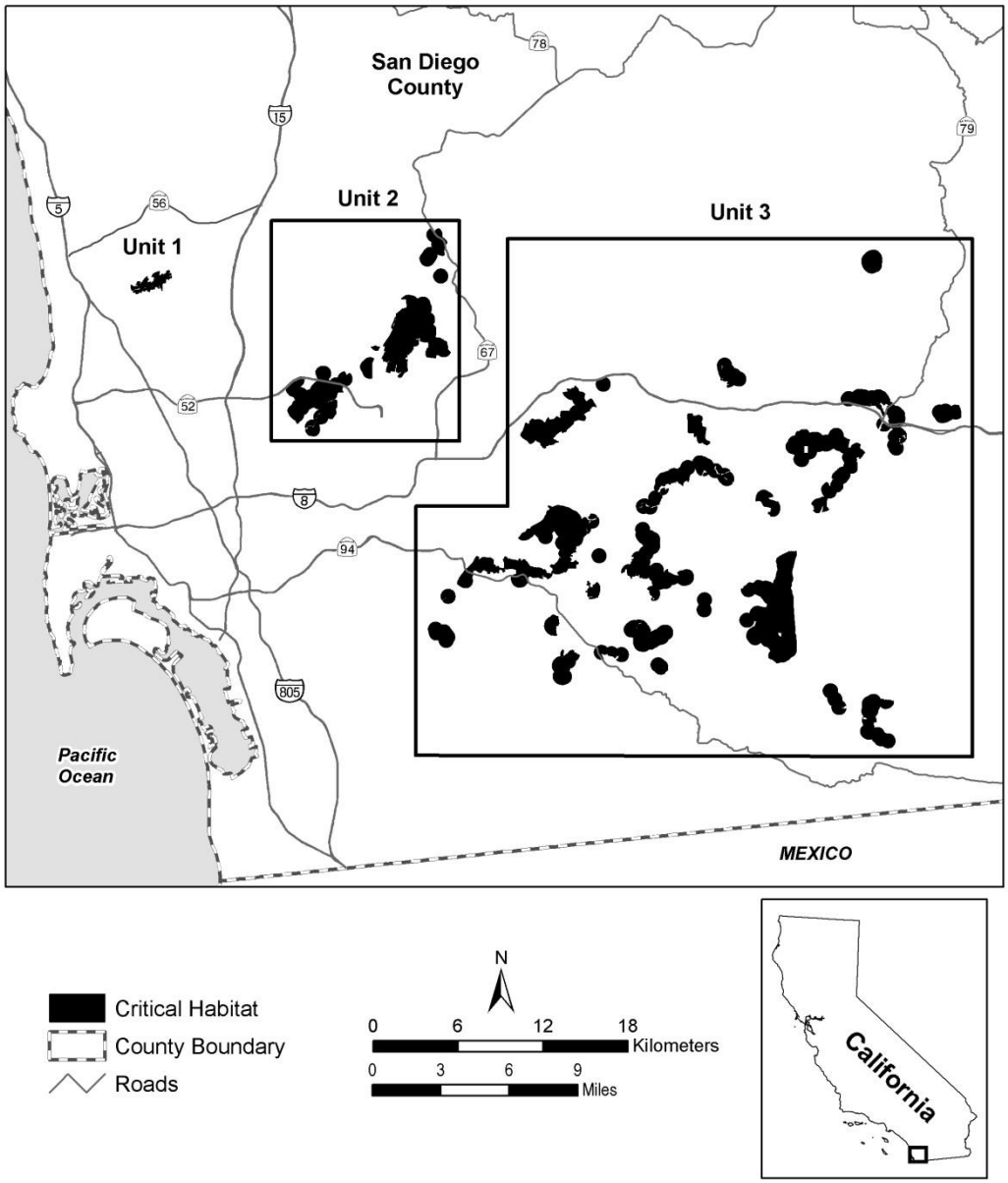
(3) Critical habitat does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries on [EFFECTIVE DATE OF THE FINAL RULE].

(4) Critical habitat was mapped using GIS analysis tools and refined using 2016 NAIP imagery and/or the World Imagery layer from ArcGIS Online. The maps in this entry, as modified by any accompanying regulatory text, establish the boundaries of the critical habitat designation. The coordinates or plot points or both on which each map is based are available to the public at *http://www.regulations.gov* at Docket No. FWS–R8–

ES–2017–0053 and at the field office responsible for this designation. You may obtain field office location information by contacting one of the Service regional offices, the addresses of which are listed at 50 CFR 2.2.

(5) Note: Index map follows:

Hermes Copper Butterfly (*Lycaena hermes*) Critical Habitat
Index Map
San Diego County, California

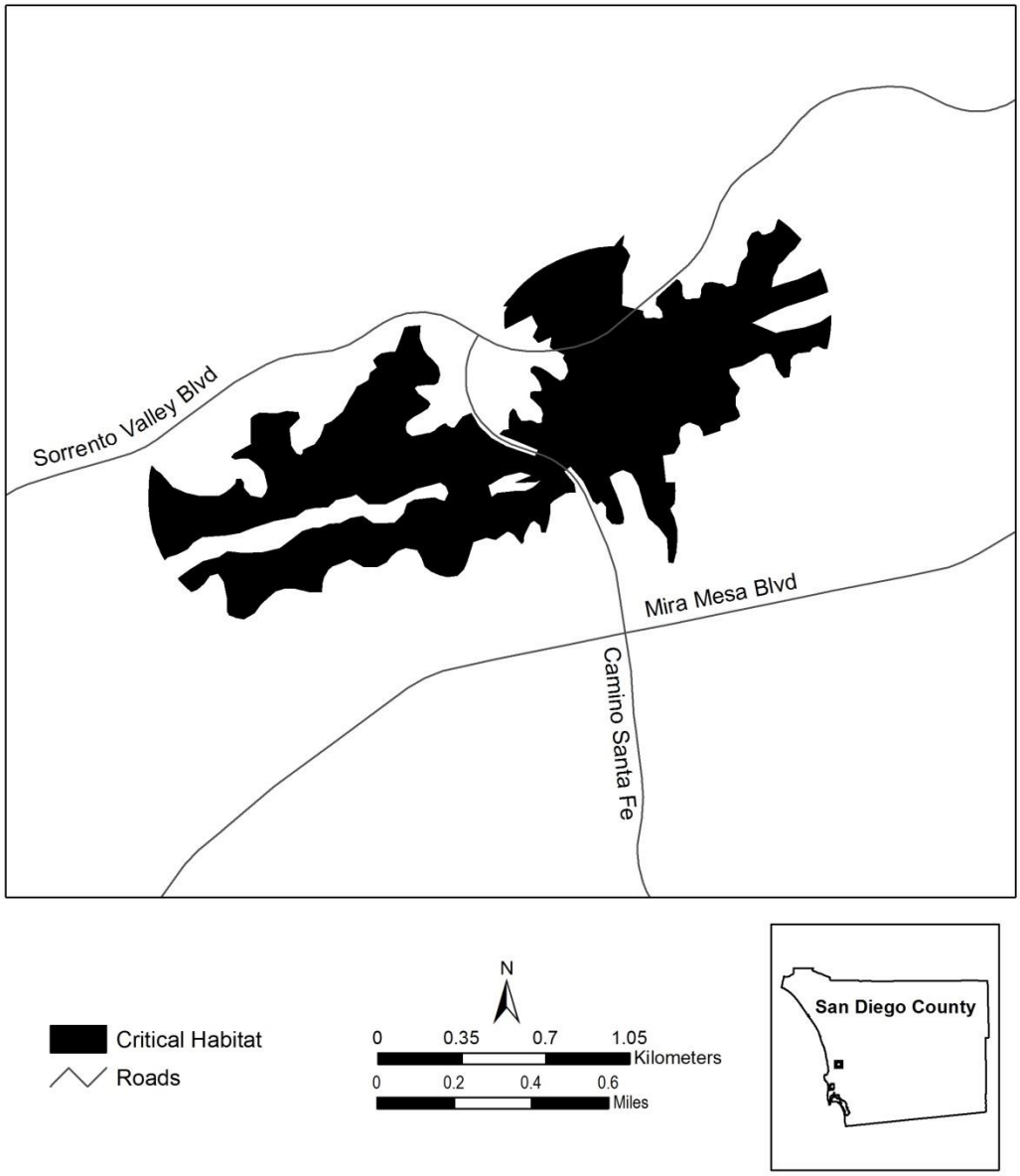


(6) Unit 1: Lopez Canyon, San Diego County, California.

(i) Unit 1 consists of 166 ha (410 ac) in San Diego County and is composed of lands jointly owned and managed by the City and County of San Diego (88 ha (218 ac)) and private or other ownership (77 ha (191 ac)).

(ii) Note: Map of Unit 1, Lopez Canyon, follows:

Hermes Copper Butterfly (*Lycaena hermes*) Critical Habitat
Unit 1
San Diego County, California

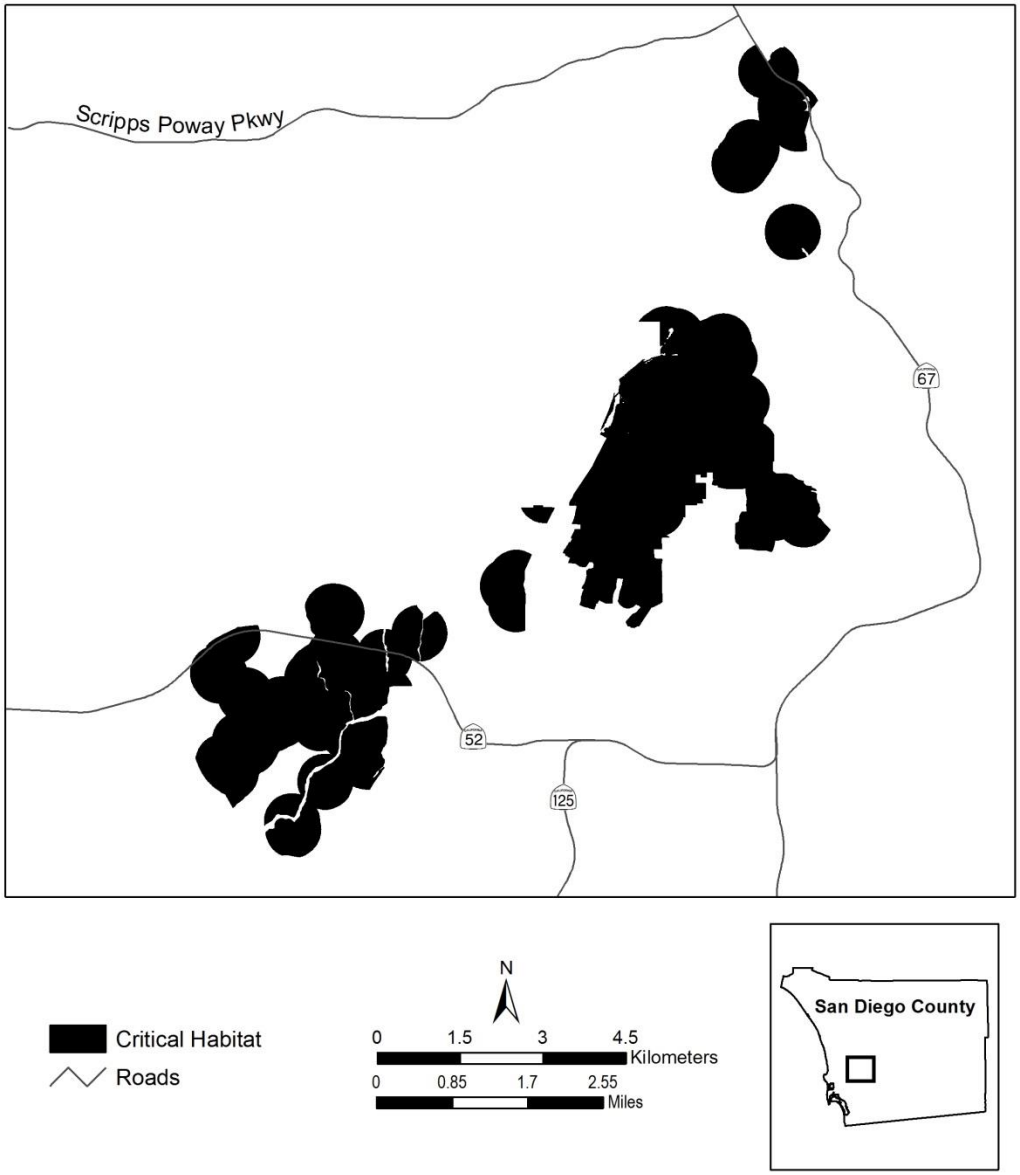


(7) Unit 2: Miramar/Santee, San Diego County, California.

(i) Unit 2 consists of 2,870 ha (7,092 ac) in San Diego County and is composed of lands owned and managed by the State of California (111 ha (275 ac)), local jurisdictions (primarily the County of San Diego; 1,113 ha (2,750 ac)), and private or other ownership (1,646 ha (4,068 ac)).

(ii) Note: Map of Unit 2, Miramar/Santee, follows:

Hermes Copper Butterfly (*Lycaena hermes*) Critical Habitat
Unit 2
San Diego County, California

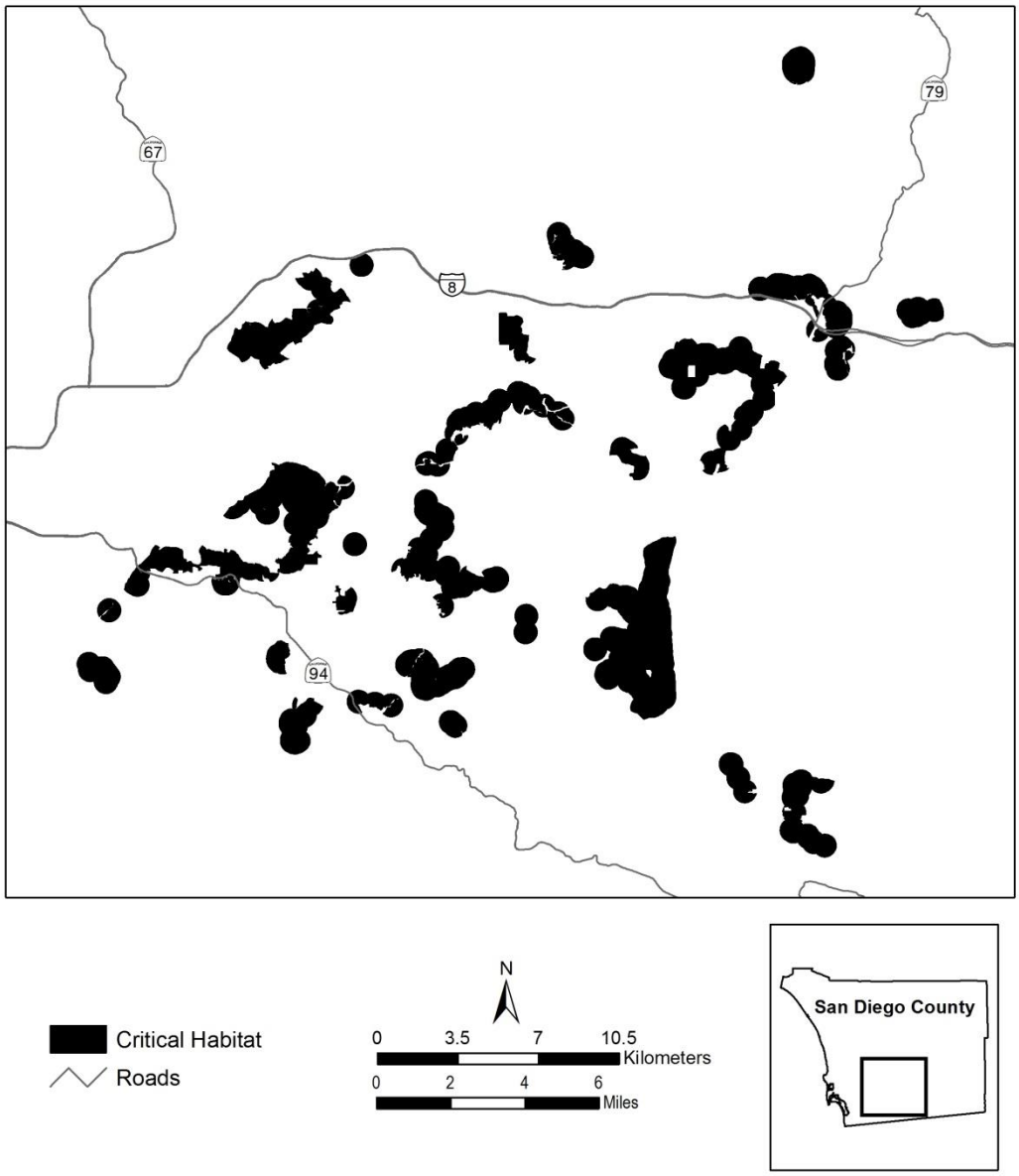


(8) Unit 3: Southeast San Diego, San Diego County, California.

(i) Unit 3 consists of 11,213 ha (27,709 ac) in San Diego County and is composed of lands owned by the Federal Government (4,213 ha (10,411 ac)), the State of California (2,074 ha (5,124 ac)), local jurisdictions (primarily the City and County of San Diego; 1,162 ha (2,871 ac)), and private or other ownership (3,765 ha (9,303 ac)).

(ii) Note: Map of Unit 3, Southeast San Diego, follows:

Hermes Copper Butterfly (*Lycaena hermes*) Critical Habitat
Unit 3
San Diego County, California



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Dated: November 26, 2019

Signed:
Margaret E. Everson
Principal Deputy Director,
Exercising the Authority of the Director,
for the U.S. Fish and Wildlife Service.

Billing Code 4333–15

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