

DEPARTMENT OF THE INTERIOR**Fish and Wildlife Service****50 CFR Part 17**

[Docket No. FWS-R8-ES-2017-0053; FF09E21000 FXES1111090FEDR 223]

RIN 1018-BC57

Endangered and Threatened Wildlife and Plants; Threatened Species Status with Section 4(d) Rule for Hermes Copper Butterfly and Designation of Critical Habitat**AGENCY:** Fish and Wildlife Service, Interior.**ACTION:** Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), determine threatened species status under the Endangered Species Act of 1973 (Act), as amended, for the Hermes copper butterfly (*Lycaena [Hermelycaena] hermes*), a butterfly species from San Diego County, California, and Baja California, Mexico. We also designate critical habitat. In total, approximately 14,174 ha (35,027 ac) in San Diego County, California, fall within the boundaries of the critical habitat designation. This rule adds the species to the List of Endangered and Threatened Wildlife. We also finalize a rule under the authority of section 4(d) of the Act that provides measures that are necessary and advisable to provide for the conservation of this species.

DATES: This rule is effective January 20, 2022.**ADDRESSES:** This final rule is available on the internet at <https://www.regulations.gov>. Comments and materials we received, as well as supporting documentation we used in preparing this rule, are available for public inspection at <https://www.regulations.gov> at Docket No. FWS-R8-ES-2017-0053.

The coordinates or plot points or both from which the maps are generated are included in the decision file for this critical habitat designation and are available at <https://www.regulations.gov> at Docket No. FWS-R8-ES-2017-0053. Additional supporting information that we developed for this critical habitat designation will also be available at <https://www.regulations.gov> and at the field office responsible for this designation.

FOR FURTHER INFORMATION CONTACT:

Scott Sobiech, 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.

SUPPLEMENTARY INFORMATION:**Executive Summary**

Why we need to publish a rule. Under the Act, to list a species as an endangered or threatened species, we are required to publish a proposal in the **Federal Register** and make a determination on our proposal within 1 year. If there is substantial disagreement regarding the sufficiency and accuracy of the available data relevant to the proposed listing, we may extend the final determination for not more than 6 months. To the maximum extent prudent and determinable, we must designate critical habitat for any species that we determine to be an endangered or threatened species under the Act. Listing a species as an endangered or threatened species and designation of critical habitat can only be completed by issuing a rule.

What this document does. This rule adds 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 extends the Act's protections to this species through specific regulations issued under section 4(d) of the Act (50 CFR 17.47(d)).

This document also designates critical habitat for the Hermes copper butterfly. We are designating a total of approximately 14,174 hectares (ha) (35,027 acres (ac)) for the species in San Diego County, California.

The basis for our action. Under the Act, we may determine that a species is an endangered or threatened species because of 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 at risk primarily due to wildfire and, to a lesser extent, habitat fragmentation, isolation, land use change, and climate change and drought, and by those threats acting in concert.

Section 4(a)(3) of the Act requires the Secretary of the Interior (Secretary) to designate critical habitat concurrent with listing to the maximum extent prudent and determinable. Section 3(5)(A) of the Act defines critical habitat as (i) the specific areas within the

geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary that such areas are essential for the conservation of the species. Section 4(b)(2) of the Act states that the Secretary must make the designation on the basis of the best scientific data available and after taking into consideration the economic impact, the impact on national security, and any other relevant impacts of specifying any particular area as critical habitat.

Previous Federal Actions

Please refer to the proposed listing and critical habitat rule (85 FR 1018) for the Hermes copper butterfly published on January 8, 2020, for a detailed description of previous Federal actions concerning this species.

Summary of Changes From the Proposed Rule

Based upon our review of the public comments, Federal and State agency comments, peer review comments, and relevant information that became available since the proposed rule published (85 FR 1018; January 8, 2020), we reevaluated our proposed listing rule and made changes as appropriate in this final rule. In addition to minor clarifying edits and incorporation of additional information on the species' biology, populations, threats, and economic impacts, this determination differs from the proposal in the following ways:

(1) We added information on data reported subsequent to publication of the proposed rule that adds to our understanding of Hermes copper butterfly distribution and viability.

(2) We added information about a 2020 wildfire that affected occupied Hermes copper butterfly occurrences.

(3) We added more recent data on drought and climate change.

(4) We added more information on local protection ordinances and how they affect the threat of development.

(5) In *Center for Biological Diversity v. Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020), the court vacated the aspect of the Final Policy on Interpretation of the Phrase "Significant Portion of Its Range" in the Endangered Species Act's Definitions of "Endangered Species" and "Threatened Species" (79 FR 37578; July 1, 2014) that provided that the Services do not undertake an

analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range. Therefore, we have revised the significant portion of the range analysis in this final rule to consider whether the species is endangered in a significant portion of its range. We evaluated the status of the species and found that no portions of the range meet the definition of endangered. This updated analysis did not result in any changes from the proposed rule but provides support for the determination.

(6) We removed a future scenario because we concluded it was not likely and therefore not useful to understanding the future status of the species.

(7) In response to a public comment, we edited the third take prohibition regarding defensible space requirements with regard to reducing wildfire risk. We removed language in the exception regarding the required 30-m (100-ft) distance from structures in order to clarify that any activities to reduce wildfire risks must be done in compliance with State and local fire codes. Currently, this distance is still 30 m (100 ft), but the rewording allows for flexibility to ensure that activities will still comply with local and State of California fire codes if they ever do change.

(8) We discovered an error in the mapping of critical habitat units in the proposed rule where we inadvertently included a low-accuracy observation record-based occurrence in critical habitat, contrary to our stated methodology of only including those based on high-accuracy information. We removed this occurrence from critical habitat, resulting in a decrease of 74 ha (184 ac) from Unit 3 and our total critical habitat designation. The remaining 14,174 ha (35,027 ac) represent all areas that meet the definition of critical habitat for the Hermes copper butterfly.

(9) During the open comment period, we received new relatively comprehensive survey data for the Hermes copper butterfly. The majority of these were negative surveys, that is, surveys where researchers looked for but did not find butterflies. To appropriately address new data since 2017 and address the concerns of public commenters (Strahm 2019 entire; Marschalek 2019 entire; Marschalek and Deutschman 2019, p. 7), we revised our occurrence status classifications methods and updated the Species Status Assessment (SSA) and this final rule to reflect these new data.

The changes to occurrence number and status categories are a combined

result of: Known subsequent losses (for example, due to fires); subsequently documented new occurrences; and new negative survey data that may reflect losses prior to, or after, 2017.

Additionally, occurrences that are categorized as "extant" are those for which surveys have recorded butterflies within the past 10 years (as in the proposed rule), a timeframe that shifted by 2 years. As such, occurrences where butterflies were last recorded in 2008 and 2009 that were categorized as "extant" in the 2020 proposed rule (analysis data through 2017) are now categorized as "presumed extant" in this 2021 final rule (analysis data through 2019).

In the 2020 proposed rule, we considered there to be 95 occurrences, 45 of which were categorized as known/presumed extant, 40 as presumed extirpated, and 10 as permanently extirpated (85 FR 1018; January 8, 2020). Based on new data and associated new methodology, we now consider there to be 98 occurrences, 26 of which are categorized as known/presumed extant, 56 as presumed extirpated, and 16 as permanently extirpated (Service 2021, entire). Changes to occurrence status category numbers in the proposed and final rule do not necessarily reflect occurrence status changes that occurred between 2017 (data used in the 2018 SSA report and 2020 proposed rule) and 2020 (data used in the 2021 SSA report and final rule), because some new data may more accurately reflect 2017 conditions. For example, occurrences categorized as presumed extant based on 2017 data, now presumed extirpated, may have already been extirpated in 2017. Also, new observation locations recorded since 2017 were likely in habitat occupied in 2017 but not yet discovered, so should not be assumed to reflect new colonizations.

Despite these occurrence status category changes, all critical habitat units are still within the area considered occupied at the time of listing.

Full details on changes to status classification methods and to the number and status categories of occurrences from the 2018 SSA report and 2020 proposed rule are summarized in appendix II of the updated 2021 SSA report.

(10) Based on the updated number of extant and extirpated occurrences, we updated our viability index. We also streamlined the description of our viability index to make it clearer and easier to understand. Because more occurrences are considered extirpated than in the proposed rule and previous 2018 SSA report, the species viability

index is lower in this final rule than it was in the proposed rule. We also made changes throughout the *Current Condition* section to reflect updated occurrence numbers.

(11) We updated our discussion of "Habitats That Are Protected from Disturbance and Representative of the Historical Geographical and Ecological Distributions of a Species" in our discussion of physical or biological features for the species to provide better context for rangewide features needed for the Hermes copper butterfly.

(12) We updated the SSA report with all the above changes and with other suggested edits received during the open comment period. The new SSA report is version 2.0 (Service 2021).

Supporting Documents

A species status assessment team prepared an SSA report for the Hermes copper butterfly. The SSA team was composed of Service biologists, in consultation with other species experts. The SSA report represents a compilation of the best scientific and commercial data available concerning the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species.

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 sought peer review of the SSA report. We sent the SSA report to eight independent peer reviewers and received six responses. The purpose of peer review is to ensure that our listing determinations, critical habitat designations, and 4(d) rules are based on scientifically sound data, assumptions, and analyses. The peer reviewers have expertise in the biology, habitat, and threats to the species. We also sent the SSA report to 7 agencies and 11 Tribes for partner review, including scientists with expertise in this species and butterfly ecology. We received reviews from two partners (one Federal agency and one Tribe).

I. Final Listing Determination 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 2.0 (Service 2021), which is available at <https://www.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 2021, Figure 4). There are 98 known historical or extant Hermes copper butterfly occurrences in the United States and northwestern Baja California, Mexico; 26 are extant or

presumed extant (all in the United States), 56 are presumed extirpated, and 16 are permanently extirpated (Table 1). Table 1 shows all occurrences, their status, the last time butterflies were detected in an occurrence, and the Ecological Unit where the occurrence is found. Additionally, if an occurrence is extirpated, Table 1 displays the reason

for the extirpation (Goudey and Smith 1994 [2007]). The category for core occurrence size is based on a total area within 1/2 km of Hermes copper butterfly records greater than 176 ha (435 ac); smaller occurrences are considered non-core (NC).

TABLE 1—HERMES COPPER BUTTERFLY OCCURRENCES IN THE UNITED STATES AND MEXICO

[Current status category was determined by a decision tree developed in 2020 (Service 2021, Figure 5), which considered data through 2019. Map # refers to Figures 6 and 7 in the SSA report.]

Map No.	Occurrence name	Ecological unit ¹	Size	Last record	Accuracy ²	2018 SSA status category ³	2020 status category Dispersal corridor-connectivity	Wildfire year (% burned if extant) ⁴	Reason extirpated
1	Bonsall	WGF	NC	1963	3	Presumed Extirpated.	Presumed Extirpated.		Development Isolation.
2	East San Elijo Hills.	CH	NC	1979	2	Presumed Extirpated.	Presumed Extirpated.		Development Isolation.
3	San Elijo Hills	CH	NC	1957	3	Extirpated	Extirpated		Development Isolation.
4	Elfin Forest	CH	NC	2011	1	Extant	Presumed Extirpated.		Drought.
5	Carlsbad	CH	NC	Pre-1963	3	Extirpated	Extirpated		Development.
6	Lake Hodges	CH	NC	1982	3	Presumed Extirpated.	Presumed Extirpated.	2007	Development Isolation, Fire.
7	Rancho Santa Fe.	CH	NC	2004	1	Presumed Extirpated.	Presumed Extirpated.	2007	Development Isolation, Fire.
8	Black Mountain	CH	NC	2004	1	Presumed Extant.	Presumed Extirpated.		Development Isolation, Drought.
9	South Black Mountain.	CH	NC	Pre-1963	3	Extirpated	Extirpated		Development.
10	Van Dam Peak	CH	NC	2011	1	Extant	Presumed Extirpated.		Development Isolation, Drought.
11	Sabre Springs	CH	NC	2001	1	Presumed Extirpated.	Presumed Extirpated.		Development Isolation.
12	Lopez Canyon	CT	Core	2011	1	Extant	Presumed Extant Isolated.		
13	Mira Mesa	CT	NC	Pre-1963	3	Extirpated	Extirpated		Development.
14	West Mira Mesa	CT	NC	Pre-1963	3	Extirpated	Extirpated		Development.
15	Northeast Miramar.	CH	Core	2000	1	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
16	Southeast Miramar.	CH	NC	1998	2	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
17	Miramar	CH	Core	2000	1	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
18	West Miramar	CT	NC	1998	2	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
19	Miramar Airfield	CT	NC	Pre-1963	3	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
20	South Miramar	CH	NC	2000	1	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
21	Sycamore Canyon.	WGF	Core	2003	1	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
22	South Sycamore Canyon.	WGF	NC	2000	1	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
23	North Santee	CH	Core	2005	1	Presumed Extant.	Presumed Extant Connected.	2003 (60%).	
24	Santee	CH	NC	1967	3	Extirpated	Extirpated		Development.
25	Santee Lakes	CH	NC	2001	1	Presumed Extirpated.	Presumed Extirpated.	2003	Development, Fire.
26	Mission Trails	CH	Core	2010	1	Extant	Presumed Extant Connected.	2003, -70%.	
27	North Mission Trails.	CH	NC	2003	1	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
28	Cowles Mountain.	CH	NC	1973	2	Presumed Extant.	Presumed Extant Connected.		
29	South Mission Trails.	CH	NC	1978	3	Presumed Extirpated.	Extirpated		Development Isolation.
30	Admiral Baker	CH	NC	2015	1	Extant	Extant Isolated.		
31	Kearny Mesa	CT	NC	1939	3	Extirpated	Extirpated		Development.
32	Mission Valley	CT	NC	Pre-1963	3	Extirpated	Extirpated		Development.
33	West Mission Valley.	CT	NC	1908	3	Extirpated	Extirpated		Development.
34	San Diego State University.	CT	NC	Pre-1963	3	Presumed Extirpated.	Extirpated		Development.

TABLE 1—HERMES COPPER BUTTERFLY OCCURRENCES IN THE UNITED STATES AND MEXICO—Continued
 [Current status category was determined by a decision tree developed in 2020 (Service 2021, Figure 5), which considered data through 2019. Map # refers to Figures 6 and 7 in the SSA report.]

Map No.	Occurrence name	Ecological unit ¹	Size	Last record	Accuracy ²	2018 SSA status category ³	2020 status category Dispersal corridor-connectivity	Wildfire year (% burned if extant) ⁴	Reason extirpated
35	La Mesa	CH	NC	Pre-1963	3	Presumed Extirpated.	Extirpated		Development.
36	Mt. Helix	CH	NC	Pre-1963	3	Presumed Extirpated.	Extirpated		Development.
37	East El Cajon	CH	NC	Pre-1963	3	Presumed Extirpated.	Extirpated		Development.
38	Dictionary Hill	CT	NC	1962	2	Presumed Extant.	Presumed Extirpated.		Drought.
39	El Monte	CH	NC	1960	2	Presumed Extirpated.	Presumed Extirpated.	2003	Development, Fire.
40	BLM Truck Trail	WGF	Core	2006	1	Presumed Extant.	Presumed Extirpated.	2003	Fire.
41	North Crestridge	WGF	NC	1981	2	Presumed Extirpated.	Presumed Extirpated.	1970 (40%), 2003.	Fire.
42	Northeast Crestridge.	WGF	NC	1963	2	Presumed Extant.	Presumed Extirpated.	2003, 2017 (60%).	Fire.
43	East Crestridge	WGF	NC	2003	1	Presumed Extant.	Presumed Extant Connected.	1970 (12%), 2003 (50%).	
44	Crestridge	WGF	Core	2014	1	Extant	Presumed Extant Connected.	1970 (98%), 2003 (80%).	
45	Boulder Creek Road.	PC	Core	2019	1	Extant	Extant Isolated	2003.	
46	North Guatay Mountain.	PC	NC	2004	1	Presumed Extant.	Presumed Extant Connected.	2003 (10%).	
47	South Guatay Mountain.	PC	NC	2010	1	Extant	Presumed Extant Connected.	1970 (99%).	
48	Pine Valley	PC	NC	Pre-1963	3	Presumed Extant.	Presumed Extant Connected.		
49	Descanso	PC	Core	2019	1	Extant	Extant Connected	1970 (56%), 2003 (50%).	
50	Japutal	WGF	Core	2012	1	Extant	Extant Connected	1970 (99%).	
51	East Japutal	WGF	NC	2010	1	Extant	Presumed Extirpated.	1970	Drought.
52	South Japutal	WGF	Core	2018	1	Extant	Extant Connected	1970.	
53	Corte Madera	PC	NC	Pre-1963	3	Presumed Extant.	Presumed Extant Connected.	1970.	
54	Alpine	WGF	Core	2011	1	Extant	Presumed Extirpated Isolated.	1970 (37%)	Drought.
55	East Alpine	WGF	NC	Pre-1963	3	Presumed Extant.	Presumed Extirpated.	1970 (30%), 2003, 2018 (75%).	Development, Fire.
56	Willows (Viejas Grade Road).	WGF	NC	2003	1	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
57	Dehesa	CH	NC	2012	3	Presumed Extant.	Extant Connected	1970.	
58	Loveland Reservoir.	WGF	Core	2012	1	Extant	Presumed Extirpated.	1970	Drought.
59	East Loveland Reservoir.	WGF	NC	2011	1	Extant	Presumed Extirpated.	1970	Drought.
60	West Loveland Reservoir.	CH	NC	2009	1	Extant	Presumed Extirpated.	1970	Drought.
61	Hidden Glen	WGF	NC	2010	1	Extant	Presumed Extirpated.	1970	Drought.
62	McGinty Mountain.	CH	Core	2014	1	Extant	Presumed Extirpated.	1970	Drought.
63	East McGinty Mountain.	WGF	NC	2001	2	Presumed Extant.	Presumed Extant Connected.	1970.	
64	North Rancho San Diego.	CH	NC	Pre-1963	3	Extirpated	Extirpated	1970	Development, Isolation.
65	Rancho San Diego.	CH	Core	2011	1	Extant	Presumed Extirpated.	1970, 2007	Drought.
66	South Rancho San Diego.	CH	NC	2007	1	Presumed Extant.	Presumed Extirpated.	1970, 2007	Drought.
67	San Miguel Mountain.	CH	Core	2007	1	Presumed Extirpated.	Presumed Extirpated.	1970, 2007	Fire.
68	South San Miguel Mountain.	CH	NC	2004	1	Presumed Extant.	Presumed Extirpated.	1970, 2007.	
69	North Jamul	CH	Core	2004	1	Presumed Extant.	Presumed Extant Isolated.	1970, 2003 (5%).	
70	North Rancho Jamul.	CH	NC	2007	1	Presumed Extirpated.	Presumed Extirpated.	2003, 2007	Fire.
71	Rancho Jamul	CH	Core	2003	1	Presumed Extirpated.	Presumed Extirpated.	2003, 2007	Fire.

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Map No.	Occurrence name	Ecological unit ¹	Size	Last record	Accuracy ²	2018 SSA status category ³	2020 status category Dispersal corridor-connectivity	Wildfire year (% burned if extant) ⁴	Reason extirpated
72	East Rancho Jamul.	CH	NC	2007	1	Presumed Extant.	Presumed Extant Isolated.	1970 (1%), 2003, 2007 (5%).	
73	Sycuan Peak	WGF	Core	2016	1	Extant	Presumed Extirpated.	1970	Drought.
74	Skyline Truck Trail.	WGF	Core	2018	1	Extant	Extant Connected	1970.	
75	Lyons Peak	WGF	NC	2003	1	Presumed Extant.	Presumed Extirpated.	1970, 2007	Drought.
76	Gaskill Peak	WGF	NC	2010	1	Extant	Presumed Extirpated.	2020	Fire.
77	Lawson Valley	WGF	Core	2019	1	Extant	Extant Connected	1970, 2007 (40%).	
78	Bratton Valley	WGF	NC	Pre-1963	3	Presumed Extirpated.	Presumed Extirpated.	1970, 2007	Fire.
79	Hollenbeck Canyon.	WGF	Core	20166	1	Presumed Extirpated ⁵ .	Presumed Extirpated.	1970, 2007	Fire.
80	Southeast Hollenbeck Canyon.	WGF	NC	2007	1	Presumed Extirpated.	Presumed Extirpated.	1970, 2007	Fire.
81	South Hollenbeck Canyon.	CH	NC	Pre-1963	3	Presumed Extirpated.	Presumed Extirpated.	1970 (5%), 2003, 2007; 2017 (20%)..	Fire.
82	West Hollenbeck Canyon.	CH	NC	2007	1	Presumed Extirpated.	Presumed Extirpated.	1970 (40%), 2007.	Fire.
83	Otay Mountain	WGF	NC	1979	2	Presumed Extirpated.	Presumed Extirpated.	2003, 2007	Fire.
84	South Otay Mountain.	WGF	NC	Pre-1963	3	Presumed Extirpated.	Presumed Extirpated.	2003, 2007	Fire.
85	Dulzura	WGF	NC	2005	1	Presumed Extirpated.	Presumed Extirpated.	2007, 2007 ⁵	Fire.
86	Deerhorn Valley	WGF	NC	1970	3	Presumed Extirpated.	Presumed Extirpated.	2007	Fire.
87	North Hartley Peak.	WGF	NC	2010	1	Extant	Presumed Extirpated.	2007	Fire, Drought.
88	South Hartley Peak.	WGF	NC	2010	1	Extant	Presumed Extant Connected.	2007 (50%).	
89	North Portrero	WGF	Core	2018	1	Extant	Extant Connected	2007 (35%).	
90	South Portrero	WGF	Core	2012	1	Extant	Extant Connected.		
91	Tecate Peak	WGF	NC	1980	3	Presumed Extirpated.	Presumed Extirpated.	2007	Fire.
92	Otay Mesa	CT	NC	Pre-1920	3	Presumed Extirpated.	Extirpated		Development, Isolation.
93	West Guatay Mountain.	PC	NC	2005	1	n/a	Presumed Extant Connected.		
94	Southeast Japutal.	PC	Core	2018	1	n/a	Extant Connected.		
95	Lyons Japutal	PC	NC	2018	1	n/a	Presumed Extirpated.	2020 (40%)	Fire.
Mexico⁶									
96	Salsipuedes	n/a	NC	1983	3	Presumed Extirpated.	Presumed Extirpated.	2014	Fire.
97	Santo Tomas	n/a	NC	Pre-1920	3	Presumed Extirpated.	Presumed Extirpated.	2003	Fire.
98	North Ensenada	n/a	NC	1936	3	Presumed Extirpated.	Presumed Extirpated.	2005, 2014	Fire.

¹ Description of ecological units: CH = Coastal Hills; CT = Coastal Terraces; WGF = Western Granitic Foothills; PC = Palomar-Cuyamaca Peak (Goudey and Smith 1994 [2007]).

² Geographic accuracy categories: 1 = GPS coordinates or accurate map; 2 = relatively accurate specimen collection site label or map; 3 = site name record or map only accurate enough for determining species' range (not used for mapping if within 1.5 km of a higher accuracy record and, if used, considered "non-core").

³ At least one adult observed after 2015 translocation, does not represent breeding.

⁴ Only fire included pre-2003 is 1970 Laguna megafire. If no percentage and status is extant or presumed extant, 100% within mapped fire footprint.

⁵ Both the Harris (entire occurrence) and the Border (small portion) fire footprints overlapped this occurrence in 2007.

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).

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 report (Service 2021), this final 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 spiny redberry (*Rhamnus crocea*) shrubs (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 California buckwheat (*Eriogonum fasciculatum*), although other nectar sources may provide equivalent or supplemental adult nutrition. Hermes copper butterflies are considered poor dispersers, they appear to have limited directed movement ability, and they have been recaptured no more than 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).

The Hermes copper butterfly has a much narrower distribution than spiny redberry, its host plant. The reasons for this lack of overlap in distribution are not well understood, but a recent chemical ecology study detected higher levels of some plant secondary compounds within the range of Hermes copper butterfly than outside it (Malter 2020, entire). Plant secondary compounds, such as tocopherols, found in significantly higher quantities within Hermes copper butterfly's historical range, were associated with warmer and drier conditions, while compounds found in significantly higher quantities outside (north of) the range were associated with cooler and wetter conditions (Malter 2020, p. 28). Tocopherols play a basic role in insect physiology, especially for insects with specific diet requirements (e.g., Vanderzant et al. 1957, p. 606; Zwolinska-Sniatalowa 1976, entire). Increased tocopherol levels associated with drought conditions have been found in plants from Mediterranean climates and other regions (e.g., Munné-Bosch et al. 1999, entire; Munné-Bosch and Alegre 2000a, entire; 200b, p. 139) and other plants (Liu et al. 2008, p. 1275). The association of tocopherols with dry conditions, potentially contributing to historical limitation of the Hermes copper butterfly's range to a drier, more southern distribution than the host plant, combined with the butterfly's apparent drought sensitivity, suggest a narrow climatic envelope for

the species within the range of its host plant (discussed further under Climate Change and Drought below). Because the climate differences noted in this study are correlated with a northern latitude difference, we expect the reverse relationship (hotter and drier outside the historical range) to the east (desert) and south of the species' historical range.

There are two types of “habitat connectivity” important to the Hermes copper butterfly—within-habitat patch connectivity and dispersal corridor-connectivity areas. Within-habitat patch connectivity requires 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. Hermes copper butterflies 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 rule.

Regulatory and Analytical Framework

Regulatory Framework

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 is an endangered species or a 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 any species is an endangered species or a 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.

These factors represent broad categories of natural or human-caused

actions or conditions that could have an effect on a species' continued existence. In evaluating these actions and conditions, we look for those that may have a negative effect on individuals of the species, as well as other actions or conditions that may ameliorate any negative effects or may have positive effects.

We use the term “threat” to refer in general to actions or conditions that are known to or are reasonably likely to negatively affect individuals of a species. The term “threat” includes actions or conditions that have a direct impact on individuals (direct impacts), as well as those that affect individuals through alteration of their habitat or required resources (stressors). The term “threat” may encompass—either together or separately—the source of the action or condition or the action or condition itself.

However, the mere identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an “endangered species” or a “threatened species.” In determining whether a species meets either definition, we must evaluate all identified threats by considering the expected response by the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species, such as any existing regulatory mechanisms or conservation efforts. The Secretary determines whether the species meets the definition of an “endangered species” or a “threatened species” only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

The Act does not define the term “foreseeable future,” which appears in the statutory definition of “threatened species.” Our implementing regulations at 50 CFR 424.11(d) set forth a framework for evaluating the foreseeable future on a case-by-case basis. The term “foreseeable future” extends only so far into the future as the Services can reasonably determine that both the future threats and the species' responses to those threats are likely. In other words, the foreseeable future is the period of time in which we can make reliable predictions. “Reliable” does not mean “certain”; it means sufficient to

provide a reasonable degree of confidence in the prediction. Thus, a prediction is reliable if it is reasonable to depend on it when making decisions.

It is not always possible or necessary to define foreseeable future as a particular number of years. Analysis of the foreseeable future uses the best scientific and commercial data available and should consider the timeframes applicable to the relevant threats and to the species' likely responses to those threats in view of its life-history characteristics. Data that are typically relevant to assessing the species' biological response include species-specific factors such as lifespan, reproductive rates or productivity, certain behaviors, and other demographic factors.

Analytical Framework

The SSA report documents the results of our comprehensive biological review of the best scientific and commercial data regarding the status of the species, including an assessment of the potential threats to the species. The SSA report does not represent a decision by the Service on whether the species should be listed as an endangered or threatened species under the Act. However, it does provide the scientific basis that informs our regulatory decisions, which involve the further application of standards within the Act and its implementing regulations and policies. The following is a summary of the key results and conclusions from the SSA report; the full SSA report can be found at Docket FWS-R8-ES-2017-0053 on <https://www.regulations.gov>.

To assess Hermes copper butterfly viability, we used the three conservation biology principles of resiliency, redundancy, and representation (Shaffer and Stein 2000, pp. 306–310). Briefly, population resiliency collectively supports the ability of the species to withstand environmental and demographic stochasticity (for example, wet or dry, warm or cold years), species redundancy supports the ability of the species to withstand catastrophic events (for example, droughts, large pollution events), and species representation supports the ability of the species to adapt over time to long-term changes in the environment (for example, climate changes). In general, the more resilient populations a species has and the more representation it has, 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 SSA process can be categorized into three sequential stages. During the first stage, we evaluated the individual species' 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 species arrived at its current condition. The final stage of the SSA involved making predictions about the species' responses to positive and negative environmental and anthropogenic influences. Throughout all of these stages, we used the best available information to characterize viability as the ability of a species to sustain populations in the wild over time. We use this information to inform our regulatory decision.

Summary of Biological Status and Threats

In this discussion, we review the biological condition of the species and its resources, and the threats that influence the species' current and future condition, in order to assess the species' overall viability and the risks to that viability.

Resource Needs

In the SSA report (Service 2021), 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 resiliency 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 (for 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 need to be 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 dispersal 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: 98 known historical or extant Hermes copper butterfly occurrences have been documented in southern California, United States, and northwestern Baja California, Mexico: 26 are extant or presumed extant (all in the United States), 56 are presumed extirpated, and 16 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 2021, 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 1 presumed extant occurrence remaining with marine climate influence, 7 extant or presumed extant with primarily montane climate influence, and the remainder (18) at intermediate elevations with a more arid climate (Service 2021, 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 Threats

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 2021, 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 2021, 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. For the purposes of this assessment, we consider the foreseeable future to be the

amount of time for which we can reasonably determine a threat's anticipated trajectory and the anticipated response of the species to those threats. 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.

We note that, by using the SSA framework to guide our analysis of the scientific information documented in the SSA report, we have not only analyzed individual effects on the species, but we have also analyzed their potential cumulative effects. We incorporate the cumulative effects into our SSA analysis when we characterize the current and future condition of the species. To assess the current and future condition of the species, we undertake an iterative analysis that encompasses and incorporates the threats individually and then accumulates and evaluates the effects of all the factors that may be influencing the species, including threats and conservation efforts. Because the SSA framework considers not just the presence of the factors, but to what degree they collectively influence risk to the entire species, our assessment integrates the cumulative effects of the factors and replaces a standalone cumulative effects analysis.

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 report as those fires greater than 16,187 ha (40,000 ac) in size) (Service 2021, 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). The historical fire-return intervals for Hermes copper butterfly habitat vegetation associations are 15–30-plus years for coastal sage scrub habitats and 30–60 years for chaparral habitats (Sawyer et al. 2009, pp. 325, 529, 1294).

In order to understand the changing frequency of fire in Hermes copper butterfly's range, we analyzed fire-rotation intervals, or the amount of time it takes for fire to burn a certain set acreage. For our analysis, we looked at how long it historically took fire footprints to add up to the total estimated range for Hermes copper butterfly (Service 2017, entire). For the historical range of the Hermes copper butterfly, the fire-rotation interval decreased from 68 years between 1910–2000 to 49 years between 1925–2015 (Service 2017, entire). 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 2021, 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 2021, 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 2021, Figure 7), and where the fire hazard is considered high (Service 2021, 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 2021, 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 34 U.S. occurrences thought to have been extirpated in whole or in part by fire since 2003 appear to have been naturally reestablished, or were not entirely extirpated (Table 1; Service 2021, Figure 7; Winter 2017, pers. comm.). Most recently, the Valley Fire burned 6,632 ha (16,390 ac), including over $\frac{1}{3}$ of the Lawson Valley core occurrence (presumed extant), all of the Gaskill Creek non-core occurrence (formerly considered extant), all records within the Lyons Japutal non-core occurrence documented in 2018, and approximately $\frac{1}{4}$ of the Hidden Glen non-core occurrence (Service 2021, Appendix II). This fire came within 4 km (2.5 mi) of both the Descanso core occurrence to the north, the highest abundance monitored site on record (Service 2021, Appendix II), and the Portrero core occurrence to the south, one of only three where adults were recorded in 2020 (Service 2021, Table 1; Figure 8).

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 temporary 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 may 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. One or more wildfires could extirpate the majority of extant Hermes copper butterfly occurrences (Marschalek and Klein 2010, p. 9; Deutschman *et al.* 2010, p. 42). 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, a translocation study, funded by the San Diego Association of Governments (SANDAG), was initiated to assist recolonization of habitat formerly occupied by the large Hollenbeck Canyon occurrence (Marschalek and Deutschman 2016c, entire). 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, Mexico, 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 (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 occurrence records of the Hermes

copper butterfly near Ensenada (NASA 2017a; 2017b; Service 2021, 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 reestablished. This threat affects all Hermes copper butterfly populations and habitat across the species' 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 69 known Hermes copper butterfly occurrences permanently or presumed extirpated, loss, fragmentation, and isolation of habitat as a result of development contributed to 26 of those (38 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 2021, 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 67 percent of the remaining undeveloped habitat is protected from destruction by development because it is on protected lands including military installations and lands within the Multiple Species Conservation Program (MSCP) (Service 2021, p. 41). Approximately 53 percent of conserved lands within mapped Hermes copper butterfly occurrences were conserved under the MSCP. The MSCP also includes biological management and monitoring within the Preserve. Within the MSCP, all of the known extant occurrences are located within the two largest subarea plans: The City of San Diego (83,415 ha (206,124 ac)) and the County of San Diego (102,035 ha (252,132 ac)). Both plans are implemented in part by local adopted ordinances (Environmentally

Sensitive Lands regulations in the City of San Diego Municipal Code and the Biological Mitigation Ordinance in the County). Both ordinances outline specific project design criteria and species and habitat protection and mitigation requirements for projects within subarea boundaries (see MSCP Subarea Plans, City of San Diego 1997, County of San Diego 1997, City's Environmentally Sensitive Lands Municipal Code (Ch. 14, Art. 3, Div. 1, § 143.0101) and County's Biological Mitigation Ordinance (Ord. Nos. 8845, 9246), County of San Diego 1998).

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 33 percent of extant Hermes copper butterfly habitat vulnerable to development, 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 local funding sources due to the focus of a local conservation organization. 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 fragmentation of remaining Hermes copper butterfly

habitat in limited areas on non-Federal lands at this time. However, some regulatory protections are in place, and 67 percent of historically occupied habitat is on protected lands owned by Federal, State, and local jurisdictions and conservancies. 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 2021, 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. 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 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 general 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). Past records suggest a slightly earlier flight season in recent years compared to the 1960s (Marschalek and Klein 2010, p. 2). 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 °F (0.04 to 0.07 °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. The 2011–2016 California drought was one of the most intense in the State's history, with the period of late 2011–2014 being the driest ever recorded (Public Policy Institute of California 2020; Syphard *et al.* 2018, p. 16). Specifically, the 12-month period in 2013–14 was the driest on record in California (Swain *et al.* 2014, p. S3), followed by another unusually dry year in 2018. Furthermore, evidence is emerging that climate change has pushed what would have likely been a moderate drought in southwestern North America into the beginning of a megadrought similar to ecologically devastating historical events (Agha Kouchak *et al.* 2014, *entire*; Griffen *et al.* 2014, *entire*; Robeson 2015, *entire*; Williams *et al.* 2020, *p. entire*).

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 sites within occurrences since 2010 indicates the past 10 years of mostly drought conditions negatively affected habitat suitability and suppressed adult population sizes. The highest elevation, wettest occurrence

(Boulder Creek Road) maintained the highest abundance among long-term monitored sites from 2014 to 2020. This higher elevation site got more rain than lower sites, indicating representation in higher elevation inland habitats is important to species' viability. The number of Hermes copper butterflies reported at Boulder Creek sharply decreased in 2019. In 2020, the maximum daily number observed at that location was limited to only three butterflies and none were reported at any of the other seven long-term monitored sites (Marschalek and Deutschman 2019, p. 8; Marschalek *pers. comm.* 2020, *entire*; Figure 11). In 2018, a new site was discovered (“Roberts Ranch South,” part of the Descanso occurrence) and, although variable from year to year, has had consistently high survey numbers. Fifty-four individuals were recorded in 2018, 95 in 2019, and 45 in 2020 (Marschalek and Deutschman 2019, p. 8; Marschalek *pers. comm.* 2020, *entire*). For all 3 years since discovery, Roberts Ranch South has far exceeded numbers found at sentinel and other survey sites.

Temperatures have significantly increased from 1951 to 2016, and these changes may be influencing the timing of the Hermes copper butterfly's flight season as well as their phenology (Service 2021, 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 interacting may 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 known 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 pose a threat to species. 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 a 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.

Species Viability Index

In the absence of population dynamics data required for a population viability analysis, we constructed a relatively simple viability index in our SSA report to better understand how species viability may change with changing conditions (Service 2021, pp. 66–68). 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 2021, Figure 13). 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 occurrences in Mexico, because there are only 3 (possibly 2) out of a total of 98, and all are presumed extirpated. For a detailed description of our methodology and of viability index results, see the Species Viability Index section of the SSA report (Service 2021, pp. 58–62).

Our index of species viability is indicative of changes in species viability (the ability of a species to sustain populations in the natural ecosystem beyond 30 years); in other words, it is correlated with the likelihood of persistence, but is not itself a probability value). This viability index is useful for comparison of current and future conditions to historical baseline conditions, with an assumed baseline indefinite likelihood of persistence. We can assume the index value and species viability move in the same direction over time (both decrease or increase together); however, once the probability of persistence for 30 years drops significantly below 100 percent (as populations become fewer, less resilient, and more isolated), viability likely decreases faster than the index value.

To calculate the viability index, we first estimated species redundancy and species representation. To estimate a current species redundancy value, we ranked each occurrence's resiliency based on the status and their relative connectedness (Service 2021, p. 53; Appendix III). We estimate there are currently 15 presumed extant, 1 extant non-core isolated, 1 core isolated, and 8 extant core connected occurrences and based on our calculations, the species currently retains 14 percent of its

historical population redundancy (Service 2021, p. 57).

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 2021, Figure 10). Using those units, occupancy in the Coastal Terraces (CT) ecological unit has been reduced to 9 percent, in the Coastal Hills (CH) unit to 18 percent, in the Western Granitic Foothills (WGF) unit to 29 percent, and 89 percent in the Palomar-Cuyamaca Peak Coastal Terraces (PC) unit. Based on these proportional values, the species retains approximately 36 percent of its historical species representation (Service 2021, p. 57).

Species viability was calculated by summing the results of the redundancy and representation calculations (Service 2021, p. 57); we estimate the species viability index value is approximately 25 percent of its historical value.

Summary of Current Condition

Of the 98 known historical occurrences in southern California, there are currently 26 occurrences that are believed to be extant or presumed extant; therefore, there is limited population resiliency to withstand stochastic events. Based on our viability index, Hermes copper butterfly has lost significant viability over the past 50 years. However, extant and presumed extant occurrences are represented across a continuum of elevations and varying habitat diversity. This helps ensure the species has sufficient representation to provide the adaptive capacity necessary to maintain species viability. The number of occurrences presumed and considered to be extant also provides redundancy to protect the species against catastrophic events. While we know fire, drought, and climate change are ongoing stressors that continue to adversely affect the species' viability, under current conditions, there appear to be a sufficient number of extant and presumed extant occurrences to currently sustain the species in the wild. Additionally, the majority of extant occurrences are on conserved lands, providing some protection from ongoing threats.

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 Bureau of Land Management's (BLM) National Landscape Conservation System Otay Mountain Wilderness 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 the species' viability because of their history of occupancy, size, or geographic location. Development poses a potential threat to certain known occurrences including 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 2021, 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 2021, 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 2021, Figures 8 and 9).

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. 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 (2004–2019), 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-year periods (1973–2003), and only one prior to 1973 (Laguna). This represents a more than six-fold increase in the rate of megafire occurrence over the past 30 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, 2017, and 2020. 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 in 2014 (Service 2021, Figure 5). A smaller unnamed fire burned approximately 38 ha (95 ac) of potential habitat near the extant core Mission Trails occurrence in 2014 (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. Most notably, as discussed in "Wildfire," the Valley Fire burned 6,632 ha (16,390 ac) in 2020, impacting or posing a threat to several extant core 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.

As discussed above, climate change and associated drought are stressors estimated to have had a significant impact on the species over the last 15 years. Furthermore, new information on availability of key nutrients from host plants (Malter 2020, p. 28; see Background), combined with apparent drought sensitivity, suggest a narrow climatic envelope for the species within the range of its host plant that is shifting with climate change. Because climate differences noted in the new study are correlated with latitude, we expect the reverse relationship (hotter and drier outside the historical range) to the east (desert) and south of the species' historical range. Evidence of limited movement and immigration capacity of the species, as well as significantly reduced dispersal corridor-connectivity areas within the species' historical range due to land use change, indicates a climate-change-driven shift in habitat suitability not likely to be mirrored by a corresponding shift in the species' range at the pace required to maintain species viability. Support for this hypothesis presented in the SSA report (Service 2021, pp. 64–65) indicates assisted recolonization, and even assisted colonization (range-shift) may be required in the future for species survival.

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.

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 plausible future conditions. For more detailed discussions of the future scenarios, see the Possible Future Conditions section of the SSA report (Service 2021, 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 low resilience score are extirpated. These losses would reduce the species redundancy and the species would retain approximately 8 percent of its historical baseline population redundancy. The species would retain approximately 7 percent of its historical representation. Resulting changes to the population redundancy and representation values would cause an

approximate drop in the viability index value from 25 to 7 percent relative to historical conditions.

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 5 percent of its historical baseline redundancy and 23 percent of its historical representation. These changes to population redundancy and representation values would result in an approximate drop in the viability index value relative to historical conditions from the current 25 percent to 14 percent.

While the Laguna Fire footprint is used in this scenario as an example of an event similar to that, it includes loss of the “Roberts Ranch South” Descanso occurrence site south of I–8, the highest occupancy monitored site (Service 2021, Appendix III) and one of only three areas where adults were observed in 2020 (Service 2021; Table 1, Figure 8). Because no adults have been detected post-drought in the northern portion of the Descanso occurrence, the entire occurrence could be lost, and it is in an area where the probability of wildfire is high. Loss of this occurrence would likely have a greater impact on species viability than indicated by these index calculations.

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, or the current trend of more frequent drought is reversed. 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. The species viability index value would thus remain at approximately 25 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.

Summary of Comments and Recommendations

In the proposed rule published on January 8, 2020 (85 FR 1018), we requested that all interested parties submit written comments on the proposal by February 24, 2020. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. Newspaper notices inviting general public comment were published in the San Diego Union-Tribune. We did not receive any requests for a public hearing.

We received 448 comments: 437 from members of the public (including 432 whose comments were collected by a conservation organization and submitted on their behalf), 2 individuals involved in Hermes copper butterfly research, 3 conservation organizations, 1 public utility company, 3 local governmental agencies, the U.S. Marine Corps Air Station (MCAS) Miramar, and the USFS. In all, 443 commenters explicitly supported listing the species as threatened or endangered, and 5 commenters indicated it should be listed as endangered, not threatened, or provided data to support endangered status. No commenters argued the species should not be listed. Several commenters provided specific information they believed was relevant to the final listing rule, and three recommended specific changes. Three comments addressed the proposed designation of critical habitat. We reviewed all comments and information received from the public for substantive issues and new information regarding the proposed listing of the species; we incorporated new scientific information as appropriate, and address comments below.

Peer Reviewer Comments

As discussed in Supporting Documents above, we received comments from six peer reviewers. We reviewed all comments we received from the peer reviewers for substantive issues and new information regarding the information contained in the SSA report. The peer reviewers generally concurred with our methods and conclusions, and provided additional information, clarifications, and

suggestions to improve the final SSA report. Peer reviewer comments are addressed in the following summary and were incorporated into the final SSA report as appropriate.

Comment 1: Two peer reviewers expressed concerns about the interpretation of the limited population genetic analyses performed on this species across its range, emphasizing that study results did not demonstrate contemporary gene flow and population structure.

Our response: We removed discussion of interpretations questioned by the reviewer, and stated that more information is needed to fully understand movement patterns of Hermes copper butterfly.

Comment 2: One peer reviewer expressed concern that there was little mention of either effective population size or minimum viable population size that can be accomplished using mark-recapture or genetic data. They also noted that the SSA report did not address local adaptation (ecological and genetic), quantified inbreeding (and depression), landscape connectivity (specifically via un-sampled populations/corridors), and temporal genetic variability (or loss thereof). Finally, they stated the species viability model does not account for the traditional “error” variables, including genetic, and other stochastic factors. They recommended using a more robust probabilistic model that incorporates persistence likelihood such as the population viability analysis used by Schultz and Hammond (2003, entire). They specifically recommended analyzing genetic samples of museum specimens from Mexico.

Our response: We agree the suggested future analyses would aid our understanding of the species. However, we do not currently have the data needed for the genetic-based analyses suggested by the peer reviewer, and we must make our decision based on the best scientific and commercial information available at the time of our rulemaking. Landscape connectivity (specifically via un-sampled populations/corridors) is generally addressed in the discussions of isolation due to development and in the population resiliency score that is incorporated in the viability index calculations. We will continue to update our information on the species as new data become available.

Comment 3: One commenter stated that our wildfire threat discussion led him to believe that it seems necessary to start translocating adults from the occurrences that fall within the large contiguous area not recently burned to

unoccupied habitats. They thought the need for translocation should be emphasized more.

Our response: Translocation is a potential recovery tool for this species. However, based on the information we have at this time, we are concerned that there is not a high likelihood of success and there may be negative impacts to the source populations. We will assess the potential for translocations (direct movement of individuals from one location to another) and assisted recolonization (including rearing of offspring for increased survival prior to reintroduction) in our recovery planning efforts based on species distribution and occurrence status at that time.

Comment 6: One commenter with expertise in modelling thought the species viability index was “interesting and useful,” and unlike any model they had seen before. Although they said they understood it, they found the description of it misleading and confusing, in particular that it was falsely described as a probability model. They stated that we have permanently altered this ecosystem, which resulted in the resulting decrease in viability. They also agreed the viability index is a valid way to measure decline from historical viability, but argued it does not provide information for the future, and has no direct relationship with extinction risk, even proportionally. Finally, the commenter said they thought the viability index analysis results were interpreted to indicate a more positive outlook than the rest of the SSA report supports.

Our response: We edited the index description to be less confusing and corrected the characterization as a probability model. While we understand the viability index is not a model that provides future predictions, to the extent future scenarios are plausible future projections, and the index can be calculated based on changes to parameters in those future scenarios, we believe it provides useful information about the species’ potential future status. Finally, we are not sure the statement that the index value has no “direct” relationship with extinction risk is accurate. We agree that we cannot know if the viability index is directly proportional to probability of persistence/extinction risk (a change in one value is correlated with same amount of change in the other), and we edited our text to reflect that. However, while the exact nature of the relationship cannot be known, it must be at least inversely proportional as stated, even if the extinction risk increases at a different rate than the viability index value decreases. For

example, the relationship might be linearly, but not directly, proportional. That said, the relationship is more likely to be an exponentially inversely proportional one (uncertain inflection point), with the extinction risk increasing exponentially as the index value decreases; as the species approaches the extinction threshold, synergy among threat effects such as small population size and isolation will likely increase. If such a relationship is in fact the case, it is possible the viability index analysis indicates a more positive outlook than the rest of the Species Status Assessment supports, as the commenter asserted.

Comment 7: One commenter said they found the three scenarios interesting and useful, but did not understand the implicit assumption that conditions would have to change for extinction risk to change. They pointed out it is possible that populations will continue to decline, even if conditions stay the same.

Our response: SSAs forecast species’ response to potential changing environmental conditions and conservation efforts using plausible future scenarios. These scenarios characterize a species’ ability to sustain populations in the wild over time (viability) based on the best scientific understanding of current and plausible future abundance and distribution within the species’ ecological settings.

We edited scenario 3 to explain this possibility: Even if environmental conditions remain unchanged, the species may continue to lose populations so that viability declines by virtue of maintaining the current trend.

Federal Agency Comments

Comment 8: Marine Corps Air Station Miramar’s comments concurred with our determination that their Integrated Natural Resources Management Plan (INRMP) contains elements that benefit the Hermes copper butterfly. They further stated that conservation measures were identified in the INRMP to conserve all habitat found occupied by the Hermes copper butterfly prior to the 2003 wildfire. They pointed out that because occurrences listed in Table 1 lacked associated geographic text descriptions or map numbers, they did not understand where occurrences are located with respect to MCAS Miramar, and expressed concern that the occurrence names in Table 1 are similar to ones they use for other areas and will lead to confusion.

Our Response: We appreciate MCAS Miramar taking the time to provide specific comments. We revised Table 1 and added map numbers in the first

column to help locate each mapped occurrence in Figures 6 and 7 of the SSA report (Service 2021).

Comments From States

We did not receive any comments from the State of California.

Comments From Tribes

We did not receive any comments from Tribes.

Public Comments

Comment 9: Four commenters stated specifically the species should be listed as endangered, not threatened. One additional commenter submitted a research report as part of his comment with species monitoring information as evidence to support endangered status. He did not specifically recommend listing the species as endangered, but concluded Hermes copper butterfly is at risk of being lost from the United States in the near future.

Our Response: We reviewed all new comments and all the updated data and information, and concluded that based on current and future threats, the Hermes copper butterfly continues to meet the definition of threatened because there appear to be a sufficient number of extant and presumed extant occurrences to currently sustain the species in the wild. Additionally, the majority of extant occurrences are on conserved lands, providing some protection from ongoing threats. We invite all interested parties to continue to send us information and data on the Hermes copper butterfly. Additionally, in accordance with section 4(c)(2) of the Endangered Species Act, the status of Hermes copper butterfly will be reviewed every 5 years.

Comment 10: One conservation organization indicated that there are opportunities for habitat enhancement in places like parks and private lands with the planting of spiny redberry host plants in natural habitat conditions that could aid in the species' recovery.

Our Response: We agree that such opportunities could be beneficial for the species; however, host plant availability does not appear to be a limiting factor within the species' range. Planting of spiny redberry in areas where landscape connectivity has been limited by development may be most beneficial. There are currently no plans for such plantings, but conservation and planting of host plants will likely be incorporated into future conservation planning.

Comment 11: We received two comments discussing the net benefit of the proposed Fanita Ranch project to Hermes copper butterfly conservation

and recovery. One local government agency and the project proponent (who included as an attachment a proposed development footprint) stated the proposed Fanita Ranch development would provide long-term Hermes copper butterfly habitat restoration, permanent management, and protection from fire in preserved areas on the property and maintain and enhance habitat connectivity. They asserted that Hermes copper butterfly may be extirpated from the property and require reintroduction. Additionally, they stated that because the local government agency must rely on developers to implement reintroduction and because the present opportunity is with current owners, reintroduction is most likely once the current project is approved.

Our Response: Based on our threats analysis (Service 2021, p. 61), it is not clear the proposed Fanita Ranch project would be a net benefit to Hermes copper butterfly conservation and recovery. The potential positive and negative impacts of this project to Hermes copper butterfly are currently, and will continue to be, addressed through discussion and consultation with the project applicants.

Comment 12: Four commenters expressed concerns about the impacts of the proposed Fanita Ranch project on the North Santee Core occurrence complex. Specifically, one conservation organization said there are significant patches of habitat that would be impacted by the proposed Fanita Ranch project, and habitat on northern and southern portions of the Fanita Ranch should be protected through conservation to maintain connectivity to adjacent undeveloped areas. A second conservation organization provided a detailed rebuttal to comments supporting the Fanita Ranch project, arguing generally the proposed development is a threat to Hermes copper butterfly.

Our Response: Based on our threats analysis (Service 2021, p. 61), we acknowledge it is possible the proposed Fanita Ranch project would negatively impact Hermes copper butterfly conservation and recovery. Such concerns are, and will continue to be, addressed through discussion and consultation with the project applicants regarding the Hermes copper butterfly.

Comment 13: Three commenters requested additional exceptions from take prohibitions under section 9(A)(1) of the Endangered Species Act. A public utility company described activities they have undertaken under their Wildfire Mitigation Plan that they believe have benefited the species and minimized wildfire damage and

expressed support for the proposed take prohibition exceptions. They stated the proposed take prohibition exceptions would benefit them and the species by enabling them to continue activities that minimize wildfire risk. They proposed additional exceptions for fire-hardening and vegetation management activities carried out by utilities.

A local government agency expressed support for the proposed exception to take prohibition for fire prevention and management activities, but recommended the specific "30 meter (m) (100 feet (ft))" brush-clearing distance be deleted from the third exception, as this distance may change with future fire code updates.

One commenter requested we include a proposed development project (Village 13) in the mapped area specifying portions of the range exempt from take prohibitions under section 9(a)(1) of the Act (see Figure 1) because past surveys for most plants indicate this area would most likely not support the Hermes copper butterfly.

Our Response: We conclude that the utility company commenter's Wildfire Mitigation Plan will benefit Hermes copper butterfly through the control and minimization of wildfires within San Diego County. We did not edit take exceptions per the commenter's request because we are currently working with this company on an amendment to their Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP) to provide for additional conservation and incidental take authorization of covered species, and to address new species including Hermes copper butterfly. The amendment includes new protocols that avoid and minimize impacts to the species from covered activities, including fire-hardening and vegetation management. We believe this amendment process is the appropriate mechanism to cover activities impacting the Hermes copper butterfly and addresses the commenter's concerns regarding the need for additional exceptions to take prohibitions.

We edited the third take prohibition exception to remove the 30-m (100-ft) distance for defensible space from structures; we did this to clarify that any activities to reduce wildfire risks must be done in compliance with State and local fire codes. Currently, this distance is still 30 m (100 ft), but the rewording allows for flexibility to ensure that activities will be in compliance with State of California fire codes if they change.

We did not include the Village 13 project area in the mapped areas exempt from take prohibitions under section

9(a)(1) of the Act (Figure 1). Doing so would be inconsistent with our methodology, as we did not consider host plant distribution data when constructing this map. Although Hermes copper butterfly is not a covered species under the existing County MSCP subarea plan (includes the Village 13 project), the County of San Diego just received a Section 6 planning grant to prepare a Butterfly HCP that would cover the Hermes copper butterfly and other butterfly species, and the Village 13 project area is within the draft plan boundary. Therefore, this issue should be addressed during HCP development, or if the site is as described, the project proponent can provide a simple habitat assessment demonstrating there is no need for surveys or possibility of take. Such a habitat assessment would serve to streamline the process at least as much as an exception from take prohibitions under section 9(A)(1) of the Endangered Species Act, which does not eliminate the need for consultation under section 7 of the Act (see Provisions of the 4(d) Rule below).

Comment 14: One public utility company said their above- and below-ground electric and gas facilities, the vegetation management probable impact zones around these facilities, and rights-of-way should be excluded from critical habitat designation based on the existing HCP and other conservation-oriented activities. They pointed out that the Service excluded other utility facilities from critical habitat designation for the coastal California gnatcatcher based on the adequacy of their HCP/NCCP to ensure conservation and management of habitat (72 FR 72010; December 19, 2007). They further stated that even though the Hermes copper butterfly is not covered by their current HCP/NCCP, its operational protocols sufficiently mitigate impacts to the species' habitat (1995 SDG&E NCCP/HCP, pp. 103–109).

Our Response: Should the proposed HCP/NCCP amendment be approved, it would address impacts to critical habitat from both operation and maintenance activities as well as construction of new facilities. The referenced exclusion from coastal California gnatcatcher critical habitat designation occurred because the existing HCP/NCCP covered that species, and our Biological Opinion analysis had already determined operational protocols sufficiently mitigate impacts to the species' habitat. It is possible this company's existing HCP/NCCP does sufficiently mitigate habitat impacts; however, this analysis is appropriately addressed through the

ongoing HCP/NCCP amendment process.

With respect to rights-of-way maintenance activities in areas of critical habitat, Federal agencies that authorize, carry out, or fund actions that may affect listed species or designated critical habitat are required to consult with us to ensure the action is not likely to jeopardize listed species or destroy or adversely modify designated critical habitat. This consultation requirement under section 7 of the Act is not a prohibition of Federal agency actions; rather, it is a means by which they may proceed in a manner that avoids jeopardy or adverse modification. Even in areas absent designated critical habitat, if the Federal agency action may affect a listed species, consultation is still required to ensure the action is not likely to jeopardize the species. Additionally, existing consultation processes also allow for emergency actions for wildfire and other risks to human life and property; critical habitat would not prevent the commenter from fulfilling those obligations. Lastly, we note that actions of private entities for which there is no Federal nexus (*i.e.*, undertaken with no Federal agency involvement) do not trigger any requirement for consultation.

In regard to the commenter's specific request to exclude their rights-of-way areas from the critical habitat designation, the commenter provided general statements of their desire to be excluded but no information or reasoned rationale as described in our preamble discussion in our policy on exclusions (see Policy Regarding Implementation of Section 4(b)(2) of the Endangered Species Act: 81 FR 7226; February 11, 2016) (Policy on Exclusions). For the Service to properly evaluate an exclusion request, the commenter must provide information concerning how their rights-of-way maintenance activities would be limited or curtailed by the designation to support the need for exclusion.

Comment 15: One local government agency explained that they are currently seeking approval of their subarea plan under the San Diego MSCP. The commenter stated that as part of the subarea plan, they, in conjunction with the Fanita Ranch property owner, are developing a Hermes copper butterfly habitat restoration plan for the property. The commenter believes their MSCP subarea plan will effectively protect the region's biodiversity while reducing conflicts between protection of wild species and economic development. They stated that the best scientific and commercial data available indicate that economic and other benefits of

excluding their draft MSCP subarea plan planning area from critical habitat outweigh those of designation and do not indicate failure to designate will result in species extinction. They also stated that their draft MSCP subarea plan planning areas should be excluded from critical habitat with a clause that these areas will be automatically designated in the event the HCP is not permitted within a fixed period of time.

Our Response: As discussed in response to comment 15 above, although the commenter provided general statements of their desire to be excluded and cited some documents, they provided no information or reasoned rationale as described in our preamble discussion in our Policy on Exclusions. We acknowledge the effort to prepare the subarea plan for the MSCP. The protective provisions provided by completed HCPs are an important part of balancing species conservation with the needs of entities to manage their lands for public and private good. However, in the absence of an approved HCP, there are no assurances of funding or implementation of the measures included in such a plan. We cannot rely on the presumed benefits of an HCP that is currently in development (see Policy on Exclusions, 81 FR 7226; February 11, 2016). Should an HCP be approved, we will be required to ensure that the project will not adversely modify Hermes copper butterfly designated critical habitat. Therefore, an approved HCP will address critical habitat concerns for projects within the HCP subarea plan boundary.

Because the commenter did not provide a reasoned rationale for exclusion and there is no approved subarea plan at this time, we are not considering the areas covered by the draft plan for exclusion from the final designation of critical habitat.

Comment 16: The local government agency also asserted the majority of the Fanita Ranch property proposed as critical habitat does not meet the definition of critical habitat because it does not contain the physical or biological features, based on mapping of spiny redberry within 5 m (15 ft) of California buckwheat. The Fanita Ranch project applicant provided similar comments, referencing the benefits of fostering a conservation partnership as the primary reason the Fanita Ranch property should be excluded from critical habitat.

Our Response: With regard to assertions of errors in the critical habitat designation, spiny redberry within 5 m (15 ft) of California buckwheat was not a listed physical or biological feature

essential to the conservation of the Hermes copper butterfly, nor have we determined it should be, nor have we determined it is a valid mapping method based on the listed features. As stated in Physical or Biological Features Essential to the Conservation of the Species: Plants specifically identified as significant nectar sources include California buckwheat (*Eriogonum fasciculatum*) and golden yarrow (*Eriophyllum confertiflorum*). 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. Additionally, in regard to the commenter's specific request to exclude their project area from the critical habitat designation based on partnership benefits, the commenter provided general statements of their desire to be excluded but no information or reasoned rationale. As discussed in the response to Comment 15, for the Service to properly evaluate an exclusion request, the commenter must provide information concerning how our partnership would be limited or curtailed by the designation to support the need for exclusion. We agree that there are strong benefits to a conservation agreement that can lead to exclusion from critical habitat; however, in this case, there is no final, approved plan in place.

Comment 17: Another local government agency requested we reevaluate designation of critical habitat in isolated areas surrounded by development, and identified by experts as likely extirpated, because these areas seem unlikely to contribute to species recovery.

Our Response: It is not clear what isolated areas were referenced by the commenters. All critical habitat units are considered occupied (see Criteria Used to Identify Critical Habitat for more detail on how we determined occupancy). Given the limited distribution of Hermes copper butterfly, we consider all critical habitat areas important for conservation of the species. Our analysis indicated that isolated areas designated as critical habitat contribute to habitat diversity within the species' range and possibly to genetic diversity (representation), which in turn will contribute to species recovery.

Comment 18: One local government agency and one project proponent expressed concern about the effect of this listing on areas already approved for development by the City of San Diego MSCP Subarea Plan. In particular,

they argued we did not follow the mutual assurances requirements in Section 9.7 Future Listings of the MSCP's Implementing Agreement, and the proposed listing would encumber land in the Del Mar Mesa area, the center of a planned commercial and residential "village" (intersection of State Route 56, Camino del Sur, and its future connection to Rancho Peñasquitos).

Our Response: Although Hermes copper butterfly was considered for coverage in the MSCP, it was ultimately not included on the permit due to unknown conservation level and insufficient distribution and life-history data. Since then, we have worked closely with researchers to learn more about the species and its distribution. The commenter references portions of Section 9.7 of the Implementing Agreement, which addresses future listings. Consistent with Section 9.7.A., the Service evaluated the conservation provided by the MSCP during the status review for Hermes copper butterfly; however, this was not clear in the proposed rule. We have updated the SSA report and final rule to better reflect our analysis of conservation provided by the MSCP. The other referenced section (9.7.C.) outlines how a "non-covered" species can be added to the permit. The commenter is correct that we had not initiated this process when they wrote their letter. Since that time, we have had discussions with both local government agencies who commented regarding the development of a county-wide HCP that would address several sensitive butterflies, including Hermes copper butterfly. One local government is submitting a request for planning dollars that would be used to prepare the HCP. Consistent with the intent of Section 9.7.C., one of the first tasks in the planning process would be to evaluate existing measures, including the MSCP. The commenter referenced a planned project on Del Mar Mesa; however, little information was provided regarding what the potential conflict is. There are no known occurrences of Hermes copper butterfly on Del Mar Mesa, nor is there any critical habitat designated in that area. Therefore, we do not anticipate the referenced project being affected by this listing.

Comment 19: One local government agency stated they do not agree with our proposed listing rule where we stated that "there is no coordinated effort to prioritize Hermes copper butterfly conservation efforts within the species' range," arguing the County of San Diego supports such an effort through the San

Diego Management and Monitoring Program (SDMMP).

Our Response: We edited the statement and updated the rule to better reflect the ongoing conservation efforts within the region. We appreciate and support the conservation efforts and partnership building provided by the SDMMP for Hermes copper butterfly and other species of concern. The SDMMP includes the Hermes copper butterfly in their Management Strategic Plan, and is working collaboratively with the Service and other stakeholders to develop management and monitoring goals and objectives for the species. We look forward to working with the County to bring the plan to completion, including ensuring the plan has funding for implementation.

Comment 20: One local government agency asked if we will accept San Diego County's current survey guidelines developed in concert with experts for use in current and future projects until such time as the FWS develops its own survey guidelines.

Our Response: At this time, the survey protocol required by San Diego County is the only widely used protocol for Hermes, and we will continue to support this protocol until an updated protocol is established.

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 an endangered species or a 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 factors 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. 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 2021, 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, 33 percent of historically occupied habitat is not protected and remains at risk from land use change. As a result of past development, which contributed to the loss of 26 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 likely resulting in degradation of habitat and decreased numbers of Hermes copper butterflies at all monitored occurrences.

Wildfire (Factor A) is a primary driver of the Hermes copper butterfly's status 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 34 U.S. occurrences (and 3 in Mexico), and only 3 of those are known to have been apparently repopulated. Wildfire frequency has significantly increased in Hermes copper butterfly habitat since 1970. Nearly all mapped

occurrences of Hermes copper butterfly currently fall within very high fire hazard severity zones, increasing the risk that a single megafire could possibly affect the majority of extant occurrences. Additionally, based on increasing drought and continued climate change, 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, and that the risk of wildfire will continue to increase into the foreseeable future.

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 will continue to make them even more likely into 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 reductions in species resiliency, redundancy, and representation. 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.

Status Throughout All of Its Range

After evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we find that multiple threats are impacting Hermes copper butterfly across its range and will continue to impact the species into the foreseeable

future. Based on our future scenarios, species viability will either stay the same at 25 percent of historical levels, or decrease to 14 or 7 percent within the foreseeable future. Thus, after assessing the best available information and based on the level of viability decrease in two of the three future scenarios, 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 there appear to be a sufficient number of extant and presumed extant occurrences to currently sustain the species in the wild. Additionally, the majority of extant occurrences are on conserved lands, providing some protection from ongoing threats.

Because remaining areas are isolated from each other, if some were lost to fire or other threats, the resiliency of the remaining areas would not be affected. Although a megafire has the potential to extirpate a high number of occurrences, we do not consider it an imminent threat because the frequency of such fires is uncertain and the fire-return intervals within Hermes copper butterfly habitat are 15–30-plus years for coastal sage scrub and 30–60 years for chaparral. We also expect that impacts to the species from fire and other threats will likely increase over time. Thus, after evaluating threats to the species and assessing the cumulative effect of the threats under the section 4(a)(1) factors, we find that the Hermes copper butterfly is not currently in danger of extinction but is likely to become in danger of extinction within the foreseeable future throughout all of its range.

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. The court in *Center for Biological Diversity v. Everson*, 2020 WL 437289 (D.D.C. Jan. 28, 2020) (*Center for Biological Diversity*), vacated the aspect of the Final Policy on Interpretation of the Phrase "Significant Portion of Its Range" in the Endangered Species Act's Definitions of "Endangered Species" and "Threatened Species" (79 FR 37578; July 1, 2014) that provided that the Service does not undertake an analysis of significant portions of a species' range if the species warrants listing as threatened throughout all of its range. Therefore, we proceed to evaluating whether the

species is endangered in a significant portion of its range—that is, whether there is any portion of the species' range for which both (1) the portion is significant; and (2) the species is in danger of extinction in that portion. Depending on the case, it might be more efficient for us to address the “significance” question or the “status” question first. We can choose to address either question first. Regardless of which question we address first, if we reach a negative answer with respect to the first question that we address, we do not need to evaluate the other question for that portion of the species' range.

Following the court's holding in *Center for Biological Diversity*, we now consider whether there are any significant portions of the species' range where the species is in danger of extinction now (*i.e.*, endangered). In undertaking this analysis for the Hermes copper butterfly, we choose to address the status question first—we consider information pertaining to the geographic distribution of both the species and the threats that the species faces to identify any portions of the range where the species is endangered.

For the Hermes copper butterfly, we considered whether the threats are geographically concentrated in any portion of the species' range at a biologically meaningful scale. We examined the following threats: Wildfire, land use change, habitat isolation, and climate change and drought, including cumulative effects. After a careful review of those threats, we determined that they are all affecting the Hermes copper butterfly across its range. There are varying levels of risk of individual threats; for example, fire risk is highest in the southern portion of the range, risk of development is higher in the northern portion of the range, land use change is occurring in parts of the southeastern part of the range, and climate change is most severe at lower elevations. Drought is occurring at similar levels rangewide. In the northern portion of the range, where development is the primary threat, we have no evidence that any remaining occurrences are currently at risk from development, though they could be in danger of development in the future. In the southern portion of the range, where fire is the primary threat, though fire could impact multiple occurrences in this part of the range currently, we expect that the most substantial impacts from fire will occur in the future. Overall, none of these threats are imminent in magnitude or at such a level to cause any parts of the range to be in danger of extinction now.

We found no concentration of threats in any portion of the Hermes copper butterfly's range at a biologically meaningful scale. Thus, there are no portions of the species' range where the species has a different status from its rangewide status. Therefore, no portion of the species' range provides a basis for determining that the species is in danger of extinction in a significant portion of its range, and we determine that the species is likely to become in danger of extinction within the foreseeable future throughout all of its range. This is consistent with the courts' holdings in *Desert Survivors v. Department of the Interior*, No. 16–cv–01165–JCS, 2018 WL 4053447 (N.D. Cal. Aug. 24, 2018), and *Center for Biological Diversity v. Jewell*, 248 F. Supp. 3d, 946, 959 (D. Ariz. 2017).

Determination of Status

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

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 conservation by Federal, State, Tribal, and local agencies, 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. Section 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 consists of preparing draft and final recovery plans, beginning with the development of a recovery outline and making it available to the public within 30 days of a final listing determination. 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 reclassification from endangered to threatened (“downlisting”) or removal from protected status (“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 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.

Following publication of this final rule, 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 will 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>.

Section 8(a) of the Act (16 U.S.C. 1537(a)) authorizes the provision of limited financial assistance for the development and management of programs that the Secretary of the Interior determines to be necessary or useful for the conservation of endangered or threatened species in foreign countries. Sections 8(b) and 8(c) of the Act (16 U.S.C. 1537(b) and (c)) authorize the Secretary to encourage conservation programs for foreign listed species, and to provide assistance for such programs, in the form of personnel and the training of personnel.

Please let us know if you are interested in participating in recovery efforts for the Hermes copper butterfly. 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 listed as an endangered or threatened species and with respect to its critical habitat. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. 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 any endangered or threatened 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 consultation as described in the preceding paragraph include management and any other landscape-altering activities on Federal lands administered by the U.S. Marine Corps, U.S. Fish and Wildlife Service, U.S. Forest Service, and Bureau of Land Management; issuance of section 404 Clean Water Act (33 U.S.C. 1251 *et seq.*) permits by the U.S. Army Corps of Engineers; and construction and maintenance of roads or highways by the Federal Highway Administration.

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 final listing on proposed and ongoing activities within the range of a listed species. The discussion below regarding protective regulations under section 4(d) of the Act complies with our policy.

II. 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 Federal agency would be required to consult with the Service under section 7(a)(2) of the Act. However, even if the Service were to conclude that the proposed activity would result in destruction or adverse modification of the critical habitat, the Federal action agency and the landowner are not required to abandon the proposed activity, or to restore or recover the species; instead, they must 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 occupied areas, we focus on the specific features that are essential to support 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. The implementing regulations at 50 CFR 424.12(b)(2) further delineate unoccupied critical habitat by setting out three specific parameters: (1) When designating critical habitat, the Secretary will first evaluate areas occupied by the species; (2) 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; and (3) 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 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) the prohibitions found in section 9 of the Act. 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 the 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, HCPs, or other species conservation planning efforts if new information available at the time of those planning efforts calls for a different outcome.

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 2021, Figure 5). This includes those specific areas within the geographical area occupied by the species at the time of listing or the currently known range of the species.

Physical or Biological Features Essential to the Conservation of the Species

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12(b), in determining which areas we will designate as critical habitat from within the geographical area occupied by the species at the time of listing, we consider the physical or biological features that are essential to the conservation of the species and that may require special management considerations or protection. The regulations at 50 CFR 424.02 define "physical or biological features essential

to the conservation of the species" as the features that occur in specific areas and that are essential to support the life-history needs of the species, including, but not limited to, water characteristics, soil type, geological features, sites, 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. For example, physical features essential to the conservation of the species might include gravel of a particular size required for spawning, alkaline 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 essential to support the life history of the species.

In considering whether features are essential to the conservation of the species, we 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 characteristics include, but are not limited to, space for individual and population growth and for normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, or rearing (or development) of offspring; and habitats that are protected from disturbance.

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 recolonize 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 California buckwheat and 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 Historical Geographical and Ecological Distributions of a Species

Maintenance of species representation across the species' range necessitates sufficiently resilient, well-connected metapopulations and sufficient numbers and configuration of host plant stands. 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 metapopulation resiliency.

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 the species' habitat, ecology, and life history as described below. Additional

information can be found in the SSA report (Service 2021, entire; available on <https://www.regulations.gov> under Docket No. FWS-R8-ES-2017-0053).

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 designated 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 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 designating any areas outside the geographical area occupied by the species because we have not identified any unoccupied areas that have a reasonable certainty of contributing to the conservation of 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 reestablishing subpopulations where they have been extirpated within the species' current range in order to ensure adequate numbers of subpopulations to maintain metapopulations. These activities help to ensure future catastrophic events, such as wildfire, would never simultaneously affect all known populations.

The 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 considerations or protection. We also limited the designation to specific areas historically or currently known to support the species within its current range. This critical habitat designation focuses on maintaining areas that support those 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 these areas 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 report (accuracy codes 1 and 2 in Table 1; Service 2021, 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 subcategories (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 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 rule have been excluded by text in the rule and are not designated as critical habitat. Therefore, a Federal action involving these lands will not trigger section 7 consultation with respect to critical habitat and the requirement of no adverse modification unless the specific action would affect the physical or biological features in the adjacent critical habitat.

We are designating as critical habitat areas that we have determined are within the geographical area occupied at

the time of listing (that is, currently occupied) and that contain one or more of the physical or biological features that are essential to support life-history processes of the species. All units contain all of the identified physical or biological features and support multiple life-history processes.

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 under Regulation Promulgation. 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 <https://www.regulations.gov> at Docket No. FWS–R8–ES–2017–0053, on our internet site <https://www.fws.gov/carlsbad/gis/cfwogis.html>, and at the field office responsible for the designation (see **FOR FURTHER INFORMATION CONTACT**).

Final Critical Habitat Designation

We are designating three units as critical habitat for Hermes copper butterfly. The critical habitat areas we describe below constitute our current best assessment of areas that meet the definition of critical habitat for Hermes copper butterfly. The three units we designate as critical habitat are: (1) Lopez Canyon; (2) Miramar/Santee; and (3) Southeast San Diego. Table 1 shows the critical habitat units and the approximate area of each unit.

TABLE 2—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: 1,999 (4,940) Local Jurisdiction: 1,162 (2,871) Private: 3,765 (9,303)	11,139 (27,525)
Total	Federal: 4,213 (10,411) State: 2,110 (5,215) Local Jurisdiction: 2,363 (5,839) Private: 5,488 (13,562)	14,174 (35,027)

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

We present brief descriptions of all units, and reasons why they meet the definition of critical habitat for Hermes copper butterfly, below. Although conservation and management of dispersal corridor connectivity areas among occurrences designated 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 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 or 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 or 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 is in Unit 3). Unit 2 mostly surrounds the eastern portion of MCAS 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 11,139 ha (27,525 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 or Protection above). This unit configuration would conserve essential contiguous habitat. This area includes half of the extant/presumed extant core occurrences in the Coastal Hills California Ecological Unit (the other half is in Unit 2), and 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 USFS, and the BLM.

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.

We published a final rule revising the 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.

Compliance with the requirements of section 7(a)(2) is documented 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 Service 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 set forth requirements for Federal agencies to reinstate 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: (1) If the amount or extent of taking specified in the incidental take statement is exceeded; (2) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (4) if a new species is listed or critical habitat designated that may be affected by the identified action.

In such situations, Federal agencies sometimes may need to request reinstatement of consultation with us, but the regulations also specify some exceptions to the requirement to reinstate 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 section 7(a)(2) of the Act by destroying or adversely modifying such habitat, or that may be affected by such designation.

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

Actions that would remove biologically significant amounts of spiny redberry host plants or 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 geographical areas owned or controlled by the Department of Defense (DoD), or designated for its use, that are subject to an INRMP 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. The following areas are DoD lands with completed, Service-approved INRMPs within the critical habitat designation.

Approved INRMPs

MCAS Miramar is the only military installation supporting Hermes copper butterfly habitat that meets the definition of critical habitat; it 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.

MCAS Miramar’s approved INRMP was completed in June 2018. The U.S. Marine Corps works 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 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 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 MCAS 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 final critical habitat designation because of this exemption.

Exclusions

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 designated critical habitat based on economic impacts, impacts on national security, or any other relevant impacts. In considering whether to exclude a particular area from the designation, we identify the benefits of including the area in the designation, identify the benefits of excluding the area from the designation, and evaluate whether the benefits of exclusion outweigh the benefits of inclusion. If the analysis

indicates that the benefits of exclusion outweigh the benefits of inclusion, the Secretary may exercise discretion to exclude the area only if such exclusion would not result in the extinction of the species. In making the determination to exclude a particular area, 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 describe below the process that we undertook for taking into consideration each category of impacts and our analyses of the relevant impacts.

On December 18, 2020, we published a final rule in the **Federal Register** (85 FR 82376) revising portions of our regulations for designating critical habitat. These final regulations became effective on January 19, 2021. The revisions set forth a process for excluding areas of critical habitat under section 4(b)(2) of the Act, and outline when and how the Service will undertake an exclusion analysis. However, the revised regulations apply to classification and critical habitat rules for which a proposed rule was published after January 19, 2021. Consequently, these new regulations do not apply to this final rule.

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. In order to consider economic impacts, we prepared an incremental effects memorandum (IEM) and screening analysis which, together with our narrative and interpretation of effects, we consider our draft economic analysis (DEA) of the proposed critical habitat designation and related factors (IEC 2018, entire). The DEA, dated August 15, 2018, was made available for public review from January 8, 2020, through March 7, 2020 (85 FR 1018). The DEA addressed probable economic impacts of critical habitat designation for the Hermes copper butterfly. We did not receive any public comments on the DEA. We conclude the DEA represents an accurate assessment of the economic impacts of the final rule. Additional information relevant to the probable incremental economic impacts of the critical habitat designation for the Hermes copper butterfly is summarized below and available in the screening analysis for the Hermes copper butterfly (IEC 2018, entire), available at <https://www.regulations.gov>.

Executive Orders (E.O.) 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 and reasonable 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 2018, p. 2). We considered each industry or category individually. Additionally, we considered whether their activities have any Federal involvement. Critical habitat designation requires consideration of potential project effects only when there is an action conducted, funded, permitted, or authorized by Federal agencies. When this final rule becomes effective, 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 was proposed concurrently with the listing, it was difficult to discern which costs would be attributable to the species being listed and which would 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 nonmigratory 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.

The critical habitat designation for the Hermes copper butterfly totals approximately 14,174 ha (35,027 ac) in three units, all of which are occupied by the species. The screening analysis 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 designated critical habitat 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 and limited to administrative costs. 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). Overall, 70 percent of critical habitat is on non-Federal lands; thus, there are few areas designated that are likely to have a

Federal nexus. Additionally, due to coordination efforts with State and local agencies, we expect few additional costs due to public perception.

Therefore, we expect that incremental costs will be minor and 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 for 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.

The Service considered the economic impacts of the critical habitat designation. The Secretary is not exercising her discretion to exclude any areas from this designation of critical habitat for the Hermes copper butterfly based on economic impacts.

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 final rule, we considered whether there are lands owned or managed by the DoD within 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 DoD. Additionally, we have determined that the lands within the final 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. Consequently, the Secretary is not exercising her discretion to exclude any areas from the final designation based on impacts 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 rule, we have determined that there are currently no HCPs or other management plans for the Hermes copper butterfly, and the final designation does not include any Tribal lands or trust resources. We anticipate no impact on Tribal lands, partnerships, or HCPs from this critical habitat designation. Consequently, the Secretary is not exercising her discretion to exclude any areas from the final designation based on other relevant impacts.

Summary of Exclusions

After consideration of the economic impact, the impact on national security, and other relevant impacts of the final designation of critical habitat, the Secretary did not consider any particular areas for exclusion and is not exercising her discretion to exclude any areas from the final designation of critical habitat under section 4(b)(2) of the Act.

III. Final Rule Issued Under Section 4(d) of the Act

Background

Section 4(d) of the Act contains two sentences. The first sentence states that the Secretary shall issue such regulations as she deems necessary and advisable to provide for the conservation of species listed as threatened. The U.S. Supreme Court has noted that statutory language like "necessary and advisable" demonstrates a large degree of deference to the agency (see *Webster v. Doe*, 486 U.S. 592 (1988)). Conservation is defined in the Act to mean the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Additionally, the second sentence of section 4(d) of the Act states that the Secretary may by regulation prohibit with respect to any threatened species any act prohibited under section 9(a)(1), in the case of fish or wildlife, or section 9(a)(2), in the case of plants. Thus, the combination of the two sentences of section 4(d) provides the Secretary with wide latitude to select and promulgate appropriate regulations tailored to the specific conservation needs of the threatened

species. The second sentence grants particularly broad discretion to the Service when adopting the prohibitions under section 9.

The courts have recognized the extent of the Secretary's discretion under this standard to develop rules that are appropriate for the conservation of a species. For example, courts have upheld rules developed under section 4(d) as a valid exercise of agency authority where they prohibited take of threatened wildlife, or include a limited taking prohibition (see *Alsea Valley Alliance v. Lautenbacher*, 2007 U.S. Dist. Lexis 60203 (D. Or. 2007); *Washington Environmental Council v. National Marine Fisheries Service*, 2002 U.S. Dist. Lexis 5432 (W.D. Wash. 2002)). Courts have also upheld 4(d) rules that do not address all of the threats a species faces (see *State of Louisiana v. Verity*, 853 F.2d 322 (5th Cir. 1988)). As noted in the legislative history when the Act was initially enacted, "once an animal is on the threatened list, the Secretary has an almost infinite number of options available to him [her] with regard to the permitted activities for those species. [S]he may, for example, permit taking, but not importation of such species, or [s]he may choose to forbid both taking and importation but allow the transportation of such species" (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Exercising its authority under section 4(d), the Service has developed a rule that is designed to address the Hermes copper butterfly's specific threats and conservation needs. Although the statute does not require us to make a "necessary and advisable" finding with respect to the adoption of specific prohibitions under section 9, we find that this rule as a whole satisfies the requirement in section 4(d) of the Act to issue regulations deemed necessary and advisable to provide for the conservation of the Hermes copper butterfly. As discussed above under Summary of Biological Status and Threats, we concluded that the Hermes copper butterfly is likely to become in danger of extinction within the foreseeable future primarily due to extirpation of populations by wildfire and loss and isolation of populations due to development. The provisions of this 4(d) rule will promote conservation of the Hermes copper butterfly by creating more favorable habitat conditions for the species and helping to stabilize populations of the species. The provisions of this rule are one of many tools that the Service will use to promote the conservation of the Hermes copper butterfly.

This 4(d) rule describes how and where the prohibitions of section 9(a)(1) of the Act will be applied. This 4(d) rule prohibits all acts described under section 9(a)(1) of the Act except as otherwise excepted or permitted. As described in more detail later in this section, this 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)(B) of the Act (Figure 1). Outside of the area delineated in Figure 1, this 4(d) rule prohibits take under section 9(a)(1)(B) 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 excepted activities must be coordinated with and reported to the Service in writing and approved to ensure accurate interpretation of exceptions (for example, that activities do not adversely affect the species' conservation and recovery). Questions regarding the application of these requirements should be directed to the Carlsbad Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Provisions of the 4(d) Rule

This 4(d) rule will provide for the conservation of the Hermes copper butterfly by prohibiting the following activities, except as otherwise excepted or permitted: Importing or exporting; take; possession and other acts with unlawfully taken specimens; delivering, receiving, transporting, or shipping in interstate or foreign commerce in the course of commercial activity; or selling or offering for sale in interstate or foreign commerce. This 4(d) rule exempts from the prohibitions in section 9(a)(1)(B) 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 from any occupied dwelling, occupied structure, or to the property line, whichever is nearer, to provide reasonable fire safety and to reduce wildfire risks consistent with the State of California fire codes or local fire codes or ordinances.

(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.

As discussed above under Summary of Biological Status and Threats, multiple factors are affecting the status of the Hermes copper butterfly. A range of activities have the potential to impact these species, including, but not limited to: Recreational activities that promote the spread of nonnative weeds and wildfire ignition, clearing of brush for fire safety, land use changes including construction of power lines and

maintenance roads, and construction of homes and businesses. Across the species' range, suitable habitat has been degraded or fragmented by development and wildfire, including megafires. Regulating these activities will address some of these problems, creating more favorable habitat conditions for the species and helping to stabilize or increase populations of the species.

Under the Act, "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Some of these provisions have been further defined in regulation at 50 CFR 17.3. Take can result knowingly or otherwise, by direct and indirect impacts, intentionally or incidentally. Regulating take will help preserve the species' remaining populations, slow their rate of decline, and decrease synergistic, negative effects from other threats.

We may issue permits to carry out otherwise prohibited activities, including those described above, involving threatened wildlife under certain circumstances. Regulations governing permits are codified at 50 CFR 17.32. With regard to threatened wildlife, a permit may be issued for the following purposes: For scientific purposes, to enhance propagation or survival, for economic hardship, for zoological exhibition, for educational purposes, for incidental taking, or for special purposes consistent with the purposes of the Act. The statute also contains certain exemptions from the

prohibitions, which are found in sections 9 and 10 of the Act.

We recognize the special and unique relationship with our State natural resource agency partners in contributing to conservation of listed species. State agencies often possess scientific data and valuable expertise on the status and distribution of endangered, threatened, and candidate species of wildlife and plants. State agencies, because of their authorities and their close working relationships with local governments and landowners, are in a unique position to assist the Services in implementing all aspects of the Act. In this regard, section 6 of the Act provides that the Services shall cooperate to the maximum extent practicable with the States in carrying out programs authorized by the Act. Therefore, any qualified employee or agent of a State conservation agency that is a party to a cooperative agreement with the Service in accordance with section 6(c) of the Act, who is designated by his or her agency for such purposes, will be able to conduct activities designed to conserve Hermes copper butterflies that may result in otherwise prohibited take without additional authorization.

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)(B) 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 we serve.

The areas where the section 9(a)(1)(B) prohibitions would not apply are shown in Figure 1. These areas were delineated 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)(B) prohibitions would not apply, please contact the Carlsbad Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

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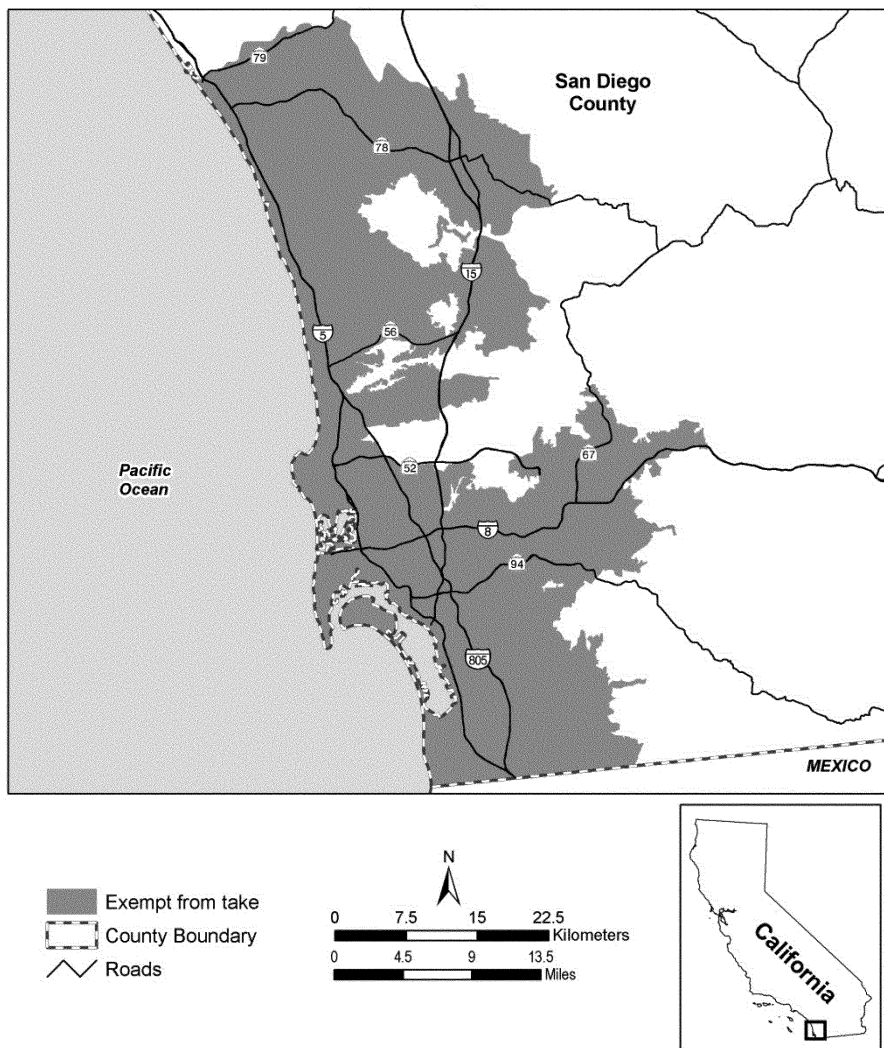


Figure 1. Portion of the Hermes copper butterfly’s current range that is exempt from take prohibitions under section 9(a)(1)(B) of the Act.

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Nothing in this 4(d) rule will 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. However, interagency cooperation may be further streamlined through planned programmatic consultations for the species between Federal agencies and the Service.

Required Determinations

Regulatory Planning and Review (Executive Orders 12866 and 13563)

Executive Order 12866 provides that the Office of Information and Regulatory

Affairs (OIRA) in the Office of Management and Budget will review all significant rules. OIRA has determined that this rule is not significant.

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 final 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.

Under the RFA, as amended, and as understood in light of recent court decisions, Federal agencies are required to evaluate only the potential incremental impacts of rulemaking on those entities directly regulated by the rulemaking itself; in other words, the RFA does not require agencies 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 will be directly regulated by this rulemaking, the Service certifies that this final critical habitat designation will not have a significant economic impact on a substantial number of small entities.

In summary, we have considered whether the final designation would result in a significant economic impact on a substantial number of small entities. For the above reasons and based on currently available information, we certify that this final critical habitat designation will not have a significant economic impact on a substantial number of small business entities. Therefore, a regulatory flexibility analysis is not required.

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 this critical habitat designation will significantly affect energy supplies, distribution, or use. Furthermore, although it does include areas where power lines 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 finding:

(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 that this rule will 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. By definition, Federal agencies are not considered small entities, although the activities they fund or permit may be proposed or carried out by small entities.

Consequently, we do not believe that the critical habitat designation will significantly or uniquely affect small government entities. 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 for the final designation of critical habitat for the Hermes copper butterfly, and it concludes that this designation of critical habitat 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 rule does not have significant federalism effects. A federalism summary impact statement is not required. In keeping with Department of the Interior and Department of Commerce policy, we requested information from, and coordinated development of this critical habitat designation with, appropriate State resource agencies. 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 for 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 State and local governments in long-range planning because they 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) of the Act 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 will not unduly burden the judicial system and that it meets the requirements of sections 3(a) and 3(b)(2) of the Order. We are designating critical habitat in accordance with the provisions of the Act. To assist the public in understanding the habitat needs of the species, this rule identifies the 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 information collection requirements, and a submission to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.) is not required. We may not conduct or sponsor and you

are 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 regulations adopted pursuant to section 4(a) of 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)).

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that Tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes.

We coordinated with Federally-recognized Tribes within the range of the species regarding both listing and critical habitat. The species' historical range falls within Kumeyaay Nation (also known in part as Ipai and Tipai) traditional cultural territory identified by the Kumeyaay Heritage Preservation Committee, of which all 12 federally-recognized Tribes are members. Though the historical range includes these lands, we determined that no Tribal lands fall within the boundaries of the final critical habitat for the Hermes copper butterfly. Based on our coordination and geographic analysis, we concluded no Tribal trust lands will be affected by the designation. We are

committed to ongoing coordination with Tribes and partnership building to ensure no effects on Tribes and to support voluntary conservation efforts in the future.

References Cited

A complete list of references cited in this rulemaking is available on the internet at <https://www.regulations.gov> and upon request from the Carlsbad Fish and Wildlife Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this final rule are the staff members of the Fish and Wildlife Service’s Species Assessment

Team and the Carlsbad Fish and Wildlife Office.

List of Subjects in 50 CFR Part 17

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

Regulation Promulgation

Accordingly, we 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. In § 17.11, amend the table in paragraph (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 follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *
(h) * * *

Common name	Scientific name	Where listed	Status	Listing citations and applicable rules
*	*	*	*	*
Insects				
*	*	*	*	*
Butterfly, Hermes copper	<i>Lycaena hermes</i>	Wherever found	T	86 FR [INSERT FEDERAL REGISTER PAGE WHERE THE DOCUMENT BEGINS]; 12/21/2021; 50 CFR 17.47(e); ^{4d} 50 CFR 17.95(i). ^{CH}
*	*	*	*	*

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

§ 17.47 Special rules—insects.

* * * * *

(e) Hermes copper butterfly (*Lycaena hermes*).—(1) *Prohibitions*. The following prohibitions that apply to endangered wildlife also apply to Hermes copper butterfly. Except as provided under paragraph (e)(2) of this section and §§17.4 and 17.5, it is unlawful for any person subject to the jurisdiction of the United States to commit, to attempt to commit, to solicit another to commit, or cause to be committed, any of the following acts in regard to this species:

- (i) Import or export, as set forth at § 17.21(b) for endangered wildlife.
- (ii) Take, as set forth at § 17.21(c)(1) for endangered wildlife.
- (iii) Possession and other acts with unlawfully taken specimens, as set forth at § 17.21(d)(1) for endangered wildlife.
- (iv) Interstate or foreign commerce in the course of a commercial activity, as set forth at § 17.21(e) for endangered wildlife.
- (v) Sale or offer for sale, as set forth at § 17.21(f) for endangered wildlife.

(2) *Exceptions from prohibitions*. In regard to this species, you may:

- (i) Conduct activities as authorized by a permit under § 17.32.
- (ii) Take, as set forth at § 17.21(c)(2) through (c)(4) for endangered wildlife.
- (iii) Take as set forth at § 17.31(b).
- (iv) Possess and engage in other acts with unlawfully taken wildlife, as set forth at § 17.21(d)(2) for endangered wildlife.
- (v) Conduct the activities listed in paragraph (e)(2)(vi) of this section, including take, outside the area delineated in paragraph (e)(2)(vii) of this section if the activities are 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, spiny redberry (*Rhamnus crocea*).

(vi) Take the Hermes copper butterfly outside the area delineated in paragraph (e)(2)(vii) of this section 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 from any occupied dwelling, occupied structure, or to the

property line, whichever is nearer, to provide reasonable fire safety and to reduce wildfire risks consistent with the State of California fire codes or local fire codes or ordinances.

(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.

(vii) Take the Hermes copper butterfly within the portion of the range described in paragraphs (e)(2)(vi)(A) and (B) of this section:

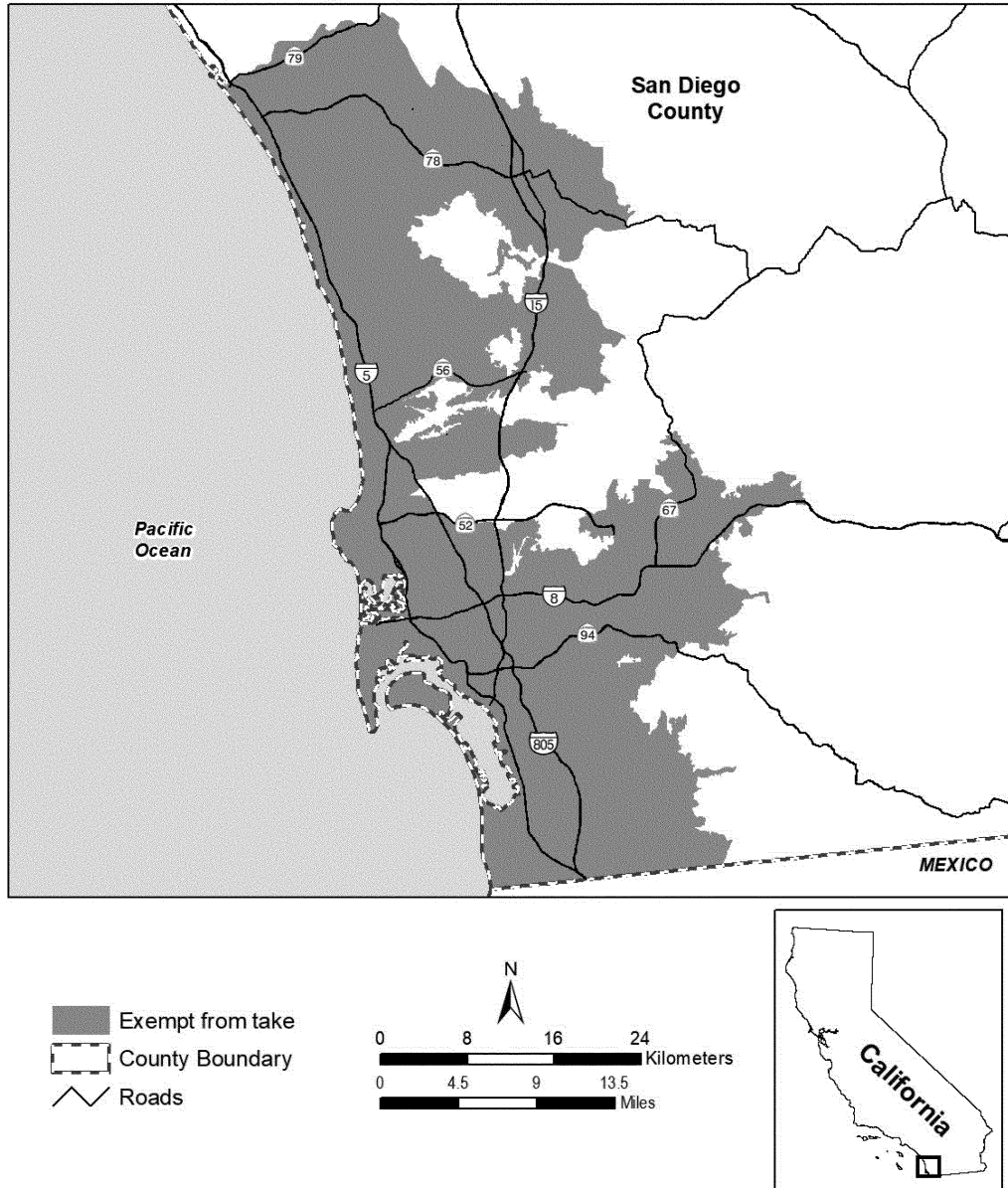
(A) The southern edge is the Mexican border, and the western edge is the Pacific coast. The eastern and northern edges of the boundary follow the development that would isolate any extant populations found within the boundaries.

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

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Figure 1 to paragraph (e)(2)(vii)(B)

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



■ 4. Amend § 17.95(i) by adding an entry for “Hermes Copper Butterfly (*Lycaena hermes*)” after the entry for “Florida Leafwing Butterfly (*Anaea troglodyta floridaalis*)” 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 in this entry.

(2) Within these areas, the physical or biological features essential to the conservation of 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:

(i) Spiny redberry host plants (*Rhamnus crocea*).

(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 January 20, 2022.

(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

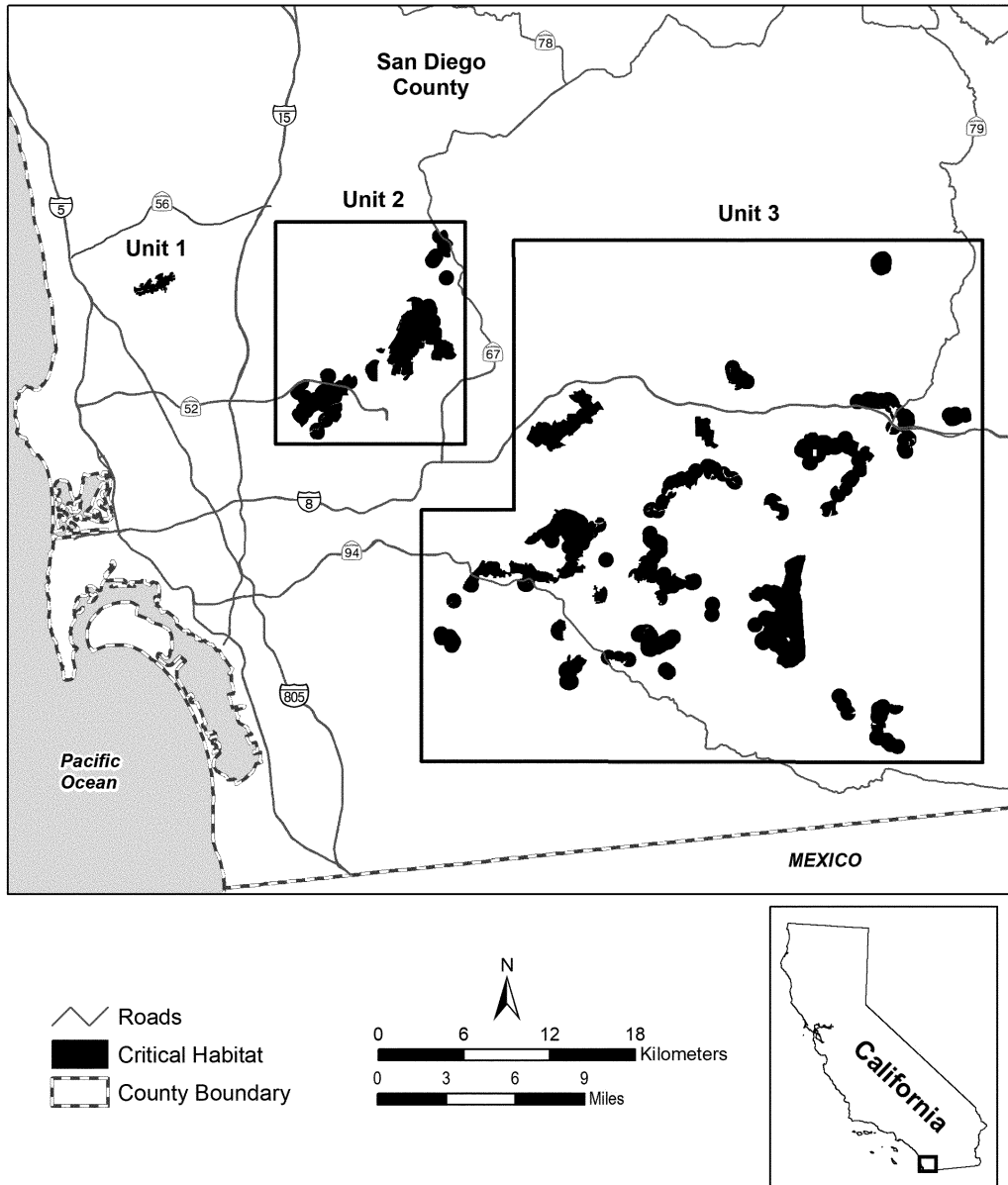
the boundaries of the critical habitat designation. The coordinates or plot points or both on which each map is based are available to the public at <https://www.regulations.gov> at Docket No. FWS-R8-ES-2017-0053, on our internet site <https://www.fws.gov/carlsbad/gis/cfwogis.html>, and at the

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:

Figure 1 to Hermes Copper Butterfly (*Lycaena hermes*) paragraph (5)

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



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

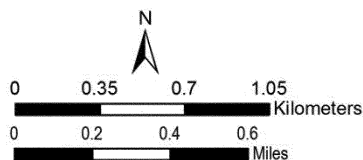
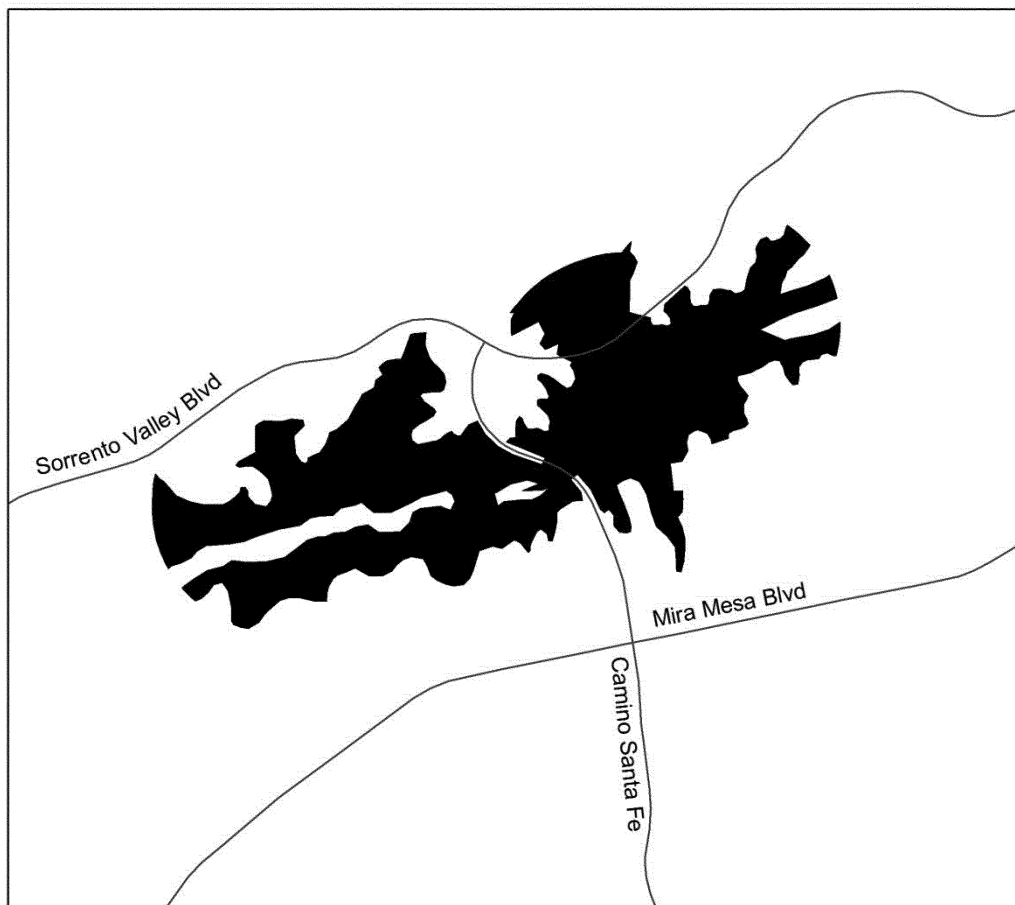
(i) Unit 1 consists of 166 hectares (ha) (410 acres (ac)) in San Diego County and is composed of lands jointly owned and

managed by the City and County of San Diego (88 ha (218 ac)) and private or other ownership (77 ha (191 ac)).

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

Figure 2 to Hermes Copper Butterfly (*Lycaena hermes*) paragraph (6)(ii)

**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

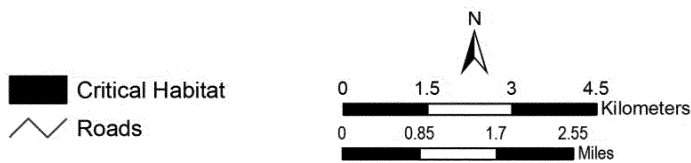
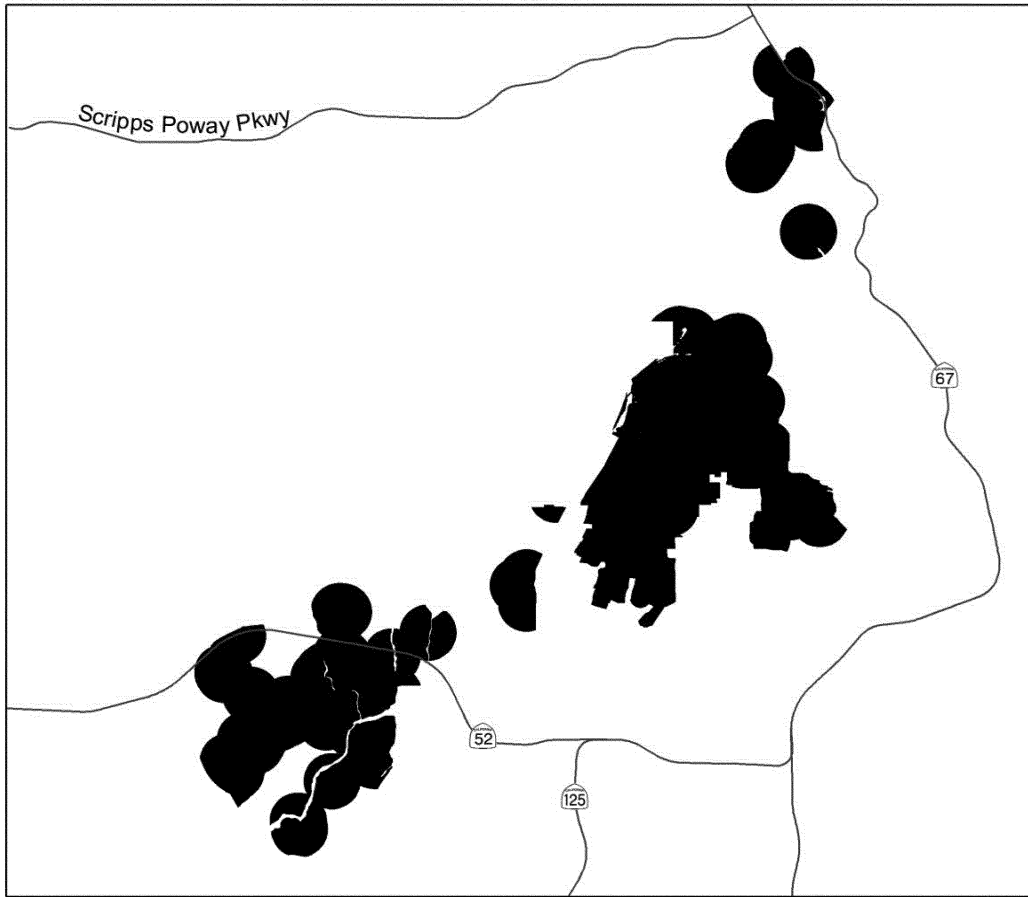
composed of lands owned and managed by the State of California (111 ha (275 ac)), local jurisdictions (primarily the County of San Diego; 1,113 ha (2,750

ac)), and private or other ownership (1,646 ha (4,068 ac)).

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

Figure 3 to Hermes Copper Butterfly (*Lycaena hermes*) paragraph (7)(ii)

**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

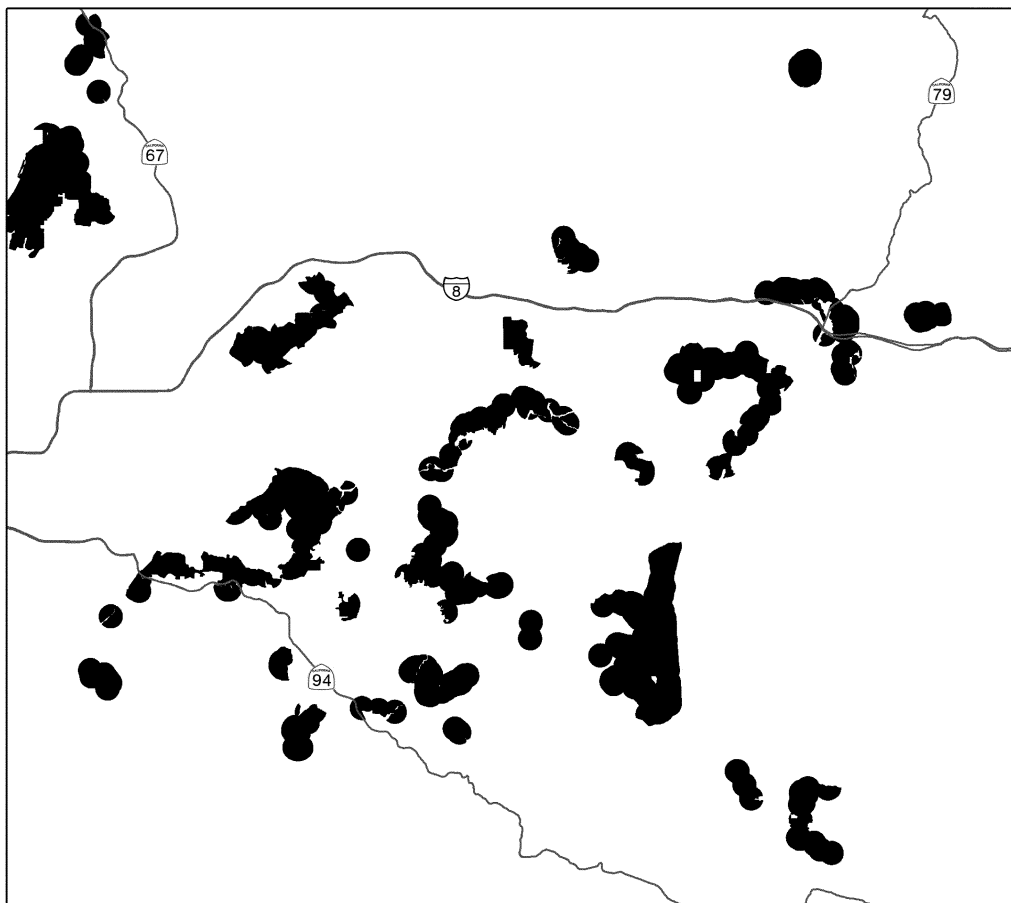
Federal Government (4,213 ha (10,411 ac)), the State of California (2,000 ha (4,940 ac)), local jurisdictions (primarily the City and County of San Diego; 1,162

ha (2,871 ac)), and private or other ownership (3,765 ha (9,303 ac)).

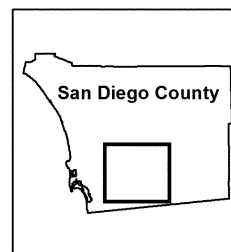
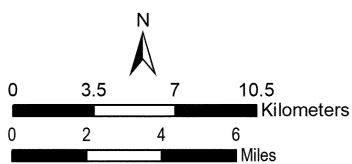
(ii) Map of Unit 3, Southeast San Diego, follows:

Figure 4 to Hermes Copper Butterfly (*Lycaena hermes*) paragraph (8)(ii)

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



■ Critical Habitat
— Roads



* * * * *

Martha Williams,
*Principal Deputy Director, Exercising the
Delegated Authority of the Director, U.S. Fish
and Wildlife Service.*

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