Hingtgen, Robert J

From: Kelly Fuller <kelly@kellyfuller.net>
Sent: Monday, March 03, 2014 1:04 PM
To: Hingtgen, Robert J
Subject: Supplemental Comments, DPEIR for Soitec Solar Project
Attachments: POC_supplemental_SOITEC_comments_030314.pdf; POC_Attach1_QCB_2002 _protocol.pdf; POC_Attach2_Interim_Mtg_Notes.pdf; POC_Attach3_QCB_5-year_review_ 2009.pdf; POC_Attach4_QCB_CriticalHab_2002.pdf; POC_Attach5_Pratt-Emmel_2010.pdf; POC_Attach6_Quino_Protocol_02-21-2014.pdf; POC_Attach7_USFWS-BIA_Memo_2012.pdf

Dear Mr. Hingtgen:

Attached are supplemental comments on the Soitec Solar draft Program Environmental Impact Report and attachments, sent on behalf of The Protect Our Communities Foundation. If you have any problems opening any of the files, please contact me.

Please confirm that these comments have been received.

Thank you for this opportunity to submit comments on the project. It is very much appreciated.

Best wishes,

Kelly Fuller
Consultant to The Protect Our Communities Foundation
kelly@kellyfuller.net

The Protect Our Communities Foundation
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Santa Ysabel, CA 92070
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March 3, 2014

Robert Hingtgen
Planning & Development Services (PDS)
Project Processing Counter
5510 Overland Avenue, Suite 110
San Diego, California 92123
Robert.Hingtgen@sdcounty.ca.gov

Sent via Electronic Mail

Subject: Soitec Solar Project Draft Program Environmental Impact Report (DPEIR) – Supplemental Comments - SOITEC SOLAR DEVELOPMENT PROGRAM ENVIRONMENTAL IMPACT REPORT EXTENDED PUBLIC COMMENT PERIOD, LOG NO. PDS2012-3910-120005 (ER); 3800-12-010 (GPA); TIERRA DEL SOL, 3300-12-010 (MUP); 3600-12-005 (REZ); 3921-77-046-01 (AP); RUGGED SOLAR, 3300-12-007 (MUP); SCH NO. 2012121018.

Dear Mr. Hingtgen:

Thank you for this opportunity to offer comments on the draft Program Environmental Impact Report (DPEIR) for the Soitec Solar Project (Project). These comments are submitted on behalf of The Protect Our Communities Foundation (POC) and supplement the previously submitted comment letter prepared by Stephan C. Volker, dated March 1, 2014.

There are serious problems with the surveys for Quino checkerspot butterflies (QCB or Quino) that were conducted to inform the environmental review for the Project. This is quite significant because the County specified in its Multi-Use Permit pre-application summary letters to the Project applicant that the Biological Resources Reports required by the County must include QCB surveys that are in compliance with the USFWS protocol standard.[1] The QCB surveys that were conducted for the Project are not.

[1] The pre-application summary letters also require protocol surveys for golden eagles: "Directed and/or protocol surveys are required for all species shown in boldface type in the list" (page 12-26). Golden eagles are a boldface species (page 15-26). However, as explained in POC's previously submitted comments (letter of March 1, 2014, prepared by Stephan C. Volker), the golden eagle surveys conducted for the Soitec Solar projects do not meet USFWS golden eagle survey protocol standards. In addition, Lewis' woodpecker is listed as a boldface type species in the pre-application summary letters and thus a species requiring directed and/or protocol surveys and discussion in the biological report. Nevertheless, the biological report just briefly mentions that there is moderate potential for Lewis' woodpecker to occur at the LanWest project site. No evidence is presented that the required focused surveys for Lewis' woodpecker ever took place. See page 2.3-108 in Dudek. 2013. Draft PEIR. Biological Resources Report, Part 1. Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/2.3_BiologicalResources_PART-I.pdf. Last accessed March 2, 2014.

The pre-application summary letters that the County's Department of Planning and Land Use (DPLU) sent to the Project applicant state, "To evaluate the impacts of the proposed project on biological resources, a Biological Resources Report is required, and must include a Biological Resources Map, as detailed below." The letters continue:

> "DPLU has also determined that the [Biological Resource] report shall include focused survey(s) - or - site assessment for the following rare and endangered species: *Quino checkerspot butterfly* and spring rare plants. The focused survey(s) must be done by biologist(s) with demonstrable knowledge in field detection of the subject species (*focused surveys for Federally listed species shall be in compliance with USFWS protocol, when such protocol exists*, and must be done by a USFWS permitted biologist" (emphasis added).[2]

At the time the Project's QCB surveys were conducted, the USFWS's 2002 QCB survey protocol was in effect.[3] Because the County made compliance with the USFWS QCB survey protocol mandatory and the Quino surveys did not meet USFWS protocol standards, as explained more fully later in this letter, the DPEIR's statement that [a]ll field surveys were completed according to County Requirements" is incorrect (Biological Resources Report, Part 1, page 2.3-3).[4]

It should be noted that this particular Project applicant is in a better position to understand the conditions of the County's pre-application summary letters and the importance of meeting them than the average applicant. At least two of the County's pre-application summary letters were signed by Patrick Brown, who later left his employment with the County and became Soitec USA's Permitting Project Manager. Since then Mr. Brown has been working for Soitec on this Project, for example representing Soitec at a June 27, 2013 meeting with the County and wildlife agencies at which USFWS said that the Project's Quino surveys should be kept up to date.[5]

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[2] See page 12-26 in Soitec LanWest/LanEast Solar LLC Pre-application Summary Letter (October 25, 2011) in DPEIR Appendix 2.3-4 (Biological Resources Report for LanWest Part 1). Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-4_BiologicalResourcesReport_LanWest_Part1.pdf. Last accessed March 2, 2014. See also page 12-26 in Soitec Rugged Solar LLC Pre-application Summary Letter (October 25, 2011) in DPEIR Appendix 2.3-2 (Biological Resources Report for Rugged Solar Part 1). Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-2_BiologicalResourcesReport_Rugged_Part1.pdf. Last accessed March 2, 2014. A pre-application Summary Letter for the Soitec Tierra del Sol Solar LLC project is not included in that project's Biological Resources Report in the DPEIR, but nothing in the DPEIR suggests that the Tierra del Sol site would not be subject to the same survey conditions as the Rugged Solar, LanWest and LanEast sites.

[3] USFWS. 2002. Quino Checkerspot Butterfly (*Euphydryas editha quino*): Survey Protocol Information. Available at http://www.fws.gov/ventura/species_information/protocols_guidelines/docs/qcbf/qchkrsptbfly_survprotocols.pdf. Last accessed March 1, 2014. Also submitted with this letter as Attachment 1.

[4] Dudek. 2013. Draft PEIR. Biological Resources Report, Part 1. Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/2.3_BiologicalResources_PART-I.pdf. Last accessed March 2, 2014.

[5] San Diego County. June 27, 2013. Meeting Notes from Interim Review Process Meeting (Soitec Solar Development). Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/Record-Documents/2013-06-27-Interim-Review-Meeting-With-US-Fish-and-Wildlife-Service-and-Dept-of-Fish-Game-Notes.pdf. Last accessed March 2, 2014. Also submitted with this letter as Attachment 2.

The Project's QCB surveys were conducted by two consulting firms, AECOM and Dudek. AECOM surveyed the Rugged Solar, LanWest and LanEast sites in 2011.[6] Dudek surveyed the Tierra del Sol site in 2012, the gen-tie alignment site in 2013 and portions of the Rugged Solar site in 2013. These dates suggest that USFWS's request that QCB surveys be kept up to date has partially been ignored. In addition, the DPEIR contains no record of QCB surveys having been conducted at the Los Robles alternative site.

Neither consulting firm reported finding QCB, a low density, difficult-to-detect species, at the Project sites.[7] AECOM also states it did not find the primary host plant for QCB, *plantago erecta*, at the Rugged Solar site and further asserts in its 45-day report that the plant grows in a different soil type than exists there (pages 8, 11).[8] ("Dotseed plantain" and "dot-seed plantain" are used as the plant's common name and primary identifier by the two companies in their reports.) However, the Rugged Solar Biological Resources Report, prepared by Dudek and containing a summary of QCB surveys for the entire project site, states: "[a]ll of the areas surveyed in the project site contained a variety of potential Quino checkerspot adult nectar plants and dot-seed plantain, their primary larval food" (page 2.3-61).[9] The DPEIR makes no attempt to reconcile this serious difference with the findings of AECOM's 45-day QCB report.

The presence or absence of QCB host plants is an important part of the documentation required by the USFWS 2002 survey protocol, which states that survey reports should include a "[s]ite assessment map with Quino checkerspot larval host plant locations mapped" and a "[l]ist of larval host plants, nectar

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[6] According to the February 7, 2012 AECOM letter, after the QCB habitat assessment and surveys were completed, the Quino Survey Area was then divided into three separately named solar "projects": LanEast Solar, LanWest Solar, and Rugged Solar. See Letter from Andrew Fisher (AECOMM) to Susie Tharatt (USFWS). February 7, 2012. In the Biological Resources Report for the Rugged Solar Project, Part 2. Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-2_BiologicalResourcesReport_Rugged_Part2.pdf. Last accessed March 1, 2014. Although Soitec Solar Development (and its subsidiary LanWest Solar Farm LLC) requested that the County "withdraw the Major Use Permit Application for the LanWest solar farm project" and "close the case out" on September 5, 2013, because the facility is discussed as part of the Soitec Solar project in the draft Programmatic Environmental Impact Report, POC will address the LanWest facility as part of the Soitec project.

[7] USFWS describes the San Diego population of QCB as low density and difficult to detect in the 2009 QCB Five-Year Review. See page 25 at USFWS. 2009. Quino Checkerspot Butterfly (*Euphydryas editha quino)* 5-Year Review. Available at http://ecos.fws.gov/docs/five_year_review/doc4341.pdf. Last accessed March 1, 2014. Also submitted with this letter as Attachment 3.

[8] Letter from Andrew Fisher (AECOMM) to Susie Tharatt (USFWS). February 7, 2012. In the Biological Resources Report for the Rugged Solar Project, Part 2. Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-2_BiologicalResourcesReport_Rugged_Part2.pdf. Last accessed March 1, 2014.

[9] Dudek. 2013. Biological Resources Report, Rugged Solar Farm, Part 1. Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-2_BiologicalResourcesReport_Rugged_Part1.pdf. Last accessed March 1, 2014. The 45-day QCB survey report that Dudek was required to submit to USFWS for the Rugged Solar site does not appear to be included in the DPEIR.

plants, and plant communities observed on the site" (page 6).[10] It is a serious issue for the credibility of the Project's QCB surveys that AECOM and Dudek, the two consulting firms that surveyed the Rugged Solar project site, do not agree as to whether *plantago erecta*, identified as the butterfly's primary larval food, is found there. This cannot be explained away as the two companies encountering different annual plants in different survey years. AECOM has stated that the site has the wrong soil type for this plant. Thus, the County (and USFWS) are faced with conflicting data regarding a USFWS protocol reporting requirement for a federally listed endangered species.

Furthermore, AECOM began its QCB surveys late in the season, which may have lowered the likelihood of finding the butterflies or even caused AECOM to miss the season altogether.[11] AECOM biologists did not begin their searches for QCB until 3/30/11, two weeks after the first adult QCB was observed at the Jacumba reference site on 3/15/11.[12] AECOM's stated reason for the late start to surveying was because temperatures at the Quino Survey Area were predicted to be below those the USFWS QCB protocol specifications (page 20).[13] The USFWS QCB protocol in use at that time (2002) asserts that "Quino checkerspots usually begin flying in February or early March" (page 2).[14] The current USFWS QCB protocol (2014) in fact *requires* surveys to start in February: "The first weekly survey for Quino shall begin during the third week of February" (2014 Quino Protocol page 2).[15]

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[10] USFWS. 2002. Quino Checkerspot Butterfly (*Euphydryas editha quino*): Survey Protocol Information. Available at http://www.fws.gov/ventura/species_information/protocols_guidelines/docs/qcbf/qchkrsptbfly_survprotocols.pdf. Last accessed March 1, 2014.

[11] In 2002, the USFWS reported that QCB flight season lasts one to two months. See page 18356 at USFWS. April 15, 2002. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Quino Checkerspot Butterfly (*Euphydryas editha quino*) Federal Register Vol. 67 No. 72. Available at http://ecos.fws.gov/docs/federal_register/fr3862.pdf. Last accessed March 1, 2014. Also submitted with this letter as Attachment 4. Even if QCB occupy an area, the area will not necessarily have a flight season every year. QCB spend most of their lives in larval diapause and can enter diapause in multiple years. Diapause is a dormant state that allows QCB to survive years of low rainfall that produce poor resources. See page 8 at Pratt, Gorden F. and John F. Emmel. 2010. Sites chosen by diapausing or quiescent stage quino checkerspot butterfly (Euphydryas editha quino), (Lepidoptera: Nymphalidae) larvae. Journal of Insect Conservation. 14:107-114. Submitted with this letter as Attachment 5.

[12] According to the Quino Checkerspot Butterfly 45-day Reports that AECOM filed with USFWS and were included in the draft PEIR, AECOM biologists began searches for QCB at the Rugged Solar, LanEast, and LanWest sites on the same day: March 30, 2011.

[13] Letter from Andrew Fisher (AECOMM) to Susie Tharatt (USFWS). February 7, 2012. In the Biological Resources Report for the Rugged Solar Project, Part 2. Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-2_BiologicalResourcesReport_Rugged_Part2.pdf. Last accessed March 1, 2014.

[14] USFWS. 2002. Quino Checkerspot Butterfly (*Euphydryas editha quino*): Survey Protocol Information. Available at http://www.fws.gov/ventura/species_information/protocols_guidelines/docs/qcbf/qchkrsptbfly_survprotocols.pdf. Last accessed March 1, 2014.

[15] USFWS. 2014. Quino Checker spot [sic] Butterfly Survey Protocol. Available at http://www.fws.gov/carlsbad/TEspecies/Documents/QuinoDocs/Quino_Protocol_2014_FINAL_022114_jrh.pdf. Last accessed March 1, 2014. Also submitted with this letter as Attachment 6.

AECOM's QCB searches were also short in weekly duration. The AECOM QCB 45-day Report for the LanEast project misinterprets the USFWS 2002 protocol surveying requirements, saying that "Although protocol was satisfied with the 5 weeks of survey, in the interest of survey rigor, AECOM biologists decided to continue with a 6th week of survey within portions of the Quino survey area considered to have the greatest (if any) potential to support Quino" (page 9).[16] However, the USFWS 2002 survey protocol states, "[i]f butterflies are not detected during the first 5 surveys, weekly surveys should continue until the end of the flight season to maximize likelihood of detection of low-density populations" (page 3).[17] Nowhere does the protocol say that after five weeks, surveying should continue only on the portions of the site that the survey biologists think are most likely to support QCB. The AECOM report further attempts to excuse the reduced survey area the AECOM biologists searched in the sixth week by stating, "According to USFWS guidelines, areas with active/in-use grazing and a lack of native vegetation can be excluded from protocol-level surveys. Evidence of cattle grazing was present in weeks 1 through 5 but these areas were still searched for 5 weeks given the presence of native vegetation despite active grazing" (page 9). In reality, the 2002 protocol lists areas that are "not recommended for butterfly surveying, including "active/in-use agricultural fields without natural or remnant inclusions of native vegetation (i.e., fields completely without any fallow sections, unplowed areas, and/or rocky outcrops)," but is completely silent on grazing (page 2). In other words, AECOM's misinterpretation of the 2002 survey protocol cannot be used to justify excluding of areas of the project site from surveying after the fifth week.

The AECOM Quino Checkerspot Butterfly 45-day Report for the LanWest site also misinterprets the USFWS 2002 survey protocol's instructions about survey duration. The AECOM report states, "protocol was satisfied with the 5 weeks of survey" (page 8). However, as explained earlier, if QCB are not found within the first five weeks of surveys, the USFWS 2002 protocol says surveying should continue to the end of the flight season. AECOM continued to survey a sixth week, but excluded portions of the site based on "increased evidence of heavy cattle grazing, a lack of host plant populations, sparse nectaring resources" (page 8). Again, as with AECOM's sixth week surveys at the LanEast site, this decision to not to survey certain portions of the site in the final week of surveying does not conform to the USFWS 2002 survey protocol. The protocol says "[a]ll areas that are not excluded should be surveyed for butterflies, regardless of Quino checkerspot host plant presence, absence and/or density" and "[a]ll non-excluded portions of the site should be thoroughly surveyed for butterflies during each weekly survey" (page 3).

The supplemental QCB surveys conducted by Dudek in 2013 at the Rugged Solar site are also problematic. Like the AECOM surveys, they began late in the season, in the fourth week of March

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[16] Letter from Andrew Fisher (AECOMM) to Erin McCarthy (USFWS). December 19, 2011. Appendix 2.3-3 (Quino Checkerspot Butterfly 45-Day Summary Report). Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-3_QuinoCheckerspotButterfly45-DaySummaryReport_LanEast.pdf. Last accessed March 2, 2014.

[17] USFWS. 2002. Quino Checkerspot Butterfly (*Euphydryas editha quino*): Survey Protocol Information. Available at http://www.fws.gov/ventura/species_information/protocols_guidelines/docs/qcbf/qchkrsptbfly_survprotocols.pdf. Last accessed March 1, 2014.

(Rugged Solar Biological Resources Report, Part 1, Table 1-1C).[18] Dudek's five weeks of surveying skipped a week between the fourth and sixth weeks, and thus did not adhere to the USFWS 2002 protocol, which states that once begun, surveys should be weekly for a minimum of five weeks on nonconsecutive days, unless there is an entire week of adverse weather (page 3).[19] However, it appears adverse weather was not the reason for the skipped week. There is no note indicating bad weather forced cancellation of a survey; however, Dudek did note a survey week was canceled due to adverse weather for Area 2 of the gen-tie alignment (Table 1-1C).[20]

Dudek's QCB surveys for Survey Area 1 of the gen-tie alignment also did not follow the USFWS protocol. Searches took place only during four weeks, not five, contrary to how they are presented in in Table 1-1. Surveys that occurred on 3/26/13 and 3/29/13 are charted as week 1 and week 2 in the table, despite being only three days apart. The USFWS 2002 survey protocol states that the searches should be done once per week. In addition, one week's search was skipped entirely between 4/12/13 and 4/26/13, which is another failure to meet the protocol standard, unless the entire week had adverse weather conditions that prevented surveys. There is no note in the table indicating bad weather was the reason for the skipped week (Table 1-1C). Despite not finding QCB, surveying efforts ceased after only four weeks of surveys.

Dudek's QCB surveys for Survey Area 2 of the gen-tie alignment likewise did not meet the USFWS protocol, with only four weeks of surveys and an unacknowledged skipped week. More than a week elapsed after the first survey on 3/15/13 until the second survey of 3/27/13. However, surveys that occurred on 3/27/13 and 3/28/13 are charted as week 2 and week 3 in the table, despite taking place on consecutive days. More than a week went by again until the fourth survey on 4/11/13; this is noted as a missed survey due to adverse weather conditions (Table 1-1C).[21] The 2002 USFWS survey protocol allows for a missed week due to an entire week of adverse weather conditions; however, QCB searches continued to take place that same missed week at Survey Areas 1 and 3 of the gen-tie alignment, and in the case of Survey Area 3, on two consecutive days of that same week. Although no QCB were found at Survey Area 2, surveying did not last five weeks, much less continue after five weeks as the USFWS 2002 protocol states it should have.

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[18] Five weeks of surveys were conducted, beginning 3/22/13 and ending 4/24/13. Dudek. 2013. Biological Resources Report, Rugged Solar Farm, Part 1. Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-2_BiologicalResourcesReport_Rugged_Part1.pdf. Last accessed March 1, 2014.

[19] USFWS. 2002. Quino Checkerspot Butterfly (*Euphydryas editha quino*): Survey Protocol Information. Available at http://www.fws.gov/ventura/species_information/protocols_guidelines/docs/qcbf/qchkrsptbfly_survprotocols.pdf. Last accessed March 1, 2014.

[20] Dudek. 2013. Biological Resources Report, Rugged Solar Farm, Part 1. Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-2_BiologicalResourcesReport_Rugged_Part1.pdf. Last accessed March 1, 2014.

[21] See 1-12 to 1-13. Dudek. 2013. Biological Resources Report, Rugged Solar Farm, Part 1. Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-2_BiologicalResourcesReport_Rugged_Part1.pdf. Last accessed March 1, 2014.

Dudek's QCB surveys for Survey Area 3 of the gen-tie alignment follow the same pattern as the other two Areas. They do not adhere to the 2002 USFWS survey protocol. There were only four weeks of surveys and two unacknowledged skipped weeks. The first survey occurred on 3/16/13 and more than a week went by before the second happened on 3/27/13. Surveys took place only two days apart on 4/3/13 and 4/5/13, but Table 1-1C identifies them as occurring on weeks three and four. Almost two weeks elapsed between the fourth survey on 4/5/13 and the final survey on 4/17/13 (Table 1-1C). There are no notes in the table indicating that adverse weather was the reason for the skipped weeks.[22] No QCB were found, but surveying did not continue past four weeks, another way in which these surveys are noncompliant with the USFWS 2002 survey protocol.

In order to safeguard an important natural resource that is fully protected by the Endangered Species Act, the County needs to be particularly careful with the QCB surveys done for this Project. In 2009 USFWS predicted that QCB populations might be entering a downswing due to the beginning of a severe drought, possibly exacerbated by climate change (5-Year Review page 8).[23] The drought USFWS noted in 2009 has intensified dramatically in the last year. However, new QCB populations have been found east of Campo since 2002.[24] This combination of worsening conditions and new QCB populations being discovered not far from the Project sites mean that it is more important than ever that the County enforce its requirement that QCB surveys be conducted according to USFWS protocol standards. As the USFWS has stated in the most-recent QCB five-year review, "Protection of habitat from destruction is a necessary first step toward recovery" (page 16).[25] If approved, this Project would destroy large areas of potential QCB habitat that have not been surveyed according to USFWS QCB protocol.

The lack of USFWS protocol surveys also means that the assessment of impacts to QCB in the DPEIR, which are judged to be less than significant, is not based on credible data. Thus in order for the DPEIR's analysis of impacts to QCB to be valid, the QCB surveys for the Soitec Solar project need to be conducted again, carefully following the current USFWS survey protocol, in a year when there is sufficient rainfall for a flight season.[26] This would also help satisfy the USFWS's June 2013 request that Quino surveys for this Project be kept up to date.

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[22] See 1-13. Dudek. 2013. Biological Resources Report, Rugged Solar Farm, Part 1. Available at http://www.sdcounty.ca.gov/pds/ceqa/Soitec-Documents/EIR-FILES/Appendix_2.3-2_BiologicalResourcesReport_Rugged_Part1.pdf. Last accessed March 1, 2014.

[23] USFWS. 2009. Quino Checkerspot Butterfly (*Euphydryas editha quino)* 5-Year Review. Available at http://ecos.fws.gov/docs/five_year_review/doc4341.pdf. Last accessed March 1, 2014.

[24] See page 7 at USFWS. 2009. Quino Checkerspot Butterfly (*Euphydryas editha quino)* 5-Year Review. Available at http://ecos.fws.gov/docs/five_year_review/doc4341.pdf. Last accessed March 1, 2014.

[25] USFWS. 2009. Quino Checkerspot Butterfly (*Euphydryas editha quino)* 5-Year Review. Available at http://ecos.fws.gov/docs/five_year_review/doc4341.pdf. Last accessed March 1, 2014.

[26] QCB may re-enter diapause in low rainfall years with poor plant resources. See page 108. Pratt, Gorden F. and John F. Emmel. 2010. Sites chosen by diapausing or quiescent stage quino checkerspot butterfly (Euphydryas editha quino), (Lepidoptera: Nymphalidae) larvae. Journal of Insect Conservation. 14:107-114. Attachment 5.

In addition to these supplemental comments on QCB, POC is submitting today one document that was inadvertently not attached to the previous comment letter prepared on POC's behalf by Stephan C. Volker, dated March 1, 2014. It is the USFWS Memorandum to Bureau of Indian Affairs, RE: Draft Avian and Bat Protection Plan for the Tule Reduced Ridgeline Project.[27] It is referenced on pages 30 and 31 of that previous letter.

Thank you again for this opportunity to comment on the DPEIR for the Soitec Solar Project.

Sincerely yours,

Kelly Fuller

Kelly Fuller
Consultant to The Protect Our Communities Foundation
kelly@kellyfuller.net

[27] Submitted here as Attachment 7.

Quino Checkerspot Butterfly

(*Euphydryas editha quino*)

SURVEY PROTOCOL INFORMATION

February 2002

U.S. Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92009

SUMMARY

The Quino checkerspot butterfly (*Euphydryas editha quino*, Quino) was listed as an endangered species on January 16, 1997 (62 FR 2313), and is protected under the provisions of the Endangered Species Act of 1973, as amended (Act). This survey protocol provides recommended guidance on survey methodology and outlines additional reporting terms and conditions (absent amended terms and conditions) for biologists possessing a current recovery permit for the Quino checkerspot pursuant to section 10(a)(1)(A) of the Act.

We recommend site assessments be conducted for all project sites within the recommended survey areas (see recommended Quino Checkerspot Survey Area Map). Site assessments determine if the project site contains areas where butterfly surveys are recommended. If a site is comprised solely of excluded areas, weekly butterfly surveys are not recommended.

The following items summarize the recommended Quino checkerspot survey protocol:

- The site assessment should be conducted prior to the first butterfly survey.
- Butterfly surveys should be conducted weekly for a minimum of 5 weeks during the flight season for non-excluded portions of the site.
- The timing of the butterfly flight season will be monitored and reported by the U. S. Fish and Wildlife Service (Service) for a number of occupied reference sites throughout the Quino checkerspot's range to assist biologists in determining when to initiate surveys. The flight season generally begins in late February to early March.
- Live capture and transport of an individual Quino checkerspot under very limited circumstances for identification and documentation purposes is authorized by recovery permits under section 10(a)(1)(A).

INTRODUCTION

To minimize take of the Quino checkerspot during surveys and provide a credible "presence-absence" methodology, we recommend that site assessments be conducted for project sites that occur, in whole or in part, within the recommended survey areas (see recommended Quino checkerspot Survey Area Map), and that butterfly surveys be conducted as indicated by such site assessments. Because adult Quino checkerspot surveys may result in take, such surveys should only be conducted by a biologist possessing a current recovery permit for the Quino checkerspot pursuant to section 10(a)(1)(A) of the Act (permitted biologist). Generally, a recovery permit for the Quino checkerspot authorizes the pursuit of butterflies for identification and photography, and under limited circumstances (described below), live capture and transport of a larva or butterfly for identification purposes.

We continue to work with local, State, and Federal biologists; scientific and academic institutions; commercial organizations; and other interested parties to collect additional data on the distribution, ecology, and biology of the Quino checkerspot. We will revise this survey protocol as needed, using the best available data. This survey protocol supersedes all previously recommended Quino checkerspot protocols.

Survey reports should be sent to Field Supervisor, Carlsbad Fish and Wildlife Office,6010 Hidden Valley Road, Carlsbad, CA 92009

QUINO CHECKERSPOT BUTTERFLY SURVEY PROTOCOL

Determining The Need For A Protocol Survey

Protocol surveys are recommended for all sites partially or completely within the recommended survey areas (see Recommended Quino checkerspot Survey Area Map). Protocol surveys consist of an initial site assessment to determine if the site contains areas recommended for butterfly surveys. If the site is determined to be comprised solely of excluded areas (described below), surveys are not recommended. If a site has areas suitable for butterfly surveys (non-excluded areas), then surveys should be conducted for those portions of the site.

Butterfly emergence from pupae varies according to environmental factors, so the butterfly flight season varies regionally and annually. To assist biologists in initiating butterfly surveys during the beginning of the flight season at their survey sites, we will monitor the phenology of Quino checkerspot larvae and their host plants at a number of occupied reference sites throughout the species' range. Quino checkerspots usually begin flying in February or early March. The Service will distribute information on monitored occupied reference sites to permit holders, jurisdictional authorities, and other parties who have expressed interest prior to the beginning of the flight season.

SITE ASSESSMENTS

Site assessments should be conducted before the first butterfly survey to identify which portions of a site should be surveyed for the Quino checkerspot. These assessments involve conducting a general field survey of the site and broadly mapping excluded areas and butterfly survey areas on a U.S. Geological Survey 7.5' (1:24,000) topographic quadrangle map that has been enlarged 200 percent (See Appendix 1 for example). We request that this site assessment map be submitted with the report within 45 days of the last survey. We will not be providing concurrence on site assessments. We will use negative and positive site assessments and butterfly survey results to refine future survey area maps.

Excluded Areas

The following areas are not recommended for butterfly surveys:

- Orchards, developed areas, or small in-fill parcels (plots smaller than an acre completely surrounded by urban development) largely dominated by non-native vegetation;

- Active/in-use agricultural fields without natural or remnant inclusions of native vegetation (i.e., fields completely without any fallow sections, unplowed areas, and/or rocky outcrops);

- Closed-canopy forests or riparian areas, dense chaparral, and small openings (less than an acre) completely enclosed within dense chaparral;

  "Closed-canopy" describes vegetation in which the upper portions of the trees converge (are touching) to the point that the open space between two or more plants is not significantly different than the open space within a single plant. Dense chaparral is defined here as vegetation so thick that it is inaccessible to humans except by destruction of woody vegetation for at least 100 meters.

Butterfly Survey Areas

All areas that are not excluded should be surveyed for butterflies, regardless of Quino checkerspot host plant presence, absence, and/or density. The Quino checkerspot is generally associated with sage scrub, open chaparral, grasslands, and vernal pools. Within these communities they are usually observed in open or sparsely vegetated areas (including trails and dirt roads), and on hilltops and ridgelines.

BUTTERFLY SURVEY GUIDELINES

Surveys for Quino checkerspot butterflies should be conducted:

- By a permitted biologist. Quino checkerspot protocol surveys should not be conducted concurrently with any other focused survey (e.g. a coastal California gnatcatcher survey).

- Once per week (weather permitting, see below) for a minimum of 5 weeks throughout the flight season on non-consecutive days. All non-excluded portions of the site should be thoroughly surveyed for butterflies during each weekly survey, even if Quino checkerspots are observed on an earlier visit.

- At an average rate of 10-15 acres (4.05-6.07 hectares) per hour. In large, open areas, 16-33 feet (5-10 meters) on either side of a survey route can generally be examined for Quino checkerspot butterfly presence, so survey routes in these areas should be roughly parallel and 33-66 feet (10 -20 meters) apart. Surveyors should walk within approximately 16 feet (5 meters) of excluded areas such as closed-canopy shrub lands.

- Only under acceptable weather conditions. Weekly surveys may not be considered credible if one or more of the following weather conditions occur: fog, drizzle, or rain; sustained winds greater than 15 miles (24 kilometers) per hour measured 4-6 feet (1.2-1.8 meters) above ground level; temperature in the shade at ground level less than 60° F (15.5° C) on a clear, sunny day; or less than 70° F (21° C) on an overcast or cloudy day.

A weekly survey should only be missed because of week-long adverse weather. If butterflies are detected during the first 5 weekly surveys, surveyors need not conduct additional surveys. If butterflies are not detected during the first 5 surveys, weekly surveys should continue until the end of the flight season to maximize likelihood of detection of low-density populations. If weather conditions as described above preclude conducting a weekly survey, two surveys can be conducted on non-consecutive days the following week. If adverse weather precludes surveys two weeks in a row, two protocol surveys may be conducted on non-consecutive days each of the two weeks immediately following the weeks of adverse weather.

SURVEY MAPS

- The locations of all adult Quino checkerspot and larvae observed should be mapped on a non-enlarged 7.5' USGS topographic map (Appendix 2). We suggest using a Global Positioning System (GPS) unit and/or aerial photos if available. All GPS locations should be corrected with an accuracy not to exceed 5 meters.

- All areas of Quino checkerspot larval host plants should be mapped on the site assessment map (Appendix 1). The plant communities on the site should be mapped.

Survey Techniques

Recommended equipment includes: binoculars, wind meter, thermometer, and a camera with close focus telephoto or macro lens. A GPS unit is also useful. Permitted biologists surveying outside Survey Areas 1 and 3 should carry a butterfly net, clear glass or plastic jar with a lid, and 35 mm film canister.

- Survey carefully to avoid trampling or otherwise harming Quino checkerspot larvae and butterflies. *Plantago erecta* and *P. patagonica*, small, often inconspicuous annual plants, are two of Quino checkerspot's primary host plants. Care should be taken to avoid stepping on all host plants, whether occurring singly, in small patches, or in dense stands. Female Quino checkerspots often select lone plants found on bare soil or in open areas for depositing their eggs.

- Walk slowly and stop periodically within areas that have an especially high potential for Quino checkerspot use, such as patches of host plants or nectar sources; ridgelines and hilltops; bare or sparsely vegetated areas between shrubs; and areas of cryptobiotic soil crusts. Field observations indicate that females may deposit eggs on *P. erecta, P. patagonica, Antirrhinum coulterianum, Cordylanthus rigidus* and/or *Castilleja exserta. C. rigidus* flowers after the adult flight season, often grows intermingled with *C. exserta*, and its vegetative parts resemble those of *C exserta.* Therefore, care should be taken to correctly identify *C. rigidus* within survey areas, perhaps after butterfly surveys are completed. Nectar plants most likely to be visited include but are not limited to members of the Asteraceae (e.g. *Lasthenia* spp., *Layia* spp., *Ericameria* spp.), *Cryptantha* spp., and *Allium* spp. Quino checkerspots cannot use flowers with deep corolla tubes, such as monkey flowers, or those evolved to be opened by bees, such as snapdragons.

- Stop occasionally to look around–surveyors standing still are more likely to see a moving butterfly. Use binoculars to scan the area ahead and around you, and to help identify butterflies from a distance.

- Follow the movements of other butterflies. Quino checkerspot males are aggressive, can spot other butterflies from a distance, and will chase them away. If a Quino checkerspot is resting with wings closed, they can be very difficult to notice until another butterfly flies by and they give chase.

Approaching a Butterfly Suspected of Being a Quino Checkerspot

Approaching a Quino checkerspot butterfly may result in take as defined by the Act, and therefore should only be conducted by a permitted biologist. When approaching a butterfly, move slowly and keep the movement of your hands, arms, legs, and body to a minimum. If the butterfly is first seen in flight, follow it discreetly, keeping at least 5-6 feet away from it until it alights (lands). Do not make sudden movements.

If the butterfly is circling, stand still and wait for it to alight–if it perceives your movement, it is less likely to stop. Observe the flight pattern. If the butterfly is a Quino checkerspot and flies in a zigzag motion with frequent abrupt changes of direction, it is likely a male. If it appears to be flying in a straight line, or with more gradual changes of direction, it is likely a female.

Once the butterfly has alighted, or if it is first seen when alighted, approach it slowly from an angle where it is not likely to perceive your shadow–from the side may give you the best view of the butterfly's body. Take a photograph of the butterfly when approximately 5-6 feet away (or at a greater distance if your camera has adequate telephoto capabilities), taking care not to allow your shadow to fall on the butterfly.

Slowly move toward the butterfly, taking photographs periodically. When your shadow is within about 1 meter of the butterfly, circle slowly around it if necessary to approach it more closely without casting a shadow on it. As you get closer you should move more and more slowly. Insects that are engaged in some activity such as courtship or feeding on flowers are easier to approach than those that are basking.

Biologists may wish to practice their approach and species identification techniques with other grassland Nymphalid butterflies such as buckeye *(Junonia coenia)*, California ringlet *(Coenonympha californica)*, and West Coast lady *(Vanessa annabella)* as it will greatly improve their ability to approach and identify Quino checkerspots.

Quino Checkerspots Outside the Areas of Recent Documentation

If a permitted biologist observes a larva or butterfly known or suspected to be a Quino checkerspot outside of Survey Areas 1 and 3, the biologist should attempt to live capture one larva or butterfly using the techniques described below. As a term and condition of their recovery permit, permitted biologists are to notify us by phone at (760) 431-9440 and fax (760) 431-9624 the same day and as soon as possible after capture so we can arrange for identification.

To collect a larva, gently pick it up, taking care not to crush it, and place it in a 35 mm film canister or similar container. Keep the container in a cool place out of direct sunlight.

To capture a butterfly, try to net it using a gentle sweeping motion through the air. If the animal is resting, you may be able to approach it slowly and place the net over it. Do not slap the net on the ground or onto a bush to capture a resting adult–this will likely result in damage or death. Do not chase the butterfly. Many butterflies will return to the same basking site or shrub after a disturbance. Once the adult has been netted, gently place the individual in a clear glass or plastic jar with ventilation. Keep the animal in a cool location while it is transported for identification. Collect the larva or butterfly even if it is inadvertently injured or killed during capture and contact the Service as described below under "Reporting Terms and Conditions."

Map where the known or suspected Quino checkerspot was captured on a non-enlarged 7.5' USGS topographic map (Appendix 2). Include in your field notes a description of the location, habitat type, time of day, date, weather conditions, and the collector's name and permit number.

Reporting Terms and Conditions for Permitted Biologists

If a permitted biologist observes or collects a suspected or known Quino checkerspot adult or larva, within 24 hours the biologist is to notify us by phone (760) 431-9440, and fax (760) 431-9624. Fax a photocopy of a 7.5' USGS topographic map with the observation site marked and a detailed description of the location of the Quino checkerspots.

Within 45 days of the last survey, permitted biologists are to send us a written report based on the terms and conditions of the Quino checkerspot recovery permit and signed by the permitted biologist(s) who conducted the surveys. Survey reports should include:

- Name, permit number, and legible copies of field notes of the permitted biologist(s) who conducted the surveys. Please note that all personnel conducting butterfly surveys should seek authorization under a section 10(a)(1)(A) recovery permit for Quino checkerspot.
- Non-enlarged 7.5' USGS topographic map (and aerial photo if available) with Quino checkerspot larvae and/or adult locations marked.
- Site assessment map with Quino checkerspot larval host plant locations mapped.
- Dates and times of each weekly survey.
- Air temperature, wind speed, and weather conditions at the start and end of each survey.
- List of butterflies observed during each weekly survey.
- List of larval host plants, nectar plants, and plant communities observed on the site.
- Photographs of any Quino checkerspot larvae and/or butterflies observed.

ADDITIONAL INFORMATION AND LIMITATIONS

Butterfly surveys may not be considered credible if: 1) unfavorable weather such as drought limits Quino checkerspot butterfly detectability; 2) the specific survey methods described above are not followed (unless deviations are requested in writing prior to the survey and agreed to by the Service); or 3) additional information indicates that the survey was inadequate or inaccurate. We will attempt to advise the public in advance if unfavorable weather limits or precludes Quino checkerspot butterfly detectability at monitored reference sites.

Questions regarding the protocol or its application to specific projects should be directed to the Carlsbad Fish and Wildlife Office Entomologist, and/or the Permit Coordinator, and/or the staff supervisor responsible for the geographic area in which the survey site is located at (760) 431-9440. We will try to provide a response within 72 hours for time-sensitive questions.

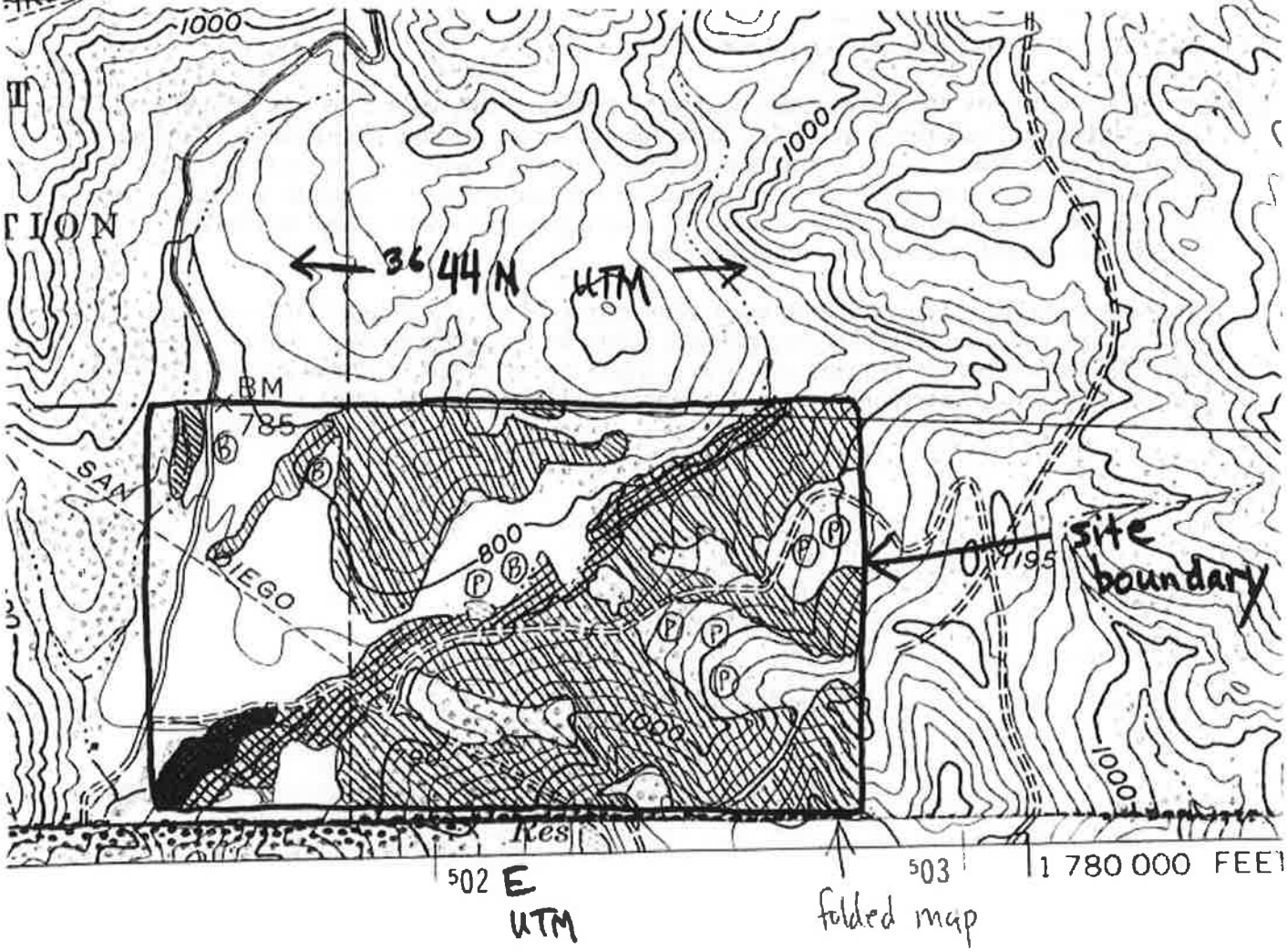
Appendix 1. Sample site assessment and host plant location map.

Figure 1. Site assessment and host plant location map for (site name).

Biologist: (your name)
USGS quad map (map name), CA. 200% enlarged.

Excluded areas:
- closed canopy chaparral
- closed canopy riparian woodland
- closed canopy oak woodland

Larval host plant area locations:
- (P) bird's beak (*Cordylanthus rigidus*)
- (P) dwarf plantain (*Plantago erecta*)



Appendix 2. Sample quino location map.

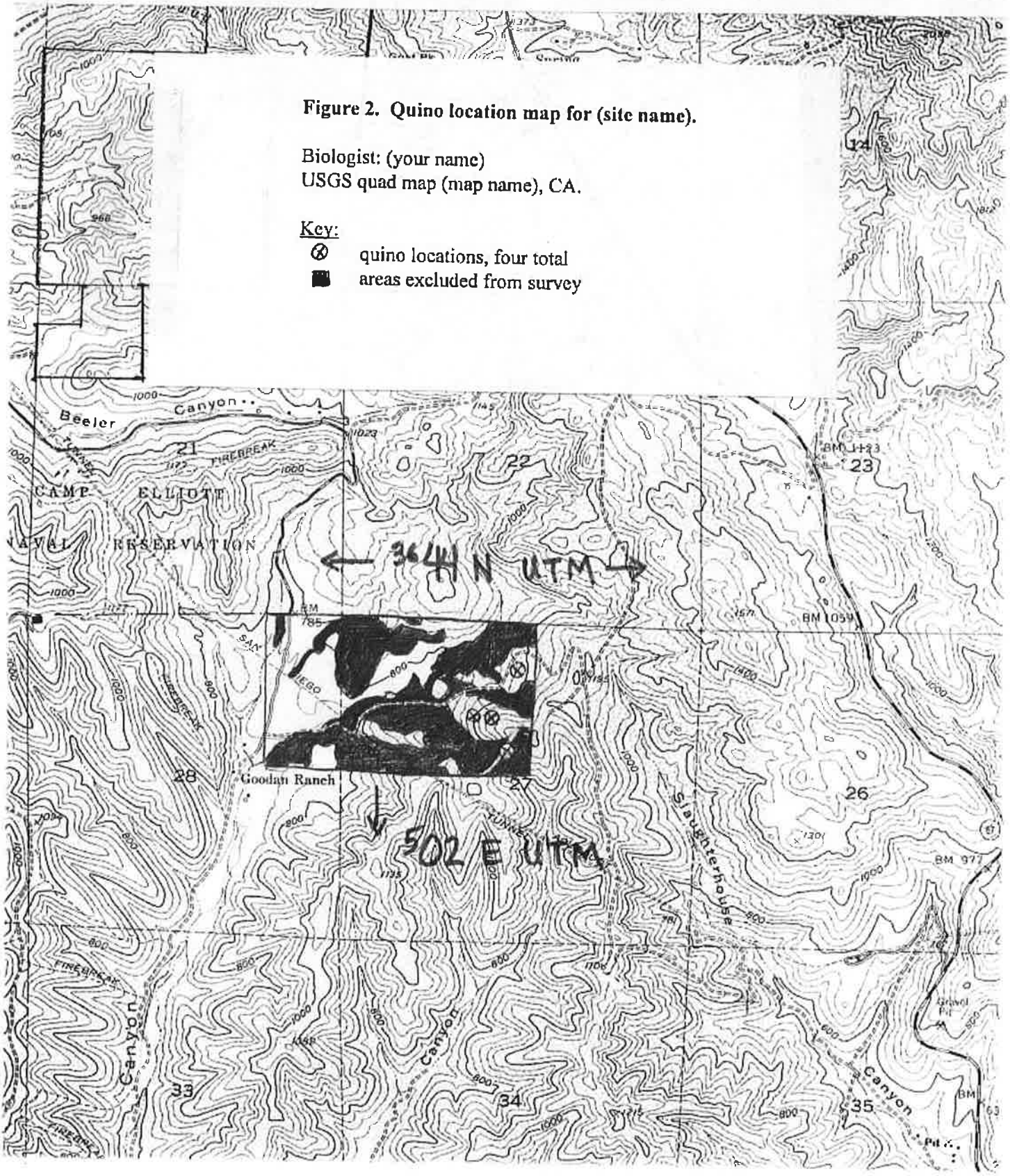


Figure 2. Quino location map for (site name).

Biologist: (your name)
USGS quad map (map name), CA.

Key:

⊗ quino locations, four total
■ areas excluded from survey

Interim Review Process Meeting With U.S Fish and Wildlife Service and Department of Fish and Game for projects within Draft East and North County MSCP

Date: June 27, 2013

Project Name: Soitec Solar Development

Project Number: P12-007, P12-010, REZ12-005, AP77-046, P12-002, GPA 12-010, ER120005

Name of Note Taker:

Name of County Staff Presenting Case: Ashley Gungle

Name of USFWS Staff: ~~Michelle Morano~~ Eric Porter, Doreen Stadtlander

Name of DFG Staff: Randy Rodriguez, Eric Weiss

Other Attendees: please see sign up sheet

1. Where is the project located (Identify street location, community, APN, etc.)?
   The projects are located throughout the Boulevard Community Plan area, within unincorporated San Diego County.
   - **Rugged- north of Interstate 8 between McCain Valley Road and Ribbonwood Road.**
   - **Tierra Del Sol- adjacent to the US Mexico border and south of Tierra Del Sol Road.**
   - **LanWest and LanEast- directly south of Interstate 8 and directly north of Old Highway 80**

2. What is the total acreage of the project site?
   1,480 acres

3. Does the project site support any rare, threatened or endangered species?
   No

4. Is the Project in East or North County MSCP? Current MSCP designation? And County Habitat Evaluation?
   The project site is located within the draft East County MSCP and is designated as Agriculture or Natural Upland within FCA and Agriculture or Natural Upland outside FCA.

5. List of concerns related to negative impacts on the biological resources which the Wildlife Agencies believe could occur from the project as proposed, and the agency's assessment as to whether those impacts have the potential to conflict with the preliminary conservation objectives in the Planning Agreement.

- Need to quantify numbers of data for species of special concern to verify mitigation
- Identify and mitigate significant populations of sensitive species.
- Quantify suitable habitat for individual sensitive species.

6. List of any additional studies on specific species which the Wildlife Agencies believe are necessary.

- Quino surveys should be kept up to date.
- Golden Eagle - look at methodology used for surveys as it compares to current guidelines
  - ↳ need more info on Rugged as foraging habitat (Rugged supports high amount of prey species)
- Focused raptor surveys (Rugged)
  - ↳ nesting, foraging, migratory
- Herp surveys - need focused survey on Rugged

7. List of any project alternatives, mitigation measures, or studies which the Wildlife Agencies believe should be considered in the environmental review process.

8. Guidance on anticipated Wildlife Agency permits required for the project including permit requirements and processing guidance.

9. **Yes/No** Were there specific concerns raised by the USFWS?

- Quino - surveys should be kept up to date
- Need to look at how impacts on species may affect ECMSCP species coverage
- Concerns addressed with preservation of FCA areas based on LanW/E ~~local~~ and Rugged project locations.
- Need to justify why lack of connectivity to FCA would not preclude movement.
- USFWS to do further review of Golden Eagle Study

10. **Yes/No** Were there specific concerns raised by DFG?

- Higher mitigation ratios may be recommended based on higher value of habitat
- Impact neutral areas may need to be considered Impacted and be mitigated
- Rugged Corridors will need to be looked at for specific species using them.
- 50' wetland buffers should be 100' or additional information should justify 50' buffers

11. **Yes/No** Were determinations made?

- Field trip w/ agencies (September)
- Want to see complete biology report (surveys, addressing County Comments) and Information on mitigation site

MEETING ATTENDEES

DATE: June 27, 2013
PROJECT: Soitec Solar Development

NAME	*ORGANIZATION*	*PHONE NUMBER/ EMAIL*
Ashley Gungle	County (PDS)	8)495-5375 ashley.gungle@sdcounty.ca.gov
maggie Loy	County (PDS)	8) 694-3736 maggie.loy@sdcounty.ca.gov
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Patrick Brown	Soitec	619 733-2619 Patrick.Brown@Soitec.com
Randy Rodriguez	CDFW	(858)637-7100 rfrodriguez@dfg.ca.gov
Eric Weiss	CDFW	(858) 467-4289 Eric.Weiss@wildlife.ca.gov
Eric Porter	USFWS	(760) 431-9440 x285 eric_porter@fws.gov
Doreen Stadtlander	USFWS	Doreen_Stadtlander@fws.gov 760-431-9440 ext 223

Quino Checkerspot Butterfly
(*Euphydryas editha quino*)

5-Year Review:
Summary and Evaluation

Painting by Alison Anderson after photo by Frank Ohrmund

U.S. Fish and Wildlife Service
Carlsbad Fish and Wildlife Office
Carlsbad, California

August 13, 2009

5-YEAR REVIEW
Quino Checkerspot Butterfly (*Euphydryas editha quino*)

I. GENERAL INFORMATION

Purpose of 5-Year Review:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (Act) to conduct a review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review). Based on the 5-year review, we recommend whether the species should be removed from the list of endangered and threatened species, be changed in status from endangered to threatened, or be changed in status from threatened to endangered. Our original listing of a species as endangered or threatened is based on the existence of threats attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview:

As summarized in the Recovery Plan (USFWS 2003a) and recent revisions to critical habitat for this species (USFWS 2009, 74 FR 28776), the Quino checkerspot butterfly (*Euphydryas editha quino*) (Quino) is a member of the family Nymphalidae (brushfooted butterflies) and the subfamily Melitaeinae (checkerspots). It is restricted to Riverside and San Diego Counties in California, and northern areas of Baja California Norte, Mexico (Mexico). Habitat for the Quino is characterized by patchy shrub or small tree landscapes with openings of several meters between woody plants, or a landscape of open swales alternating with dense patches of shrubs, habitats often collectively termed "scrublands". Quino will frequently alight on vegetation or other substrates to mate or bask, and require open areas with high solar exposure to facilitate breeding and movement. *Euphydryas editha* populations often display a metapopulation structure, and require conservation of temporarily unoccupied patches of habitat for population resilience. A metapopulation is composed of a number of local populations. Individuals interact among local populations within a metapopulation just enough to reduce the extinction probability of the metapopulation compared to the extinction probability of any local population.

Methodology Used to Complete the Review:

This review was prepared by the Carlsbad Fish and Wildlife Office (CFWO) using information from the Recovery Plan, survey information from experts, and 10(a)1(A) Recovery Permit reports. The Recovery Plan, published peer-reviewed scientific studies, survey reports, other submitted or collected data, and personal communications with experts were our primary sources of information used to update the species' status and threats. We received two letters containing

information from the public in response to our *Federal Register* Notice initiating this 5-year review from: (1) The State of California Attorney General on May 6, 2008; and (2) the Center for Biological Diversity, including copies of cited literature, on May 13, 2008. This 5-year review contains updated information on the species' biology and threats, and an assessment of that information compared to that known at the time of listing and at the time of Recovery Plan publication (USFWS 2003a). We focus on current threats to the species that are attributable to the Act's five listing factors. The review synthesizes all this information to evaluate the listing status of the species and provide an indication of its progress towards recovery. Finally, based on this synthesis and the threats identified in the five-factor analysis, we recommend a prioritized list of conservation actions to be completed or initiated within the next 5 years.

Contact Information:

Lead Regional Office: Diane Elam, Deputy Division Chief for Listing, Recovery, and Habitat Conservation Planning, and Jenness McBride, Fish and Wildlife Biologist, Region 8; (916) 414-6464.

Lead Field Office: Alison Anderson, Entomologist, and Bradd Baskerville-Bridges, Recovery Branch Chief, Carlsbad Fish and Wildlife Office; (760) 431-9440.

FR Notice Citation Announcing Initiation of This Review: A notice announcing initiation of the 5-year review of this taxon and the opening of a 60-day period to receive information from the public was published in the *Federal Register* on March 5, 2008 (USFWS 2008, 73 FR 11945). We received two letters containing information from the public in response to our Federal Notice initiating this 5-year review; relevant information specific to the taxon being reviewed here was incorporated.

Listing History:

Original Listing
FR Notice: 62 FR 2313
Date of Final Listing Rule: January 16, 1997
Entity Listed: Quino checkerspot butterfly (*Euphydryas editha quino*), an insect subspecies
Classification: Endangered

Associated Rulemakings:

Original Proposed Critical Habitat
FR Notice: 66 FR 9476
Date of Proposed Critical Habitat Rule: February 7, 2001

Final Critical Habitat
FR Notice: 67 FR 18356
Date of Final Critical Habitat Rule: April 15, 2002

Proposed Revision to Critical Habitat
FR Notice: 73 FR 3328
Date of Proposed Revised Critical Habitat Rule: January 17, 2008

Final Revision to Critical Habitat
FR Notice: 74 FR 28776
Date of Final Revised Critical Habitat Rule: June 17, 2009

Review History: No previous 5-year reviews have been completed for the Quino.

Species' Recovery Priority Number at Start of 5-Year Review:

The recovery priority number is 6C according to the recovery plan (USFWS 2003, p. iv; the recovery priority number in the USFWS' 2008 Recovery Data Call for the CFWO was in error because it was never updated after the recovery plan was published). This ranking is based on a 1-18 ranking system where 1 is the highest-ranked recovery priority and 18 is the lowest (USFWS 1983, 48 FR 43098). This number indicates the taxon is a subspecies that faces a high degree of threat and has a low potential for recovery. The "C" indicates conflict with construction or other development projects or other forms of economic activity.

Recovery Plan or Outline:

Name of Plan or Outline: Recovery Plan for the Quino Checkerspot Butterfly (*Euphydryas editha quino*)
Date Issued: August 11, 2003

II. REVIEW ANALYSIS

Application of the 1996 Distinct Population Segment (DPS) Policy:

The Endangered Species Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate wildlife. This definition limits listing as distinct population segments to vertebrate species of fish and wildlife. Because the species under review is an invertebrate and the DPS policy is not applicable, the application of the DPS policy to the species' listing is not addressed further in this review.

Information on the Species and its Status:

The Quino Recovery Plan (USFWS 2003a) was co-authored by a Technical Recovery Team of seven expert biologists and ecologists (USFWS 2003a, p. ii) and provides a comprehensive scientific review and analysis of published and non-published information and data through 2002 relevant to conservation of the Quino. Therefore, the Recovery Plan was cited as a primary source for some of the scientific information discussed below.

Species Description

Quino differ from other *Euphydryas editha* subspecies in a variety of characteristics including size, wing coloration, and larval and pupal phenotypes (Mattoni *et al.* 1997, p. 100). Adult Quino have a wingspan of approximately 1.5 inches (4 centimeters) (USFWS 2003a, p. 6). The dorsal (top) sides of the wings have a red, black, and cream colored checkered pattern; the ventral (bottom) sides are dominated by a checkered red and cream pattern (USFWS 2003a, p. 6). The abdomen of the Quino has red stripes across the top (USFWS 2003a, p. 6).

Species Biology and Life History

The Quino life cycle includes four distinct life stages: egg, larva (caterpillar), pupa (chrysalis), and adult, with the larval stage divided into 5 to 7 instars (periods between molts, or shedding skin) (USFWS 2003a, p. 157). There is usually one generation of adults per year, although larvae may remain in diapause (summer dormancy) for multiple years prior to maturation (USFWS 2003a, p. 8).

Quino are exothermic (cold-blooded) and therefore require an external heat source to increase their metabolic rate to levels needed for normal growth and behavior. Within open, woody-canopy communities, larvae seek microclimates with high solar exposure for basking in order to speed their growth rate (Weiss et al. 1987, p. 161; Weiss et al. 1988, p. 1487; Osborne and Redak 2000, p. 113; USFWS 2003a, p. 20). Like most butterflies, adult Quino frequently bask and remain in sunny areas to increase their body temperature to the level required for normal active behavior (USFWS 2003a, p. 18).

Spatial Distribution

The Quino's historical range included much of non-montane southern California: southwestern Ventura; southwestern San Bernardino; Los Angeles; Western Riverside; and San Diego counties (USFWS 2003a, p. 1; USFWS GIS database). More than 75 percent of the Quino's historical range has been lost (Brown 1991, p. 10), including more than 90 percent of its coastal mesa and bluff distribution (USFWS 2003a, p. 1; USFWS GIS database). At listing, Quino populations were reduced in number and size from historical conditions by more than 95 percent range wide. This reduction was primarily due to direct and indirect human impacts including habitat loss and fragmentation, invasion of nonnative plant species, and catastrophic natural events such as increased frequency of drought and wildfire (USFWS 1997, 62 FR 2313). The current range for Quino includes multiple areas in southern Riverside County, south into Mexico. For detailed current United States population distribution information, see discussions below and Figures 1 and 2.

Delineating Population Distributions

The scientific data available to us for use in delineating Quino population distributions consists of geographic information system (GIS)-based habitat information, subspecies observation locations, and subspecies movement data from mark-release-recapture studies. Population-scale occupancy (a population distribution) is defined by all areas used by adults during the persistence

time of a population (years to decades; USFWS 2003a, p. 24). Distribution studies over multiple years are required to quantify Quino population distributions based on recorded subspecies locations. Therefore, we discuss Quino population locations in terms of "occurrence complexes" (USFWS 2003a, p. 35), which are our best estimators of approximate population location and population membership. Occurrence complexes are mapped in the Recovery Plan using a 0.6 mile (1 kilometer) movement radius from each butterfly observation, and may be based on the observation of a single individual (Figures 1 and 2). Occurrences within approximately 1.2 miles (2 kilometers) of each other are considered to be part of the same occurrence complex, as these occurrences are proximal enough that the observed butterflies were likely to have come from the same population (USFWS 2003a, p. 35). Occurrence complexes may expand due to new butterfly observations, or contract due to habitat loss (e.g., occurrence complexes are defined in part by extant habitat, USFWS 2003a, p. 78).

Some occurrence complexes are identified in the Recovery Plan (USFWS 2003a, p. 35) and revised critical habitat rule (USFWS 2009, 74 FR 28776) as "core." These occurrence complexes are considered likely centers of population density based on characteristics including geographic size, number of reported individuals, documented reproduction, and repeated observations. Such population density centers are likely to contain habitat supporting local "source" populations for a metapopulation (Murphy and White 1984, p. 353; Ehrlich and Murphy 1987, p. 125; Mattoni et al. 1997, p. 111; USFWS 2003a, pp. 25-26), or "source" populations for megapopulations (a group of populations also dependent on one another, but on a time scale greater than that of subpopulations; USFWS 2003a, pp. 21, 24-26). A local source population is one in which the emigration rate typically exceeds the immigration rate, and is thus a source of colonists for unoccupied habitat patches within a metapopulation distribution (USFWS 2003a, p. 166). Therefore, in the final revised critical habitat rule (USFWS 2009, 74 FR 28776), we define a core occurrence complex as an area where at least two of the following criteria apply: (1) 50 or more adults have been observed during a single survey; (2) immature life stages have been recorded; and (3) the geographic area within the occurrence complex (i.e., within 0.6 mile (1 kilometer) of subspecies occurrences) is greater than 1,290 acres (522 hectares). In the final revised critical habitat rule (USFWS 2009, pp. 74 FR 28776), we also described habitat-based population distributions for core occurrence complexes (proposed revised critical habitat units). Habitat-based population distributions include any contiguous habitat within an occurrence complex (described above) and within an additional 0.6 mile (1 kilometer) of an occurrence complex. We used biological and geographic information (primarily USFWS GIS host plant occurrence data, vegetation layers, and satellite imagery) to capture the physical or biological features essential to the conservation of the subspecies in these areas. Any areas within the occurrence complex that we determined did not contain habitat were removed. This process resulted in the identification of a habitat-based population distribution for each core occurrence complex that is occupied at a population distribution scale, but where detectability may vary annually. Though we have not mapped habitat-based population distributions for all occurrence complexes, we are able to estimate habitat-based population distribution membership of all occurrence complexes by distances between them and satellite imagery of intervening habitat (Figures 1 and 2). In this document, we refer to habitat-based population distributions as "core", instead of occurrence complexes (Table 1; Figures 1 and 2); however, population dynamics have not been studied for this subspecies and it is still possible some habitat-based populations contain more than one population, or more than one distribution belongs to a single

population. Because population distributions are estimated, we believe it is prudent not to name populations at this time.

The number of known populations has increased since the time of listing. The listing rule (USFWS 1997, 62 FR 2313) identified "seven or eight" Quino populations within the United States. All extant populations in the United States were said to occur in southwestern Riverside and north-central San Diego Counties. At least one population was known to exist in Mexico, in the Sierra Juarez near Tecate. Based on our current analysis (Table 1) occupied areas known at the time of listing fall within three extant core habitat-based population distributions, and one core and one non-core habitat-based population distribution of unknown status. The remaining habitat-based population distributions documented post-listing were either not known or considered extirpated. Population distributions documented post-listing consist of 6 core and 15 non-core extant distributions, 6 non-core distributions of unknown status, and 4 non-core distributions extirpated post-listing.

Status and Local Distribution of Populations

Mattoni et al. (1997, p. 99) predicted that Quino would be the "passenger pigeon butterfly" – a once common, widespread species crashing to extinction over a few decades; however, those authors underestimated the number of remaining populations and potential of this eruptive species to once more increase its abundance, and possibly its range. Occurrence data collected since the Recovery Plan was published in 2003 expanded many occurrence complexes, merged others, and established new ones (Figures 1 and 2).

Recent survey information indicates the Tule Peak habitat-based population distribution (Riverside County) supports the only extant, resilient population that undergoes periodic high density events similar to the 1977 event described by Murphy and White (1984, p. 351; Ehrlich and Murphy 1987, p. 127) in San Diego County (CFWO 2004; Pratt 2004, p. 17;). Occupancy in the Tule Peak habitat-based population distribution was first documented in 1998 (Pratt 2001, p. 17). Hundreds of adults were observed during surveys in 2001, which was unprecedented, because five or fewer individuals are typically reported during project-based surveys (USFWS GIS database). In 2004, following a year of above-average host plant density in the Anza area (CFWO 2004), another high-density Quino event occurred with higher abundance than was reported in 2001. An estimated 500 to 1,000 adult Quino were reported in a single day in 2004 (Anderson 2007, p. 1; CFWO 2004; Pratt 2004, pp. 16-17). Over 30 new occurrence locations were reported in 2004 in the vicinity of Tule Peak Road (92 to over 100 observations in a single day), south of the Cahuilla Band of Indians Tribal lands and the community of Anza (Osborne 2004, pp. 1-6, 8-10; Anderson 2007, p. 5; CFWO 2004; Osborne 2007, pp. 13-16). Most recently, a relatively high abundance year occurred in 2009, following a year of average to above-average rainfall in 2008 (CFWO 2009; G. Pratt, University of California, Riverside, pers. comm. 2009a, p. 1, 2009b, p. 1). These post-Recovery Plan observations indicate the Tule Peak habitat-based population distribution contains higher densities and produces more emigrants than any other occupied area within the subspecies' range.

New Quino observations in San Diego County (USFWS GIS database) between occurrence complexes identified in the Recovery Plan have resulted in merging of the Otay Valley, West

Otay Mountain, Otay Lakes, Proctor Valley, Dulzura, and Honey Springs occurrence complexes into a single, expanded Otay Occurrence Complex (Table 1, Figure 2). The merging of occurrence complexes in the Otay area was expected based on the Recovery Plan, which noted that occupied habitat in the vicinity of Otay Lakes and Rancho Jamul is an area of key landscape connectivity for all subpopulations in southwest San Diego County (USFWS 2003a, pp. 53-54). The Otay core habitat-based population distribution also includes the Marron Valley, West Otay Valley, Jamul Butte, and Rancho San Diego/Jamul occurrence complexes (Table 1, Figure 2).

Six new Quino observation locations were reported in central San Diego County since the Recovery Plan was published in 2003 (Figure 2). The Recovery Plan described two occurrence complexes in central San Diego County: San Vicente and Alpine (USFWS 2003a, p. 48). Four of the six new occurrence complexes (South San Vicente, Sycamore Canyon, Fanita Ranch, and North East Miramar) combined with the previously known San Vicente Occurrence Complex, belong to the San Vicente core habitat-based population distribution (Table 1, Figure 2). These new occurrence complexes provide the information needed to establish a new Central San Diego Recovery Unit as described in the Recovery Plan (USFWS 2003a, pp. 86-88, 111-112).

Multiple new Quino observation locations have been reported in south-central San Diego County since 2002 east of the community of Campo (Dicus 2005a, p. 1, 2005b, p. 1; PSBS 2005a, p. 18, 2005b, p. 26; O'Conner 2006, pp. 2-4). We consider this cluster of new observations near Campo to belong to a new, independent Campo population (core habitat-based population distribution; Figure 2). The Jacumba Occurrence Complex was not classified as core in the Recovery Plan (USFWS 2003a, p. 52) due to its relatively small geographic size and small number of observed individuals. However, adult Quino are consistently observed in the area (CFWO 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009). As many as 50 individuals are estimated to have been observed in one day near Jacumba Peak (Pratt, pers comm. 2007a, p. 1). Furthermore, reproduction was documented in the Jacumba Occurrence Complex in 1998 and again in 2004 (Pratt, pers. comm. 2007b, p. 1). Therefore, we now consider the Jacumba occurrence complex to represent a relatively resilient population and the associated habitat-based population distribution is therefore classified as core.

Abundance

Accounts of large population density fluctuations at historical Quino population sites (Orsak 1977, pp. 137-138; Murphy and White 1984, pp. 350-354) and collection record data (Anderson 2003, p. 4) indicate that the Quino is a climate-sensitive, "eruptive" species that periodically experiences order of magnitude increases in abundance every 5-20 years, then drop back to much lower abundance over time (Orsak 1977, pp. 137-138; Murphy and White 1984, pp. 350-351; Anderson 2003, p. 4; USFWS GIS database).

Major weather pattern-driven fluctuations in Quino population abundance are similar to long-term population fluctuations in the *Euphydryas editha bayensis* (bay checkerspot butterfly) recorded by Paul Ehrlich's research group at Jasper Ridge (see Ehrlich et al. 1975, pp. 221-228). The balance between resilience and vulnerability may have been disrupted in this case, because the Jasper Ridge bay checkerspot butterfly population was functionally extirpated in 1997 (Mattoni et al. 1997, p. 110). The last rangewide Quino population abundance low was in the

late 1980s (Anderson 2003, p. 4). Historically, population abundance lows for this species occurred in the mid 1960s, early 1950s, the late 1930s-early 1940s, and the mid-1920s, corresponding with either drought or one-time extreme weather events such as floods (Anderson 2003, p. 4).

The extirpation of Quino from Orange County is an example of permanent regional-scale loss of populations due to a combination of human impacts and natural (from a historical/evolutionary perspective) fluctuations in abundance. Examination of the history of Orange County Quino populations (Anderson 2003, pp. 3-4) reveals a combination of naturally occurring stochastic events (drought, flood, and fire) exacerbated by ongoing human-caused habitat destruction and degradation (development, agriculture, and grazing), which resulted in the extirpation of Quino populations from Orange County. In 1938, a 100-year flood (Paulson et al. 1989, p. 1) marked the last year of any recorded lower-elevation Quino collection in Orange County (Anderson, 2003, p. 3). Significant changes in Quino abundance were noted by lepidopterists in Orange County for over 60 years (Mattoni et al. 1997, p. 110). Quino were collected in high numbers at Irvine County Park between 1917 and 1922, followed by an almost complete absence of collections correlated with drought (Mattoni et al. p. 110; Anderson 2003, p. 3). In 1933 and 1934, the species was again common, but extirpation quickly followed, correlated with ongoing development and the 1938 flood that filled Irvine Lake (Santiago Reservoir) (USFWS 2003a, p. 30; Anderson 2003, p. 3). The last Quino population was extirpated in Orange County by a fire in 1967 in the Black Star Canyon/Hidden Valley area (see Orsak 1977, p. 137 for description of extirpation). If the lower elevation population that existed at Irvine Park had not been permanently extirpated, it may have served as a source of recolonization for habitat occupied by the higher-elevation Black Star Canyon population (approximately 3 miles (5 kilometers) away). It is difficult for higher elevation populations to recolonize lower elevation habitats because host plant and other aspects of breeding habitat suitability decline earlier at lower elevations with the approach of drier summer weather.

Dispersal and recolonization events were probably high during the 1990s and 2000s, however abundance peaks during the 2000s were reduced relative to the "hundreds to thousands of individuals" (Murphy and White 1984, p. 351) reported from multiple sites in the late 1970s (Anderson 2003, p. 4; USFWS GIS database). Examination of weather patterns and Quino occurrence records indicate drought such as occurred during the 1980s also occurred in the 1960s (Anderson 2003, p. 4). Recent climate evidence (Hidalgo et al. 2007, pp. 54-59; Environmental News Service 2009) suggests we are already experiencing the beginning of a severe drought, possibly exacerbated by climate change, and the effects are likely to cause another Quino population collapse in the next 5-10 years. Recent evidence supports Murphy and White's (1984, p. 355) hypothesis:

> The extirpation of a single, large reservoir population of [Quino] may effectively deny other habitats necessary migrants, creating a ripple effect of irreversible long-term extinctions. We suspect that just such a circumstance has eliminated [Quino] from Orange County and much of coastal San Diego County, and now threatens populations in Riverside and inland San Diego Counties in California.

On the regional distribution scale, each consecutive Quino abundance peak was reduced from the previous one due to ongoing human-caused destruction of habitat and loss of source populations. With the exception of severe flooding, this series of events and recorded Quino abundance and distribution patterns leading to the regional extirpation of Quino in Orange County mirror the recent extirpation of the subspecies in the Harford Springs habitat-based population distribution (the Gavilan Hills in northwest Riverside County; see Orsak 1977, p. 138; Martin 1970, p. 4; Table 1) and trends in extant core habitat-based population distributions such as Warm Springs Creek, Skinner/Johnson, Oak Mountain/Vail Lake, and western portions of Otay. This long-term downward abundance trend (last population lost was in 2008, Horse Thief Canyon, see Table 1) should be considered when assessing current species' status.

Habitat or Ecosystem

Quino habitat is characterized by patchy shrub or small tree landscapes with openings of several meters between large plants, or a landscape of open swales alternating with dense patches of shrubs (Mattoni et al. 1997, p. 112); such habitats are often collectively termed "scrublands." Quino will frequently perch on vegetation or other substrates to mate or bask, and require open areas to facilitate movement (USFWS 2003a, pp. 10-11).

Adult butterflies will only deposit eggs on species they recognize as host plants. Quino oviposition (i.e., egg deposition) has been documented on *Plantago erecta* (erect or dwarf plantain), *Plantago patagonica* (Patagonian plantain), and *Anterrhinum coulterianum* (white snapdragon) (USFWS 2003a, pp. 14-18). In 2008, oviposition and larval development were recorded for the first time on a new species of host plant, *Collinsia concolor* (Chinese houses) (Pratt, pers. comm. 2008a, p. 1; 2008b, p. 1; 2008c, p. 1; 2008d, p. 1; 2008e, p. 1). Although *C. concolor* commonly occurs in habitats with *P. erecta*, *P. patagonica*, and *A. coulterianum*, (Pratt 2001, pp. 42-43; Anderson unpubl. data 2008, pp. 2-3), this plant species is typically found in cooler and moister micro-habitats that tend to grow in the shade on north facing slopes (Pratt 2001, p. 40; Pratt, pers. comm. 2008b, p. 1).

Newly hatched pre-diapause larvae cannot move more than a few centimeters during the first two instars, restricting their development during this stage to the individual host plant where the eggs were deposited. Older pre-diapause larvae usually wander independently in search of food and may switch to feeding on a different species of host plant (USFWS 2003a, p. 7). All known species of host plant (see species listed above) may serve as primary or secondary host plants, depending on location and environmental conditions (USFWS 2003a, p. 17). Quino egg clusters and pre-diapause larval clusters have also been documented in the field on *Cordylanthus rigidus* (thread-leaved bird's beak) and *Castilleja exserta* (purple owl's-clover) (USFWS 2003a, pp. 14-18). However, use of *C. rigidus* and *C. exserta* is rare, and these species alone are not believed to support Quino breeding (USFWS 2003a, pp. 16-17).

The physical structure of flowers is the primary factor that determines nectar source use. Adult checkerspot butterflies of the genus *Euphydryas* have a short tongue, approximately 0.43 inch (11 millimeters) long (Pratt, pers. comm. 2007a, p. 1), and typically cannot feed on flowers that have deep corolla tubes or flowers evolved to be opened by bees (USFWS 2003a, p. 19). Although adults may nectar on flowers with a corolla length nearly a centimeter longer than their proboscis (0.59-1.10 inch (15-28 millimeters)), such as *Linanthus androsaceus* (false baby stars)

(Murphy 1984, p. 114; Hickman 1993, p. 842), they are not likely to prefer such species (Murphy 1984, p. 114). Therefore, flowers with a corolla tube greater than 0.43 inch (11 millimeters) are less likely to be used as nectar sources by the Quino. Edith's checkerspot butterflies prefer flowers with a platform-like surface on which they can remain upright while feeding (USFWS 2003a, p. 19).

White and Levin (1981, pp. 350-351) found that adult Quino's within-habitat patch movement distances from larval host plant patches to adult nectar sources often exceeded 656 feet (200 meters). Movement distances greater than this distance were the extreme values recorded by White and Levin (1981, p. 349), as 656 feet (200 meters) was more than double the average recapture distance in 1972, and almost 4 times the average distance in 1973. Therefore, nectar sources greater than 656 feet (200 meters) from larval host plants are not likely used by the subspecies.

It is not possible to determine habitat suitability based on standing host plant densities. Densities of *Plantago erecta* required for larval development have been estimated (USFWS 2003a, pp. 22-23); however, it is not always possible to determine typical host plant densities because: (1) Germinating host plants may be entirely consumed by larvae; or (2) seeds may not germinate and larvae may return to in diapause when precipitation levels are below-average (USFWS 2003a, p. 23). These principles apply to all host plant species to some extent; therefore, host plants detected in habitat appearing otherwise suitable should be considered an indicator of habitat suitability.

Changes in Taxonomic Classification or Nomenclature

The taxon now commonly called the Quino has undergone several nomenclatural changes. It was originally described as *Melitaea quino* (Behr 1863, pp. 90-91). Gunder (1929, pp. 5-8) reduced it to a subspecies of *Euphydryas chalcedona*. At the same time, he described *Euphydryas editha wrighti* from a checkerspot butterfly specimen collected in San Diego. After reexamining Behr's descriptions and specimens, Emmel *et al.* (1998, p. 101) concluded that the Quino should be associated with *E. editha*, not *E. chalcedona*, and that it was synonymous with *E. editha wrighti*. Because *E. editha wrighti* is a junior synonym for the Quino, *E. editha quino* is now the accepted scientific name (USFWS 2003a, pp. 5-6).

Genetics

Dr. Michael Singer (University of Texas, Austin) is currently conducting a genetics study with the primary goal of investigating the dispersal and colonization potential of the Quino based on the genetic relationships among populations. This information is needed for decisions regarding reintroduction of extirpated populations from extant populations and augmentation of extant low density populations that are vulnerable to extirpation. In particular, the research should facilitate the restoration of occupancy to historically occupied areas on Otay Mesa. The research focuses on comparing the genetic relatedness of historical Quino on Otay Mesa to potential source sites in San Diego County that could be used in an augmentation effort. Additionally, the research may explore the genetic relatedness of populations surrounding Otay Mountain with populations in southeastern San Diego County, populations in Riverside County, and populations in Mexico.

Initial Amplified Fragment Length Polymorphism analyses (Singer, pers. comm. 2009, p. 1) placed the Marron Valley and Lake Skinner occurrence complexes on the genetic map that already existed for Edith's checkerspot. This analysis clearly supports the integrity of the Quino subspecies as a coherent genetic entity within the species. This genetic map confirms a strong isolation by distance relationship among populations. Approximately 70 percent of the variation among populations can be explained by the geographic distance between them (Wee 2004, p. 13). In other words, populations that are geographically closest to each other are also genetically closest to each other. This relationship can be used to choose the most appropriate source populations for restoration in circumstances where available genetic information from extinct populations is inadequate.

Species-specific Research and/or Grant-supported Activities

See the description above of the ongoing genetic study being conducted by Dr. Michael Singer at the University of Texas, Austin. The project was funded by California Transportation Ventures to satisfy the funding obligation outlined in the biological opinion for the SR 125 South Project (USFWS 1999, 1-6-99-F-14). The money was placed in a non-endowment fund (Quino Checkerspot Butterfly Genetic and Captive Propagation Research Fund) and is currently managed by the San Diego Foundation.

Following the 2003 fires, the Service conducted a post-fire assessment study of affected occurrence complexes in San Diego County (USFWS 2007). The results of post-fire Quino observations and monitoring were generally positive, indicating continued persistence of occupancy after fire (USFWS 2007, p. 2). Most surveyors and Service staff reported small patches of unburned habitat within or adjacent to fire perimeters where host plants and in some cases even larvae were found (CFWO 2004, 2006). Contracted surveyors and CFWO staff noted that the fires are a threat to population resilience because they exacerbate nonnative plant invasion (e.g., *Erodium sp.*; CFWO 2006) that is already ubiquitous throughout the subspecies' range. Monitoring of areas adjacent to the Otay Fire perimeter provided comparative evidence of negative fire impacts as well, and we concluded that Quino population resiliency within the Otay Recovery Unit was likely compromised by the 2003 fires (USFWS 2007, p. 3); although it is not clear what the magnitude of the effect may be, or the time scale on which the effect may be apparent.

Edith Allen (University of California, Riverside) conducted research in 2004 and 2005 to determine effective methods for restoration of Quino habitat that had been converted to agricultural land (Marushia and Allen 2005). The study was conducted at Johnson Ranch (Marushia and Allen 2005, p. 1) in the Skinner/Johnson habitat-based population distribution. They found that discing after initial germination of grasses in the fall was an effective treatment against nonnative species, and provided good site preparation for solarization (tarping), which was the most effective among the treatments tested. Solarization produced the highest diversity and cover of native species, especially the Quino host plants, and the least density and cover of nonnative species (Marushia and Allen 2005, p. 2).

In 2008, the Service coordinated a rangewide study of occupancy using sample sites throughout the species range. Field surveys indicated that 2008 was a year of average detectability (based

on environmental conditions). This study was designed to: (1) Help us determine the likelihood of species detectability using standard survey methods; (2) determine the likelihood of occupancy in a given year of habitat proximal to recent Quino observations; and (3) establish an occupancy baseline for future conservation analyses and management. Specific study objectives included estimating the percentage of areas within 262 feet (80 meters) of at least one Quino occurrence between 1997 and 2007 used by adults during the 2008 flight season, and estimating detection probabilities (CFWO 2008, p. 1). Sample plots were approximately 2 acres (0.8 hectare) and centered on randomly placed points within the sample area (described above; CFWO 2008, p. 1). Surveys were conducted by 10(A)1(a) recovery permit holders in a manner similar to that specified in the CFWO presence-absence survey protocol (CFWO 2008, p. 2; CFWO 2002, pp. 1-6). Initial data analysis was conducted using the program MARK (White and Burnham 1999, pp. 120-138). In San Diego County, Quino adults were detected in 7 of 164 plots (4 percent naïve rate, not corrected for detection probability) where at least one survey was conducted (T. Grant, CFWO, pers. obs. 2009, p. 1). The cumulative detection probability was between 0.5 and 0.8 (T. Grant, pers. obs. 2009, p. 1), meaning that there was a 50 to 80 percent chance of observing at least 1 Quino on a plot if it was occupied. The revised occupancy estimate using the calculated detection probability was 5.5 percent (95 percent CI 0.025-0.115) (T. Grant, pers. obs., 2009, p. 3). In Riverside County, Quino adults were detected in 22 out of 107 plots (21 percent naïve rate), where at least one survey was conducted (Western Riverside County Multiple Species Habitat Conservation Plan (Western Riverside County MSHCP) Biological Monitoring Program 2009, p. 11). The cumulative detection probability after 3 visits was 0.96, meaning that there was a 96 percent chance of observing at least 1 Quino on a plot if it was occupied. The revised occupancy estimate using the calculated detection probability was 23 percent (95 percent confidence intervals: 0.16-0.34), a slight increase from the naïve estimate. These results indicate adult Quino presence within an estimated population distribution can vary substantially (approximately 30 percent maximum likelihood of occupancy in habitat where occupancy has been documented since listing), and the likelihood of detecting Quino occupancy using standard survey methods is relatively high (may be greater than 95 percent), but may be as low as 50 percent. Additionally, there may be substantial differences between the north and south portions of the subspecies' range in occupancy rates and detectability.

Dr. Gordon Pratt (University of California, Riverside) has successfully reared Quino in captivity since listing in 1997 under a Service 10(a)1(A) recovery permit. He has obtained funding through the Service and third parties through a Habitat Conservation Plan (HCP) implementation. In 2006, Dr. Pratt (p. 9; Pratt and Emmel 2009, pp. 1, 5) conducted a study of diapause site choice at his captive propagation facility using captive stock and found that Quino larvae prefer to diapause in or near the base of native shrubs, such as *Eriogonum fasciculatum.*

The CFWO monitors Quino reference sites for larval and adult activity during the active season (possible December through May). Sites are monitored and information is posted on the internet for the general public. Monitoring is primarily for phenological information and to document continued Quino presence. Search efforts are not always equal, and negative surveys under unsuitable weather conditions (per survey protocol) are not reported. The CFWO staff also work with permitted volunteers to provide the best biological information possible. We share the most relevant information available to us on our website (e.g., CFWO 2009) regarding habitat areas throughout the subspecies' range.

Five-Factor Analysis

The following five-factor analysis describes and evaluates the threats attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act. Although we believe that most populations described above were likely extant at the time of listing, the listing rule analyzed threats in the context of approximately seven known populations. Our current analysis applies to all habitat known to be occupied since listing.

FACTOR A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

At the time of listing, the Quino was imperiled primarily because habitat was being damaged, fragmented, and destroyed by human activities. Urban development, grazing, and invasion of nonnative plants were the predominant threats at that time (USFWS 1997, 62 FR 2313). Threats associated with Factor A were identified in the Recovery Plan (section entitled "Reasons for Decline and Current Threats") and included: loss and fragmentation of habitat and landscape connectivity, invasion by nonnative plants, off-road vehicle activity, grazing, enhanced soil nitrogen, and increased atmospheric carbon dioxide concentration (USFWS 2003a, pp. 56-60). Little has changed with regard to the magnitude and immediacy of these threats since publication of the Recovery Plan. We now believe the magnitude and immediacy of the threat of climate change-induced habitat modification to lower latitudes (in Mexico and lower elevation populations) has increased, though the magnitude of development as a threat has likely decreased due to listing, habitat conservation to-date and a slowdown in development caused by the current economic conditions.

Land Use Changes

Since completion of the Recovery Plan in 2003, loss and modification of Quino habitat continue to be a primary threat to the subspecies, especially in areas where urbanization is expected to expand (Southeast San Diego County, and the Bautista Road Occurrence Complex and associated habitat in the final revised critical habitat Unit 7; USFWS 2009, 74 FR 28776) (Table 1). In areas where habitat is protected, urbanization of surrounding lands may result in the fragmentation of protected habitats, which could prevent movement of the subspecies between habitat areas.

Acquisitions of land and conservation easements have resulted in preservation of much habitat for the subspecies (Table 1). We do not yet know how much local Quino abundance, distribution, and habitat availability can be reduced without critically compromising population resiliency. We believe it is important to consider a historical perspective and acknowledge that some insect extinctions occur in places or at spatial scales different from those of vertebrates and plants, and that insects often have extremely high reproductive and dispersal capacities under optimal environmental conditions compared to those taxa, as well as different habitat requirements during different life stages (Dunn 2005, p. 1031). Several documented extinctions have occurred for insect species with high periodic abundance and large geographic ranges for which habitat suitability under suboptimal environmental conditions were extremely limited in at least one life stage (reviewed by Dunn 2005, pp. 1033-1034). Although we know some required

Quino habitat components (e.g., host plant presence), habitat suitability within population distributions has not been studied or quantified, especially with regard to environmental conditions and temporal variability. Because during periods of extreme high or low precipitation the amount of suitable habitat within an Edith's checkerspot population distribution is extremely limited and geographically variable depending on conditions (Weiss *et al.* 1988, p. 1495), some crucial areas for Quino were likely destroyed within many extant population distributions (e.g., Harford Springs habitat-based population distribution; USFWS 2003a, pp. 36 and 39; see Table 1 and Figures 1 and 2 for estimated habitat losses). Such losses of crucial areas within habitat patches might not be apparent until consecutive years of severe drought or high rainfall, but then have an impact disproportional to the size of the area lost (Weiss *et al.* 1988, p. 1495). Therefore, despite slightly elevated population abundances, the discovery of previously unknown population locations, habitat conservation to-date, and additional planned conservation since listing, we believe the subspecies continues to be threatened by habitat loss, degradation, and fragmentation.

Based on our population distribution estimates, there may have been as many as 37 extant populations at the time of listing (6 known, thought to be 7 or 8); there are currently 33, with 10 (4 known at the time of listing) categorized as "core" (Table 1, Figures 1 and 2). The status of all occurrence complexes within 12 habitat-based population distributions are classified as unknown (e.g., Winchester and West Otay mesa habitat-based population distributions), and habitat within two core habitat-based population distributions has been significantly reduced. The entire Warm Springs Creek core habitat-based population distribution is considered highly threatened and the population status is unknown (Table 1, Figure 1). Approximately 52 percent (2,953 acres (1,194 hectares)) of habitat within the Warm Springs Creek occurrence complexes has been lost since listing, and 21 percent (560 acres (227 hectares)) of remaining habitat is outside the planned preserve (see *Regional Planning Efforts* subsection below) and will likely be destroyed (Table 1). The Skinner/Johnson core habitat-based population distribution has more conserved habitat than Warm Springs Creek and is less isolated by development; however, approximately 41 percent (6,491 acres (2,627 hectares)) of habitat within occurrence complexes (including two entire occurrence complexes) has been lost since listing (Table 1).

Of the total 147,359 acres (59,634 hectares) of mapped occurrence complexes extant at the time of listing or documented post-listing (all area within 0.6 mile (1 kilometer) of observations), approximately 42 percent are on public lands or privately owned preserves that are not subject to large-scale land-use conversion, approximately 19 percent are privately owned lands likely to be conserved under an HCP, approximately 24 percent are private and tribal lands where the likelihood of habitat loss is variable, and approximately 15 percent have been destroyed by development or land use changes (Table 1). The fact that the majority of habitat within occurrence complexes has been or is likely to be conserved since listing demonstrates how effective listing under the Act is in achieving and encouraging habitat conservation.

Disturbance

Disturbance of habitat can open woody canopies and may sometimes increase habitat suitability, but frequent off-road vehicle use compacts soil, destroys host plants, increases erosion and fire frequency, creates trails that are conduits of nonnative plant invasion, and in occupied habitat

causes direct mortality of Quino (USFWS 2003a, pp. 58-59). If there are no Quino proximal and abundant enough to recolonize disturbed habitat, an increase in habitat suitability the following year due to disturbance is irrelevant. Increased human population densities proximal to occupied habitat increase the rate of disturbance due to recreational activities such as off-road vehicle activity. Recreational disturbance is frequently observed in monitored, occupied habitat where larvae are observed on host plants (USFWS 2003a, p. 59; CFWO 2008).

Nonnatives

Conversion from native vegetation to nonnative annual grassland is the greatest threat to conserved habitat (USFWS 2003a, pp. 57-58), and a high magnitude threat to all habitat that is not managed. Increased dominance of nonnative plant species reduces the abundance (by competition) and suitability (by shading) of Quino host plants (USFWS 2003a, pp. 57-58). Females are less likely to deposit eggs on host plants that are shaded by other plants. Female Quino deposit eggs on plants located in full sun, preferably surrounded by bare ground or sparse, low vegetation (USFWS 2003a, p. 18). Plants shaded through the midday hours (1100 to 1400) or embedded in taller vegetation appear to be less likely targets for oviposition (Singer 1983, p. 392; USFWS 2003a, p. 12), probably because of the high temperature requirements of developing larvae (Osborne and Redak 2000, p. 12). Habitat fragmentation exacerbates vegetation type conversion because ground disturbance and edge effects in fragments with large edge-to-area ratios experience higher rates of invasion. Other causes of vegetation type conversion include fire, grazing, off-road vehicle activity, and increased nitrogen deposition (USFWS 2003a, pp. 57-58; see discussion below).

Altered Host Plant Phenology

The ongoing and predicted climate change trends (see "Factor E" section below) likely contribute to increased prediapause larval death due to early host plant aging at the southern range edge (in Mexico) and at lower elevations in the United States (USFWS 2003a, p. 64). Field studies have documented population crashes and extirpations in several butterfly species; including Edith's checkerspot, as a direct result of butterfly-host asynchrony (Parmesan 2006, p. 646).

Nitrogen Deposition

Nitrogen deposition influences nonnative plant invasion by increasing soil fertility, as invasive species are often better competitors for soil nutrients than native plant species (Padgett *et al.* 1999, p. 769). Soils in urbanized and agricultural regions are being fertilized by excess nitrogen generated by human activities, and this threat continues to increase in magnitude as human population densities increase (USFWS 2003a, p. 65). Soils in the most polluted regions near Riverside, California, have more than 80 parts per million (weight) extractable nitrogen, more than four times the typical concentration detected in natural, unpolluted soils (Padgett *et al.* 1999, pp. 776 and 778).

Grazing

Grazing by cattle and sheep increase initial rates of invasion by nonnative plants by disturbing the soil, and cause direct mortality of Quino (USFWS 2003a, pp. 59-60). However, once grazing is removed, the rate of nonnative plant invasion increases; therefore the Recovery Plan recommended commercial grazing in occupied habitat be phased out and replaced by other, less destructive, nonnative plant control methods (USFWS 2003a, p. 60). The threat of grazing has been removed (e.g., Marron Valley) or is being managed (e.g., San Bernardino National Forest lands) in most areas, though no plans or actions to control nonnative plant species are currently in place.

Summary of Factor A

Much habitat has been conserved since listing in 1997. Population extirpation within several non-core habitat-based population distributions (e.g. Winchester), and at least one core habitat-based population distribution (Warm Springs Creek) is probable in the near future due primarily to the ongoing effects of Factor A threats, past and present. While it is clear the rate of habitat destruction has slowed and much future destruction has been precluded, some habitat loss is likely to continue. The rate and scope of habitat modification has increased due to impacts of growing proximal human populations, ongoing nonnative species invasion, climate change effects, and nitrogen deposition. Protection of habitat from destruction is a necessary first step toward recovery. The greatest challenge will be to continue managing the remaining habitat and populations to prevent future population losses, and implementing management objectives for Quino under regional HCPs (see "Factor D" section below). Destruction, modification, and curtailment of habitat and range continue to be threats to Quino.

FACTOR B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

At the time of listing, over-collection was considered a potential threat to Quino because of specimen value to collectors (USFWS 1997, 62 FR 2313). The impact of overutilization for any purpose is not known at this time (USFWS 2003a, p. 55).

FACTOR C: Disease or Predation

At the time of listing, disease was not known to be a factor affecting the Quino (USFWS 1997, 62 FR 2313). The listing rule (USFWS 1997, 62 FR 2313) stated there was evidence predation by invasive nonnative species may pose a threat to the Quino; however, the magnitude of this threat was not known. Threats associated with this factor were also identified in the Recovery Plan under the "Reasons for Decline and Current Threats" section (USFWS 2003a, pp. 55). The impacts of disease and predation remain unknown.

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

At the time of listing, regulatory mechanisms thought to have some potential to protect the Quino included: (1) the California Environmental Quality Act (CEQA); (2) the National Environmental

Protection Quality Act (NEPA); and (3) the Act in those cases where Quino occur and is incidentally protected in habitat occupied by a listed wildlife species. The listing rule (USFWS 1997, 62 FR 2313) provides an analysis of the level of protection that was anticipated from those regulatory mechanisms. This analysis remains valid.

State Protections

The State's authority to conserve rare wildlife and plants is comprised of four major pieces of legislation: the California Endangered Species Act, the Native Plant Protection Act, CEQA, and the Natural Community Conservation Planning Act (NCCPA). Insect taxa are not listable entities under the California Endangered Species Act (CESA), therefore this protection does not apply to Quino. The CEQA requires review of any project that is undertaken, funded, or permitted by the State or a local governmental agency. If significant effects are identified, the lead agency has the option of requiring mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved. The Natural Community Conservation Program is a cooperative effort to protect regional habitats and species under the Natural Community Conservation Planning Act. The program helps identify and provide for area wide protection of plants, animals, and their habitats while allowing compatible and appropriate economic activity. Many Natural Community Conservation Plans (NCCPs) are developed in conjunction with HCPs prepared pursuant to the Act.

Federal Protections

National Environmental Policy Act (NEPA): NEPA (42 U.S.C. 4371 *et seq.*) provides some protection for listed species that may be affected by activities undertaken, authorized, or funded by Federal agencies. Prior to implementation of such projects with a Federal nexus, NEPA requires the agency to analyze the project for potential impacts to the human environment, including natural resources. In cases where that analysis reveals significant environmental effects, the Federal agency must propose mitigation alternatives that would offset those effects (40 C.F.R. 1502.16). These mitigations provide some protection for listed species. However, NEPA does not require that adverse impacts be fully mitigated, only that impacts be assessed and the analysis disclosed to the public.

Sikes Act: The Sikes Act (16 U.S.C. 670) authorizes the Secretary of Defense to develop cooperative plans with the Secretaries of Agriculture and the Interior for natural resources on public lands. The Sikes Act Improvement Act of 1997 requires Department of Defense installations to prepare Integrated Natural Resource Management Plans (INRMPs) that provide for the conservation and rehabilitation of natural resources on military lands consistent with the use of military installations to ensure the readiness of the Armed Forces. INRMPs incorporate, to the maximum extent practicable, ecosystem management principles and provide the landscape necessary to sustain military land uses. While INRMPs are not technically regulatory mechanisms because their implementation is subject to funding availability, they can be an added conservation tool in promoting the recovery of endangered and threatened species on military lands.

The Navy has updated its Naval Base Coronado INRMP to specifically address the Quino and its habitat at the La Posta Facility and is awaiting approval by the Service. The INRMP will incorporate all conservation measures included in the current Quino Habitat Enhancement Plan and address expansion plans for the La Posta Facility (see above discussion under "Factor A" for further details).

National Park Service (NPS) Organic Act: The NPS Organic Act of 1916 (39 Stat. 535, 16 U.S.C. 1, as amended), states that the National Park Service "shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations … to conserve the scenery and the national and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." The National Park Service Management Policies indicate that the Park Service will "meet its obligations under the National Park Service Organic Act and the Endangered Species Act to both pro-actively conserve listed species and prevent detrimental effects on these species." This includes working with the Service and undertaking active management programs to inventory, monitor, restore, and maintain listed species habitats, among other actions.

National Forest Management Act (NFMA): The National Forest Management Act (36 C.F.R. 219.20(b)(i)) has required the USDA Forest Service to incorporate standards and guidelines into Land and Resource Management Plans, including provisions to support and manage plant and animal communities for diversity and for the long-term, rangewide viability of native species. Recent changes to NFMA may affect future management of listed species, particularly rare plant occurrences, on National Forests. On January 5, 2005, the Forest Service revised National Forest land management planning under NFMA (70 FR 1023). The 2005 planning rule changed the nature of Land Management Plans so that plans generally would be strategic in nature and could be categorically excluded from NEPA analysis, and thus not subject to public review. Under the 2005 planning rule, the primary means of sustaining ecological systems, including listed species, would be through guidance for ecosystem diversity. If needed, additional provisions for threatened and endangered species could be provided within the overall multiple-use objectives required by NFMA. The 2005 planning rule did not include a requirement to provide for viable populations of plant and animal species, which had previously been included in both the 1982 and 2000 planning rules. On March 30, 2007, however, the United States District Court in *Citizens for Better Forestry et al. v. USDA* (N.D. Calif.) enjoined (prohibited) the USDA from implementing and utilizing the 2005 rule until the Forest Service provided for public comment and conducted an assessment of the rule's effects on the environment, including listed species.

On April 21, 2008, the Forest Service published a final 2008 planning rule and a record of decision for a final environmental impact statement examining the potential environmental impacts associated with promulgating the new rule (73 FR 21468). The 2008 planning rule also does not include a requirement to provide for viable populations of plant and animal species on Forest Service lands. As part of the environmental analysis, a biological assessment was prepared to address the 2008 planning rule's impact to threatened, endangered, and proposed species and designated and proposed critical habitat. The assessment concluded that the rule does not affect, modify, mitigate, or reduce the requirement for the Forest Service to consult or

conference on projects or activities that it funds, permits, or carries out that may affect listed or proposed species or their designated or proposed critical habitat. On August 8, 2008, the Forest Service published an interim directive and requested public comment on its section 7 consultation policy for developing, amending, or revising Land Management Plans under the 2008 planning rule. Thus, the impact of the 2008 rule to listed species is unknown at this time.

Federal Land Policy and Management Act of 1976 (FLPMA): The Bureau of Land Management is required to incorporate Federal, State, and local input into their management decisions through Federal law. The FLPMA (Public Law 94-579, 43 U.S.C. 1701) was written "to establish public land policy; to establish guidelines for its administration; to provide for the management, protection, development and enhancement of the public lands; and for other purposes". Section 102(f) of the FLPMA states that "the Secretary [of the Interior] shall allow an opportunity for public involvement and by regulation shall establish procedures ... to give Federal, State, and local governments and the public, adequate notice and opportunity to comment upon and participate in the formulation of plans and programs relating to the management of the public lands". Therefore, through management plans, the Bureau of Land Management is responsible for including input from Federal, State, and local governments and the public. Additionally, Section 102(c) of the FLPMA states that the Secretary shall "give priority to the designation and protection of areas of critical environmental concern" in the development of plans for public lands. Although the Bureau of Land Management has a multiple-use mandate under the FLPMA which allows for grazing, mining, and off-road vehicle use, the Bureau of Land Management also has the ability under the FLPMA to establish and implement special management areas such as Areas of Critical Environmental Concern, wilderness, research areas, etc., that can reduce or eliminate actions that adversely affect species of concern (including listed species).

The Lacey Act: The Lacey Act (P.L. 97-79), as amended in 16 U.S.C. 3371, makes unlawful the import, export, or transport of any wild animals whether alive or dead taken in violation of any United States or Indian tribal law, treaty, or regulation, as well as the trade of any of these items acquired through violations of foreign law. The Lacey Act further makes unlawful the selling, receiving, acquisition or purchasing of any wild animal, alive or dead. The designation of "wild animal" includes parts, products, eggs, or offspring.

National Wildlife Refuge System Improvement Act of 1997: This act establishes the protection of biodiversity as the primary purpose of the National Wildlife Refuge system. This has lead to various management actions to benefit the federally listed species. Much habitat in southern San Diego County has been conserved within the National Wildlife Refuge System (Otay core habitat-based population distribution).

Endangered Species Act of 1973, as amended (Act): The Act is the primary Federal law providing protection for this species. The Service's responsibilities include administering the Act, including sections 7, 9, and 10 that address take. Since listing, the Service has analyzed the potential effects of Federal projects under section 7(a)(2), which requires Federal agencies to consult with the Service prior to authorizing, funding, or carrying out activities that may affect listed species. A jeopardy determination is made for a project that is reasonably expected, either directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery of a listed species in the wild by reducing its reproduction, numbers, or distribution (50 CFR 402.02).

A non-jeopardy opinion may include reasonable and prudent measures that minimize the amount or extent of incidental take of listed species associated with a project.

Section 9 prohibits the taking of any federally listed endangered or threatened species. Section 3(18) defines "take" to mean "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Service regulations (50 CFR 17.3) define "harm" to include significant habitat modification or degradation which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Harassment is defined by the Service as an intentional or negligent action that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. The Act provides for civil and criminal penalties for the unlawful taking of listed species. Incidental take refers to taking of listed species that results from, but is not the purpose of, carrying out an otherwise lawful activity by a Federal agency or applicant (50 CFR 402.02).

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Regional Planning Efforts

Incidental take permits, pursuant to section 10(a)(1)(B) of the Act, may be issued to authorize take of listed animal species resulting from projects without a Federal nexus. This section provides protection for the Quino through the approval of HCPs that detail measures to minimize and mitigate the potential impacts of projects to the maximum extent practicable. To qualify for an incidental take permit, applicants must develop, fund, and implement a Service-approved HCP that details measures to minimize and mitigate the project's adverse impacts to listed species. Regional HCPs in some areas now provide an additional layer of regulatory protection for covered species, and many of these HCPs are coordinated with California's related NCCP Program.

City of Chula Vista Subarea Plan under the San Diego MSCP

Although not covered under the umbrella of the of the subregional San Diego County MSCP document, the Quino is a covered species under the City of Chula Vista (City) Subarea Plan (Chula Vista Subarea Plan), which provides for the long-term conservation of this subspecies. The MSCP subregional plan has been in place for more than a decade. The plan provides for establishment and management of approximately 171,920 acres (69,574 hectares) of preserve

lands within the Multiple Habitat Preserve Area (MHPA; preserve planning area) and Pre-approved Mitigation Areas (PAMA; area where purchase of land is approved for mitigation). The MSCP was developed in support of applications for incidental take permits for several federally listed species by 12 participating jurisdictions and many other stakeholders in southwestern San Diego County. Under the umbrella of the MSCP, each of the 12 participating jurisdictions is required to prepare a subarea plan that implements the goals of the MSCP within that particular jurisdiction. Planned conservation estimates in Table 1 (PC) are based on the MHPA and PAMA within all approved subarea plans.

The Chula Vista Subarea Plan contains requirements to monitor and adaptively manage Quino habitats. This area-specific management plan is comprehensive and addresses a broad range of management needs at the preserve and species levels intended to reduce threats to the Quino. Lands preserved under the Chula Vista Subarea Plan are adaptively managed and maintained to: (1) Ensure the long-term viability and sustainability of native ecosystem function and natural processes throughout the preserve; (2) protect existing and restored biological resources from the impacts of human activities within the preserve while accommodating compatible uses; (3) enhance and restore, where feasible, appropriate native plant associations and wildlife connections to adjoining habitat to provide viable wildlife and sensitive species habitat; (4) facilitate monitoring of selected target species, habitats, and linkages to ensure long-term persistence of viable populations of priority plant and animal species (including the Quino); and (5) ensure functional habitats and linkages for those species (USFWS 2003b, pp. 18, 70, FWS-SDG-882.1).

The MSCP and the Chula Vista Subarea Plan incorporate many processes that allow for Service oversight and participation in program implementation. These processes include: annual reporting requirements, review and approval of proposed subarea plan amendments or preserve boundary adjustments, review and comment on projects through CEQA, and chairing the Habitat Management Technical Committee and the Monitoring Subcommittee (MSCP 1998, pp. 5-11 to 5-23).

Western Riverside County MSHCP

The Western Riverside County MSHCP is a large-scale, multi-jurisdictional HCP encompassing approximately 1.26 million acres (510,000 hectares) of land in western Riverside County. The Western Riverside County MSHCP addresses 146 listed and unlisted "covered species", including the Quino. The Western Riverside County MSHCP is a multi-species conservation program minimizing and mitigating expected loss of habitat and associated incidental take of covered species. On June 22, 2004, the USFWS issued an incidental take permit (USFWS 2004, TE-088609-0) under section 10(a)(1)(B) of the Act to 22 permittees under the Western Riverside County MSHCP for a period of 75 years.

Preservation and management of approximately 67,493 acres (27,314 hectares) of Quino habitat under the Western Riverside County MSHCP will contribute to conservation and ultimate recovery of this subspecies. The Western Riverside County MSHCP removes or reduces threats to this subspecies by placing large blocks of occupied and unoccupied habitat into preservation throughout the MSHCP Conservation Area. The approximately 67,493 acres (27,314 hectares)

that will be conserved under this plan for the Quino capture a variety of habitat characteristics supporting Quino throughout western Riverside County. Distribution of the subspecies within the existing Western Riverside County MSHCP Conservation Area is documented through annual surveys. Surveys will continue annually as lands are added to the Conservation Area. The surveys are intended to verify continued occupancy at a minimum of 75 percent of the occupied locations identified in the plan. An adaptive management program is being implemented to maintain or enhance all conserved habitat to increase its value for, and the viability of, Quino populations (Dudek 2003, Volume I, Section 9, Table 9–2, pp. 9–28, 9–29).

Mexican Law

The Service is not aware of any existing regulatory mechanisms that protect the Quino or its habitat in Mexico. The Quino is not listed under the Mexican equivalent of the Act (Norma Oficial Mexicana NOM-059).

Tribal Policies and Programs

Although all tribes that have occupied Quino habitat within their jurisdictions have environmental programs engaged in general conservation planning, we are not aware of any existing regulatory mechanisms that specifically protect the Quino or its habitat.

Summary of Factor D

In summary, the Act is the primary Federal law that provides protection for this species since its listing as endangered in 1997. Under the Act and the NCCPA, regional HCPs provide considerable conservation benefit for Quino. Other Federal and State regulatory mechanisms provide discretionary protections for the species based on current management direction, but do not guarantee protection for the species absent its status under the Act. Therefore, we believe that State and other Federal laws and regulations have limited ability to protect the species in absence of Act.

FACTOR E: Other Natural or Manmade Factors Affecting Its Continued Existence

The listing rule (USFWS 1997, 62 FR 2313) stated that the restricted range, localized distribution, and small population sizes of the Quino made it more vulnerable to Factor A threats. The listing rule also stated that restricted range, localized distribution, and small population sizes make historical levels of natural events such as fire and periodic drought significant threats to the subspecies. Threats associated with climate change were emphasized in the Recovery Plan (USFWS 2003a, pp. 63-65), and further exacerbate Factor A and other Factor E threats. Current scientific data support the continued existence of those threats. Although the range is less restricted as was believed at the time of listing (Table 1, Figures 1 and 2), it is likely small population size and localized distribution threatens existing populations such as Warm Springs Creek (core habitat-based population distribution) in Riverside County (see above discussion under "Factor A").

Stochastic events

Droughts, wildfires, and floods can severely reduce population abundance of Quino, while intermediate amounts of precipitation, combined with high temperatures, can restore higher population abundance (Murphy and White 1984, pp. 351-352; Anderson 2003, p. 4; see "Abundance" section above for detailed discussion). While natural catastrophic events existed under historical environmental conditions and were likely to temporarily impact resilient populations (see USFWS 2007, p. 2 regarding impacts of recent fires), increased frequency and intensity of stochastic events due to climate change (see below discussion; IPCC 2007, p. 8) and interaction with Factor A threats increase the magnitude and severity of impacts of stochastic events on Quino populations. The more habitat that is lost and degraded, the smaller and more localized populations become, and the more likely catastrophic natural events are to extirpate populations that have reduced resiliency.

Small Population Size

Small population size increases the vulnerability of Quino to stochastic events, makes it more difficult for individuals to find mates, and may result in inbreeding (Pratt pers comm. 2009c, p. 1). Inbreeding depression was found to increase the extirpation probability of a related, similar butterfly species, *Melitaea cinxia* (the Glanville fritillary; Nieminen *et al.* 2001, pp. 242-243).

Climate Change

As discussed in the final revised critical habitat designation, the best available scientific information suggests the Bautista Road Occurrence Complex (above 4,000 feet (1,219 meters) in elevation) supports ongoing range shift for this subspecies upslope in elevation, and extirpation of many populations in lower-elevation, where drier habitats are likely to occur. It is also likely that smaller occurrence complexes north of the community of Anza are the result of relatively recent colonization events (post-1980s drought).

Parmesan (1996, pp. 765-766) concluded that the average position of known Edith's checkerspot butterfly populations shifted north and up in elevation, likely due to a warming, drying climate. Parmesan (1996, pp. 765-766) compared the distribution of the Edith's checkerspot butterfly in the early part of the 20th century to its distribution from 1994 to 1996 using historical records and field surveys. This study identified a rangewide pattern of local Edith's checkerspot butterfly extirpations and noted that 80 percent of historical populations in the southern part of the range were currently extinct in the mid-1990s (with the majority being Quino populations). In contrast, historical populations in the mid-latitude part of Edith's checkerspot butterfly's range experienced only 40 percent extirpations, and the extirpation rate in the northern part was as low as 20 percent (Parmesan 1996, pp. 765-766). Fewer than 15 percent of the Edith's checkerspot butterfly extirpations occurred in the highest elevation band (above 7,874 feet (2,400 meters) (Parmesan 1996, pp. 765-766). Parmesan (1996, pp. 765-766) concluded that this pattern of extirpation indicates contraction of the southern boundary of the subspecies' overall distribution by almost 100 miles (160 kilometers) and a shift in the average location of an Edith's checkerspot butterfly occurrence northward by 57 miles (92 kilometers). A parallel elevation gradient in extirpations shifted the mean location of Edith's checkerspot butterfly populations

upward by 407 feet (124 meters). A breakpoint in the pattern of extirpations occurred at approximately 7,874 feet (2400 meters), with about 40 percent of all populations below the breakpoint recorded as extirpated in suitable habitats, while less than 15 percent were extirpated above the breakpoint. This range shift closely matched shifts in mean yearly temperature (Parmesan 1996, pp. 765-766; Karl et al. 1996, pp. 279-292). The Quino may be the subspecies of Edith's checkerspot most affected by climate change, because Parmesan's study found extirpations to be most common at lower elevations and latitudes, and the Quino's range includes both extremes.

Studies demonstrate a correlation of population distribution and phenology changes with climate changes for many other butterfly and insect species in California and around the world (Parmesan et al. 1999, p. 580; Forister and Shapiro 2003, p. 1130; Parmesan and Yohe 2003, pp. 38-39; Karban and Strauss 2004, pp. 251–254; Thomas et al. 2004, pp. 146-147; Osborne and Ballmer 2006, p. 1; Parmesan 2006, pp. 646-647; Thomas et al. 2006, pp. 415-416). Metapopulation viability analyses of other endangered nymphalid butterfly species also indicate that current climate trends pose a major threat to butterfly metapopulations by reducing butterfly growth rates and increasing subpopulation extirpation rates (Schtickzelle and Baguette 2004, p. 277; Schtickzelle et al. 2005, p. 89). Most recently, Preston et al. (2008, p. 2506) incorporated biotic interactions into niche models to predict suitable habitat for species under the range of climate conditions predicted for southern California in recent climate change models (Hayhoe et al. 2004, pp. 12422-12427; IPCC 2007, p. 9). Preston et al. (2008, p. 2508) found that Quino habitat decreased and became fragmented under altered climate conditions based on the climate-only model. For increasing temperatures and 110 percent precipitation, there was a shift in habitat to the eastern portion of the currently occupied range corresponding with an upslope movement of the species to higher elevations in adjacent mountains (Preston et al. 2008, p. 2508). The abiotic–biotic model (better performing model) predicted 98 to 100 percent loss of suitable Quino habitat when the temperature increased 1.7 and 2.8 °C or when the precipitation is 50 percent (significantly lower) or 150 percent (significantly higher) of current levels (Preston et al. 2008, p. 2508). An increase of less than 1.8° F (1 °C) with no change in current precipitation resulted in no predicted habitat shift, although there was an eastward (upslope) shift within the current distributional footprint at 110 percent precipitation (Preston et al. 2008, p. 2508). Such similar climate response patterns in modeled habitat and related and co-occurring insect species further support the validity of Parmesan's (1996, pp. 765–766) Quino observations and conclusions (Preston et al. 2008, pp. 2511-2512). Therefore, the hypothesis of climate-driven range shift occurring in the foothills north of the community of Anza is well supported by the best available scientific information.

Documentation of past climate-related changes that have already occurred in California (Ehrlich and Murphy 1987, p. 124; Croke et al. 1998, pp. 2128, 2130; Davis et al. 2002, p. 820; Breshears et al. 2005, p. 15144) and future drought predictions for the state (e.g., Field et al. 1999, pp. 8-10; Brunelle and Anderson 2003, p. 21; Lenihen et al. 2003, p. 1667; Hayhoe et al. 2004, p. 12422; Breshears et al. 2005, p. 15144; Seager et al. 2007, p. 1181) and North America (IPCC 2007, p. 9), and extirpation of Edith's checkerspot butterfly populations following extreme climate events (Ehrlich et al. 1980, pp. 101-105; Singer and Ehrlich 1979, pp. 53–60; Singer and Thomas 1996, pp. 9–39) indicate prolonged drought and other climate-related changes will continue into the near future, and these changes will affect Quino populations. Thomas et al.

(2004, p. 147) estimated 29 percent of species in scrublands (habitat for the Quino) face eventual extinction, and 7 (with dispersal) to 9 (without dispersal) percent of butterfly species in Mexico will become extinct due to climate change-driven impacts (mid-range climate predictions; Thomas et al. 2004, p. 146). During drought conditions in 2007 surveyors noted that, for the first time since the subspecies was listed, no Quino were observed during Riverside County surveys or occurrence complex monitoring (CFWO 2007). In 2008 and 2009, the only occupied site below 3,500 feet (1067 meters) in elevation in Riverside County where relatively high Quino densities were reported was on the top of Oak Mountain at approximately 2,600 feet (793 meters) in elevation (CFWO 2008, 2009). Oak Mountain is unique in that it is the highest topographic point within an area encompassing over 7,000 acres (2833 hectares) of relatively suitable and contiguous Quino habitat surrounding Vail Lake (Helix Environmental Planning 2003, pp. 1–2, USFWS GIS database and satellite imagery). Above 3,500 feet (1067 meters) in elevation in Riverside County and in southwestern San Diego County adult densities appeared to be relatively high in 2008 (CFWO 2008, 2009) compared to elsewhere in the range. Therefore, recent field evidence supports the hypothesis that more extreme climatic conditions throughout the subspecies' range are causing reduced densities in the lowest elevation, driest habitats.

Comparison of Figures 1 and 2 indicate more populations have been documented in San Diego County than in Riverside County since the Recovery Plan was published, though there is reason to believe these populations do not represent local range expansion, as those north of the community of Anza are believed. The elevation gradient is less pronounced in San Diego County than in Riverside County, and all San Diego populations are below 4,000 feet (1,219 meters) in elevation, well within what we believe is the subspecies' historical elevation range. Furthermore, examination of the difference in weather patterns (less variable climate in San Diego; Anderson 2000, p. 6) and survey detectability (lower detectability in San Diego) indicates San Diego County is more likely to support stable, low-density, difficult-to-detect populations than Riverside County. Therefore, it is likely these recently documented populations in San Diego County have existed since listing and were not detected, or are the result of recolonization of habitat within the subspecies' historical range.

Summary of Factor E

In summary, the restricted range, localized distribution, and small population sizes make Quino more vulnerable to stochastic events (such as drought and fire), climate change effects, and Factor A threats. Of particular concern is the vulnerability of Quino populations to prolonged drought, and the likelihood that climate change significantly increases this vulnerability.

III. RECOVERY CRITERIA

The Service published a final Recovery Plan in 2003. Recovery plans provide guidance to the USFWS, States, and other partners and interested parties on ways to minimize threats to listed species, and on criteria that may be used to determine when recovery goals are achieved. There are many paths to accomplishing the recovery of a species and recovery may be achieved without fully meeting all recovery plan criteria. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished. In that instance, we may determine that, over all, the threats have been minimized sufficiently, and the species is robust

enough, to downlist or delist the species. In other cases, new recovery approaches and/or opportunities unknown at the time the recovery plan was finalized may be more appropriate ways to achieve recovery. Likewise, new information may change the extent that criteria need to be met for recognizing recovery of the species. Overall, recovery is a dynamic process requiring adaptive management, and assessing a species' degree of recovery is likewise an adaptive process that may, or may not, fully follow the guidance provided in a recovery plan. We focus our evaluation of species status in this 5-year review on progress that has been made toward recovery since the species was listed (or since the most recent 5-year review) by eliminating or reducing the threats discussed in the five-factor analysis. In that context, progress towards fulfilling recovery criteria serves to indicate the extent to which threat factors have been reduced or eliminated. The Quino recovery plan (USFWS 2003) did not have threat-based recovery criteria.

Recovery Criteria:

The Recovery Plan (USFWS 2003a, pp. v-vi) states the Quino could be downlisted to threatened when the following criteria are met. Below we discuss the current applicability of these criteria, progress toward meeting them, and how they help reduce or eliminate threats attributable to one or more of the listing factors above.

1) Permanently protect the habitat within occurrence complexes (estimated occupied areas based on habitat within 0.6 mile (1 kilometer) of recent butterfly occurrences), in a configuration designed to support resilient populations. One or more occurrence complexes may belong to a single greater population distribution, or an occurrence complex may contain more than one whole or partial population distributions. When population distributions are determined, they will replace the occurrence complex as the protected unit. There are currently 46 described occurrence complexes.

This recovery criterion is still applicable, but requires updating. The number of occurrence complexes should be revised because some have been merged to form a single complex, new occurrences complexes have been discovered, and habitat-based population distributions should be substituted for occurrence complexes as the relevant conservation unit. Habitat-based population distributions better reflect the long-term distributions of populations and associated habitat. Much habitat has been conserved since publication of the Recovery Plan (as described above), and more habitat associated with the occurrence complexes will continue to be conserved under regional HCPs such as the Western Riverside County MSHCP and the San Diego MSCP. Populations in the vicinity of the community of Anza and State Route 371 are likely the most resilient throughout the range of the subspecies; however, development has been steadily reducing the amount of habitat in that area since the subspecies was listed (USFWS GIS database, satellite imagery). The largest gap in plans for protection of habitat needed to support resilient populations is on private lands (Tule Peak and Bautista Road) and the smaller occurrence complexes in the vicinity of the community of Anza. The newly discovered Barbara Trail Occurrence Complex (western edge of the Tule Peak habitat-based population distribution) is privately owned by a landowner who has sold much land in the past for mitigation (Greg Reeden, former owner of the Silverado Mitigation Bank), but is not currently planned for conservation. The newly discovered Terwilliger Valley Occurrence Complex (eastern edge of

the Tule Peak habitat-based population distribution) is also largely under private ownership and threatened by encroaching development.

Maintenance of populations in the Tule Peak and Bautista Road core habitat-based population distributions, and habitat connectivity to smaller, higher elevation habitat-based population distributions, is needed to support climate change-driven range shift and prevent an increase in the subspecies' extinction probability (USFWS 2003a, pp. 46-47; Osborne 2007, pp. 9-10). The Anza/Mount San Jacinto foothills area (in and adjacent to the Bautista Road core habitat-based population distribution) supports the greatest elevation gradient within the extant range of the Quino, and is proximal to population that likely produces the most emigrants within the subspecies' range (Tule Peak core habitat-based population distribution, see above discussion). The highest elevation core habitat-based population distributions (Tule Peak and Bautista Road) also support the highest (co-occurring) diversity of host plant species (*Plantago patagonica*, *Antirrhinum coulterianum*, *Collinsia concolor*, *Cordylanthus rigidus*, and *Castilleja exserta*) within the range of the Quino, a factor known to mitigate the effects of climate extremes on Edith's checkerspot butterfly populations (Hellmann 2002, p. 925). Therefore, this high-elevation habitat is most likely to retain climatic suitability, increase in suitability, or expand under the influence of climate change.

This criterion helps reduce or eliminate loss and modification of Quino habitat by eliminating the threat of urban development and other land use changes.

2) Conduct research including: determine the current short-term and potential long-term distributions of populations and associated habitat; and conduct preliminary modeling of metapopulation dynamics for core occurrence complexes.

This recovery criterion is still applicable. As described above habitat-based population distributions have been delineated for these (formerly categorized as "core") occurrence complexes that better reflect the long-term distributions of populations and associated habitat. No metapopulation modeling has been attempted. Genetic research described above will help determine relatedness among individuals at different sites and should help better determine population membership of occupied sites. Other specific current needs are methods for reintroduction (for example in northern Orange County or northwestern Riverside County), site-specific use of primary and secondary host plant species, and effective, safe use of herbicides for habitat restoration (see Russell and Schultz 2009, p. 1).

This criterion helps reduce or eliminate loss and modification of Quino habitat by providing information needed to determine what habitat requires protection and (other research mentioned above) how to restore modified habitat. This criterion also helps reduce the threats posed by fire, enhanced soil nitrogen, increased atmospheric carbon dioxide concentration, and climate change by providing information needed to determine what conservation measures (protection and management) are needed to counteract these threats.

3) Permanently provide for and implement management of occurrence complexes (or population distributions when delineated) to restore or enhance habitat quality and population resilience.

This recovery criterion is still applicable. Although some management is occurring at a few conserved sites scattered throughout the subspecies range (e.g., Johnson Ranch in Riverside County), no occurrence complex/population is currently being managed as a whole. Most sites are not currently managed for Quino conservation and a comprehensive assessment of the success of management practices has not been conducted. This criterion helps reduce or eliminate modification of Quino habitat by providing means to enhance or preserve suitability of habitat required for species recovery.

4) The protected, managed (conserved) population segments within core occurrence complexes (or population distributions when delineated) must demonstrate evidence of resilience. Evidence of resilience is demonstrated if a decrease in the number of occupied habitat patches over a 10- to 20-year period within an occurrence complex (or population distribution when delineated) is followed by increases of equal or greater magnitude. Monitoring must be initiated in the third of three years of favorable climate (total annual January and February precipitation within one standard error of the average total for those months over the past 30 years, based on local or proxy climate data). Populations that do not demonstrate resilience after 20 years should be augmented and monitoring reinitiated.

This recovery criterion is still applicable, but requires updating. Monitoring of threats such as nonnative plant invasion should be incorporated in a measurable way. No formal monitoring has been initiated as described, although the Service continues to qualitatively track the persistence and abundance of Quino in some occurrence complexes. A one-time rangewide survey was conducted in 2008 (described above), and qualitative information suggests some of these populations (none fully protected yet) may be relatively resilient. This criterion may require modification depending on what the population structure may be and how well habitat patches can be defined. Not all populations may be well-defined metapopulations with clearly delineated habitat patches.

This criterion is required to demonstrate successful reduction of all threats and subspecies recovery

5) One additional population should be documented or introduced within the Lake Matthews population site (formerly occupied, not known to be currently occupied) in the Northwest Riverside Recovery Unit. At least one of the extant populations outside of current recovery units (e.g., the San Vicente Reservoir occurrence complex) must meet resilience specifications above unless an additional population is established or documented within 6 miles (10 kilometers) of the ocean (a more stable marine climate influence should minimize susceptibility to drought and reduce probability of extirpation).

The intent of this recovery criterion is still applicable, but it should be updated. It is possible that establishment of an experimental population in the Irvine Ranch Preserve (USFWS 2003a, p. 112) could fulfill the intent of the reintroduction requirement. It is not likely more than one reintroduction is required for downlisting to threatened. The new San Vicente core habitat-based population distribution is evidence that there is a potentially resilient population in this area. Several new populations have been documented at higher elevations, and it is not clear that

coastal environments are currently more likely to support resilient Quino populations than more montane environments. Recovery units should be updated (USFWS 2003a, p. 111).

This criterion helps reduce the magnitude of all threats because additional populations reduce the probability of extinction. In particular, this criterion helps reduce the threat of population extirpation due to restricted range.

6) Establish and maintain a captive propagation program for purposes of maintenance of representative refugia populations, research, and reintroduction and augmentation of wild populations, as appropriate.

This recovery criterion is still applicable in part. It is not likely that all populations require refugia populations to prevent extirpation, although some likely do, such as the Warm Springs Creek habitat-based population distribution. We no longer believe refugia populations are needed to prevent extinction of the subspecies as a whole. However, there is still a need for captive populations for research, and possibly for reintroduction or augmentation of extirpated populations (see discussions and criterion 5 above). There is an ongoing captive propagation program, which has developed methodologies for rearing all life stages in captivity in support of Quino research activities.

This criterion helps reduce or eliminate loss and modification of Quino habitat by providing information needed to determine how to restore modified habitat. Second, this criterion helps reduce the threats posed by fire, enhanced soil nitrogen, increased atmospheric carbon dioxide concentration, and climate change by providing information needed to determine what conservation measures (protection and management) are needed to counteract these threats. Finally, this criterion reduces the threat of population extirpation due to restricted range, localized distribution, and small population size.

7) Initiate and implement a cooperative outreach program targeting areas where Quino populations are concentrated in western Riverside and southern San Diego Counties.

This recovery criterion is still applicable. No centralized cooperative outreach program or coordinated tracking of outreach has been established to-date, although various outreach efforts regularly occur through regional HCPs programs and Service staff interactions with entities such as educational institutions and tribes. Outreach also occurs through interactions of such experts as the captive propagation manager, Dr. Gordon Pratt with members of local communities where he works or conducts studies.

This criterion helps reduce or eliminate loss and modification of Quino habitat by informing the public of threat effects and garnering support for conservation.

IV. SYNTHESIS

The extinction vulnerability of Quino based on the number of known populations has been greatly reduced since the subspecies was listed, and has improved since the Recovery Plan was published. The listing rule (USFWS 1997, 62 FR 2313) identified "seven or eight" extant Quino

populations within the United States. Based on our current analysis (Table 1), populations described in the listing rule belong to 4 core and one non-core habitat-based population distributions. Three of the core habitat-based population distributions known at the time of listing are extant, and the status of one is unknown. The status of the non-core habitat-based population distribution known at the time of listing is unknown. Based on our current analysis (Table 1) 6 core and 25 non-core habitat-based population distributions were documented post-listing. All 6 core habitat-based population distributions documented post-listing are extant. Of the 25 non-core habitat-based population distributions documented post-listing 15 are extant, 6 are of unknown status, and 4 were extirpated post-listing. The habitat conservation status of the subspecies has also improved, because much habitat has been preserved and more is planned for preservation under regional HCPs (Table 1). However, the species is still vulnerable to extinction with current habitat destruction and population losses. Habitat protection and future management mandates, which occurred as a result of listing, make it possible to manage most core populations to prevent future population collapse. Quino still needs the protection and management of the Act in order to achieve recovery, because of continued threats of habitat loss, stochastic environmental events, altered habitat suitability due to climate change, and nonnative species invasions. Therefore, we recommend no status change at this time.

V. RESULTS

Recommended Listing Action:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist (indicate reason for delisting according to 50 CFR 424.11):
    ____ *Extinction*
    ____ *Recovery*
    ____ *Original data for classification in error*
__X__ No Change

New Recovery Priority Number and Brief Rationale: Change to 9C. This number indicates the taxon is a subspecies that faces a moderate degree of threat and has a high potential for recovery (USFWS 1983, 48 FR 43098). The "C" indicates conflict with construction or other development projects or other forms of economic activity. The degree of threat is considered moderate because if recovery were held off for 1-5 years the subspecies would not face immediate extinction. Recovery potential is considered high because the threats to and biological and ecological limiting factors of Quino are well understood. Habitat loss and nonnative species invasions are manageable threats. Furthermore, there is an increased focus on studying and understanding the effects of climate change.

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

1. Work with partners to help protect habitat in the vicinity of the community of Anza, in particular that associated with the new observations west and east of the Tule Peak critical habitat unit (Unit 6; USFWS 2009, 74 FR 28776) and private land within the Bautista critical habitat unit (Unit 7; USFWS 2009,74 FR 28776). Prudent design of

reserves should include landscape connectivity to other habitat patches and ecological connectivity (habitat patches linked by dispersal areas; USFWS 2003a, p. 162) to accommodate range shift due to climate change (USFWS 2003a, p. 64). This action helps meet recovery criterion 1 by reducing or eliminating loss and modification of Quino habitat by eliminating the threat of urban development and other land use changes.

2. Identify partners to conduct potential research to aid in management and conservation of Quino:
    a. Research the effects of common herbicides on immature life stages for use in restoring/managing occupied habitat.
    b. Determine primary and secondary host plant species used in the Campo core habitat-based population distribution.
    c. Determine if larvae are using *Penstamon sp.* as a secondary host plant in the field.

    This action helps meet recovery criterion 2 by providing information needed to determine what habitat requires protection and how to restore modified habitat, which will ultimately contribute to reduced Quino habitat loss and modification.

3. Conduct an experimental reintroduction at Irvine Ranch Preserve using current captive stock (owned by the Irvine Ranch Conservancy) in Orange County at the north end of the Santa Ana Mountains (USFWS 2003a, p. 111). This action helps meet recovery criterion 5 by reducing the threat of population extirpation due to restricted range, localized distribution, and small population size.

4. Conduct surveys to determine the extent of new population discovered in 2009 on CDFG preserve lands (Cañade de San Vicente) in Ramona, and evaluate its status. This action is required to meet recovery criteria 1 and 3, which help reduce or eliminate loss and modification of Quino habitat by eliminating the threat of urban development and other land use changes.

5. Work with partners to help conserve the Quino checkerspot butterfly. Identify opportunities to continue conservation and initiation of formal monitoring of all core habitat-based population distributions (including Warm Springs, Sage, and Bautista Road in Riverside County, and all San Diego County). Currently the Riverside Conservation Authority monitors reference sites in all other core habitat-based population distributions in Riverside County. Other current monitoring is informal and occurs on select conserved lands that may not reflect population status (e.g., in the Warm Springs occurrence complex by Center for Natural Lands Management), or as Service staff or volunteers are available (CFWO 2009). This action helps reduce loss and modification of Quino habitat by eliminating the threat of urban development and other land use changes, and is required to demonstrate successful reduction of all threats and subspecies recovery. This action will help meet recovery criteria 1 and 4.

6. Consider updating the Recovery Plan and recovery units (possible revised units are illustrated in Figures 1 and 2; USFWS 2003a, p. 111). Revision should include a new recovery unit in central San Diego County (USFWS 2003a, pp. 86-88, 111-112) that captures the San Vicente, Cañade de San Vicente, and Mission Trails Park habitat-based

population distributions (Figure 2), and one in northern Orange County that captures suitable habitat for reintroduction (USFWS 2003a, pp. 90-91, 112-113). This action will help achieve subspecies recovery (downlisting or delisting).

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW

Quino checkerspot butterfly (*Euphydryas editha quino*)

Current Classification: Endangered

Recommendation Resulting from the 5-Year Review:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
__X__ No change needed

Review Conducted By: Carlsbad Fish and Wildlife Office

FIELD OFFICE APPROVAL:

Lead Field Supervisor, U.S. Fish and Wildlife Service

ACTING

Approve _____ Date AUG 13 2009

Scott A. Sobiech

REGIONAL OFFICE APPROVAL:

Assistant Regional Director, U.S. Fish and Wildlife Service, Region 8

Approve _____ Date _____

Table 1. Quino checkerspot butterfly occurrence status within the United States, 1986-2009 (time period for recent observations analyzed in the Recovery Plan was within 10 years of listing, 1986- 2002). GIS occurrence data is not available for the portion of the subspecies' range in Mexico.

Occurrence Complex[1]	**Habitat-based population distribution** [2]	**Location (Recovery Unit/ Proposed Recovery Unit)**	**Status at Listing**[3]	**Status in Recovery Plan**	**Status Post-Recovery Plan**	**Current Conservation Estimate**	**Current Threats**[4]
1. Harford Springs	1. Harford Springs	SW of Lake Matthews, RC (NW Riverside)	Extp	Extant	Extp	33 % C 18 % PC 30 % NC 18 % Dev	High: climate change effects, habitat destruction, degradation, and fragmentation, nonnative plant invasion, drought, and fire.
2. Canyon Lake	2. Canyon Lake	W of Canyon Lake, RC (NW Riverside)	ND	Extant	Unk	29 % C 30 % PC 10 % NC 30 % Dev	High: "
3. Horse Thief Canyon	3. Horse Thief Canyon	N of Lake Elsinore (none)	Extp	Extp	DE	100 % Dev	N/A
4. N Murrieta	4. Murrieta	Between I 215 and I 15	ND	DE	Extp	100 % Dev	N/A
5. Murrieta	4. Murrieta	Between I 215 and I 15	ND	DE	Extp	100 % Dev	N/A
6. N Warm Springs Creek	5. Warm Springs Creek Core	N of the City of Murrieta, RC (SW Riverside)	ND	Extant	Unk	13 % C 46 % PC 8 % NC 33 % Dev	High: climate change effects, habitat destruction, degradation, and

							fragmentation, nonnative plant invasion, drought, and fire.
7. Warm Springs Creek	5. Warm Springs Creek Core	N of the City of Murrieta, RC (SW Riverside)	Extant	Extant	Unk	2 % C 32 % PC 10 % NC 57 % Dev	High: "
8. Winchester	6. Winchester	S of the community of Winchester, RC (SW Riverside)	ND	Extant	Unk	9 % C 0 % PC 16 % NC 75 % Dev	High: "
9. Domenigoni Valley	7. Domenigoni Valley	SW of Domenigini Valley Reservoir, RC (SW Riverside)	ND	Extant	Unk	58 % C 46 % PC 15 % NC 22 % Dev	Medium: climate change effects, habitat destruction, degradation, and fragmentation, nonnative plant invasion, drought, and fire.
10. Skinner/ Johnson	8. Skinner/ Johnson Core	Surrounding Lake Skinner, RC (SW Riverside)	Extant	Extant	Extant	38 % C 9 % PC 20 % NC 33 % Dev	Medium: "
11. Crowne Hill	8. Skinner/ Johnson Core	City of Temecula, RC (none)	ND	DE	Extp	100 % Dev	N/A
12. N Butterfield Stage Road	8. Skinner/ Johnson Core	City of Temecula, RC (none)	ND	DE	Extp	100 % Dev	N/A

13. Red Hawk	9. Red Hawk	City of Temecula, RC (none)	ND	DE	Extp	100 % Dev	N/A
14. Pauba Valley	10. Oak Mountain/ Vail Lake Core	W of Oak Mountain RC (S Riverside)	ND	Extant	Unk	1 % C 28 % PC 5 % NC 66 % Dev	High: climate change effects, habitat destruction, degradation, and fragmentation, nonnative plant invasion, drought, and fire.
15. Black Hills	10. Oak Mountain/ Vail Lake Core	N of Oak Mountain RC (S Riverside)	ND	Extant	Unk	0 % C 12 % PC 57 % NC 31 % Dev	High: "
16. Oak Mountain/ Vail Lake	10. Oak Mountain/ Vail Lake Core	Surrounding Vail Lake, RC (S Riverside)	Extant	Extant	Extant	23 % C 62 % PC 6 % NC 9 % Dev	Medium: climate change effects, habitat destruction, degradation, and fragmentation, nonnative plant invasion, drought, and fire.
17. Sage	11. Wilson Valley Core	Surrounding the community of Sage, RC (S Riverside)	Extant	Extant	Unk	5 % C 59 % PC 14 % NC 23 % Dev	High: "
18. Rocky Ridge	11. Wilson Valley Core	S of the community of Sage, RC	ND	Extant	Unk	18 % C 40 % PC 37 % NC	High: "

		(S Riverside)				5 % Dev	
19. Wilson Valley	11. Wilson Valley Core	NW of Wilson Valley, RC (S Riverside)	ND	Extant	Extant	26 % C 63 % PC 4 % NC 7 % Dev	Medium: "
20. Billy Goat Mountain	11. Wilson Valley Core	E of Wilson Valley, RC (S Riverside)	ND	Extant	Unk	49 % C 50 % PC 1 % NC 0 % Dev	Medium: "
21. Aguanga	12. Dameron Valley	W of community of Aguanga, RC (S Riverside)	ND	Extant	Unk	26 % C 38 % PC 16 % NC 19 % Dev	Medium: "
22. Dameron Valley	12. Dameron Valley	SE of community of Aguanga, RC (S Riverside)	ND	Extant	Unk	37 % C 7 % PC 42 % NC 14 % Dev	High: "
23. Oak Grove	13. Oak Grove	Community of Oak Grove, SD (S Riverside)	Extant	Extant	Unk	14 % C 0 % PC 72 % NC 14 % Dev	High: climate change effects, habitat destruction, degradation, and fragmentation, nonnative plant invasion, and fire.
24. Brown Canyon	14. Brown Canyon	SE of the community of Hemet, RC (S Riverside)	ND	Extant	Unk	14 % C 86 % PC 0 % NC 0 % Dev	Medium: habitat degradation, nonnative plant invasion, drought, and fire.

25. Barbara Trail	15. Tule Peak Core	SW of the community of Anza, RC (S Riverside/N San Diego)	ND	Extant	Extant	7 % C 21 % PC 56 % NC 16 % Dev	High: habitat destruction, degradation, and fragmentation, nonnative plant invasion, and fire.
26. Tule Peak	15. Tule Peak Core	S of the community of Anza, RC (S Riverside/N San Diego)	ND	Extant	Extant	26 % C 36 % PC 36 % NC 2 % Dev	Medium: "
27. Iron Spring Canyon	15. Tule Peak Core	S of the community of Anza, RC (S Riverside/N San Diego)	ND	Extant	Extant	28 % C 71 % PC 2 % NC 0 % Dev	Low: habitat degradation, nonnative plant invasion, and fire.
28. Terwilliger Valley	15. Tule Peak Core	S E of the community of Anza, RC (S Riverside/N San Diego)	ND	ND	Extant	48 % C 0 % PC 38 % NC 15 % Dev	High: habitat destruction, degradation, and fragmentation, nonnative plant invasion, and fire.
29. Cahuilla Creek	16. Cahuilla Creek	SW of the community of Anza, RC (S Riverside/N San Diego)	ND	Extant	Unk	0 % C 0 % PC 92 % NC 8 % Dev	High: habitat destruction, degradation, and fragmentation, nonnative plant invasion, and fire.
30. Cave Rocks	17. Cave Rocks	The community	ND	ND	Unk	66 % C 0 % PC	High: "

		of Anza, RC (S Riverside/N San Diego)				31 % NC 62 % Dev	
31. Bautista Road	18. Bautista Road Core	N of the community of Anza, RC (S Riverside/N San Diego)	ND	Extant	Extant	45 % C 9 % PC 23 % NC 22 % Dev	Medium: habitat destruction, degradation, and fragmentation, nonnative plant invasion, and fire.
32. Quinn Flat	19. Quinn Flat	NE of Garner Valley, RC (S Riverside/N San Diego)	ND	ND	Extant	100 % C	Low: nonnative plant invasion and fire.
33. Horse Creek	20. Horse Creek	SE of Bautista Spring, RC (S Riverside/N San Diego)	ND	ND	Extant	98 % C 0 % PC 0 % NC 2 % Dev	Low: "
34. N Rouse Ridge	21. N Rouse Ridge	Rouse Ridge, RC (S Riverside/N San Diego)	ND	ND	Extant	100 % C 0 % PC 0 % NC 0 % Dev	Low: nonnative plant invasion, grazing, and fire.
35. S Fork Trail	22. S Fork Trail	S of State Route 78, NW of Lake Hemet, RC (S Riverside/N San Diego)	ND	ND	Extant	98 % C 0 % PC 2 % NC 0 % Dev	Low: "

36. Pine Meadow	23. Pine Meadow	W Garner Valley, RC (S Riverside/N San Diego)	ND	Extant	Extant	81 % C 0 % PC 15 % NC 5 % Dev	Low: nonnative plant invasion, grazing, and fire.
37. Lookout Mountain	23. Pine Meadow	S Garner Valley, RC (S Riverside/N San Diego)	ND	Extant	Extant	39 % C 0 % PC 61 % NC 0 % Dev	Medium: habitat destruction, degradation, and fragmentation, grazing nonnative plant invasion, and fire.
38. N Garner Valley	24. N Garner Valley	S Garner Valley, RC (S Riverside/N San Diego)	ND	ND	Extant	79 % C 0 % PC 18 % NC 2 % Dev	Low: nonnative plant invasion and fire.
39. Cañada de San Vicente	25. Cañada de San Vicente	S of community of Ramona SD (none/ Central San Diego)	ND	ND	Extant	89 % C 11 % PC 6 % NC 0 % Dev	Medium: climate change effects, nonnative plant invasion, drought, and fire.
40. San Vicente	26. San Vicente Core	N of San Vicente Reservoir, SD (none/ Central San Diego)	ND	Extant	Extant	88 % C 11 % PC 0 % NC 1 % Dev	Medium: "
41. S San Vicente	26. San Vicente Core	N of San Vicente Reservoir, SD (none/ Central San	ND	ND	Extant	27 % C 5 % PC 0 % NC 68 % Dev	Medium: "

		Diego)					
42. Fanita Ranch	26. San Vicente Core	N of the community of Santee, SD (none/ Central San Diego)	ND	ND	Unk	9 % C 36 % PC 54 % NC 1 % Dev	High: climate change effects, habitat destruction, degradation, and fragmentation, nonnative plant invasion, drought, and fire.
43. Sycamore Canyon	26. San Vicente Core	Sycamore Canyon Open Space Preserve S of the City of Poway, SD (none/ Central San Diego)	ND	ND	Extant	88% C 6 % PC 6 % NC 0 % Dev	Medium: climate change effects, nonnative plant invasion, drought, and fire.
44. NE Miramar	26. San Vicente Core	NE border of Miramar Naval Air Station, SD (none/ Central San Diego)	ND	ND	Extant	70 % C 18 % PC 3 % NC 10 % Dev	Medium: climate change effects, habitat degredation, nonnative plant invasion, drought, and fire.
45. Mission Trails Park	27. Mission Trails Park	Mission Trails Regional Park, SD (none/ Central San Diego)	Extp	Extp	Extant	93 % C 0 % PC 1 % NC 6 % Dev	Medium: climate change effects, habitat degradation, nonnative plant invasion, drought, and fire.
46. Alpine	28. Alpine	S of the community	ND	Extant	Unk	13 % C 0 % PC	High: climate change effects,

		of Alpine, SD (none/ Central San Diego)				38 % NC 48 % Dev	habitat destruction, degradation, and fragmentation, nonnative plant invasion, and fire.
47. W Otay Mesa	29. W Otay Mesa	W Otay Mesa, SD (SW San Diego/ S San Diego)	Extp	Extant	Unk	7 % C 0 % PC 0 % NC 93 % Dev	High: climate change effects, habitat destruction, nonnative plant invasion, and drought.
48. W Otay Valley	30. Otay Core	N of Otay Mesa SD (SW San Diego/ S San Diego)	ND	Extirp	Extant	7 % C 15 % PC 8 % NC 69 % Dev	High: "
49. Otay	30. Otay Core	Vicinity of Otay Mountain, Lakes, Mesa, and River, SD (SW San Diego/ S San Diego)	Extant	Extant	Extant	55 % C 17 % PC 19 % NC 9 % Dev	Medium: climate change effects, habitat destruction, degradation, and fragmentation, nonnative plant invasion, and fire.
50. Rancho San Diego/Jamul	30. Otay Core	Vicinity of the community of Jamul, and E of Sweetwater reservoir,	Extp	Extant	Extant	48 % C 15 % PC 16 % NC 21 % Dev	Medium: "

		SD (SW San Diego/ S San Diego)					
51. Jamul Butte	30. Otay Core	N of Jamul Butte, SD (SW San Diego/ S San Diego)	ND	ND	Unk	0 % C 0 % PC 59 % NC 41 % Dev	High: climate change effects, habitat destruction, degradation, and fragmentation, nonnative plant invasion, and fire.
52. Marron Valley	30. Otay Core	W of Otay Mountain, Marron Valley, SD (SW San Diego/ S San Diego)	ND	Extant	Extant	76 % C 0 % PC 24 % NC 0 % Dev	Medium: climate change effects, habitat destruction, degradation, and fragmentation, nonnative plant invasion, and fire.
53. Barrett Junction	30. Otay Core	NW of Tecate Peak, SD (SW San Diego/ S San Diego)	Extp	Extant	Extant	22 % C 0 % PC 73 % NC 6 % Dev	High: "
54. Tecate	31. Tecate	N of the City of Tecate, SD (SW San Diego/ S San Diego)	ND	Extant	Extant	8 % C 0 % PC 43 % NC 48 % Dev	High: "
55. W Barrett	32. W	W of Barrett	Extp	Extp	Extant	78 % C	Medium: habitat

Lake	Barrett Lake	Lake, SD (none/ S San Diego)				0 % PC 17 % NC 5 % Dev	destruction, degradation, and fragmentation, nonnative plant invasion, and fire.
56. Round Portrero	33. Round Portrero	SE of Barrett Lake, SD (none/ S San Diego)	ND	ND	Extant	85 % C 0 % PC 15 % NC 0 % Dev	Medium: "
57. SE Morena	34. SE Morena	SE of Lake Morena and Morena Butte, SD (none/ S San Diego)	ND	ND	Extant	62 % C 0 % PC 38 % NC 0 % Dev	Medium: "
58. Canyon City	35. Canyon City	Vicinity of the community of Canyon City, SD (none/ S San Diego)	ND	ND	Extant	20 % C 0 % PC 80 % NC 0 % Dev	High: "
59. E Canyon City	35. Canyon City	"	ND	ND	Extant	33 % C 0 % PC 67 % NC 0 % Dev	High: "
60. N La Posta	36. Campo Core	NE of the Community of Campo, SD (none/ S San Diego)	ND	ND	Extant	91 % C 0 % PC 9 % NC 0 % Dev	Medium: habitat degradation, destruction, nonnative plant invasion, and fire.
61. La Posta	36. Campo	"	ND	ND	Extant	86 % C	Medium: "

	Core					0 % PC 14 % NC 0 % Dev	
62. E La Posta	36. Campo Core	"	ND	ND	Extant	0 % C 0 % PC 100 % NC 0 % Dev	High: "
63. Campo	36. Campo Core	E of the Community of Campo, SD (none/ S San Diego)	ND	ND	Extant	30 % C 0 % PC 70 % NC 0 % Dev	Medium: "
64. S Campo	36. Campo Core	"	ND	ND	Extant	37 % C 0 % PC 63 % NC 0 % Dev	Medium: "
65. E Campo	36. Campo Core	"	ND	ND	Extant	0 % C 0 % PC 86 % NC 14 % Dev	High: "
66. Jacumba	37. Jacumba Core	NW of the community of Jacumba, SD (SE San Diego/ S San Diego)	Extp	Extant	Extant	59 % C 0 % PC 40 % NC 1 % Dev	Medium: habitat degradation, destruction, nonnative plant invasion, drought, and fire.

Abbreviations: C- conserved based on public ownership or privately owned for conservation purposes, includes tribal lands; Dev- developed or converted to agriculture based on GIS land use data and satellite imagery; DE- documented then subsequently extirpated; E- east; Extp- extirpated; I- Interstate; N- north; N/A- not applicable; NC- no conservation planned based on private ownership and no inclusion in an HCP reserve design; ND- not documented, no historic records; PC- planned for conservation based on a Habitat Conservation Plan reserve design model or map; RC- Riverside County; S- south; SD- San Diego County; Unk- unknown; W- west;

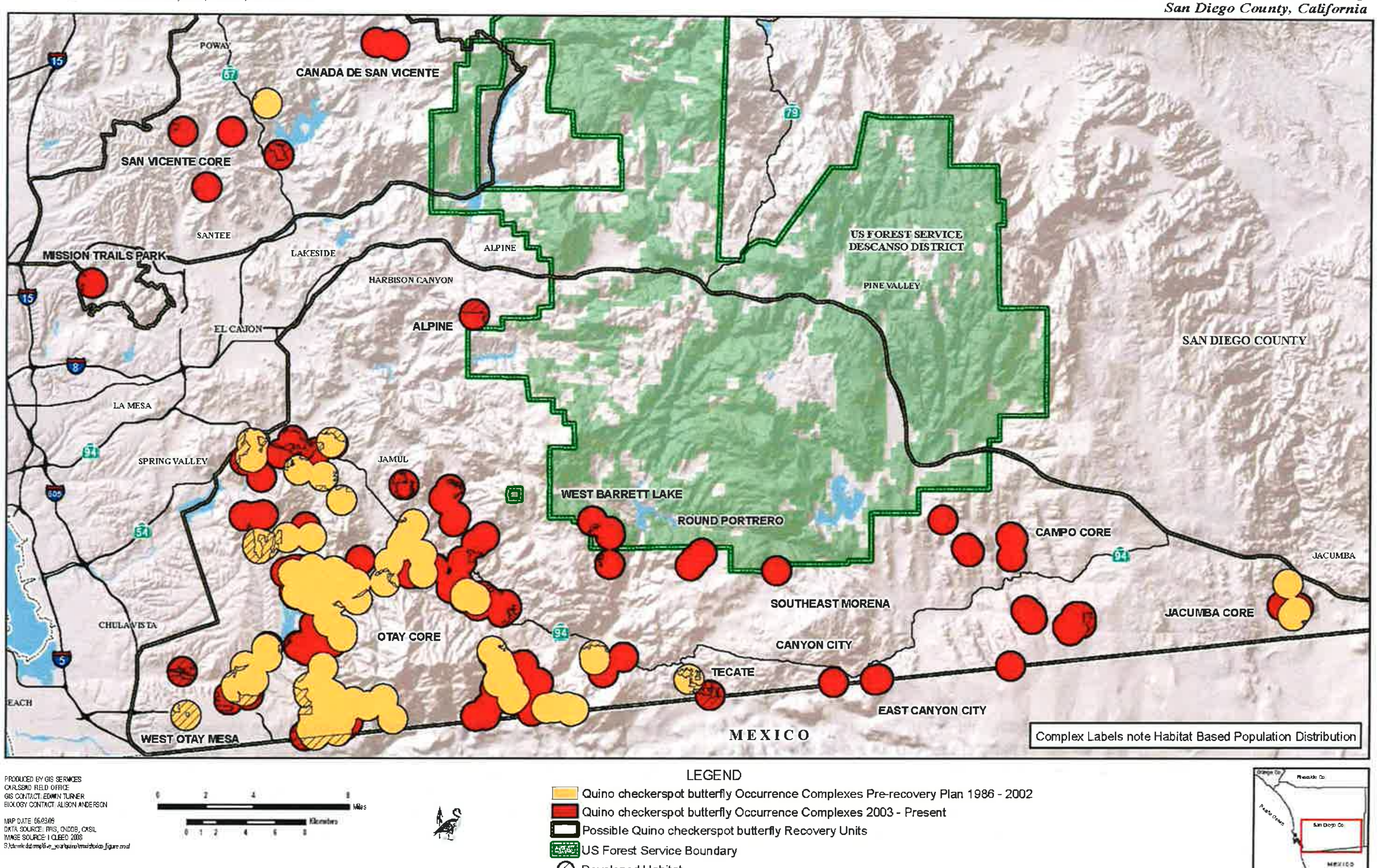
[1]The area within overlapping one km radii of the most recent observation locations (may be a single-non-overlapping area).

[2]Estimated population memberships and categorization based on methods used in the final revised critical habitat rule to map critical habitat units (USFWS 2009, 62 FR 2313). Membership is based on contiguous, suitable habitat between occurrence complexes that are less than 1.2 mile (2 kilometer) apart.

[3]Estimate based on GIS occurrence data and listing rule text, "Currently, only seven or eight populations are known within the United States… All known extant populations in the United States occur in southwestern Riverside and north-central San Diego counties… In 1996, a very small group of [Quino checkerspot butterflies] was sighted on Otay Mesa, but …is not expected to persist" (January 16, 1997, 62 FR, p. 2315).
[4]Climate-change effects are listed as a threat for all lower elevation occurrence complexes that are likely to experience decreasing habitat suitability (Preston et al. 2008, p. 2508), we used a break point of 2,500 feet (762 meters). Non-climate change-related drought is listed as a threat for all occurrence complexes with a 1961-1990 annual average precipitation below 15 inches (38 centimeters) (Oregon Climate Service 1995, p. 1).

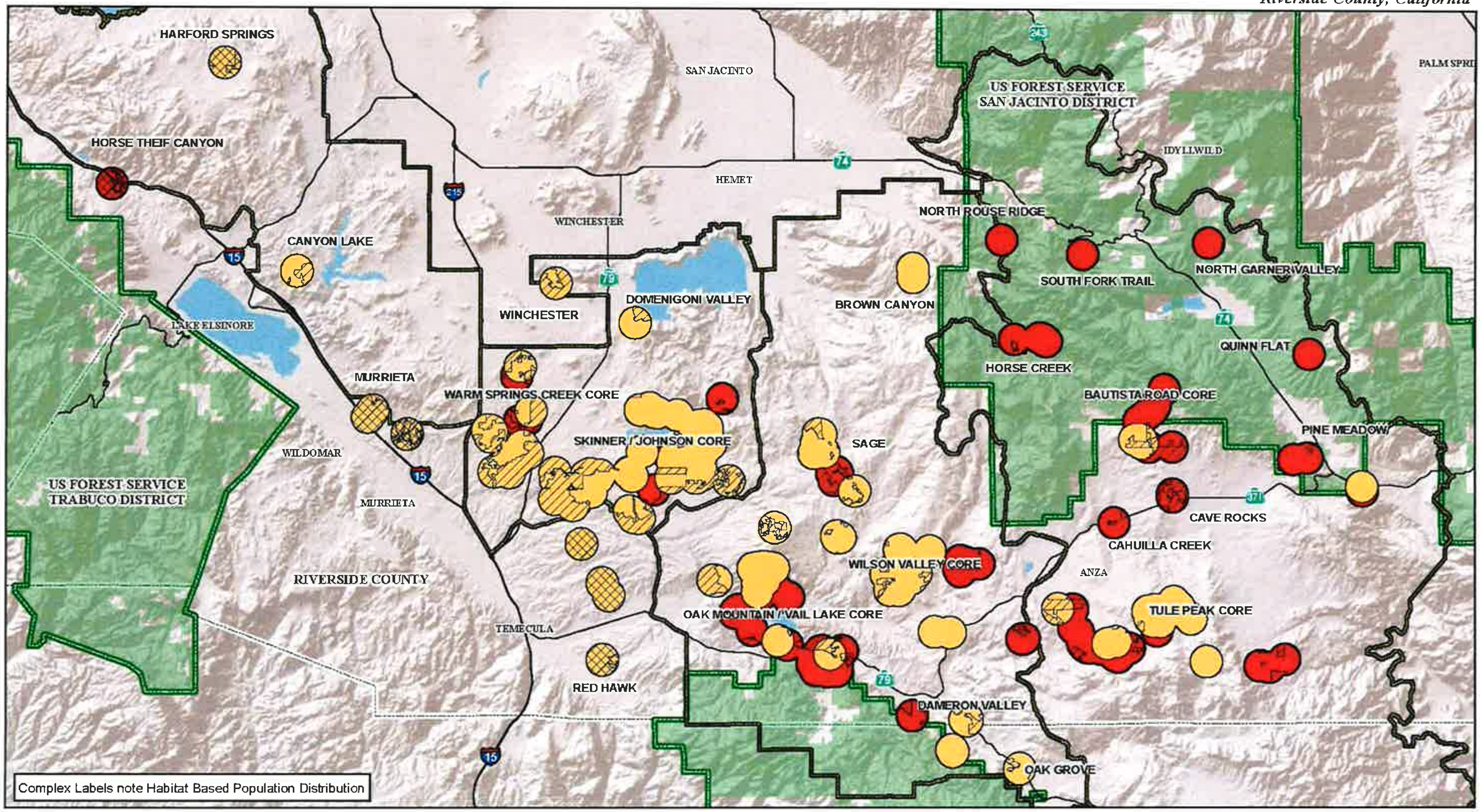
U.S. Fish & Wildlife Service
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Carlsbad, California 92011

Quino checkerspot butterfly Habitat Complex Map
San Diego County, California



U.S. Fish & Wildlife Service
Carlsbad Fish and Wildlife Office
6010 Hidden Valley Road, Carlsbad, California 92011

Quino checkerspot butterfly Habitat Complex Map
Riverside County, California



PRODUCED BY GIS SERVICES
CARLSBAD FIELD OFFICE
GIS CONTACT: EDWIN TURNER
BIOLOGY CONTACT: ALISON ANDERSON

MAP DATE: 06/23/09
DATA SOURCE: FWS, CNDDB, CASIL
IMAGE SOURCE: I-CUBED 2003

Miles: 0 2 4 8
Kilometers: 0 1 2 4 6 8

LEGEND

- Quino checkerspot butterfly Occurrence Complexes Pre-recovery Plan 1986 - 2002
- Quino checkerspot butterfly Occurrence Complexes 2003 - Present
- Possible Quino checkerspot butterfly Recovery Units
- US Forest Service Boundary
- Extirpated Complex
- Developed Habitat

Federal Register

Monday,
April 15, 2002

Part III

Department of the Interior

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Quino Checkerspot Butterfly (Euphydryas editha quino); Final Rule

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

RIN 1018–AH03

Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Quino Checkerspot Butterfly (*Euphydryas editha quino*)

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), designate critical habitat for the Quino checkerspot butterfly (*Euphydryas editha quino*) pursuant to the Endangered Species Act of 1973, as amended (Act). A total of approximately 69,440 hectares (ha) (171,605 acres (ac)) in Riverside and San Diego Counties, California, are designated as critical habitat for the Quino checkerspot butterfly.

Critical habitat identifies specific areas, both occupied and unoccupied, that are essential to the conservation of a listed species and that may require special management considerations or protection. The primary constituent elements for the Quino checkerspot butterfly are those habitat components that are essential for the Quino checkerspot butterfly. All areas designated as critical habitat for the Quino checkerspot butterfly contain one or more of the primary constituent elements essential to the conservation of the species. This final rule takes into consideration the potential economic and other effects of designating critical habitat for the Quino checkerspot butterfly.

We solicited data and comments from the public on all aspects of the proposed rule and draft economic analysis. We revised the proposal and the draft economic analysis to incorporate or address new information received from habitat and butterfly surveys conducted during the 2001 butterfly flight season; public comments on the proposed critical habitat designation and the draft economic analysis on the proposed designation; the Quino Checkerspot Butterfly Recovery Plan (Service, in prep.); and any new scientific and commercial information made available since the proposal was published.

DATES: This designation becomes effective on May 15, 2002.

ADDRESSES: Comments and materials received, as well as supporting documentation used in the preparation of this final rule, are available for public inspection, by appointment, during normal business hours at the Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service, 2730 Loker Avenue West, Carlsbad, CA 92008.

FOR FURTHER INFORMATION CONTACT: Douglas Krofta, Chief, Branch of Listing, Carlsbad Fish and Wildlife Office, at the above address (telephone 760/431–9440; facsimile 760/431–9624).

SUPPLEMENTARY INFORMATION:

Background

The Quino checkerspot butterfly (*Euphydryas editha quino*) is a member of the family Nymphalidae (brush-footed butterflies) and the subfamily Melitaeinae (checkerspots and fritillaries). The Quino checkerspot differs in physical appearance from other subspecies of *E. editha* in size, wing coloration, larval, and pupal characteristics (Mattoni *et al.* 1997). Researchers have spent more than 4 decades conducting extensive focused research on Edith's checkerspot (*Euphydryas editha*), in particular the federally-listed bay checkerspot butterfly (*Euphydryas editha bayensis*). While an extraordinary amount of information is available on Edith's checkerspot in general, specific information on the Quino checkerspot is sparse (Murphy and White 1984, Mattoni *et al.* 1997, Osborne and Redak 2000), including only two formal ecological studies (White and Levin 1981, Osborne and Redak 2000). Therefore, much of the information used in developing this critical habitat designation, as well as the recovery and management strategy for the Quino checkerspot butterfly, as discussed in the recovery plan that is currently being finalized (Service, in prep.), is based on research on other subspecies of Edith's checkerspot, especially the bay checkerspot butterfly. Because there are a number of biological and ecological similarities between the two federally endangered subspecies of Edith's checkerspot, including shared host plant species, a primarily coastal (historic) distribution, and apparently similar within-patch dispersal behavior (Mattoni *et al.* 1997, White and Levin 1981), we believe that extrapolation of bay checkerspot butterfly research conclusions to the Quino checkerspot butterfly is justified in most cases.

The Quino checkerspot butterfly has undergone several nomenclatural changes. Originally described as *Melitaea quino* (Behr 1863), Gunder (1929) reduced it to a subspecies of *Euphydryas chalcedona*. At the same time, he described *Euphydryas editha wrighti* from a checkerspot specimen collected in San Diego County. After reexamining Behr's descriptions and specimens, Emmel *et al.* (1998) concluded that the Quino checkerspot butterfly should be associated with *E. editha*, not *E. chalcedona*. For the Quino checkerspot butterfly, *E. editha quino* is now the accepted scientific name.

The life cycle of the Quino checkerspot butterfly includes four distinct life stages: egg, larva (caterpillar), pupa (chrysalis), and adult, with the larval stage divided into 5 to 7 instars (periods between molts, or shedding skin). There is typically one generation of adults per year, with a 4- to 6-week flight period beginning between late February and May, depending on weather conditions (Emmel and Emmel 1973). Adult emergence from pupae is staggered, resulting in a 1- to 2-month flight season, with each adult butterfly living approximately 10 to 14 days (Service, in prep.).

The adult Quino checkerspot butterfly has a wingspan of approximately 4 centimeters (cm) (1.5 inches (in.)). The top sides of the wings have a red, black, and cream colored checkered pattern while the bottom sides have a red and cream marbled pattern. The abdomen of the Quino checkerspot butterfly has red stripes across the top. Quino checkerspot butterfly larvae are dark black with a row of orange fleshy, hairy extensions on their backs. Pupae are mottled black on a pale blue-gray background.

Peak adult butterfly emergence for most brush-footed butterfly species, and probably for Quino checkerspot butterflies as well, occurs shortly after the beginning of the flight season, usually in the second or third week (Zonneveld 1991). Female bay checkerspot butterflies usually mate on the day they emerge from the pupa and lay 1 or 2 egg clusters per day for most of their adult life. Bay and Quino checkerspot egg clusters typically contain 20 to 150 eggs (M. Singer, C. Parmesan, and G. Pratt, pers. comm., 1999). Eggs deposited by adults on host plants hatch in 10 to 14 days. If sufficient rain falls in late summer or early fall, a rare second generation of fewer adults may occur (Mattoni *et al.* 1997).

Quino checkerspot butterfly larvae may undergo as many as seven molts prior to pupation. During the first two instars, pre-diapause (before summer dormancy) larvae cannot move more than a few centimeters and are usually restricted to the primary host plant species (plants on which the adult

female butterfly lays her eggs). Newly hatched larvae spin a web and feed in clusters on the plant where their eggs were deposited. During the third instar (about 10 days after hatching), larvae are able to move between individual host plants. Third instar larvae usually wander independently in search of food and may switch from feeding on the plant on which they hatched to another host plant, either of the same species or another one that serves as an alternate food source. If larvae have accumulated sufficient energy reserves, they enter diapause (summer dormancy) as host plants age and become dry and inedible, and usually remain in diapause until December or January. Although the exact location of diapausing Quino checkerspot butterfly larvae is not known, clusters of post-diapause larvae found near dense grass and shrub cover indicate that they may diapause in these areas (Osborne and Redak 2000). Laboratory observations have demonstrated Quino checkerspot butterfly larvae are capable of sustaining or reentering diapause for multiple years, the maximum duration of which has not yet been determined (G. Pratt, pers. comm., 2001).

Sufficient rainfall, usually during November or December, stimulates germination and growth of host plants, and apparently causes larvae to break diapause. Records of Quino checkerspot butterfly individuals collected following unusual summer rains indicate that it does not require winter chilling to break diapause, and may not diapause at all under some circumstances (Mattoni *et al.* 1997). Post-diapause larvae can crawl up to several meters in search of food and disperse among their host plants. Post-diapause larval dispersal has been well documented in the bay checkerspot butterfly. Post-diapause larvae seek microclimates (small habitats with uniform climate) with exposure to sunlight, which speeds development (White 1974, Weiss *et al.* 1987, Osborne and Redak 2000). Because of variable weather during winter and early spring, the time between the termination of diapause and pupation can range from 2 weeks, if conditions are warm and sunny, to over 2 months if cold, rainy conditions prevail (G. Pratt, pers. comm., 2001). Post-diapause larvae undergo from 2 to as many as 4 instars prior to pupating in webbed shelters near ground level. Adults emerge from pupae after approximately 10 days, depending on the weather (Mattoni *et al.* 1997).

Adult Quino checkerspot butterflies spend time searching for mates, basking in the sun to regulate body temperature, feeding on nectar, defending territories, and in the case of females, searching for sites to deposit eggs. The Quino checkerspot butterfly, like other subspecies of Edith's checkerspot, shows a habitat preference for low-growing vegetation interspersed with barren spots (Osborne and Redak 2000). The thermodynamic requirements of the butterfly and its natural avoidance of shaded areas deter flight below the canopy of vegetation (M. Singer, pers. comm., 2001).

Male Quino checkerspot butterflies, and to a lesser extent females, are frequently observed on hilltops and ridgelines (Carlsbad Fish and Wildlife Office GIS Quino checkerspot butterfly database and metafile, Osborne 2001). A number of behaviors characteristic of species commonly found on hilltops have been documented. For example, male Quino checkerspots have been observed to perch consistently in prominent locations on hilltops devoid of host plants and "attack" any other males that approach (Osborne 2001, Pratt 2001). Further evidence that Edith's checkerspots may display facultative "hilltopping" behavior was found in Colorado, where males of an Edith's checkerspot population were also observed aggregating on hilltops, where females travel to seek mates, when population densities were low (Ehrlich and Wheye 1986 as discussed in Ehrlich and Murphy 1987). Hilltops may also represent centers of Quino checkerspot population density in some areas. Based on occurrence data, Quino checkerspot butterfly adults are frequently observed on hilltops (Service, in prep.), even in the absence of nearby larval host plants (Osborne 2001). Based on current knowledge of the Quino checkerspot butterfly ecology and biology, we believe hilltops provide essential breeding areas for some local populations.

Habitat patch distributions are defined by a matrix of adult resources (all larval resources are found within areas of adult movement), primarily nectar plants, oviposition plants, and basking sites. Habitat patches for the bay checkerspot butterfly can vary greatly in area and distribution (Harrison *et al.* 1988). Habitat patch fragmentation occurs when land use changes compromise adult movement patterns and frequently results from habitat destruction that reduces resource availability. Such fragmentation may significantly reduce the ability of habitat patches to support local populations.

Most Quino checkerspot butterfly populations are part of a larger metapopulation structure (sets of local habitat patch populations) (Service, in prep.). Isolated habitat patches are not sufficient to ensure the long-term persistence of butterfly metapopulations (Hanski 1999). A local habitat patch population may be expected to persist on the time scale of years (Harrison 1989). Persistence of metapopulations for longer terms results from the interaction among sets of local habitat patch populations at larger geographic scales. Although local habitat patch populations may change in size independently, their probabilities of existing at a given time are not independent of one another because they are linked by processes of extirpation and mutual recolonization, processes that occur on the order of every 10 to 40 years for some butterflies, including the Quino checkerspot (Harrison *et al.* 1988, Murphy and White 1984).

Metapopulations should be stable over the course of decades, since most of their constituent habitat patch populations will be recolonized within approximately 10 years of extirpation. The intervening distance and topography among habitat patches primarily determine colonization rates (Harrison 1989). The long-term persistence of butterfly species with metapopulation dynamics depends on the maintenance of temporarily unoccupied habitat patches and recolonization events that link habitat patches within metapopulations (Murphy and White 1984; Hanski 1999; Service, in prep.). Maintenance of landscape connectivity (habitat patches linked by intervening dispersal areas) is essential in order to maintain metapopulation resilience. Land use changes that dispersal between habitat patches and isolate local populations by compromising landscape connectivity can be just as detrimental to metapopulation survival as those that destroy or reduce the size of habitat patches (Service, in prep.).

Possibly the most extensive documentation of metapopulation dynamics in any species has been carried out over the past 42 years on several subspecies of Edith's checkerspot, primarily the endangered bay checkerspot (*e.g.*, Ehrlich 1961, 1965; Singer 1972; Murphy and Ehrlich 1980; White and Levin 1981; Ehrlich and Murphy 1987; Harrison 1989; Boughton 1999, 2000). Although not every population of Edith's checkerspot studied has demonstrated metapopulation dynamics (Ehrlich and Murphy 1987), the majority of studies (*e.g.*, Ehrlich 1961, 1965; Singer 1972; Murphy and Ehrlich 1980; White and Levin 1981; Ehrlich and Murphy 1987; Harrison 1989; Boughton 1999, 2000) and local climate and habitat patterns

(Service, in prep.) indicate most Quino checkerspot populations should display some type of metapopulation dynamics. Until the specific long-term dynamics or genetic composition of Quino checkerspot populations are documented and suggest otherwise, it is prudent to assume that local populations belong to a greater metapopulation at some spatial and temporal scale (Hanski 1999; Service, in prep.).

Mark-release-recapture studies indicate that in most seasons Edith's checkerspot subspecies exhibit sedentary behavior during the majority of their adult lives, although these studies were not specifically designed to quantify long-distance dispersal. In this type of study, researchers mark captured individuals, release them, and then recapture as many as possible within a target area after a period of time. Most recaptures have occurred within 100 to 200 meters (m) (490 to 980 feet (ft)) of release (Ehrlich 1961, 1965; Gilbert and Singer 1973; White and Levin 1981; Harrison *et al.* 1988; Harrison 1989; Boughton 1999, 2000). Harrison *et al.* (1988) documented no between-habitat patch transfers of marked individuals greater than 1 km (0.6 mi). Harrison (1989) recaptured bay checkerspots in a target habitat patch greater than 1 km (0.6 mi) from the point of release in only 5 percent of cases. However, dispersal tendency appears to be relatively variable in Edith's checkerspots (White and Levin 1981) and appears to have evolved to fit local or regional situations (Gilbert and Singer 1973). White and Levin (1981) noted that, "It seems likely from the lower return rate in 1972 (a dry year) and from the observed pattern of out-dispersal, that many marked (male Quino checkerspot butterflies) individuals dispersed beyond the area covered by our efforts that year." Research indicated that females were more likely to emigrate than males (Ehrlich *et al.* 1984); and older adults appeared to have a greater tendency to disperse as butterfly densities, host plant suitability, and female egg load weights declined (White and Levin 1981, Harrison 1989).

When quality host plants are in short supply, larvae respond by diapausing (if they are mature enough) and adults respond by dispersing (White and Levin 1981, Murphy and White 1984). Several populations of Quino checkerspots studied for almost a decade increased in number by nearly two orders of magnitude in 1977, and many habitat patches were defoliated by larvae, resulting in very high rates of dispersal (Murphy and White 1984). Dispersal tendency also increased when dry conditions reduced the number and suitability of host plants (White and Levin 1981). Long-distance dispersal in bay checkerspot butterflies has been documented as far as 6.4 km (3.9 mi) (Murphy and Ehrlich 1980), 5.6 km (3.4 mi) (1 male), and 2 km (1.8 mi) (1 female) (Harrison 1989). Individual long-distance dispersal may be prevalent under certain conditions, but the likelihood of long-distance colonization by a given individual is usually low because environmental conditions promoting dispersal are not likely to also promote colonization due to reduced butterfly densities and host plant quality.

Dispersal direction from habitat patches seems to be random in the bay checkerspot butterfly, but dispersing butterflies are likely to move into habitat patches when they can detect them (pass within approximately 50 m (163 ft)), and are most likely to remain where the existing density of butterflies is lowest (Harrison 1989). Bay checkerspot butterfly patch occupancy patterns also suggest that patches separated from a source population by hilly terrain are less likely to be colonized than those separated by flat ground (Harrison 1989). Harrison (1989) concludes that because establishment rates were low during her study, and initial dispersal direction was random, relatively large numbers of butterflies must have emigrated from the source population at some point to explain the apparent long term habitat patch re-colonization pattern. High habitat patch colonization rates probably only occur during rare outbreak years, when high local densities combine with favorable establishment conditions in unoccupied patches (Harrison 1989). Rare outbreak events are thought to play a crucial role in Quino checkerspot butterfly metapopulation resilience (Murphy and White 1984).

Long-distance habitat patch colonization may be achieved within a single season through dispersal of individual butterflies, or over several seasons through stepping-stone habitat patch colonization events. Bay checkerspot island habitat patch recolonization distances from the Morgan Hill mainland habitat patch population averaged 3.4 km (2.1 mi) between the late 1970s and late 1980s, with a minimum distance (individual butterfly movement) of 1.4 km (0.9 mi), and a maximum of 4.4 km (2.7 mi) (Harrison *et al.* 1988). An overview of dispersal studies suggests that long-distance movements by individuals are not common, but may allow for infrequent between-patch exchanges of up to 6.0 km (3.7 mi) under optimal conditions. Bay checkerspot butterfly habitat patch colonization patterns and models suggest that habitat patches as distant as 7.0 km (4.3 mi) may provide sources of recolonization for each other via stepping-stone dispersal over a 40- to 50-year period (Harrison 1988 *et al.*, Harrison 1989).

Quino checkerspot butterfly oviposition (egg deposition) has most often been documented on *Plantago erecta* (dwarf plantain). However, egg clusters and pre-diapause larvae have also recently been documented on other species of host plant. *Plantago patagonica* (woolly plantain) and *Anterrhinum coulterianum* (white snapdragon) appear to be the primary host plants utilized above the elevational limits of dwarf plantain (approximately 3000 m (9750 ft)) (Pratt 2001). In 2000 (a dry year), all larval clusters at the Silverado pre-approved mitigation area in Riverside County were found on woolly plantain (and few white snapdragon plants were observed). In 2001, however, when both host plants were abundant, all larval clusters were found on white snapdragon despite the presence of woolly plantain (Pratt 2001). In 2001, a site near Barrett Junction in southern San Diego County yielded another interesting primary host plant observation. Although dwarf plantain was abundant, the plants were small in stature and all larval clusters were found on *Cordylanthus rigidus* (thread-leaved bird's beak) within the patches of dwarf plantain, confirming earlier observations of this species as a primary host plant (Pratt 2001). All host plant species occur in coastal sage scrub, open chaparral, grassland, and similar open-canopy plant communities. Dwarf plantain is often associated with soils with fine-textured clay or with cryptogamic crusts (i.e., soil crusts composed of fungi, mosses, and lichens).

The two most important factors affecting the suitability of host plants for Quino checkerspot butterfly oviposition are exposure to solar radiation and host plant phenology (timing of development). Quino checkerspot butterflies deposit eggs on plants located in full sun, preferably surrounded by bare ground or sparse, low-growing vegetation (Weiss *et al.* 1987, 1988; Osborne and Redak 2000). Primary host plants must remain edible for approximately 8 weeks to support pre-diapause larvae if no secondary host plants (species of host plant adults do not deposit eggs on) are available (Singer 1972, Singer and Ehrlich 1979).

Secondary host plants may be important before and after larval

diapause. Secondary host plants are important for pre-diapause larvae when the primary hosts become unavailable before larvae can enter diapause, and for post-diapause larvae when primary host plant availability is limited when the larvae emerge from diapause. Such was the case with many populations of the bay checkerspot where dwarf plantain was the primary host plant, but most larvae survived to reach diapause by migrating to *Castilleja exserta* (owl's clover). Pre-diapause larvae fed on owl's clover until diapause, then returned to feeding on dwarf plantain when they broke diapause in the winter (Singer 1972, Ehrlich *et al.* 1975). Some populations of the Quino checkerspot butterflies may depend on secondary hosts for their survival. Multiple overlapping primary and secondary host plant distributions within a habitat patch probably contribute to patch suitability. For example, in 2001 a host plant micro-patch was documented in southwestern San Diego County where thread-leaved bird's beak was the primary host plant, but dwarf plantain (relatively small in stature) and owl's clover were also present (Pratt 2001). It is possible that dwarf plantain is an important post-diapause secondary host plant at sites such as the one near Barrett Junction because thread-leaved bird's beak is very immature, and less abundant, than dwarf plantain when larvae come out of diapause (Pratt 2001).

Edith's checkerspot butterflies use a much wider range of plant species for adult nectar feeding than for larval foliage feeding. The butterflies frequently take nectar from *Lomatium* spp. (lomatium), *Muilla* spp. (goldenstar), *Achillea millefolium* (milfoil or yarrow), *Amsinkia* spp. (fiddleneck), *Lasthenia* spp. (goldfields), *Plagyobothrys* and *Cryptantha* spp. (popcorn flowers), *Gilia* spp. (gilia), *Eriogonum fasciculatum* (California buckwheat), *Allium* spp. (onion), and *Eriodictyon* spp. (yerba santa) (D. Murphy and G. Pratt, pers. comm., 2000). *Salvia columbare* (chia) may also be used for nectar feeding (Orsak 1978; K. Osborne, pers. comm., 2001), but is probably not preferred (G. Pratt, D. Murphy, pers. comm., 2001). Quino checkerspot butterflies have been observed flying several hundred meters from the nearest larval habitat patch to nectar sources.

Although habitat patches may theoretically be delineated by long-term studies based on host and nectar plant distribution and density, delineation of long-term habitat patch footprints, or extant larval occupancy, may be difficult to estimate at any given point in time (Service, in prep.). Plant population quality, density, and distribution change over time for a variety of reasons, and Quino checkerspot populations have evolved to respond to shifting habitat patch suitability in space and time (Service, in prep.). For example, environmental conditions may not favor plant germination one season, or favor germination of other plant species, but low-density germination of host plant individuals or a seed bank may still result in abundant germination at a later date. Lower primary host plant density may be sufficient if secondary host plant species are present, and feeding by herbivores, including Quino checkerspot butterfly larvae, will reduce the density of host plants, even under the best environmental conditions (Service, in prep.). During years when host plant densities are too low to support larvae to maturity, the larvae may remain in diapause for 2 or more years. Host plant densities may even remain very low for a long enough period to result in the extirpation of larval residents (of micropatches) or local populations (of habitat patches). If the canopy opens or environmental conditions improve, these sites may support larvae again. Because the size, quality, and number of host plant micropatches and habitat patches fluctuate regularly, so do Quino checkerspot population distributions and the number of Quino checkerspot individuals that mature each season.

The Quino checkerspot butterfly is threatened primarily by urban and agricultural development, non-native plant species invasion, off-road vehicle use, grazing, and fire management practices (62 FR 2313). These threats destroy and degrade the quality of habitat and result in the extirpation of local Quino checkerspot populations. Quino checkerspot butterfly population decline likely has been, and will continue to be, caused in part by enhanced nitrogen deposition, elevated atmospheric carbon dioxide concentrations, and climate change (Service, in prep.). Nonetheless, urban development poses the greatest threat and exacerbates all other threats. Activities resulting in habitat fragmentation or host or nectar plant removal reduce habitat quality and increase the probability of local Quino checkerspot butterfly population extirpation and species extinction.

Other threats to the species identified in the final listing rule (62 FR 2313) include illegal trash dumping and predation. Dumping, a documented problem for some populations (G. Pratt, pers. comm., 2000, 2001), is detrimental because of resulting habitat degradation and destruction. Over-collection by butterfly hobbyists and dealers is a probable threat, although the magnitude of this activity is unknown. Stamp (1984) and White (1986) examined the effects of parasitism and predation on the genus *Euphydryas*, although it is not clear whether these mortality factors pose a significant threat to this species. Predation by Argentine ants (*Iridomyrmex humilis*) has been observed in colonies of the butterfly in the laboratory (G. Pratt, pers. comm., 2000) and intense predation by non-native Brazilian fire ants (*Solenopsis invicta*) is likely where they co-occur with Quino checkerspot butterflies (Porter and Savignano 1990). Brazilian fire ants were documented in 1998 in the vicinity of historic Quino checkerspot butterfly habitat in Orange County and have subsequently been found in Riverside and Los Angeles Counties (California Department of Food and Agriculture 1999).

The recovery strategy for the Quino checkerspot butterfly focuses on conservation of occurrence complexes within recovery units, as discussed in the recovery plan that is currently being finalized (Service, in prep.). Occurrence complexes are based on Quino checkerspot butterfly observations, probably within a greater distribution of undocumented metapopulations. Occurrences are mapped in the recovery plan (Service, in prep.) using a 1 km (0.6 mi) dispersal radius. This distance delineates the area within which we would expect to find the habitat patch associated with an individual observed butterfly (Gilbert and Singer 1973, Harrison *et al.* 1988, Harrison 1989). Occurrences within 2 km (1.2 mi) of each other are considered to be part of the same occurrence complex because such observations are proximal enough that the observed butterflies would have come from the same population (Ehrlich and Murphy 1987, Harrison *et al.* 1988, Harrison 1989).

Recovery units represent the primary areas for managing recovery efforts (Service, in prep.). Most recovery units contain of one or more core occurrence complexes and correspond to habitat regions described in the recovery plan (Service, in prep.). Several factors were considered in identifying recovery units, including biological factors, political boundaries, and ongoing conservation efforts. In some instances, recovery unit boundaries were modified to maximize efficiency of reserves, encompass areas of common threats, or accommodate logistic concerns. Recovery units include areas of apparent landscape connectivity that are

not currently known to be occupied (*e.g.*, the Railroad Canyon Reservoir (Canyon Lake) area in Riverside County), when evidence warranted inclusion. Because of their broad scale, recovery units include lands both essential and non-essential to the long term conservation of the Quino checkerspot butterfly.

Although the Quino checkerspot butterfly is a subspecies of Edith's checkerspot, for ease in description we refer to it as a species for the remainder of this document.

Previous Federal Action

On September 30, 1988, we received a petition dated September 26, 1988 to list the Quino checkerspot butterfly as endangered under the Act from Dr. Dennis Murphy of the Stanford University Center for Conservation Biology. At the time the petition was submitted, Quino checkerspot butterfly observations had not been reported for several years. The status of the Quino checkerspot butterfly had been under review since 1984 (49 FR 21664). It was classified as a Category 1 candidate species on November 21, 1991 (56 FR 58804), meaning that information on file was sufficient to support a proposal to list this species as endangered or threatened.

On August 4, 1994, we published a petition finding in the **Federal Register** (59 FR 39868) with a proposed rule to list the Quino checkerspot butterfly as endangered. This publication included the 90-day finding that the petition presented substantial information that listing the Quino checkerspot butterfly may be warranted, the 12-month petition finding that listing the Quino checkerspot butterfly was warranted, and the proposed rule to list the species. On September 26, 1994, we published a notice extending the public comment period and announcing a public hearing on the proposed rule for the Quino checkerspot butterfly and several other species (59 FR 49045). We published a final rule listing the Quino checkerspot butterfly as endangered on January 16, 1997 (62 FR 2313). In the final listing rule, we determined that designation of critical habitat was not prudent for the Quino checkerspot butterfly.

On June 30, 1999, the Center for Biological Diversity filed suit in the U.S. District Court, challenging the not-prudent finding for critical habitat as published in the final listing rule for the Quino checkerspot butterfly. The plaintiff contended that we did not properly consider the benefits of designating critical habitat or adequately document known or perceived threats that would result from a critical habitat designation. On February 16, 2000, we agreed to a stipulated settlement that required us to re-evaluate the existing not-prudent finding. If we found that critical habitat was prudent, then a proposal to designate critical habitat was to be submitted for publication in the **Federal Register** by February 1, 2001, and a final designation made by October 1, 2001. If we found that critical habitat was not prudent, then a final determination was to be submitted for publication in the **Federal Register** by June 1, 2001.

In accordance with the stipulated settlement agreement, we re-evaluated the not-prudent finding as determined at the time of listing. Following our re-evaluation, we determined that designating critical habitat was, in fact, prudent and published a proposed rule to designate it on February 7, 2001 (66 FR 9476).

Because completion of the draft economic analysis for the proposed designation was delayed and we required time to hold public hearings, we requested a 90-day extension to adequately address public comments and complete the final designation from the plaintiffs. The plaintiffs agreed to the extension and on October 2, 2001 the District Court approved the 90-day extension requiring us to complete the final designation by January 4, 2002. We subsequently received another extension giving us until April 4, 2002 to complete the final designation of critical habitat for the Quino checkerspot butterfly.

Critical Habitat

Critical habitat is defined in section 3 of the Act as—(i) the specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographic area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. "Conservation" means the use of all methods and procedures that are necessary to bring an endangered or threatened species to the point at which listing under the Act is no longer necessary.

Critical habitat receives protection under section 7 of the Act through prohibition against destruction or adverse modification of critical habitat with regard to actions carried out, funded, or authorized by a Federal agency. Section 7 also requires conferences on Federal actions that are likely to result in the destruction or adverse modification of proposed critical habitat. In our regulations at 50 CFR 402.02 we define destruction or adverse modification as "the direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species. Such alterations include, but are not limited to, alterations adversely modifying any of those physical or biological features that were the basis for determining the habitat to be critical." Aside from the added protection that may be provided under section 7, the Act does not provide for other forms of protection to lands designated as critical habitat. Because consultation under section 7 of the Act does not apply to activities on private or other non-Federal lands that do not involve a Federal nexus, critical habitat designation would not afford any additional protections under the Act against such activities.

To be included in a critical habitat designation, the habitat must first be "essential to the conservation of the species." Critical habitat designations identify, to the extent known, habitat areas that provide for the essential life cycle needs of the species (*i.e.*, areas containing the primary constituent elements, as defined at 50 CFR 424.12(b)) using the best scientific and commercial data available.

Section 4 requires that we designate critical habitat for a species, to the maximum extent determinable and practicable, at the time of listing. When we designate critical habitat at the time of listing or under short court-ordered deadlines, we will often not have sufficient information to identify all areas which are essential for the conservation of the species. Nevertheless, we are required to designate those areas we know to be essential, at the time of designation, using the best information available.

Within the geographic area occupied by the species, we will designate only areas currently known to be essential. Essential areas should already have the features and habitat characteristics that are necessary to sustain the species. We will not speculate about what areas might be found to be essential if better information became available, or what areas may become essential over time. If the information available at the time of designation does not show that an area provides essential life cycle needs of the species, then the area should not be included in the critical habitat designation.

Our regulations state that, "The Secretary shall designate as critical

habitat areas outside the geographic area presently occupied by the species only when a designation limited to its present range would be inadequate to ensure the conservation of the species'' (50 CFR 424.12(e)). Accordingly, when the best available scientific and commercial data do not demonstrate that the conservation needs of the species require designation of critical habitat outside the range of occupied areas, we will not designate critical habitat in areas outside the geographic area occupied by the species.

Our Policy on Information Standards Under the Endangered Species Act, published in the **Federal Register** on July 1, 1994 (59 FR 34271), provides criteria, establishes procedures, and provides guidance to ensure that decisions made by the Service represent the best scientific and commercial data available. It requires us, to the extent consistent with the Act, and with the use of the best scientific and commercial data available, to rely on primary and original sources of information as the basis for critical habitat designations. When determining which areas are critical habitat, a primary source of information should be the listing package for the species. Additional information may be obtained from a recovery plan, articles in peer-reviewed journals, conservation plans developed by States and counties, scientific status surveys and studies, biological assessments, unpublished materials, and expert opinion.

Habitat is often dynamic and species may move from one area to another over time. Furthermore, we recognize that designation of critical habitat may not include all of the habitat areas that may eventually be determined to be necessary for the recovery of the species. For these reasons, it is understood that critical habitat designations do not signal that habitat outside the designation is unimportant or may not be required for conservation of the species. Areas outside the critical habitat designation will continue to be subject to conservation actions that may be implemented under section 7(a)(1) and the regulatory protections afforded by the section 7(a)(2) jeopardy standard and the section 9 take prohibition, as determined on the basis of the best available information at the time of the action. Therefore, federally funded or assisted projects affecting listed species outside their designated critical habitat areas may still result in jeopardy findings in some cases. Similarly, critical habitat designations made on the basis of the best available information at the time of designation will not control the direction and substance of future recovery plans, habitat conservation plans, or other species conservation planning efforts if new information available to these planning efforts calls for a different outcome.

Methods

We used the best scientific and commercial data available to determine areas essential to the conservation of the Quino checkerspot butterfly. We reviewed available information that pertains to the habitat requirements of this species, including data from research and survey observations published in peer-reviewed articles; information from private and institutional collections; regional GIS coverages; data collected from biological reports submitted by holders of section 10(a)(1)(A) recovery permits, including data from the 2001 flight season; and recommendations from the Quino checkerspot butterfly recovery team during the development of the draft and final recovery plans for the butterfly.

Primary Constituent Elements

In accordance with section 3(5)(A)(i) of the Act and regulations at 50 CFR 424.12, we are required to base critical habitat determinations on the best scientific and commercial data available and to consider those physical and biological features (primary constituent elements) that are essential to the conservation of the species and that may require special management considerations or protection. These include, but are not limited to, space for individual and population growth and normal behavior; food, water, air, light, minerals, or other nutritional or physiological requirements; cover or shelter; sites for breeding, reproduction, rearing (or development) of offspring; and habitats that are protected from disturbance or representative of the historic geographical and ecological distribution of a species. All areas designated as critical habitat for the Quino checkerspot butterfly contain one or more of these physical or biological features.

The areas designated as critical habitat are designed to provide sufficient habitat to maintain self-sustaining populations of Quino checkerspot butterflies throughout its range and provide those habitat components essential for the conservation of the species. Habitat components that are essential for the Quino checkerspot butterfly (*i.e.*, primary constituent elements) include the biological needs of larval diapause, feeding, and pupation, adult oviposition, nectaring, roosting and basking, and dispersal, genetic exchange, and shelter. The critical habitat units are configured to provide room for metapopulation dynamics, which is essential for the conservation of the species, including dispersal corridors.

Primary constituent elements occur in undeveloped areas that support various types of open-canopy woody and herbaceous plant communities. They include, but are not limited to, plant communities that provide populations of host plant and nectar sources for the Quino checkerspot butterfly.

The primary host plants (species of plants that butterflies deposit eggs on) that have been documented for the Quino checkerspot butterfly include dwarf plantain, woolly plantain, white snapdragon, and thread-leaved bird's beak, with dwarf plantain being both the most common and the most commonly used as a host. Dwarf plantain is an annual herb found in coastal sage scrub, open chaparral, grassland and similar plant communities. The plant is often associated with cryptogamic crusts and fine-textured clay soils.

Some local populations of Quino checkerspot butterfly larvae may depend on secondary host plants to survive. Typically, secondary hosts are important when the primary host plants begin to dry up and become inedible before larvae are mature enough to respond by entering diapause (Singer 1972, Ehrlich *et al.* 1975). Owl's clover is important as a pre-diapause secondary host plant. Secondary host plant species may also be important for post-diapause larvae if primary host plant species are not abundant enough when the larvae come out of diapause. Species that serve as primary host plants at one site may serve as secondary host plants at another. Use may also vary annually, depending on local population preferences and environmental conditions.

Adult Quino checkerspot butterflies use a variety of plants for nectar feeding. Quino checkerspot butterflies prefer flowers with a platform-like surface on which they can remain upright while feeding (D. Murphy and G. Pratt, pers. comm., 2000). The Quino checkerspot butterfly frequently takes nectar from lomatium, goldenstar, yarrow, fiddleneck, goldfields, popcorn flower, gilia, California buckwheat, onion, and yerba santa (D. Murphy and G. Pratt, pers. comm., 2000).

Topographic features (*i.e.,* hills and ridges) that are relatively prominent for the geographic area associated with an occupied habitat patch are also frequently inhabited by Quino checkerspot butterflies during mating season. Male Quino checkerspot

butterflies have been observed to patrol territories, perch in open areas on hilltops, and chase away competing males when they approach (Osborne 2001, Pratt 2001). Further evidence that Edith's checkerspots may display facultative "hilltopping" behavior was found in Colorado. Males of another subspecies of Edith's checkerspot also appeared to aggregate on hilltops, where females travel to seek mates, when population densities were low (Ehrlich and Wheye 1986 as discussed in Ehrlich and Murphy 1987). Such "hilltopping" behavior is believed to be important to reproduction in some local populations (Service, in prep.). These topographic features also constitute primary constituent elements of Quino checkerspot butterfly habitat.

In summary, the primary constituent elements of Quino checkerspot butterfly habitat consist of:

(1) Grassland and open-canopy woody plant communities, such as coastal sage scrub, open red shank chaparral, and open juniper woodland, with host plants or nectar plants;

(2) Undeveloped areas containing grassland or open-canopy woody plant communities, within and between habitat patches, utilized for Quino checkerspot butterfly mating, basking, and movement; or

(3) Prominent topographic features, such as hills and/or ridges, with an open woody or herbaceous canopy at the top. Prominence should be determined relative to other local topographic features.

Criteria Used To Identify Critical Habitat Units

The draft recovery plan (Service 2001) for the Quino checkerspot butterfly identifies the specific recovery needs of the species, and serves as guidance for identifying areas essential to conservation of the Quino checkerspot butterfly to propose as critical habitat. This recovery plan is being finalized based on data from the 2001 adult butterfly flight season and public comments received on the draft recovery plan. The final recovery plan (Service, in prep.) details a strategy for recovering the butterfly to the point at which it can be downlisted to threatened. This recovery strategy focuses on lands described as essential for the long term conservation of the Quino checkerspot butterfly because they: (1) Contain extant populations that must be managed to recover the species; (2) provide landscape connectivity or linkages among populations, or at least are required to maintain natural long term resilience and genetic exchange among smaller populations or metapopulations; or (3) contain habitats that were part of a historical population distribution adjacent to occupied areas and either contain habitat necessary to support the expansion of small, low-density populations or have the potential to contain suitable habitat for them if they are restored.

Areas supporting core populations (large occurrence complexes) of the Quino checkerspot butterfly, or that have the potential to support core populations (*i.e.,* areas currently containing or supporting primary constituent elements), are essential to the long term conservation of the species because they represent the foundation for continued persistence of the species. Furthermore, some habitat areas that would not be considered essential if they were geographically isolated are, in fact, essential when situated in locations where they facilitate continued landscape connectivity among surrounding local populations or otherwise play a significant role in maintaining metapopulation viability (*e.g.,* by providing sources of immigrants to recolonize adjacent habitat patches following periodic extirpation events). Populations on the periphery of the species' range, or in atypical environments, are important for maintaining the genetic diversity of the species and could be essential to evolutionary adaptation to rapidly changing climatic and environmental conditions (Lesica and Allendorf 1995).

In the proposed designation of critical habitat for the Quino checkerspot butterfly we used a 4.8 km (3 mi) radius from each recent occurrence to define areas essential to the conservation of the butterfly. Following the proposal, we re-evaluated the use of this approach based on public comments and data in peer-reviewed literature. In the final recovery plan (Service, in prep.), we define spatially clustered Quino checkerspot butterfly observations as occurrence complexes. Based on our understanding of likely Quino movement patterns, occurrence complexes are estimated and mapped using a 1 km (0.6 mi) dispersal distance around recent butterfly occurrences. This method ensures inclusion of the habitat likely used by the butterflies in each observation. We have based this final critical habitat designation on these occurrence complexes. For portions of this final critical habitat designation (the Temecula/Murrieta/Oak Grove subunit and the Otay unit), we used a configuration of the mapped occurrence complexes that provided for landscape connectivity and viable Quino checkerspot butterfly metapopulations. In these two areas, we mapped the distribution of the occurrence complexes defined by the 1 km (0.6 mi) dispersal distance around recent butterfly occurrences and evaluated those intervening lands proximal to the complexes. Initially, we evaluated lands that were included in the proposal. For this final rule, we then defined critical habitat by first connecting the outer tangents of complexes, thereby including the essential lands among complexes, to form a cohesive unit that would provide for survival and conservation of regional populations. We made the determination that the lands among the complexes are essential based on knowledge of the ecology of the Quino checkerspot butterfly, the relationship of occurrence complexes to each other, interpretation of aerial photography, GIS land use coverage, and information from field visits. Finally, we excluded lands within the complex configuration that we knew were not essential, for example, developed areas greater than 2.0 ha (5.0 ac), and lands dominated by Tecate cypress woodland.

We then used these occurrence complexes to prepare initial maps of the final critical habitat units. Where occurrence complexes are relatively close to each other, within about 4.8 km (3 mi) of another occurrence complex, we prepared the initial unit maps by connecting the peripheries of all the nearby occurrence complexes. Based on what we understand about Quino checkerspot butterfly dispersal behavior, we believe the butterflies within these areas represent a regional metapopulation; the occurrence complexes may represent subpopulations of these metapopulations which are located close enough to other subpopulations to provide for recolonization in the event of local extirpation.

As we discussed above, 4.8 km (3 mi) is the maximum estimated 10-year recolonization distance using a stepping-stone dispersal model, based on results from the Morgan Hill bay checkerspot population (Harrison et al. 1988); that is, it is unlikely that populations located more than 4.8 km (3 mi) from the nearest known population play a significant role in maintaining a metapopulation (unless there are closer populations we have not yet identified). However, for specific reasons described below for each unit, we believe that several of these more isolated occurrence complexes are in areas essential to the conservation of the butterfly. We used a different approach, similar to that which we used in the proposed rule, to develop initial unit

maps for these isolated occurrences. In these cases, we initially evaluated areas that were included in the proposal and were within 4.8 km (3 mi) of each recent observation. We made the determination that the lands surrounding the complexes are essential based on knowledge of the ecology of the Quino checkerspot butterfly, interpretation of aerial photography, GIS land use coverage, and information from field visits. Finally, we excluded all lands within 4.8 km (3 mi) of occurrences that available data indicated were not essential, for example, agricultural areas greater than 2.0 ha (5.0 ac) and hills with very little vegetation dominated almost entirely by boulders and exposed rock. We believe that this identifies the minimum area needed to provide sufficient habitat to support the long-term conservation of the butterfly in these locations. This method was used to map isolated occurrence complexes in the Harford Springs subunit of Unit 1, the Brown Canyon subunit of Unit 2, and the Jacumba Unit.

For the Lake Mathews/Estelle Mountain Reserve subunit of Unit 1 that is currently not known to be occupied, we used a variation of the methodology based on the 4.8 km (3 mi) dispersal radii. In the proposed designation, we used the 4.8 km (3 mi) method based on 1982 occurrence data and expanded the subunit to include an additional portion of the Lake Mathews/Estelle Mountain Reserve to the south that was not captured. For this final designation, we limited critical habitat in this subunit to only those lands within the Lake Mathews/Estelle Mountain Reserve. This reserve captures the highest quality habitat known to remain within the dispersal radius and is the focal point of future recovery efforts (Service, in prep.).

For the development of this final designation we also took into consideration information provided through public comments, the draft and final economic analyses, and biological information that became available since the proposed designation was published. This latter information included data from the 2001 adult butterfly flight season, which corroborated and further supported decisions made during the development of the proposed designation in most cases. In general, the data from the 2001 flight season: (1) Provided additional support for the inclusion of areas into critical habitat that we determined to be essential during the development of the proposed rule; (2) indicated several areas believed to be essential but not known to be occupied were now, in fact, occupied (specifically in the northeastern portion of Unit 3); and (3) documented several new areas of occupancy outside of proposed critical habitat. These areas outside of proposed critical habitat, in which the Quino checkerspot butterfly has recently been documented (2001), have not been included in this final designation. These new occurrences are discussed later in the Critical Habitat and Summary of Comments and Recommendations sections of this final rule.

We identified and mapped areas essential to the conservation of the species using the configuration of occurrence complexes and the characteristics of essential habitat described above. The initial unit and subunit maps were based on interpretation of aerial photography at a scale of 1:24,000 (comparable to the scale of a 7.5 minute U.S. Geological Survey Quadrangle topographic map) and current digital ortho-photography. We then revised these initial units based on other information, including boundaries of approved habitat conservation plans (HCPs), information developed through section 7 consultations, boundaries of active restoration efforts for the butterfly, and information obtained from ongoing analyses used for the development of reserve systems for future conservation plans that may cover the butterfly (*e.g.*, Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP)). Additionally, in Riverside County (Units 1 and 2), we used an updated GIS land use coverage from the County of Riverside to exclude lands greater than or equal to 2.0 ha (5.0 ac) designated as urban or intense agriculture. A comparable updated GIS coverage was not available for use for San Diego County. However, we attempted to manually exclude areas of similar description from those critical habitat units (Units 3 and 4).

For the purpose of this designation, critical habitat units have been described using Universal Transverse Mercator (UTM) North American Datum of 1927 (NAD 27) coordinates derived from a 100-m grid that approximated the essential critical habitat line delineated from digital aerial photography with the exception of the Lake Mathews portion of Unit 1 and Unit 3 (Otay Unit). The Lake Mathews portion of Unit 1 was described referencing the Lake Mathews/Estelle Mountain Reserve. The Otay Unit was described using a combination of UTM coordinates and boundaries for the Multiple Habitat Preservation Area, the County of San Diego's pre-approved mitigation areas, the Major Amendment Areas, State and Federal lands, and State Route 94.

In defining critical habitat boundaries, we made an effort to exclude all developed areas, such as towns, housing developments, and other lands unlikely to contain primary constituent elements essential for Quino checkerspot butterfly conservation. Our 100-m UTM grid minimum mapping unit was designed to minimize the amount of development along the urban edge included in our designation. However, this minimum mapping unit did not allow us to exclude all developed areas, such as buildings, paved or improved roads, aqueducts, railroads, other paved areas, lawns, large areas of closed canopy woody vegetation such as chaparral and cypress, active agricultural fields, and other urban landscaped areas that do not contain primary constituent elements. Federal actions limited to these areas would not trigger a section 7 consultation unless they would affect the species and/or primary constituent elements in adjacent critical habitat.

Critical Habitat

The approximate area encompassing the designation of critical habitat for the Quino checkerspot butterfly by county and land ownership is shown in Table 1.

TABLE 1. APPROXIMATE CRITICAL HABITAT IN HECTARES (HA) (ACRES (AC)) BY COUNTY AND LAND OWNERSHIP (AREA ESTIMATES REFLECT CRITICAL HABITAT UNIT BOUNDARIES.[1])

County	Federal[2]	Tribal	Local/State	Private	Total
Riverside	3,985 ha (9,850 ac)	525 ha (1,300 ac)	4,805 ha (11,875 ac)	29,945 ha (74,005 ac)	39,260 ha (97,030 ac)
San Diego	9,785 ha (24,175 ac)	0 ha (0 ac)	3,800 ha (9,395 ac)	16,595 ha (41,005 ac)	30,180 ha (74,575 ac)

TABLE 1. APPROXIMATE CRITICAL HABITAT IN HECTARES (HA) (ACRES (AC)) BY COUNTY AND LAND OWNERSHIP (AREA ESTIMATES REFLECT CRITICAL HABITAT UNIT BOUNDARIES.[1])—Continued

County	Federal[2]	Tribal	Local/State	Private	Total
Total	13,770 ha (34,025 ac)	525 ha (1,300 ac)	8,605 ha (21,270 ac)	46,540 ha (115,010 ac)	69,440 ha (171,605 ac)

[1] Approximate hectares have been converted to acres (1 ha = 2.47 ac). Based on the level of imprecision of mapping at this scale, approximate hectares and acres have been rounded to the nearest 5.
[2] Federal lands include Bureau of Land Management (BLM, Department of Defense (DOD), National Forest, and Service lands).

Critical habitat includes Quino checkerspot butterfly habitat throughout the species' current range in the United States (*i.e.*, Riverside and San Diego Counties, California). Lands designated are under private, local, State, Federal, and Tribal ownership, with Federal lands including lands owned or managed by BLM, Forest Service, DOD, and the Service. Lands designated as critical habitat have been divided into four critical habitat units.

We are designating critical habitat on lands that are considered essential to the conservation of the Quino checkerspot butterfly. Using the recovery plan for guidance (Service, in prep.), we determine that an area is essential if it has one or more of the following characteristics: (1) Lands considered to be occupied within recovery unit boundaries that are part of occurrence complexes identified in the recovery plan (Service, in prep.); (2) lands that provide landscape connectivity among occurrence complexes; and (3) lands not known to be occupied that contain confirmed historic Quino checkerspot butterfly locations identified as essential in the recovery plan (Service, in prep.). In this final rule, we are designating approximately 2,450 ha (6,050 ac) of land within the Estelle Mountain Reserve in Unit 1 (western Riverside County) that is currently not known to be occupied by the Quino checkerspot butterfly.

Areas designated as critical habitat are designed to provide sufficient habitat to maintain self-sustaining populations of the Quino checkerspot butterfly throughout its range and provide those habitat components essential for the conservation of the species. Critical habitat units are configured to provide for metapopulation dynamics, including dispersal, which, as stated in the recovery plan (Service, in prep.), are essential for the conservation of the species.

A brief description of each unit and the reasons for proposing to designate it as critical habitat are presented below.

Unit 1: Lake Mathews Unit

Unit 1 encompasses approximately 5,765 ha (14,250 ac) within the northwestern portion of Riverside County and occurs within the Northwest Riverside Recovery Unit described in the recovery plan. All habitat identified as essential in this recovery unit is being designated as critical habitat, except the habitat within the Lake Mathews MSHCP, which is being excluded under section 4(b)(2) of the Act (discussed below in the section entitled "Exclusions Under Section 4(b)(2)"). Approximately 220 ha (540 ac) of this unit is Federal land, approximately 2,655 ha (6,565 ac) is State or local government land, and the remaining 2,890 ha (7,145 ac) is private land. This unit is divided into two subunits: The Harford Springs subunit and the Lake Mathews/Estelle Mountain Reserve subunit.

The Harford Springs subunit includes approximately 3,320 ha (8,200 ac) of lands, including Harford Springs County Park. Quino checkerspot butterflies were observed in Harford Springs County Park in 1998. This site was once part of a more extensive, well-documented distribution with one of the most well-known historic collection locations (*i.e.*, Lilly Hill). The Quino checkerspot butterfly was historically abundant in this area, with consistently high densities reported by collectors from the 1950s to the mid 1980s (Orsak 1978; K. Osborne and G. Pratt, pers. comm., 2000).

The Lake Mathews/Estelle Mountain Reserve subunit, about 2,450 ha (6,050 ac) in size, is currently not known to be occupied, but considered essential to the conservation of the species (Service, in prep.). This subunit contains the Lake Mathews population site. Quino checkerspot butterflies were last observed at the southern margin of Lake Mathews in 1982 (Carlsbad Fish and Wildlife Office GIS Quino checkerspot butterfly database and metafile) when dozens of butterflies were documented. Similar to the area containing the Harford Springs occurrence complex, the Quino checkerspot butterfly was historically abundant at this location. Essential habitat for the butterfly exists in the vicinity of Lake Mathews and within the Lake Mathews/Estelle Mountain Reserve established for the Stephens' kangaroo rat, which is directly south of the Lake (Service, in prep.). As discussed later in this rule, the lands within the Lake Mathews MSHCP, where the 1982 occurrences were documented, have been excluded from critical habitat designation because the Lake Mathews MSHCP provides coverage for the Quino checkerspot butterfly. The land, including the butterfly habitat, within the Lake Mathews/Estelle Mountain Reserve to the south is not currently managed for the Quino checkerspot butterfly. This area is considered essential and included in designated critical habitat because: (1) The butterfly was historically regionally abundant, as recently as 1982; (2) quality habitat containing the primary constituent elements exists; and (3) it is the focus of restoration and reestablishment efforts as described in the recovery plan (Service, in prep.).

The Harford Springs and Lake Mathews/Estelle Mountain Reserve subunits are characterized by diverse topography and high-quality habitat patches, with extensive, dense stands of dwarf plantain in open spaces within juniper woodland, coastal sage scrub, and grassland communities. Landscape connectivity still exists between Harford Springs County Park and the Lake Mathews area. The Lake Mathews/Estelle Mountain Reserve also contains possibly the "largest continuous stand of dwarf plantain in Riverside County," south of Lake Mathews in the vicinity of Black Rocks, west of Monument Peak (K. Osborne, pers. comm., 2000).

Unit 2: Southwest Riverside Unit

Unit 2 encompasses approximately 34,780 ha (85,950 ac) within southwestern Riverside County and northern San Diego County. This critical habitat unit supports all or part of 21 of the 22 occurrence complexes identified as important to Quino checkerspot butterfly recovery in the southwestern Riverside region (Service, in prep.). Mapped portions of some of the complexes identified as important to

recovery in the final recovery plan (Service, in prep.) were not designated because those portions fell outside the proposed critical habitat. Under the Act and the Administrative Procedure Act (5 U.S.C. 702 & 706), we are required to allow the public an opportunity to comment on the proposed rulemaking. Therefore, we are unable to include this area in the final rule. This critical habitat similarly contains two subunits, the Brown Canyon subunit and the Temecula/Murrieta/Oak Grove subunit. All lands within this critical habitat unit (*i.e.,* both subunits) are considered to be occupied by the Quino checkerspot butterfly.

Unit 2 includes approximately 3,955 ha (9,775 ac) of Federal lands; an estimated 525 ha (1,300 ac) of lands within the Cahuilla Band of Mission Indians' Reservation, just north of the Silverado Ranch mitigation bank; approximately 2,150 ha (5,310 ac) of lands under State or local jurisdictional ownership; and an estimated 28,150 ha (69,565 ac) of lands in private ownership. We discuss the relationship of designated critical habitat for the Quino checkerspot butterfly to the inclusion of lands within the Cahuilla Band of Mission Indians' Reservation below (see the section "Government-to-Government Relationship With Tribes").

The Brown Canyon subunit encompasses approximately 4,915 ha (12,140 ac) of land east-southeast of the town of Hemet in Riverside County. This subunit contains the Brown Canyon occurrence complex, a persistent population identified as essential in the recovery plan (Service, in prep.). Because it is not proximal to other occurrence complexes in Unit 2, and may lack landscape connectivity with the main Temecula/Murrieta/Oak Grove subunit, this subunit has been defined using the 4.8 km (3 mi) dispersal radius to maintain a critical mass of habitat (refer to the Criteria Used To Identify Critical Habitat section of this final rule). The Brown Canyon occurrence complex is the northeastern-most complex within the current range of the butterfly, and is contiguous with the last remaining undeveloped landscape corridor to the northern portion of its former range. If the species is undergoing a northern range shift, as hypothesized (Parmesan 1996 as discussed in the draft recovery plan, Service 2001), this occurrence complex potentially represents the only remaining route for northern expansion of the species. Further, the resiliency of this population has not likely been compromised by habitat impacts associated with development and recreational use due to the insulation provided by surrounding hilly terrain and publicly owned lands.

The Temecula/Murrieta/Oak Grove subunit encompasses approximately 29,865 ha (73,810 ac) in southwest Riverside County. This unit stretches east from Interstate 215 near the towns of Murrieta and Temecula to the mountains and desert edge, north to near the town of Hemet in Riverside County, and south to Oak Grove Valley in San Diego County.

Recent observations have been recorded throughout the Temecula/Murrieta/Oak Grove subunit, indicating a degree of landscape connectivity throughout, especially in the less-urbanized eastern areas. Several large occurrence complexes are found within the subunit in the vicinity of Warm Springs Creek near the town of Murrieta, in the vicinity of Lake Skinner within the proposed Southwest Riverside County Multiple Species Reserve, and on BLM and pre-approved mitigation lands at Oak Mountain, near Wilson Valley, and south of the Cahuilla Band of Mission Indians' Reservation. The easternmost Quino checkerspot butterfly population is a recent extension of the known geographic and elevational range for the species (Pratt *et al.,* submitted). A new primary host plant for the species, white snapdragon, was documented in this area in 2001 and represents a vital element of habitat heterogeneity in the species' range. The Bautista Road occurrence complex (northeast of the town of Anza in Riverside County) occurs at the periphery of the known regional butterfly distribution within the recovery unit and outside of critical habitat. However, this occurrence complex is not included in designated critical habitat because it was first documented in 2001 following the publication of the proposal and we do not currently have sufficient information concerning habitat within the complex and landscape connectivity to other complexes to determine that it is essential to the conservation of the species.

Unit 3: Otay Unit

Unit 3 encompasses approximately 26,075 ha (64,430 ac) within the southwestern portion of San Diego County. Land ownership for this unit includes approximately 9,440 ha (23,330 ac) of Federal land, including 180 ha (450 ac) of the Naval Space Surveillance Station managed by the DOD and lands within the San Diego National Wildlife Refuge (SDNWR) Otay-Sweetwater Unit; approximately 3,620 ha (8,945 ac) under State or local jurisdictional ownership; and approximately 13,015 ha (32,155 ac) that are privately owned. All lands within this critical habitat unit are considered to be occupied by the Quino checkerspot butterfly.

Lands encompassed by this unit stretch south from the San Diego National Wildlife Refuge (SDNWR) Otay-Sweetwater Unit and State Route 94 to the international border with Mexico, west along Otay River Valley and the northern rim of Otay Mesa, and east to the town of Tecate. Unit 3 supports all or part of 12 of the 13 occurrence complexes identified in the final recovery plan (Service, in prep.) as important to recovery in southwestern San Diego County. Mapped portions of some of the complexes identified as important to recovery in the final recovery plan (Service, in prep.) were not designated because those portions fell outside the proposed critical habitat.

Recent Quino checkerspot butterfly observations are concentrated in lower elevation areas surrounding east Otay Valley, Otay Mountain, the Jamul Mountains, and San Miguel Mountain. The Otay Lakes area historically supported large populations that extended south to Otay Mesa and across the international border (White and Levin 1981, Murphy and White 1984). The western portion of this unit contains the only known occupied habitat with a marine climate influence, an environmental factor prevalent throughout most of the species' historic range and thought to be beneficial to population resilience because it provides climatic stability and higher average humidity, minimizing host plant susceptibility to drought (Service, in prep.). The Otay area west of the mountain, therefore, represents a vital element of habitat heterogeneity within the species' range.

The Dulzura Occurrence Complex was documented during the 2001 flight season outside of proposed critical habitat. Based on an initial analysis during the ongoing amendment process for the MSCP in late 2001, we determined that this occurrence complex is essential to the conservation of the Quino checkerspot butterfly. Under the Act and the Administrative Procedure Act (5 U.S.C. 702 & 706), we are required to allow the public an opportunity to comment on the proposed rulemaking. Therefore, because the Dulzura Occurrence Complex was not in the proposed rule we are unable to include this area in the final rule. Due to the short court-ordered schedule for completing this designation and budgetary constraints, we are unable to re-propose critical habitat at this time.

It is important to note that the land that supports the Dulzura occurrence complex does not appear to be threatened by actions that may negatively affect the butterfly or its habitat. The land that supports this new occurrence complex is primarily in a designated wilderness area owned and managed by the BLM. Because of regulations governing designated wilderness areas (*e.g.*, minimizing development and off-road impacts), habitat essential to the Quino checkerspot butterfly is unlikely to be impacted by such threats. We will continue to work closely with BLM concerning the protection and management of the Quino checkerspot butterfly in this area. Further, as indicated, the occurrence complex is being considered in the current amendment process to the MSCP. If amended, the MSCP will provide for additional protections and management for the Quino checkerspot butterfly and its habitat. Furthermore, because the area is occupied by the butterfly, any actions that have a Federal nexus and may affect the butterfly will require consultation under section 7 of the Act.

Unit 4: Jacumba Unit

Unit 4 encompasses approximately 2,820 ha (9,970 ac) of land in southeastern San Diego County south of Interstate 8 in the vicinity of the town of Jacumba. This critical habitat unit supports the Jacumba occurrence complex identified as important to recovery in the recovery plan. Land ownership for this unit includes approximately 154 ha (380 ac) of Federal land, approximately 180 ha (450 ac) under State or local jurisdictional ownership, and approximately 2,485 ha (6,145 ac) under private ownership. All lands within this critical habitat unit are considered to be occupied by the Quino checkerspot butterfly.

The Jacumba occurrence complex occurs within the Southeast San Diego Recovery Unit described in the recovery plan (Service, in prep.). This apparently isolated population center occurs in a unique high-desert region of juniper woodlands, which provides a vital element of habitat heterogeneity in the species' range. Recent Quino checkerspot butterfly observations are concentrated northwest of the community of Jacumba in Anza Borrego Desert State Park and private lands. The metapopulation distribution likely extends south across the international border. Occupancy has been documented approximately 6 km (3.7 mi) to the south in El Condor (Baja California, Mexico) and the U.S. occurrence complex may belong to the same metapopulation.

Effects of Critical Habitat Designation

Section 7 Consultation

Section 7(a) of the Act requires Federal agencies, including the Service, to ensure that actions they fund, authorize, or carry out do not destroy or adversely modify critical habitat. Destruction or adverse modification occurs when a Federal action directly or indirectly alters critical habitat to the extent it appreciably diminishes the value of critical habitat for the conservation of the species. Individuals, organizations, States, local governments, and other non-Federal entities are affected by the designation of critical habitat only if their actions occur on Federal lands, require a Federal permit, license, or other authorization, or involve Federal funding.

Section 7(a) of the Act requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened, and with respect to its critical habitat, if any is designated or proposed. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR part 402. Section 7(a)(4) of the Act requires Federal agencies to confer with us on any action that is likely to jeopardize the continued existence of a species proposed for listing or result in destruction or adverse modification of proposed critical habitat. Conference reports provide conservation recommendations to assist the agency in eliminating conflicts that may be caused by the proposed action. The conservation recommendations in a conference report are advisory.

We may issue a formal conference report, if requested by the Federal action agency. Formal conference reports include an opinion that is prepared according to 50 CFR 402.14, as if the species was listed or critical habitat was designated. We may adopt the formal conference report as the biological opinion when the species is listed or critical habitat is designated, if no substantial new information or changes in the action alter the content of the opinion (see 50 CFR 402.10(d)).

If a species is listed or critical habitat is designated, section 7(a)(2) of the Act requires Federal agencies to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a 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 (action agency) must enter into consultation with us. Through this consultation, the Federal action agency would ensure that the permitted actions do not destroy or adversely modify critical habitat.

If we issue a biological opinion concluding that a project is likely to result in the destruction or adverse modification of critical habitat, we would also provide reasonable and prudent alternatives to the project, if any are identifiable. Reasonable and prudent alternatives are defined at 50 CFR 402.02 as alternative actions identified during consultation that can be implemented in a manner consistent with the intended purpose of the action, that are consistent with the scope of the Federal agency's legal authority and jurisdiction, that are economically and technologically feasible, and that the Director believes would avoid destruction or adverse modification of critical habitat. Reasonable and prudent alternatives can vary from slight project modifications to extensive redesign or relocation of the project. Costs associated with implementing a reasonable and prudent alternative are similarly variable.

Regulations at 50 CFR 402.16 require Federal agencies to reinitiate consultation on previously reviewed actions in instances where critical habitat is subsequently designated and the Federal agency has retained discretionary involvement or control over the action or such discretionary involvement or control is authorized by law. Consequently, some Federal agencies may request reinitiation of consultation with us on actions for which formal consultation has been completed if those actions may affect designated critical habitat.

Activities on Federal lands that may affect the Quino checkerspot butterfly or its critical habitat will require section 7 consultation. Activities on private or State lands requiring a permit from a Federal agency, such as a permit from the U.S. Army Corps of Engineers (Corps) under section 404 of the Clean Water Act, or some other Federal action, including funding (*e.g.*, from the Federal Highway Administration, Federal Aviation Administration, Federal Emergency Management Agency, or Natural Resources Conservation Service) will also continue to be subject to the section 7 consultation process. Federal actions not affecting listed species or critical habitat and actions on non-Federal lands that are not federally funded or permitted do not require section 7 consultation.

Section 4(b)(8) of the Act requires us to evaluate briefly in any proposed or final regulation that designates critical

habitat those activities involving a Federal action that may adversely modify such habitat or that may be affected by such designation. Activities that may result in the destruction or adverse modification of critical habitat include those that alter the primary constituent elements to an extent that the value of critical habitat for the survival and recovery of the Quino checkerspot butterfly is appreciably reduced. We note that such activities also may jeopardize the continued existence of the species.

To properly portray the effects of critical habitat designation, we must first compare the section 7 requirements for actions that may affect critical habitat with the requirements for actions that may affect a listed species. Section 7 prohibits actions funded, authorized, or carried out by Federal agencies from jeopardizing the continued existence of a listed species or destroying or adversely modifying the listed species' critical habitat.

Actions likely to result in the destruction or adverse modification of critical habitat would almost always result in jeopardy to the species concerned, particularly when the area affected by the proposed action is occupied by the species concerned. In those cases, critical habitat provides little additional protection to a species, and the ramifications of its designation are few or none. However, critical habitat designation in unoccupied areas may trigger consultation under section 7 of the Act where it would not have otherwise occurred if critical habitat had not been designated.

Federal agencies already consult with us on activities in areas currently occupied by the species to ensure that their actions do not jeopardize the continued existence of the species. These actions include, but are not limited to:

(1) Regulation of activities affecting waters of the United States, including vernal pool and other Quino checkerspot butterfly habitat areas in watersheds, by the Corps under section 404 of the Clean Water Act;

(2) Regulation of grazing, mining, and recreation by the BLM, Forest Service or the Service;

(3) Road construction and maintenance, right-of-way designation, and regulation of agricultural activities on Federal land by BLM, Forest Service, DOD, and the Service;

(4) Regulation of airport improvement activities by the Federal Aviation Administration jurisdiction;

(5) Construction of roads and fences along the International Border with Mexico and immigration enforcement activities by the Immigration and Naturalization Service/Border Patrol that take place in Quino checkerspot butterfly habitat;

(6) Hazard mitigation and post-disaster repairs funded by the Federal Emergency Management Agency;

(7) Construction of communication sites licensed by the Federal Communications Commission;

(8) Activities funded by the U. S. Environmental Protection Agency, Department of Energy, or any other Federal agency; and

(9) Construction of fire breaks by the BLM, Forest Service, Service, or other Federal agencies for the maintenance or control of fire management and suppression activities.

Federal agencies already consult with us on activities in areas currently occupied by the species, or if the species may be affected by the action, to ensure that their actions do not jeopardize the continued existence of the species. In the area designated as critical habitat that is currently not known to be occupied by the Quino checkerspot butterfly, we already consult on other listed species, including the coastal California gnatcatcher (Polioptila californica californica) and the Stephens' kangaroo rat (Dipodomys stephensi), and have designated critical habitat. Thus, we do not anticipate a significant additional regulatory burden will result from the designation of critical habitat for the Quino checkerspot butterfly.

If you have questions regarding whether specific activities will constitute adverse modification of critical habitat, contact the Field Supervisor, Carlsbad Fish and Wildlife Office (see **ADDRESSES** section). Requests for copies of the regulations on listed wildlife, and inquiries about prohibitions and permits may be addressed to the U.S. Fish and Wildlife Service, Branch of Endangered Species, 911 N.E. 11th Avenue, Portland, Oregon 97232 (telephone 503/231–6131; facsimile 503/231–6243).

Exclusions Under Section 4(b)(2)

Subsection 4(b)(2) of the Act allows us to exclude areas from critical habitat designation where the benefits of exclusion outweigh the benefits of designation, provided such exclusion will not result in the extinction of the species. For the following reasons, we believe that in most instances, the benefits of excluding legally operative HCPs, for which the Quino checkerspot butterfly is a covered species and take has been authorized, from critical habitat designations will outweigh the benefits of including them.

1. Benefits of Inclusion

The benefits of including HCP lands in critical habitat are normally small. The principal benefit of any designated critical habitat is that activities that may affect such habitat require consultation under section 7 of the Act. Such consultation would ensure that adequate protection is provided to avoid adverse modification of critical habitat. Where HCPs are in place, our experience indicates that this benefit is small or non-existent. Currently approved and permitted HCPs are already designed to ensure the long term survival of covered species within the plan area. Where we have an approved HCP, lands that we ordinarily would define as critical habitat for the covered species will normally be protected in reserves and other conservation lands by the terms of the HCPs and their implementing agreements. These HCPs and Implementing Agreements (IAs) include management measures and protections for conservation lands that are crafted to protect, restore, and enhance their value as habitat for covered species.

In addition, an HCP application itself requires consultation under section 7 of the Act. As part of this process, we are required to evaluate the issuance of incidental take permits for a proposed action to ensure that the action as proposed would not jeopardize the continued existence of the species covered under the HCP or result in the destruction or adverse modification of designated critical habitat. Because HCPs, particularly large regional HCPs, address land use within the plan boundaries, habitat issues will have been thoroughly addressed in the HCP and through consultation on the HCP. Our experience is also that, under most circumstances, consultations under the jeopardy standard will achieve the same result as consultations under the adverse modification standard.

Further, HCPs typically provide greater conservation benefits to a covered species than section 7 consultations because HCPs assure the long term protection and management of a covered species and its habitat, and funding for such management, through the standards found in the joint Service and National Marine Fisheries Service HCP Handbook, 5-Point Addendum to the HCP Handbook (64 FR 35242), and the HCP No Surprises regulation (63 FR 8859). Such assurances are typically not provided by section 7 consultations which, in contrast to HCPs, often do not commit the project proponent to implementing long-term special management or protections. Thus, a

consultation typically does not accord the lands it covers the extensive benefits an HCP provides.

The development and implementation of HCPs provide other important conservation benefits, including the collection and development of additional biological information to guide conservation efforts and assist in species recovery, and the creation of innovative solutions to conserve species while allowing for development. The educational benefits of critical habitat, including informing the public of areas that are important for the long-term survival and conservation of the species, are essentially the same as those that would occur from the public notice and comment procedures required to establish an HCP, as well as the public participation that occurs in the development of many regional HCPs. For these reasons, we believe that designation of critical habitat has little benefit in areas covered by approved and legally operative HCPs.

2. Benefits of Exclusion

The benefits of excluding HCPs from designation as critical habitat may be more significant than the benefits of including HCPs in critical habitat. Benefits include relieving landowners, communities, and counties of any additional minor regulatory review that might be imposed by critical habitat. Many HCPs, particularly regional HCPs, take many years to develop and, upon completion, become regional conservation plans that are consistent with the recovery of covered species. Most regional plans benefit many species, both listed and unlisted. Imposing additional regulatory review after HCP completion may jeopardize conservation efforts and partnerships in many areas, and could be viewed as a disincentive to those developing HCPs. Excluding HCPs provides us with an opportunity to streamline regulatory compliance and confirm regulatory assurances for HCP participants.

A related benefit of excluding HCPs is that it would encourage the continued development of partnerships with HCP participants, including States, local governments, conservation organizations, and private landowners, that together can implement conservation actions we would be unable to accomplish alone. By excluding areas covered by HCPs from critical habitat designation, we preserve these partnerships and, we believe, set the stage for more effective conservation actions in the future.

In general, then, we believe the benefits of critical habitat designation to be small in areas covered by approved and legally operative HCPs. We also believe that the benefits of excluding HCPs from designation are significant. Weighing the small benefits of inclusion against the benefits of exclusion, including the benefits of relieving property owners of an additional layer of approvals and regulation, together with the encouragement of conservation partnerships, would generally result in HCPs being excluded from critical habitat designation under section 4(b)(2) of the Act.

Not all HCPs are alike with regard to species coverage and design. Within this general analytical framework, we need to evaluate completed and legally operative HCPs in which the Quino checkerspot butterfly is a covered species on a case-by-case basis to determine whether the benefits of excluding these particular areas outweigh the benefits of including them.

Relationship to Habitat Conservation Plans

Section 4(b)(2) of the Act allows us broad discretion to exclude from critical habitat designation areas where the benefits of exclusion outweigh the benefits of designation, provided the exclusion will not result in the extinction of the species. We expect that critical habitat may be used as a tool to identify those areas essential for the conservation of the species, and we encourage development of HCPs for such areas on non-Federal lands. HCPs currently under development are intended to provide for protection and management of habitat areas essential for the conservation of the Quino checkerspot butterfly, while directing development and habitat modification to nonessential areas of lower habitat value.

Only HCPs within the boundaries of designated critical habitat units are discussed here. Those approved and legally operative HCPs that provide coverage and incidental take approval for the Quino checkerspot butterfly have been excluded from this designation. These include the Assessment District 161 Subregional HCP, the Rancho Bella Vista HCP, and the Lake Mathews MSHCP in Riverside County that provide coverage and incidental take authorization for the Quino checkerspot butterfly.

The Riverside County Assessment District 161 Subregional HCP, which authorizes take of the Quino checkerspot butterfly, has been completed and approved. This HCP includes protection measures for Quino checkerspot butterfly habitat, habitat restoration research, educational outreach, and captive propagation. The Rancho Bella Vista HCP also occurs within the Riverside County Assessment District 161, but an independent HCP was approved for this project. Although no Quino checkerspot butterflies have been observed within the project boundaries, the butterfly is known from adjacent occupied habitat patches and is covered by the Rancho Bella Vista HCP. This HCP provides for conservation of the Quino checkerspot butterfly through monitoring of this species, habitat and dispersal corridor preservation and management, and habitat restoration and enhancement.

The Lake Mathews MSHCP has been completed and approved by the California Department of Fish and Game (CDFG) and the Service. As explained below in the Summary of Comments section and the Recommendations and Summary of Changes from the Proposed Rule section, this HCP and accompanying section 10(a)(1)(B) permits provide for conservation and management of Quino checkerspot butterfly habitat and take authorization for the butterfly. Although the Quino checkerspot butterfly has not been recently observed (since 1982) within reserve boundaries, dozens of butterflies were documented within the reserve during the 1981 and 1982 adult butterfly flight seasons.

The benefits of excluding lands covered by these HCPs would be significant in preserving positive relationships with our conservation partners, lessening potential additional regulatory review and potential economic burdens, reinforcing the regulatory assurances provided for in implementation agreements for approved HCPs, and providing for more established and cooperative partnerships for future conservation efforts.

In summary, excluding lands covered by HCPs in critical habitat designations outweigh the benefits of including lands covered by HCPs. Furthermore, we have determined in section 7 consultations on these approved HCPs that they would not jeopardize the continued existence of the Quino checkerspot butterfly, which means that they will not appreciably reduce likelihood of the survival and recovery of the species. Consequently, excluding these lands from the critical habitat designation will not result in the extinction of the species. Therefore, these lands have not been designated as critical habitat for the species.

Currently, there are several HCPs within the boundaries of designated critical habitat that are now under development or being amended to provide protection for the Quino