Palos Verdes Blue Butterfly
(*Glaucopsyche lygdamus palosverdesensis*)

5-Year Review:
Summary and Evaluation

Photo by Alex Dunkel

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

March 2008

5-YEAR REVIEW
Palos Verdes Blue Butterfly
(*Glaucopsyche lygdamus palosverdesensis*)

1. GENERAL INFORMATION

1.1. Reviewers

Lead Region: Diane Elam and Jenness McBride, Region 8 (California and Nevada), 916-414-6464

Lead Field Office: Karen A. Goebel and Eric E. Porter, Carlsbad Fish and Wildlife Office, 760-431-9440

1.2. Methodology used to complete the review:

This review was compiled by Eric Porter of the Carlsbad Fish and Wildlife Office, U.S. Fish and Wildlife Service (Service) and considered available literature, office files, and discussions with researchers whose expertise included the Palos Verdes blue butterfly, related species, or a biological field relevant to Palos Verdes blue butterfly conservation.

1.3. Background:

1.3.1. FR Notice citation announcing initiation of this review:

The notice announcing the initiation of this and other 5-year reviews and opening of the information request period for 60 days was published on February 14, 2007 (72 FR 7064). We did not receive any information specific to the Palos Verdes blue butterfly, but we did receive one general comment letter supporting continued protection under the Endangered Species Act of 1973 (Act), as amended, of all species noticed in this announcement.

1.3.2. Listing history

Original Listing
FR notice: Federal Register 45 FR 44939
Date listed: July 2, 1980
Entity listed: subspecies; Palos Verdes Blue Butterfly
(*Glaucopsyche lygdamus palosverdesensis)*
Classification: endangered; final critical designated at time of listing

1.3.3. Associated rulemakings

No associated rulemaking has occurred for this species.

1.3.4. Review History

No comprehensive status reviews have been conducted for this species.

1.3.5. Species' Recovery Priority Number at start of 5-year review

6. This priority number, as identified in the 2007 Recovery Data Call for the Carlsbad Fish and Wildlife Office, indicates a high degree of threat and a low potential for recovery for a listed subspecies (Listing and Recovery Priority Guidelines, 48 FR 43104, September 21, 1983).

1.3.6. Recovery Plan or Outline

Name of plan: Palos Verdes Blue Butterfly Recovery Plan
Date issued: January 19, 1984
Date of previous revisions: None

2. REVIEW ANALYSIS

2.1. Application of the 1996 Distinct Population Segment (DPS) policy

2.1.1. Is the species under review a vertebrate?

No. The Act defines species as including any subspecies of fish or wildlife or plants and any distinct population segment of any species of vertebrate wildlife. This definition limits listings as distinct population segments (DPS) only to vertebrate species of fish and wildlife. Because the Palos Verdes blue butterfly is an insect (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.

2.2. Recovery Criteria

2.2.1. Does the species have a final, approved recovery plan containing objective, measurable criteria?

No. The recovery plan suggests steps to be taken to determine adequate recovery criteria but does not present criteria for downlisting.

2.3. Updated Information and Current Species Status

2.3.1. Biology and Habitat

Status and Distribution

Historically, the Palos Verdes blue butterfly occurred throughout the Palos Verdes peninsula in Los Angeles County, California. When the Palos Verdes blue butterfly was

recognized as a distinct subspecies in the 1970's, its range and distribution were already reduced by grazing, agriculture, and residential and urban development (Service 1984; Arnold 1987; Mattoni 1992). The type locality (where the subspecies was first collected and identified) on the Alta Vista Terrace was developed for residential use in 1978, and the Palos Verdes blue butterfly population was extirpated (Service 1984). By the early 1980's, Palos Verdes blue butterflies were found at only 10 locations (Arnold 1987), and none were observed between 1983 and 1993, leading to the conclusion that the Palos Verdes blue butterfly was likely extinct (Arnold 1987; Mattoni 1992). However, the Palos Verdes blue butterfly was discovered in 1994 on the Defense Fuel Support, San Pedro (Mattoni 1992).

The only area currently known to be consistently occupied by the Palos Verdes blue butterfly includes the Defense Fuel Support, San Pedro, and the former Palos Verdes Navy housing area. The Navy committed to conserving the Palos Verdes blue butterfly within both the Defense Fuel Support (Formal Section 7 Consultation for the Chevron 1-8" Pipeline and Associated Government Pipelines Project, Defense Fuel Support Point, San Pedro, Los Angeles County, California (1-6-96-F-09)) (Chevron Biological Opinion) and the former Palos Verdes Navy housing area (Formal Section 7 Consultation for the Proposed Disposal and Reuse of the Palos Verdes and San Pedro Navy Housing Areas, Los Angeles County, California (Palos Verdes and San Pedro Navy Housing Biological Opinion)). To implement the Chevron Biological Opinion, the Navy restored 10 acres (ac) (4.05 hectares (ha)) of Palos Verdes blue butterfly habitat, and a 10.44-ac (4.22-ha) conservation area was established with implementation of the Palos Verdes and San Pedro Navy Housing Biological Opinion. Through the 2001 Integrated Natural Resource Management Plan (INRMP), the Navy has proposed additional measures to protect existing Palos Verdes blue butterfly habitat within the Defense Fuel Support. Palos Verdes blue butterflies have been observed during formal surveys in this area every year since 1994 (Longcore 2006).

In 1994, a captive rearing program was established from the population at the Defense Fuel Support, San Pedro (Longcore *et al*. 2002). The Navy committed to funding this captive breeding program as a part of the Chevron Biological Opinion. Palos Verdes blue butterflies have been successfully reared in captivity every year since the program was established, and in 2007 a secondary rearing facility was established at Moorpark College, Moorpark, California. While the success of the captive breeding program varied since its inception, the establishment of the secondary rearing facility and improved rearing procedures made 2007 the most successful year on record with over 4,000 Palos Verdes blue butterfly pupae (resting stage "cocoons") produced in captivity (J. Johnson, pers. comm. 2007). In March 2008, an initial reintroduction effort was initiated on the Palos Verdes Peninsula. It is too early to evaluate the success of the reintroduction, which will be evaluated over a two-three year period. We anticipate future releases from this captive rearing program.

Palos Verdes blue butterfly pupae from the Defense Fuel Support captive rearing program were introduced to the 28.5-ac (11.5 ha) Linden H. Chandler Preserve (Chandler Preserve) in the City of Rolling Hills Estates following habitat restoration efforts in 2000.

Several Palos Verdes blue butterfly adults were observed flying, mating, and ovipositing at the Chandler Preserve in 2001; however, only one or two adults were seen in 2002 (T. Longcore pers. comm. 2002), and the site is not considered occupied at this time. The Palos Verdes Peninsula Land Conservancy is currently working with the Service to implement a habitat restoration in an effort to reintroduce the Palos Verdes blue butterfly to the Preserve in 2008.

Two male and one female Palos Verdes blue butterflies were discovered at the Malaga Dune in 2001 in the City of Palos Verdes Estates (R. Mattoni and J. George pers. comm. 2001). Previous surveys at the Malaga Dune did not detect the Palos Verdes blue butterfly; therefore, its abundance is assumed to be very low at this site (R. Mattoni pers. comm. 2001). Based on the continued presence of host plants within Malaga Dune, the site is still considered occupied; however, surveys have not been conducted since 2001.

In summary, there is one fairly robust population of the Palos Verdes blue butterfly at the Defense Fuel Support, San Pedro, and within preserved habitat at the former Palos Verdes Naval housing area. A captive rearing program provides some assurance against impacts from catastrophic events to wild populations. The Malaga Dune likely supports a low density population, and the status of the Palos Verdes blue butterfly reintroduction effort at the Chandler Preserve is unknown. The total existing occupied habitat for the Palos Verdes blue butterfly is likely less than 50 ac (20 ha).

Life History Requirements

Palos Verdes blue butterflies require suitable larval host plants for oviposition and larval development. *Astragalus trichopodus lonchus* (coast locoweed) was once thought to be the exclusive larval hostplant for the Palos Verdes blue butterfly; however, Palos Verdes blue butterfly larvae are now known to feed also on *Lotus scoparius* (deerweed) (Mattoni 1992). Both of these host plants are naturally distributed within disturbed patches in coastal sage scrub communities throughout the Palos Verdes peninsula. Both plant species invade cleared areas following disturbance. Palos Verdes blue butterflies require some minimum number of larval host plants and nectar resources to successfully exploit a habitat patch over extended periods (Mattoni and Longcore 2002). Mattoni and Longcore (2002) suggest that slope and azimuth (orientation relative to north) may also affect habitat quality.

The adult flight period is tied to host plant flowering and generally occurs between late January and early May (Arnold 1987; Lipman *et al*. 1999). Palos Verdes blue butterfly adults are thought to be relatively poor dispersers (Mattoni 1992), and initial studies suggest that males are more likely to disperse among habitat patches than females (Lipman *et al*. 1999). Oviposition (egg-laying) occurs throughout the flight season, and eggs are laid on the flowerheads or leaves of coast locoweed or deerweed (Service 1984; Mattoni 1992).

Abundance and Population Dynamics

Researchers conducted surveys for the Palos Verdes blue butterfly on the Defense Fuel Support, San Pedro, from 1994 to 2006 and on the adjacent former Palos Verdes Navy housing area from 1999 to 2006 (Longcore 2006). Based on population estimation methods described in Mattoni *et al*. (2001), population sizes from 1994 to 2003 were estimated at 69, 105, 247, 109, 199, 209, 132, 139, 215, 30, 282, 204, and 219. These results suggest that Palos Verdes blue butterfly populations fluctuate dramatically under natural conditions.

Relative estimates of annual abundance varied substantially among habitat patches in an 8-year study at the Defense Fuel Support, San Pedro (Mattoni *et al.* 2002a). This spatial and temporal variation suggests that no single patch can provide consistently high-quality habitat for the Palos Verdes blue butterfly over the long-term. Patches with few or no Palos Verdes blue butterflies in a given year may support high abundances in other years. Maintenance of any single population may rely on dispersal among habitat patches or subpopulations as described in metapopulation theory (Gilpin and Hanski 1991).

In 2000, pupae from the captive rearing program were released into two areas within the Defense Fuel Support in an effort to reintroduce the Palos Verdes blue butterfly into areas with suitable host plants (Mattoni *et al*. 2002b). The reintroduction effort was considered successful because several adults emerged with typical flight and mating behavior in each area in 2001. Palos Verdes blue butterflies have also been observed within these areas during surveys in subsequent years.

2.3.2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1. Factor A, Present or threatened destruction, modification or curtailment of its habitat or range:

At the time of listing in 1980, habitat destruction through residential and commercial development was considered a threat to the Palos Verdes blue butterfly (45 FR 44939). Habitat modification through weed control and non-native weed invasion and habitat loss through recreational development were also considered threats to the Palos Verdes blue butterfly; however, these threats were described under listing factor E (other natural or manmade factors).

We anticipate that future impacts to Palos Verdes blue butterfly habitat within the Defense Fuel Support, San Pedro, and the former Palos Verdes Navy housing area will be minor and mostly temporary. The Navy works closely with the Service to ensure that projects with potential to impact Palos Verdes blue butterfly habitat will adequately address the species to ensure long-term protection of the existing population. Specific management objectives are described in the Navy's INRMP for the Defense Fuel Support. At the Malaga Dune site, which likely supports a small population of the Palos Verdes blue butterfly, there is no identified development

threat, although the site is not protected from future development proposals by any conservation mechanism (*e.g.*, conservation easement).

Large tracts of undeveloped land remain within the historical distribution of the Palos Verdes blue butterfly that have areas suitable for Palos Verdes blue butterfly reintroduction following habitat restoration. Because the sites have the potential to support additional Palos Verdes blue butterfly populations, they have high value for Palos Verdes blue butterfly recovery efforts. The City of Rancho Palos Verdes is currently developing a Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) that will conserve over 1,400 ac (566.6 ha) of undeveloped land, mostly within the historical range of the Palos Verdes blue butterfly. Implementation of the Rancho Palos Verdes NCCP/HCP would nearly eliminate the threat of habitat destruction or modification within recoverable Palos Verdes blue butterfly habitat; we anticipate this NCCP/HCP will be completed in late 2008 or early 2009. Thus, while not totally eliminated, the threat of habitat destruction has been greatly reduced at the remaining occupied and restorable sites within the Palos Verdes blue butterfly's historical range on the Palos Verdes peninsula.

We are unaware of weed control practices that continue to threaten Palos Verdes blue butterfly habitat; however, past weed control practices have removed host plants on restorable Palos Verdes blue butterfly habitat, and non-native weed invasion continues to threaten the Palos Verdes blue butterfly within both occupied and recoverable habitat. All occupied habitat requires management to control the spread of non-native weeds, and the Navy is currently implementing a successful weed management program at the Defense Fuel Support, San Pedro (Soil Ecology and Restoration Group 2002). Historic land use practices, including weed control and grazing, impacted Palos Verdes blue butterfly habitat throughout its historical range. Because these impacts had lasting effects, habitat restoration, in particular planting of host plants, will be necessary prior to effective reintroduction efforts. While current Palos Verdes blue butterfly habitat is not threatened by ongoing habitat modification, lasting impacts of land use practices will need to be addressed on restorable habitat for future recovery efforts.

2.3.2.2. Factor B, Overutilization for commercial, recreational, scientific, or educational purposes:

This factor was not considered applicable at the time of listing, and we are unaware of any substantial impact to the Palos Verdes blue butterfly from collectors since the species was listed. In addition, as a result of the listing, research activities on the Palos Verdes blue butterfly are controlled and monitored by the Service through the issuance of Act section 10(a)(1)(A) recovery permits.

2.3.2.3. Factor C, Disease or predation:

At the time of listing, the threat of disease or predation was not known to be applicable. Neither disease nor predation is known to substantially impact the species

at this time. There is concern that watering of host plants during habitat restoration efforts may result in larval and egg predation by earwigs (Dermaptera) (Pratt 2004). Although this is a potential threat that should be accounted for in future restoration efforts, it is not currently considered a significant threat to the Palos Verdes blue butterfly.

2.3.2.4. Factor D, Inadequacy of existing regulatory mechanisms:

State Protections

California Endangered Species Act. The Palos Verdes blue butterfly is not listed under the California Endangered Species Act (CESA), which does not protect insects. Thus, the only State laws providing any potential protection to the Palos Verdes blue butterfly are the California Environmental Quality Act (CEQA) and the Natural Communities Conservation Planning (NCCP) Act.

California Environmental Quality Act. The CEQA is the principal statute mandating environmental assessment of projects in California. The purpose of CEQA is to evaluate whether a proposed project may have an adverse effect on the environment and, if so, if that effect can be reduced or eliminated by pursuing an alternative course of action or through mitigation. CEQA applies to projects proposed to be undertaken or requiring approval by State and local public agencies (http://www.ca.gov/state/portal).

If significant effects are identified through the CEQA process, the lead agency has the option to require mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA Sec. 21002). Because the coastal sage scrub is recognized in California as a unique and declining resource with several endemic species, projects in Palos Verdes Peninsula that are mandated to comply with CEQA may provide some consideration of impacts to Palos Verdes blue butterfly and its habitat. However, any protection afforded rare or sensitive species or their habitats, through CEQA, are at the discretion of the lead agency involved.

Natural Community Conservation Planning. The NCCP program is a cooperative effort involving the State of California and numerous private and public partners to protect habitats and species. A NCCP identifies and provides for the regional or area-wide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. The program began in 1991 under the State's NCCP Act (California Fish and Game Code 2800-2835). The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale while accommodating compatible land use (http://www.dfg.ca.gov.NCCP/). Regional NCCPs may provide protection to federally listed species, such as the Palos Verdes blue butterfly, by conserving native habitats upon which the species depend.

The City of Rancho Palos Verdes is currently developing a NCCP/HCP that will conserve Palos Verdes blue butterfly habitat throughout a significant portion of its historical range. At this time, the Palos Verdes blue butterfly habitat within the proposed conservation areas is not known to be occupied; however, if the Palos Verdes blue butterfly are discovered or reintroduced, the plan provides specific management and minimization measures to ensure protection of existing populations.

Federal Protections

National Environmental Policy Act (NEPA). The NEPA may provide some protection for the Palos Verdes blue butterfly for projects with a Federal nexus (undertaken, funded, or authorized by Federal agencies). NEPA requires that the planning process for Federal actions be documented to ensure that effects on the environment are considered. The NEPA process is intended to help public officials make better decisions based on an understanding of the environmental consequences of their actions and to take actions to protect, restore, and enhance the environment (40 CFR 1500.1). Carrying out the NEPA process ensures that agency decision makers have information about the environmental effects of Federal actions and information on a range of alternatives that will accomplish the project purpose and need.

For environmental impacts that are significant, the Federal agency must identify means to mitigate these impacts (40 CFR 1502.16). For projects undertaken, funded, or authorized by Federal agencies, NEPA would at least require that any significant adverse impacts to the human environment, including impacts to the natural and physical environment (40 CFR 1508.14), be considered. Again, because coastal sage scrub is recognized in California as a unique and declining resource with several endemic species, projects in the Palos Verdes Peninsula that are mandated to comply with NEPA may provide some consideration of impacts to the Palos Verdes blue butterfly and its habitat.

Endangered Species Act. The Act (1973, as amended; 16 USC 1531 *et seq.*) is the primary Federal law providing protection for the Palos Verdes blue butterfly. Beyond the actual listing of the species, these protections are afforded particularly through sections 7, 9, and 10 of the Act. Section 7 of the Act requires Federal agencies to insure that any action authorized, funded, or carried out by them is not likely to jeopardize the continued existence of listed species or adversely modify their critical habitat. Section 7 also encourages Federal agencies to use their authorities to carry out programs for the conservation of listed species. Section 9 of the Act includes prohibitions against possessing, selling, importing, exporting, and taking listed species. Section 10 of the Act provides a process whereby private landowners can gain an exemption to the section 9 take prohibitions (*i.e.*, a section 10(a)(1)(B) permit) provided such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Protection on Department of Defense Lands. The Sikes Act (16 U.S.C. 670) authorizes the Secretary of Defense to develop cooperative plans for conservation and rehabilitation programs on military reservations and to establish outdoor recreation facilities. The Sikes Act also provides for the Secretaries of Agriculture and the Interior to develop cooperative plans for conservation and rehabilitation programs on public lands under their jurisdiction. While the Sikes Act of 1960 was in effect at the time of the Palos Verdes blue butterfly's listing, it was not until the amendment of 1997 (Sikes Act Improvement Act) that Department of Defense (DOD) installations were required to prepare INRMPs. Consistent with the use of military installations to ensure the readiness of the Armed Forces, INRMPs provide for the conservation and rehabilitation of natural resources on military lands. They incorporate, to the maximum extent practicable, ecosystem management principles and provide the landscape necessary to sustain military land uses. While INRMPs are not technically a regulatory mechanism because their implementation is subject to funding availability, they address the conservation of natural resources on military lands and can be an added conservation tool in promoting the recovery of endangered and threatened species.

In 2001, the Navy adopted an INRMP for the Defense Fuel Support, San Pedro (U. S. Navy 2001). Like other INRMPs, it is largely ecosystem-based except where biological opinions direct species-specific actions. The Defense Fuel Support's INRMP incorporated the Service's Chevron Biological Opinion. Because it incorporates the provisions of this consultation pursuant to section 7 of the Act, the Defense Fuel Support's INRMP provides specific direction regarding Palos Verdes blue butterfly management, habitat restoration, and captive breeding.

Summary of Factor D Analysis:

While both CEQA and NEPA and the State's NCCP Act may provide some discretionary conservation benefit to the Palos Verdes blue butterfly, the Act is the primary regulatory mechanism mandating Palos Verdes blue butterfly conservation and ensuring that the Palos Verdes blue butterfly is addressed during planning efforts that may impact the species or its habitat. Because the population at Defense Fuel Support, San Pedro, is under the Navy's jurisdiction, section 7 of the Act is the primary Federal process for addressing Palos Verdes blue butterfly conservation needs at this site. Section 10 of the Act is the primary Federal process for addressing both the economic development needs of the Palos Verdes Peninsula and the conservation needs of the species on private lands. Thus, it is through the Act that we continue to work with our Federal and State partners, local jurisdictions, and private landowners to implement actions to reduce ongoing threats and recover this species.

2.3.2.5. Factor, E, Other natural or manmade factors affecting its continued existence:

At the time of listing, habitat destruction through recreational development (*e.g.*, City Parks) and habitat modification through weed control and non-native plant invasion were considered under this listing factor (45 FR 44939); however, we have now addressed these impacts under listing factor A (destruction, modification or curtailment of habitat) for this review. Based on the limited distribution of the Palos Verdes blue butterfly in the wild, we have identified small population size and isolation as important, current threats to the Palos Verdes blue butterfly.

The Palos Verdes blue butterfly is threatened by small population size and isolation of known occupied areas. It is commonly accepted in conservation biology that small populations have higher probabilities of extinction than larger populations because their low numbers make them susceptible to inbreeding, loss of genetic variation, high variability in age and sex ratios, demographic stochasticity, and random naturally occurring events such as wildfires, floods, droughts, or disease epidemics (Soulé 1987; Shaffer 1981, 1987; Meffe and Carroll 1997; Primack 1998).

Another factor commonly understood to make populations vulnerable to stochastic events is isolation. Isolation often acts in concert with small population size to increase the probability of extinction. Isolated populations are more susceptible to long-term/permanent extirpation by accidental or natural catastrophes because the likelihood of recolonization following such events is negatively correlated with the extent of isolation (*i.e.*, colonization is less likely as isolation increases) (Wilcox and Murphy 1985; Meffe and Carroll 1997). Urbanization and land conversion have fragmented the historical range of the Palos Verdes blue butterfly such that remaining blocks of occupied habitat likely now function more independently of each other (*i.e.*, are more isolated) where they were formerly connected. Large reserve areas associated with the proposed Rancho Palos Verdes NCCP/HCP have the potential to support connected patches of occupied Palos Verdes blue butterfly habitat following habitat restoration and reintroduction of the Palos Verdes blue butterfly; however, the threats of small population size and isolation will remain until this plan and an effective reintroduction effort are implemented and monitored.

2.4. Synthesis

At the time of listing in 1980, habitat loss through urban development and habitat degradation through weed control practices were considered the major threats to the Palos Verdes blue butterfly. All Palos Verdes blue butterfly populations known at the time of listing were thought to be extirpated by 1983. Currently, the Palos Verdes blue butterfly is only known to occupy very limited habitat at the Defense Fuel Support, San Pedro, and former Palos Verdes Navy housing area, and it is likely present within only a very small area of the Malaga Dune. While the Defense Fuel Support/former Palos Verdes Navy housing area population appears relatively stable and is under effective management, additional populations must be established or augmented to guard against the risk of extinction from a

stochastic event and ensure long-term survival of the species. For these reasons, we conclude that the Palos Verdes blue butterfly continues to meet the Act's definition of endangered, and we recommend no status change at this time.

3. RESULTS

3.1. Recommended Classification

____ Downlist to Threatened

____ Uplist to Endangered

____ Delist (Indicate reasons for delisting per 50 CFR 424.11):

____ Extinction

____ Recovery

____ Original data for classification in error

__X_ No change is needed

3.2. New Recovery Priority Number: 6 (no change)

4. RECOMMENDATIONS FOR FUTURE ACTIONS

Reintroduction of Palos Verdes Blue Butterfly within Historical Range

We anticipate that large areas that once supported the Palos Verdes blue butterfly will be protected as open space throughout the Palos Verdes Peninsula with implementation of the Rancho Palos Verdes NCCP/HCP. It is likely that these patches within these areas can be restored to once again support populations of this subspecies, and Palos Verdes blue butterflies are available to release from captive rearing efforts. Successful reintroduction outside of the Palos Verdes blue butterfly's current range would substantially increase the likelihood of long-term survival and recovery for the species.

Research Objectives Related to Palos Verdes Blue Butterfly Biology

Specific information regarding microhabitat requirements for the Palos Verdes blue butterfly would lead to more efficient habitat management, restoration, and reintroduction efforts. Factors thought to influence Palos Verdes blue butterfly persistence include slope, wind, and vegetation characteristics surrounding host plant patches. Targeted research should identify the range of conditions under which the Palos Verdes blue butterfly can be expected to persist.

Revise Recovery Plan

The information used to create the existing recovery plan is outdated, and the plan does not establish specific, measurable criteria that can be used to evaluate recovery progress. A revised recovery plan should include updated information habitat suitability outside of the Defense Fuel Support, San Pedro, and former Palos Verdes Navy housing area as well as recommendations for reintroduction efforts.

5. REFERENCES

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Personal Communications

We obtained valuable information about Palos Verdes blue butterfly-related issues through personal communication with the following people who have expert knowledge about the butterfly and/or its habitat.

Jeremiah George, The Urban Wildlands Group, 2001.

Jana Johnson, The Urban Wildlands Group, 2007.

Dr. Travis Longcore, The Urban Wildlands Group, 2002.

Dr. Rudi Mattoni, The Urban Wildlands Group, 2001.

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of PALOS VERDES BLUE BUTTERFLY

Current Classification: Endangered

Recommendation resulting from the 5-Year Review:

____ Downlist to Threatened

____ Uplist to Endangered

____ Delist

__X__ No change needed

Appropriate Listing/Reclassification Priority Number, if applicable:

Review Conducted By:

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 3-27-08

REGIONAL OFFICE APPROVAL:

Lead Regional Director, Fish and Wildlife Service

Approve _____ Date 3/31/08