

County of San Diego Multiple Species Conservation Program

Quino Checkerspot Butterfly Amendment

Proposed Conservation Policies

1.0 Introduction

This report provides the project processing procedures proposed as part of the County of San Diego's Quino Checkerspot Butterfly Amendment (Quino Amendment) to the Multiple Species Conservation Program (MSCP) Subarea Plan (County Subarea Plan) and an analysis of anticipated conservation levels. By providing a concise summary of these critical issues, this report will facilitate review by staff, analysts, consultants, property owners, and the Wildlife Agencies (California Department of Fish and Game and U.S. Fish and Wildlife Service). It is assumed that those reviewing this report have prior knowledge of the County of San Diego's Multiple Species Conservation Program (MSCP) South County Subarea Plan (County Subarea Plan) and Quino Amendment.

Major components of the Quino Amendment not discussed in this report, but which will be addressed in the future, include:

- **Adaptive Management and Monitoring:** A group of independent scientists prepared a report (Longcore *et al.* 2003) that provides adaptive management recommendations for Quino checkerspot butterfly (Quino) populations within the County Subarea Plan. Based upon the recommendations in the report and other data, an adaptive management and monitoring strategy is being developed.
- **Financing of Adaptive Management and Monitoring:** There is an existing adaptive management and monitoring program being implemented within the County Subarea Plan that will provide numerous benefits to Quino populations. Funding for this program comes from multiple sources (see Section 7.0 of the County Subarea Plan). However, to ensure the success of the Quino Amendment, additional adaptive management and monitoring actions will be necessary. As the adaptive management and monitoring strategy for the Quino Amendment is developed, the County of San Diego (County) will assess additional costs that will be necessary and identify funding mechanisms.
- **Effects of the Quino Amendment on Other Species:** The Quino Amendment proposes minor changes to the existing County Subarea preserve system. Specifically, modifications are being proposed to the Otay Ranch Village 13 area. The effects of these modifications will be analyzed in the Quino Amendment and associated environmental documents to ensure that the ecological benefits provided by the preserve system are not diminished.

To concisely present the conservation levels and impacts proposed by the Quino Amendment, the following items are discussed in this report:

- **Section 1 - Introduction:** Describes the goals of the Quino Amendment, provides important definitions, and gives an overview of Unforeseen and Changed Circumstances.
- **Section 2 - Baseline Quino Habitat and Population Conditions:** Discusses the general known distribution of Quino populations and habitat.
- **Section 3 - Project Processing:** Discusses the general project processing procedures related to Quino that will be implemented throughout the County Subarea Plan.
- **Section 4 - Conservation Analysis:** Assesses the consistency of the proposed conservation levels with overarching conservation goals.

1.1 Quino Amendment Goals

In general, the Quino Amendment will provide assurances for the long-term conservation of Quino within the County Subarea while allowing for public and private development consistent with the approved Implementing Agreement for the County Subarea Plan. Upon approval of the Quino Amendment, Quino will be included as a Covered Species Subject to Incidental Take under the County Subarea Plan. Such authorization is necessary because otherwise lawful activities associated with construction of public and private projects in the County Subarea will result in the modification and destruction of Quino habitat.

The Quino Amendment has two overarching goals:

- 1) Provide for the long-term viability of Quino within the County Subarea and contribute to the recovery of Quino in the region through the conservation and adaptive management of Quino habitat.
- 2) Improve regulatory certainty for development projects in order to facilitate development outside of the County Subarea preserve areas.

These goals will be achieved by accomplishing the following objectives (1-4, below, are directly related to the discussion in this report):

- 1) Preserve a sufficient amount of occupied Quino habitat to ensure the long-term conservation of Quino in the County Subarea.
- 2) Provide conservation of appropriate habitat (including habitat not currently known to be occupied) within a preserve design appropriate to the metapopulation dynamics of Quino.
- 3) Provide Take Authorization of Quino for both public and private projects.
- 4) Minimize regulatory burdens associated with Federal Endangered Species Act compliance for Quino.
- 5) Provide an adaptive management framework that offers long-term management of key habitat constituents necessary for the persistence of Quino, with new strategies implemented as additional information is learned.
- 6) Facilitate monitoring of the species and key habitat constituents to ensure long-term persistence of viable populations.
- 7) Ensure necessary funding for adaptive management and monitoring of the preserve.
- 8) Ensure compatibility with the overall conservation goals of the County Subarea Plan for all Covered Species.

1.2 Definitions

- **Occupied Quino Habitat:** Occupied Quino Habitat shall be defined and mapped as follows (an example of mapped Occupied Quino Habitat is provided in Figure 1):
 - All Potential Quino Habitat within 200 meters (656 feet) of a Quino sighting (at a minimum).
 - Any additional natural habitat within 200 meters (656 feet) of a Quino sighting containing Significant Larval Host Plant Patches (defined below) with appropriate nectaring plants present.
 - Any additional natural lands within 200 meters (656 feet) of Significant Larval Host Plant Patches with appropriate nectaring plants present, until no additional significant patches are encountered.
 - Habitats to be excluded from extension beyond the 200 meter (656 foot) radius from Significant Larval Host Plant Patches include inappropriate Quino habitat or habitat beyond significant barriers to dispersal, including:

- Closed canopy chaparral, upland forest, or riparian forest that do not have open areas at least two square meters (21.5 square feet) in size;
 - Dense deergrass meadows;
 - Dense non-native grassland where few host plants are present; and
 - Barriers such as solid fencing/walls over two (6.6 feet) meters in height, dense vegetation (ornamental or natural) over three meters (9.8 feet) in height, or buildings.
- Hilltops or ridgelines, linked by open areas and natural vegetation to open canopy areas containing an open, woody-canopy area at least two square meters (21.5 square feet) in size, that may be used by Quino for mating or hilltopping behavior within 200 meters (656 feet) of an open area containing host and nectar plants for feeding and natural vegetation or open areas for movement and basking (e.g., are within 500 meters (1,640 feet) of Significant Larval Host Plant Patch and consist of Potential Quino Habitat).

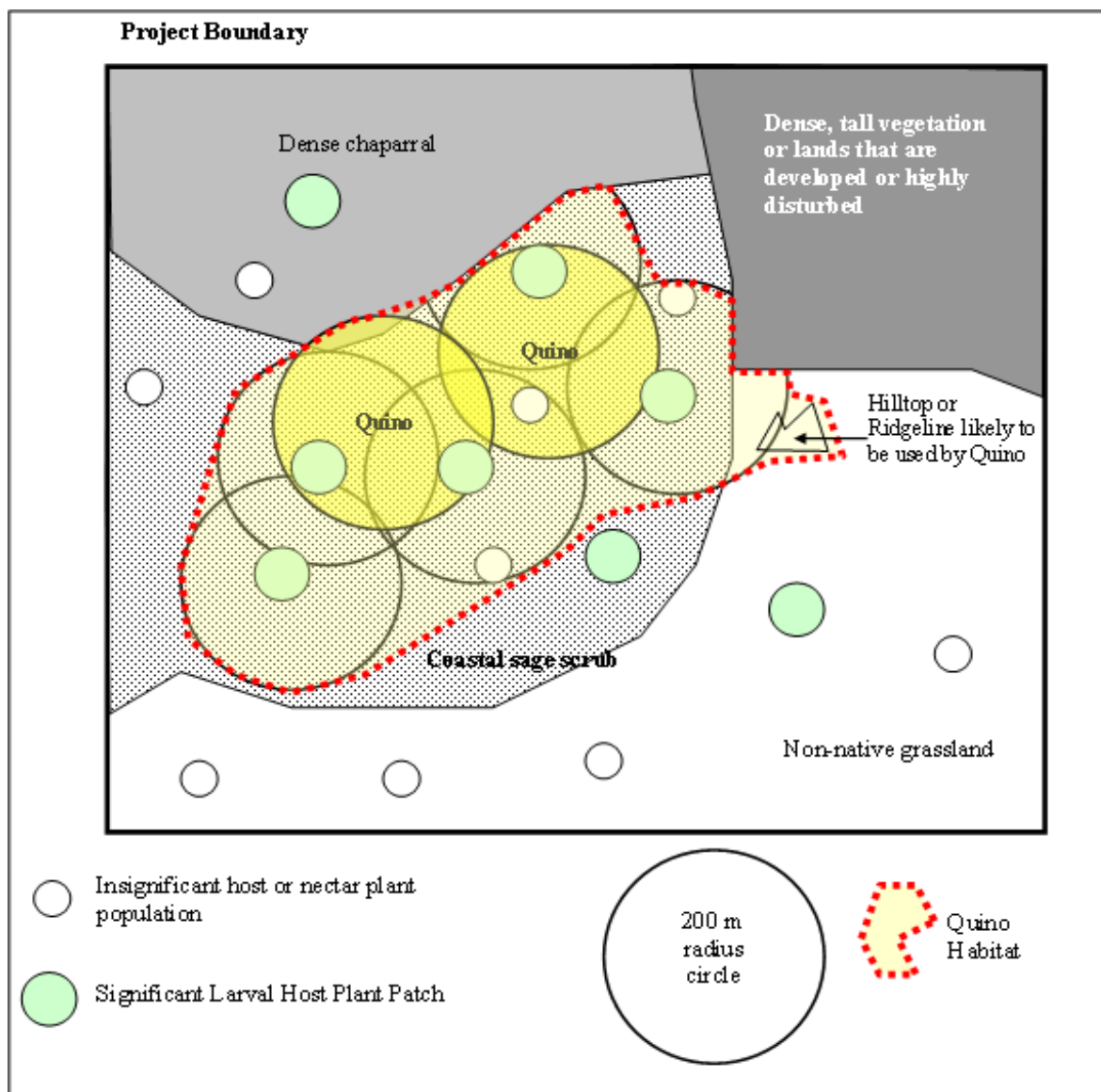


Figure 1. Example of Occupied Quino Habitat Mapping.

- **Potential Quino Habitat:** At the most general level, all vegetation communities with a potential to support Quino are considered Potential Quino Habitat. However, the potential of these vegetation communities to support Quino in different areas is further classified based upon the results of Quino surveys. Negative survey results do not necessarily preclude an area from being considered Potential Quino Habitat, since patches of suitable habitat that are unoccupied in one season may be occupied in another season due to metapopulation dynamics (see Section 2.1 for a thorough description of Potential Quino Habitat and Figure 2 for a map of Potential Quino Habitat.)
- **Significant Larval Host Plant Patch:** An area within which a Quino larval host plant species covers at least two square meters and contains a density of at least 20 individual host plants per square meter in at least one part of the patch in a normal rainfall year (*i.e.*, within 80 percent of the mean seasonal total from July 1 to March 1 measured at Lindberg Field, Brown Field, or closest precipitation station with a historical rainfall data). There may be seasons in which precipitation timing and quantities provide adequate conditions for larval host plants that would not meet normal rainfall year criteria, but would still constitute a Significant Larval Host Plant Patch, as determined from field investigations by a permitted biologist. Where secondary host plants are present, the number of primary host species needed may be reduced, provided they are sufficient for larvae to reach a size at which they can locate the secondary host plants. Depending on conditions, the ability to detect a Significant Larval Host Plant Patch later in the season may decline.
- **Suitable Quino Habitat:** To delineate Suitable Quino Habitat, the same process is followed as for delineating Occupied Quino Habitat (see above definition and Figure 1). However, rather than beginning habitat mapping at a Quino sighting, mapping begins at a Significant Larval Host Plant Patch where appropriate nectaring plants are present.
- **Viable Quino Habitat:** Quino habitat is considered “viable” if it is capable of maintaining normal ecosystem functions over the long-term (50 years) that sustain Quino, based on the best available science as interpreted by a qualified County biologist (*e.g.*, lands identified as Biological Resource Core Areas in the Biological Mitigation Ordinance for the County Subarea Plan). In order to make a determination that Quino habitat is not viable and may, therefore, be impacted within Quino Criteria Areas (see Section 3.3), concurrence from the Wildlife Agencies is required.

1.3 Unforeseen and Changed Circumstances

The purpose of the Quino Amendment is to provide for the conservation of Quino and mitigation, minimization, compensatory measures, and management required for Incidental Take of Quino through otherwise lawful and permitted activities in the County Subarea. Accordingly, except in the case of Unforeseen Circumstances, no further mitigation or compensation shall be required by the County or Third Party Beneficiaries to address impacts of covered activities on Quino. Provided the County is properly implementing the County Subarea Plan, including the Quino Amendment, the U.S. Fish and Wildlife Service (USFWS) may not require (1) any conservation or mitigation measures in addition to those set forth in the Quino Amendment in response to a Changed Circumstance; or (2) additional conservation or mitigation measures for any Changed Circumstance not identified in the Quino Amendment without the County's consent.¹ As recognized in the “No Surprises” Rule,² the USFWS or other federal agency, state agency, local agency, or private entity may take additional actions at their own expense to protect or conserve Quino within the County Subarea.

¹ 50 C.F.R. § 17.22(b)(5)(ii).

² 50 C.F.R. §§ 17.22(b)(6) and 17.32(b)(6).

- **Unforeseen Circumstances:** Changes in circumstances affecting a species or geographic area covered by a conservation plan that could not have been reasonably anticipated by plan developers and the USFWS at the time of the conservation plan's negotiation and development and that result in a substantial and adverse change in the status of the covered species.
- **Changed Circumstances:** Changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the USFWS at the time of the conservation plan's negotiation and development and that can be planned for (*i.e.*, fire or other natural catastrophic event in areas prone to such event).³ Changed Circumstances under the Quino Amendment will include reasonably foreseeable future events that may occur during the life of the County Subarea Plan that may negatively affect Quino and/or its associated habitat within the preserve. Changed Circumstances that may be addressed by the Quino Amendment include: climate change, repetitive fire, drought, non-native plant invasion, tribal annexations, and climate change (listed below). It should be noted that although flood can constitute a Changed Circumstance, it is not anticipated to affect Quino.
 - **Climate Change:** For the purposes of Changed Circumstances, climate change refers to the alteration of the atmosphere that is causing changes in climate, including increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising sea levels. In California, it is anticipated that there will be warmer temperatures (Cayan *et al.* 2006), greater extremes in weather, and larger variation between wet and dry years (Franco 2005) but precipitation patterns are more difficult to project (Lenihan *et al.* 2006). Some of the most dramatic potential climate change impacts include increased frequency and severity of extreme events, such as heat waves, wildfires, and flooding (Lenihan *et al.* 2006, IPCC 2007). To accommodate shifts in distribution, species will need a range of large core habitat areas connected by landscape-level linkages (Franco 2005). Those species with specific habitat requirements with a limited ability to relocate or that are surrounded by development (leaving few relocation options), are most at risk (NPS 2006). These changes could alter the structure, composition, and productivity of natural communities (Lenihan *et al.* 2006).

Evidence of local climate change and a corresponding change in Quino's range-wide distribution supports the conclusion that climate change is a substantial threat to Quino's survival in the foreseeable future. Quino may have the potential to be particularly impacted by climate change based on a number of factors, such as temperature, host plant density, host plant availability and non-migratory, fairly sedentary nature of Quino. In response to climate change, species such as Quino may shift their range northward and upward in elevation. (USFWS 2003)

Impacts from climate change (*i.e.*, invasive species, fire, drought, flooding) could have a compounding effect, intensifying the severity of each impact (Cayan *et al.* 2006). Managing the effects of climate change will be challenging as impacts occur simultaneously (Lenihan *et al.* 2006). Climate change may exacerbate other potential Changed Circumstances, such as repetitive fire, drought, and non-native species invasion, listed below.

- **Repetitive Fire:** For the purpose of Changed Circumstances, repetitive fire is defined as fire frequency that results in type conversion. The USFWS has indicated that for coastal sage scrub and riparian habitat, repeat fires within the same footprint within 10 years of the original burn can adversely hamper natural regrowth and interrupt the ability of habitat to

³ 50 C.F.R. § 17.3.

rejuvenate. Diffendorfer *et al.* (2007) cite several sources that indicate fire cycles of one to three years within coastal sage scrub can increase non-native plant species presence and lead to conversion to grassland. Ten years after a fire, shrub dominated habitat types prevalent in preserve areas are expected to be fully re-established and capable of natural regeneration. Fire is an important natural disturbance within the County Subarea that promotes vegetation and wildlife diversity, releases nutrients, and eliminates heavy fuel accumulations that can lead to catastrophic burns. As fire is a natural feature in the County Subarea, under normal circumstances natural regrowth of habitat is expected. However, certain repetitive fires in the same location of the preserve may adversely affect Quino due to degradation of natural habitats to those dominated by invasive non-native species. This is generally a greater concern for shrub-dominated habitats.

- **Drought:** For the purpose of Changed Circumstances, drought is defined as climatic drought of five to 10 years in length, as declared by the California State Department of Water Resources and/or the San Diego County Water Authority. Longer periods of drought are considered Unforeseen Circumstances. Drought is a weather phenomenon that is beyond direct local control. Drought is not uncommon in southern California and is a phenomenon to which local natural habitats and species are adapted. Rainfall data over the past 150 years for the County indicate that drought periods of two to three years are fairly common, droughts lasting up to five years are not uncommon, and 10 year droughts occasionally occur. Drought occurs slowly over a multi-year period, differing from catastrophic events such as fire or flood, which occur rapidly and afford little time for disaster response preparation. Climate change may affect drought frequency or intensity. Drought conditions may adversely affect Quino and Quino habitat, particularly if they are unable to adapt to changes as they occur.
- **Non-native Species Invasion:** For the purpose of defining Changed Circumstances, invasion of exotic species is defined as an introduction of a species within a preserve that has either: (a) not previously been known to occur in County and has been noxious elsewhere; or (b) is a particularly noxious variety of non-native species that is resistant to typical control measures. Unforeseen circumstances would be defined as invasion within a preserve of a species not currently known to be a noxious elsewhere, but that becomes so upon introduction to the preserve. Although invasive, exotic, or pest species of plants and/or animals may currently exist within the areas identified for inclusion in the preserve, they are expected to be controlled through the adaptive management process. An unexpected and/or sudden increase in new invasive species may create the potential for a significant adverse affect on Quino. Opportunities for introduction of invasive species could increase as urban development expands in areas surrounding the preserve. Additionally, the occurrence of a catastrophic event, including the other identified Changed Circumstances defined herein, may precipitate the establishment of novel invasive species.
- **Tribal Annexations:** For the purpose of Changed Circumstances, tribal annexations refers to the bringing into trust lands larger than 100 acres within the PAMA (cumulatively) that are currently owned by tribes (as of 2008). The purchase of land by tribes does not, in itself, constitute a Changed Circumstance. In recent years, many tribes in the County have purchased lands that may expand reservation boundaries. Lands owned by a tribe that are not held in trust are still subject to County ordinances and jurisdiction. Tribes may bring lands into trust through an act of the U.S. Congress, or with approval from the Bureau of Indian Affairs. Once lands are brought into trust, they are no longer subject to County ordinances or jurisdiction. As a result, if land is held in trust, the County would not have the ability to regulate potential new

development on such lands, nor would it have the ability to acquire, preserve, manage, or monitor such lands. Therefore, these lands would effectively become excluded from the County Subarea, which could necessitate an adjustment of conservation target for Quino.

- **Relationship to Adaptive Management.** Preventative measures and responses to Changed Circumstances will be addressed through the adaptive management and monitoring elements of the Quino Amendment. The adaptive management program will require monitoring of Quino and habitat conditions, with a management response to observed threats. In anticipating and reacting to Changed Circumstances, adaptive management allows for revisions to the operating conservation program, thereby enhancing future strategies for the conservation of Quino and its habitat. Changed Circumstances allow specific triggers and management actions to be applied to foreseeable threats.

2.0 Baseline Quino Habitat and Population Conditions

Numerous Quino populations have been identified (Figures 2 and 3) through surveys in the County Subarea. In addition, as of 2006, approximately 22,000 acres of the County Subarea had negative survey results for Quino. In order to assess the suitability of habitats to support Quino in unsurveyed areas, a model was developed (*i.e.*, Potential Quino Habitat Model, discussed in Section 2.1). Modeling of the potential of habitats to support Quino was necessary for the following reasons:

- Survey results are not available for all areas and some of the available surveys were not conducted in accordance with established protocol;
- Patches of suitable habitat that are unoccupied in one season may be occupied in another season due to metapopulation dynamics; and
- During poor environmental conditions, adult flight periods may be precluded and Quino may remain in or return to diapause, which could render negative survey results.

The County and the Wildlife Agencies have worked together to assess the potential of extant habitat within the County Subarea to support Quino. Actual Quino habitat utilization under current conditions is typically limited to small patches and depends heavily on habitat quality, particularly related to the extent of non-native plant invasion. Furthermore, various anthropogenic activities have restricted the distribution of Quino in areas where this species would otherwise be expected to occur. Although habitat may be unoccupied during one season, it may be occupied in another season due to shifts in population and other factors such as precipitation. Therefore, negative survey results may not preclude an area from being Potential Quino Habitat. The total acreage of areas modeled as Potential Quino Habitat may exceed the actual extent of currently occupied habitat, but may support Quino in the future. Model bias should be roughly proportionate in and out of the preserve, so the conservation analysis should not be affected. Where available, detailed habitat assessment and survey information has informed the decision-making process. In addition, the Quino Amendment provides for further habitat assessment and survey requirements on a site-specific basis where appropriate.

2.1 Potential Quino Habitat Model

To assess the suitability of different areas to support Quino, a Potential Quino Habitat Model was developed. Only areas with habitat types generally considered capable of supporting Quino were considered in the model.

Habitat types considered to have the potential to support Quino (*i.e.*, Potential Quino Habitat) are limited to the following:

- Coastal sage scrub (including flat-topped buckwheat scrub);
- Maritime succulent scrub;
- Chaparral;
- Coastal sage scrub/chaparral ecotone;
- Grassland;
- Vernal pool; and
- Agricultural lands that have been acquired for conservation and are no longer in agricultural use (*i.e.*, are recovering their habitat values).

Although dense-canopy chaparral is not generally considered to have the potential to support Quino, all chaparral habitats have been included as Potential Quino Habitat because available mapping does not consider vegetation density and features such as fire breaks, dirt roads, or trails, which could provide patches of suitable habitat. Many Quino observations have been in habitat largely mapped as chaparral, but which has been opened up by grazing, fire breaks, and dirt roads (*e.g.*, on Otay Mountain).

The assessment of potential habitat was based, overall, on vegetation mapping conducted to support development of the County Subarea Plan in 1995. This was updated to some extent by refining vegetation data as more current survey data were available and reclassifying newly developed areas as “developed.”

Areas of Potential Quino Habitat have been assigned Classes A through C, with A representing the highest relative potential for Quino and C representing the lowest. This categorization takes into account survey results between 1999 and 2009. However, negative survey results from 2002 were not considered, as it was a relatively poor survey year for Quino. Proximity to known Quino locations was based on a one kilometer (0.6 mile) radius. This radius was selected because data from mark-recapture studies indicate that dispersal greater than this distance is not common in checkerspot butterflies (USFWS 2003).

Based on known Quino observations and negative survey data, the following classes were assigned to Potential Quino Habitat within the County Subarea:

- **Class A** includes Potential Quino Habitat within one kilometer (0.6 mile) of any known Quino location (1999 to 2009).
- **Class B** includes Potential Quino Habitat with no known protocol survey in 1999, 2000, 2001, 2003, 2004, 2005, 2006, 2007, 2008, or 2009 and outside one kilometer (0.6 mile) of any known Quino location.
- **Class C** includes Potential Quino Habitat with a negative protocol survey in 1999, 2000, 2001, 2003, 2004, 2005, 2006, 2007, 2008, or 2009 that is also outside one kilometer (0.6 mile) of any known Quino location.

2.2 Current Habitat Conditions

The total acreage of Potential Quino Habitat includes approximately 35,763 acres (23 percent) in Class A, 110,566 acres (71 percent) in Class B, and 9,936 acres (six percent) in Class C (Table 1 and Figure 2). Class A habitat is restricted to the South County, Alpine-Jamul, and San Vicente Quino Management Units (QMU) where Quino were observed since 1999 or later. Most of these observations were in the southern part of the County, although there have been a number of observations northwest of the San Vicente Reservoir and a smaller number of observations in Alpine.

Table 1. Potential Quino Habitat within Each QMU (in acres).

Quino Management Unit							
Model Class	Alpine-Jamul	Lake Hodges	San Pasqual	San Vicente	South County	Total	Percent
A	2,097	0	0	2,740	30,927	35,763	23%
B	37,152	3,311	7,298	28,759	34,046	110,566	71%
C	1,072	2,792	409	4,031	1,632	9,936	6%
Total Potential Habitat:	40,321	6,102	7,707	35,529	66,605	156,265	

A large amount of the Potential Quino Habitat falls into Class B, as a large portion of Potential Quino Habitat is not in close proximity to any known Quino observation and has not been subject to Quino surveys. This reflects the current uncertainty about the potential of many areas to support Quino.

Wildland fire may have impacted Quino populations and habitat within the County Subarea in recent years. In 2003, the Otay Fire severely burned habitats where Quino had been observed previously in the Otay Mountain region. In 2005, the Border 50 Fire burned additional Quino habitat in the Marron Valley area. Post-fire monitoring surveys have not indicated that populations were completely extirpated by the 2003 and 2005 fires, but Quino densities and extent of occupied habitat appeared to be reduced. In addition, increased rates of invasion by non-native plant species has been detected, which poses an indirect threat to Quino host plants through competition. In 2007, the Harris Fire impacted the Otay Mountain region, including areas that had not been impacted by fires in 2003 and 2005. Habitat damage and impacts to Quino from the Harris Fire are still being assessed.

3.0 Project Processing

The process for demonstrating project conformance to this plan and obtaining coverage for Quino is described below. These requirements will apply to all projects that are currently subject to regulations under the County Subarea Plan (see County Subarea Plan, Biological Mitigation Ordinance).

3.1 Areas without On Site Conservation Requirements (Quino 0% Conservation Areas)

These are areas that have been determined to be outside of the critical areas for Quino. If Quino or Quino habitat are found in these areas, they would be considered to be isolated and would not significantly impact the species as a whole. As a result, within these areas (Quino 0% Conservation Areas, Figures 2 and 3), conservation of Quino or Quino habitat will not be required on site. However, conservation of viable Occupied Quino Habitat will be encouraged. Where impacts to Occupied Quino Habitat occur, mitigation will be required as described in Section 3.5.

3.2 Quino Preserve Areas (Quino 100% Conservation Areas)

This designation (Figures 2 and 3) pertains to lands within existing County Subarea preserves and certain lands in the Alpine-Jamul QMU that will be preserved as part of the Quino Amendment. No impacts to Quino or Quino habitat will be allowed within Quino preserve areas (Quino 100% Conservation Areas, Figures 2 and 3). However, compatible preserve uses (*e.g.*, trails, staging areas, etc. that avoid impacts to Quino and Quino habitat) as identified in the County Subarea Plan (County of San Diego, 2007) and Framework Management Plan (County of San Diego, 2001) are anticipated to occur and will not be counted against conservation levels.

3.3 Quino Criteria Areas

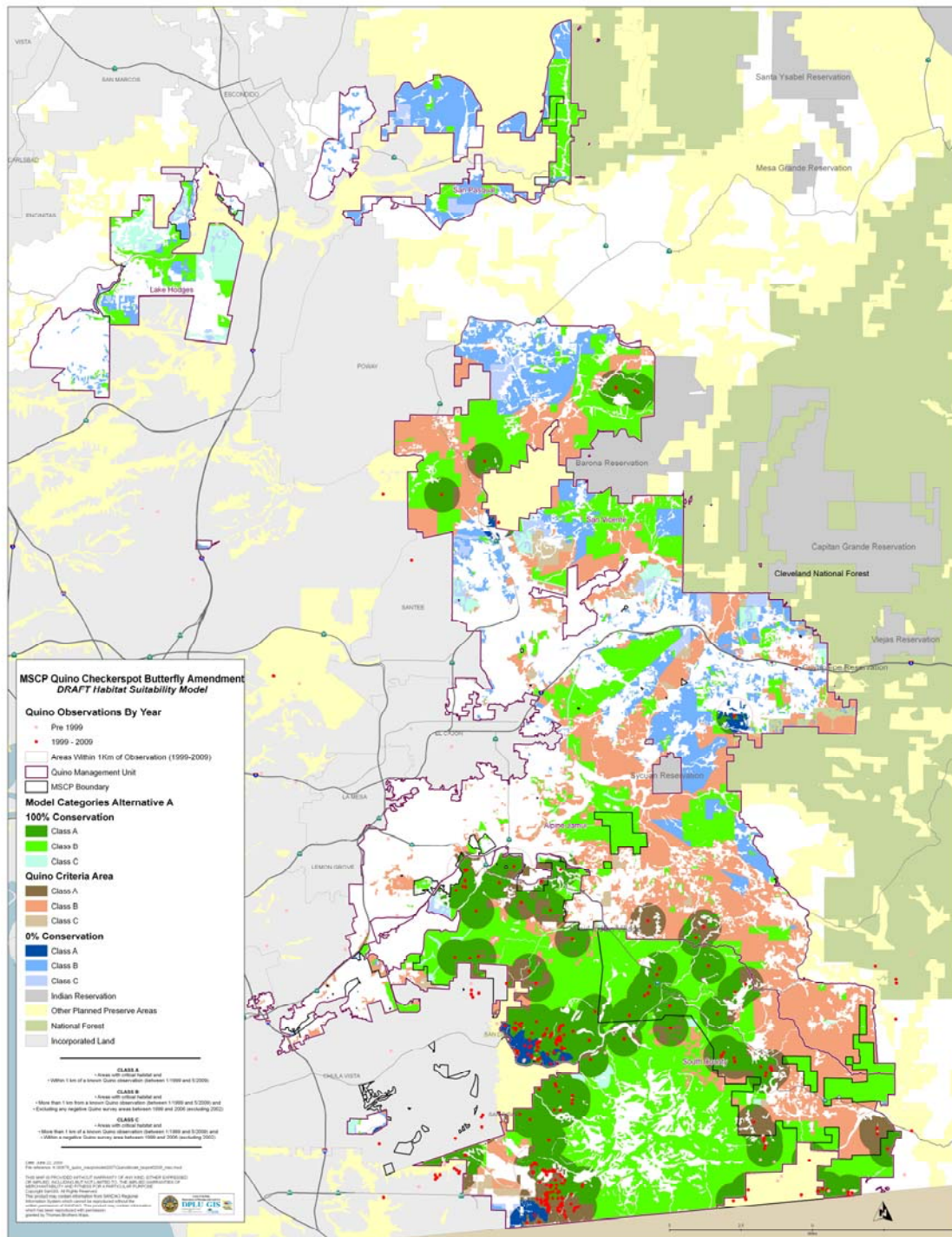
Quino Criteria Areas (Figures 2 and 3) refer to lands that are not currently preserved with one of the following designations under the County Subarea Plan: Major Amendment Area; Minor Amendment Area; Minor Amendment Area Subject to Special Consideration; Pre-Approved Mitigation Area; Take Authorized Area; or Unincorporated Land in the Metro-Lakeside-Jamul Segment.

If Occupied Quino Habitat within Quino Criteria Areas is considered viable, it must be preserved onsite. To make a determination that Occupied Quino Habitat is not viable within a Quino Criteria Area, concurrence from the Wildlife Agencies will be required. If Occupied Quino Habitat is deemed unviable, it may be impacted. However, mitigation will be required as described in Section 3.5.

If Occupied Quino Habitat is considered viable it shall be avoided (and preserved), using the following design criteria:

- 1) Projects shall be required to comply with all applicable design criteria in the County Subarea Plan.
- 2) Project development shall be sited in areas that minimize impacts to Occupied Quino Habitat.
- 3) Clustering to the maximum extent permitted by County regulations shall be implemented where necessary as a means of achieving avoidance.
- 4) Notwithstanding the requirements of the Slope Encroachment Regulations contained in the County's Resource Protection Ordinance, projects shall be allowed to utilize a design that may encroach into steep slopes to avoid impacts to habitat.
- 5) The County shall consider reduction in road construction standards to the maximum extent consistent with public safety considerations.
- 6) Where complete avoidance of Occupied Quino Habitat is infeasible, encroachment may be authorized (*i.e.*, to avoid an unconstitutional taking of private property). However, encroachment must not be so great as to render the habitat unviable and may not exceed 20 percent of Occupied Quino Habitat. Under these circumstances, only the minimum development necessary to avoid an unconstitutional taking of private property from application of the County Subarea Plan, Biological Mitigation Ordinance, shall be allowed. Further, all impacts must be mitigated as described in Section 3.5. Avoided habitat may be credited towards attainment of mitigation requirements for Quino and can be used to satisfy mitigation requirements for onsite project impacts to other habitats (*e.g.*, Coastal sage scrub).

Within Quino Criteria Areas, if unoccupied but Potential Quino Habitat provides a critical linkage for connectivity between metapopulations of Quino, then the functionality of such a linkage shall be maintained. To maintain the functionality of a critical linkage between metapopulations of Quino in such a situation, the above project design criteria may be applied, as necessary.



⁴ The County is currently working with the Superior Ready Mix Otay Hills Project applicants to determine if the project should be explicitly incorporated into the Quino Amendment. The project may be included in future drafts, which would result in changes to this map.

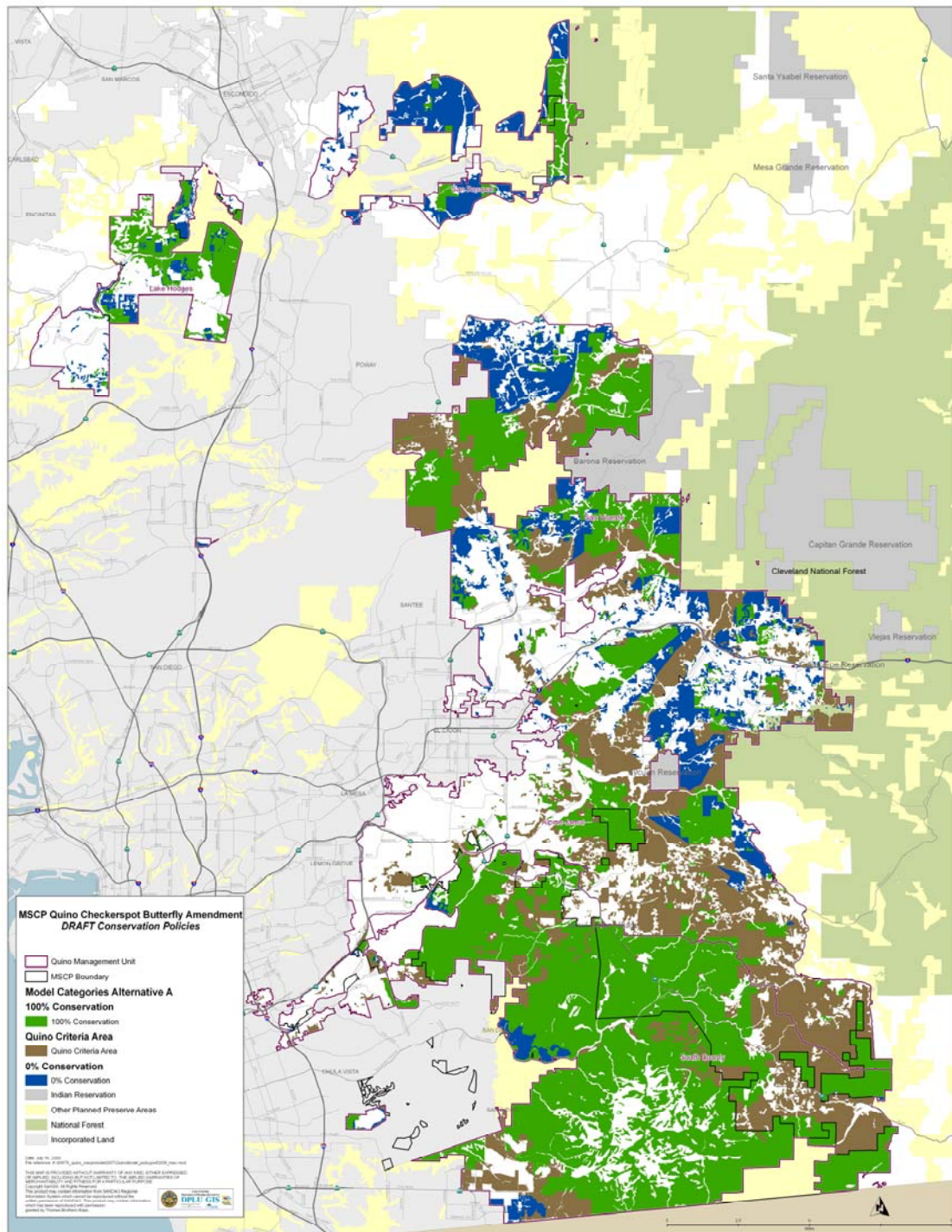


Figure 3. Quino Amendment Conservation Policies⁵.

⁵ The County is currently working with the Superior Ready Mix Otay Hills Project applicants to determine if the project should be explicitly incorporated into the Quino Amendment. The project may be included in future drafts, which would result in changes to this map.

3.4 Survey Requirements

In order to determine whether impacts to Quino may result from a project, the site must first be assessed to determine if Quino are or could be present. Survey protocols are intended to efficiently identify and map Quino habitat on a project site, with focused Quino surveys required only when warranted. Surveys will be required within the South County, Alpine-Jamul, and San Vicente QMUs (Figure 4).

Exceptions to requirements for performing Quino surveys or habitat assessments may be granted for any of the following reasons:

- Protocol Quino surveys, authorized by the USFWS, were conducted on the project site within the prior year and did not detect Quino;
- A general biological survey done within the prior five years indicates the site is composed entirely of unsuitable habitat elements (as listed below), barring any changes (*e.g.*, wildland fire);
- Current high-resolution aerial imagery clearly demonstrates a vegetation community composed entirely of closed canopy elements that would not support Quino adults or larvae; or
- Qualified biologists from the County and Wildlife Agencies have provided written concurrence that the site (or portions of the site) is unsuitable habitat for Quino, as based upon the best available information and current conditions.

For projects that require further surveys, the first and most basic level of survey is the general Quino habitat assessment. This assessment is required for properties within the Quino Survey Area (Figure 4). General Quino habitat assessments are intended to determine whether focused Quino surveys are necessary and the portions of the property on which focused surveys should be conducted. General Quino habitat assessments can be conducted at any time of the year.

The following conditions will be considered to represent unsuitable habitat, which is not subject to focused Quino survey requirements:

- Orchards, developed areas, or small in-fill parcels (plots smaller than one acre and completely surrounded by urban development) dominated by non-native vegetation;
- Active/in-use agricultural fields without natural or remnant inclusions of native vegetation (*i.e.*, fields completely devoid of fallow sections, unplowed areas, and/or rocky outcrops);
- Closed canopy* forests, riparian areas, or dense chaparral;**
- Dense deergrass meadow; and
- Dense non-native grassland where few host plants are present (host plants are only identifiable during the spring; pockets of native grassland or less dense non-native grassland should be considered Potential Quino Habitat).

*“Closed canopy” describes vegetation in which the upper portions of the trees or shrubs converge (are touching) to the point that the open space between two or more plants does not significantly differ from 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 (“bushwacking”) for at least 100 meters.

The above criteria may be refined based on further research, experiments, or data on habitat preferences, without necessitating an amendment to the County Subarea Plan. If potentially suitable habitat is identified during the general Quino habitat assessment, a focused Quino survey will be required.

To determine whether Quino are absent from a site, focused Quino surveys shall be conducted using the most current USFWS survey protocols. However, if Quino are present, then only the minimal amount of survey effort needed to adequately map Occupied Quino Habitat (see definition) will be required.

The results of all habitat assessments and surveys must be reported to the County and the Wildlife Agencies. The County and Wildlife Agencies shall provide feedback regarding these results, as appropriate. The County will determine, in consultation with the Wildlife Agencies, whether a particular year should be considered a non-flight year (*i.e.*, a year when surveys cannot be conducted because Quino are too difficult to observe). If a year is determined to be a non-flight year, the applicant must consult with the County and Wildlife Agencies to determine whether additional surveys are required or if an adequate impact assessment can be developed in the absence of further surveys. (USFWS 2008)

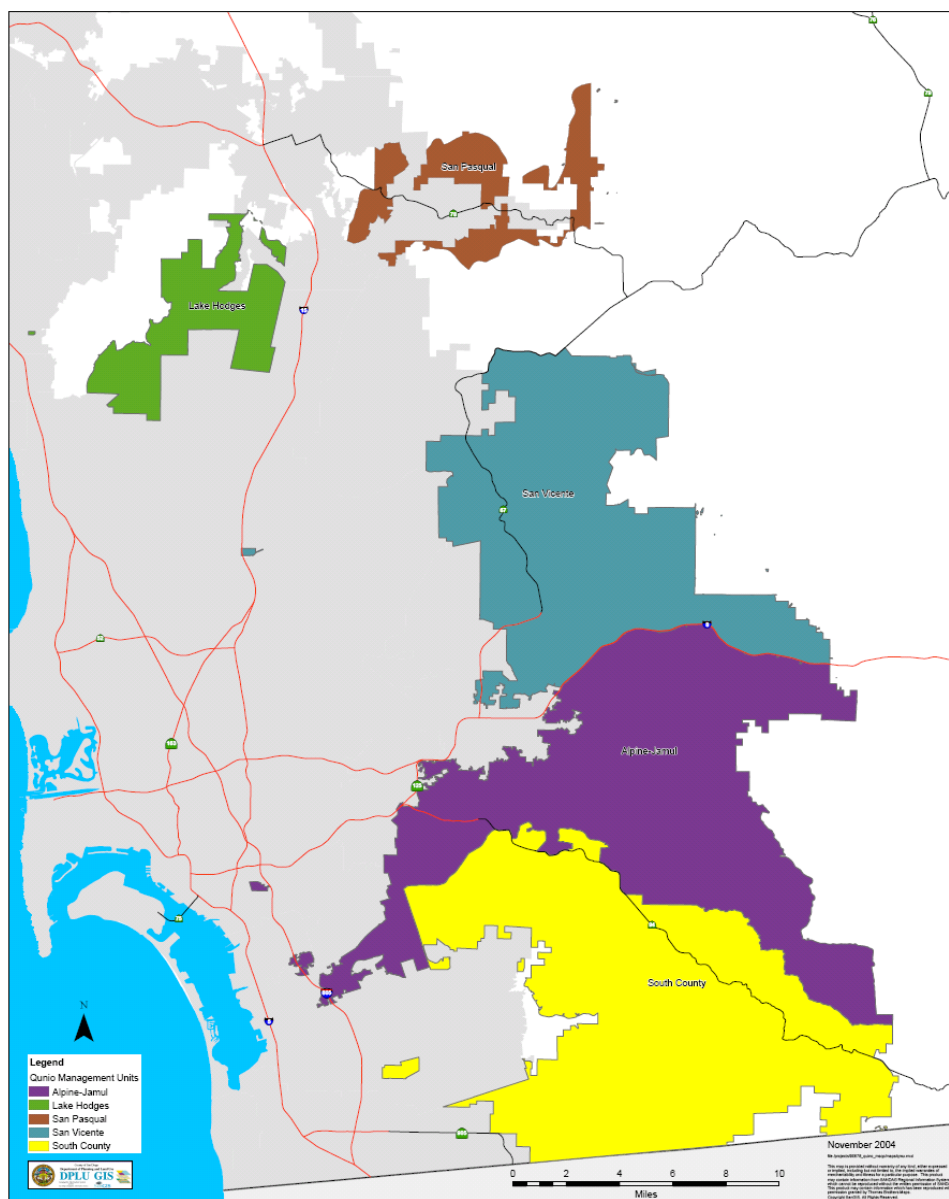


Figure 4. Quino Management Units. The required survey area consists of the San Vicente (blue), Alpine-Jamul (purple), and South County (yellow) QMUs.

3.5 Mitigation Requirements

Where impacts to Occupied Quino Habitat occur, mitigation will be required. In general, mitigation will involve land conservation at a set mitigation ratio (Table 2). However, up to two components of the mitigation ratio may be satisfied by creating Viable Quino Habitat. For example, if one acre of Occupied Quino Habitat is being impacted, then a 4:1 mitigation requirement may be satisfied by conserving two acres of land and creating two acres of Viable Quino Habitat. Proposals to create Viable Quino Habitat must be reviewed and accepted by the County and Wildlife Agencies to ensure that these projects have a high likelihood of success (*i.e.*, will be utilized by Quino and remain viable).

Quino habitat creation must result in Viable Quino Habitat within disturbed or agricultural lands less than 0.6 miles from a known Quino population or another strategic location. Additionally, habitat creation must occur within the preserve (*i.e.*, PAMA and conserved land) and, if possible, within the same QMU as the impacts.

For mitigation, the project applicant must demonstrate a substantial effort to (1) preserve Occupied Quino Habitat; and (2) preserve land within the same QMU as the impacts. If the project applicant adequately demonstrates that either of these actions is infeasible, then conservation of Suitable Quino Habitat within one kilometer (0.6 miles) of Occupied Quino Habitat or conservation in a different QMU may be allowed, if reviewed and accepted by the County and Wildlife Agencies. However, increased mitigation will be required (Table 2).

For impacts to Potential Quino Habitat within designated Critical Habitat (USFWS 2009), mitigation must be in kind at existing ratios under the County Subarea Plan. For impacts to Potential Quino Habitat within designated Critical Habitat, mitigation must occur within Critical Habitat in the preserve. For impacts to Potential Quino Habitat outside of areas designated as Critical Habitat, mitigation may occur within the preserve, but is not required to be within Critical Habitat.

Table 2. Required Mitigation Ratios for Impacts to Occupied Quino Habitat.

	Mitigation Site is in Same QMU as Impacts	Mitigation Site is in Different QMU than Impacts
Mitigation Site Consists of Occupied Quino Habitat	3:1	4:1
Mitigation Site Consists of Suitable Quino Habitat within 0.6 miles of Occupied Quino Habitat	4:1	(Not Allowed)

4.0 Conservation Analysis

A large core population of Quino will be preserved in the South County QMU. Within other portions of the County Subarea, known Quino populations are smaller; however, there are many unsurveyed areas where Quino are likely to occur. In the San Vicente and Alpine-Jamul QMUs, several known populations of Quino will be preserved along with large areas of Potential Quino Habitat. Although Quino are not expected to occur in the Lake Hodges or San Pasqual QMUs, conservation of substantial Potential Quino Habitat will benefit Quino if the species does in fact occur there now or in the future.

Conservation of Potential Quino Habitat, final preserve design, conservation measures, and adaptive management will ensure connectivity between currently known and yet undiscovered populations of Quino. Overall, approximately 101,440 acres of Potential Quino Habitat within Classes A, B, and C will be preserved through preserves and the goals established for the Pre-approved Mitigation Area under the County Subarea Plan. Where projects have the potential to impact Quino habitat, surveys will be required and the conservation measures described in Section 3 must be followed. As a result, as development occurs in Quino Criteria Areas, there will be additional conservation of Quino and Quino Habitat beyond what is conserved through the preserves and Pre-approved Mitigation Area. An effective adaptive management program will ensure Quino persistence within the preserve. Overall, implementation of the Quino Amendment will result in conservation of substantial interconnected Quino habitat throughout the County Subarea and contribute to the regional recovery of Quino.

4.1 Lake Hodges Quino Management Unit

Although some areas within Potential Quino Habitat in the Lake Hodges QMU have been surveyed since 1999, the last known Quino observation in this QMU was in 1932. Therefore, Quino are not believed to currently occur within this QMU. Nevertheless, a large proportion of Potential Quino Habitat is or will be preserved (Table 3). Due to an absence of positive surveys for Quino, no Class A habitat is currently identified within the Lake Hodges QMU. However, approximately 4,725 acres of Potential Quino Habitat in Classes B and C in this QMU will be conserved through preserves and the goals established for the Pre-approved Mitigation Area under the County Subarea Plan. Hence, if Quino are present within the Lake Hodges QMU now or in the future, the species will be afforded a high level of conservation that should allow for the long-term persistence of the species.

Table 3. Conservation and Impacts to Potential Quino Habitat within the Lake Hodges QMU.

Policy	MSCP Designation	Class B		Class C	
		Total	Conserved	Total	Conserved
Quino 100% Conservation Areas	Hardline Preserve	2,090	2,090	2,434	2,434
Quino 0% Conservation Areas	Major Amend. Area	29	0	21	0
	Minor Amend. Area	218	0		0
	Pre-approved Mitigation Area	265	199	2	2
	Take Authorized	140	0	247	0
	Unincorporated in Metro-Lakeside-Jamul Segment	331	0	64	0
	Santa Fe Valley 'D' Designator	234	0	23	0
	Santa Fe Valley OS II	3	0	0	0
Total:		3,311	2,289	2,792	2,436
Percent:			69%		87%

4.2 San Pasqual Quino Management Unit

There are no historic records of Quino presence within the San Pasqual QMU and recent surveys have been negative. As a result, Quino are not believed to currently occur within this QMU and it is unlikely that Quino will occur there in the future. Due to an absence of positive surveys for Quino, there is currently no Class A habitat identified within the San Pasqual QMU. Nevertheless, a large amount of Potential Quino Habitat is or will be preserved (Table 4). Approximately 4,724 acres of Potential Quino Habitat in Classes B and C will be conserved in this QMU through preserves and the goals established for the Pre-approved Mitigation Area under the County Subarea Plan. Hence, if Quino are present within the San Pasqual QMU now or in the future, the species will be afforded a level of conservation that should allow for the long-term persistence of the species.

Table 4. Conservation and Impacts to Potential Quino Habitat within the San Pasqual QMU.

Policy	MSCP Designation	Class B		Class C	
		Total	Conserved	Total	Conserved
Quino 100% Conservation Areas	Hardline Preserve	2,213	2,213	1	1
Quino 0% Conservation Areas	Pre-Approved Mitigation Area	3,060	2,295	287	215
	Unincorporated in Metro-Lakeside-Jamul Segment	2,026	0	121	0
Total:		7,298	4,508	409	216
Percent:			62%		53%

4.3 San Vicente Quino Management Unit

Portions of Potential Quino Habitat in the San Vicente QMU have been surveyed and there have been some recent sightings of Quino in this QMU. The vast majority of land where Quino are most likely to occur will be preserved. Without taking into account Occupied Quino Habitat that will be preserved in the future in Quino Criteria Areas (see Section 3), 92 percent of Class A habitat will be conserved in this QMU through preserves and goals established for the Pre-approved Mitigation Area under the County Subarea Plan (Table 5). Overall, approximately 21,688 acres of Potential Quino Habitat in Classes A, B, and C will be conserved in this QMU through preserves and the goals established for the Pre-approved Mitigation Area under the County Subarea Plan. Where projects have the potential to impact Quino habitat, surveys will be required and the conservation measures described in Section 3 must be followed. As a result, as development occurs in Quino Criteria Areas, there will be additional conservation of Quino and Quino Habitat beyond what is conserved through the preserves and Pre-approved Mitigation Area. The high level of conservation for known Quino populations and Potential Quino Habitat, along with an effective adaptive management program, should contribute to Quino recovery in the region.

Table 5. Conservation and Impacts to Potential Quino Habitat within the San Vicente QMU.

Policy	MSCP Designation	Class A		Class B		Class C	
		Total	Conserved	Total	Conserved	Total	Conserved
Quino 100% Conservation Areas	Hardline Preserve	2,304	2,304	10,709	10,709	1,133	1,133
Quino Criteria Area	Pre-Approved Mitigation Area	291	218 *	8,818	6,614 *	947	710 *
	Unincorporated in Metro-Lakeside-Jamul Segment	35	-- **	1,373	-- **	5	-- **
Quino 0% Conservation Areas	Take Authorized	5	0	62	0	391	0
	Unincorporated in Metro-Lakeside-Jamul Segment	104	0	7,797	0	1,554	0
Total:		2,740	2,522 ***	28,759	17,323 ***	4,031	1,843 ***
Percent:			92% ***		60% ***		46% ***

* Does not include additional conservation that will occur within Quino Criteria Areas in PAMA if Quino are found through surveys, resulting in additional conservation.

** Acres conserved will be based on future surveys within Quino Criteria Area that show Occupied Quino Habitat.

*** Does not include additional conservation that will occur within Quino Criteria Areas in PAMA if Quino are found through surveys, resulting in additional conservation or conservation that will occur in Quino Criteria Areas not in PAMA if Quino are found through surveys (see Section 3).

4.4 Alpine-Jamul Quino Management Unit

There are a number of recent Quino sightings in the Alpine-Jamul QMU, although a large portion of Potential Quino Habitat has not been surveyed. Hence, there is a relatively high level of uncertainty regarding the distribution and abundance of Quino in this QMU. Two known populations of Quino within this QMU will be preserved within hardline preserve areas. Overall, approximately 18,511 acres of Potential Quino Habitat in Classes A, B, and C will be conserved in this QMU through preserves and the goals established for the Pre-approved Mitigation Area under the County Subarea Plan (Table 6). However, conservation of Quino in this QMU will also depend on the avoidance and mitigation measures described in Section 3, including potential conservation of yet undiscovered populations in Quino Criteria Area. Where projects have the potential to impact Quino habitat, surveys will be required and the conservation measures described in Section 3 must be followed. Additionally, it is likely that some Quino populations in areas without onsite Quino conservation requirements (0% Quino Conservation Areas) will be considered viable and landowners will opt to preserve populations on site, rather than mitigate off site.

The total acres of Potential Quino Habitat that will be conserved in this QMU is dependent upon future surveys in the Quino Criteria Area that reveal Occupied Quino habitat, which will be conserved through the policies in Section 3. This additional conservation that will occur in the future if Quino are found through surveys in Quino Criteria Area outside of the Pre-approved Mitigation Area is not accounted for in Table 6. In addition, if surveys reveal Occupied Quino Habitat in the Pre-approved Mitigation Area, additional conservation could also be required. Overall, the conservation policies under the Quino Amendment, final preserve within the Alpine-Jamul QMU, and an effective adaptive management program should contribute to recovery of Quino in the region.

Table 6. Conservation and Impacts to Potential Quino Habitat within the Alpine-Jamul QMU.

Policy	MSCP Designation	Class A		Class B		Class C	
		Total	Conserved	Total	Conserved	Total	Conserved
Quino 100% Conservation Areas	Hardline Preserve	448	448	10,507	10,507	213	213
Quino Criteria Area	Minor Amend. Area	25	--**	138	--**	1	--**
	Pre-Approved Mitigation Area	272	204*	9,164	6,873*	355	266*
	Unincorporated in Metro-Lakeside-Jamul Segment	1,070	--**	11,652	--**	248	--**
Quino 0% Conservation Areas	Take Authorized	41	0	64	0	0	0
	Unincorporated in Metro-Lakeside-Jamul Segment	241	0	5,626	0	255	0
Total:		2,097	652***	37,152	17,380***	1,072	479***
Percent:			31%***		47%***		45%***

* Does not include additional conservation that will occur within Quino Criteria Areas in PAMA if Quino are found through surveys, resulting in additional conservation.

** Acres conserved will be based on future surveys within Quino Criteria Area that show Occupied Quino Habitat.

*** Does not include additional conservation that will occur within Quino Criteria Areas in PAMA if Quino are found through surveys, resulting in additional conservation or conservation that will occur in Quino Criteria Areas not in PAMA if Quino are found through surveys (see Section 3).

4.5 South County Quino Management Unit⁶

There have been numerous surveys within Potential Quino Habitat in the South County QMU and the vast majority of land where Quino are most likely to occur will be preserved. Through preserves and goals established for the Pre-approved Mitigation Area under the County Subarea Plan alone, 23,811 acres of Class A will be conserved (Table 7). Overall, approximately 51,792 acres of Potential Quino Habitat in Classes A, B, and C will be conserved in this QMU through preserves and the goals established for the Pre-approved Mitigation Area under the County Subarea Plan. However, conservation of Quino in this QMU will also depend on the avoidance and mitigation measures described in Section 3, including potential conservation of yet undiscovered populations in Quino Criteria Area. Where projects have the potential to impact Quino habitat, surveys will be required and the conservation measures described in Section 3 must be followed. Additionally, it is likely that some Quino populations in areas without onsite Quino conservation requirements (0% Quino Conservation Areas) will be considered viable and landowners will opt to preserve populations on site, rather than mitigate off site.

The total acres of Potential Quino Habitat that will be conserved in this QMU is dependent upon future surveys in the Quino Criteria Area that reveal Occupied Quino habitat, which will be conserved through

⁶ The County is currently working with the Superior Ready Mix Otay Hills Project applicants to determine if the project should be explicitly incorporated into the Quino Amendment. The project may be included in future drafts, which would result in changes to the conservation analysis.

the policies in Section 3. This additional conservation that will occur in the future if Quino are found through surveys in Quino Criteria Area outside of the Pre-approved Mitigation Area is not accounted for in Table 7. If surveys reveal Occupied Quino Habitat in the Pre-approved Mitigation Area, additional conservation could also be required. Overall, the high level of conservation for known Quino populations in the South County QMU, conservation policies under the Quino Amendment, final preserve, and effective adaptive management program should contribute to recovery of Quino in the region.

Table 7. Conservation and Impacts to Potential Quino Habitat within the South County QMU.

Policy	MSCP Designation	Class A		Class B		Class C	
		Total	Conserved	Total	Conserved	Total	Conserved
Quino 100% Conservation Areas	Hardline Preserve	23,553	23,553	26,984	26,984	733	733
	Otay Ranch Areas-No Take Permits Issued	81	81	0	0	0	0
	Conserved Subject to Agreement with Wildlife Agencies	6	6	0	0	0	0
Quino Criteria Area	Major Amend. Area	1,293	--**	241	--**	58	--**
	Minor Amend. Area	731	--**	329	--**	309	--**
	Minor Amend. Area Subj. to Special Considerations	322	--**	0	0	23	--**
	Take Authorized	1,519	--**	1,217	--**	78	--**
	Pre-Approved Mitigation Area	236	177*	205	154*	147	110*
	Unincorporated Land in Metro-Lakeside-Jamul Segment	2,005	--**	4,938	--**	49	--**
Quino 0% Conservation Areas	Minor Amend. Area	430	0	16	0	65	0
	Take Authorized	750	0	115	0	169	0
Total:		30,497	23,817***	34,030	27,138***	1,567	843
Percent:			78%***		80%***		54%

* Does not include additional conservation that will occur within Quino Criteria Areas in PAMA if Quino are found through surveys, resulting in additional conservation.

** Acres conserved will be based on future surveys within Quino Criteria Area that show Occupied Quino Habitat.

*** Does not include additional conservation that will occur within Quino Criteria Areas in PAMA if Quino are found through surveys, resulting in additional conservation or conservation that will occur in Quino Criteria Areas not in PAMA if Quino are found through surveys (see Section 3).

References

- Cayan, Dan, Ed Maurer, Mike Dettinger, Mary Tyree, Katharine Hayhoe, Celine Bonfils, Phil Duffy, and Ben Santer. March 2006. Climate Scenarios for California. Retrieved on January 8, 2008 from <http://www.energy.ca.gov/2005publications/CEC-500-2005-203/CEC-500-2005-203-SF.PDF>.
- County of San Diego. 1997. Multiple Species Conservation Program: County of San Diego Subarea Plan.
- County of San Diego. 2001. County of San Diego Multiple Species Conservation Program: Framework Management Plan.
- Diffendorfer, Jay E., Genie M. Fleming, Jenifer M. Duggan, Robert E. Chapman, Matthew E. Rahn, Milan J. Mitrovich, and Robert N. Fisher. 2007. Developing terrestrial, multi-taxon indices of biological integrity: an example from coastal sage scrub. *Biological Conservation* 140(2007): 130-141.
- Franco, Guido. June 2005. Climate Change Impacts and Adaptation in California (California Energy Commission Staff Paper). Retrieved January 8, 2008 from <http://www.energy.ca.gov/2005publications/CEC-500-2005-103/CEC-500-2005-103.PDF>.
- IPCC. 2007. Summary for Policymakers. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Retrieved January 8, 2008 from <http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf>.
- Lenihan, James M., Dominique Bachelet, Raymond Drapek, and Ronald P. Neilson. February 2006. The Response of Vegetation Distribution, Ecosystem Productivity, and Fire in California to Future Climate Scenarios Simulated by the MC1 Dynamic Vegetation Model. Retrieved on January 8, 2008 from <http://www.energy.ca.gov/2005publications/CEC-500-2005-191/CEC-500-2005-191-SF.PDF>.
- Longcore, T., D.D. Murphy, D. Deutschman, R. Redak, and R. Fisher. 2003. A Management and Monitoring Plan for Quino Checkerspot Butterfly (*Euphydryas editha quino*) and Its Habitats in San Diego County. Advisory Report to the County of San Diego.
- National Park Service, U.S. Department of the Interior. Climate Change in National Parks. Retrieved on January 8, 2008 from http://www.nps.gov/pore/planyourvisit/upload/brochure_climatechangeinnationalparks.pdf.
- Singer, M.C. and C. Parmesan. Habitat Requirements in Terms of Host Plants, Recovery Team Personal Communication (with USFWS), 1999.
- United States Fish and Wildlife Service. 2003. Recovery Plan for the Quino Checkerspot Butterfly (*Euphydryas editha quino*). Portland, Oregon.
- United States Fish and Wildlife Service. January 17, 2008. Revised Designation of Critical Habitat for the Quino Checkerspot Butterfly (*Euphydryas editha quino*); Proposed Rule.
- United States Fish and Wildlife Service. June 17, 2009. Revised Designation of Critical Habitat for the Quino Checkerspot Butterfly (*Euphydryas editha quino*); Final Rule.