Report of a Directed Survey for the Quino Checkerspot Butterfly over the Sunroad Centrum Property, Otay Mesa San Diego, California

I. Introduction

A. Summary. The Sunroad Centrum Property is located in the extreme southern part of the City of San Diego, east of Brown Field, near the east edge of the Otay Mesa (see Figures 1 and 2). The site is characterized by a series of low rolling hills topographically above the mesa itself and at the southwestern edge of Johnson Canyon. The property includes colluvial deposits at the edge of the Mesa, the site is above the wave cut terrace to the west and on the low rolling hills composed of debris derived in large part from Otay Mountain to the east. No populations of the Dot-seed Plantain or other species known to be utilized by the Quino Checkerspot were found on site. However, extensive *Plantago/Castilleja* stands are known to occur to the west of this site and the Quino has been sighted both to the west and north of this property. Within the Sunroad Centrum property is a topographically high ground that is occupied by a mima mound complex and an eclectic suite of plant species. In that there are known to be Quino is the general vicinity of the property and in that the prevailing west wind would tend to move individuals from the known habitats to the west, it was felt that the hilltopping location should be surveyed in depth. The report documents a federal protocol survey to determine the presence or absence of the Quino Checkerspot Butterfly on the Sunroad Centrum property. The species was not found.

The bulk of the property is occupied by a ruderal association characteristic of abandoned agricultural fields. Some of the fields appear to have been in agriculture within the last year or two. The north central part of the property, however, is characterized by a mima mound topography. This area does not appear to have ever been disced or ploughed and it supports a number of native species. The tops of the mima mounds themselves are generally occupied by shrubs characteristic of the Coastal Sage Scrub. The interstices between the mounds are occupied by relatively large numbers of native bunch grasses and those areas are best characterized as disturbed native grasslands. The area, then, is a complex checker board of disturbed native grassland and disturbed Coastal Sage Scrub. Some of the mound interstices are developed as vernal pools. No populations of any of the food plants utilized by the Quino Checkerspot were found o the Sunroad Centrum property.

Despite the lack of food plants suitable for the Quino, an adult survey of the site was mandated by the subregional proximity of adult sightings and the proximity of known populations of the larval food plants. The north central "mima" mounds area is the highest local point on the topography and it was thought that this might serve as a hilltopping location. Adults have been found to the west and north of the Sunroad site and an extensive area (several acres) of larval habitat is located a short

distance to the west. For these reasons a comprehensive protocol survey was completed.

Given the complete lack of Dot-seed Plantain on-site, given the lack (on-site) of any plant population suitable for the Quino larvae, and the lack of any adult observations during the current (1999) field season, it is felt that the property does not support a population of the Quino Checkerspot Butterfly.

B. Background. The Quino Checkerspot Butterfly (*Euphydryas editha quino*; see Figure 4) was listed as an endangered species in January of 1997 (Fish and Wildlife Service, 1997). Thought at one time to be extinct, the subspecies is today (1999) found in a small number of populations in Riverside and San Diego Counties. As a wildlife species listed under the Federal Endangered Species Act (ESA) the Quino is afforded the considerable legal protections offered by the Act. Commission of a "take" of the species, either directly or indirectly, is prohibited by law. In order to assist land owners and in an effort to prevent a "take" of the species, the Fish and Wildlife Service has promulgated survey protocols for the species (Fish and Wildlife Service, 1999). These protocols identify geographical areas over which surveys for the adult butterflies are mandated and over which surveys are recommended when populations of certain plant species are present and/or in the presence of certain topographic features.

The Quino Checkerspot is best thought of as a "two phase" animal. The larvae are obligate feeders on one (two? three?) food plants: Dot-seed Plantain (*Plantago erecta*); perhaps Owl's Clover (*Castilleja exserta*); and possibly on other members of the Scrophulariaceae family (such as Chinese Houses, *Collinsia heterophylla*). The presence or absence of these food plants is usually sufficient to decide the presence or absence of the larvae on a given site. The second "phase" is the adult butterfly. The males of the species exhibit what is referred to as "hilltopping" behavior. They fly to prominent topographical points where they congregate, spending hours each day inspecting each butterfly that passes by, hoping to find a receptive female Quino. The adults are, additionally, found in association with the larval food plants, where they originally emerged from the pupa and where they subsequently lay eggs and roost. Properties with either plant populations that favor the Quino adults and larvae and/or with topography that favors the adults should be surveyed in order to define the presence or absence of the species.

The Sunroad Centrum Property is located in the County of San Diego, on the eastern edge of the Otay Mesa community. The site is east of Brown Field, east of (actually partly astride) Harvest Road, and north of Otay Mesa Road (see Figures 1 and 2). The approximately 250-acre property includes a series of low rolling hills that are truncated on the north by Johnson Canyon. East of these hills approximately two miles, the topography rises abruptly to Otay Mountain, which dominates the eastern skyline. The north-central part of the property lies at a higher elevation forming what might be interpreted as a hilltopping location. This area is above roughly the 600-foot contour and is dominated by a mima mound topography. The mima mound area includes some small enclosed basins and these are developed as vernal pools.

The Sunroad Centrum Property lies within an area defined in the Federal Survey Protocols as an "Adult Focused Survey Area." As such, a ground survey for at least the larval food plants is

mandated. Such a survey was performed in 1999 by members of the REC Environmental staff. No Dot-seed Plantain was found during that survey effort, or during any subsequent field visit to the site. In addition, no *Castilleja exserta* was found on site (except for one or two isolated individuals) and no *Collinsia heterophylla* was found within the bounds of the property. The majority of the property, as previously indicated, has been recently disced and/or ploughed for agricultural use and the larval food plants of the Quino Checkerspot would not necessarily be expected on those disrupted soils.

An extensive population of *Plantago erecta* along with numerous individuals and clumps of *Castilleja exserta* were found to the northwest of the subject property, along the north side of Lone Star Road. This is probably the most extensive area of "Quino habitat" that this author has seen (see Figure 3). An extensive population of the Quino Checkerspot is known at the southeast corner of Otay Mountain, a few miles to the east of this property. Another population of the Quino is known to the north of this site a few miles, on the north side of Otay Lake (Wier, Harold A., Dudek and Associates, 1999, personal communication to R. Riggan). Additionally, it is reported that RECON located Quino Checkerspots to the west of the project site, in the alignment of proposed route SR 125 (Wier, ibid.). Populations of the butterfly to the west of this site are all the more important when one considers that the prevailing wind is from the west.

Given the proximity of known populations of the Quino Checkerspot, and, given the habitat to the west, it was felt that the high part of the subject property could be defined as a hilltopping location. (See Figure 3). This area of disturbed, but native, vegetation, was selected due to both its relative elevation and due to the presence of the native plants (although no Quino food plants were present).

The 1999 flight season of the Quino Checkerspot was defined by the Fish and Wildlife Service as extending from 1 March through 9 May 1999. During this ten-week period butterfly surveys were limited to days that met certain specific wind, clarity (lack of cloud cover) and temperature conditions. Butterflies are thermally dependent and are simply not functional on cool, cloudy and/or excessively windy days. During the ten weeks of the flight season, more than 38 of the 70-days (or something greater than 54 percent of the days) were not available for survey work at the Sunroad Centrum site. Unsuitable days were characterized by excessive wind, cloud cover, rain, low air temperature, or (usually) some combination of these factors. The subject property lies at a unique location with respect to coastal weather parameters. Due to the proximity to the coast the site, is frequently one of the last locations where the morning-and-evening-low-clouds-along-the-coast ("June Gloom") burns off, or clears (although the clouds last even longer into the morning further to the west). Because the burn off occurs earlier in the day further inland (for example, on the high slopes of Otay Mountain), thermal heating on the more inland areas has already reduced air pressures inland and initiated the on-shore air flow by the time the clouds are clearing at the Sunroad Centrum site. In other words, by the time the clouds clear, the wind is picking up. For this reason, the subject property is hardly an ideal butterfly location.

The Sunroad Centrum site was surveyed seven times during the flight period of the Quino. This was the maximum given weather considerations, and assuming a seven-day work week on the part of the consultant. Of the last three weeks of the flight period, three whole days and only one or two half days (after coastal cloud burn-off) were suitable for butterfly work at Otay Mesa.

II. Project Description

A. Physical Environment. The geological formation underlying the entire site is mapped as "Otay Formation" by Kennedy and Tan (1977). However, the higher elevation parts of the site (especially the mima mound area) are characterized by numerous cobbles and small boulders derived from the Santiago Peak Metavolcanics, the country rock underlying Otay Mountain. This member of the Otay Formation appears, therefore, to be derived in part (if not wholly) from slope wash and colluvium from the mountains to the east. Around the periphery of the mima mound area are piles of these cobbles and boulders. Many of the piles are on the order of ten by 20 feet (or greater) and are typically one to two feet above the immediately adjacent terrain. Many of the piles seem to be set into depressions, rock only (no soil filler) extends below the level of the surrounding ground surface in many of the piles. It is assumed that these piles were created actinically by field workers clearing the cobbles and boulders from the adjacent fields (which have been ploughed and/or disced).

No springs, seeps or other permanent water sources were observed during the course of the survey effort with the exception of an artificially created cattle tank. This cattle tank or pond occupies an mechanically excavated basin and is visible on the U.S.G.S. Quadrangle Map for the region (see Figure 2 and 3). No definable wetlands (using the Federal tripartite definition; Environmental Laboratory, 1987) were observed within the project boundaries with the exception of a small number of vernal pools and the afore mentioned cattle tank.

B. Biological Environment. The vegetation over are the bulk of the Sunroad Centrum property has been severely disturbed and is dominated by a suite of ruderal species. The bulk of these areas appear to have been used in some form of agriculture. Typical plant species in this ruderal association include:

Centaurea melitensis
Hordeum leporinum
Brassica nigra
Erodium sp.
Eremocarpus setigerus
Hirschfeldia incana
Avena barbata
Bromus (several species)

The north central portion of the property is developed in a mima mound topography. This area has a sufficiently large deposit of cobbles and boulders that ploughing or discing was considered infeasible and the area was never used in mechanical agriculture (although it was probably extensively grazed). The mima mounds themselves support shrub species characteristic of the Coastal Sage Scrub. The interstices between the mima mounds are occupied by a suite of native and non-native grasses. This complex topography can be viewed as a checker board of disturbed Coastal Sage Scrub and disturbed Native Grasslands. Species typical of this checker board include:

Rhus integrifolia
Ferocactus viridescens
Isomeris arborea
Viguiera laciniata
Encelia californica
Simmondsia chinensis
Eriogonum fasciculatum
Artemisia californica
Malosma laurina
Stipa sp. (one or more species)
Avena barbata
Bromus sp. (several species)

Plant surveys (to determine the presence or absence of species suitable for the Quino larvae) were performed on this property in the spring of 1999 by the staff of REC Environmental. Neither *Plantago erecta* nor any suitable Scrophulariaceae were located as a result of the survey. Neither the *Plantago* nor any of the other species (except for a small number of widely scattered individuals of *Castilleja exserta*) were found on site during any of the subsequent field visits to the property.

The on-site vegetation is illustrated in Figures 5A and 5B. As can be seen in the photographs, ruderal species predominate along with the grasses. Perhaps due to Operation Gatekeeper and perhaps due to the proximity of the prison just to the north of the site (on the other side of Johnson Canyon; see Figure 1) the number of illegal aliens in this part of the Mesa has been significantly reduced. There does not appear to be significant off-road vehicle use of the property at this time. The only immediate factor militating for change is the pending development of most of the site for industrial/commercial use.

The suite of wildlife species found within the bounds of the property is comparable to that seen on any other disturbed ruderal, disturbed Native Grassland, Coastal Sage Scrub adjacent to the urban parts of the City. Rodents and birds dominate the fauna with reptiles are a close third. Sensitive wildlife species noted during the butterfly survey work included the following:

Rufous-crowned Sparrow	*Aimophila ruficeps*
Northern Harrier	*Circus cyaneus*

Apparently a pair of the Harriers and one or more pair of the Rufous-crowned are nesting within the mima mound area of the property. Given the large habitat requirements of the Harrier probably only *one pair is* present on this part of the Mesa. Given the limited available habitat, only one or two pair of the Sparrow are anticipated.

Sensitive plant species include (but are not necessarily limited to):

San Diego Coyote Thistle	*Eryngium aristulatum*
San Diego Hasseanthus	*Dudleya variegata*

The *Eryngium* is, of course, found in the vernal pools on the property. The *Dudleya* is located in gravelly openings in the vegetation on the sides of the mima mounds. The *Dudleya* is illustrated (but misidentified) in a photo included in the field notes in the attached appendix to this report.

C. Proposed Development. The development plan for the property encompasses all but the northern part of the mima mound topography and the area immediately adjacent to (or within) Johnson Canyon. The bulk of the site will be padded out as approximately 5-acre industrial lots.

III. Field Methods

A detailed discussion of the field methods, the date of the surveys and the extant weather conditions on each of the field dates is included in the field notes and on the "General Forms" reproduced in this report as the appendix. These details will not be repeated here. The reader is referred to the appendix.

In general, the following considerations governed the conduct of the field survey:

- There were no populations of Dot-seed Plantain (*Plantago erecta*) on the Sunroad Centrum property. Field visits, therefore, were restricted to the one area of semi-native vegetation, an area which was also a potential hilltopping location (see Figure 3).

- The only hilltopping location within the bounds of the property is the mima mound area in the north central part of the site (see Figure 3).

- Due to the difficulty of accessing the property, field observers were required to walk in from Harvest Road. As such, a portion of the ruderal lands were examined during each of the field visits to the site.

Perhaps due to the dryness of the year, few butterflies were seen in the ruderal parts of the site. The bulk of the species and individuals were found within the north central "semi-natural" area. The bulk fo the field effort was, accordingly, devoted to this part of the site.

IV. Results and Analysis

No adult or larval Quino Checkerspot Butterflies were seen during the course of the survey effort on the Sunroad Centrum property.

The following points highlight the results of the butterfly survey effort on the Sunroad Centrum property:

- A total of 10 butterfly species were observed. These are detailed in Table 1.

- Generally, the total number of species and the total number of individuals seemed less than one would anticipate given the habitats present on-site and the relative prominence of the hilltopping location. This is probably attributable to the sparse rain fall during the current year and the unique location of the site relative to the overcast burn off. For example, virtually no sulfurs were seen during the course of the survey of this property. The common Alfalfa Butterfly (*Colias eurytheme*) was actually rare this year on all of the properties examined, a condition that undoubtedly reflects the lack of growth (due to rain) in the normal suite of food plants utilized by this butterfly species. In the previous year a variety of mustards dominated the surrounding fields.

- The number of *Coenonympha tullia* found on the property was exceptional, up to 47 in one observational period. This population was apparently due to the to exceptional quantity of native bunch grasses in the north central part of the site.

- *Papilio zelicaon* was particularly common on-site but was highly localized along the north edge, next to Johnson Canyon, were there is a large stand of the species' larval food plant: *Foeniculum vulgare*.

- The absence of certain species was intriguing. For example, only a single "blues" was seen on the property, *Brephidium exilis*. And only a single individual was found, despite an extensive search of the relatively common larval food plant: *Atriplex semibaccata*. *B. exilis* can be an eruption species, sometimes seen in clouds of hundreds over a suitable food plant. Why only one individual on this site is unknown.

Given the complete lack of *Plantago erecta* on this site (and the virtual lack of *Castilleja exserta* or any possible alternative larval food plants for the Quino Checkerspot), and the lack of any Quino sightings on the Sunroad Centrum property, it would appear that the site can be developed without concern for a possible take of the Quino Checkerspot.

V. Certification

This report represent an independent survey and analysis of the Sunroad Centrum property for the occurrence of the Quino Checkerspot Butterfly. Any errors or omissions are solely the responsibility of the undersigned.

Royce B. Riggan, Jr., AICP, Federal Permit Number PRT-780195
Principal
RBRiggan and Associates
RBR Job Number 1740.11D
15 June 1999

Attachments:

1. References Cited
2. Table 1 — Butterfly Species Observed
3. Figure 1 — Project Location on a Thomas Brothers Map
4. Figure 2 — Project Location on a USGS Quadrangle Map
5. Figure 3 — Location of Potential Quino Resources
6. Figure 4 — Representative Butterflies Observed
7. Figure 5A — Site Photographs (Thumbnails)
8. Figure 5B — Site Photographs (Thumbnails)
9. Figure 5C — Site Photographs (slides)
10. Appendix
    a. Copies of Pertinent Pages from Author's Field Notebook
    b. Copies of FWS's General Forms

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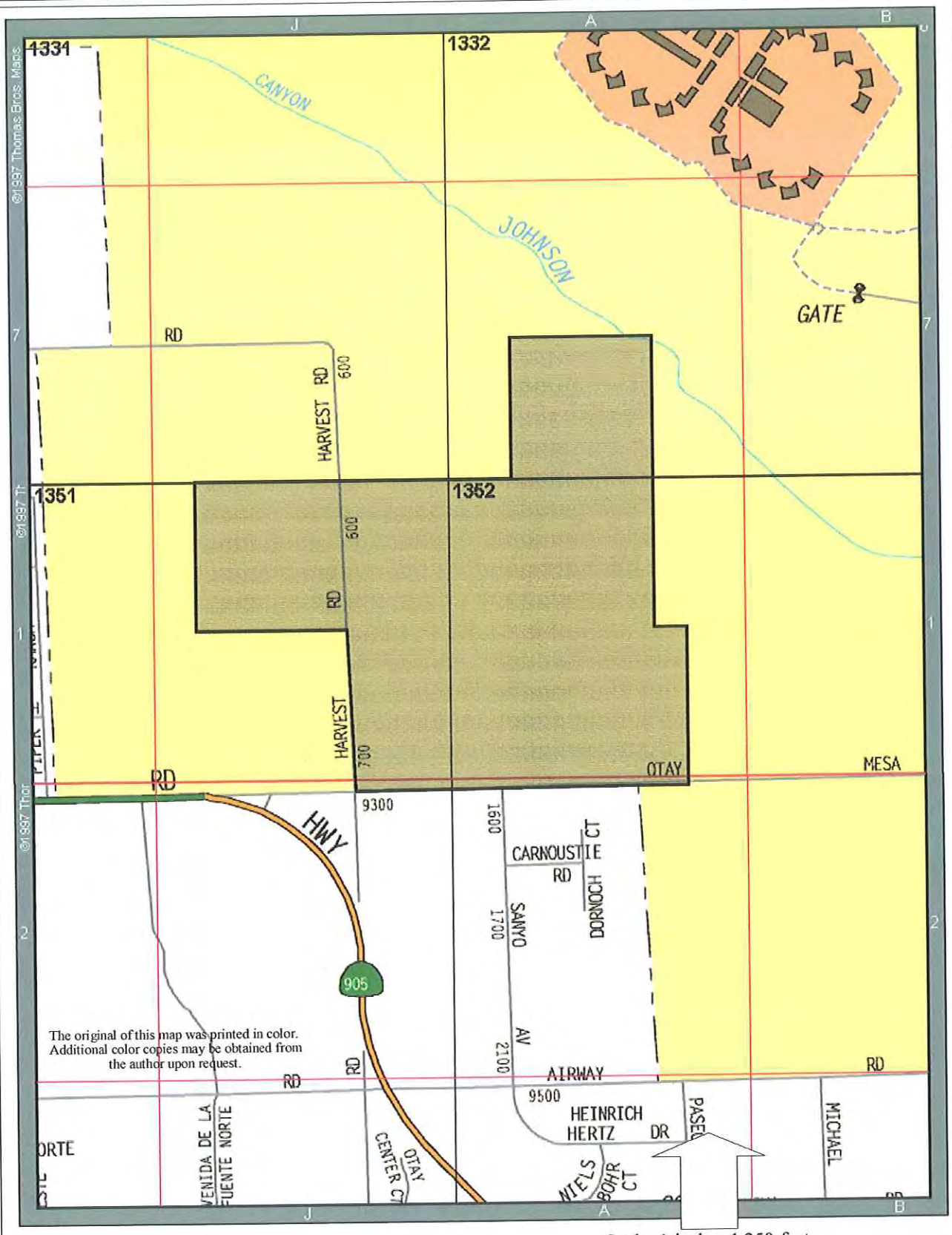
Table 1

Butterfly Species Observed on the Sunroad Centrum Property, Otay Mesa, as part of a Protocol Survey for the Quino Checkerspot

Butterfly Species:	3/3/99	3/12/99	3/19/99	3/28/99	4/4/99	4/10/99	4/17/99	Note:
Apodemia mormo					1	1		Seen on or near *Eriogonum fasciculatum* in the primary survey area. The buckwheat is occasional on the tops of the mima mounds.
Brephidium exilis	1							A single individual was observed by three individuals at close range on an Atriplex semibaccata. Subsequent to that sighting, no additional individuals could be found despite a careful search.
Coenonympha tullia	27	19	37	22	47	2	12	Abundant, but found for the most part in the primary search area where native bunch grasses predominate. Not common in the ruderal areas where non-native annual grasses predominate.
Erynnis cf. *funeralis*			1					The single individual seen with a white trailing edge on the HW was assumed to be a member of this species. Photographs were not obtained so differentiation to species was not possible.

Butterfly Species:	3/3/99	3/12/99	3/19/99	3/28/99	4/4/99	4/10/99	4/17/99	Note:
Papilio zelicaon	2			7	2	7	1	Found primarily on the north edge of the property where there are extensive stands of *Foeniculum vulgare*.
Pontia protodice	2	1		2			2	Seen as flybys, no hilltopping behavior was observed in the primary survey area.
Strymon melinus	1							Found in the lee of a shrub, near the hilltopping location on the property.
Vanessa sp.	1	1				1		Seen primarily as flybys, could not be observed with sufficient clarity to determine species. All appeared, however, to belong to the *cardui* group.
Vanessa anabella				1	6		1	Found primarily on the periphery of the property in association with stands of *Brassica nigra*.
Vanessa atalanta	1	1						Seen early in the season, this species' larvae feed on Stinging Nettle. Nettles were not observed on-site and are not known to occur in the immediate vicinity of the site.

Total: 10 identified species or genera.



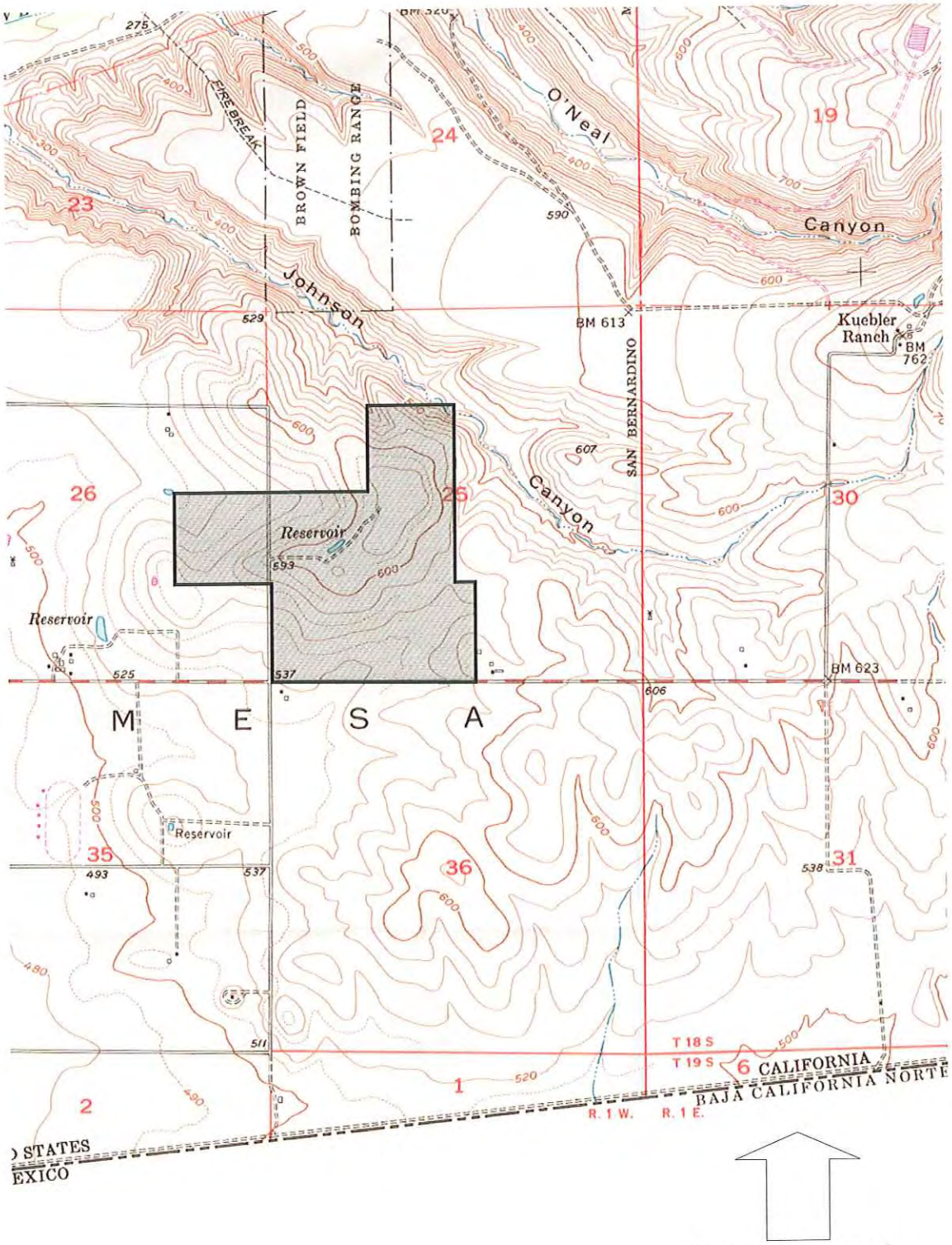
Scale: 1-inch = 1,250-feet

RBRiggan and Associates Job Number 1730.10C 25 February 1999 [:\1730-fig1.wpg]

RBRiggan and Associates

Location of the 250-acre Sunroad Centrum Property on a Thomas Brothers Base Map
[map © Thomas Bros Maps]

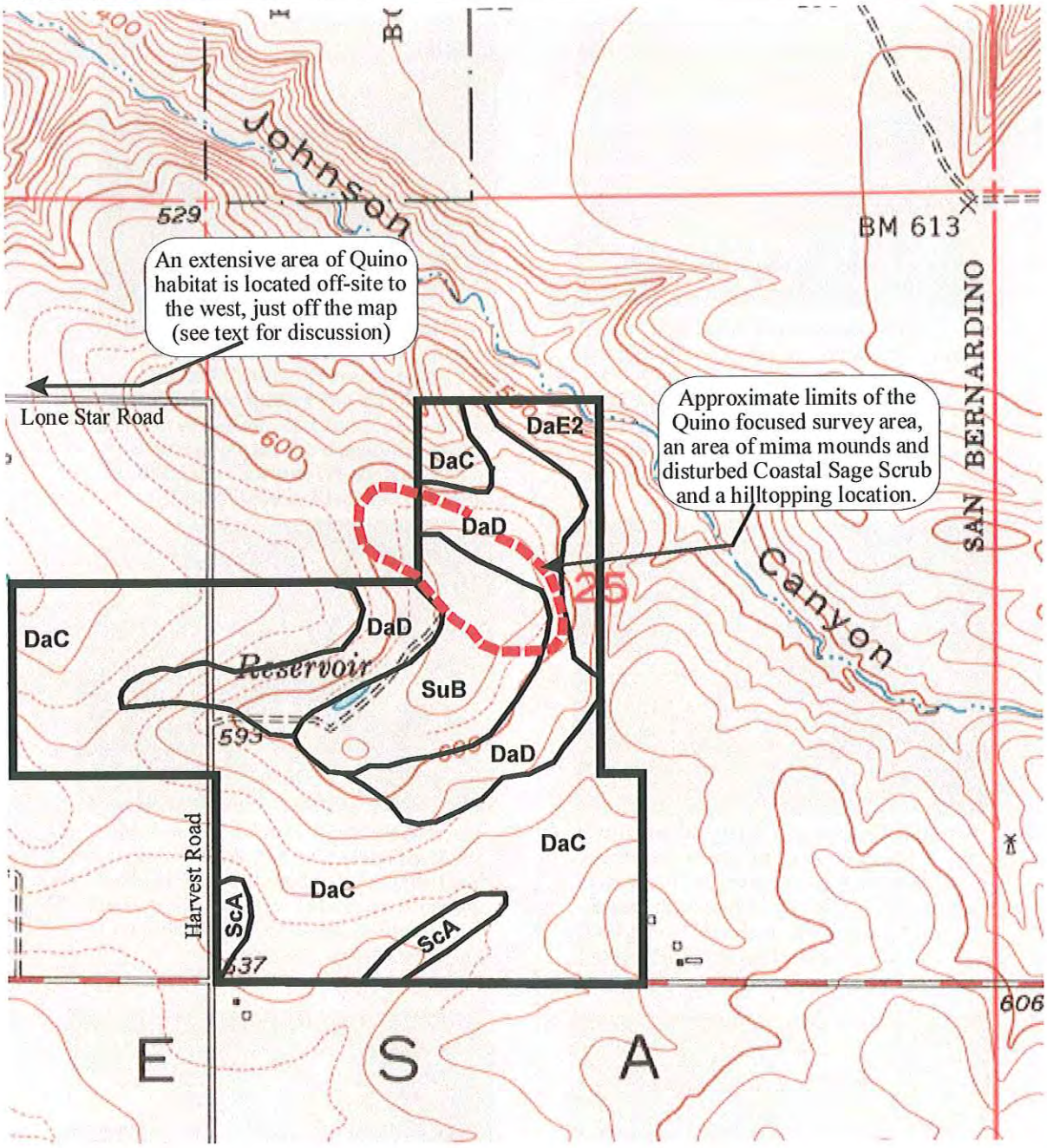
Figure 1



Scale: 1-inch = 2,000-feet

RBRiggan and Associates Job Number 1730.10C 25 February 1999 [:\1730-fig2.wpg]

RBRiggan and Associates	Location of the 250-acre Sunroad Centrum Property on a Scanned Portion of the U.S.G.S. 7½-minute Otay Mesa Quadrangle Map	**Figure 2**



KEY TO SOIL TYPES:

DaC — Diablo Clay, 209% slopes [surface layer moderately Alkaline clay, 27-inches thick]
DaD — Diablo Clay 9-15% slopes
DaE2 — Diablo Clay 15-30% slopes, eroded
ScA — Salinas Clay 0-2% slopes [clay loam, may have a surface layer of clay]
SuB — Stockpen Gravelly Clay Loam, 2-5% slopes

Scale: 1-inch = 1,000-feet

RBRiggan and Associates Job Number 1730.10C 28 March 1999 [:\1730-fig3.wpg]

RBRiggan and Associates	The 250-acre Sunroad Centrum Property with Soil Types Delineated (after Bowman, et al., 1973) and Other Resources Identified	Figure 3

Slide #1: View looking generally northeast across the northern part of the site. The Jamul Mountains are in the distance. The foreground field is dominated by Brassica nigra and was apparently in agriculture within the last few years.(photo taken 11 June 1999).

Slide #2: View looking generally south from the central part of the site. Otay Mesa Road and the industrial development beyond are visible in the background. The fore ground is dominated by the recently abandoned agricultural fields in the south part of the project site.

The original of this graphic was printed in color. Additional color copies may be obtained from the author.

RBRiggan and Associates Job Number 1730.10C 15 June 1999 [:\1730-fig5A.wpg]

RBRiggan and Associates	**Site Photographs: Prints of Slides #1 and #2.**	**Figure 5A**

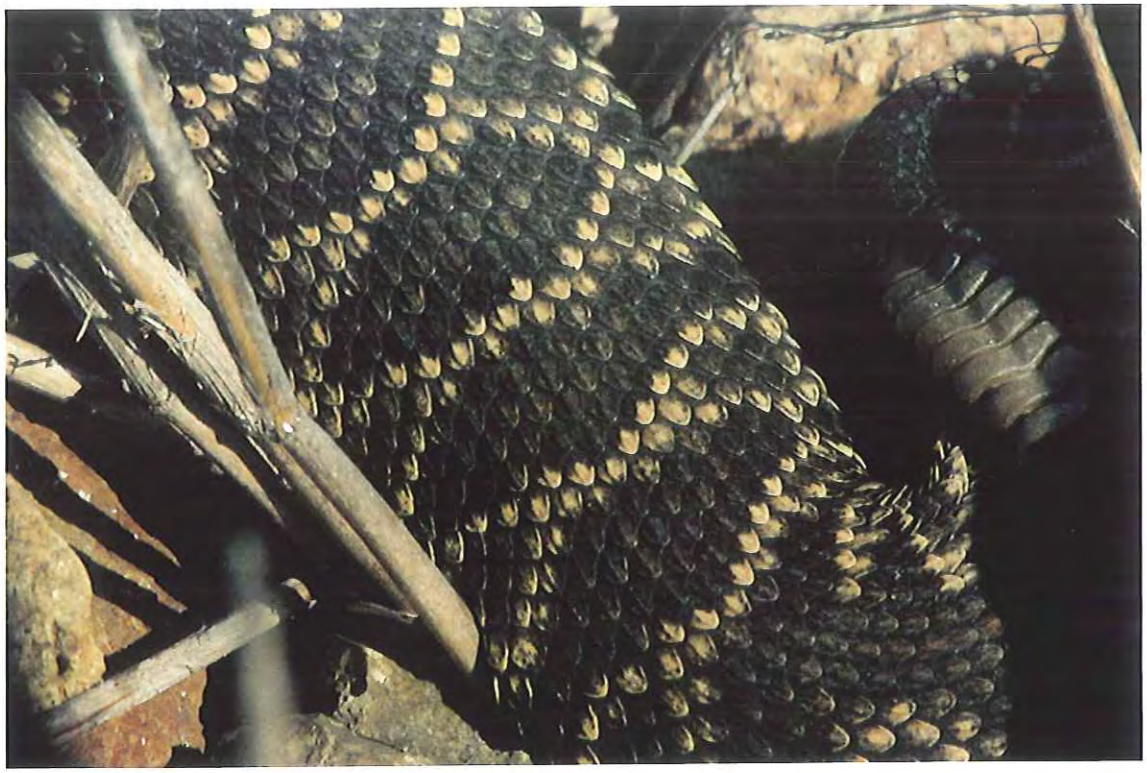
Slide #3: View looking generally east across the north central part of the site. The state and federal prison complexes are visible in the background. Immediately in front of the prison buildings, the high ground surveyed as a part of this Quino effort is visible as are a few of the Coastal Sage Scrub shrubs on the mima mound tops.

Slide #4: View looking generally north across the high ground in the north central part of the site. Individual shrubs are generally on the tops of the mima mounds while the interstices are occupied by a disturbed native grassland. This is the area surveyed as a part of this Quino effort.

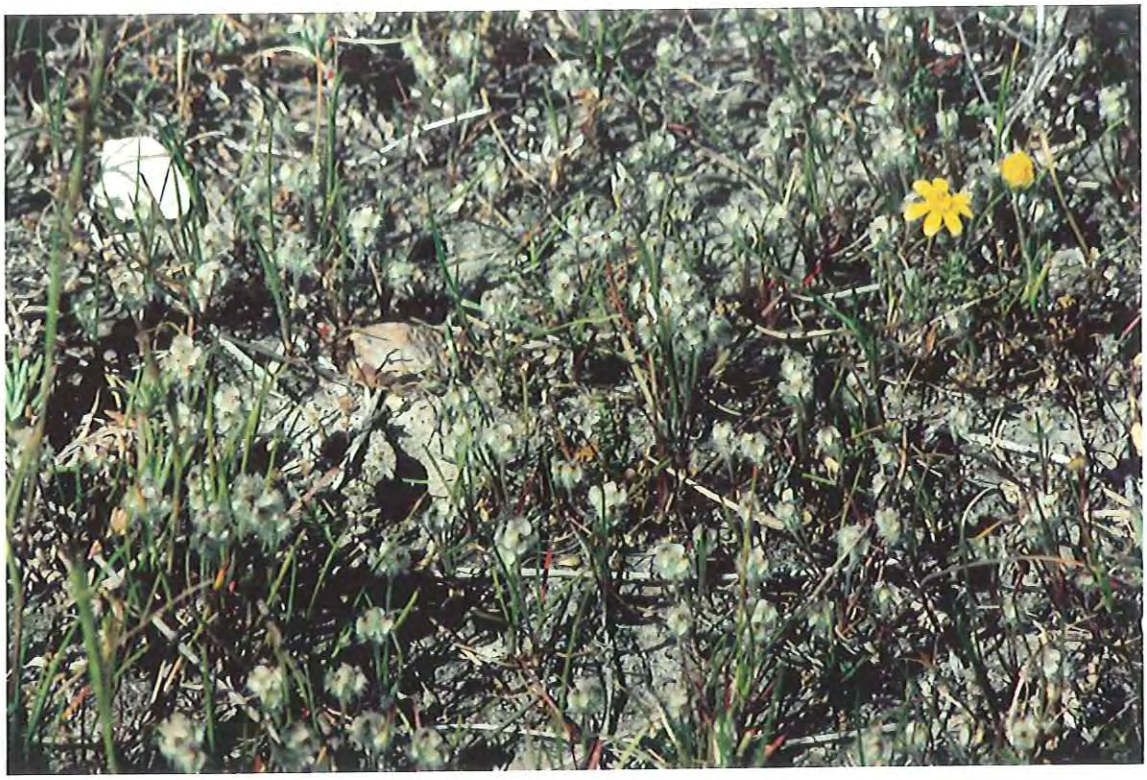
The original of this graphic was printed in color. Additional color copies may be obtained from the author.

RBRiggan and Associates Job Number 1730.10C 15 June 1999 [:\1730-fig5B.wpg]

RBRiggan and Associates	**Site Photographs: Prints of Slides #3 and #4.**	**Figure 5B**



1999 Field Notes	**Plate 1A** — Photograph of a segment of a *Crotalus viridis helleri*, the snake was trying to retreat into a boulder pile and had substantially flattened the exposed portion of its body. See Field Notes for 21 February 1999. **Plate 1B** — *Peromyscus eremicus* found clambering in the top of an *Avena barbata* during the middle of the afternoon on a sunny day. See Field Notes for 21 February 1999	**Plate 1**



1999 Field Notes	**Plate 2A** — Photograph of a segment of a *Plantago erecta* population found on Otay Mesa, northeast of Brown.See Field Notes for 21 February 1999. **Plate 2B** — *Bothriocyrtum californicum* nest found on the south-facing slope of a property at the west edge of Otay Mesa. See Field Notes for 28 March 1999	**Plate 2**

1999 Field Notes	**Plate 5A** — View of the central portion of the body of a *Crotalus viridis helleri* found in dense native and non-native grasses in an area of mima mounds. One two individuals. See Field Notes for 4 April 1999. **Plate 5B** — Vegetative *Dudleya multicaulis* found on mima mounds on East Otay Mesa. See Field Notes for 28 March 1999.	**Plate 5**

Copies of four slides illustrating the site were included in the reports submitted to the Fish and Wildlife Service, provided to REC Environmental, to the project applicant and retained by RBRiggan and Associates.

If this report does not contain copies of the slides please refer to the thumbnails printed in the two proceeding Figures. Additional copies of the slides may be obtained from the author.

RBRiggan and Associates Job Number 1730.11C 12 June 1999 [:\1730-fig5C.wpg]

RBRiggan and Associates	**Site Photographs: Slides #1through #4 — See Figures 5A and 5B for Thumbnails and Descriptions of the Slides**	Figure 5C

Appendices

1. Copies of RBR Field Note Entries

2. Completed FWS "Quino Checkerspot General Form" for Each Site Visit

3 March 1999

The following notes were made on the first of what is to be several field visits to a property on the eastern edge of the Otay Mesa, in the southern part of the City and County of San of Diego. The property is referred to as the Sunroad Centrum site and it encompasses approximately 250 acres. The majority of the site lies in the southwest quarter of section 25, Township 18 South, Range 1 West. The property also includes the northeast quarter of the southeast corner of section 26 and the southeast quarter of the northwest quarter with of section 25. The property is illustrated in this field notebook as Figure 8. This site visit is the first of several that will ultimately constitute a federal protocol presence/absence survey for the endangered Quino Checkerspot Butterfly (*Euphydryas editha quino*).

The larvae of the Quino Checkerspot feed primarily on *Plantago erecta*. The Sunroad Centrum property has been previously surveyed by staff members of REC Environmental. That fairly extensive effort produced no observations of the *Plantago*. In addition, none of what are considered secondary larval food plants were observed during the course of the survey effort. No individuals of *Collinsia heterophylla* were found and only one or two widely scattered individuals of *Castilleja exserta* were seen.

The bulk of the property has been used in recent years in intensive agriculture. Based on the ruderal vegetation that now occupies most of the site, it is difficult to ascertain the elapsed time since the last agricultural effort. Topographically, the north central portion of the site is higher ground and it is underlain by the Stockpen gravelly clay loam (Bowman, et al., 1973). The site is mapped as being underlain entirely by the Otay formation (Kennedy and Tan, 1977). If, in fact, this is correct geological mapping, then this particular member of the Otay formation is characterized by a significant component of cobbles and small boulders, all of which appear to be derived from the Santiago peak metavolcanics which dominate the high ground to the east. It would appear that the source of these cobbles and boulders is slope wash from the adjacent high ground. Agricultural activity (apparently hand transport to clear the fields for discing) has resulted in these rocks being concentrated into dense piles scattered across the site. The typical rock pile measures perhaps 15 by 25 feet, contains no vegetation, and stands above the immediately adjacent ground surface by 1 2 feet. The piles consist entirely of metavolcanic clasts.

The majority of this north central area is occupied by a series of mima mounds. The tops of the mounds support scattered individual shrubs characteristic of the Coastal Sage Scrub. Interstices between in the individual mounds are generally dominated by a suite of grass species, many of which are native bunch grasses. The area between the mounds is probably best described as a disturbed native grass land.

Shrubs species characteristic of the mima mounds within the relictual grass land in include the following:

Artemisia californica
Isomeris arborea
Opuntia sp.

Salvia mellifera
Eriogonum fasciculatum

At scattered locations within the property there are also a small number of vernal pools. These are generally found in the interstices between the individual mima mounds. These vernal pools are, of course, classifiable as wetlands. Indeed, at least one of the vernal pools contains a small number of individuals of the federally listed endangered *Eryngium aristulatum*. No attempt was made to survey or evaluate the pools as a part of this field effort. Other significant resources within the bounds of the Sunroad Centrum property are the subject of studies and reports developed, or being developed, by REC Environmental.

The balance of the property, that is the area outside of the remaining mima mounds, has been intensely used in recent years in agriculture and is today occupied by a ruderal association. This ruderal association is dominated by a fairly basic suite of native and non-native adventive weed species. Species typical of this association include:

Brassica nigra
Foeniculum vulgare
Centaurea melitensis
Bromus (several species)
Avena barbata

While no food plants (*Plantago*, *Castilleja*, or *Collinsia*) associated with the larvae of the Quino Checkerspot were located during the course of the plants survey of the property, it was felt that the high ground (that area above 620 feet) might serve as a hilltopping location for the Quino. The Quino has been observed (in the current year) approximately five miles to the north, on the north side of Otay Lake. The quino has also been observed in an area roughly a mile to two miles to the west of the property as a part of RECON's survey effort for state Route 125 (Harold A Wier, Dudek and Associates, personal communication, March, 1999).

In that the Quino has been observed to the west of the subject property (and keeping in mind that the prevailing wind is from the west), and considering observations of the Quino to the north and northeast, it was felt that an adult survey of the project site was mandated, if for no other reason than an abundance of caution. When one considers that the species has been found a short distance west and northwest it is, a priori, a reasonable assumption that species can be found hilltopping on the subject property. It is perhaps for this latter reason that the adult survey was conducted.

The field survey conducted on this date was between the hours of 1130 and 1315. At the beginning of the observational period wind measurements were made with the Turbometer at between 4.4 and 10.3 mph. Air temperature at the beginning of the observational period was 64.6 degrees Fahrenheit and humidity was 55 percent. It should be noted that wind speed is highly variable on-site. As one proceeds into the mima mound area one finds pockets within the terrain where wind speed is essentially zero due to the topographic relief. The property was entered at the 593 elevation point on Harvest Road. The observers preceded east from that point and subsequently concentrated their effort on the high ground (generally above the 620 foot contour). Observations of the site were made

by Riggan who was accompanied in the field by Denise Dixon and Dr. Danielle Flynn of the REC Environmental staff.

Butterfly species observed on this date (and the number of individuals per species) were as follows:

Coenonympha tullia — 27
Pontia protodice — 2
Vanessa atalanta — 1
Strymon melinus — 1
Papilio zelicaon — 2
Brephidium exile — 1
Vanessa sp. — 1
Erynnis sp. — 1

The extensive numbers of *Coenonympha tullia* are not unexpected. The entire 250 acre property is at some level dominated by grasses and the less disturbed areas are dominated by native grasses. Mostof the other species noted were seen as flybys. The only exceptions were the *Strymon* which was found perched in the lee of a shrub near the crest of the (allbeit subtle) hilltopping area and the *Brephidium* which was found tightly associated with an *Atriplex semibaccata*.

[Note added 10 May 1999: now that the flight season for the Quino is over it should be added that of the seven visits made to this property, a *Brephidium exile* was found only on this one field date. *Atriplex semibaccata* is fairly common in the ruderal parts of the property and individual plants and clumps of the plants were examined for this species but no others were found.]

Two Northern Harriers (*Circus cyaneus*) were seen on the property. One was seen in doing the display looping characteristic of mating or pair bonding.

[Note added on 12 June 1999: this pair was seen on-site throughout the observational period for the Quino. On a subsequent visit on this date, three individuals were seen flying and interacting together. One was thought to be a juvenile, ergo mating did occur on-site? However, neither a nest nor a fledgling was ever found during the survey of the site, however see other entires in these notes for this site].

12 March 1999

The following notes were made during a field visit to what is referred to as the Sunroad Centrum property on eastern Otay Mesa. This field visit is part of an ongoing survey of the property to determine the presence or absence of *Euphydryas editha quino*. This property has been previously described in this notebook (see the entry at 3 March 1999) and is illustrated as Figure 8.

Observations on this field date were made between the hours of 1230 and the 1400. Wind speed was measured at the beginning of the observational period at between 2.7 and 7.9 mph. Air temperature at the beginning of the period was measured at 70.4 degrees Fahrenheit and the humidity was 36

percent. The primary field survey was conducted by Riggan who was accompanied in the field by Elyssa Robertson of the REC Environmental staff. The property was entered from Harvest Road and the focus of the survey effort was the high ground, the hilltopping area generally located above 620 feet.

The following Butterfly species (and numbers of individuals) were seen during the course of the survey effort:

Coenonympha tullia — 19
Vanessa atalanta — 1

The rather small number of both species and individuals was surprising given the success on the site only a week previously. In that a large number of *Coenonympha* were flying, it was felt that weather conditions were appropriate for Butterfly activity. The one *Vanessa atalanta* noted was seen near Harvest Road in association with a dense stand of the *Brassica nigra.*

19 March 1999

The following the field notes were taken as part of an ongoing survey of the Sunroad Centrum property to determine the presence or absence of the federally endangered Quino Checkerspot Butterfly. The Sunroad Centrum property has been previously described in these notes at 3 March 1999. The property is also illustrated in this field notebook as Figure 8.

Field observations on this date were made by a single observer: Riggan. Weather conditions were measured at the beginning of the observational period. Wind speed was determined with a Turbometer as lying between 5.1 and 10.4 mph. It should be noted, once again, that wind is extremely erratic and that the wind speed measured on Harvest Road is not necessarily reflective of the wind speeds found within the microtopography of the mima mound complex. Air temperature was recorded at 74.6 degrees and humidity was 41 percent. All field observations were made between the hours of 1400 and 1630.

Only a single species of Butterfly was noted during the course of the survey effort:

Coenonympha tullia — 37

Given the very large number of *Coenonympha* observed and given their broad distribution throughout the central portion of the site, it was felt that the weather conditions were certainly consistent with the flight requirements of butterflies and general. One cannot readily speculate as to why additional butterfly species were not observed.

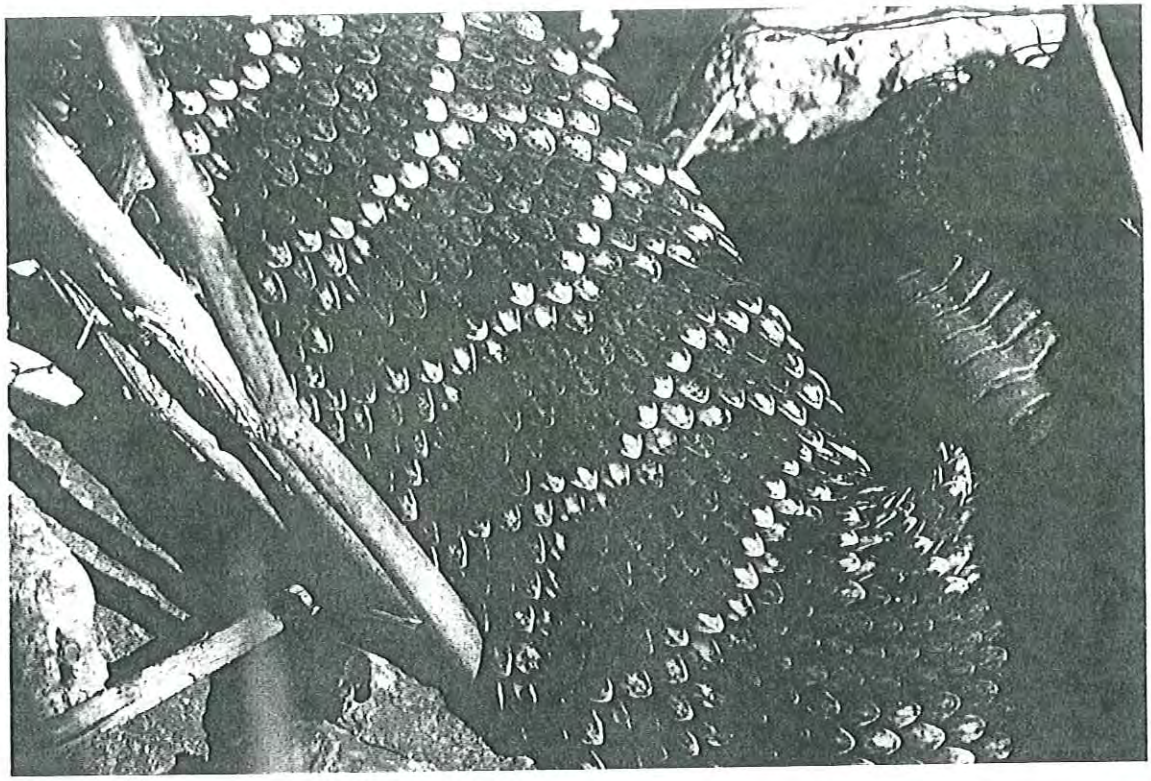
This is the third survey date on the Sunroad Centrum property. On this date, and on each of the previous two, extensive sign indicative of Voles (*Microtus californicus*) was seen in throughout the property. As a one might expect, a dense rodent population is typically correlated with a high number of predators. Near the end of the observational period, while returning to the truck, this

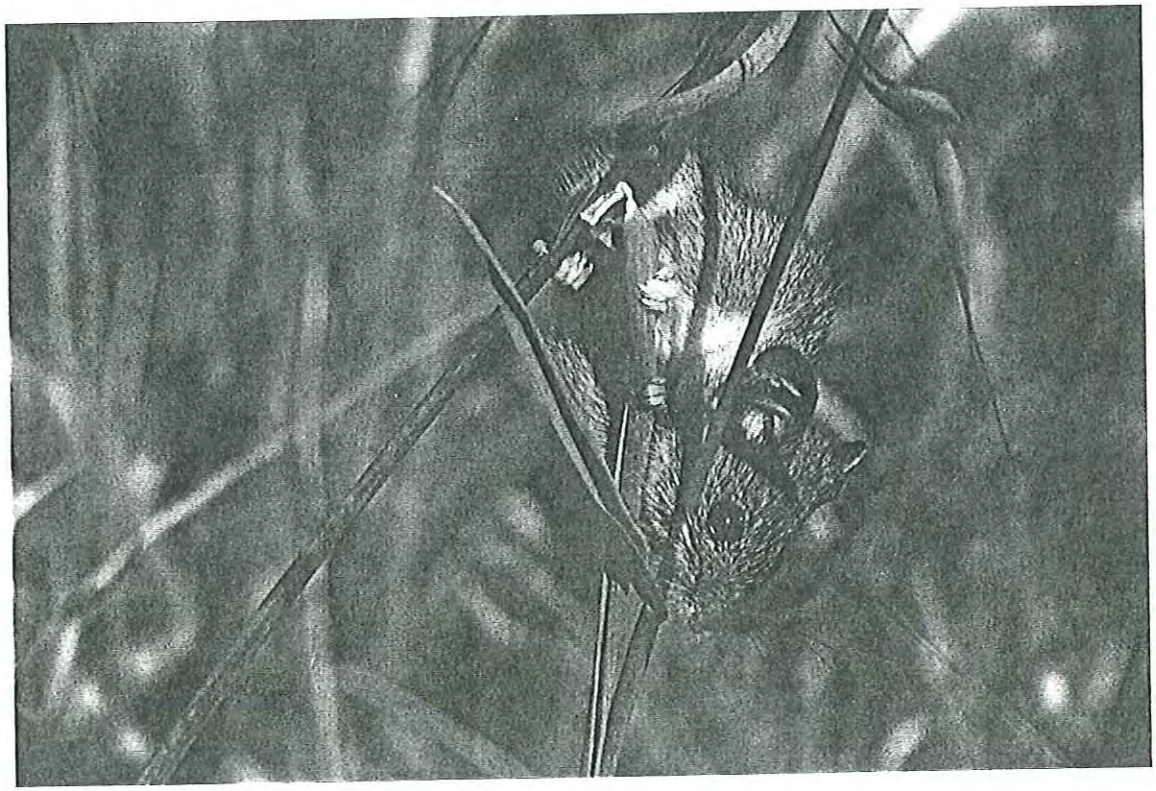
observer stopped momentarily near one of the numerous rock piles scattered across the site. Upon stopping, a brief (perhaps 1 to 2 seconds) rattle was heard. The observer immediately glanced around the area where he was standing thinking that a rattlesnake was in close proximity. Not seeing the snake, the author shifted his feet slightly only to hear a rattle lasting perhaps five seconds. The rattle was obviously close and a more intense visual scan was done of the immediate vicinity. This done, the author shifted his right foot again only to be now presented with a continuous rattle. Looking down the author realized that he was standing on an approximately 3 to 3.5 foot long Western Diamondback Rattlesnake, *Crotalus viridis helleri*. The snake had elevated the fore part of its body and was in a strike posture approximately eight inches from the author's ankle. Needless to say, the snake and its immediate vicinity were quickly abandoned. The author feels bad about this particular incident, in that the author is somewhat overweight and undoubtedly did significant internal damage to the poor animal by standing on it. Once released from the "weight", the snake immediately retreated into the rock pile. However, as it went it significantly flattened its body. This can be seen to a certain extent in the photograph of the snake on Plate 1 of these field notes. The flatness of the body was quite noticeable and one wonders if this might be a behavior adapted to predator avoidance? Would this flattened posture make the snake more difficult to pick up, especially by a hawk?

Also illustrated in Plate 1 [note that the dates on the Plate caption are wrong, they should refer to 19 March 1999] is a *Peromyscus* found up in the top of an *Avena barbata* stalk in the middle of the afternoon. The mouse held this position for several minutes allowing this and a number of other photographs. Based on the relatively uniform color of the tail it may be a *P. eremicus*. Why it was abroad in the middle of the day (attempting suicide as it were) is an unknown. There is no lack of food resources on the site, or at least that is the way the site appears to a human observer. Steve Montgomery opined that the *Peromyscus* populations are elevated due to last years El Niño event and there may simply be a great deal of competition for space. Perhaps this animal had been crowded into the upper part of the grass canopy.

After work was compete on the Sunroad Centrum site, properties to the west were examined briefly. An extensive population of *Plantago erecta* and *Castilleja exserta* was found. Both species were found together and both seemed to occupy a considerable acreage within the site. This is perhaps the most extensive Quino-suitable habitat that this author has found or observed. The habitat was located behind a posted barbed wire fence along the north side of Lone Star Road, beginning approximately 0.3-miles east of La Media Road. From this point the habitat extended approximately a ¼-mile or more (perhaps significantly more) to the east. The author elected to not violate the "no tresspassing" signs posted at several locations along the well maintained fence and viewed the property with binoculars from the edge of Lone Star Road. Because of the flat terrain at this location it was difficult to see an appreciable distance from the fence line but in at least one location the Quino habitat seemed to extend at least 100-feet north of the road. The existence of this habitat further reinforces the argument for a formal adult survey of the Sunroad Centrum site. That site is located directly down wind from this Quino habitat area. A photograph of the Plantago is provided in Plate 2 of this field notebook. [Note that the date on the Plate is incorrect, it should read 19 March 1999].

There is a wild onion, *Allium* sp., growing within the survey area of the Sunroad Centrum site. The onion is in bloom at this time and *Coenonympha* were observed nectaring on the flowers. The





1999 Field Notes

Plate 1A — Photograph of a segment of a *Crotalus viridis helleri*, the snake was trying to retreat into a boulder pile and had substantially flattened the exposed portion of its body. See Field Notes for 21 February 1999.
Plate 1B — *Peromyscus eremicus* found clambering in the top of an *Avena barbata* during the middle of the afternoon on a sunny day. See Field Notes for 21 February 1999

Plate 1

Plate 2A — Photograph of a segment of a *Plantago erecta* population found on Otay Mesa, northeast of Brown.See Field Notes for 21 February 1999.
Plate 2B — *Bothriocyrtum californicum* nest found on the south-facing slope of a property at the west edge of Otay Mesa. See Field Notes for 28 March 1999

Coenonympha were also seen nectaring on Blue-eyed Grass (*Sysrinchium bellum*) but, when both plants were present, they seemed to favor the *Allium*.

While walking through the primary survey area, a Northern Harrier (*Circus cyaneus*) was flushed from beneath a large, overhanging *Artemisia californica*, at a distance of only 2 meters. At that distance, of course, it is hard to tell who was more startled, the bird or the author. There was no sign of a nest, of eggs, or of young beneath the bush. However, a "nest" site of the Northen Harrier was observed by the author on a nearby property a few years previous. In that case there was no formal nest at all, rather, the downy chick was simply on the ground beneath a shrub. The soil beneath the shrub observed on this field date was clear and packed and could represent a site used frequently by the Harrier. It will be interesting to see if additional "nest" sites are found during the course of the Quino survey.

A striped phase California Kingsnake (*Lampropeltis getulus*) was found on the subject property. The snake was mature, perhaps in its 3rd or 4th year.

28 March 1999

The following notes were made during a field visit to what is referred to as the Sunroad Centrum property (RBR job number 1730.10C). This field visit is part of an ongoing series, which constitute a federal protocol survey for the endangered Quino Ceckerspot Butterfly (*Euphydryas editha quino*). The subject property has been previously described in these field notes, see the entry at 3 March 1999. The property is also mapped as Figure 8 of this field notebook.

Observations on this date were made between 1230 and 1400 hours. A single observer was onsite this date: Riggan. Wind speed was measured at the beginning of the observational period at between 3.2 and the 9.7 mph. It should be once again pointed out that wind speed was extremely erratic at this site and would frequently dropped to zero within the microtopography of the mima mound area. Air temperature at the beginning of the field effort was 74.6 degrees Fahrenheit and humidity was 44 percent. Temperature and humidity dropped slightly through the field period. The survey effort was concentrated in the north central portion of the site, generally above an elevation of approximately 620 feet. Entry was made from Hrvest Road and the area walked was comparable to that covered during previous survey dates.

The following butterflies (and numbers of individuals) were observed on this field date:

Papilio zelicaon — 7
Pontia protodice — 2
Coenonympha tullia — 22
Vanessa anabella — 1

Along the extreme northern edge of the principal survey area within the site, on the flatter slopes immediately overlooking Johnson Canyon, there are extensive stands of *Foeniculum vulgare*. The majority of the *Papilio zelicaon* were seen in this area, in association with the larval food plants.

In the two *Pontia protodice* were seen as flybys. Both of were examined carefully in binoculars so as to carefully determine the species. The size, color, and flight behavior are sufficient to distinguish in the species from the *Coenonympha*.

The single *Vanessa anabella* was found flying among *Brassica nigra* and the edge of Harvest Road.

The *Coenonympha tullia* were scattered throughout be focused survey area within the project site. The majority of individuals observed were flushed from within the dense grasses as the author walked slowly between the mima mounds. Typically, the flushed individuals would fly a few feet and then land within the grasses. This behavior allowed a fairly accurate count to be made in that one could clearly observe where each individual butterfly landed, thereby preventing double counts.

As happened on the previous field date, a Northern Harrier was flushed at close distance from beneath a shrub. Once again, there was no apparent nest, eggs, or fledglings beneath the shrub. However, the ground beneath shrub was relatively clear and appeared to be somewhat packed. The location where the adult bird was flushed on this date was in the general vicinity of the one seen upon 19 March, however it was a clearly different location.

A Ring-necked Snake (*Diadelphis amabilis*) was found in an opening in the grass in the northern part of the focused survey area. The snake was briefly captured and examined but was far too active for photography (the author was alone and has only two hands).

A juvenile rattlesnake (*Crotalus viridis helleri*) was found on Lone Star Road, approximately a quarter mile west of the junction with harvest Road. This individual appeared to be approximately a year in age, based on its relative length.

Previous survey work on the subject property (by REC Environmental) resulted in the location of a few small populations of *Dudleya variegatus*. This species occurs in small, gravelly openings in the vegetation on the sides of mima mounds. This plant is considered a species of special concern by the Fish and Wildlife Service and is a List 1B plant on the CNPS Inventory. A photograph of the plant is included in this field notebook on Plate 5 [Note: the Plate is mislabeled] .

4 April 1999

The following field notes were made during the visit to be Sunroad Centrum property on the western part of Otay Mesa. This field visit was part of an ongoing federal protocol survey to determine the presence or absence of the Quino Checkerspot Butterfly (*Euphydryas editha quino*). The subject property has been previously described, refer to the entry in this field notebook at 3 March 1999.

Wind speed was measured at the beginning of the field visit using a Turbometer. Speeds of from 1.7 to 4.7 mph were recorded at the edge of Harvest Road. This particular location has an unrestricted reach to the west and the wind speeds measured at this location probably exceed those found within the primary survey area of the subject property. Within the primary survey area the microtopography of the mina mounds can effectively reduce wind speed to near zero. Air

temperatures and the beginning of the period were 69.9 degrees Fahrenheit and dropped to 66.1 degrees by the end of the observations. Humidity was relatively constant, measuring 32 percent at the beginning of the period and 31 percent at the end of the field observations. One observer onsite this date: Riggan.

If the following butterfly species (and numbers of individuals) were observed on this date:

Vanessa annabella — 6
Coenonympha tullia — 47
Apodemia mormo — 1
Papilio zelicaon — 2

The *Vanessa* were scattered among *Brassica nigra* near Harvest Road, outside of the primary survey area. One or two *Vanessa* were seen in flying within the primary survey area, possibly as hilltopping individuals.

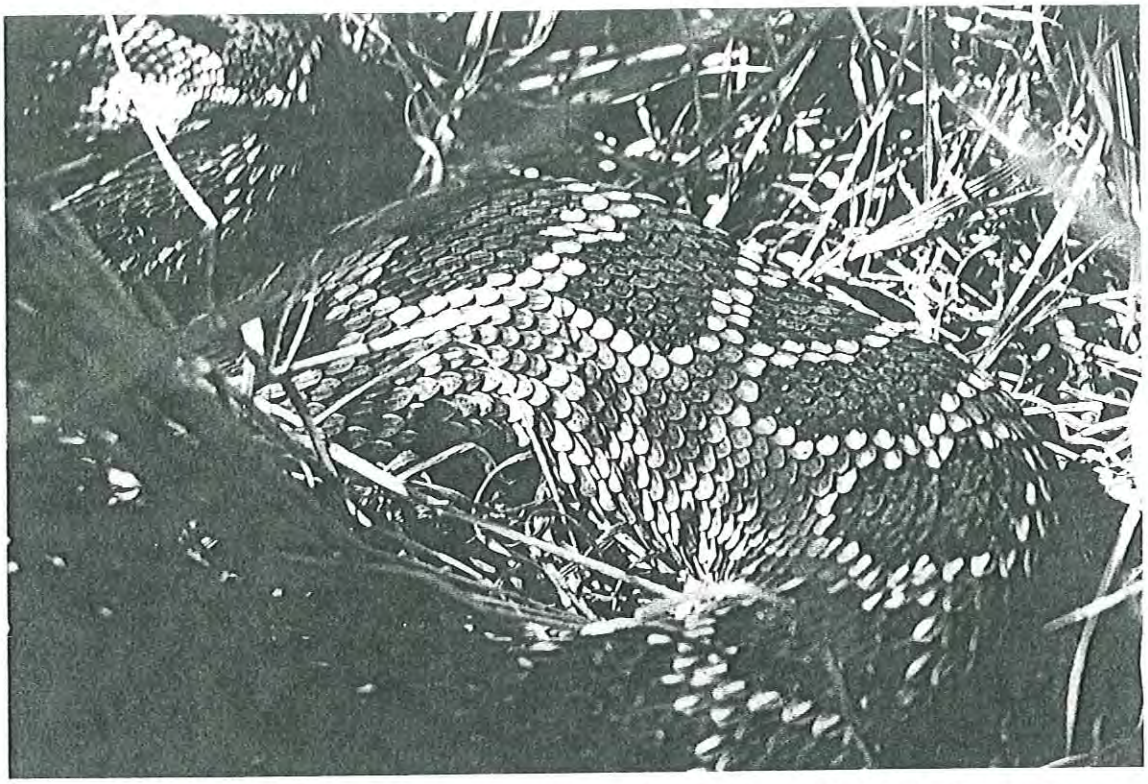
The *Coenonympha* appear to be closely tied to the presence of native bunch grasses. In the relatively recently disturbed (agricultural) fields, where the grasses are virtually all annuals and many are nonnative, the *Coenonympha* is not found.

The single *Apodemia mormo* was found in direct association with a small stand of *Eriogonum fasciculatum*. This shrub is sparse but relatively common on the tops of the mima mounds.

Spring migration is in full swing, large numbers of Cliff Swallows were seen over the site during the entire observational period.

In a figurative repeat of the observation of a *Peromyscus eremicus* on an earlier field date at this site, at least two voles were seen exposed, outside of their system of haunts and trails, in plain sight. Given the constant presence of a pair of Northern Harrier's on this property, the action of these voles is tantamount to suicide. It is relatively common to see voles moving beneath the grasses as one walks across the property. Rather, one should say that it is relatively common to see grasses move, indicating the passage of voles, as one walks across the property.

The author, once again, came within less than six inches of stepping directly in the middle of a pair of Western Diamondback Rattlesnakes (*Crotalus viridis helleri*). The two snakes were lying in the grass, intertwined about each other. As a humorous but factual anecdote, the snake which was effectively "on top" immediately retreated about three feet from its companion, coiling in heavy grass and proceeding to rattle continuously. The second snake, the one effectively "on the bottom" remained in the position it was found, neither moving nor making any attempt to rattle. One assumes that some sort of making behavior was either in progress and/or was interrupted. The snake that appeared to be "on the bottom" was photographed and appears in Plate 5 of this field notebook.



1999 Field Notes

Plate 5A — View of the central portion of the body of a *Crotalus viridis helleri* found in dense native and non-native grasses in an area of mima mounds. One two individuals. See Field Notes for 4 April 1999.
Plate 5B — Vegetative *Dudleya multicaulis* found on mima mounds on East Otay Mesa. See Field Notes for 28 March 1999.

Plate 5

10 April 1999

The following notes were made during a field visit to the Sunroad Centrum property (RBR Job Number 1730.10C). This visit is part of an on-going series of field surveys as part of a federal protocol survey of the property to determine the presence or absence of the Quino Checkerspot Butterfly (*Euphydryas editha quino*). The property has been previously described in these field notes, see the entry at 3 March 1999. The property is also illustrated in this notebook as Figure 8.

Observations on this date were made between the hours of 1230 and 1345. A single observer participated: Riggan. Wind speed was measured at the beginning of the observational period using a Turbometer, speeds were between 3.5 and 7.8 mph. Wind speeds within the site, as previously discussed, were less due to microtopographical considerations. Air temperature at the beginning of the period was 71.5 degrees Farenheit and the humidity was 32 percent. Temperatures were warming through the period.

The following butterfly species (and numbers of individuals) were seen during the field effort:

Papilio zelicaon — 7
Coenonympha tullia — 22
Vanessa sp. — 1
Apodemia mormo — 1

The *Papilio* were, once again, seen primarily along the northern edge of the site near the extensive stands of *Foeniculum vulgare*. This is a hilltopping species yet in this case the high ground is immediately adjacent to the larval food plants. This probably explains the large numbers seen on the site. In addition, the *Foeniculum* stand is in the lee of the high ground and, therefore, is exposed to less wind than is the balance of the hilltop. Some of the *Papilio* were observed nectaring on *Dichelostemma pulchella*.

As is apparently typical of the site, the *Coenonympha* were distributed commonly in the areas with native grasses and were sparse (or not present) in areas dominated by non-native, ruderal grasses and forbs.

The single *Vanessa* was a flyby (a member of the *cardui* group) and could not be identified to species. The *Apodemia mormo* was seen in association with a small stand of California Buckwheat (*Eriogonum fasciculatum*).

17 April 1999

The following notes were taken during a visit to the west Otay Mesa Sunroad Centrum property. This site is RBR Job Number 1730.11D and is the subject of an ongoing series of surveys (in accordance with federal protocols) to determine the presence or absence of the Quino Checkerspot Butterfly (*Euphydryas editha quino*). The property is illustrated as Figure 8 in these field notes and is

described in detail in the entry at 3 March 1999.

A single obsserver was on-site this date: Riggan. All observations were made between the hours of 1330 and 1500. Air temperature at the beginning of the period was 87.2 degrees and the humidity was 19 percent. There was no appreciable temperature change during the field period. Winds were measured with a Turbometer at the edge of Harvest Road; speeds of from 4.8 to 10.4 were recorded.

Spring is starting to pass. The grasses on the subject property are drying and this is the first field date when most of the non-shrubs were observed to be in water stress. Complete drying of the annual grasses should occur before our next visit to the site. As would be expected with drying conditions, a small suite of butterflies was observed on this date:

Pontia protodice — 2
Vanessa anabella — 1
Coenonympha tullia — 12
Papilio zelicaon — 1

The *Pontia*, *Vanessa* and *Papilio* were all flybys on the "hilltop" in the primary survey area of the site. The *Coenonympha* were scattered across the site as usual but the numbers are clearly dropping. It almost felt like one had to work to find them.

An interesting note: all this grass (including native bunch grasses and non-native annuals) and yet no Hesperiidae have been observed within the bounds of the property, not a single individual. One would think that at least a *Hylephila phyleus* would have been seen by now. That species is known to occur on native bunch grasses in chaparral stands close to the coast, why not in these fields??

[Note added on 10 May 1999: The Quino flight season was closed this morning by the Fish and Wildlife Service. During the ten weeks of the flight season, more than 38 of the 70-days (or greater than 54 percent) were unsuitable for survey work at the Sunroad Centrum site. Unsuitable days were characterized by excessive wind, cloud cover, rain, low air temperature, or some combination of these factors. The Sunroad Centrum site was surveyed seven times during the period. This was the maximum possible number of survey dates given weather considerations, and assuming a seven day work week on the part of the permitted consultant. Of the last three weeks of the flight period, only three whole days and one to two half days (after coastal cloud burn-off) were suitable for butterfly work in Otay Mesa.]

Quino Checkerspot General Form

Survey type: Habitat Assessment/Adult Survey

Surveyor: RIGGAN Date: 03/03/99 (mm/dd/yyyy) Site Visit No: (1) 2 3 4 5 6 7 8 9 10 J#1730

Total site acres: 250 Site Name: Sunroad Site Location: Otay Mesa

Time (24 hr)	Sky	Wind (Beaufort)	Temp F or C
Begin 1130	(clear/) partcloudy/overcast/fog/drizzle/shower	<1 1-3 (4-7) 8-12 >12	64.6
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	warming
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
End 1315	(clear/) partcloudy/overcast/fog/drizzle/shower	<1 1-3 (4-7) 8-12 >12	±70

Total hours surveyed: 1.75

Focused Survey Acres: <40 Elev Min: 600 ft Max 625 ft

Describe, map, and estimate areas surveyed below.

Host Plants[a]	Patch Size (ft^2)	No Plants/ft^2	Sparse/Dense[b]	Map ID[c]	
none					

a. Larval or nectar resources. Identify species b. Sparse= plants not touching; dense = plants touching c. Corresponds to polygon on a map.

Surrounding land uses (including adjoining properties):

North vacant / prison Distance ~~ft./mile~~ → variable

South agriculture / industrial Distance ~~ft./mile~~ → "

East vacant / agriculture Distance ~~ft./mile~~ → "

West vacant / agriculture Distance ~~ft./mile~~ → variable

Habitat onsite (circle): (open soils) (hilltop) ridge Plantago Castilleja (soil crusts) (old roads) nectar (clay soils) (rock outcrops)

Conditions: (e.g.,grazing (agriculture) sowbugs/earwigs recent fire grading)

Other: see field notes

Quino Checkerspot General Form

Survey type: Habitat Assessment/Adult Survey

Surveyor: RIGGAN Date: 03/12/99 (mm/dd/yyyy) Site Visit No: 1 (2) 3 4 5 6 7 8 9 10 J#1730

Total site acres: 250 Site Name: Sunroad Site Location: Otay Mesa

Time (24 hr)	Sky	Wind (Beaufort)	Temp F or C
Begin 1230	clear/ partcloudy/overcast/fog/drizzle/shower	<1 (1-3) 4-7 8-12 >12	70.4
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
End 1400	clear/ partcloudy/overcast/fog/drizzle/shower	<1 (1-3) 4-7 8-12 >12	±70

Total hours surveyed: 1.5

Focused Survey Acres: <40 Elev Min: 600 ft Max: 625 ft

Describe, map, and estimate areas surveyed below.

Host Plants[a]	Patch Size (ft^2)	No Plants/ft^2	Sparse/Dense[b]	Map ID[c]	
none					

a. Larval or nectar resources. Identify species. b. Sparse= plants not touching; dense = plants touching c. Corresponds to polygon on a map.

Surrounding land uses (including adjoining properties):

North vacant/prison Distance ~~ft./mile~~ → variable

South agriculture/industrial Distance ~~ft./mile~~ → "

East vacant/agriculture Distance ~~ft./mile~~ → "

West vacant/agriculture Distance ~~ft./mile~~ → variable

Habitat onsite (circle): open soils (hilltop) ridge Plantago Castilleja (soil crusts) (old roads)
nectar (clay soils) (rock outcrops)

Conditions: (e.g.,grazing (agriculture) sowbugs/earwigs recent fire grading)

Other: See field notes

Quino Checkerspot General Form

Survey type: Habitat Assessment/Adult Survey

Surveyor: RIGGAN Date: 03/19/99 (mm/dd/yyyy) Site Visit No: 1 2 3 4 5 6 7 8 9 10 #1730

Total site acres: 250 Site Name: Sunroad Site Location: Otay Mesa

Time (24 hr)	Sky	Wind (Beaufort)	Temp F or C
Begun 1400	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	74.6
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
End 1630	clear/ partcloudy/overcast/fog/drizzle/shower 2% cloud cover	<1 1-3 4-7 8-12 >12	<70

Total hours surveyed: 2.5

Focused Survey Acres: 40 plus Elev Min: 600ft Max: 625ft

→ see field notes

Describe, map, and estimate areas surveyed below.

Host Plants[a]	Patch Size (ft²)	No Plants/ft²	Sparse/Dense[b]	Map ID[c]	
none					

a. Larval or nectar resources. Identify species. b. Sparse= plants not touching; dense = plants touching c. Corresponds to polygon on a map.

Surrounding land uses (including adjoining properties):

North vacant / prison Distance ~~ft./mile~~ variable

South agriculture / industrial Distance ~~ft./mile~~ "

East vacant / agriculture Distance ~~ft./mile~~ "

West vacant / agriculture Distance ~~ft./mile~~ variable

Habitat onsite (circle): open soils hilltop ridge Plantago Castilleja soil crusts old roads nectar clay soils rock outcrops

Conditions: (e.g.,grazing agriculture sowbugs/earwigs recent fire grading)

Other: see field notes

Quino Checkerspot General Form Survey type: Habitat Assessment/Adult Survey

Surveyor: RIGGAN Date: 03/28/99 (mm/dd/yyyy) Site Visit No: 1 2 3 (4) 5 6 7 8 9 10 J#1730

Total site acres: 250 Site Name: Sunrood Site Location: Otay Mesa

Time (24 hr)	Sky	Wind (Beaufort)	Temp F or C
Begin 1230	(clear)/partcloudy/overcast/fog/drizzle/shower	<1 1-3 (4-7) 8-12 >12	74.6
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
End 1400	(clear)/partcloudy/overcast/fog/drizzle/shower	<1 1-3 (4-7) 8-12 >12	±78

Total hours surveyed: 1.5

Focused Survey Acres: <40 Elev Min: 600 ft Max: 625 ft

Describe, map, and estimate areas surveyed below.

Host Plants[a]	Patch Size (ft^2)	No Plants/ft^2	Sparse/Dense[b]	Map ID[c]	
none					

a. Larval or nectar resources. Identify species. b. Sparse= plants not touching; dense = plants touching c. Corresponds to polygon on a map.

Surrounding land uses (including adjoining properties):

North vacant / prison Distance ~~ft./mile~~ variable

South agriculture / industrial Distance ~~ft./mile~~ "

East vacant / agriculture Distance ~~ft./mile~~ "

West vacant / agriculture Distance ~~ft./mile~~ variable

Habitat onsite (circle): open soils (hilltop) ridge Plantago Castilleja (soil crusts) (old roads) nectar (clay soils) (rock outcrops)

Conditions: (e.g.,grazing (agriculture) sowbugs/earwigs recent fire grading)

Other: see field notes

Quino Checkerspot General Form Survey type: Habitat Assessment/Adult Survey

Surveyor: RIGG-AN Date: 04/04/99 (mm/dd/yyyy) Site Visit No: 1 2 3 4 (5) 6 7 8 9 10 J#1730

Total site acres: 250 Site Name: Sunroad Site Location: Otay Mesa

Time (24 hr)	Sky	Wind (Beaufort)	Temp F or C
Begin 1345	(clear)/partcloudy/overcast/fog/drizzle/shower	<1 (1-3 4)7 8-12 >12	69.9
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
End 1515	(clear)/partcloudy/overcast/fog/drizzle/shower	<1 1(3 4-7) 8-12 >12	66.1

Total hours surveyed: 1.5

Focused Survey Acres: <40 Elev Min: 600 ft Max: 625 ft

Describe, map, and estimate areas surveyed below.

Host Plants[a]	Patch Size (ft^2)	No Plants/ft^2	Sparse/Dense[b]	Map ID[c]	
none					

a. Larval or nectar resources. Identify species. b. Sparse= plants not touching; dense = plants touching c. Corresponds to polygon on a map.

Surrounding land uses (including adjoining properties):

North vacant / prison Distance ~~ft./mile~~ variable

South agriculture/industrial Distance ~~ft./mile~~ "

East vacant / agriculture Distance ~~ft./mile~~ "

West vacant / agriculture Distance ~~ft./mile~~ variable

Habitat onsite (circle): open soils hilltop ridge Plantago Castilleja soil crusts old roads

nectar clay soils rock outcrops

Conditions: (e.g.,grazing agriculture sowbugs/earwigs recent fire grading)

Other: see field notes

Quino Checkerspot General Form Survey type: Habitat Assessment/Adult Survey

Surveyor: RIGGAN Date: 04/10/99 (mm/dd/yyyy) Site Visit No: 1 2 3 4 5 6 7 8 9 10 J#1730

Total site acres: 250 Site Name: Sunrood Site Location: Otay Mesa

Time (24 hr)	Sky	Wind (Beaufort)	Temp F or C
Begin 1230	clear/partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	71.5
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	↓
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
	clear/ partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	
End 1345	clear/partcloudy/overcast/fog/drizzle/shower	<1 1-3 4-7 8-12 >12	±75

Total hours surveyed: 1.25

Focused Survey Acres: <40 Elev Min: 600ft Max: 625ft

Describe, map, and estimate areas surveyed below.

Host Plants[a]	Patch Size (ft^2)	No Plants/ft^2	Sparse/Dense[b]	Map ID[c]	
none					

a. Larval or nectar resources. Identify species. b. Sparse= plants not touching; dense = plants touching c. Corresponds to polygon on a map.

Surrounding land uses (including adjoining properties):

North vacant/prison Distance ~~ft./mile~~ variable

South agriculture/industrial Distance ~~ft./mile~~ "

East vacant/agriculture Distance ~~ft./mile~~ "

West vacant/agriculture Distance ~~ft./mile~~ variable

Habitat onsite (circle): open soils hilltop ridge Plantago Castilleja soil crusts old roads nectar clay soils rock outcrops

Conditions: (e.g.,grazing agriculture sowbugs/earwigs recent fire grading)

Other: see field notes