A PETITION TO THE UNITED STATES FISH AND WILDLIFE SERVICE

For action pursuant to Section 4 (b) of the Endangered Species Act, relating to listing endangered species of plants.

I. SPECIES BEING PETITIONED:

Common Name: Orcutt's Hazardia, Orcutt's goldenbush, Orcutt's bristleweed

Scientific Name: *Hazardia orcuttii* (Gray) Greene

II. RECOMMENED ACTION:

__x__ List
__x__ as Endangered

III. AUTHOR OF PETITION:

Name: [redacted]
Address:

Telephone Number: [redacted]

I hereby certify that, to the best of my knowledge, all statements made in this petition are true and complete.

Signature: [redacted]
Date: 3/8/01

1. Population Trends

Orcutt's hazardia is known from only a single population within the United States, located at Lux Canyon in Encinitas, California. Currently this population consists of about 350 individual plants. The exact number of individuals that occurred historically at this site is uncertain. About half the occurrence was previously destroyed in 1984 for a housing development. Approximately 300 plants were seen in 1988 according to the California Department of Fish and Game Natural Diversity Database. Thus it is likely that the population, when discovered, numbered around 700 individuals.

Reiser (1996) wrote that the one known U.S. population is slowly declining; a re-examination in 1989 showed substantial site degradation since he had last viewed the locale three years previously. Inhabitants from the newly built residences were said to be expanding footpaths for recreational use in the area. More recently, about 200 individuals were transplanted from private lands onto the Manchester Conservation Bank. About 65 percent of the transplanted individuals have died (Markus Spiegelberg, Center for Natural Lands Management, personal communication). The current population estimate of 350 individuals includes 70 individuals that have thus far survived transplantation.

Overall, the current status of Orcutt's hazardia in California and Baja California is one of decline.

2. Range and Distribution

The species is known from only one disjunct locality in the United States (Lux Canyon in Encinitas) with the rest of the distribution of the species being in northwest Baja California, Mexico. The Baja California distribution is along coastal plains and hills from Colonet to 1.5 kilometers south of the border near Tijuana (Clark 1979). The Encinitas population is a 60 kilometer disjunction. There has only ever been one United States occurrence known historically and there is still only one known occurrence in the United States. That population has been greatly reduced in number and aerial coverage. The species is a CNPS List 1B species (Skinner, 1994) meaning it is rare, threatened, or endangered in California and elsewhere. It has a RED Code of 3-3-2 meaning it is distributed in one to several highly restricted occurrences in California, it is endangered throughout California, and is rare outside of California. Plants are located at the edge of a residential development east of El Camino Real and south of Encinitas Boulevard at 33° 1' 55"/ 117° 15' 1". Natural Diversity Database lists only the one occurrence for the species. In its one U.S. location, it is at an elevation of 275 feet (80 m). The bulk of the remaining plants can be found at the end of Calle Ryan in Encinitas on what is currently known as the Manchester Preserve.

The San Diego Natural History Museum and Rancho Santa Ana Botanical Gardens have 19 records for *Hazardii orcuttii* (formerly *Happlopappus orcuttii*) representing 14 separate locations with 13 of those locations being in coastal Baja California. Section 10 of this petition contains a summary of herbarium occurrences and Section 11 of this petition includes maps of the distribution of Orcutt's hazardia. There are 5 recent collections of *Hazardii orcuttii* in the herbariums (1970-2000) and 8 older collections in

the herbariums (1929-1969). The species is uncommon in Baja California, Mexico but historically it could be locally common where it occured. Coastal northern Baja California, Mexico is undergoing rapid development and at least three of the historical reports for the species could not be relocated in recent surveys ([redacted] personal communication).

While the bulk of the United States plants are located within a preserve, the area is adjacent to a housing development and is heavily used. Fragmentation is worsening as additional development occurs in the remaining limited distribution of the species. Trails are expanding in the habitat both in number and width. A large amount of organic matter is being added to the population in the form of dog urine and feces. Native plants growing in xeric habitats are usually not adapted to growing in elevated nitrogen levels. Invasive weeds frequently are favored with added nitrogen. The plants moved this past year out of native habitat in the northern part of the distribution were relocated with a plantation style planting in a highly disturbed area of the preserve instead of being scattered in a matrix of native species. It is unclear if plants will survive long-term in their exposed transplant location. There are chunks of asphalt adjacent to some of the transplanted plants and dumped concrete below one of the naturally occurring plants suggesting the area is subject to continued human disturbance. Plants are distributed in various scattered locations on the mesa top and down the slopes.

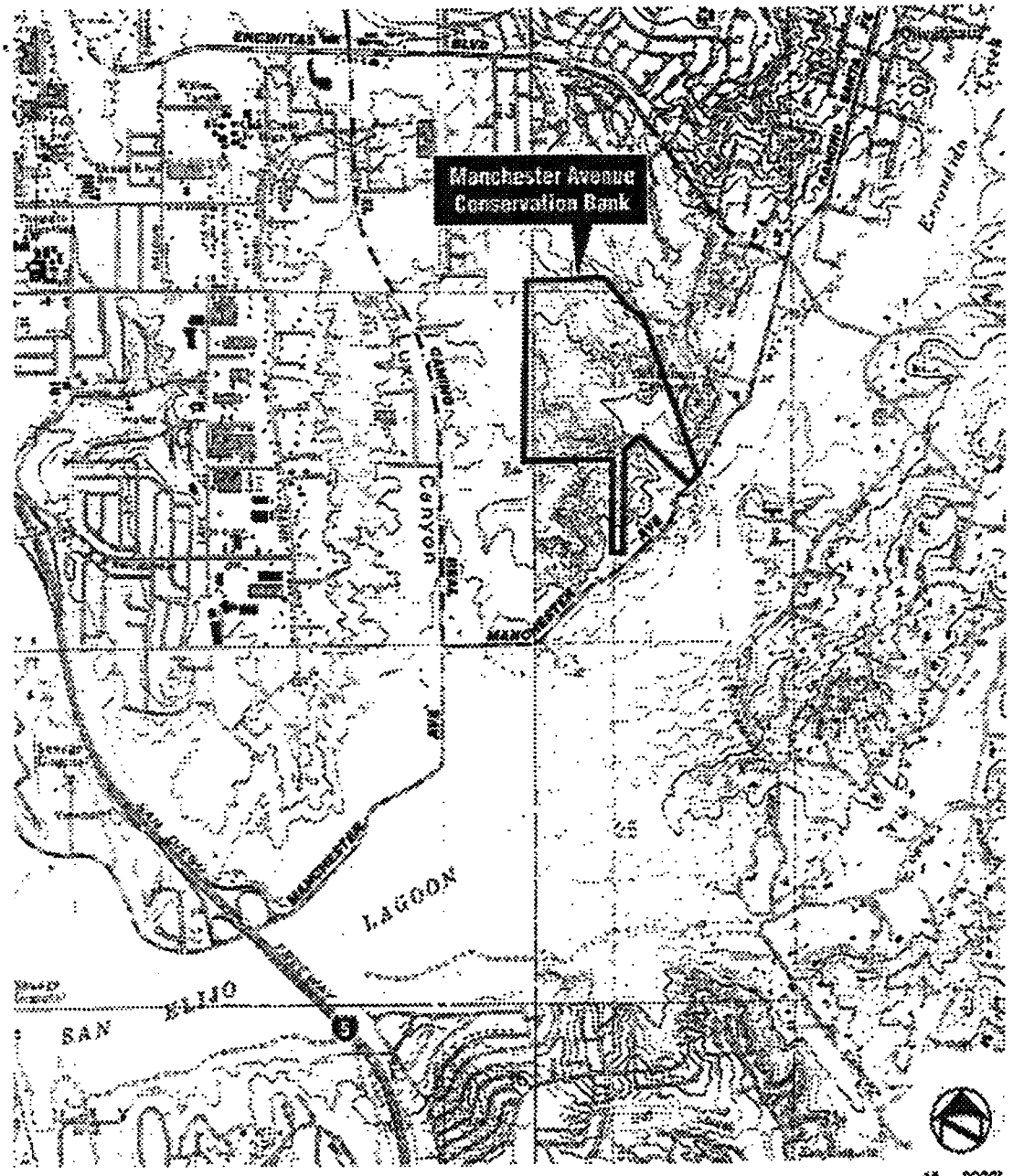
Despite the posting of the preserve status at the entrance to the preserve, the City of Encinitas Fire Department used the area for brush clearance training this past season impacting a number of robust plants in one of the denser *Hazardia* areas.

3. Abundance

Markus Spiegelberg of the Center For Land Management has documented 350 plants this year for the United States population. This number includes approximately 70 surviving transplanted shrubs out of a total of 200 transplanted shrubs. It is unknown how many plants remain outside of the Manchester Preserve. The area with the densest historical numbers of the species was developed for the Spyglass development. Based upon those observations, it is likely there were as many as 700 plants historically although no documentation on actual historic numbers has been located.

4. Life History

Orcutt's hazardia is a member of the Asteraceae. It is a yellow-flowered perennial evergreen shrub that blooms from August to October. *Hazardia orcuttii* (Orcutt's hazardia) was originally described as *Haplopappus orcuttii* in 1885 by Asa Gray from a collection taken from All Saints Bay (Bahia de Todos Santos near Ensenada), Baja California, Mexico, on 22 September 1884 (Clark 1979). E. Greene transferred *H. orcuttii* to the genus *Haplopappus* as *Haplopappus orcuttii* in 1894. In a monograph, H.M. Hall (1928), treated *Hazardia* as a subgenus within the much broader genus *Haplopappus*. California and Baja California floras, including Abrams and Ferris (1960), Munz (1973), and Wiggins (1980) have followed Hall's treatment. Dennis Clark (1979) recognized *Hazardia* as a full genus based on distinctive floral, genetic, and chemical differences. The concept of *Hazardia orcuttii* has been recognized in all recent taxonomic



SOURCE: USGS 7.5 Minute Series, Encinitas & Rancho Santa Fe Quadrangles

1" = 2000'

treatments (Beauchamp 1986, Brown and Clark 1993). Lane and Hartman (1996) noted that *Hazardia* grow in xeric habitats.

Orcutt's hazardia is a resinous shrub, 5-10 dm tall, with open woody branches that are leafy throughout. The leaves are sessile and somewhat clasping. The coriaceous (leathery) leaves are spatulate-lanceaolate (slightly spoon-shaped) to narrowly obovate and 20-50 mm long and 3 to 15 mm wide. The leaves are resinous-punctate, glabrous, and have margins that are entire or rarely few-toothed below. The midrib is prominent while lateral veins are inconspicuous. The flowers are in racemose or paniculate capitulescences from 5 to 15 cm (or occasionally up to 50 cm) in length, the peduncles reduced or absent. The involucres are turbinate and shorter than disk, 7 to 10 mm high, 4 to 6 mm wide exclusive of the squarrose tips; the bracts 30 to 40 in several series, linear, acute to obtuse, light green, with a resinous glandular-dotted apex, 4 to 6 mm long, to 1 mm wide, the margins scarious. The flower heads are radiate (with both ray and disc flowers as opposed to disc flowers alone). The ray flowers number 10 to 20, fertile, yellow, and glabrous. The corolla slightly amplicate from the middle, 5 to 7 mm long, the lobes broadly acute, to 0.8 mm long. The ray and disk achenes (fruits) are similar, or those of rays slightly shorter, subcylindric but tapering slightly to the base, faintly ribbed, 3 to 4.5 mm long, to 1 mm wide, sparsely ascending-strigose. Pappus of 20 to 30 scabrous, brownish bristles, 4 to 5 mm long (Clark 1979; Brown and Clark 1993). Chromosome number, n = 5 (fide R.C. Jackson on label of Moran 12440).

Hazardia orcuttii is one of two species of *Hazardia* growing in San Diego County (Beauchamp 1985). *H. orcuttii* is distinguished from the more widespread *Hazardia squarrosa* by having smaller radiate (with ray flowers) heads as opposed to larger discoid (lacking ray flowers) heads of *H. squarrosa*. *H. squarrosa* generally has leaves that are serrate to sharply dentate as opposed to generally entire (without serrations or teeth) in *H. orcuttii* (Clark 1979).

Taxonomy with closely related Asteraceae has most recently been based upon pollen morphology, flavonoid chemistry, chromosome number, and morphological cladistics. Lane and Hartman (1996) used *Hazardia* as the outgroup for analysis of *Grindelia*, *Isocoma*, *Olivaea*, *Prionopsis*, *Rayjacksonia*, *Stephanodoria*, and *Xanthocephalum*, species formerly lumped as *Happlopappus*, based on morphological differences. Clark and Mabry (1977) examined the flavonoids in 13 species of *Hazardia* and found that *H. orcuttii* was consistent with other members of *Hazardia*. *H. orcuttii* was shown to have glycosyl flavonoids based on apigenin (8-*C*-gly, 7-*O*-diglc, 6,8-*C*-digly, 6,8-*C*-digly), kaempferol (3-*O*-gln, 3-*O*-gal, 3-*O*-rhaglc), isorhamnetin (3-*O*-gal), quercetin (3-*O*-rhaglc), and two unidentified flavonol methyl esters. The flavonoid composition fit with *H. orcuttii* being in the Subsection Hazardia as opposed to Subsections Bracteofolia or Machaerantheroides.

Reiser (1994) describes the species as growing in open chaparral with chamise on loamy alluvial land of the Huerhuero complex. He states Diegan sage scrub is found on the periphery of this localized population. Wier (NDDB) describes the species as growing in mixed coast chaparral on the edge of a grassland. He lists associated species as being

Acanthomintha ilicifolia (San Diego thornmint), *Adolphia californica* (California adolphia), *Adenostoma fasciculatum* (Chamise), *Rhus integrifolia* (Lemonadeberry), and *Mimulus puniceus* (Coast monkeyflower). The NDDB lists the general habitat as chaparral and coastal scrub. The microhabitat is listed as often clay soils in grassy edges of chaparral and coastal scrub. On the Manchester Preserve, Orcutt's hazardia is growing in a disturbed setting, in a coastal sage scrub matrix (*Artemisia californica, Eriogonum fasciculatum, Rhus integrifolia, Opuntia prolifera,* and *Ferocactus viridescens*), in mixed chaparral (*Adenostoma fasciculatum, Mimulus auranticus, Xylococcus bicolor*, and *Quercus dumosa*), and in grasslands (*Nasella pulchra, Acanthomintha ilicifolia, Grindelia* sp., and *Hemizonia fasciculata*).

Clark (1979) lists associates in Baja California populations as being *Agave, Artemisia, Simmondsia, Opuntia,* and *Rhus*. Reid Moran listed Baja California, Mexico associated species at Punta Banda as being *Agave shawii, Artemisia californica, Viguiera laciniata, Rhus integrifolia, Simmondsia, Euphorbia misera,* and *Opuntia prolifera*. Terry Spohn listed the La Joya associated species as *Eriogonum fasciculatum* and *Artemisia californica.*

In Mexico, *Hazardia orcuttii* hybridizes with *Hazardia ferrisiae* and *Hazardia berberidis*. Neither of these species reaches the United States and hybrids with *H. squarrosa* have not been reported.

Quail Botanical Gardens has collected seed from the Lux Canyon population for long-term storage and for establishment of plants in Quail Botanical Garden. Only a fraction of the seed collected germinated (Phillips 2000) and the Garden currently has 3 individuals. Plants appear to generate readily in cultivation from cuttings (Dylan Hannon, Rancho Santa Ana Botanic Garden, personal communication). Plants from Lux Canyon are currently being propagated at Rancho Santa Ana Botanic Gardens.

5. Kind of Habitat Necessary for Survival

Hazardia orcuttii grows on coastal slopes and mesas but not on the immediate coast in bluff scrub areas. It appears to grow equally well in maritime chaparral and coastal sage scrub on mesas and north, south, and west slopes based on its Mexican distribution. It occurs at elevations below 200 meters.

Orcutt's hazardia appears to require shrubby habitat in relatively frost-free coastal environments. Although its soils requirements have not been studied, it is likely that the majority of its known localities are at least weakly correlated with some form of clay soil.

It has been suggested that the species occurs in areas currently more subject to disturbance at the Manchester Mitigation Bank. It is unknown if there is a relationship between plant density and prior disturbance. The area has numerous trails and plants do seem to be abundant adjacent to the trails whereas they are less common in the denser vegetation. The Encinitas Fire Department has regularly cleared at the Calle Ryan entrance to the area and plant density is high in that area.

6. Factors Affecting Ability to Survive and Reproduce

The largest factor affecting the species is continued development of the habitat supporting the species. Because of the greatly restricted distribution of the species in California, additional development is expected to contribute significantly to the decline of this species. Orcutt's hazardia is found in the United States in a narrow distribution along the slopes and ridges between Manchester Avenue and Encinitas Boulevard. Due to its limited U.S. range, any significant modification or destruction of habitat could result in serious decline within this population. About half of the population as originally identified was lost to development in1984.

The remaining U.S. population occurs within a private land holding owned by Ted Chang and within the Manchester Conservation Area. The habitat within private land is not protected. While there is no current specific plans to develop this property, Mr. Chang has indicated he would like to develop the property. In the meantime, the habitat has been modified adjacent to structures and Manchester Road for purposes of fuel modification and weed abatement. Additionally, the habitat has been locally modified by the extraction of specific shrubs which has resulted in trampling and thinning of the vegetation. While perhaps well intentioned, transplantation of the species as if it were a crop by people only experienced with landscape plants threatens the ability of the species to reproduce and survive. Transplantation of rare plants has generally been recognized as a potentially risky and experimental method of conservation. To succeed, transplantation requires identification of a suitable reception site based on soils, associated species, and aspect in combination with careful removal of individuals or cuttings at optimal season for the transplantation. Adequate long-term monitoring is need in order to react to failure or adjust for unforeseen circumstances.

In early 2000, a significant number of individuals of Orcutt's hazardia were transplanted without coordination or local land managers, State Agencies, botanists with experience in transplantation of native shrubs in wild conditions, or with any plan or oversight. Currently 65 percent of this transplantation effort has already failed which is contributing to a sharp decline in the Encinitas population. Because the species is not listed, the City of Encinitas is able to claim that they have no regulatory power to prevent the less than optimal transplantations.

Seed viability may be problematic as suggested by low germination of seed collected by Quail Botanical Garden personnel (Phillips, 2000). The population is small and getting smaller. This may be impacting sexual reproduction for the species. Alternative explanations for the lack of seed germination might be: seed production is variable and dependent on sufficient moisture during the year, a critical pollinator is absent from the site due to the fragmentation, there is a soil requirement that is not understood for the species, or that mature seed development must occur on the plant and seeds were harvested too early. Research on this topic would be helpful to understand the species limitations.

There are a series of issues associated with long term viability and encroaching urbanization. Fire at the site is much more likely with adjacent residences. It is unknown if the species is fire adapted and could readily recover from a fire event. The aerial extent of the population has been reduced such that a small fire event could eliminate the species if it is not adapted for fire.

Trails are proliferating in the area from increased usage of the area by local residents. Plants were seen on the edge of some of those trails and it is unknown if plants have already been eliminated by expanded trails. More houses will only intensify the problem. Increased nitrogen introduced by the numerous dogs that utilize the area can be detrimental to the plants directly if they are not able to utilize the nitrogen and indirectly as the increased nitrogen usually results in increased weed problems. Although the area is largely weed free, Tumbleweed (*Salsola tragus*) and Tocalote (*Centaurea melitensis*) were identified on the site. Not having a historical perspective on the area, it is difficult to know if the asphalt and concrete were from old dumping episodes or newer occurrences since the housing was added to the area. Signs are posted on the wood barriers at the end of Calle Ryan asking people to report off-road vehicle activity and other illegal trespass issues.

Development is also the greatest threat to Orcutt's hazardia in Baja California, Mexico. Coastal areas are rapidly being converted into resort areas for tourists down the length of Baja California but most heavily in the northern reaches of the peninsula that are easily accessed by American tourists.

7. Degree and Immediacy of Threat

In the U.S., the species grows on property owned by [redacted] wishes to develop his property and had previously transplanted part of the plants on his property during the winter season to an area that will be preserved (the Manchester Conservation Area currently managed by the Center for Natural Lands Management). Earlier this year, there were reports of additional plant removal by a landscape company not familiar with the species during the early summer period when annual vegetation was dry. A total of approximately 200 plants have been transplanted with 70 surviving at this point in time. Given that the personnel were not familiar with the species and did not consult with Center for Natural Lands Management personnel, they chose to locate plants in very exposed locations and there was significant loss of plants. A Mr.Gary Barbarios with the City of Encinitas Planning Department reported there was nothing he could do about the plant removal since the species is not listed. There appears to be 65% lethality in the recently moved transplantations and the dry season is not over. Since only 350 plants had ever been reported for the total distribution of the species in the United States (although the number of shrubs was likely an underestimate based on the current count and documented losses), loss of the transplants due to lack of an adequate plan is significant. This species has no federal or state protection.

Hazardia orcuttii is designated as List 1B under the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Vascular Plants of California* (Skinner and Pavlik 1994). List 1B plants are highly vulnerable to extinction, or in the case of this

species, extirpation from the United States. All plants listed under CNPS List 1B meet the definitions of Section 1901, Chapter 10 of the Native Plant Protective Act or Sections 2062 and 2067 of the California Endangered Species Act and thus impacts to these plants are considered significant under the California Environmental Quality Act (CEQA).

CEQA gives the lead agencies, such as the City of Encinitas, direct authority to approve development and associated project mitigation measures. However, in the case of Lux Canyon, there is no specific project proposed and thus the roll the City of Encinitas plays in oversight of the current transplantation project is less clear. Listing Orcutt's hazardia by CDFG under the California Endangered Species Act would afford this species additional protection through prohibitions on "take" and require individuals to obtain a Management Agreement with CDFG to possess or harm the species.

8. Impact of Existing Management Efforts

The Center for Natural Lands Management had no input into the transplantation site on the Manchester Conservation Area and is concerned about its exposed nature. They have fenced the site with low chain link fencing. The Manchester Preserve was setup as mitigation for the Spyglass development and also sold credits to other landowners. The bank was initially set up in 1996. The Center for Natural Lands Management started management in the summer of 1999. A preserve manager, Markus Spiegelberg, was hired in the winter of 1999 and has started assessing management needs. Mr. Spiegelberg has had fencing constructed at the site to keep people and dogs in the adjacent housing development from trampling the plants. Plants not within the Conservation Area apparently have no protection from City of Encinitas regulations. [redacted] is expected to propose a development in part of the remaining habitat of the species.

The Multiple Habitat Conservation Program (MHCP) is an California Natural Community Conservation Planning (NCCP) effort in addition to a Federal Habitat Conservation Plan (HCP) that includes lands in the City of Encinitas. The MHCP has yet to undergo public comment and is expected to go out for public review in November of this year. Under the current plan, Orcutt's hazardii is a covered species with additional take permitted. No surveying was performed for the majority of lands with the program. If the species were to occur on the slopes west of El Camino Real, it is likely that the species could be protected in that area as the land is identified for 95% conservation. Although the area is identified as 95% preserved, its actual protection level is not guaranteed as the properties are largely subdivided into small parcels with different ownerships and lands would require purchase to ensure protection. It is not clear that the species receives adequate protection for lands east of El Camino Real.

Cuttings from this population are currently being grown at both Rancho Santa Ana Botanic Gardens in Claremont and Quail Botanical Gardens in Encinitas. The Center for Natural Lands Management intends to introduce plants raised at Quail Botanical Gardens into additional areas in the Conservation Area as the current total area occupied by the species is very small and subject to extirpation with a single fire event.

9. Suggestions for Future Management

Markus Spiegelberg of the Center for Natural Lands Management is working with Recon, a local Biological Consulting firm, to start an offsite population at a nearby restoration site. This seems a prudent action given that a small fire or other event could readily eliminate the species in the United States given its current distribution. Susan Welker, a San Diego County Ranger at San Elijo Lagoon that is downstream from the site that supports Orcutt's hazardia, has suggested she has a suitable location for establishing an additional population.

An educational program is needed for the communities surrounding the remaining plants and strict enforcement of feces removal is needed. The area should be closed to uncontrolled access if behavioral changes do not occur by the surrounding neighbors. A weed control plan is needed to ensure the few invasive species in the area are eliminated. Russian thistle and Tocalote were seen at the site in a September visit.

A thorough survey for the species is needed of both public and private habitat in remaining coastal areas of the City of Encinitas. It is unclear if there is a soil specificity of the species or if it formerly occupied additional areas that have been developed in the past. Sandstone is abundant at the site but there is also a clay overlay on at least part of the site as demonstrated by the presence of San Diego thornmint. Coastal mesas were some of the first areas heavily developed in San Diego County and that early development may account for the disjunct distribution of the species. Clay soils have been identified west of El Camino Real although no one has reported *Hazardii orcuttii* on that side of the road.

Additional research examining the requirements of the species would be helpful.

10. Availability and Sources of Information

Hazardia orcuttii A. Gray
collections at Rancho Santa Ana and the San Diego Natural History Museum
August 28, 2000 and August 30, 2000

SAN DIEGO COUNTY, CALIFORNIA

[Encinitas]: ca. 1mi S Encintas Blvd., east of El Camino Real, at site of Heritage Park Development, 33° 03'N, 117°15'W; at edge of grassy field. Tom Oberbauer 188, 25 Aug 1979. RSA 283757, SD 103905.

Encinitas: east of El Camino Real, north of Manchester, 33° 03'N, 117° 13.5'W; growing in coastal sage scrub. Tom Oberbauer s.n., 9 May 1979. SD 102751.

Encinitas: along El Camino Real, 0.75mi N Manchester; growing in chaparral on sandstone. R.M. Beauchamp & A. Hilmi s.n., 15 Aug 1983. RSA 592633.

BAJA CALIFORNIA, MEXICO

Playas de Tijuana: 1mi from U.S. border, 32° 32' N, 117° 07' W. elev. 10m; in undisturbed areas. Reid Moran 18541, 25 Sep 1971. RSA 231265, SD 80213.

Coronado Islands: Ralph Sumner s.n., 1920. SD 5248. Reid Moran has a note attached to this specimen stating: *"The locality of this collection seems extremely doubtful: (1) I have visited the islands many times. I have never seen this plant; (2) ALthough Sumner worked here and his specimens should be here, I have found no other of his specimens labeled as from the Coronado Islands in 1920. R.M. 1976."*

La Joya: 32° 29'N, 117° 06'W, elev. 75m; with *Artemisia californica* and *Eriogonum fasciculatum* on north slope. Reid Moran & Terry Spohn 25207, 4 Nov 1977. SD 98811.

La Joya: about 4mi below U.S. border, 32° 29' N, 117° 06' W; on coastal hills. Reid Moran 15243, 4 Jul 1968. RSA 207286, SD 68038.

Jatay: 32° 01'N, 116° 51'W, elev. 50m; on coastal mesa. Reid Moran 14634, 28 Oct 1967. RSA 207237, SD 67364.

1mi S Rio Guadalupe, about 28mi N Ensenada. Wiggins & Gillespe 3915, 8 Sep 1929. POM 196895.

Just below La Salina, about 45mi S Tijuana; grows on gently sloping soil in first valley back from the sea. Soil mixed loam and gravel. Grows with Eriogonum fasciculatum and dwarf form of Artemisia californica to form a low, very open chaparral. H.M. Hall 12252, 2 Oct 1926. POM 194774.

San Miguel, 2mi W Sauzel, 31° 54'N, 116° 44'W, elev. 50m on south and west slopes. Reid Moran 13544, 10 Sep 1966. RSA 193447, SD 63559.

Ensenada: alt. 50ft; region of type locality. Lewis S. Rose 58128, 21 Aug 1958. RSA 118770.

Punta Banda: flat top, 3.5 road miles W La Joya, 31° 43.5'N 116° 42.5'W, alt. 200m; with *Agavii shawii, Artemisia californica, Viguera laciniata, Rhus integrifolia, Simmondsia, Euphorbia misera,* and *Opuntia prolifera.* Chromosomes: n=5 fide C. Jackson. Reid Moran 13440, 27 Aug 1966. RSA 193450, 359696. [Note: a second collection

with same number at SD is described as approaching "H. berberidis" and has some teeth on the lves. See below]

Punta Banda: Todos Santos Bay, 5m; mesa above lagoon. F.R. Fosberg 55778, 7 Sep 1931. RSA 359699.
other collections: F.R. Fosberg 55701, 7 Sep 1931. RSA 359697.

Punta Banda: Todos Santos Bay, alt. 30m; mesa. F.R. Fosberg 55733, 6 Sep 1931. RSA 359698.

4km [4km?] SE Maneandero, 31°42' N, 116° 31'W, elev. 50ft; on gentle south slope. Reid Moran 14515, 2 Sep 1967. RSA 193600, SD 64881.

5km SE Maneandero, 31° 41.5' N, 116° 32'W, elev. 100m; along dry shallow arroyo. Reid Moran 26310, 21 Sep 1978. SD 101056.

Arroyo north of Punta San Jose. 31°N 28.5' N, 116° 35.5' W, elev. 50m. Reid Moran & Jack Reveal 22535, 5 Jul 1975. SD 91836.

1.5mi N Arroyo Salado and c.a. 1mi inland, 31° 07'N, 116° 17'W, elev. 50m; on mesa. Reid Moran 14066, 16 Jul 1967. RSA 14066, SD 65784.

W of Colonet: Arroyo, c.a. 1mi west; east of Colonet Mesa, 30° 59.5'N, 116° 17'W, ALT. 40M; coastal sage scrub. Robert F. Thorne, Rolf Dahlgren, Steve Boyd, & Dave Charlton 60770, 19 Jun 1985. RSA 342986.

Approaching *Hazardia berberidis* (A. Gray) E. Greene

Punta Banda: flat top, 3.5 road miles W La Joya, 31° 43.5'N 116° 42.5'W, alt. 200m. Reid Moran 13442, 27 Aug 1966. SD 63511.

Punta Banda: flat top, 3.5 road miles W La Joya, 31° 43.5'N 116° 42.5'W, alt. 200m; locally common with *Agavii shawii, Artemisia californica, Viguera laciniata, Rhus integrifolia, Simmondsia, Euphorbia misera,* and *Opuntia prolifera.* Chromosomes: n=5 fide C. Jackson. Reid Moran 13440, 27 Aug 1966. SD 63529.

Hazardia orcuttii x *H. berberidis* (A. Gray) E. Greene

Ensenada: alt. 20ft; coastal fields. Lewis S. Rose 60078, 22 Aug 1960. RSA 155642.

Punta Banda: flat top, 3.5 road miles west of La Joya, 31° 43.5'N, 116° 42.5'W, elev. 200m; occasional with *H. orcuttii* and *H. berberidis* seen within 1 mile. Reid Moran 13441, 27 Aug 1966. RSA 193453, SD 63524.

4mi SE Maneandero, 31°42' N, 116° 31'W, elev. 50ft; only one seen on gentle south slope with H. orcuttii. Reid Moran 14516, 2 Sep 1967. SD 64880.

Hazardia orcuttii x *H. ferrisiae*

1.5mi N Arroyo Salado and c.a. 1mi inland, 31° 07'N, 116° 17'W, elev. 50m; occasional with parental species on mesa. Reid Moran 14067, 16 Jul 1967. SD 65790.

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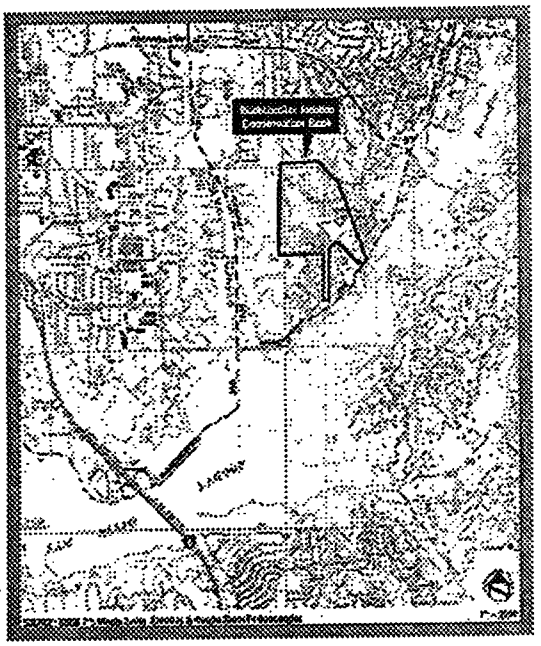
Center For Natural Lands Management

Manchester Mitigation Bank



Physical Description: The Manchester Mitigation Bank is located in the southwestern portion of the city of Encinitas, San Diego County. The 123 acre parcel is 1 mile east of Interstate 5, east of El Camino Real and north of Manchester Avenue. The reserve has a varied topography, ranging from a gently sloping canyon bottom to extremely steep canyon walls. Elevations are from 40 to 275 above sea level.

Conservation Purpose: This site has been protected to be used as a mitigation bank, selling credits to surrounding developers to mitigate for habitat loss resulting from their projects. Although small, it is a biologically rich site representative of the high diversity of coastal San Diego County's natural habitats.

Habitat Types: Over 80% of this reserve is covered in two native habitat types, diegan sage scrub and southern maritime chaparral. Several threatened or endangered species occur on this site including the San Diego thorn-mint, Acanthomintha ilicifolia, Del Mar manzanita, Arctostaphylos glandulosa var crassifolia, Del Mar sand aster, Lessingia filaginifolia var linifolia, and the California gnatcatcher, Polioptila californica.

Research Projects: The focus of management here is the control of exotic species. This site is in a highly urban-suburban setting. The questions here focus on whether or not the conserved natural communities and species can persist, or for how long, and what management measures are required to reduce their risk of extirpation.

Formation and History: Tech-Bilt, Inc. proposed to establish the Manchester Mitigation Bank in 1996. The Center for Natural Management was selected to both own and manage the reserve in perpetuity.

Volunteer Opportunities: The Manchester reserve has hiking trails. There are opportunities for nearby residents to act as volunteer patrollers, help with trail maintenance and to alert CNLM staff of any issues that arise with regard to this site.

Manager: The Manchester Mitigation Bank's habitat management is under the direction and supervision of CNLM's Southern California Regional Director, Cameron Barrows.