

Endangered Plant Program

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**SURVEYS AND ASSESSMENT OF KNOWN
ACANTHOMINTHA ILICIFOLIA POPULATIONS**

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ABSTRACT

We surveyed 20 sites (Element Occurrences) of *Acanthomintha ilicifolia* (San Diego thornmint) in the spring and early summer of 1994. These sites were on public, protected private land or unprotected private land. The majority of the sites were on public land. Four of the sites were small, artificial populations that had been established as mitigation for loss of natural populations.

Acanthomintha is a small, annual herb of very restricted distribution. It is an endangered species in California and is endemic to San Diego County and northwestern Baja California, Mexico. *Acanthomintha* is found on widely scattered, discrete patches—often extensive—of clayey soils that retain moisture. It usually occurs on gentle slopes of less than 20°, and frequently slopes less than 15°. The direction of the slopes varies, but many of the populations we surveyed face south or southwest. Common native associates were *Calochortus concolor* and *C. splendens*; the grass, *Stipa pulchra*; *Apiastrum angustifolium*; *Calycadenia tenella*; *Corethrogyne filaginifolia* var. *virgata*; *Chorizanthe fimbriata* var. *fimbriata*; *Hemizonia fasciculata*; and *Harpagonella palmeri*. Shrubby species often in association were *Adenostoma fasciculatum*, *Eriogonum fasciculatum*, *Heteromeles arbutifolia*, *Malosma laurina*, *Rhamnus crocea*, *Yucca whipplei*, various *Rhus* species and various *Salvia* species.

The exotics that were usually found, often at high density, with *Acanthomintha* were the grasses *Avena* (several species), *Bromus mollis* and *B. rubens*; thistles such as *Centaurea melitensis* and *Cirsium vulgare*; and the annual herbs, *Anagallis arvensis*, *Brassica nigra*, *Hypochoeris glabra* and *Sonchus oleraceus*.

Acanthomintha populations are dense and stable on the larger sites such as those near or on Viejas Mountain (US Forest Service land), McGinty Mountain (The Nature Conservancy, California Department of Fish and Game, and County of San Diego), and Sycamore Canyon (County of San Diego/California Department of Fish and Game). Smaller populations on public land such as those in Penasquitos Canyon Regional Park and Mission Trails Regional Park are subject to various forms of disturbance such as trails, erosion and dense growth of non-native weedy plants. The population at Penasquitos is notable for the wide year-to-year fluctuation in number of flowering plants. Three of the four artificial populations that we examined are doing very poorly. Intense management efforts will be necessary for these populations to survive.

One artificial population is thriving, but it is at risk because of the closeness of residential development and the potential for disturbance that such closeness brings.

Our conclusion is that *Acanthomintha* populations are most robust in the areas with the least disturbance, and that they are particularly sensitive to the presence of dense stands of annual exotics. These exotic plants appear to compete successfully for light, and probably soil moisture as well. The effects of drought may be felt through mortality of the current year's plants, reduced fecundity that is revealed in a small population in the subsequent year or years, and differential impacts on exotics and *Acanthomintha*. We found suggestions of all three processes at work, but additional detailed studies will be necessary to understand the contribution of each to the population dynamics of this species.

CHAPTER 1. INTRODUCTION and OBJECTIVES

Acanthomintha ilicifolia (San Diego thornmint) is a small herbaceous mint, endemic to San Diego County and northwestern Baja California, Mexico. It is Endangered in the State of California. The Center for Plant Conservation in cooperation with the California Department of Fish and Game has identified San Diego thornmint as a regional priority for protection. It is one of the most restricted clay soil endemics (Oberbauer 1991). Because of the patchy nature of suitable clay soils, the populations of *Acanthomintha* are likewise patchily distributed over a wide area.

At an endangered species recovery workshop held in San Diego in January 1993, the participants identified 52 Element Occurrences (EO's) of *Acanthomintha*, with 20 of those believed to be extirpated and only 12 protected by public or private agencies. In 1993, the California Department of Fish and Game indicated that of the presumed extant populations, only 16 were rated as "excellent" or "good". Identified as major threats to the species were development, roads and trails, competition from exotics and various other forms of disturbance. Biologists familiar with the species believe that competition from exotics may be an especially potent threat (Taylor 1994). Because *Acanthomintha* blooms and sets seed late in the growing season, it would be adversely affected by plants that diminish soil moisture early in the season, and this would be especially true in a drier than average year or series of dry years.

The purpose of this survey was to visit as many of the known occurrences of *Acanthomintha ilicifolia* as was possible and to assess their status following an extended series of dry years. We visited occurrences that are found on public land or private lands which permitted us access, such as those held by non-profit groups or in designated open spaces, and on private property where we had secured permission. A total of 20 EO's were visited, with four of them being artificially established populations.

At each site our goal was to assess the quality of the habitat, especially in terms of disturbance and defensibility; estimate the population size of *Acanthomintha*; identify both native and exotics in association with thornmint; and record, both on data sheets and photographically, various attributes of the site. We also mapped the populations if our observations indicated that plants occurred where they had not been found before or that there had been mapping errors in the past.

CHAPTER 2. METHODS

2.1. GENERAL

This survey was conducted entirely during the late spring and summer of 1994. At the time the survey was made, 37 extant Element Occurrences (EO) for *Acanthomintha ilicifolia* were on record with the Natural Diversity Data Base (NDDDB), Natural Heritage Division of the California Department of Fish and Game. Of these 37 EO's, five were artificially established populations. Ms Diane Steeck, Drought Coordinator for The Nature Conservancy, sent letters to every private property owner of record requesting permission for us to survey the *Acanthomintha* EO on their land. Of the 37 letters sent (in relation to 23 EO's), 10 letters were returned because of out-of-date or inadequate addresses. Seven replies were received, and permission was granted to visit three properties (EO's 17, 25 and 41). One additional property owner would grant permission only with the payment of a fee, two property owners requested more detailed information on location and one no longer owned the site in question. We visited occurrences that are located on public land or private lands which permitted us access, such as those held by non-profit groups or in designated open spaces, and the two of the three privately owned EO's for which permission was given. We did not visit EO 17 because we had already surveyed other EO's in the area before we received permission, and a return trip to the area was not possible. A total of 20 EO's were visited, or 50% (16 of 32) of the extant natural EO's and 80% (4 out of 5) of the artificial EO's.

The NDDDB supplied us with maps and past field survey forms. We only mapped the sites if we found that an EO had been incorrectly mapped in the past or if we found additional patches of *Acanthomintha*.

References cited in the Site Narratives (Chapter 4) are made to material contained in the NDDDB records.

2.2. FIELD SURVEY FORM

We used past survey sheets and the NDDDB records as a guide and tried to maintain consistency, where possible. This meant, for example, that we did not always use the most current nomenclature. Each bold heading below corresponds to an entry on the Field Survey

Form, and the text that follows explains our decision rules for making entries into each blank. Forms printed in Appendix A are edited versions of the original Field Survey Forms. Changes were made only for purposes of clarification or consistency.

Population location:

A common name was used for the site if there was a common name that appeared to be used frequently in past surveys and in the California Natural Diversity Data Base (NDDDB) records.

Element Occurrence:

The element occurrence number, as assigned by NDDDB, was never changed for this study.

Subpopulation:

Subpopulations were more or less discrete habitat patches within an element occurrence. Some past subpopulations were lumped in our treatment, primarily when the habitat seemed continuous and the discreteness appeared to be a function of population fluctuations rather than discontinuity of habitat. The subpopulations were always designated using letters, even if the past surveys used numbers or other means of recognition. All subpopulations are shown on the maps.

Estimated number of plants:

Accurate counts were made up to about 100 plants. Above that number, density calculations were done for a small area and the population numbers were estimated based on density and the area of the site.

Estimated area of population:

The area of populations or subpopulations was estimated by pacing off the distance of the diameter or side, if the site was circular or square. If the site was neither circular nor square, then the lengths of the long and short axes were estimated.

Size of plants:

Meter sticks were used to measure a subset of the population for percentages in the size categories. On the raw field data sheets, the last category was misprinted "greater than 10 cm". This is corrected to "greater than 15 cm" on the final data sheets contained within the report (Appendix A).

Phenology:

Phenology was estimated using the whole population, if it was small, or a subset that was extrapolated to the whole population, if it was large.

Slope Direction:

Slope angle was measured with an inclinometer and the compass direction was noted. All slopes are given as positive and the slope compass direction is the direction towards which the slope was dropping. The investigator stood at the uphill side of the slope and made a compass reading on the down hill side of the slope. If the site was at a crest between two slopes going in opposite directions, or was found in an area that had a dramatically variable slope, then two slope directions were taken to further define the site.

Extent of Exotics:

To characterize the extent of exotics at any given site, we estimated cover of exotics as either greater than or less than fifty percent.

Dominant Exotics:

The dominant exotics listed were the three dominant exotics, regardless of the percent of exotics at a site. They are listed on the Field Survey Forms in order of greatest numbers to fewest numbers.

Surrounding Plant Communities:

We assigned the sites to plant communities based on the indicator species we found, using the nomenclature of Munz (1974).

Other Rare Species:

Any other sensitive species found on the site at time of the survey were noted. To capture *Acanthomintha* at the peak of its bloom season, we surveyed after (May/June) many other herbaceous species bloom.

Disturbance:

Disturbance was rated as none, low, medium, and high. Sites that were medium or high had disturbance that was definitely affecting the *Acanthomintha* populations. A brief description of each type of disturbance and recommendations for removing the disturbance were given.

Defensibility:

The distance to the closest road was measured, whether it was dirt, gravel, or pavement. Distance to open space was the distance to a preserved site that was undisturbed. If the *Acanthomintha* was connected to natural open space, "0 m" was recorded on the raw data sheets. This is not included on the edited sheets in Appendix A. If there were natural or other boundaries between the site and open space, this was recorded. Surrounding land use was noted.

Photos:

Three photos were taken at each site using a Minolta x-700, a 50 mm lens, and Ektachrome Elite film (200 ASA). A closeup shot was taken of an individual plant that represented an average plant for the site. A red frame (2 cm x 11 cm) was placed around the plant for scale. This shot was always of the flowering phase, unless no flowers could be found. A shot of *Acanthomintha* with its associates was the second shot. A yellow frame (5 cm x 2 cm) was used for scale. At a couple of the sites, the rectangle was unavailable for scale, so we used a compass (7.5 cm x 5 cm). The third shot was a shot showing the site in reference to the habitat and a landmark. Landmarks were mountains, buildings, etc. This shot was either taken from the edge of the site looking back at it, or from the middle of the site. The compass direction that the shot was taken from is given on the Field Survey Form. Often, additional notes on the third photograph are given to assist in finding the site at a later date.

Think EB got her
colors (or #s) mixed
up - the slides show
red frame to be 2x5cm
a yellow to be 2x11.

Map Change:

If we felt that the maps needed changing or clarification, "Map Change" was written at the bottom of the raw field survey form. If not, then "No Map Change" was written. If we were unable to find a previously mapped subpopulation, but the habitat seemed suitable, we left it on the map and labeled it NF for "not found". If it seemed more likely that there had been a mapping error, we noted this in the "Site Narrative" section of the report (Chapter 4).

2.3. CHECKLIST FOR ASSOCIATED SPECIES

We recorded as many species as we could from each site. If listed as an unknown, then they were never identified. Some species that weren't on the checklist are written in on the raw field forms, and these names were often abbreviated to save time. Most of the nomenclature follows Munz (1974). Data from the raw field forms was entered into a spread sheet (Appendix B) to facilitate analysis and comparison of sites.

CHAPTER 3. RESULTS AND DISCUSSION

We located all Element Occurrences that we had access to that had been recorded as extant during previous surveys, except one (EO 35). This site may have been destroyed by a sand mining operation. Most of the populations we visited had been surveyed during the period 1980 to 1992. Direct comparisons of population size, especially for the larger sites, are often not possible because the area surveyed at each has changed or we identified additional subpopulations (EO's 30 and 32). In addition, it is important to recognize that population estimates were not done with standardized methodology and thus between year comparisons give only a very rough picture of the population trends of *Acanthomintha*. The variability among observers is probably least at the small sites, such as the transplant sites, because of their small size and well circumscribed boundaries. Based on comments from earlier surveys recorded with the Natural Diversity Data Base (NDDDB), we can at least make some qualitative summary comments regarding the condition of the occurrence sites and the size of the population(s).

3.1. POPULATION TRENDS

3.1.1. Natural Occurrences

In most of the natural occurrences, the population sizes appear to be at least as large as they were reported previously, although there were extreme fluctuations in some cases. Our population estimates equaled or exceeded past estimates for EO's 19, 21, 33, 34, 35, 47, 48, 50 and 51 (Table 1). The Penasquitos Canyon occurrence (EO 19) is notable for its fluctuation in population numbers—from a low of 14 plants in 1991 to highs of 1000 in 1986 and 1994. The current year's precipitation (as recorded at Lindbergh Field) is not a good predictor of *Acanthomintha* population size, but the previous year's precipitation is strongly correlated with population size at this site. This would suggest that the effect of precipitation is primarily on seed production. The Sabre Springs (EO 36) and the two Rancho Santa Fe occurrences (EO 47 and EO 48) likewise have widely varying estimates of population size, with our estimates considerably higher than those previously recorded. In these three cases, the lower population estimates correspond to drier than average years (1988/89 and 1989/90 for EO 36 and 1988/89 for EO's 47 and 48; precipitation data from the US Weather Bureau, Lindbergh Field). The three US Forest Service occurrences in the Viejas Mountain vicinity (EO 12, 50 and 51) and the Sycamore Canyon/Slaughterhouse Canyon populations (EO 32) are probably the

<u>ELEMENT OCCURRENCE</u>	<u>YEAR</u>	<u>POPULATION</u> (Est.)	<u>AREA -m²</u> (Est.)
EO 12 Poser Mountain	1991	6652	111
	1994	2606	
EO 19 Los Penasquitos Canyon	1980	300	50
	1986	1000	
	1990	740	
	1991	14	
	1994	1000+	
EO 21 McGinty Mountain (south)	1986	100	25
	1994	200-250	
EO 22 McGinty Mountain (peak)	1994	1500	13
EO 25 Rancho Bernardo	1983	<100	10
	1986	0	
	1990	400	
	1991	98	
	1992	800	
	1994	300-500	
EO 30 McGinty Mountain (middle)	1994	950	23
EO 32 Sycamore Canyon/ Upper Slaughterhouse Canyon	1992	8800	43,870
	1994	5000*	
EO 33 Mission Trails Regional Park	1986	200	50
	1994	300	
EO 34 Mission Trails Regional Park	1986	200	10
	1994	300	
EO 35 Tierrasanta (East)		Not found	
EO 36 Poway/Sabre Springs	1989	5970	80
	1990	>3000	
	1994	15,000	
EO 38 Lux Canyon/El Camino (transplant)	1986	30	2
	1988	"a few"	
	1989	"several"	
	1994	17	
EO 39 Quail Botanic Gardens (transplant)	1988	70	10
	1994	160	
EO 41 San Marcos/Las Brisas (transplant)	1987	200	10
	1988	700-1000	
	1994	30	
EO 42 Heritage Park/Spyglass (transplant)	1994	5000	700
EO 47 Rancho Santa Fe (north)	1989	400	10
	1994	2000	
EO 48 Rancho Santa Fe (south)	1989	17	3000
	1994	1000	
EO 50 Viejas Mountain	1991	4000	903
	1994	9000	
EO 51 Viejas Mountain/Victoria Lane	1991	1000	20,000
	1994	3500	
EO 61 Escondido/Emerald Heights	1992	100	1
	1994	5	
			<hr/> 68,878

Table 1. Population estimates. *Includes only previously mapped areas in subpopulation 1.

least disturbed sites we surveyed. Compared to 1991 estimates, our population estimates were higher for EO's 50 and 51, but lower for EO 12. There is no obvious explanation for the lower numbers at EO 12. The previous estimates for EO 32 ranged up to 1000 plants in subpopulations two through four. We found substantially larger populations than that, but our estimate for subpopulation one was lower.

3.1.2. Transplant Occurrences

Of the four transplant occurrences (EO's 38, 39, 41 and 42), two have stable, very small populations (EO's 38 and 39), one has dropped precipitously from a larger population (EO 41) and one appears to be doing well (EO 42). This latter site was weeded of iceplant and tilled prior to seeding, then weeded after the seeding (F. Sproul pers. comm.). The sites of the two occurrences that have dropped to fewer than two dozen plants have dense cover of weedy species, primarily *Centaurea melitensis*, *Avena* spp., and *Sonchus* spp. Adjacent land uses appear to be a problem for these small, artificial populations. These problems range from shading by non-native trees such as *Eucalyptus* spp. to erosion, trails and dominance by herbaceous weeds.

3.2. HABITAT AREA

The total estimated area of occupied habitat was 68, 878 m² or 6.89 ha (17.0 acres)(Table 1). Over 64% of the area is in one occurrence (EO 32, Sycamore Canyon/Upper Slaughterhouse Canyon; another 29% is in EO 51 (Viejas Mountain/Victoria Lane), for a total of 93% in two element occurrences. Nearly three-quarters (13 or 74%) of the element occurrences that we visited had an estimated area of occupied habitat 100 m² or less (1 acre = approximately 4000 m²).

3.3. HABITAT ATTRIBUTES

In general, we found that the most successful populations of *Acanthomintha* were located in relatively undisturbed areas characterized by heavy clay soils and relatively sparse weedy competitors. The *Acanthomintha* plants at these sites tended to be large as well as abundant. Frequently, they were found in the most open areas on the downslope side of the clay soil

patches. Slope directions varied, but many of the thriving, natural subpopulations faced southeast, south, southwest or west (Table 2). Slope angle was rarely greater than 20° and commonly less than 15° (Table 2).

3.4. ASSOCIATION WITH EXOTICS

The exotics that were closely associated with *Acanthomintha* were the grasses *Avena* (several species), *Bromus mollis* and *B. rubens*; thistles such as *Centaurea melitensis* and *Cirsium vulgare*; and the annual herbs, *Anagallis arvensis*, *Brassica nigra*, *Hypochoeris glabra* and *Sonchus oleraceus* (Appendix B). Native geophytes were especially common. Examples are *Allium* spp., *Bloomeria crocea*, *Calochortus concolor* and *C. splendens*, and *Chlorogalum parviflora*. The native grass, *Stipa pulchra*, and possibly other *Stipa* species, were found at most of the sites. Annual herbs frequently found with *Acanthomintha* were *Apiastrum angustifolium*, *Calycadenia tenella*, *Corethrogyne filaginifolia* var. *virgata*, *Chorizanthe fimbriata* var. *fimbriata*, *Hemizonia fasciculata* and *Harpagonella palmeri*. Shrubby species often in association were *Adenostoma fasciculatum*, *Eriogonum fasciculatum*, *Heteromeles arbutifolia*, *Malosma laurina*, *Rhamnus crocea*, *Yucca whipplei*, various *Rhus* species and various *Salvia* species.

3.5. PRECIPITATION EFFECTS

Precipitation effects were not clear cut. At three sites (EO's 35, 47 and 48), population estimates were lower in years when substantially below average precipitation was recorded at Lindbergh Field. One site (EO 19) showed a strong relationship between the current year's population size and the previous year's precipitation, suggesting a drought impact on seed production. Other sites revealed no obvious trends. Additional work would be necessary to separate the differential effects of drought on *Acanthomintha* and its exotic associates; the relative importance of mortality and fecundity responses of *Acanthomintha* to drought; and the ways that disturbance interacts both with exotic and drought effects.

ELEMENT OCCURRENCE		SLOPE ANGLE(S) (in degrees)	SLOPE DIRECTION(S) (in degrees)
EO 12	Poser Mountain	20,25,15,15	17,130,200,180
EO 19	Los Penasquitos Canyon	24	280
EO 21	McGinty Mountain (south)	4,4	70,250
EO 22	McGinty Mountain (peak)	8,8	352,72
EO 25	Rancho Bernardo	15	202
EO 30	McGinty Mountain (middle)	10,10	148,314
EO 32	Sycamore Canyon/ Upper Slaughterhouse Canyon*	15,2,14,	276,342,336
		23,10,5	268,252,8
		20,9	192,2
		10,15,15,15	280,70,278,100
		15,15	94,140
EO 33	Mission Trails Regional Park	12	164
EO 34	Mission Trails Regional Park	10	46
EO 35	Tierrasanta (East)		
EO 36	Poway/Sabre Springs	0,0,0	154,15,5
EO 38	Lux Canyon/El Camino (transplant)	35	58
EO 39	Quail Botanic Gardens (transplant)	4	66
EO 41	San Marcos/Las Brisas (transplant)	3	148
EO 42	Heritage Park/Spyglass (transplant)	7	78
EO 47	Rancho Santa Fe (north)	12	313
EO 48	Rancho Santa Fe (south)	25	336
EO 50	Viejas Mountain	6,5,10,12	164,184,84,80
EO 51	Viejas Mountain/Victoria Lane	15	184
EO 61	Escondido/Emerald Heights	1,10	220,204

Table 2. Slope angles and directions. *Includes only subpopulation 1.

CHAPTER 4. SITE NARRATIVES

EO 12: Poser Mountain

Past: Seven subpopulations were found in 1991 (Betts) containing about 6,650 plants. The subpopulations varied from excellent to fair in quality. Some cattle trespass from nearby lands and grazing was a problem. This is on US Forest Service land (Cleveland National Forest).

Current: All seven previously mapped subpopulations were found, but we combined some of them because they appeared to be one subpopulation with no break in distribution. We found an estimated 2,500 plants. Scott McMillan had been to this site in 1992, and the populations appeared more robust in 1992. Cattle trespass didn't appear to be a serious problem, but there was evidence of cattle grazing in the past (no fresh evidence). There was some trash on more than one subpopulation, probably tossed from vehicles on Old Viejas Grade Road.

Recommendations: If the Old Viejas Grade Road is expanded or paved, it will have a definite effect on subpopulations A and B. The road easement and right-of-way should be researched to determine the potential for impacts from road maintenance, upgrading or realignment. The fencing surrounding the National Forest Service property should be checked occasionally to make sure that cattle can't get through from the Viejas Indian Reservation. The risk of grazing is probably the most important threat at this time. If grazing is excluded, these populations should remain in good condition. Fire control may have a deleterious affect by allowing for the competing shrubs and understory to overtop the *Acanthomintha* habitat. This should be monitored and if it appears to be the case, controlled burns might be prescribed.

EO 19: Los Penasquitos Canyon

Past: This population was reported by Loy in 1980. At that time it had 300 plants. The NDDB reports 1000 plants were found in 1986, 740 plants in 1990, 14 plants in 1991, and 36 plants in 1992. This site is in relatively undisturbed grassland, but increase in trail use was noted as a problem. The CNDDDB says that efforts were underway to close this trail section. This land is owned by the City of San Diego and is part of a regional park.

Current: We found over a 1000 plants on the north side of the trail and about 500 on the south side. The riding/hiking trail cuts right through the population and splits it in two. The trail is

blocked on the sides by a post fence and signs that say to keep out, but the signs are not weather proof (a piece of paper in a plastic cover) and have either fallen off, or are unreadable.

Recommendations: Trail reroute, erosion control and revegetation would diminish threats to this population. If the trail remains, new, permanent weather proof signs need to be put up telling trail users to stay out of the areas adjacent to the trail.

EO 21: McGinty Mountain (south)

Past: Oberbauer reported the occurrence in 1983. Garrett (1986) found 150 plants in good condition, but spread thinly over a disturbed area.

Current: We found 200-250 plants on both sides of the dirt road that runs along the ridgetop. The road probably cut the historical population in two. Because of the road cut, the drainage now goes down through the western portion of the population. It is still possible to drive on this road, because there is no gate or fence.

Recommendations: The road needs to be closed off so that no traffic goes through. Erosion control and revegetation will be required to stop the degradation of this population and to reestablish plants on the roadbed soils.

EO 22: McGinty Mountain (peak)

Past: This occurrence was reported by Oberbauer in 1983. In 1986 Garrett found 1,000 plants in one population divided by a trail. She commented that even though there was evidence of old mining operations, it was one of the largest and healthiest populations in San Diego County. The site was privately held in 1986.

Current: A map supplied in 1994 by the Department of Fish and Game (DFG) indicates three subpopulations, one in the location described by Garrett and two others to the south flanking the dirt road. The property is now owned by The Nature Conservancy with a conservation easement to the DFG.

We only found one of the three subpopulations on the DFG map. It had about 500 plants in two patches: one centered on the road and the other 30 m north on the west side of the road cut. The two southern subpopulations were not found, and they may be mismatched because the area is

unsuitable habitat. The road is not closed to vehicle access. There are no fences or gates to stop a truck from driving to the top of the mountain. An additional site that was found by Wier in 1994 (Pers. comm.) to the east was included in EO 22 as subpopulation B. It had approximately 1000 plants. This site is very close to a trail bend and is threatened by horse/bike/foot traffic. This trail may have eliminated a portion of the population.

Recommendations: This site should have the road access closed off so that there is no chance of destroying more of the population. The road will have to be reseeded and decompacted before *Acanthomintha* will grow there again. The subpopulation B that occurs on the edge of the trail should have a fence blocking traffic from leaving the trail at that point.

EO 25: Rancho Bernardo

Past: According to the NDDB records, fewer than 1000 plants were seen in 1983, no plants in 1986, 400 in 1990, 98 in 1991, and 800 in 1992. The occurrence was reported by E. Wier (1983). The site was reported to be weedy and that a burn was needed. Industrial park development, road building, and dumping may threaten this population.

Current: We found between 300-500 plants. The site was very weedy and the area around the site has been heavily graded. The down-hill slope has been cut within 100 feet of the population.

Recommendations: The site needs to be fenced so that when more development comes to the area, no one dumps anything on the site or damages it. The site needs to be weeded. *Cirsium vulgare* is a major problem here, with over 10 very large plants on or near the site. They should be removed.

EO 30: McGinty Mountain (middle)

Past: Garrett found about 50 plants in 1986. According to the NDDB records, 376 plants were found in 1989 (observer unknown). Wier (Pers. comm. 1994) mapped three sites in the vicinity, none of which corresponded with Garrett's 1986 sighting.

Current: We found two of the sites that Wier had mapped (30 A and B). We could not find his third site down the west slope of the mountain to the north of the old Peg Leg Mine. This site we called subpopulation C. It was mapped near where a home was being built. The home was

surrounded by clay soil. It is possible that this subpopulation is gone, it could have been mis-mapped (Wier pers. comm.), or we may simply have not found it. We also did not find *Acanthomintha* where Garrett had EO 30 mapped. There was potential habitat with clay soil, so we marked it NF (Not Found). It is possible that Garrett's EO 30 is our 30B. In the two subpopulations we found (30A and B), there were about 950 plants. Subpopulation B is right next to the road where someone might choose to turn around because it is flatter than the surrounding area. It appeared that people had done so in the past.

Recommendations: As with all the other *Acanthomintha* sites on McGinty Mountain, the road needs to be closed, especially for subpopulation B. It needs to be confirmed whether or not 30 C is extirpated.

EO 32: Sycamore Canyon/Upper Slaughterhouse Canyon

Past: The occurrence is divided into four discrete subpopulations: Goodan Ranch (#1), BLM (#2 and #3) and the northern end of Slaughterhouse Canyon (#4). NDDDB records indicate over 3000 plants seen in these four subpopulations in 1986/87, 200 at the north end of the occurrence in 1989 (possibly Goodan Ranch subpopulation), and about 8800 seen in the western part of the occurrence in 1992 (apparently Goodan Ranch subpopulation). As of 1992, the west end of the occurrence was protected as a regional park. Taylor (1992) stated that the portion of the Goodan Ranch subpopulation that he numbered 4 had the lowest weed cover he had seen anywhere and his number 2 (also a portion of the Goodan Ranch subpopulation) had larger plants than he had ever seen.

Current: In subpopulation 1, we considered Taylor's #1 and #2 to be one sub-subpopulation which we called 1A. His #3 we called 1C, and his #4 we labeled 1B. These three sub-subpopulations had a total of nearly 5,000 plants. We found three more sub-subpopulations. One is up slope of 1 A-C. We called this 1D. Another is still higher up slope under the power lines. This we called 1E. The largest sub-subpopulation is south as the slope drops off towards the fallow agriculture fields. This we numbered 1F. Sub-subpopulation 1D had over 500 plants. We found upwards of 20,000 plants for the whole Sycamore Canyon: Goodan Ranch site, with about half of these plants being in the sub-subpopulations 1E and 1F. Some of the sub-subpopulations had a high weed abundance (A, B, D, E); others did not (C, F).

Subpopulation 2 is a large population of 5-10,000 plants with little disturbance. It is one of the densest sites we visited. To the south we found a new, large subpopulation that we gave #5.

It consists of a large population near the top of the slope and a smaller one near the bottom towards the creek, with suitable habitat continuous between them. There were an estimated 3000 plants in the upper area and 500 plants in the lower one. Subpopulation 3 is very close to a road. It had 3000 or more plants that were widely scattered. Subpopulation 4 had over 1000 plants, also widely scattered. This population is split by a dirt road.

Recommendations: This site is in good shape, although it might be impacted if roads are extended near or through it. Fencing will not be necessary unless development encroaches upon this site. There is the chance that the power company or telephone company could do some damage to subpopulation E (which is under the lines) if they come out for repairs, but this would only happen if they drove vehicles up the slope. As easement holders, they should be notified of the plant's presence and sensitivity. Two of the subpopulations are very close to dirt roads and are thus vulnerable to disturbance. They should be protected by barriers and signs.

EO 33: Mission Trails Regional Park

Past: About 300 plants were seen by Garrett (1986). According to her, the land was then owned by the U.S. Navy (USN). Jeep and hiking trails crisscrossed the area, but posed no immediate threat to the stability of the population.

Current: The site may have been mapped incorrectly by Garrett, but her verbal site description is consistent with the population we found. This is subpopulation A, and it had about 300 plants. There is a trail that once cut through the site, but it is now blocked off with several signs telling hikers to keep out. It appears that this site is now part of Mission Trails Regional Park. Navy personnel were uncertain of the land ownership (E. Jacobsen pers. comm.).

We found potential habitat and clay patches at the two other sites where Wier found very small populations in 1990 (Pers. comm.), but we found no *Acanthomintha*. They are labeled subpopulations B and C. These two subpopulations are near a dirt road and the aqueduct and subject to disturbance. Also, they may have been damaged or extirpated by the brushing and ordinance removal operations being carried out in this area by the US Army.

Recommendations: Although the subpopulation A is blocked off, it is not clear where you can and can't go if you're hiking/jogging/biking. The other two areas should be searched again for *Acanthomintha*. In the meantime, further disturbance to the area should be prevented. Restoration would be in order for this site.

EO 34: Mission Trails Regional Park

Past: There were 200 plants found at this site in 1986 (Garrett). Habitat was in good condition with no known threats. The US Navy was reported to be the landowner in prior NDDB records, but attempts to clarify current ownership were unsuccessful.

Current: We found between 200-300 plants in a very heavy weed cover. The map by Garrett is incorrect, but the verbal description of the site is accurate. The population is east of the backyard of a house (11792 Inviero Street) by about 160 feet, and there was a foot path in between the house and the *Acanthomintha* population.

Recommendations: The population is very close to homes and to foot traffic and needs a fence around it. The introduced species are dominant and may swamp out the *Acanthomintha* if they are not removed.

EO 35: Tierrasanta (East)

Past: This site had a vigorous population of 400-600 plants in 1980 (Beauchamp, NDDB report). According to that report it was proposed for USN housing, but it was unknown at that time if it had been developed.

Current: We had difficulty finding this site. If we did locate it, there was no *Acanthomintha*. The map we had was inadequate, and the description was not useful. We found an area of clay soils that was up against the fence surrounding a sand-mining operation. Right on the other side of the fence the slope had been dramatically cut away, and it appeared that the clay soil had once extended on the other side of the fence. If the *Acanthomintha* occurred on that side of the soil patch, it has been extirpated. The undisturbed side of the fence had many *Acanthomintha* associates (including *Harpagonella palmeri*), but we found no *Acanthomintha*.

Recommendations: Ownership of this parcel needs to be verified. If the sand-mining operation has destroyed the population, it probably could be restored to the side of the fence that still has open potential habitat, using EO 34 as a seed source.

EO 36: Poway/Sabre Springs

Past: This site was described by Craig Reiser (1988) as possibly the largest site known for *Acanthomintha ilicifolia*. Reiser said that in 1989 an illegal haul road was built through the center of the population and 60-70% of the plants were destroyed. The remaining population was in two pieces. According to Tom Huffman of the San Diego City Planning Dept., the City was going to ask Pardee Construction to restore the portion of the population it destroyed. According to the NDDDB, 5970 plants were seen in 1989, and >3000 plants in three subpopulations in 1990. In December 1991, plants were reintroduced to mitigate for the haul road destruction. The seeds were taken from this site and propagated at Rancho Santa Ana Botanic Garden. In 1992, about 7000 plants were observed on the site.

Current: We found an estimated 15,000 plants (possibly more). The road still cuts the population in two and if any attempts have been made to restore the damaged portion, they are not evident. The sewage treatment plant is not presently operating. If the Sabre Springs Development gets any closer, it will be a threat. This area is now open space, and many people appear to use it for walking/jogging. This could impact the population.

Recommendations: At this time, installation of signs alerting people to the sensitive *Acanthomintha* habitat might be enough, but if trail use increases when the new development is finished, then fencing may be necessary. This site is extensive and one of the best sites we've seen, even after the disturbance. Restoration work on the part of the population destroyed by the road should be done to improve its habitat quality. If it had not been destroyed it would have been one of the largest *Acanthomintha* populations.

EO 38: Lux Canyon/El Camino (transplant)

Past: This is a transplant site from EO: 28 (Spyglass). According to the NDDDB, 30 seedlings were seen in 1986, and in 1987-88 only a few plants, and in a 1989 report, Beauchamp indicated that "several" individuals survived to set seed. Beauchamp has not monitored the site because he believes it would trample the plants. This is difficult to understand because the transplant area is so small that it would appear to be easily surveyed without tramping.

Current: We found 17 plants in an area of about 2 m². The clay soils patch was much larger than the actual distribution of *Acanthomintha*. The site is close to a drainage and to a parking lot. The site is surrounded by *Eucalyptus spp.* trees and the leaf litter is evident. The site is also one

of the steeper localities we surveyed. Weeds were very dense at this site, and there was a trail going through it.

Recommendations: This site is in trouble and needs active management. If seed is still available, more seeds need to be added to the site. It also needs to be weeded. The site is very small and surrounded by development, so unless it is given very good care, it will probably fail. The *Eucalyptus spp.* should be removed from the immediate area, and the occurrence should be monitored to insure the trees don't reinvade. Fencing is needed as well as signs so that there is less likelihood of disturbance. At this point it would only take a small amount of damage to wipe out the population.

EO 39: Quail Botanic Gardens (transplant)

Past: This is a transplant site from EO: 28 (Spyglass). It is listed in the NDDDB as a failed site as of 1987, but in a report by Beauchamp(1989) it is not considered extirpated. He estimated that there may have been as many as 70 unbranched plants in May of 1988. He stated that the site needed to be weeded and that a large *Eucalyptus sp.* tree was shading the site. He recommended that the tree be removed.

Current: We found about 160 plants in a 10 m² area. Foot traffic is very close to the population. The clay soil that was placed on the natural sandstone when the soils were transplanted is slowly eroding away along the edges. The *Eucalyptus sp.* appears to still be there.

Recommendation: The site does not have a sign warning visitors to keep off, and it needs one. The clay soil should be surrounded by some sort of low retaining wall to stop the clay soil from washing away over time. If this site is to be a permanent site, then this slow erosion needs to be stopped as soon as possible. Weeding should be continued and any nearby *Eucalyptus spp.* removed.

EO 41: San Marcos/Las Brisas (transplant)

Past: This is a transplant site from EO: 23 (nearby). Beauchamp reported a few plants had been found growing at the site before the transplant (Wickenheiser 1988). The site was weeded and revegetated with native species by Beauchamp (reports in 1987 and 1989). In 1987, a chain-link fence was erected on the western edge of the transplant site. The *Acanthomintha*

population was estimated at "several hundred" in 1987 and 700-1000 in 1988. In 1988, Beauchamp told DFG that a fence around the south and east side was planned. This open space lot was to be returned to the homeowners association who would take over management. Management was to be for 5 years, or until a certain density was reached.

Current: We found only 30 plants in about a 10 m² area. The site had been scraped before it had been revegetated, but the original disturbance is still very evident. This occurrence is nearly gone. The *Acanthomintha* that is there now is growing under the heavy cover of dense weeds and is very small in size. If other native plants were placed at this site, then they didn't survive either. There is a fence on the south and east side now.

Recommendations: Who ever has been responsible for management of this site, appears not to have been doing the work. The site is one of the worst we surveyed. The weeds dominate everywhere, and the evidence of disturbance is blatant. This site is now well protected because of the fence, but efforts in re-seeding and weeding will be required to bring this population to a healthy, stable point.

EO 42: Heritage Park/Spyglass (transplant)

Past: This is a transplant occurrence from nearby EO: 28 (Spyglass). In 1988 Beauchamp told Wickenheiser of DFG that the site was believed to be extirpated since it had not been protected after the introduction of seeds in 1985/86. ORV's, and iceplant were listed as threats, as well as hiking/jogging/biking trails. In 1989, Beauchamp indicated that a meeting with the homeowners had taken place to educate them on the *Acanthomintha* population. Beauchamp had planned to burn the site, remove the iceplant, and put up a fence in hopes of promoting the growth of any seeds remaining in the soil.

Current: We found over 5000 plants at this site in 3 subpopulations. There was not much iceplant found, but there was no clear evidence of a burn to the site. According to F Sproul (Pers. comm.) the site was weeded of iceplant and tilled prior to seeding. Weeding was also done after the seeding. There is no fence protecting the site and trails used by hikers/joggers/bikes/ORV's are a serious threat. The home owner whose backyard is adjacent to the site has been mowing the back area and getting very close to the western subpopulations.

Recommendations: The site is healthy. Burning is unnecessary at this point. The most important thing to do is fence the site off and sign it. The home owners next to the site should be

"reminded" that the *Acanthomintha* is still growing behind their house and it should not be disturbed.

EO 47: Rancho Santa Fe (north)

Past: G. Scheid saw 400 plants in 1989 (NDDDB). According to the NDDDB, the surrounding area was once cultivated and grazed, but was fallow. The population was to be in designated open space, but a road and pipeline would be close to the plants because the area is the future site of Brighton Homes Development.

Current: We found over 2000 plants on the slope, in about a 10 m² area. The evidence of grazing was substantial, and possibly indicated that grazing had occurred since 1989. No pipeline has gone through yet, and the Brighton Homes Development is not close to the site at this time.

Recommendations: If grazing is still occurring, then it should be stopped. The evidence of damage by trampling was very obvious. If the surrounding development comes too close, the site could be under heavy threat. If development does not encroach, the site should be maintainable.

EO 48: Rancho Santa Fe (south)

Past: In 1989 (Scheid), the site was described as being within open space, but threatened by dirt roads and a pump station. Only 17 plants were found. This is an open space.

Current: We found over 1000 plants in an area of about 100 m by 30 m. We found no evidence of disturbance by the pump station, but the roads are a threat. An even greater threat are the trails that have been cut through the site by hikers/joggers/transients/workers. These trails cut back and forth over the clay soil patch that the plants are found on, and they are beginning to affect the hydrology of the site and the plants themselves. If not closed off, the paths could become a very serious problem. Development is taking place on the top of the ridge, but it is not clear how close it will come to the canyon that *Acanthomintha* is found in.

Recommendations: This site is currently a very good one. The population is very healthy and is defensible. The only serious problem at this point in time is the trails. The area should be fenced and signed so that people stay out. It would be easy to direct them around the site. If development comes much closer to the edge of the canyon, the site will be affected.

EO 50: Viejas Mountain

Past: The survey done by Betts in 1991 found about 4,000 plants in approximately 10 subpopulations. The area had little evidence of human activities. There was some slight evidence of cattle grazing, but not much. This is US Forest Service land abutting the Viejas Indian Reservation.

Current: Our survey found *Acanthomintha* in most of the sites mapped by Betts in 1991. We broke the population up into four major subpopulations which were made up of smaller groups of plants. We found about 9,000 plants in the whole area. We also found little evidence of people using the site, and very little evidence of cattle (cattle droppings appeared to be old). The fence is still in disrepair and does not stop the cattle from entering the site. The cattle probably don't spend long on the site because it is steep and only the lower subpopulations had much grass in them.

Recommendations: This site should be left alone, except to repair the fences to ensure that no cattle enter. As with Poser Mountain, fire frequency may become important if this area is fire suppressed. This needs to be monitored and if the understory or shrubs begins to affect the *Acanthomintha*, then prescribed burns should be done.

EO 51: Viejas Mountain/Victoria Lane

Past: In 1991, Betts found about 1,000 plants. He found about seven subpopulations ranging from 50 to 200 individuals. He stated that the area was naturally protected by very thick shrub cover and a steep slope. He saw no evidence of people or cattle, but the fence along the road below was in a state of disrepair. This is US Forest Service property.

Current: We found all seven subpopulations and about 3,500 plants. This area was very, very difficult to get to, so evidence of people and cattle is non-existent. There appeared to be no obvious threat to the site.

Recommendations: Monitor for possible impacts if the adjacent private land is developed. As with EO: 12 and 50, fire suppression could be a problem in the future (see EO: 12 or 50).

EO 61: Escondido/Emerald Heights

Past: Fewer than 100 plants in two subpopulations were seen in 1992 (Dillane). Heavy invasion by *Centaureum* [sic *Centaurea*?] was taking place and the upslope drainage was eroding the north side of the northeast population. It is in a City of Escondido open space.

Current: We found two subpopulations; one with three plants, the other with two. The drainage mentioned by Dillane is destroying the clay soils that *Acanthomintha* is found on. The building of the homes above has completely altered the hydrology and this population is all but gone. Because of this disturbance, weed invasion is high. The surrounding area appeared to be potential habitat for *Acanthomintha*, but we didn't find any.

Recommendations: The hydrology should be altered so that the water drainage does not go down the clay soil patch. Even if this is done, the weeds will need to be removed and the drainage restored. This site seemed to be a good area to re-introduce *Acanthomintha* because the habitat appeared perfect. If this population is lost and the drainage can be fixed, then this site would be a good reintroduction site.

CHAPTER 5. RECOMMENDATIONS

Site-specific management recommendations have been given in the individual site narratives (Chapter 4). Overall, it is important to recognize that there are a number of factors that must be considered in evaluating the status of these *Acanthomintha ilicifolia* populations. A particular amount and/or timing of precipitation may favor abundant germination and growth of *Acanthomintha* or some of its competitors instead. This particular year (1994) appeared to be relatively favorable for *Acanthomintha*. Surveys should be taken in succeeding years to more fully establish the dynamics of these populations and to determine the natural variability in population size, especially in response to drier than average years. Conditions of seed germination and seedling establishment need to be investigated, for both *Acanthomintha* and its putative competitors such as *Avena* spp., *Sonchus oleraceus*, *Centaurea melitensis* and *Bromus* spp.

It seems clear that this species is susceptible to various forms of disturbance, especially the invasion of the site by exotics and anything that contributes to erosion (Taylor 1994). The survivorship and fecundity effects of specific exotics should be established and their role in exacerbating drought impacts determined. Weeding appears to be a successful element in maintaining artificial populations, and a better understanding of the mechanisms whereby weeds impact the species would allow management efforts to be more efficient as well as effective. Where present, eroded channels and gulches need to be restored and steps taken to prevent renewed erosion. When the population is completely artificial, it is extremely important that the imported soil is not lost through erosion or runoff. This can be prevented by a berm or low retaining wall and transplantation only to sites with a very gentle slope.

Because *Acanthomintha* is a relatively small, annual herb, its population numbers can be affected adversely by trampling and off highway vehicle traffic including bicycles, trucks, and motorcycles. Small sites will need to be securely fenced and intensively managed to prevent extirpation of their *Acanthomintha ilicifolia* populations. Other impacts associated with small sites isolated from natural habitat may be increased herbivory, lack of pollinators, and increased or unseasonable runoff. On-going monitoring could help to determine if these are important factors in population stability and identify other factors as well. Transplantation to artificial sites is less desirable than maintenance of native populations in their historic locations. Three of the four transplanted populations that we visited were doing very poorly. Others have failed entirely by the end of a 4-year monitoring period (J. Dice pers. comm.). Nothing is known about the population genetics of *Acanthomintha*, but in the absence of

information on the between population genetic differentiation of this species, transplantation is preferable to losing the genetic resources of any particular site (Bauder 1993). Additional genetic information, especially quantitative studies done on traits that may have adaptive significance, would assist in prioritizing preservation efforts.

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APPENDIX A
FIELD SURVEY FORMS

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: POSER MOUNTAIN

Element Occurrence: 12 Subpopulation: A Upslope of old Vicjas Grade

Investigators: Scott McMillan Marcy Darby Mathew McMillan Date: 6/21/94

A. Extent of population:

Est. number of plants: 31 Est. area of population: 1 meter²

Size of plants: 0-5 cm: 20% 5-10 cm: 20% 10-15cm: 30% >15 cm: 30%

Phenology: Veg: 25% Flr: 70% Frt: 5%
(# unless % noted)

B. Site description:

Slope direction: 170 ° Angle of slope: 20°

Extent of exotics: <50% Dominant exotic species: Avena spp.

Centaurea melitensis, Bromus rubens

Surrounding plant community(ies): Chaparral

Other rare species: Harpagonella palmeri

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: _____

Comments: _____

D. Defensibility:

Dist. to travelled roads: 50 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: US Forest Service

E. Photos:

Film exposure #:

1. closeup with scale: 7-8 _____

2. associates with frame: 9-10 _____

3. habitat with landmarks & direction: 11-12 178°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: POSER MOUNTAIN

Element Occurrence: 12 Subpopulation: B Three sub-subpopulations

Investigators: Scott McMillan Marcy Darby Matthew McMillan Date: 6/21/94

A. Extent of population:

Est. number of plants: 1500 Est. area of population: 50 meter²

Size of plants: 0-5 cm: 10% 5-10 cm: 20% 10-15cm: 30% >15 cm: 40%

Phenology: Veg: Flr: 90% Frt: 10%
(# unless % noted)

B. Site description:

Slope direction: 130 ° Angle of slope: 25°

Extent of exotics: <50% Dominant exotic species: Avena spp.

Centaurea melitensis, Bromus rubens

Surrounding plant community(ies): Chaparral

Other rare species: Harpagonella palmeri

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: x

Other: _____

Comments: Needs to be clearly marked and fenced to exclud cattle.

D. Defensibility:

Dist. to travelled roads: 30 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: US Forest Service/Vicjas Indian Reservation

E. Photos:

Film exposure #:

1. closeup with scale: 13-14 _____

2. associates with frame: 15-16 _____

3. habitat with landmarks & direction: 17-18 186°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: POSER MOUNTAINElement Occurrence: 12 Subpopulation: CInvestigators: Scott McMillan Marcy Darby Matthew McMillan Date: 6/21/94

A. Extent of population:

Est. number of plants: 1200 Est. area of population: 50 meter²Size of plants: 0-5 cm: 5-10 cm: 10% 10-15cm: 20% >15 cm: 70%Phenology: Veg: Flr: 90% Frt:
(# unless % noted)

B. Site description:

Slope direction: 200 ° Angle of slope: 15°Extent of exotics: <50% Dominant exotic species: _____Surrounding plant community(ies): ChaparralOther rare species: *Harpagonella palmeri*

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: _____

Comments: Needs to be clearly marked and fenced to exclude cattle.

D. Defensibility:

Dist. to travelled roads: 100 m Dist. to natural open space: 10 mConnection to natural open space: Y x N Natural/other barriers: Y N xSurrounding land use: US Forest Service/Viejas Indian Reservation

E. Photos:

Film exposure #:

1. closeup with scale: 21-22 _____2. associates with frame: 23-24 _____3. habitat with landmarks & direction: 19-20 200°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: POSER MOUNTAIN

Element Occurrence: 12 Subpopulation: D Two sub-subpopulations

Investigators: Scott McMillan Marcy Darby Matthew McMillan Date: 6/21/94

A. Extent of population:

Est. number of plants: 75 Est. area of population: 10 meter²

Size of plants: 0-5 cm: 5-10 cm: 10% 10-15cm: 30% >15 cm: 60%

Phenology: Veg: Flr: 90% Frt: 10%
(# unless % noted)

B. Site description:

Slope direction: 180 ° Angle of slope: 15°

Extent of exotics: <50% Dominant exotic species: Avena spp.

Centaurea melitensis, Bromus rubens

Surrounding plant community(ies): Chaparral

Other rare species: Harpagonella palmeri

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: X

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: x

Other: _____

Comments: Needs to be clearly marked and fenced to exclude grazing.

D. Defensibility:

Dist. to travelled roads: 150 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: US Forest Service/Viejas Indian Reservation

E. Photos:

Film exposure #:

1. closeup with scale: 25-26 _____

2. associates with frame: 27-28 _____

3. habitat with landmarks & direction: 29-30 180°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: PENASQUITOS CANYON

Element Occurrence: 19 Subpopulation: Could be subdivided into 4 (3 s. of road)

Investigators: Scott McMillan Paul Kemp Date: 5/26/94

A. Extent of population:

Est. number of plants: 12 to 1400; B-D (south) 450-500 Est. area of population: 20 + 30 m²

Size of plants: 0-5 cm: 10% 5-10 cm: 30% 10-15cm: 30% >15 cm: 30%

Phenology: Veg: 5% Flr: 85% Frt: 10%
(# unless % noted)

B. Site description:

Slope direction: 180 ° Angle of slope: 24°

Extent of exotics: >50% Dominant exotic species: *Bromus rubens*

Centaurea melitensis, *Avena* spp.

Surrounding plant community(ies): Coastal Sage Scrub

Other rare species: *Adolphia californica*

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: Hiking trail cuts through population.

Comments: Signs are posted warning to stay out of thornmint habitat

D. Defensibility:

Dist. to travelled roads: 150 m Dist. to natural open space: <100 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: City of San Diego Open Space Preserve

E. Photos:

Film exposure #:

1. closeup with scale: 15-16 Habitat shot: Figure in

2. associates with frame: 17-18 pop A. photographer in

3. habitat with landmarks & direction: 13-14 pop B. 358°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: MC GINTY MOUNTAIN

Element Occurrence: 21 Subpopulation: Goes down north and south sides of road.

Investigators: Scott McMillan Paul Kemp Date: 6/13/94

A. Extent of population:

Est. number of plants: 200-250 Est. area of population: narrow 50 m strip

Size of plants: 0-5 cm: 10% 5-10 cm: 20% 10-15cm: 50% >15 cm: 20%

Phenology: Veg: Flr: 100% Frt: 10%

(# unless % noted)

B. Site description:

Slope direction: 70°/250° Angle of slope: 4°/4°

Extent of exotics: <50% Dominant exotic species: Centaurea

melitensis. Brassica spp. Bromus rubens

Surrounding plant community(ies): Chaparral

Other rare species: Nolina interrata

Rare/sensitive communities: _____

C. Disturbance:

High: x Medium: _____ Low: _____

Vehicles: x Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: Road has caused drainage to cut through west side of road and go

Comments: through the Acanthomintha population. Restoration needed.

D. Defensibility:

Dist. to travelled roads: 100 m Dist. to natural open space: 100 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: Single family residences: The Nature Conservancy

E. Photos:

Film exposure #:

1. closeup with scale: 24-25

2. associates with frame: 1-2

3. habitat with landmarks & direction: 3-4 250°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: MC GINTY MOUNTAIN

Element Occurrence: 22 Subpopulation: A

Investigators: Scott McMillan Paul Kemp Date: 6/13/94

A. Extent of population:

Est. number of plants: 500 Est. area of population: 10 m²

Size of plants: 0-5 cm: 10% 5-10 cm: 10% 10-15cm: 50% >15 cm: 30%

Phenology: Veg: Flr: 100% Frt:
(# unless % noted)

B. Site description:

Slope direction: 352° Angle of slope: 8°

Extent of exotics: <50% Dominant exotic species: Centaurea melitensis,

Bromus rubens, Avena barbata

Surrounding plant community(ies): Chaparral

Other rare species: Nolina interrata

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: x Low: _____

Vehicles: x Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: Road cut through the Acanthomintha population

Comments: _____

D. Defensibility:

Dist. to travelled roads: 1 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: The Nature Conservancy

E. Photos:

Film exposure #:

1. closeup with scale: 5-6 _____

2. associates with frame: 7-8 _____

3. habitat with landmarks & direction: 9-10 352°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: MC GINTY MOUNTAIN

Element Occurrence: 22 Subpopulation: B

Investigators: Scott McMillan Paul Kemp Date: 6/13/94

A. Extent of population:

Est. number of plants: 900-1000 Est. area of population: 2-3 m²

Size of plants: 0-5 cm: 10% 5-10 cm: 30% 10-15cm: 30% >15 cm: 30%

Phenology: Veg: _____ Flr: 100% Frt: _____
(# unless % noted)

B. Site description:

Slope direction: 72° Angle of slope: 8°

Extent of exotics: <50% Dominant exotic species: _____

Surrounding plant community(ies): Chaparral

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: Adjacent to a trail that may have impacted the subpopulation

Comments: Needs to be signed and/or fenced

D. Defensibility:

Dist. to travelled roads: 1 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: The Nature Conservancy

E. Photos:

Film exposure #:

1. closeup with scale: 11-12 _____

2. associates with frame: 13-14 _____

3. habitat with landmarks & direction: 15-16 10°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: RANCHO BERNARDO

Element Occurrence: 25 Subpopulation: _____

Investigators: Scott McMillan Paul Kemp Date: 5/31/94

A. Extent of population:

Est. number of plants: 300-500 Est. area of population: 10 m²

Size of plants: 0-5 cm: 10% 5-10 cm: 20% 10-15cm: 15% >15 cm: 55%

Phenology: Veg: Flr: 95% Frt: 5%
(# unless % noted)

B. Site description:

Slope direction: 202° Angle of slope: 15°

Extent of exotics: >50% Dominant exotic species: Bromus mollis

Centaurea melitensis, Anagallis arvensis, Avena spp., Spergula?

Surrounding plant community(ies): Grassland with Stipa, weeds

Other rare species: Dudleya variegata

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: Cirsium vulgare present.

Comments: Site needs weeding and protection from surrounding land uses.

D. Defensibility:

Dist. to travelled roads: 50 m Dist. to natural open space: _____

Connection to natural open space: Y N x Natural/other barriers: Y N x

Surrounding land use: industrial park, graded land

E. Photos:

Film exposure #:

1. closeup with scale: 31-32 _____

2. associates with frame: 33-34 _____

3. habitat with landmarks & direction: 35-36 202°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: MC GINTY MOUNTAIN

Element Occurrence: 30 Subpopulation: A

Investigators: Scott McMillan Paul Kemp Date: 6/13/94

A. Extent of population:

Est. number of plants: 250 Est. area of population: 3 m²

Size of plants: 0-5 cm: 10% 5-10 cm: 30% 10-15cm: 30% >15 cm: 60%

Phenology: Veg: Flr: 90% Frt: 10%
(# unless % noted)

B. Site description:

Slope direction: 148° Angle of slope: 10°

Extent of exotics: <50% Dominant exotic species: Centaurea melitensis,
Bromus rubens, Avena barbata

Surrounding plant community(ies): Chaparral

Other rare species: Harpagonella palmeri

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: _____

Comments: _____

D. Defensibility:

Dist. to travelled roads: 300 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: The Nature Conservancy

E. Photos:

Film exposure #:

1. closeup with scale: 17 _____

2. associates with frame: 18 _____

3. habitat with landmarks & direction: 19 8°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: MC GINTY MOUNTAIN

Element Occurrence: 30 Subpopulation: B

Investigators: Scott McMillan Paul Kemp Date: 6/13/94

A. Extent of population:

Est. number of plants: 700 Est. area of population: 20 m²

Size of plants: 0-5 cm: 5% 5-10 cm: 5% 10-15cm: 30% >15 cm: 60%

Phenology: Veg: Flr: 90% Frt: 10%
(# unless % noted)

B. Site description:

Slope direction: 314° Angle of slope: 10°

Extent of exotics: <50% Dominant exotic species: *Centaurea melitensis*,
Bromus rubens, *Avena barbata*

Surrounding plant community(ies): Chaparral

Other rare species:

Rare/sensitive communities:

C. Disturbance:

High: Medium: Low: x

Vehicles: x Trash/Dumping: Brushing: Grazing:

Other:

Comments: Vehicles turn around in the area.

D. Defensibility:

Dist. to travelled roads: <10 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: The Nature Conservancy

E. Photos:

Film exposure #:

1. closeup with scale: 20

2. associates with frame: 21

3. habitat with landmarks & direction: 22 278°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: MC GINTY MOUNTAIN

Element Occurrence: 30 Subpopulation: C NOT FOUND, may be extirpated

Investigators: Scott McMillan Paul Kemp Date: 6/13/94

A. Extent of population:

Est. number of plants: _____ Est. area of population: _____

Size of plants: 0-5 cm: 5-10 cm: 10-15cm: >15 cm:

Phenology: Veg: Flr: Frt:
(# unless % noted)

B. Site description:

Slope direction: _____ Angle of slope: 1

Extent of exotics: _____ Dominant exotic species: _____

Surrounding plant community(ies): _____

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: _____

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: _____

Comments: _____

D. Defensibility:

Dist. to travelled roads: _____ Dist. to natural open space: _____

Connection to natural open space: Y N Natural/other barriers: Y N

Surrounding land use: The Nature Conservancy

E. Photos:

Film exposure #:

1. closeup with scale: _____

2. associates with frame: _____

3. habitat with landmarks & direction: _____

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: MC GINTY MOUNTAIN

Element Occurrence: 30 Subpopulation: D NOT FOUND, may be mis-mapped

Investigators: Scott McMillan Paul Kemp Date: 6/13/94

A. Extent of population:

Est. number of plants: _____ Est. area of population: _____

Size of plants: 0-5 cm; 5-10 cm; 10-15cm; >15 cm;

Phenology: Veg: _____ Flr: _____ Frt: _____
(# unless % noted)

B. Site description:

Slope direction: _____ Angle of slope: 1

Extent of exotics: _____ Dominant exotic species: _____

Surrounding plant community(ies): _____

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: _____

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: _____

Comments: _____

D. Defensibility:

Dist. to travelled roads: _____ Dist. to natural open space: _____

Connection to natural open space: Y N Natural/other barriers: Y N

Surrounding land use: The Nature Conservancy

E. Photos:

Film exposure #:

1. closeup with scale: _____

2. associates with frame: _____

3. habitat with landmarks & direction: _____

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SYCAMORE CANYON

Element Occurrence: 32 Subpopulation: 1A

Investigators: Scott McMillan Paul Kemp Date: 5/13/94

A. Extent of population:

Est. number of plants: 1300-1500+ Est. area of population: 30 m²

Size of plants: 0-5 cm: 60% 5-10 cm: 30% 10-15cm: 10% >15 cm:

Phenology: Veg: 95% Flr: 5% Frt:
(# unless % noted)

B. Site description:

Slope direction: 276° Angle of slope: 15°

Extent of exotics: >50% Dominant exotic species: Avena spp.,

Bromus rubens, Polypogon monspeliensis?

Surrounding plant community(ies): Coastal sage scrub, chamise chaparral

Other rare species: Harpagonella palmeri, Corethrogyne filag var. virg

Rare/sensitive communities:

C. Disturbance:

High: Medium: Low: none

Vehicles: Trash/Dumping: Brushing: Grazing:

Other:

Comments: Weeding would probably help.

D. Defensibility:

Dist. to travelled roads: 100 m Dist. to natural open space:

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: San Diego County park, Dept. Fish and Game

E. Photos:

Film exposure #:

1. closeup with scale: 0-1

2. associates with frame: 2-3

3. habitat with landmarks & direction: 4-5 36°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SYCAMORE CANYON

Element Occurrence: 32 Subpopulation: 1B (strip wrapping around rock outcrop)

Investigators: Scott McMillan Paul Kemp Date: 5/13/94

A. Extent of population:

Est. number of plants: 1800-2000+ Est. area of population: 50 x 10 m

Size of plants: 0-5 cm: 30% 5-10 cm: 40% 10-15cm: 20% >15 cm: 10%

Phenology: Veg: 90% Flr: 10% Frt:
(# unless % noted)

B. Site description:

Slope direction: 342° (336°) Angle of slope: 2° (14°)

Extent of exotics: >50% Dominant exotic species: Avena spp.,

Bromus rubens, Polypogon monspeliensis?

Surrounding plant community(ies): Coastal sage scrub, chamise chaparral

Other rare species: Harpagonella palmeri, Corethrogyne filag var. virg

Rare/sensitive communities: Gnatcatcher

C. Disturbance:

High: Medium: Low: x

Vehicles: Trash/Dumping: Brushing: Grazing:

Other:

Comments: Weeding would probably help.

D. Defensibility:

Dist. to travelled roads: 100 m Dist. to natural open space: none

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: San Diego County park, Dept. Fish and Game

E. Photos:

Film exposure #:

1. closeup with scale: 6-7

2. associates with frame: 8-9

3. habitat with landmarks & direction: 10-11 20°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SYCAMORE CANYON

Element Occurrence: 32 Subpopulation: 1C

Investigators: Scott McMillan Paul Kemp Date: 5/13/94

A. Extent of population:

Est. number of plants: 1200-1300 Est. area of population: 10 m²

Size of plants: 0-5 cm: 5% 5-10 cm: 10% 10-15cm: 15% >15 cm: 70%

Phenology: Veg: 8% Flr: 90% Frt: 2%
(# unless % noted)

B. Site description:

Slope direction: 268° Angle of slope: 23°

Extent of exotics: <50% Dominant exotic species: *Bromus rubens*

Bromus mollis *Sonchus oleraceus*

Surrounding plant community(ies): Coastal sage scrub

Other rare species: *Harpagonella palmeri*

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: _____

Comments: Weeding would probably help.

D. Defensibility:

Dist. to travelled roads: 100 m Dist. to natural open space: _____

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: San Diego County park, Dept. Fish and Game

E. Photos:

Film exposure #:

1. closeup with scale: 12-13 _____

2. associates with frame: 14-15 _____

3. habitat with landmarks & direction: 16-17 268°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SYCAMORE CANYON

Element Occurrence: 32 Subpopulation: 1D

Investigators: Scott McMillan Paul Kemp Date: 5/13/94

A. Extent of population:

Est. number of plants: 500+ Est. area of population: 30 m²

Size of plants: 0-5 cm: 10% 5-10 cm: 60% 10-15cm: 20% >15 cm: 10%

Phenology: Veg: 79% Flr: 20% Frt: 1%
(# unless % noted)

B. Site description:

Slope direction: 252° Angle of slope: 10°

Extent of exotics: >50% Dominant exotic species: *Bromus rubens*

Bromus mollis, *Avena fatua*

Surrounding plant community(ies): Coastal sage scrub

Other rare species: *Harpagonella palmeri*

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: none

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: _____

Comments: Weeding would probably help.

D. Defensibility:

Dist. to travelled roads: 3-400 m Dist. to natural open space: _____

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: San Diego County park, Dept. Fish and Game

E. Photos:

Film exposure #:

1. closeup with scale: 18-19 _____

2. associates with frame: 20-21 _____

3. habitat with landmarks & direction: 22-23 8°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SYCAMORE CANYON

Element Occurrence: 32 Subpopulation: 1E (10 m n of telephone pole #476839)

Investigators: Scott McMillan Paul Kemp Date: 5/13/94

A. Extent of population:

Est. number of plants: 5000-10,000 Est. area of population: 100+ m²

Size of plants: 0-5 cm: 10% 5-10 cm: 20% 10-15cm: 40% >15 cm: 30%

Phenology: Veg: 50% Flr: 50% Frt: 0%
(# unless % noted)

B. Site description:

Slope direction: 2° Angle of slope: 9°

Extent of exotics: >50% Dominant exotic species: Bromus rubens,

Bromus mollis, Avena fatua

Surrounding plant community(ies): Coastal sage scrub

Other rare species: Harpagonella palmeri, Corethrogyne filagin, var. virg.

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: none

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: _____

Comments: Weeding would probably help.

D. Defensibility:

Dist. to travelled roads: 500 m Dist. to natural open space: _____

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: San Diego County park, Dept. Fish and Game

E. Photos:

Film exposure #:

1. closeup with scale: 26-27 _____

2. associates with frame: 25-28 _____

3. habitat with landmarks & direction: 24-29 14°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SYCAMORE CANYON

Element Occurrence: 32 Subpopulation: 1F

Investigators: Scott McMillan Paul Kemp Date: 5/13/94

A. Extent of population:

Est. number of plants: 3000-5,000 Est. area of population: 150 m²

Size of plants: 0-5 cm: 25% 5-10 cm: 25% 10-15cm: 35% >15 cm: 15%

Phenology: Veg: 85% Flr: 15% Frt: 0%
(# unless % noted)

B. Site description:

Slope direction: 8° (192°) Angle of slope: 5° (20°)

Extent of exotics: <50% Dominant exotic species: Bromus rubens,

Bromus mollis, Avena fatua, Sonchus oleraceus

Surrounding plant community(ies): Coastal sage scrub

Other rare species: Harpagonella palmeri, Corethrogyne filagin. var. virg.

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: none

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: Formerly disked farm land to south.

Comments: Weeding would probably help.

D. Defensibility:

Dist. to travelled roads: 250 m Dist. to natural open space: _____

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: San Diego County park, Dept. Fish and Game

E. Photos:

Film exposure #:

1. closeup with scale: 30-31 _____

2. associates with frame: 32-33 _____

3. habitat with landmarks & direction: 34-35 4°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SYCAMORE CANYON

Element Occurrence: 32 Subpopulation: 2

Investigators: Scott McMillan Date: 9/18/94

A. Extent of population:

Est. number of plants: 5000-10,000 Est. area of population: 100 x 30m

Size of plants: 0-5 cm: 10% 5-10 cm: 30% 10-15cm: 30% >15 cm: 30%

Phenology: Veg: 0% Flr: 0% Frl: 100%
(# unless % noted)

B. Site description:

Slope direction: 280° (70°) Angle of slope: 10° (15°)

Extent of exotics: <50% Dominant exotic species: Centaurea melitensis
Avena spp., Sonchus oleraceus

Surrounding plant community(ies): Coastal sage scrub/chaparral

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: none

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: _____

Comments: _____

D. Defensibility:

Dist. to travelled roads: 1/4 mile Dist. to natural open space: _____

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: park or BLM?

E. Photos:

Film exposure #:

1. closeup with scale: 14-15 _____

2. associates with frame: 16-17 _____

3. habitat with landmarks & direction: 18-19 295°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SYCAMORE CANYON

Element Occurrence: 32 Subpopulation: 3

Investigators: Scott McMillan Date: 9/18/94

A. Extent of population:

Est. number of plants: 3000 Est. area of population: 200 x 75m

Size of plants: 0-5 cm: 10% 5-10 cm: 20% 10-15cm: 35% >15 cm: 35%

Phenology: Veg: 0% Flr: 0% Frt: 100%
(# unless % noted)

B. Site description:

Slope direction: 278° Angle of slope: 15°

Extent of exotics: <50% Dominant exotic species: Centaurea melitensis

Avena spp., Bromus rubens

Surrounding plant community(ies): Chaparral

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: x Grazing: x

Other: It is very close to the road.

Comments: Close to the site is graded with many weeds: Needs barrier/signs.

D. Defensibility:

Dist. to travelled roads: 30 m Dist. to natural open space: _____

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: park or BLM?

E. Photos:

Film exposure #:

1. closeup with scale: 26-27 _____

2. associates with frame: 28-29 _____

3. habitat with landmarks & direction: 30-31 278°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SYCAMORE CANYON

Element Occurrence: 32 Subpopulation: 4

Investigators: Scott McMillan Date: 9/18/94

A. Extent of population:

Est. number of plants: 1000 Est. area of population: 100 x 200 m

Size of plants: 0-5 cm: 5% 5-10 cm: 20% 10-15cm: 35% >15 cm: 40%

Phenology: Veg: 0% Flr: 0% Frt: 100%
(# unless % noted)

B. Site description:

Slope direction: 100° Angle of slope: 15°

Extent of exotics: <50% Dominant exotic species: Centaurea melitensis

Avena spp., Bromus rubens

Surrounding plant community(ies): Chaparral

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: x Grazing: x

Other: It is split by a dirt road.

Comments: Needs barrier/signs.

D. Defensibility:

Dist. to travelled roads: 0 m Dist. to natural open space: _____

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: park or BLM?

E. Photos:

Film exposure #:

1. closeup with scale: 32-33

2. associates with frame: 34-35

3. habitat with landmarks & direction: 36-37 140°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SYCAMORE CANYON

Element Occurrence: 32 Subpopulation: 5

Investigators: Scott McMillan Date: 9/18/94

A. Extent of population:

Est. number of plants: 3000+ & 500 Est. area of population: 50 x 100, 50² m

Size of plants: 0-5 cm: 10% 5-10 cm: 20% 10-15cm: 35% >15 cm: 35%

Phenology: Veg: 0% Flr: 0% Frt: 100%
(# unless % noted)

B. Site description:

Slope direction: 94° (140°) Angle of slope: 15° (15°)

Extent of exotics: <50% Dominant exotic species: *Centaurea melitensis*
Avena spp., *Bromus rubens*

Surrounding plant community(ies): Chaparral

Other rare species: *Harpagonella palmeri*, possibly *Fritillaria biflora*

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: There are Eucalypts on the east-facing slope. _____

Comments: No disturbance. Eucalypts should be removed.

D. Defensibility:

Dist. to travelled roads: 1/2 mile Dist. to natural open space: _____

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: park or BLM?

E. Photos:

Film exposure #:

1. closeup with scale: 20-21 _____

2. associates with frame: 22-23 _____

3. habitat with landmarks & direction: 24-25 106°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: MISSION TRAILS

Element Occurrence: 33 Subpopulation: A (B and C suitable habitat: no plants obs.)

Investigators: Scott McMillan Brenda Stone Date: 7/11/94

A. Extent of population:

Est. number of plants: 300 Est. area of population: 50 m²

Size of plants: 0-5 cm: 5-10 cm: 5% 10-15cm: 25% >15 cm: 70%

Phenology: Veg: Flr: 1% Frt: 99%
(# unless % noted)

B. Site description:

Slope direction: 164° Angle of slope: 12°

Extent of exotics: >50% Dominant exotic species: Bromus carinatus,

Avena spp., Centaurea melitensis

Surrounding plant community(ies): Coastal sage scrub, chaparral

Other rare species:

Rare/sensitive communities:

C. Disturbance:

High: Medium: x Low:

Vehicles: x Trash/Dumping: Brushing: Grazing:

Other: Trails are cut through the site but one is blocked off.

Comments: Needs signs saying "keep out". Restoration possible

D. Defensibility:

Dist. to travelled roads: 10 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: Mission Trails Regional Park

E. Photos:

Film exposure #:

1. closeup with scale: 27-28

2. associates with frame: 29-30

3. habitat with landmarks & direction: 31-32 264°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: MISSION TRAILS (160' from back fence of 11792 Inviero St.)

Element Occurrence: 34 Subpopulation: _____

Investigators: Scott McMillan Paul Kemp Date: 5/18/94

A. Extent of population:

Est. number of plants: 200-300 Est. area of population: 10 m²

Size of plants: 0-5 cm: 40% 5-10 cm: 20% 10-15cm: 20% >15 cm: 20%

Phenology: Veg: 90% Flr: 10% Frt:
(# unless % noted)

B. Site description:

Slope direction: 46° Angle of slope: 12°

Extent of exotics: >50% Dominant exotic species: Brassica nigra,

Avena spp., Anagallis arvensis

Surrounding plant community(ies): Coastal sage scrub

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: x Trash/Dumping: x Brushing: x Grazing: _____

Other: Very weedy area, Path adjacent

Comments: Needs protection from disturbance, weed removal.

D. Defensibility:

Dist. to travelled roads: 150 m Dist. to natural open space: 30 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: Mission Trails Regional Park to east, residence to w

E. Photos:

Film exposure #:

1. closeup with scale: 36-37 _____

2. associates with frame: 1-2 _____

3. habitat with landmarks & direction: 3-4 228°(toward homes)

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: POWAY

Element Occurrence: 36 Subpopulation: Could be treated as 3 subpopulations

Investigators: Scott McMillan Paul Kemp Date: 5/19/94

A. Extent of population:

Est. number of plants: 16,400 Est. area of population: 80 m²

Size of plants: 0-5 cm: 20% 5-10 cm: 30% 10-15cm: 30% >15 cm: 20%

Phenology: Veg: 14% Flr: 80% Frt: 1%
(# unless % noted)

B. Site description:

Slope direction: 14°/20°/5° Angle of slope: None

Extent of exotics: >50% (Upper <50%) Dominant exotic species: Brassica nigra,

Avena spp., Centaurea melitensis, Centaurea melitensis, Lolium

Surrounding plant community(ies): Coastal sage scrub, oak scrub

Other rare species: Adolphia californica

C. Disturbance:

High: Medium: x+ Low:

Vehicles: x Trash/Dumping: Brushing: x Grazing:

Other: Road, now abandoned, cuts the site into pieces. Population could have

Comments: been continous and large. Restoration needed.

D. Defensibility:

Dist. to travelled roads: 150 m Dist. to natural open space:

Connection to natural open space: Y x N Natural/other barriers: Y N

Surrounding land use: Sewage plant to nw, grading to s & east to development.

E. Photos:

Film exposure #:

1. closeup with scale: 5-6 upper site

2. associates with frame: 7-8 upper site

9-10 upper site habitat (o°)

3. habitat with landmarks & direction: 11-12 2 sites on hill, 3rd behind-192°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: Lux Canyon (El Camino transplant)

Element Occurrence: 38 Subpopulation: _____

Investigators: Scott McMillan Paul Kemp Date: 6/6/94

A. Extent of population:

Est. number of plants: 17 Est. area of population: 2 m²

Size of plants: 0-5 cm: _____ 5-10 cm: _____ 10-15cm: 10% >15 cm: 90%

Phenology: Veg: _____ Flr: 80% Frt: 20%
(# unless % noted)

B. Site description:

Slope direction: 58° Angle of slope: 35°

Extent of exotics: >50% Dominant exotic species: Brassica nigra,

Avena spp., Centaurea melitensis, Anagallis arvensis

Surrounding plant community(ies): Coastal sage scrub

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: x Low: _____

Vehicles: _____ Trash/Dumping: _____ Brushing: x Grazing: _____

Other: Eucalyptus possibly invading area. Within 3 m of an apartment parking

Comments: lot. Needs fencing and signs, as well as regular weeding.

D. Defensibility:

Dist. to travelled roads: 100 m Dist. to natural open space: _____

Connection to natural open space: Y N x Natural/other barriers: Y N x

Surrounding land use: Homes and apartments

E. Photos:

Film exposure #:

1. closeup with scale: 9-10 _____

2. associates with frame: 11-12 _____

3. habitat with landmarks & direction: 13-14 58°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: QUAIL BOTANIC GARDENS, ENCINITAS (transplant)

Element Occurrence: 39 Subpopulation: _____

Investigators: Scott McMillan Paul Kemp Date: 6/6/94

A. Extent of population:

Est. number of plants: 160 Est. area of population: 10 m²

Size of plants: 0-5 cm: 95% 5-10 cm: 5% 10-15cm: >15 cm:

Phenology: Veg: Flr: Frt: 100%
(# unless % noted)

B. Site description:

Slope direction: 66° Angle of slope: 4°

Extent of exotics: <50% Dominant exotic species: Bromus rubens,

Avena spp., Bromus carinatus

Surrounding plant community(ies): Coastal sage scrub/chaparral, bot. garden

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: x Low: _____

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: Foot traffic very close. Imported soil mound eroding away.

Comments: Needs to be signed & surrounded by a berm or retaining wall.

D. Defensibility:

Dist. to travelled roads: 100 m Dist. to natural open space: _____

Connection to natural open space: Y N x Natural/other barriers: Y N x

Surrounding land use: Quail Botanic Gardens, green houses.

E. Photos:

Film exposure #:

1. closeup with scale: 27-28 _____

2. associates with frame: 29-30 _____

3. habitat with landmarks & direction: 31-32 39°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: LAS BRISAS (transplant)

Element Occurrence: 41 Subpopulation: _____

Investigators: Scott McMillan Paul Kemp Date: 5/31/94

A. Extent of population:

Est. number of plants: 30 Est. area of population: 10 m²

Size of plants: 0-5 cm: 20% 5-10 cm: 80% 10-15cm: 10% >15 cm:

Phenology: Veg: Flr: 50% Frt: 50%
(# unless % noted)

B. Site description:

Slope direction: 148° Angle of slope: 3°

Extent of exotics: >50% Dominant exotic species: Bromus spp.,

Sonchus spp., Brassica spp., Centaurea melitensis

Surrounding plant community(ies): Coastal sage scrub, chaparral

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: x Medium: _____ Low: _____

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: Scraped before revegetation, but still disturbed.

Comments: This site is almost gone. Weeds dominate and need to be removed.

D. Defensibility:

Dist. to travelled roads: 100 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: Trailer park, roads

E. Photos:

Film exposure #:

1. closeup with scale: 25-26 _____

2. associates with frame: 27-28 _____

3. habitat with landmarks & direction: 29-30 126° towards intersection

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: SPYGLASS/HERITAGE PARK

Element Occurrence: 42 Subpopulation: 2 30 m behind homes; 1 30 m to east

Investigators: Scott McMillan Paul Kemp Date: 6/6/94

A. Extent of population:

Est. number of plants: 5000+ Est. area of population: _____

Size of plants: 0-5 cm: 30% 5-10 cm: 30% 10-15cm: 35% >15 cm: 5%

Phenology: Veg: Flr: 5% Frt: 95%
(# unless % noted)

B. Site description:

Slope direction: 78° Angle of slope: 7°

Extent of exotics: >50% Dominant exotic species: Bromus mollis, Bromus rubens, Avena spp., Centaurea melitensis

Surrounding plant community(ies): Coastal sage scrub

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: x Medium: _____ Low: _____

Vehicles: x Trash/Dumping: _____ Brushing: x Grazing: _____

Other: Bike trail is a serious threat. Homeowners mowing back yards get very

Comments: close to western subpopulations. Fence and sign.

D. Defensibility:

Dist. to travelled roads: 50 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y x N

Surrounding land use: Homes to west.

E. Photos:

Film exposure #:

1. closeup with scale: 3-4 _____

2. associates with frame: 5-6 _____

3. habitat with landmarks & direction: 7-8 276°, pop 3 behind photo

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: RANCHO SANTA FE (north)

Element Occurrence: 47 Subpopulation: _____

Investigators: Scott McMillan Paul Kemp Date: 6/6/94

A. Extent of population:

Est. number of plants: 2000+ Est. area of population: 10 m²

Size of plants: 0-5 cm: 30% 5-10 cm: 30% 10-15cm: 30% >15 cm: 10%

Phenology: Veg: Flr: 5% Frt: 95%
(# unless % noted)

B. Site description:

Slope direction: 313° Angle of slope: 12°

Extent of exotics: >50% Dominant exotic species: Bromus rubens,

Avena spp., Centaurea melitensis

Surrounding plant community(ies): Coastal sage scrub

Other rare species: _____

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: x Low: _____

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: x

Other: Cattle trampling

Comments: Need to exclude cattle.

D. Defensibility:

Dist. to travelled roads: 500 m Dist. to natural open space: _____

Connection to natural open space: Y N x Natural/other barriers: Y N x

Surrounding land use: Homes and fallow agriculture

E. Photos:

Film exposure #:

1. closeup with scale: 15-16

2. associates with frame: 17-18

3. habitat with landmarks & direction: 19-20 313°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: RANCHO SANTA FE (south)

Element Occurrence: 48 Subpopulation: Many follow scrub/grassland boundary

Investigators: Scott McMillan Paul Kemp Date: 6/6/94

A. Extent of population:

Est. number of plants: 1000+ Est. area of population: 100x30 m

Size of plants: 0-5 cm: 20% 5-10 cm: 20% 10-15cm: 30% >15 cm: 30%

Phenology: Veg: Flr: 90% Frt: 10%
(# unless % noted)

B. Site description:

Slope direction: 336° Angle of slope: 25°

Extent of exotics: >50% Dominant exotic species: Bromus carinatus,

Avena spp., Lolium spp.

Surrounding plant community(ies): Coastal sage scrub

Other rare species:

Rare/sensitive communities:

C. Disturbance:

High: Medium: x Low:

Vehicles: Trash/Dumping: Brushing: Grazing:

Other: Trail goes up and down through populations.

Comments: Needs to be fenced and signed. Restore trails.

D. Defensibility:

Dist. to travelled roads: 300 m Dist. to natural open space: 10 m

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: Homes to se. Fallow agriculture & greenhouses to nw

E. Photos:

Film exposure #:

1. closeup with scale: 23-24

2. associates with frame: 25-26

3. habitat with landmarks & direction: 21-22 242°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: VIEJAS MOUNTAINElement Occurrence: 50 Subpopulation: AInvestigators: Scott McMillan Paul Kemp Ellen Bauder Date: 6/14/94

A. Extent of population:

Est. number of plants: 77 Est. area of population: 3 m²Size of plants: 0-5 cm: 10% 5-10 cm: 40% 10-15cm: 40% >15 cm: 10%Phenology: Veg: Flr: 100% Frt:
(# unless % noted)

B. Site description:

Slope direction: 80° Angle of slope: 12°Extent of exotics: <50% Dominant exotic species: *Bromus rubens**Centaurea melitensis*, *Avena* spp.Surrounding plant community(ies): ChaparralOther rare species: *Harpagonella palmeri*

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: xVehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: x

Other: _____

Comments: Evidence of grazing.

D. Defensibility:

Dist. to travelled roads: 500 m Dist. to natural open space: _____Connection to natural open space: Y x N Natural/other barriers: Y N xSurrounding land use: US Forest Service/Viejas Indian Reservation

E. Photos:

Film exposure #:

1. closeup with scale: 23-24 _____2. associates with frame: 25-1 _____3. habitat with landmarks & direction: 2-3 80°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: VIEJAS MOUNTAIN

Element Occurrence: 50 Subpopulation: B

Investigators: Scott McMillan Paul Kemp Ellen Bauder Date: 6/14/94

A. Extent of population:

Est. number of plants: 1000, widely scattered Est. area of population: 2-300 m²

Size of plants: 0-5 cm: 10% 5-10 cm: 10% 10-15cm: 50% >15 cm: 30%

Phenology: Veg: Flr: 100% Frt:
(# unless % noted)

B. Site description:

Slope direction: 84° Angle of slope: 10°

Extent of exotics: <50% Dominant exotic species: Bromus rubens,

Centaurea melitensis, Avena spp.

Surrounding plant community(ies): Chaparral

Other rare species: Harpagonella palmeri, Quercus engelmannii

Rare/sensitive communities:

C. Disturbance:

High: Medium: Low: x

Vehicles: Trash/Dumping: Brushing: Grazing: x

Other:

Comments: Some evidence of grazing.

D. Defensibility:

Dist. to travelled roads: 500 m Dist. to natural open space:

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: US Forest Service/Viejas Indian Reservation

E. Photos:

Film exposure #:

1. closeup with scale: 4-5

2. associates with frame: 6-7

3. habitat with landmarks & direction: 8-9 84°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: VIEJAS MOUNTAIN

Element Occurrence: 50 Subpopulation: C

Investigators: Scott McMillan Paul Kemp Ellen Bauder Date: 6/14/94

A. Extent of population:

Est. number of plants: 2500 Est. area of population: 300 m²

Size of plants: 0-5 cm: 30% 5-10 cm: 30% 10-15cm: 30% >15 cm: 10%

Phenology: Veg: 20% Flr: 80% Frt:
(# unless % noted)

B. Site description:

Slope direction: 184° Angle of slope: 5°

Extent of exotics: <50% Dominant exotic species: Bromus rubens,

Centaurea melitensis, Avena app.

Surrounding plant community(ies): Chaparral

Other rare species: Harpagonella palmeri, Orobanche parishii ssp. parishii

Rare/sensitive communities:

C. Disturbance:

High: Medium: Low: x

Vehicles: Trash/Dumping: Brushing: Grazing: x

Other:

Comments:

D. Defensibility:

Dist. to travelled roads: 1 km ? Dist. to natural open space:

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: US Forest Service

E. Photos:

Film exposure #:

1. closeup with scale: 10-11

2. associates with frame: 12-13

3. habitat with landmarks & direction: 14-15 184°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: VIEJAS MOUNTAIN

Element Occurrence: 50 Subpopulation: D

Investigators: Scott McMillan Paul Kemp Ellen Bauder Date: 6/14/94

A. Extent of population:

Est. number of plants: 2000 Est. area of population: 300 m²

Size of plants: 0-5 cm: 5% 5-10 cm: 5% 10-15cm: 20% >15 cm: 70%

Phenology: Veg: 5% Flr: 95% Frt: 10%
(# unless % noted)

B. Site description:

Slope direction: 164° Angle of slope: 6°

Extent of exotics: <50% Dominant exotic species: Bromus rubens,

Centaurea melitensis, Avena app.

Surrounding plant community(ies): Chaparral

Other rare species: Harpagonella palmeri

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: x

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: Trail goes up and down through populations.

Comments: Some erosion may be a problem as could residences below.

D. Defensibility:

Dist. to travelled roads: 1 km Dist. to natural open space: _____

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: US Forest Service, private residences below.

E. Photos:

Film exposure #:

1. closeup with scale: 16-17 _____

2. associates with frame: 18-19 _____

3. habitat with landmarks & direction: 20-21 130°, looking towards 50 C

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: VIEJAS MOUNTAIN (Victoria Lane)

Element Occurrence: 51 Subpopulation: _____

Investigators: Scott McMillan Marcy Darby Matthew McMillan Date: 6/21/94

A. Extent of population:

Est. number of plants: 3500 Est. area of population: 400 mx50 m

Size of plants: 0-5 cm: 10% 5-10 cm: 30% 10-15cm: 30% >15 cm: 30%

Phenology: Veg: Flr: 90% Frt: 10%
(# unless % noted)

B. Site description:

Slope direction: 184° Angle of slope: 15°

Extent of exotics: <50% Dominant exotic species: Bromus rubens,

Centaurea melitensis, Avena spp.

Surrounding plant community(ies): Chaparral

Other rare species: Harpagonella palmeri

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: _____ Low: _____

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: _____

Comments: _____

D. Defensibility:

Dist. to travelled roads: 500 m Dist. to natural open space: _____

Connection to natural open space: Y x N Natural/other barriers: Y N x

Surrounding land use: US Forest Service/Viejas Indian Reservation

E. Photos:

Film exposure #:

1. closeup with scale: 1-2 _____

2. associates with frame: 3-4 _____

3. habitat with landmarks & direction: 5-6 180°

ACANTHOMINTHA ILICIFOLIA FIELD SURVEY FORM

Population Location: ESCONDIDO (Emerald Heights)

Element Occurrence: 61 Subpopulation: A/B (A is n-nw of knoll, B nw of A)

Investigators: Scott McMillan Date: 5/31/94

A. Extent of population:

Est. number of plants: 3 (A), 2 (B) Est. area of population: 1 m²

Size of plants: 0-5 cm: 5-10 cm: 100% 10-15cm: >15 cm:

Phenology: Veg: Flr: 100% Frt:
(# unless % noted)

B. Site description:

Slope direction: 220°(A), 204°(B) Angle of slope: 1°(A), 10° (B)

Extent of exotics: <50% Dominant exotic species: Anagallis arvensis,

Centaurea melitensis, Sonchus oleracea, Brassica nigra

Surrounding plant community(ies): Coastal sage scrub/chaparral

Other rare species: Harpagonella palmeri

Rare/sensitive communities: _____

C. Disturbance:

High: _____ Medium: x Low: _____

Vehicles: _____ Trash/Dumping: _____ Brushing: _____ Grazing: _____

Other: Drainage created by home on ridge above to north is destroying

Comments: subpopulation B and jeopardizes the whole clay soil area.

D. Defensibility:

Dist. to travelled roads: 150 m Dist. to natural open space: 150 m

Connection to natural open space: Y N x Natural/other barriers: Y N x

Surrounding land use: Homes and recreation center

E. Photos:

Film exposure #:

1. closeup with scale: 19-20 (compass for scale) _____

2. associates with frame: 21-22 _____

3. habitat with landmarks & direction: 23-24 250°

APPENDIX B
SPECIES LIST BY SITE

SITE SPECIES LISTS

SPECIES	EO#	12A	12B	12C	12D	19	21	22A
Adenostoma fasciculatum				X	X		X	X
Adolphia californica						X		
Allium				X				X
Anagallis arvensis						X	X	X
Antirrhinum nuttallianum								
Apiastrum angustifolium								
Aristida adscensionis								
Artemisia californica			X	X	X	X		
Asclepias californica				X				
Astragalus spp.								
Avena		X	X	X	X			
Avena barbata								X
Avena fatua						X		
Baccharis sarothroides								
Bloomeria crocea				X				
Brassica								
Brassica nigra						X	X	
Brodiaea jolonensis								
Bromus						X		
Bromus carinatus			X					
Bromus diandrus								
Bromus mollis						X		
Bromus rubens		X		X	X	X	X	X
Bromus tectorum								
Calamagrostis densa								
Calochortus concolor		X	X	X				
Calochortus splendens						X		X
Calycadenia tenella						X		
Calystegia macrostegia			X		X			
Castilleja foliolosa		X	X					
Ceanothus cyaneus								
Ceanothus greggii								
Ceanothus tomentosus								
Centaurea melitensis		X		X	X		X	X
Centaureum venustum								
Cercocarpus minutiflorus								
Chaenactis glabriuscula								
Chlorogalum parviflora				X	X			
Chorizanthe fimbriata var. fimbriata		X	X	X	X		X	X
Chrysanthemum coronarium								
Cirsium vulgare		X	X	X	X			
Cneoridium dumosum							X	
Cordylanthus filifolius								
Corethrogyne filaginifolia var. virgata		X	X	X	X			
Cryptantha								
Cuscuta spp.								
Delphinium parryi var. parryi								
Dichelostemma capitata								
Dudleya edulis								
Dudleya pulverulenta			X	X	X			X
Dudleya variegata								
Epilobium								
Eremocarpus setigerus								
Eriodictyon crassifolium		X						

SITE SPECIES LISTS

	EO#	12A	12B	12C	12D	19	21	22A
SPECIES								
Eriogonum fasciculatum		X	X	X				X
Eriophyllum confertiflorum		X	X	X	X	X		X
Erodium cicutarium						X		X
Eucalyptus								
Ferocactus viridescens								
Filago californica		X						X
Foeniculum vulgare								
Fraxinus spp.								
Galium angustifolium		X	X	X	X	X		
Gastridium ventricosum						X		
Gilia spp.								X
Gnaphalium californicum								
Grindelia robusta								
Gutierrezia californica		X	X	X	X		X	X
Gutierrezia sarothrae								
Haplopappus venetus						X		X
Harpagonella palmeri		X	X	X	X			
Hazardia squarrosa							X	X
Helianthus gracilis				X				X
Hemizonia fasciculata				X	X	X	X	X
Heteromeles arbutifolia		X	X	X	X			
Hordeum vulgare								
Hypochoeris glabra						X		
Isomeris arborea						X		
Lamarkia								
Lepidium spp.				X				
Lolium spp.						X		
Lonicera subspicata			X					
Lotus cf. grandiflora								X
Lotus scoparius		X						
Lupinus spp.						X		
Malosma laurina							X	
Marah macrocarpa								
Medicago polymorpha								
Melilotus alba								
Melilotus indicus								
Mimulus puniceus								
Navarretia spp.								
Navarretia hamata								
Nolina interrata							X	X
Nicotiana glauca								
Opuntia littoralis								
Orobancha parishii var. parishii					X			
Orthocarpus purpurascens								
Oxalis albicans								
Penstemon heterophyllus								
Phalaris spp.								
Plantago spp.								
Plantago erecta					X			
Porophyllum gracilis								
Quercus					X			
Quercus dumosa			X					
Quercus engelmannii			X					
Rhamnus crocea			X	X			X	

SITE SPECIES LISTS

	EO#	12A	12B	12C	12D	19	21	22A
SPECIES								
Rhus integrifolia						X		
Rhus ovata			X	X			X	
Salsola kall								
Salvia apiana		X	X	X				
Salvia clevelandii							X	
Salvia mellifera						X		
Salvia sonomensis								
Sambucus mexicana								
Sanicula spp.				X				
Sanicula bipinnatifida								
Scutellaria tuberosa								
Selaginella bigelovii					X			
Selaginella cinerascens								
Simmondsia chinensis								
Sisyrinchium bellum		X	X	X	X			X
Solanum tenuberia							X	
Sonchus oleraceus						X	X	
Spergula spp.								
Spergularia sp.						X		
Stachys rigida								
Stipa spp.								
Stipa coronata								
Stipa pulchra		X	X	X	X	X	?	X
Tetracoccus dioicus								
Trichostema lanatum								
Trichostema parishii								
Uropappus lindleyi						X		
Vulpia myuros								
Xylococcus bicolor							X	X
Yucca whipplei		X	X	X	X		X	X

SITE SPECIES LISTS

SPECIES	25	30A	30B	32(1A)	32(1B)	32(1C)	32(1D)	32(1E)	32(1F)
Adenostoma fasciculatum		X	X	X					
Adolphia californica									
Allium	X	X	X		X	X	X		X
Anagallis arvensis	X			X	X	X	X	X	X
Antirrhinum nuttallianum		X	X						
Aplastrum angustifolium	X			X	X	X	X	X	X
Aristida adscensionis	X							X	X
Artemisia californica	X				X	X	X	X	X
Asclepias californica									
Astragalus spp.									
Avena				X					
Avena barbata									
Avena fatua	X				X	X	X	X	X
Baccharis sarothroides									X
Bloomeria crocea	X			X	X	X		X	X
Brassica									
Brassica nigra	X								
Brodiaea jolonensis									
Bromus	X								
Bromus carinatus									
Bromus diandrus									
Bromus mollis	X			X	X	X	X	X	X
Bromus rubens	X	X	X	X	X	X	X	X	X
Bromus tectorum									
Calamagrostis densa					X				
Calochortus concolor									
Calochortus splendens	X	X	X	X	X	X	X	X	X
Calycadenia tenella									
Calystegia macrostegia	X							X	
Castilleja foliolosa									
Ceanothus cyaneus									
Ceanothus greggii									
Ceanothus tomentosus									
Centaurea mollis	X	X	X					X	
Centaurea venustum		X	X					X	
Cercocarpus minutiflorus		X	X						
Chaenactis glabriuscula									
Chlorogalum parviflora	X				X	X	X	X	X
Chorizanthe fimbriata var. fimbriata	X	X	X	X			X	X	X
Chrysanthemum coronarium									
Cirsium vulgare	X								
Cnroridium dumosum									
Cordylanthus filifolius									
Corethrogyne filaginifolia var. virgata	X			X		X	X	X	X
Cryptantha									
Cuscuta spp.		X	X						
Delphinium parryi var. parryi				X					
Dichelostemma capitata	X						X	X	X
Dudleya edulis									
Dudleya pulverulenta									
Dudleya variegata	X								
Epilobium									
Eremocarpus setigerus								X	
Eriodictyon crassifolium									

SITE SPECIES LISTS

SPECIES	25	30A	30B	32(1A)	32(1B)	32(1C)	32(1D)	32(1E)	32(1F)
Eriogonum fasciculatum	X				X	X			X
Eriophyllum confertiflorum		X	X	X		X		X	X
Erodium cicutarium	X			X			X	X	X
Eucalyptus									
Ferocactus viridescens	X								
Filago californica		X	X	X	X	X	X	X	
Foeniculum vulgare									
Fraxinus spp.									
Gallium angustifolium					X			X	
Gastidium ventricosum		X	X			X	X	X	
Gilia spp.			X						
Gnaphalium californicum									
Grindella robusta				X	X		X		
Gutierrezia californica		X	X						
Gutierrezia sarothrae									X
Haplopappus venetus	X						X	X	X
Harpagonella palmeri		X	X	X	X	X		X	X
Hazardia squarrosa			X						X
Helianthus gracilis									
Hemizonia fasciculata	X	X	X	X	X	X		X	
Heteromeles arbutifolia		X	X	X	X	X		X	X
Hordeum vulgare			X						
Hypochoeris glabra	X			X	X		X	X	X
Isomeris arborea	X								
Lamarkia									
Lepidium spp.									
Lolium spp.									
Lonicera subspicata				X		X		X	X
Lotus cf. grandiflora									
Lotus scoparius								X	
Lupinus spp.									
Malosma laurina	X	X	X	X	X	X	X	X	X
Marah macrocarpa									
Medicago polymorpha									
Mellilotus alba									
Mellilotus indicus									
Mimulus puniceus				X				X	
Navarretia spp.				X					
Navarretia hamata		X	X						X
Nolina interrata									
Nicotiana glauca									
Opuntia littoralis	X								
Orobanche parishii var. parishii									
Orthocarpus purpurascens									
Oxalis albicans					X			X	
Penstemon heterophyllus									
Phalaris spp.	X								
Plantago spp.	X								
Plantago erecta				X	X	X	X	X	
Porophyllum gracilis			X						
Quercus									
Quercus dumosa				X					
Quercus engelmannii									
Rhamnus crocea				X	X	X		X	X

SITE SPECIES LISTS

SPECIES	25	30A	30B	32(1A)	32(1B)	32(1C)	32(1D)	32(1E)	32(1F)
<i>Rhus integrifolia</i>	X								
<i>Rhus ovata</i>			X						
<i>Salsola kali</i>									
<i>Salvia apiana</i>	X			X	X	X		X	X
<i>Salvia clevelandii</i>		X	X			X			
<i>Salvia mellifera</i>	X			X	X			X	X
<i>Salvia sonomensis</i>									
<i>Sambucus mexicanum</i>									
<i>Sanicula</i> spp.			X						
<i>Sanicula bipinnatifida</i>							X		
<i>Scutellaria tuberosa</i>									
<i>Selaginella bigelovii</i>				X	X				
<i>Selaginella cinerascens</i>					X			X	X
<i>Simmondsia chinensis</i>									
<i>Sisyrinchium bellum</i>	X	X	X	X	X	X	X	X	X
<i>Solanum tenulobata</i>									
<i>Sonchus oleraceus</i>	X	X	X		X		X	X	X
<i>Spergula</i> spp.									
<i>Spergularia</i> sp.	X								
<i>Stachys rigida</i>									
<i>Stipa</i> spp.									
<i>Stipa coronata</i>			X						
<i>Stipa pulchra</i>	X	X	X		X	X	X	X	X
<i>Tetracoccus dioicus</i>		X	X						
<i>Trichostema lanatum</i>			X						
<i>Trichostema parishii</i>									
<i>Uropappus lindleyi</i>	X			X	X	X	X		
<i>Vulpia myuros</i>									
<i>Xylococcus bicolor</i>		X	X						
<i>Yucca whipplei</i>		X	X					X	X

SITE SPECIES LISTS

SPECIES	32(2)	32(3)	32(4)	32(5)	33	34	36	38	39
Adenostoma fasciculatum	X	X	X	X					X
Adolphia californica							X	X	
Allium									
Anagallis arvensis	X	X		X	X	X	X	X	X
Antirrhinum nuttallianum									
Apiastrum angustifolium	X	X	X	X			X	X	X
Aristida adscensionis									
Artemisia californica	X	X	X	X	X	X		X	X
Asclepias californica									
Astragalus spp.					X				
Avena	X	X	X	X	X		X	X	X
Avena barbata									
Avena fatua						X			
Baccharis sarothroides			X		X		X		
Bloomeria crocea						X	X	X	X
Brassica									
Brassica nigra			X		X	X	X	X	X
Brodiaea jolonensis									
Bromus									
Bromus carinatus		X	X	X	X				X
Bromus diandrus							X		
Bromus mollis		X	X	X	X		X	X	X
Bromus rubens	X	X	X	X	X	X	X	X	X
Bromus tectorum									X
Calamagrostis densa									
Calochortus concolor									
Calochortus splendens	?	?	?	?		X	X		
Calycadenia tenella					X				
Calystegia macrostegia			X	X					
Castilleja foliolosa									
Ceanothus cyaneus									
Ceanothus greggii									
Ceanothus tomentosus									
Centaurea melitensis	X	X	X	X	X	X	X	X	X
Centaurea venustum							X	X	
Cercocarpus minutiflorus		X		X					
Chaenactis glabriuscula									
Chlorogalum parviflora									X
Chorizanthe fimbriata var. umbriata	X	X			X		X		
Chrysanthemum coronarium									
Cirsium vulgare							X		
Cneoridium dumosum									
Cordylanthus filifolius								X	
Corethrogyne filaginifolia var. virgata	?	?	?	?					
Cryptantha									
Cuscuta spp.									
Delphinium parryi var. parryi							X		
Dichelostemma capitata							X		
Dudleya edulis								X	
Dudleya pulverulenta									
Dudleya variegata									
Epilobium									
Eremocarpus setigerus	X								
Eriodictyon crassifolium									

SITE SPECIES LISTS

SPECIES	32(2)	32(3)	32(4)	32(5)	33	34	36	38	39
<i>Eriogonum fasciculatum</i>				X	X			X	X
<i>Eriophyllum confertiflorum</i>	X	X	X	X				X	
<i>Erodium cicutarium</i>						X	X	X	
<i>Eucalyptus</i>				X				X	
<i>Ferocactus viridescens</i>					X	X			
<i>Filago californica</i>					X	X		X	
<i>Foeniculum vulgare</i>								X	
<i>Fraxinus</i> spp.									
<i>Galium angustifolium</i>								X	
<i>Gastidium ventricosum</i>									X
<i>Gilia</i> spp.									
<i>Gnaphalium californicum</i>						X			
<i>Grindelia robusta</i>	X		X						X
<i>Gutierrezia californica</i>	?	?		?	X				
<i>Gutierrezia sarothrae</i>									
<i>Haplopappus venetus</i>		X	X		X	X	X	X	
<i>Harpagonella palmeri</i>				X					
<i>Hazardia squarrosa</i>									
<i>Helianthus gracilis</i>									
<i>Hemizonia fasciculata</i>	X	X	X	X	X	X	X	X	X
<i>Heteromeles arbutifolia</i>	X	X	X	X	X			X	
<i>Hordeum vulgare</i>									
<i>Hypochoeris glabra</i>						X	X	X	X
<i>Isomeris arborea</i>					X				
<i>Lamarkia</i>									
<i>Lepidium</i> spp.									
<i>Lolium</i> spp.							X		X
<i>Lonicera subspicata</i>	X		X				X	X	
<i>Lotus cf. grandiflora</i>									
<i>Lotus scoparius</i>		X							
<i>Lupinus</i> spp.							X		
<i>Malosma laurina</i>	X	X	X	X					
<i>Marah macrocarpa</i>							X		
<i>Medicago polymorpha</i>						X	X		
<i>Melilotus alba</i>								X	
<i>Melilotus indicus</i>						X	X		
<i>Mimulus puniceus</i>	X							X	
<i>Navarretia</i> spp.									
<i>Navarretia hamata</i>							X		
<i>Nolina interrata</i>									
<i>Nicotiana glauca</i>									
<i>Opuntia littoralis</i>					X	X			
<i>Orobanche parishii</i> var. <i>parishii</i>									
<i>Orthocarpus purpurascens</i>							X		
<i>Oxalis albicans</i>									
<i>Penstemon heterophyllus</i>									
<i>Phalaris</i> spp.									
<i>Plantago</i> spp.			X			X	X		X
<i>Plantago erecta</i>							X	X	
<i>Porophyllum gracilis</i>									
<i>Quercus</i>									
<i>Quercus dumosa</i>	X	X		X			X		
<i>Quercus engelmannii</i>									
<i>Rhamnus crocea</i>	X		X	X					

SITE SPECIES LISTS

	32(2)	32(3)	32(4)	32(5)	33	34	36	38	39
SPECIES									
Rhus integrifolia	X	X			X	X	X	X	X
Rhus ovata		X		X					
Salsola kali									X
Salvia apiana	X	X	X	X	X			X	
Salvia clevelandii									
Salvia mellifera		X		X	X			X	
Salvia sonomensis									
Sambucus mexicanum									
Sanicula spp.									
Sanicula bipinnatifida									
Scutellaria tuberosa									
Selaginella bigelovii									
Selaginella cinerascens									
Simmondsia chinensis									X
Sisyrinchium bellum		X			X	X			
Solanum tenellum									
Sonchus oleraceus	X	X		X	X	X	X	X	
Spergula spp.								X	
Spergularia sp.					X				
Stachys rigida							X	X	
Stipa spp.									
Stipa coronata									
Stipa pulchra		X	X	X	X		?	X	
Tetracoccus diolcus									
Trichostema lanatum									
Trichostema parishii									
Uropappus lindleyi							X	X	
Vulpia myuros								X	
Xylococcus bicolor	X	X		X					
Yucca whipplei			X					X	

SITE SPECIES LISTS

SPECIES	41	42	47	48	50A	50B	50C	50D	51	61
Adenostoma fasciculatum	X				X	X	X	X	X	X
Adolphia californica	X			X						
Allium		X			X	X		X	X	
Anagallis arvensis		X	X	X	X	X	X	X	X	X
Antirrhinum nuttallianum										
Aplastrum angustifolium	X	X	X	X						X
Aristida adscensionis										
Artemisia californica		X	X	X						X
Asclepias californica										
Astragalus spp.										
Avena		X	X	X						
Avena barbata										
Avena fatua	X				X	X	X		X	
Baccharis sarothroides										
Bloomeria crocea		X		X	X			X	X	
Brassica										
Brassica nigra	X	X	X	X						X
Brodiaea jolonensis								X		
Bromus	X									
Bromus carinatus		X		X						
Bromus diandrus										
Bromus mollis	X	X	X	X	X					X
Bromus rubens		X	X	X	X	X			X	X
Bromus tectorum				X						
Calamagrostis densa										
Calochortus concolor					X	X	X	X		
Calochortus splendens		X		X					X	X
Calycadenia tenella					X	X	X	X		
Calystegia macrostegia				X	X			X	X	X
Castilleja foliolosa							X	X		
Ceanothus cyaneus									X	
Ceanothus greggii								X		
Ceanothus tomentosus										?
Centaurea mollis	X	X	X		X	X	X	X	X	X
Centaurea venustum		X		X	X	X	X			X
Cercocarpus minutiflorus								X		
Chaenactis glabriuscula					X					
Chlorogalum parviflora		X			X	X		X	X	X
Chorizanthe fimbriata var. fimbriata					X		X	X	X	X
Chrysanthemum coronarium		X								
Cirsium vulgare			X		X		X	X	X	
Cneoridium dumosum										
Cordylanthus filifolius						X				
Corethrogyne filaginifolia var. virgata		X					X	X		
Cryptantha										X
Cuscuta spp.	X									
Delphinium parryi var. parryi							X			
Dichelostemma capitata		X								
Dudleya edulis		X								
Dudleya pulverulenta							X	X		
Dudleya variegata										
Epilobium							X			
Eremocarpus setigerus										
Eriodictyon crassifolium					X			X		X

SITE SPECIES LISTS

SPECIES	41	42	47	48	50A	50B	50C	50D	51	61
Eriogonum fasciculatum							X	X		
Eriophyllum confertiflorum	X	X			X	X	X	X	X	X
Erodium cicutarium										X
Eucalyptus										
Ferocactus viridescens										
Filago californica		X			X			X	X	
Foeniculum vulgare				X						
Fraxinus spp.				X						
Gallium angustifolium							X	X	X	
Gastroidium ventricosum		X							X	
Gilia spp.									X	
Gnaphalium californicum				X						X
Grindella robusta		X	X							
Gutierrezia californica					X	X	X		X	
Gutierrezia sarothrae										
Haplopappus venetus	X	X		X						X
Harpagonella palmeri					X		X	X	X	X
Hazardia squarrosa				X				X	X	X
Hellanthus gracilis								X		X
Hemizonia fasciculata	X	X	X	X	X	X	X		X	X
Heteromeles arbutifolia			X	X	X		X	X	X	X
Hordeum vulgare										
Hypochoeris glabra	X	X			X		X			
Isomeris arborea										
Lamarkia		X								
Lepidium spp.										
Lolium spp.			X	X						
Lonicera subspicata				X				X		X
Lotus cf. grandiflora										
Lotus scoparius					X				X	
Lupinus spp.			X							
Malosma laurina					X			X		
Marah macrocarpa										
Medicago polymorpha		X								
Mellilotus alba										
Mellilotus indicus										
Mimulus puniceus		X		X						X
Navarretia spp.										
Navarretia hamata										X
Nolina interrata										
Nicotiana glauca			X							
Opuntia littoralis										
Orobancha parishii var. parishii							X			
Orthocarpus purpurascens										
Oxalis albicans										
Penstemon heterophyllus					X		X			
Phalaris spp.										
Plantago spp.	X	X	X							
Plantago erecta		X			X	X				
Porophyllum gracilis								X		
Quercus								X		
Quercus dumosa	X				X	X				
Quercus engelmannii						X				
Rhamnus crocea					X	X	X	X	X	X

SITE SPECIES LISTS

	41	42	47	48	50A	50B	50C	50D	51	61
SPECIES										
Rhus integrifolia	X	X	X	X						
Rhus ovata						X		X	X	X
Salsola kali										
Salvia apiana					X	X	X	X	X	
Salvia clevelandii							X		X	
Salvia mellifera	X									X
Salvia sonomensis									X	
Sambucus mexicanum			X							
Sanicula spp.					X	X		X	X	X
Sanicula bipinnatifida										
Scutellaria tuberosa										X
Selaginella bigelovii							X			
Selaginella cinerascens								X		
Simmondsia chinensis										
Sisyrinchium bellum			X	X	X	X	X		X	
Solanum tenulobata										
Sonchus oleraceus	X	X		X			X			X
Spergula spp.										
Spergularia sp.	X	X		X						
Stachys rigida				X						
Stipa spp.					X	X				
Stipa coronata										
Stipa pulchra		X	X	X				X	X	X
Tetracoccus dioicus										
Trichostema lanatum										
Trichostema parishii									X	
Uropappus lindleyi	X						X		X	
Vulpia myuros										
Xylococcus bicolor								X		
Yucca whipplei	X	X			X	X	X	X		