

Acanthomintha ilicifolia
(San Diego thornmint)

**5-Year Review:
Summary and Evaluation**



Acanthomintha ilicifolia, Photo by Andrew Borchert

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

August 12, 2009

5-YEAR REVIEW

Acanthomintha ilicifolia (San Diego thornmint)

I. GENERAL INFORMATION

Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (Act) to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review). Based on the 5-year review, we recommend whether the species should be removed from the list of endangered and threatened species, be changed in status from endangered to threatened, or be changed in status from threatened to endangered. Our original listing of a species as endangered or threatened is based on the existence of threats attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview:

Acanthomintha ilicifolia (San Diego thornmint) is an annual aromatic herb in the Lamiaceae (mint family). This plant ranges in height from 2 to 6 inches (5 to 15 centimeters) and has white, two-lipped, tubular flowers with rose-colored markings on the lower lip (Jokerst 1993, p. 713). *Acanthomintha ilicifolia* occurs in openings within coastal sage scrub, chaparral, and native grassland (Beauchamp 1986, p. 175; Reiser 2001, pp. 3-5). *Acanthomintha ilicifolia* is restricted to gabbro soils derived from igneous rock, and gray calcareous clay soils derived from soft calcareous sandstone (Oberbauer and Vanderwier 1991, pp. 208-209). This species is endemic to San Diego County, California, and northwestern Baja California, Mexico.

Methodology Used to Complete This Review:

This review has been prepared by the Carlsbad Fish and Wildlife Office (CFWO) using the Region 8 guidance issued in March 2008. Our primary sources of information used to update the species' status and threats are survey data, data for *Acanthomintha ilicifolia* in the California Natural Diversity Database (CNDDDB 2008, pp. 1-73, Element Occurrences 1-82) maintained by the California Department of Fish and Game (CDFG), and personal communications with species and habitat experts. We received no information specific to this species from the public in response to our Federal Register Notice initiating this 5-year review. This 5-year review contains updated information on the species' biology and threats, and an assessment of that information compared to that known at the time of listing. We focus on current threats to the species that are attributable to the Act's five listing factors. The review synthesizes all this information to evaluate the listing status of the species and provide an assessment of its progress

towards recovery. Finally, based on this synthesis and the threats identified in the five-factor analysis, we recommend a prioritized list of conservation actions to be completed or initiated within the next 5 years.

Contact Information:

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Lead Field Office: Jonathan Snapp-Cook, Fish and Wildlife Biologist, Region 8, Carlsbad Fish and Wildlife Office; (760) 431-9440.

Federal Register (FR) Notice Citation Announcing Initiation of This Review: A notice announcing initiation of the 5-year review of this taxon and the opening of a 60-day period to receive information from the public was published in the Federal Register on March 5, 2008 (USFWS 2008a, pp. 11945-11950). We received one letter from the public in response to our Federal Notice initiating this 5-year review; however, no information specific to this species under review was provided.

Listing History:

Original Listing

FR Notice: 63 FR 54937

Date of Final Listing Rule: October 13, 1998, effective November 12, 1998

Entity Listed: *Acanthomintha ilicifolia* (San Diego thornmint), a plant species

Classification: Threatened

State Listing

Acanthomintha ilicifolia was listed by the State of California as endangered in 1982.

Associated Rulemakings: We designated approximately 671 acres (272 hectares) of land in San Diego County, California, for *Acanthomintha ilicifolia*. The critical habitat was published in the Federal Register on August 26, 2008 (USFWS 2008b, pp. 50454-50496), and became effective on September 25, 2008.

Review History: No previous reviews have been drafted for this species.

Species' Recovery Priority Number at Start of 5-Year Review: The recovery priority number for *Acanthomintha ilicifolia* is 2C according to the Service's Fiscal Year 2008 Recovery Data Call for the CFWO, based on a 1-18 ranking system where 1 is the highest-ranked recovery priority and 18 is the lowest (USFWS 1983, 48 FR 43098). This number indicates that the taxon is a species that faces a high degree of threat and has a high potential for recovery. The C indicates conflict with construction or other development projects.

Recovery Plan or Outline: A recovery plan has not yet been drafted for this species.

II. REVIEW ANALYSIS

Application of the 1996 Distinct Population Segment (DPS) Policy

The Act defines “species” as including any subspecies of fish or wildlife or plants, and any distinct population segment (DPS) of any species of vertebrate wildlife. This definition of species under the Act limits listing as distinct population segments to species of vertebrate fish or wildlife. Because the species under review is a plant, the DPS policy is not applicable, and the application of the DPS policy to the species’ listing is not addressed further in this review.

Information on the Species and its Status

Species Description

Acanthomintha ilicifolia is an annual aromatic herb in the Lamiaceae (mint family). Species of *Acanthomintha* have paired leaves and several sharply spined bracts (modified leaves) below whorled flowers (Jokerst 1993, p. 713). *Acanthomintha ilicifolia* can be distinguished from other members of the genus by its flowers, which have hairless anthers and style. The tubular, two-lipped corollas (united petals) are white with rose markings on the lower lip.

Species Biology and Life History

Acanthomintha ilicifolia is restricted to gabbro and calcareous clay soils known as clay lenses. This annual species germinates in late winter to early spring and flowers in April and May. Seeds mature in late spring and early summer. Studies show this species has a small seed bank (Bauder and Sakrison 1999, pp. 25-28, 43-44).

The breeding system of *Acanthomintha ilicifolia* has not been studied, but research shows that other members of the genus *Acanthomintha* are self-compatible to varying degrees (Steek 1995, pp. 27-33). A 1996 study identified several insect species that visited the flowers and moved from plant to plant (Bauder and Sakrison 1997, p. 38). These insects represented possible pollinators of *A. ilicifolia*; however, none were thought to represent species-specific pollinators (Bauder and Sakrison 1997, p. 39). A study is currently underway that may provide useful information about the pollinators of *A. ilicifolia* (See the “Species-specific Research and/or Grant-supported Activities” for more details on this project).

Spatial Distribution

The October 13, 1998, listing rule for *Acanthomintha ilicifolia*, stated that there were historically 52 occurrences of *A. ilicifolia* in the United States, all within San Diego County, and 9 occurrences of *A. ilicifolia* in Mexico, all within northwestern Baja California. At that time we knew of 32 extant occurrences in the United States that ranged from San Marcos (at the northern extent of the range) east to Alpine and south to Otay Mesa in San Diego County (CNDDDB 1997, Reiser 1996, Roberts 1997 as cited in USFWS 1998a, p. 54938). We did not have adequate data to determine the status of the occurrences in northwestern Baja California, Mexico. The 1998

listing rule estimated that the species occupied approximately 400 acres (156 hectares) in the United States.

Now, we have records for 80 historical occurrences of *Acanthomintha ilicifolia* in the United States, 27 more occurrences than we knew of at the time of listing (see Figure 1). We consider 55 of the 80 historical occurrences to be extant (included in this tally are also occurrences that are presumed extant); 23 more extant occurrences than at the time of listing. For 37 occurrences, we have recent survey data or specific information on the location indicating that the occurrence is extant (see Table 1; extant occurrences are marked with a “Y” in the “Extant” column). For 18 occurrences, we do not have recent survey data or specific information on the site, but we presume that these occurrences are extant because the habitat where they were found remains intact (see Table 1; presumed extant occurrences are marked with a “PE” in the “Extant” column). Throughout this five year review when using the term “extant” we are referring to both extant occurrences and presumed extant occurrences.

Currently, we have records for 13 historical occurrences in Baja California, Mexico, 4 more occurrences than we knew of at the time of listing. We do not have any survey data for these occurrences. These occurrences may be extant; however, the areas around many of the occurrences in Mexico are being developed or used as agricultural lands. Additional information on these occurrences will help us to gain a better assessment of the status of *Acanthomintha ilicifolia* in the future. This review focuses primarily on the status of *A. ilicifolia* in the United States.

The 27 new occurrences are all within San Diego County. The known range of this species now extends north to the City of Oceanside, east to Ramona, and southeast to Jamul (see Figure 2). The new occurrences slightly expand the known range of *Acanthomintha ilicifolia* in the United States. The habitat where this species grows and its general distribution are essentially the same as when it was listed. We consider most the new occurrences to have been occupied at the time of listing because *A. ilicifolia* seed is not known to disperse in large quantities or over great distances making it unlikely that many new occurrences would have been established since it was listed. There are two occurrences (Calavera Hills and Hobbes Property) where only a very few plants have been found and it is possible that these areas represent newly established occurrences. To allow for comparison between the final listing rule and this 5-year review, we have included the names used to refer to occurrences in the listing rule in Table 1. The listing rule used the term “population” to refer to distinct occurrences and in this review we use the term “occurrence.”

Figure 1 provides a comparison between the distribution of *Acanthomintha ilicifolia* in 1998 and 2009. Figure 1b shows the locations of the occurrences that we know to be extant, the occurrences that we presume to be extant, and the occurrences we believe are extirpated. Table 1 provides the following information for each occurrence: occurrence name, corresponding CNDDDB element occurrence number (EO), status, ownership/conservation, the highest number of plants recorded pre-listing, the highest number of plants recorded post-listing, and the potential threats. The occurrences in Table 1 are ordered from north to south. Figure 2 shows the distribution of *A. ilicifolia* throughout its entire range in the United States and Mexico.

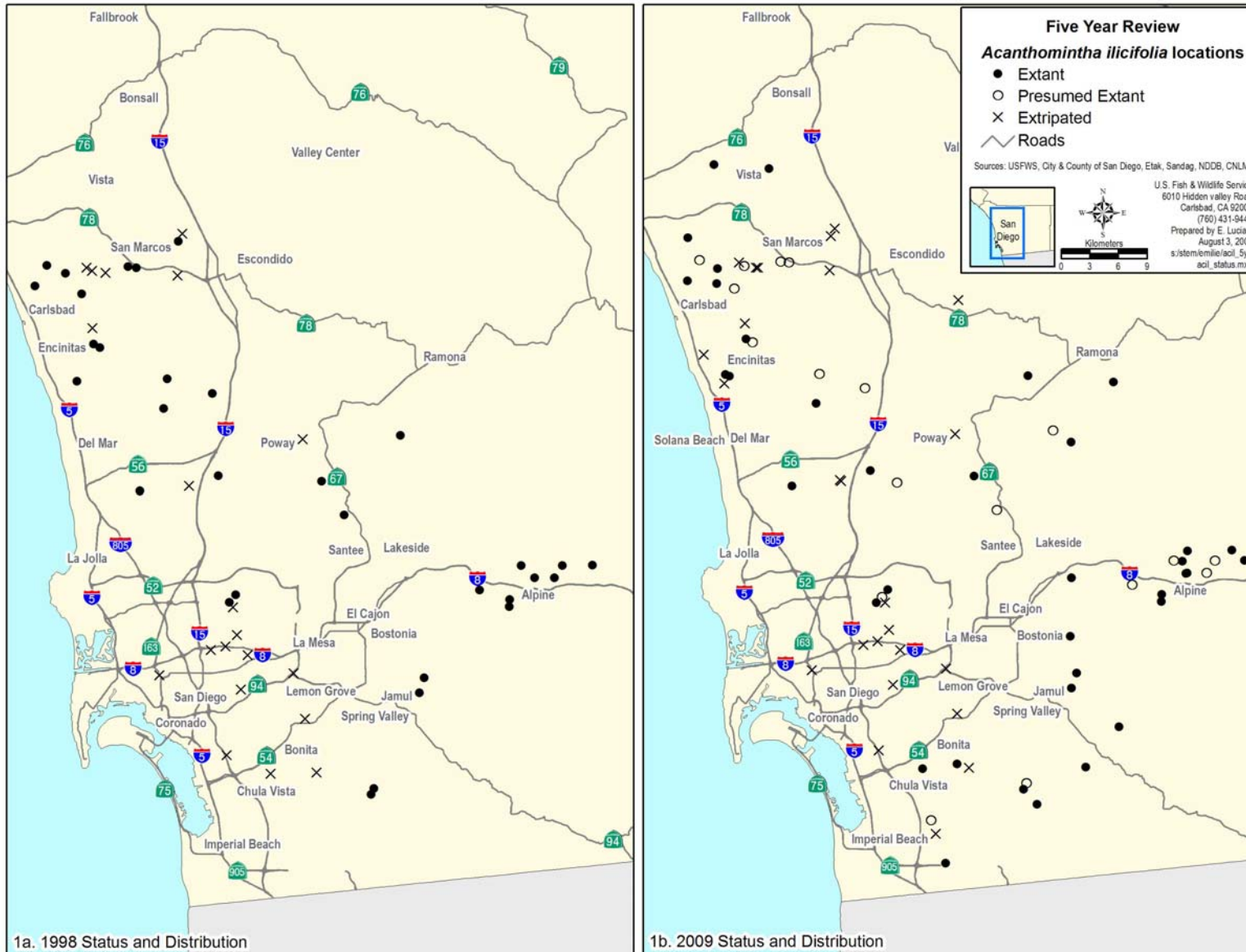


Figure 1. *Acanthomintha ilicifolia* occurrences in the United States – a) status and distribution at the time of listing (1998); b) current status and distribution (2009).

Table 1. Known occurrences of *Acanthomintha ilicifolia* in the United States; prepared for 5-year review, 2009; CNDDDB element occurrence number (EO) if available (CNDDDB 2009), status, occurrence name, general location, ownership/conservation, the highest number of plants recorded pre-listing, the highest number of plants recorded post-listing, and current threats. The occurrences are ordered from north to south.

CNDDDB Element Occurrence Number (EO)	Extant (2009)	Location Description	General Location in San Diego County	Ownership/Conservation	Estimated Number of Plants				Threats Code
					Highest Pre-listing	Year	Highest Post-listing	Year	
---	Y*	Taylor	Oceanside	SDHC (Pending)	N/A	N/A	185	2001	i, r, n
---	Y*	Calavera Hills	Carlsbad	CNLM	N/A	N/A	4	2009	n
EO 31	PE	Carlsbad Racetrack (north)	Carlsbad	Pvt	1,000	1986	0	2006	u, i, n
EO 16	N	Carlsbad Racetrack (south)	Carlsbad	Pvt	200	1980	N/A	N/A	extirpated
EO 70	Y	Palomar Airport Road	Carlsbad	CNLM, County of San Diego	several hundred	1997	188	2006	r, d, n
EO 58	Y	Emerald Pointe	Carlsbad	SDHC	no estimate	1992	--	--	i, n
EO 57	PE	Letterbox Canyon (Spyglass)	Carlsbad	Pvt cons	no estimate	1992	0	2006	i, n
EO 82	Y*	La Costa Greens	Carlsbad	CNLM	N/A	N/A	1000	2001	i, r, n
EO 59	PE	El Fuerte Street (Rancho Carillo)	Carlsbad	Pvt	no estimate	1991	--	--	u, i, n
EO 20	N	La Costa Avenue and Rancho Santa Fe Road	Carlsbad	Pvt	hundreds	1978	N/A	N/A	extirpated
EO 47	Y	Southeast Carlsbad (west)	Carlsbad	Pvt cons	2,000	1994	500	2006	i, r, n
EO 48	PE	Southeast Carlsbad (east)	Carlsbad	Pvt cons	1,000	1994	--	--	i, r, n
EO 17	PE	Upham	San Marcos	Pvt	25	1986	--	--	u, i, d, o, n
EO 23	N	Las Brisas (s, EO 41)	San Marcos	Pvt	2,500	1986	N/A	N/A	extirpated
EO 40	N	Twin Oaks (s, EO 49)	San Marcos	Pvt	no estimate	1988	N/A	N/A	extirpated

CNDDB Element Occurrence Number (EO)	Extant (2009)	Location Description	General Location in San Diego County	Ownership/ Conservation	Estimated Number of Plants				Threats Code
					Highest Pre-listing	Year	Highest Post- listing	Year	
EO 41	N**	Las Brisas transplant site (t, EO 23)	San Marcos	Pvt	30	1994	N/A	N/A	extirpated
EO 53	PE	Linda Vista and Bent Avenue	San Marcos	City of San Marcos	no estimate	1991	--	--	i, n
---	Y*	Palisades Estates	Vista	Pvt cons	N/A	N/A	--	--	i, r, n
EO 61	N	Emerald Heights	Escondido	Pvt cons	less than 100 plants	1992	N/A	N/A	extirpated
EO 37	N	Indian Hill	San Marcos	Pvt	65	1987	N/A	N/A	extirpated
EO 49	N**	San Diego Wild Animal Park (t, EO 40)	Escondido	Pvt cons	1,500	1992	N/A	N/A	extirpated
EO 39	N**	Quail Botanical Garden (t, EO 28)	Encinitas	Pvt cons	200	1993	N/A	N/A	extirpated
EO 28	Y	Lux Canyon (east), Manchester Avenue Mitigation Bank (sp, EO 38, 39, 42)	Encinitas	CNLM	4,000	1992	2,856	2001	i, r, n
EO 42	Y**	Manchester Avenue Mitigation Bank (t, EO 28)	Encinitas	CNLM	5,000	1994	count combined with EO 28	2001	i, r, n
EO 38	N**	Lux Canyon (west) (t, EO 28)	Encinitas	Pvt	30	1986	0	2006	extirpated
---	Y*	Hobbes Property	Ramona	Pvt cons	N/A	N/A	15	2008	f, n
EO 77	Y*	1 mile NW of Bassett Ranch	Ramona	Pvt	N/A	N/A	100	1999	u, i, n
EO 78	Y*	Monte Vista (Long's Gulch)	Ramona	CDFG	N/A	N/A	25	2006	f, n
EO 69	PE	Monte Vista (Daney Canyon)	Ramona	CDFG	100	1995	--	--	f, n
EO 32	Y	Sycamore Canyon	Poway	County of San Diego	31,000	1994	5,043	2005	r, f, p, n
EO 64	PE	Asphalt Inc. (Slaughterhouse Canyon)	Poway	Pvt	60,000	1993	--	--	i, f, n
EO 36	Y	Sabre Springs (west)	Poway	City of San Diego	16,400	1994	17,085	2004	i, h, f, n
EO 26	PE**	Saber Springs (east)	Poway	Pvt	no estimate	1945	--	--	u, i, f, n

CNDDB Element Occurrence Number (EO)	Extant (2009)	Location Description	General Location in San Diego County	Ownership/ Conservation	Estimated Number of Plants				Threats Code
					Highest Pre-listing	Year	Highest Post- listing	Year	
EO 11	N	Poway Grade	Poway	Pvt	no estimate	1940	N/A	N/A	extirpated
EO 25	PE	Thornmint Court	Black Mountain	Pvt cons	800	1992	--	--	i, r, f, n
EO 60	Y	Black Mountain	Black Mountain	City of San Diego	no estimate	1992	777	2001	i, f, n
EO 46	PE	Rancho Santa Fe	Black Mountain	Pvt	500	1991	--	--	u, i, f, n
EO 19	Y	Los Peñasquitos Canyon	North San Diego	City of San Diego	1,800	1994	2,091	2005	i, r, f, n
EO 43	N**	Black Mountain Road (t, EO 44)	North San Diego	Pvt	10,000	1990	N/A	N/A	extirpated
EO 44	N	Black Mountain Road (s, EO 43)	North San Diego	Pvt	10,000	1990	N/A	N/A	extirpated
EO 1	N	University Heights	North San Diego	Pvt	no estimate	1936	N/A	N/A	extirpated
EO 4	N	0.5 mi. east of SDSU	North San Diego	Pvt	no estimate	1955	N/A	N/A	extirpated
EO 5	N	2 mi. west of SDSU	North San Diego	Pvt	no estimate	1949	N/A	N/A	extirpated
EO 6	N	1 mi. north of SDSU	North San Diego	Pvt	no estimate	1936	N/A	N/A	extirpated
EO 8	N	Alvarado Canyon	North San Diego	Pvt	no estimate	1936	N/A	N/A	extirpated
EO 33	Y	Mission Trails Park	North San Diego	City of San Diego	300	1994	354	2001	r, f, n
EO 34	PE	Near Mission Trails Park	North San Diego	Pvt	200	1986	--	--	i, r, f, n
EO 35	N	SW Tierra Santa parcel, NW of mouth of Mission Gorge	North San Diego	Pvt	400-600	1980	N/A	N/A	extirpated
EO 79	Y*	Near Mission Gorge	North San Diego	Pvt	N/A	N/A	50	2003	u, i, n
EO 81	Y*	Crestridge Ecological Reserve	El Cajon	CDFG	N/A	N/A	505	2000	f, n

CNDDB Element Occurrence Number (EO)	Extant (2009)	Location Description	General Location in San Diego County	Ownership/ Conservation	Estimated Number of Plants				Threats Code
					Highest Pre-listing	Year	Highest Post- listing	Year	
EO 72	Y**	Suncrest	El Cajon	Pvt	no estimate	1994	18	2004	u, i, f, n
EO 12	Y	Poser Mountain (south slope)	Alpine	CNF	6,650	1991	thousands	2001	f, n
EO 74	Y**	Poser Mountain (southwest flank)	Alpine	CNF	no estimate	1995	2,000	2000	f, n
EO 50	PE	Viejas Mountain (lower slope and plateau)	Alpine	CNF	5,600	1994	--	--	f, n
EO 51	Y	Viejas Mountain (southwest slope)	Alpine	CNF	1,000	1991	8,300	2003	f, n
EO 62	PE	Viejas Mountain (eastern slope)	Alpine	CNF	5,000	1992	--	--	f, n
EO 75	Y*	Viejas Mountain (west-southwest flank)	Alpine	CNF	N/A	N/A	70	2001	f, n
EO 80	Y*	Viejas Mountain (summit)	Alpine	CNF	N/A	N/A	30	2003	f, n
---	Y*	Viejas Hills	Alpine	CNF (pending transfer of lands to CNF)	N/A	N/A	--	--	f, n
EO 73	PE	East of Murphy Ranch	Alpine	Pvt	8,750	1997	--	--	u, i, f, n
EO 63	Y	Wright's Field (north)	Alpine	Backcountry Land Trust	40	1994	no estimate	2003	i, r, n
EO 67	Y	Wright's Field (south)	Alpine	Backcountry Land Trust	800	1995	--	--	i, r, n
EO 45	PE	Sky Mesa Ranch	Alpine	Pvt	1,500	1990	--	--	i, n
EO 21	Y	McGinty Mountain (southwest slope)	Jamul	TNC	225	1994	--	--	r, o, n
EO 22	Y	McGinty Mountain (summit and ridgeline)	Jamul	TNC, Pvt	2,400	1994	--	--	r, o, n
---	Y*	Rancho Jamul Ecological Reserve	Jamul	CDFG	N/A	N/A	no estimate	2006	r, f, n
---	Y*	Hollenbeck Wildlife Area	Jamul	CDFG	N/A	N/A	33,777	2003	r, f, n
EO 7	N	Spring Valley	South San Diego	Pvt	no estimate	1949	N/A	N/A	extirpated
EO 13	N	Chollas Mesa	South San Diego	Pvt	no estimate	1986	N/A	N/A	extirpated

CNDDB Element Occurrence Number (EO)	Extant (2009)	Location Description	General Location in San Diego County	Ownership/ Conservation	Estimated Number of Plants				Threats Code
					Highest Pre-listing	Year	Highest Post-listing	Year	
EO 66	N	Sweetwater Reservoir (north side)	South San Diego	Pvt	no estimate	1920	N/A	N/A	extirpated
EO 10	N	Proctor Valley Road	South San Diego	Pvt	300	1994	N/A	N/A	extirpated
EO 15	Y***	Bonita, Wheeler Ridge	South San Diego	Pvt	no estimate	1935	115	2001	i, r, n
---	Y*	Bonita Meadows	South San Diego	CalTrans	N/A	N/A	--	--	i, r, n
EO 14	N	Paradise Valley	South San Diego	Pvt	no estimate	1882	N/A	N/A	extirpated
EO 55	PE	Otay Lakes (northeast side)	South San Diego	Pvt	33	1990	--	--	u, i, r, f, n
EO 56	Y	Otay Lakes (northeast side)	South San Diego	Pvt	no estimate	1990	40	2000	u, i, r, f, n
---	Y*	Otay Lakes (south side)	South San Diego	City of San Diego	N/A	N/A	89	2001	f, n
---	N*	Dennery Canyon (s, Cal Terraces)	South San Diego	Pvt	N/A	N/A	N/A	N/A	extirpated
EO 71	PE**	Poggi Canyon	South San Diego	Pvt	no estimate	1987	--	--	u, i, r, o, n
---	Y*	Cal Terraces (t, Dennery Canyon)	South San Diego	Pvt cons	N/A	N/A	--	--	i, n
Notes: Extant Key: Y – Extant occurrence PE –Presumed extant N – Extirpated occurrence Occurrences with no asterisk were known at the time of listing (October 13, 1998) *New occurrence since listing **Occurrence not counted in listing rule due to lack of specific information or because it was translocated, but the occurrence was translocated or discovered prior to listing (October 13, 1998) ***Occurrences was thought to be extirpated at the time of listing, but is now considered extant					Ownership Key: CalTrans – California Department of Transportation CNF - Cleveland National Forest CDFG – California Department of Fish and Game CNLM – Center for Natural Lands Management Pvt – Private Pvt cons - Private conserved SDHC – San Diego Habitat Conservancy TNC – The Nature Conservancy				

CNDDDB Element Occurrence Number (EO)	Extant (2009)	Location Description	General Location in San Diego County	Ownership/ Conservation	Estimated Number of Plants				Threats Code
					Highest Pre-listing	Year	Highest Post-listing	Year	
Notes (continued): Location Description - Translocation Notations: (s, xx) salvaged/removed from this location, xx is the location where the original occurrence was moved to (sp, xx) partially salvaged/removed from this location (some plants left at original location), xx is the location where the original occurrence was moved to (t - xx) translocated to this location, xx is the location of the original occurrence					Threats Code (Factor: threat): Factor A: u - Urbanization - potential development Factor A: i - Urbanization - indirect effects Factor A: r – Recreation - non-motorized Factor A: o – Recreation - motorized Factor A: d – Discing or mowing for fire control Factor C: h - Herbivory Factor E: n – Nonnative plants Factor E: f - Fire Factor E: g - Grazing				

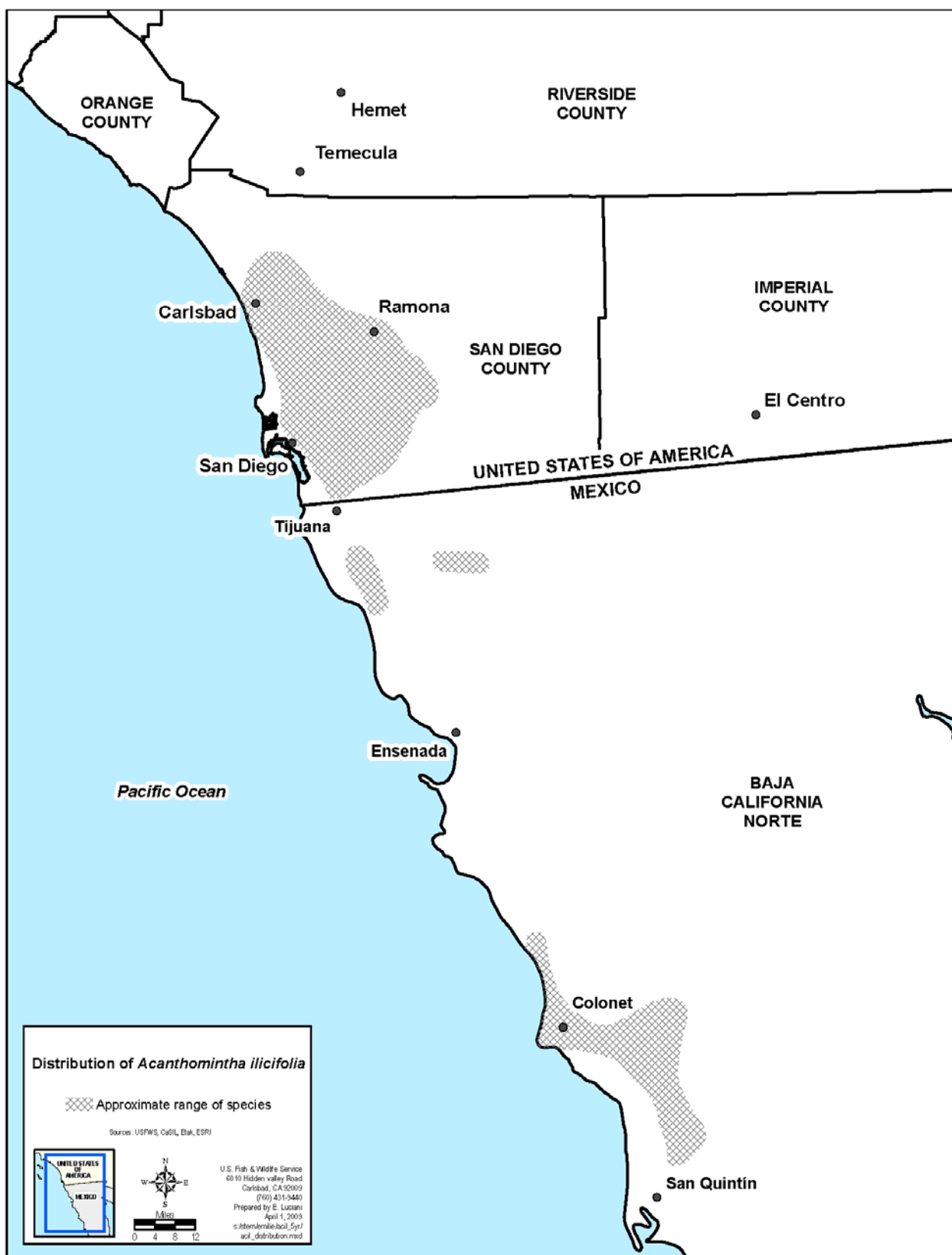


Figure 2. Distribution of *Acanthomintha ilicifolia* in San Diego County, USA, and Baja California, Mexico.

The listing rule discussed the topic of salvage and translocation and concluded that translocation of *Acanthomintha ilicifolia* had not been shown to provide a long-term conservation benefit for the species (USFWS 1998a, p. 54948). The listing rule did not include any translocated occurrences in the 52 historical occurrences tallied at the time of listing. In this review, we have included the translocated occurrences in our tally of historical occurrences. Five occurrences were salvaged when their native locations were developed. These five occurrences were translocated to seven new areas (see Table 1; occurrences salvaged are marked with an “s” or “sp” and the new areas are marked with a “t”). Five of the translocated occurrences are no longer extant; two of the translocated occurrences have had long-term success (Table 1; EO 42 and Cal Terraces). The translocations may have failed due to poor receptor site selection (incorrect soils, vegetation community, slope, or aspect) or poor follow-up after the initial translocation (lack of records on the translocation, no long-term monitoring, or lack of funding to manage the translocation). If future translocations are attempted, better methods for site selection and follow-up should be used.

In summary, the distribution of *Acanthomintha ilicifolia* has not changed substantially since this species was listed, but we have become aware of several more occurrences. We now know of 80 historical occurrences in contrast to the 52 historical occurrences discussed in the listing rule and we now believe that there are 55 extant occurrences compared to the 32 extant occurrences that we knew of in 1998. Additionally, we are aware of 13 historical occurrences in Baja California, Mexico in contrast to the 9 known at the time of listing; however, a lack of data on these occurrences prevents us from determining the current status of this species in Mexico.

Abundance

At the time of listing in 1998, we estimated that there were approximately 150,000 to 170,000 *Acanthomintha ilicifolia* individuals in 32 extant occurrences in the United States. Approximately 60 percent of the reported individuals were concentrated in four occurrences (Sycamore Canyon, Slaughterhouse Canyon (also referred to as the Asphalt, Inc.), and two occurrences on Viejas Mountain). As discussed above in the “Distribution” section, we currently consider 55 occurrences to be extant. We do not have an estimate on the number of individual *A. ilicifolia* plants, but we believe that it is comparable or greater than what we knew of at the time of listing because we have not lost any large occurrences since listing and we now know of more total occurrences.

The abundance of standing individuals of *Acanthomintha ilicifolia* fluctuates annually at each occurrence. We have found that at occurrences surveyed over a number of years, the size of an occurrence can differ by an order of magnitude (City of San Diego 2005, p. 1-4). Additionally, a uniform surveying methodology has not been used throughout the species range, and occurrences have not been surveyed consistently on an annual basis. Therefore, the abundance of *A. ilicifolia* is difficult to compare between sites and over time.

The largest number of *Acanthomintha ilicifolia* individuals ever reported at a single occurrence is 60,000 (EO 64 in 1993). There are also several small occurrences with fewer than 100 individual plants. We have at least one year of survey data for 44 of the 55 extant occurrences. This data was collected between 1986 and 2009 using a variety of methods, including visual

estimates, density estimates, and complete census of the number of individuals. Based on the maximum count at each of these 44 occurrences, 12 have fewer than 100 plants, 14 have between 100 and 999 plants, 14 have between 1,000 and 9,999 plants, and 4 have between 10,000 and 100,000 plants (see Table 1).

Habitat or Ecosystem

The listing rule accurately describes *Acanthomintha ilicifolia* as occurring on heavy clay soils in openings within coastal sage scrub, chaparral, and native grassland (Beauchamp 1986, p. 175; Reiser 1996, pp. 3-5). *Acanthomintha ilicifolia* occurs on isolated patches of clay soils derived from gabbro and soft calcareous sandstone substrates (Oberbauer and Vanderwier 1991, pp. 208-209). The soils derived from gabbro substrates are red to dark brown clay soils, and those derived from soft calcareous sandstone are gray clay soils. These patches of clay soils surrounded by non-clay soils are called “clay lenses.”

Acanthomintha ilicifolia occurs on gentle southeast to west facing slopes. An analysis of 20 *A. ilicifolia* occurrences found that the slopes range from 0 to 25 degrees, with the majority of the sites having slopes less than 20 degrees (Bauder *et al.* 1994, pp. 10-11). This study found natural (not translocated) occurrences were on slopes that faced southeast, south, southwest, and west (Bauder *et al.* 1994, pp. 10-11). The known occurrences of *A. ilicifolia* range in elevation from sea level to 3,000 ft (914 m) (USFWS GIS analysis, 2009). *Acanthomintha ilicifolia* occurs in areas where the soils are mapped as Las Posas, Olivenhain, Redding, Huerhuero, Altamont, Cienega, and Linne (USFWS GIS database, soils described by Bowman *et al.* 1973, pp. 22-24, 38-40, 54-55, 61-64, 67-68, and 71-72).

Clay lenses often have an open or unpopulated appearance and are typically devoid of woody, perennial shrubs. Clay lenses are generally inhabited by a specific flora that consists of forbs, native grasses, and geophytes (plants having underground bulbs, tubers, or corms, such as lilies, iris, and onions) (Oberbauer and Vanderwier 1991, pp. 208-209). Native plant species that are associated with *Acanthomintha ilicifolia* on clay lenses include *Hesperis matronalis* var. *sparsiflora* (erect evax), *Harpagonella palmeri* (Palmer's grappling-hook), *Convolvulus simulans* (bindweed), *Apiastrum angustifolium* (mock parsley), and *Microseris douglasii* ssp. *platycarpa* (small flowered microseris) (Bauder *et al.* 1994, pp. 9-10; S. McMillan, EDAW Environmental Inc., pers. comm. 2006, p. 1; J. Vinje, Center for Natural Lands Management, pers. comm. 2006, p. 1-2).

The critical habitat rule for *Acanthomintha ilicifolia* analyzed the habitat factors that support this species. These factors are summarized in the “Primary Constituent Elements” section of the rule (USFWS 2008b, pp. 50465-50466). The critical habitat rule states:

Clay lenses that provide substrate for seedling establishment and space for growth and development of *Acanthomintha ilicifolia* are:

- (a) Within chaparral, grassland, or coastal sage scrub;
- (b) On gentle slopes ranging from 0 to 25 degrees;
- (c) Derived from gabbro and soft calcareous sandstone substrates with a loose, crumbly structure and fissures approximately 1 to 2 feet (30 to 60 cm) deep; and

(d) Characterized by a low density of forbs and geophytes, and a low density or absence of shrubs.

Some reports that discuss *Acanthomintha ilicifolia* characterize it as a vernal pool species. There are relatively few occurrences that do occur near vernal pool habitat and in these cases *A. ilicifolia* does not grow in the vernal pools. In our listing and critical habitat, we correctly characterize this species' habitat.

Changes in Taxonomic Classification or Nomenclature

No changes in taxonomic classification or nomenclature have occurred since listing.

Genetics

No studies focused on the genetics of *Acanthomintha ilicifolia* have been conducted or proposed.

Species-specific Research and/or Grant-supported Activities

A project to determine the pollinators of *Acanthomintha ilicifolia* is currently funded by the Service and CDFG through Section 6; this project is called "Pollinator Study on Lakeside Ceanothus (*Ceanothus cyaneus*) and San Diego thornmint (*Acanthomintha ilicifolia*).” The purpose is to determine the potential pollinators for *A. ilicifolia* through field observations, collections of insects, and analysis of those insects for pollen using Scanning Electron Microscopy. The final report on this research is due at the end of 2009.

Five-Factor Analysis

The following five-factor analysis describes and evaluates the threats attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act.

FACTOR A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

Threats identified under Factor A in the listing rule for *Acanthomintha ilicifolia* include: Urbanization, illegal dumping, trampling/grazing, erosion, off-road vehicle (ORV) activity, and mining (USFWS 1998a, p. 54945). The listing rule identified urbanization as the most significant threat to *A. ilicifolia*. In this review, we expanded the discussion on ORV activity to include other forms of recreation that impact *A. ilicifolia* habitat and added fire as a potential threat to *A. ilicifolia* habitat under Factor A. We also moved the discussion on nonnative plants from Factor E, where it was discussed in the listing rule, to this section.

Urbanization – Direct and Indirect Threats

At listing, development and urbanization of *Acanthomintha ilicifolia*'s habitat was considered to be the most significant threat to this species. Urbanization was the primary factor in the loss of the 20 occurrences of *A. ilicifolia* extirpated prior to 1998. In 1998, about 16 percent of *A.*

ilicifolia occurrences (5 of 32) occurred on proposed or approved development sites. The listing rule stated that 60 percent of all individuals would be situated in proximity to development after implementation of those proposed developments. Even when the direct impacts of development were avoided, the development footprint was often very close to the *A. ilicifolia* occurrence. The proximity of development to occurrences of this species leads to nonnative plant competition, trampling, fragmentation, and increased isolation in many cases. The listing rule indicated that nine occurrences of *A. ilicifolia* were on lands protected from development. Of these, four occurrences were on lands managed by the City of San Diego, one occurrence was on land managed by The Nature Conservancy (TNC), and four occurrences were on land managed by the Cleveland National Forest (CNF).

At this time, 34 of the 55 extant occurrences (62 percent) are adjacent to development, cut-slopes, agricultural fields, golf courses, ornamental landscaping, and fuel modification zones. However, very few occurrences have been extirpated due to habitat loss. We consider two occurrences to have been extirpated due to impacts associated with development (Table 1, EO 61, and Dennery Canyon). Three recent and proposed development projects avoided directly impacting *Acanthomintha ilicifolia* occurrences and resulted in the conservation of these occurrences (Table 1, EOs 31, 58, and Taylor). Twelve of the 55 extant occurrences are on private lands in areas that have not yet been fully developed. These areas may be vulnerable to impacts associated with development; however, as we have seen in recent projects, the direct impacts to *A. ilicifolia* are usually avoided and the occurrences are conserved.

At this time, 39 of the 55 extant occurrences (71 percent) of *Acanthomintha ilicifolia* are conserved. Eight of the conserved occurrences are on land owned and managed by the CNF (Table 1, EOs 12, 50, 51, 62, 74, 75, 80 and Viejas Hills). Eight are on land owned or partially owned by the State of California; seven of these are owned by CDFG (Table 1, EOs 69, 78, 81, Rancho Jamul Ecological Reserve, and Hollenbeck Wildlife Area), and one is owned by the California Department of Transportation (Table 1, Bonita Meadows). Eight are on land owned or managed by local governments; two of these are owned by the County of San Diego (Table 1, EOs 70 (partial) and 32), five are owned by the City of San Diego (Table 1, EOs 19, 33, 36, 60, and Otay Lakes (south side)), and one is managed by the City of San Marcos (Table 1, EO 53). Eighteen conserved occurrences are on privately owned lands. Seven of these occurrences are on lands that receive minimal management because they are managed by home owners associations or they are on conserved lands where the conservation of *A. ilicifolia* is not the primary focus of the preserved land (Table 1, EOs 25, 47, 48, 57, Palisades Estates, Hobbes Property, and Cal Terraces). The other eleven privately owned occurrences are managed by organizations focusing on habitat and rare species conservation and who actively manage and monitor *A. ilicifolia* at these sites. Of these eleven occurrences, the Center for Natural Lands Management manages five occurrences (Table 1, EOs 28, 42, 70 (partial), 82, and Calavera Hills); TNC manages two occurrence (Table 1, EOs 21 and 22 (partial)); The Back County Land Trust manages one occurrence (Table 1, EOs 63 and 67); and the San Diego Habitat Conservancy (previously the Helix Land Conservancy) will soon manage two occurrences (Table 1, EO 58 and Taylor).

The fact that many of the conserved areas for this species exist in the urbanized western half of San Diego creates a challenge for reserve managers working to conserve *Acanthomintha*

ilicifolia. Conserved areas often have to develop strategies to adaptively manage impacts from nonnative plants, ORV activities, human trampling, unauthorized mountain bike trails, erosion caused by landscape irrigation, and herbivory (J. Vinje, Center for Natural Lands Management, pers. comm. 2006, p. 1; M. Kelly, Los Peñasquitos Canyon Preserve, pers. comm. 2005, p. 1-2; Bauder *et al.* 1994, p. 23). Working with land managers to develop strategies to minimize the impacts associated with preserves surrounded by urbanized areas will be a necessary part of the long-term conservation of *A. ilicifolia*.

In summary, only two occurrences of *Acanthomintha ilicifolia* have been extirpated since this species was listed. Thirty more occurrences have been conserved since the species was listed; adding to the 9 conserved occurrences discussed in listing rule, a total of 39 extant occurrences are now on conserved lands. As a result, the threat of habitat loss has been eliminated for 71 percent of the extant occurrences. At the sixteen other extant occurrences, not yet formally conserved, we believe there are future opportunities to work with landowners for the conservation of *A. ilicifolia*. At the occurrences that have been conserved, reducing the impacts associated with preserving habitat near urbanized area will be a primary concern.

Recreation – non-motorized and motorized

The listing rule identified ORV activity as a threat to *Acanthomintha ilicifolia*, stating that habitat degradation from ORV activity on McGinty Mountain (Table 1, EOs 21 and 22) and on the CNF (Table 1, EOs 12, 50, 51 and 62) was currently occurring and that ORV activity was a potential problem in Los Peñasquitos Canyon (Table 1, EO 19) (USFWS 1998a, p. 54945). The listing rule also identified trampling and foot traffic as a threat for this species (USFWS 1998a, p. 54945). Other than in Los Peñasquitos Canyon, the listing rule did not specifically indicate where these activities had affected the species.

The ORV activity occurring on the CNF at the time this species was listed has been addressed through management actions such as the installation of gates and other barriers. At Los Peñasquitos Canyon fencing has been installed to keep trail use out of the areas where *Acanthomintha ilicifolia* occurs. Barriers have been installed at McGinty Mountain to minimize ORV use of the trails; however, some ORV activity still occurs.

Presently, several extant occurrences of *Acanthomintha ilicifolia* are in areas potentially impacted by recreational activities. These activities include jogging, hiking, mountain biking, and motorized ORV activity. In Table 1, we differentiate between non-motorized and motorized recreation because of the different impacts caused by each and also because different management strategies may be needed to reduce the threats associated with these different types of recreation. Twenty-three of the 55 extant occurrences (42 percent) are in areas where non-motorized recreation occurs (Table 1). In several areas, trails run through or adjacent to occurrences of *A. ilicifolia* (Table 1, EOs 19, 21, 22, 28, 33, 42, 47, 48, 63, 67, 70, and Hollenbeck Wildlife Area). Four of the 55 extant occurrences (7 percent) are in areas where unauthorized ORV activity occurs (Table 1, EOs 17, 21, 22, and 71).

At this time no occurrences have been extirpated due to recreational activities. Recreation occurring at over 40 percent of the extant occurrences is a potential threat to *Acanthomintha*

ilicifolia because trail use on wet clay lens soils can cause deep ruts. We believe it is important to manage these threats and take precautions to ensure that the potential negative impacts associated with recreation are minimized.

Mining

In the listing rule, mining was identified as a threat to *Acanthomintha ilicifolia*. At the time of listing, there was a soil and sand mine near one of the larger occurrences (Table 1, EO 64). This mine continues to operate, but the area where *A. ilicifolia* occurs is avoided as a condition under the operations permit for the mine. We consider mining to be a minimal threat to *A. ilicifolia* at this time. Clay mines in Mexico occur in some areas where *A. ilicifolia* has been reported, but we do not have information on the specific impacts of these mining operations on *A. ilicifolia* occurrences.

Nonnative Plants

In the listing rule, competition with nonnative plants was identified as a threat to *Acanthomintha ilicifolia*, noting that the presence and abundance of these nonnative species is generally an indirect result of habitat disturbance by development, mining, grazing, discing, and alteration of hydrology (USFWS 1998a, p. 54950). Nonnative plants may alter habitat in an area to the point that it no longer supports *A. ilicifolia*. In the listing rule, the invasion of nonnative species was noted to be most problematic immediately adjacent to urban areas and in habitat fragmented by development (Alberts *et al.* 1993, pp. 106-108). The listing rule noted that *A. ilicifolia* is particularly sensitive to nonnative competition.

Currently, the most prominent nonnative species that threaten *Acanthomintha ilicifolia* are *Avena* spp. (wild oats), *Brachypodium distachyon* (purple false brome), *Brassica nigra* (black mustard), *Centaurea melitensis* (yellow star thistle), *Cynara cardunculus* (artichoke thistle), and *Foeniculum vulgare* (fennel) (Bauder and Sakrison 1997, p. 40). Invasive, nonnative plants impact *A. ilicifolia* by competing for nutrients, light, water, and space. For example, *Centaurea melitensis*, a nonnative thistle, can dry out soils because this plant species takes moisture out of the soil that would have been available to co-occurring native plants (DiTomaso 2001, pp. 3, 12). The biomass and reproductive output of *A. ilicifolia* was reduced in a greenhouse experiment where *A. ilicifolia* was grown with *C. melitensis*, (Bauder and Sakrison 1999, p. 12). In a field experiment at the Hollenbeck Wildlife Area occurrence (Table 1), nonnative species near *A. ilicifolia* plants were removed. Researchers found that there was no increase in the number of *A. ilicifolia* plants, but that the reproductive output of the plants in the treatment area was significantly higher (Lawhead 2006, pp. 1-2).

Some occurrences are currently receiving treatments to control the extent and spread of the nonnative species. The impacts associated with nonnative plants have the potential to diminish the reproductive output of *Acanthomintha ilicifolia* and occupy space that provides habitat for this species. Determining the best practices to control nonnative plant species in and around *A. ilicifolia* occurrences is important for the conservation of this species.

Illegal Dumping

In the listing rule, illegal dumping was identified as a threat to *Acanthomintha ilicifolia*. At this time, we do not have any specific information to show that illegal dumping is a threat to *A. ilicifolia* habitat.

Fire, Fuel Modification (Discing, Mowing, and Clearing), and Post Fire Restoration

Fire was not discussed as a threat to *Acanthomintha ilicifolia* in the listing rule. Since listing, researchers have commented on the potential impact of fire as well as associated impacts to *A. ilicifolia* occurrences. In 1999, Bauder and Sakrison highlighted some of the risks associated with fire for *A. ilicifolia*. They stated that fire during the summer or fall could have a detrimental effect on *A. ilicifolia* by diminishing the seed available for the next growing season because little seed is stored in the soil, and standing plants retain a large amount of seed in the dried calyces until the rainy season begins (Bauder and Sakrison 1999, p. 44). These researchers stated fire in *A. ilicifolia* habitat could favor some nonnative plant species. Conversely, they suggested fire could be used positively as a management tool to reduce the amount of nonnative plant material (Bauder and Sakrison 1999, p. 44). They suggested additional research was needed to determine the particular effects of fire on this species (Bauder and Sakrison 1999, p. 44).

Major fires occurred during 2003 and 2007 that burned through areas occupied by *Acanthomintha ilicifolia* in San Diego County. These fires burned *A. ilicifolia* habitat in Sycamore and Slaughterhouse Canyons, on Viejas and Poser Mountains, on McGinty Mountain, at the Hollenbeck Canyon Wildlife Area, at the Rancho Jamul Ecological Reserve, at the Crestridge Reserve, at Mission Trails Regional Park, and around Lower Otay Lake. Following the fires, there was an increase in cover by nonnative grasses at some occurrences. Restoration efforts have followed the fires in some of the burned areas. In some case, these restoration efforts were not necessarily beneficial for *A. ilicifolia*. For example, biologists expressed concern after a hydroseed-slurry was used to restore the southern slope of Viejas Mountain because the hydroseed mixture created a hard covering on the ground that may impede the ability of *A. ilicifolia* seedlings to grow (F. Sproul, Botanist, EDAW Environmental Inc., pers. comm. 2006, pp. 1-2). Although several *A. ilicifolia* occurrences burned in these fires and there are incidental observations, no data was collected to determine the specific impacts these fires had on *A. ilicifolia*. Fire has the potential to negatively impact *A. ilicifolia* habitat because nonnative plant species typically invade areas following a fire, but we do not believe that the recent fires caused the extirpation of an *A. ilicifolia* occurrences.

Summary of Factor A

At the time of listing, the direct loss of *Acanthomintha ilicifolia* habitat to development was the primary threat to this species. Since listing, the majority (71 percent) of *A. ilicifolia* occurrences are now in areas that are protected from development. The conservation of these areas has been accomplished through the application of the Act, other State and Federal laws, and the regional planning efforts in San Diego County (see the “Regional Planning Efforts” section under Factor D). These conservation efforts have greatly reduced the threat of the direct habitat loss. Currently, the greatest threat to *A. ilicifolia* attributable to Factor A is the threat to its habitat

caused by nonnative plant species. To a lesser degree, the threats associated with the proximity to urbanized areas and recreational activities still impact this species. At a limited number of sites, activities such as discing, mowing, and ORV activity impact occurrences of *A. ilicifolia*. Fire also poses a potential threat to this species' habitat. Overall, Factor A threats are still a concern across this species' range; however, the degree of the threats under Factor A have decreased since this species was listed. The threats that we have identified in Factor A can largely be addressed through the use of adaptive management techniques.

FACTOR B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The listing rule states that *Acanthomintha ilicifolia* may be threatened with vandalism or collection. Listing a plant species can precipitate commercial or scientific interest, both legal and illegal, which can threaten the species through unauthorized and uncontrolled collection for commercial and scientific purposes. The listing of species as endangered or threatened publicizes their rarity and may make them more susceptible to collection by researchers or curiosity seekers (Mariah Steenson, pers. comm. 1997, as cited in USFWS 1998a, p. 54952). Plants are particularly vulnerable to vandalism. We have not recorded any instances of vandalism or uncontrolled collection on *A. ilicifolia*. We do not believe that *A. ilicifolia* is currently threatened by overutilization or vandalism. Overutilization for any purpose is not considered a threat to *A. ilicifolia* at this time.

FACTOR C: Disease or Predation

No diseases were known to affect *Acanthomintha ilicifolia* at listing, and none have been detected since listing.

The listing rule stated that herbivory may threaten *Acanthomintha ilicifolia* plants at some occurrences. Herbivory in the form of direct consumption of seedlings and mature plants was observed to have negative impacts on *A. ilicifolia* in at least two instances. Prior to listing, herbivory by rabbits was cited as the cause for the failure of an *A. ilicifolia* occurrence translocated to Quail Gardens (Table 1, EO 39). Since listing, herbivory by nonnative snails or another animal was suggested as a possible reason for the disappearance of several thousand seedlings at the Sabre Springs (west) (Table 1, EO 36) in 2005 (M. Kelly, Los Peñasquitos Canyon Preserve, pers. comm. 2005, p. 1-2). Reported negative impacts to *A. ilicifolia* associated with herbivory have not been widespread, but new instances of this threat should be reported to the Service. At this time, we do not consider herbivory as a widespread threat to this species.

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

At the time of listing, regulatory mechanisms thought to potential to protect *Acanthomintha ilicifolia* included: (1) The California Endangered Species Act (CESA); (2) the California Environmental Quality Act (CEQA) and the National Environmental Quality Act (NEPA); and (3) the Act in those cases where *A. ilicifolia* occurs and is incidentally protected in habitat occupied by a listed wildlife species. The listing rule provides an analysis of the level of

protection that was anticipated from those regulatory mechanisms (USFWS 1998a, pp. 54947-54950). Below we have included a discussion of the laws discussed in the listing rule and added discussions on the Native Plant Protection Act (NPPA), the Natural Community Conservation Planning Act (NCCP Act), the California Coastal Act, U.S. Forest Service Management Policies, Regional Planning Efforts, Local Laws and Regulations, and Mexican Law.

State Protections

State laws providing protection to *Acanthomintha ilicifolia* include the NPPA, CESA, CEQA, and the NCCP Act. There are also occurrences of *A. ilicifolia* that occur in the Coastal Zone and may trigger the protections associated with the California Coastal Act.

Native Plant Protection Act (NPPA) and California Endangered Species Act (CESA): In 1982, the California Fish and Game Commission listed *Acanthomintha ilicifolia* as endangered under the Native Plant Protection Act (NPPA) (Division 2, chapter 10, section 1900 *et seq.* of the California Fish and Game Code (CFG)) and the California Endangered Species Act (CESA) (Division 3, chapter 1.5, section 2050 *et seq.* of the CFG). Both the NPPA and CESA include prohibitions forbidding the “take” of *A. ilicifolia* (Chapter 10, Section 1908 and Chapter 1.5, Section 2080, CFG code). However, sections 2081(b) and (c) of CESA allow CDFG to issue incidental take permits for State-listed threatened and endangered species if:

- 1) The authorized take is incidental to an otherwise lawful activity;
- 2) The impacts of the authorized take are minimized and fully mitigated;
- 3) The measures required to minimize and fully mitigate the impacts of the authorized take are roughly proportional in extent to the impact of the taking on the species, maintain the applicant’s objectives to the greatest extent possible, and are capable of successful implementation;
- 4) Adequate funding is provided to implement the required minimization and mitigation measures and to monitor compliance with and the effectiveness of the measures; and
- 5) Issuance of the permit will not jeopardize the continued existence of a State-listed species.

Furthermore, with regard to prohibitions of unauthorized take under NPPA, landowners are exempt from this prohibition for plants to be taken in the process of habitat modification. Where landowners have been notified by the State that a rare or endangered plant is growing on their land, the landowners are required to notify CDFG 10 days in advance of changing land use in order to allow salvage of listed plants. *Acanthomintha ilicifolia* has been salvaged at five sites and planted out as seed (translocated) at seven sites (Fiedler 1991, pp. 8-13; CNDDDB 2008, p. 1-73; M. Kelly, Los Peñasquitos Canyon Preserve, pers. comm. 2005, p. 1-2).

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

agencies (http://www.ceres.ca.gov/topic/env_law/ceqa/summary.html). The California Environmental Quality Act requires disclosure of potential environmental impacts and a determination of “significant” if a project has the potential to reduce the number or restrict the range of a rare or endangered plant or animal; however, projects may move forward if there is a statement of overriding consideration. If significant effects are identified, the lead agency has the option of requiring mitigation through changes in the project or to decide that overriding considerations make mitigation infeasible (CEQA section 21002). Protection of listed species through CEQA is, therefore, dependent upon the discretion of the lead agency involved.

Natural Community Conservation Planning Act (NCCP): The NCCP program is a cooperative effort between the State of California and numerous private and public partners with the goal of protecting habitats and species. A NCCP identifies and provides for the regional or area-wide protection of plants, animals, and their habitats, while allowing compatible and appropriate economic activity. The program began in 1991 under the State’s NCCP Act (CFG Code 2800-2835). The primary objective of the NCCP program is to conserve natural communities at the ecosystem scale while accommodating compatible land uses (<http://www.dfg.ca.gov/nccp/>). Regional NCCPs provide protection to federally listed species by conserving native habitats upon which the species depend. The specific plans under the NCCP Act that cover *Acanthomintha ilicifolia* are discussed below in the “Regional Planning Efforts” section.

California Coastal Act: The California Coastal Commission (CCC) considers the presence of listed species when defining Environmentally Sensitive Habitat Areas (ESHA) which are subject to section 30240 of the California Coastal Act of 1976. This section of the California Coastal Act states that ESHAs shall be protected against any significant disruption of habitat values. Certain local jurisdictions have developed their own Local Coastal Programs or Land Use Plans that have been approved by the CCC. Although approximately 91 percent of California’s wetlands were lost prior to 1980 there has been relatively little loss of wetlands in the California coastal over the last 30 years due to the extremely protective nature of section 30233 of the Coastal Act (California Coastal Commission 2006, p. 23). In addition to a reduction of wetland losses, there have been large and small restoration projects conducted by a variety of cooperators (California Coastal Commission 2006, p. 23). Projects that occur in the Coastal Zone and potentially impact *Acanthomintha ilicifolia* may receive additional protection due to this law, but not all occurrences are within the Coastal Zone.

Federal Protections

National Environmental Policy Act (NEPA): NEPA (42 U.S.C. 4371 *et seq.*) provides some protection for listed species that may be affected by activities undertaken, authorized, or funded by Federal agencies. Prior to implementation of such projects with a Federal nexus, NEPA requires the agency to analyze the project for potential impacts to the human environment, including natural resources. In cases where that analysis reveals significant environmental effects, the Federal agency must propose mitigations that would offset those effects (40 C.F.R. 1502.16). These mitigations usually provide some protection for listed species. However, NEPA does not require that adverse impacts be fully mitigated, only that impacts be assessed and the analysis disclosed to the public.

U.S. Forest Service Management Policies: At the time of listing, occurrences of *Acanthomintha ilicifolia* on the CNF were known on Viejas Mountain and Poser Mountain (USFWS 1998a, p. 54988). The U.S. Forest Service (USFS) management policies affecting *A. ilicifolia* were briefly discussed.

A 2005 non-jeopardy biological and conference opinion (USFWS 2005) addresses the revised Land and Resource Management Plans (LRMP) for the four southern California National Forests. These plans describe the strategic direction for these four National Forests at a broad program-level for land and resource management. These plans include land use zones that identified management intent and anticipated level of public use in any area of the forests and standards that are fundamental requirements and define the parameters for the activities that the USFS anticipated.

The revised LRMP for the CNF will benefit *Acanthomintha ilicifolia* and its habitat. The CNF has completed many of the actions outlined in the 1991 Management Guide (USFS 1991) written to help the CNF avoid and minimize impacts to *A. ilicifolia*. The revised LRMP contains general provisions for conservation of this species and the Management Guide suggests specific management and conservation actions that should address known threats to this species on USFS lands. However, the LRMP is a guidance document and does not require or assure funding for management actions outlined in the plan. Additionally, the LRMP does not preclude projects from occurring outside of the framework of the LRMP.

As part of our section 7 consultation with the USFS on the revised LRMP, the USFS consulted on activities carried out on national forest lands including: roads and trail management; recreation management; special use permit administration; administrative infrastructure; fire and fuels management; livestock grazing and range management; minerals management; and law enforcement. In our 2005 biological opinion on the revised LRMP, we determined that implementation of the plan was not likely to jeopardize the continued existence of *Acanthomintha ilicifolia* (USFWS 2005, pp. 114-119). We are not aware of any new information that would change our conclusion. The revised LRMP standards can be changed by a forest plan amendment (USFS 2005, p. 1). Although the LRMP set important parameters for authorization of specific projects, the LRMP does not authorize the projects. Actual authorization of projects depends on analysis of site-specific effects, project-level section 7 consultation under the Act, and consistency with appropriate management direction and applicable legal requirements (USFWS 2005, p. 8).

Endangered Species Act of 1973, as amended (Act): The Act is the primary Federal law currently providing protection for this species. The Service's responsibilities include administering the Act, including sections 7, 9, and 10 that address take. Since listing, the Service has analyzed the potential effects of Federal projects under section 7(a)(2), which requires Federal agencies to consult with the Service prior to authorizing, funding, or carrying out activities that may affect listed species. A jeopardy determination is made for a project that is reasonably expected, either directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery of a listed species in the wild by reducing its reproduction, numbers, or distribution (50 CFR 402.02). A non-jeopardy opinion may include reasonable and prudent

measures that minimize the amount or extent of incidental take of listed species associated with a project.

Section 9 prohibits the taking of any federally listed endangered or threatened species. Section 3(18) defines “take” to mean “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Service regulations (50 CFR 17.3) define “harm” to include significant habitat modification or degradation which actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering. Harassment is defined by the Service as an intentional or negligent action that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. The Act provides for civil and criminal penalties for the unlawful taking of listed species. Incidental take refers to taking of listed species that result from, but is not the purpose of, carrying out an otherwise lawful activity by a Federal agency or applicant (50 CFR 402.02). For projects without a Federal nexus that would likely result in incidental take of listed species, the Service may issue incidental take permits to non-Federal applicants pursuant to section 10(a)(1)(B). To qualify for an incidental take permit, applicants must develop, fund, and implement a Service-approved Habitat Conservation Plan (HCP) that details measures to minimize and mitigate the project’s adverse impacts to listed species. Regional HCPs in some areas now provide an additional layer of regulatory protection for covered species, and many of these HCPs are coordinated with California’s related Natural Community Conservation Planning program.

With regard to federally listed plant species, section 7(a)(2) requires Federal agencies to consult with the Service to ensure any project they fund, authorize, or carry out does not jeopardize a listed plant species. Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the “take” of federally endangered wildlife; however, the take prohibition does not apply to plants. Instead, plants are protected from harm in two particular circumstances. Section 9 prohibits (1) the removal and reduction to possession (i.e., collection) of endangered plants from lands under Federal jurisdiction, and (2) the removal, cutting, digging, damage, or destruction of endangered plants on any other area in knowing violation of a state law or regulation or in the course of any violation of a state criminal trespass law. Federally listed plants may be incidentally protected if they co-occur with federally listed wildlife species.

Regional Planning Efforts

Incidental take permits, pursuant to section 10(a)(1)(B) of the Act, may be issued to authorize take of listed animal species resulting from projects without a Federal nexus. This section provides protection for *Acanthomintha ilicifolia* through the approval of Habitat Conservation Plans (HCPs) that detail measures to minimize and mitigate the potential impacts of projects to the maximum extent practicable. This regulatory protection was not wholly realized prior to the Federal listing of *A. ilicifolia*. *Acanthomintha ilicifolia* is a “covered species” under most existing and planned individual and regional HCPs in San Diego County, California. As a covered species, *A. ilicifolia* is afforded an additional layer of regulatory protection. The two most important regional HCPs for *A. ilicifolia* are the San Diego Multiple Species Conservation Program/Natural Community Conservation Plan/HCP (MSCP) (City of San Diego 1997,

approved by the Service in 1997) and the San Diego Multiple Habitat Conservation Program/Natural Community Conservation Plan (MHCP) (AMEC Earth and Environmental, Inc. and Conservation Biology Institute 2003, approved by the Service in 2004).

City of San Diego and County of San Diego Subarea Plans under the San Diego MSCP

The City of San Diego and County of San Diego Subarea Plans under the MSCP contain requirements to monitor and adaptively manage *Acanthomintha ilicifolia* habitat and provide for the conservation of this species' PCE as outlined in the final critical habitat rule (73 FR 50453; August 26, 2008). The framework and area-specific management plans are comprehensive and address a broad range of management needs at the preserve and species levels that are intended to reduce the threats to covered species and thereby contribute to the recovery of the species. These plans include the following: (1) Fire management, (2) public access control, (3) fencing and gates, (4) ranger patrol, (5) trail maintenance, (6) visitor/interpretive and volunteer services, (7) hydrological management, (8) signage and lighting, (9) trash and litter removal, (10) access road maintenance, (11) enforcement of property and/or homeowner requirements, (12) removal of invasive species, (13) nonnative predator control, (14) species monitoring, (15) habitat restoration, (16) management for diverse age classes of covered species, (17) use of herbicides and rodenticides, (18) biological surveys, (19) research, and (20) species management conditions (MSCP 1998).

Eight major populations (as defined by the MSCP – Sycamore Canyon (EO 32), Poway (EO 36), Lake Hodges (4S Ranch) (EO 60), El Capitan (EO 73), McGinty Mountain (EO 21 and 22), Otay Lakes (EO 55 and 56), Asphalt Inc. (EO 64), Sky Mesa (EO 45)) of *Acanthomintha ilicifolia* are included within preserve lands under the MSCP, each of which will be conserved from 80 to 100 percent, with 85 percent overall coverage (USFWS and CDFG 1996, p. 39). Additionally, under the City of San Diego's Subarea Plan, impacts to narrow endemic plants, including *A. ilicifolia*, inside the Multi-Habitat Planning Area (MHPA) will be avoided and outside the MHPA will be protected as appropriate by: (1) Avoidance, (2) management, (3) enhancement, and/or (4) transplantation to areas identified for preservation (City of San Diego 1997, p. 105-106; USFWS 1997, p. 15). Under the County of San Diego's Subarea Plan, narrow endemic plants, including *A. ilicifolia*, are conserved under the Biological Mitigation Ordinance using a process that: (1) Requires avoidance to the maximum extent feasible, (2) allows for a maximum 20 percent encroachment into a population if total avoidance is not feasible, and (3) requires mitigation at the 1:1 to 3:1 (in kind) for impacts if avoidance and minimization of impacts would result in no reasonable use of the property (County of San Diego (BMO) 1997, p. 11; USFWS 1998b, p. 12). These measures help protect *A. ilicifolia* and its essential habitat whether located on lands targeted for preserve status within the MHPA and Pre-Approved Mitigation Area (PAMA) or located outside of those areas. The narrow endemic policy for both the City of San Diego and County of San Diego Subarea Plans require *in situ* conservation of *A. ilicifolia* or mitigation to ameliorate any habitat loss. Therefore, although some losses may occur to this species within the lands that are not currently preserved or otherwise designated for conservation under the MSCP, the preservation, conservation, and management of *A. ilicifolia* provided under the City and County MSCP Subarea Plans ensures the long-term conservation of this species and its habitat within all areas addressed by the subarea plans under the MSCP.

In the 1998 final rule listing *Acanthomintha ilicifolia* as threatened (63 FR 54938; October 13, 1998), we identified habitat destruction and fragmentation from urban development, ORV activity, nonnative invasive plant species, livestock trampling and grazing, and mining as primary threats to the species. As described above, the MSCP provides protection and appropriate management for *A. ilicifolia*, and its habitat through implementation of conservation strategies that are consistent with generally accepted principles of conservation biology. The MSCP preserves habitat that supports this species and provides for its recovery. Currently, 6 occurrences of *A. ilicifolia* are conserved through the City of San Diego Subarea Plan under the MSCP (Table 1, EO 19, 33, 36, 60, Otay Lakes (south side), and Cal Terraces), an additional 4 occurrences of *A. ilicifolia* (Table 1, EO 46, 34, 35, and 79) are in this plan's planning boundary, but are not yet conserved. Though the County of San Diego Subarea Plan under the MSCP, 10 occurrences of *A. ilicifolia* are conserved (Table 1, EO 15, 21, 22, 25, 32, 63, 67, 81, Rancho Jamul Ecological Reserve, and Bonita Meadows); an additional 6 occurrences of *A. ilicifolia* (Table 1, EO 11, 26, 45, 64, 71, and 72) are also in this plan's planning boundary.

Carlsbad Habitat Management Plan (HMP) Under the San Diego Multiple Habitat Conservation Program (MHCP)

The MHCP is a comprehensive, multi-jurisdictional planning program designed to create, manage, and monitor an ecosystem preserve in northwestern San Diego County. The MHCP is a framework plan that has been in place for 5 years. It is also a regional subarea plan under the State of California's Natural Communities Conservation Planning (NCCP) program and was developed in cooperation with CDFG. The MHCP is designed to be implemented through approved individual subarea plans. The MHCP preserve system is intended to protect viable populations of native plant and animal species and their habitats in perpetuity, while accommodating continued economic development and quality of life for residents of northern San Diego County. The MHCP includes an approximately 112,000-acre (45,324-hectare study area within the cities of Carlsbad, Encinitas, Escondido, San Marcos, Oceanside, Vista, and Solana Beach.

According to the MHCP, 91 percent of the major populations and critical locations (as defined and identified in the MHCP) of *Acanthomintha ilicifolia* in the study area for the MHCP will be conserved under the Focused Planning Areas (FPAs) design (core areas and linkages important for conservation of sensitive species) and will be conserved at levels of 95 to 100 percent. In addition to the conserved occurrences, an estimated 3,403 acres (1,377 hectares) of potentially suitable habitat will be conserved as a result of the existing preserve design and preserve policies. Any occurrences that fall outside of FPAs will be conserved at a minimum 80 percent level based on the Narrow Endemic Plant Policy. The Narrow Endemic Plant Policy requires conservation of additional occurrences of narrow endemic species (80 percent outside of FPAs), mitigation for unavoidable impacts, and management practices designed to achieve no net loss of narrow endemic plant populations. Additionally, cities that apply for subarea permits cannot permit more than 5 percent gross cumulative loss of narrow endemic populations or occupied acreage within the FPAs and no more than 20 percent cumulative loss of narrow endemic locations, population numbers, or occupied acreage outside of FPAs (AMEC Earth and Environmental, Inc. and Conservation Biology Institute 2003).

The City of Carlsbad received a permit on their individual Subarea Plan under the MHCP framework plan on November 9, 2004 (AMEC Earth and Environmental, Inc. and Conservation Biology Institute 2003). *Acanthomintha ilicifolia* is a conditionally covered species under the Carlsbad HMP. “Conditional” coverage means that the City of Carlsbad receives coverage for this species as identified in the associated biological opinion, as long as the City of Carlsbad complies with the conservation measures outlined in the HMP. The City of Carlsbad’s coverage for *A. ilicifolia* is also conditional until the City of San Marcos completes their subarea plan under the MHCP. However, we believe the City of Carlsbad has demonstrated compliance with the conservation measures for *A. ilicifolia* required to be implemented by the City under the HMP.

Consistent with the framework provided under the MHCP, the Carlsbad HMP contains requirements to conserve and adaptively manage *Acanthomintha ilicifolia* habitats and provide for the conservation of this species, thereby contributing to the recovery of *A. ilicifolia*. The Carlsbad HMP also incorporates many processes to ensure that the Service has an active role to ensure proper implementation of the HCP. For example, area specific management plans must be developed for each preserve area within the Carlsbad HMP, and monitoring and management objectives must be established for each preserve. The Service has an opportunity to review and approve these area specific management plans. Progress towards meeting these objectives is measured through the submission of annual reports. There are also regular coordination meetings between the Service and the City of Carlsbad to discuss on-going conservation issues. Under the Carlsbad HMP, the City must account annually for the progress it is making in assembling conservation areas. The City is required to provide the Service with an annual report that includes the habitat acreage destroyed and conserved within the HMP. This accounting process ensures that habitat conservation proceeds in rough proportion to habitat loss and complies with the Carlsbad HMP and associated implementing agreement.

In the 1998 final rule listing *Acanthomintha ilicifolia* as threatened (63 FR 54938; October 13, 1998), we identified the following threats to the species: habitat destruction and fragmentation from urban development, ORV activity, nonnative invasive plant species, livestock trampling and grazing, and mining. The Carlsbad HMP incorporates conservation measures to address these threats into the management of its preserve area. The Carlsbad HMP provides protection and appropriate management for *A. ilicifolia*, and its habitat through implementation of conservation strategies that are consistent with generally accepted principles of conservation biology. The Carlsbad HMP preserves habitat that supports this species and provides for its recovery. Currently, 7 of 9 *A. ilicifolia* occurrences (78 percent) in the City of Carlsbad HMP are conserved (Table 1, EO 47, 48, 57, 58, 70, 82, and Calavera Hills); an additional two occurrences of *A. ilicifolia* (Table 1, EO 31 and 59) are also in this plan’s planning boundary.

Local Laws and Regulations

In San Diego County, most jurisdictions require that prior to any grading activities a grading permit is acquired (San Diego County Code of Regulatory Ordinances, Title 8, Division 7, Chapter 1; San Diego Municipal Code, Chapter 14, Article 3, Division 1: Environmentally Sensitive Lands Regulations; San Diego Municipal Code, Chapter 14, Article 2, Division 1: Grading Regulations; Municipal Code for the City of Carlsbad, California, Chapter 15.16:

Grading and Erosion Control; City of Encinitas Grading, Erosion, and Sediment Control Ordinance (Chapter 23.24)). As part of the permit process application receive environmental review which ensures that grading projects take environmental constraints into account. The result of these and other local laws is a high rate of compliance to existing laws before grading at a project site occurs. Due to the regulations under CEQA and NEPA, project proponents attempt to reduce the impacts that their projects will have on sensitive biological resources. Without the status of being federally threatened, *Acanthomintha ilicifolia* would not necessarily receive the same level of priority for avoidance as it does at this time.

Mexican Law

The Service is not aware of any existing regulatory mechanisms that protect *Acanthomintha ilicifolia* or its habitat where it occurs in northwestern Baja California, Mexico. *Acanthomintha ilicifolia* is not listed under the Mexican equivalent of the Act (Norma Oficial Mexicana NOM-059).

Summary of Factor D

In summary, the Act is the primary law that provides protection for this species since its listing as threatened in 1998. Other Federal and State regulatory mechanisms provide discretionary protections for the species based on current management direction, but do not guarantee protection for the species absent its status under the Act. Therefore, we continue to believe other laws and regulations have limited ability to protect the species in absence of the Act.

FACTOR E: Other Natural or Manmade Factors Affecting Its Continued Existence

The final listing rule for *Acanthomintha ilicifolia* (USFWS 1998a, p. 54950) identified the vulnerability of small populations, nonnative species competition (an indirect habitat disturbance resulting from development, mining, grazing, discing, and alteration of hydrology), and grazing under Factor E. Since listing, we added climate change as a potential threat to *A. ilicifolia* under Factor E.

Vulnerability of Small Populations

In the listing rule, it was noted that *Acanthomintha ilicifolia* is vulnerable to extinction because it exhibits large population fluctuations from year to year. Also, inbreeding was identified as a problem for small *Acanthomintha ilicifolia* populations, which can have significantly lower germination rates than larger populations of the same species due to high levels of homozygosity (Menges 1990, pp. 52-62). Most occurrences of *A. ilicifolia* have an average of less than 1,000 plants and could be vulnerable because of their small size. At this time, no genetic analysis has been conducted to determine if inbreeding is a problem for *A. ilicifolia*. Additionally, there has been no research to determine if seeds from smaller occurrences have lower germination rates when compared to larger occurrences. Occurrences with fewer plants are more susceptible to extirpation by threats such as nonnative species competition, trampling, and too frequent fire.

Small occurrences output fewer seeds each year; therefore, the ability of these occurrences to

withstand the impacts from various threats is decreased. This is a limitation to *Acanthomintha ilicifolia*'s survival because there may not be a persistent seed bank or the species may not be able to recolonize areas of suitable habitat due to dispersal barriers such as intervening development (USFWS 1998a, p. 54950). In a study to examine the soil seed bank for *A. ilicifolia*, researchers found that there was a low ratio of the number of seeds produced each year to the number of seeds that remained in the soil (Bauder and Sakrison 1999, 25-28, 43-44). More management attention may be needed when conserving smaller occurrences to ensure their persistence. Larger occurrences may be more self-sustaining in respect to these threats and may not require such careful attention once direct threats are ameliorated.

Competition with Nonnative Grasses and Forbes

The listing rule identified risks from replacement by nonnatives as a byproduct of habitat degradation associated with development, grazing, discing, and alteration of hydrology, discussing the impacts associated with nonnative plants under Factor E. Currently, the impacts nonnative plants have on *Acanthomintha ilicifolia*'s habitat are of the greatest concern and, therefore, we have moved the discussion of this threat under Factor A.

Grazing

In the listing rule, grazing was cited as a threat to *Acanthomintha ilicifolia* because of the negative impacts to the species that grazing causes such as increasing erosion, soil compaction, and the introduction of a variety of nonnative. The CNDDDB indicates that eight occurrences were threatened by grazing at the time of listing (Table 1, EOs 12, 46, 50, 55, 56, 60, 62, and 69). Since listing, grazing animals were removed from these eight occurrences. Currently, we are not aware of any grazing that affects any *A. ilicifolia* occurrences. While the Black Mountain occurrence (Table 1, EO 60) was being grazed, nonnative grasses were abundant in the area. When grazing was removed, *Cynara cardunculus* (artichoke thistle) became abundant and had to be removed to protect the occurrence of *A. ilicifolia* (M. Kelly, Los Peñasquitos Canyon Preserve, pers. comm. 2005, p. 1-2). Currently, we do not consider grazing to be a threat to *A. ilicifolia*. Some of the areas that were grazed in the past are still degraded by nonnative plant species and could benefit from restoration activities.

Climate Change

There is a broad consensus among scientists that the earth is in a warming trend caused by the anthropogenic greenhouse effect. We cannot predict what will happen in southern California, but many scientists support predictions for warmer, wetter winters, and warmer, drier summers (Field *et al.* 1999, pp. 2-3, 20). Additionally, the southwestern region of the country is predicted to become drier and hotter overall (Hayhoe *et al.* 2004, p.12424; Seager *et al.* 2007, p. 1181). Climate change may also affect the duration and frequency of drought and these climatic changes become even more dramatic and intense (Graham 1997). Documentation of climate-related changes that have already occurred in California (Croke *et al.* 1998, pp. 2128, 2130; Brashears *et al.* 2005, p. 15144), and future drought predictions for California (e.g., Field *et al.* 1999, pp. 8–10; Lenihien *et al.* 2003, p. 1667; Hayhoe *et al.* 2004, p.12422; Brashears *et al.* 2005, p. 15144; Seager *et al.* 2007, p. 1181) and North America (IPCC 2007, p. 9) indicate prolonged drought

and other climate related changes will continue in the foreseeable future. We anticipate these changes will affect *Acanthomintha ilicifolia* habitat and occurrences.

Rainfall and temperature both affect the germination rate and successful reproduction of *Acanthomintha ilicifolia*. Five factors associated with a changing climate may affect the long-term viability of *A. ilicifolia* occurrences in its current habitat configuration: (1) Drier conditions may result in a lower percent germination and smaller population sizes; (2) higher temperatures may inhibit germination (Bauder and Sakrison, p. 32); (3) a shift in the timing of the annual rainfall may favor nonnative species; (4) the timing of pollinator life-cycles may become out-of-sync with timing of flowering *A. ilicifolia*; and (5) drier conditions may result in increased fire frequency, making the ecosystems in which *A. ilicifolia* currently grows more vulnerable to the threats of subsequent erosion and nonnative/native plant invasion. In a changing climate, conditions could change in a way that would allow both native and nonnative plants to invade the habitat where *A. ilicifolia* occurs.

Although we cannot predict the exact effects of climate change on *Acanthomintha ilicifolia*, it is likely that it will exacerbate identified threats and may introduce new additional threats. A changing climate with spatial and temporal shifting of temperature and precipitation may cause this species specific adaptations to climate to work against its survival. A changing climate may also provide advantages to known or new nonnative/native plant species to threaten *A. ilicifolia*. Sharing information between scientists, land managers, and decision makers will increase our ability to address and mitigate these threats. Increasing the success with which we address current threats to *A. ilicifolia* will increase our success of handling the uncertain effects of future climate change.

Summary of Factor E

In summary, impacts associated with vulnerability of small populations, competition from nonnative plant species, and grazing were identified at the time of listing and, except for grazing, these threats continue to effect *Acanthomintha ilicifolia*'s survival. Since listing, climate change has become an acknowledged risk factor and potential threat to consider. Although climate change data specific to *A. ilicifolia* is currently unavailable, adverse impacts to *A. ilicifolia* and its habitat are possible. Therefore, we believe that these natural and man-made factors continue to threaten *A. ilicifolia*.

III. RECOVERY CRITERIA

At this time, a recovery plan has not been completed for *Acanthomintha ilicifolia*. The critical habitat rule provides maps of the areas essential to the recovery of this species. Additionally, the existing HCPs identify locations local jurisdictions are working to conserve. With 39 of the 55 extant occurrences on land protected from development, the HCPs and other conservation efforts are providing for the recovery of *A. ilicifolia*.

IV. SYNTHESIS

At the time of listing in 1998, 32 of 52 known occurrences of *Acanthomintha ilicifolia* were extant. Currently, we believe that 55 of 80 known occurrences of *A. ilicifolia* are extant. The new occurrences of *A. ilicifolia* were found within or on the edge of the range known at the time of listing and within similar habitat. The increased number of occurrences provides more opportunities to conserve this species and its habitat.

At the time of listing, nine occurrences were on land protected from development. Currently, 39 occurrences are protected from development. Because 71 percent of the potentially extant occurrences are now on conserved lands, the overall threat of development to *Acanthomintha ilicifolia* has decreased in severity and magnitude. The implementation of regional HCPs has greatly helped to reduce the direct threat of development. The existing HCPs provide cohesive regional efforts to identify important occurrences of *A. ilicifolia* and direct development to avoid and conserve these occurrences.

Currently, the most pervasive rangewide threat for *Acanthomintha ilicifolia* is caused by nonnative plant species. An influx of nonnative plant species has been shown to alter the open character of *A. ilicifolia*'s habitat. Additionally, experiments have shown significant reductions in size and reproductive output of *A. ilicifolia* plants that are crowded by nonnative plant species. On conserved lands, adaptive management is being used to develop appropriate ways to control the threat of nonnative plant species.

Acanthomintha ilicifolia is also threatened to a lesser degree by trampling/grazing, erosion, impacts associated with hiking and biking, and ORV activity. In general, these threats were discussed in the listing rule; however, the impacts associated with hiking and biking are a more recent concern due increased recreational use of lands conserved for *A. ilicifolia*. Fire and climate change are also seen as potential new threats for *A. ilicifolia*; however, the specific impacts associated with fire and climate change have not yet been fully explored.

Acanthomintha ilicifolia is progressing towards recovery through the positive actions of developers, academic researchers, regional planners, local governments, State and Federal agencies, land managers, and environmental groups. Threats are still present for this species, although at a more moderate degree than when the species was listed. Our knowledge on these threats will continue to evolve as more research, monitoring, and management information is gathered and analyzed. We will continue to make progress towards the recovery of *A. ilicifolia* through the use of our diverse partnerships and through the use of the best available conservation science.

V. RESULTS

Recommended Listing Action:

- ☐ Downlist to Threatened
- ☐ Uplist to Endangered
- ☐ Delist (indicate reason for delisting according to 50 CFR 424.11):

☐ Extinction
☐ Recovery
☐ Original data for classification in error
☒ No Change

New Recovery Priority Number and Brief Rationale: We recommend the recovery priority number should be changed from “2C”, a high degree of threat and a high chance of recovery, with conflicts associated with development, to “8”, a moderate degree of threat and a high chance of recovery. The high degree of threat from development has been reduced through conservation efforts to protect 39 of 55 extant occurrences from development. Currently, *Acanthomintha ilicifolia* experiences a moderate degree of threat from nonnative plants and recreational activities. To a lesser degree, development and urbanization still threaten this species. Additionally, we have removed the “C” indicating conflict because Regional Planning Efforts have created partnerships across this species’ range that seek beneficial outcomes where there may have been conflict in the past.

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

1. Identify opportunities to work with private landowners to encourage conservation actions for *Acanthomintha ilicifolia* on sites that are not conserved. This could be done through the Partners for Fish and Wildlife Program as well as other cooperative programs. Projects could identify and reduce threats, and enhance areas that support *A. ilicifolia*.
2. Develop relationships with landowners and managers of conserved lands where *Acanthomintha ilicifolia* occurs to minimize threats associated with urban preserves, such as nonnative plant species.
3. Develop a working group for *Acanthomintha ilicifolia* to coordinate monitoring efforts, share effective methods of reducing threats, and gather data on less surveyed occurrences of *A. ilicifolia*. Include land managers, CDFG, USFS, academics, and local governments in this working group.
4. Encourage the participation of academic researchers to investigate questions of pollination and seed set, climate change, and fire effects in relationship to *Acanthomintha ilicifolia*.
5. Develop restoration projects to benefit *Acanthomintha ilicifolia* in areas that have been impacted by ORV and grazing activity.
6. Continue to work with CDFG to strengthen opportunities to conserve *Acanthomintha ilicifolia* through State protections.
7. Work with researchers and government agencies in Mexico to evaluate the status of *Acanthomintha ilicifolia* in northwestern Baja California, Mexico.

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**U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW**

Acanthomintha ilicifolia (San Diego thornmint)

Current Classification: Threatened

Recommendation Resulting from the 5-Year Review:

- ☐ Downlist to Threatened
- ☐ Uplist to Endangered
- ☐ Delist
- ☒ No change needed

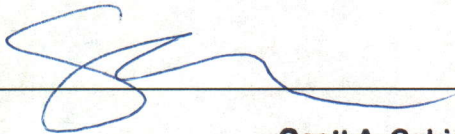
Review Conducted By: Carlsbad Fish and Wildlife Office

FIELD OFFICE APPROVAL:

ACTING

Lead Field Supervisor, U.S. Fish and Wildlife Service

Approve _____



Scott A. Sobiech

Date _____

AUG 12 2009