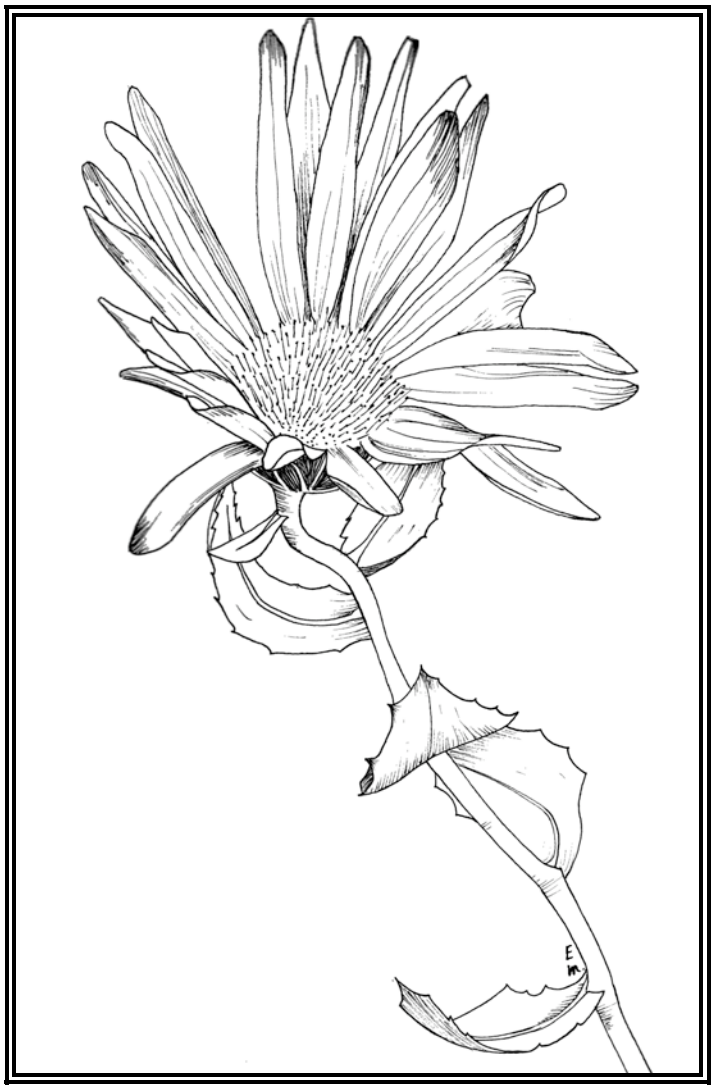
RANCHO SANTA ANA BOTANIC GARDEN OCCASIONAL PUBLICATIONS

NUMBER 8

A CONSERVATION PLAN FOR MECCA ASTER, *XYLORHIZA COGNATA* (ASTERACEAE)

MITCHELL E. MCGLAUGHLIN



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1.0 Executive Summary

Xylorhiza cognata (H.M.Hall) T.J.Watson (Asteraceae, Mecca aster) is a native shrub known from the Indio Hills and Mecca Hills of Riverside County, California (Fig. 1). The California Native Plant Society (CNPS) has placed *X. cognata* on its 1B.2 list, classifying it as "fairly endangered" in California. *Xylorhiza cognata* is a covered species in the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP 2007) and will be included in the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO 2002) when it is completed. There are fewer than twenty known extant occurrences of *X. cognata.* *Xylorhiza cognata* is not listed as threatened or endangered under the State or Federal Endangered Species Acts, and no listing seems warranted at this time. Recommended management actions for *X. cognata* include surveying for additional occurrences, determining if plants of this species are associated with a specific substrate, annual monitoring of several occurrences to document fluctuations in population size, restricting off-highway vehicle (OHV) use in areas covered under the CVMSHCP, and studying aspects of the species' reproductive biology, phenology, and life history to better determine appropriate conservation activities.

2.0 Scope and Purpose

This conservation plan surveys all of the known occurrences of this species, describes the threats to those occurrences, if known, and outlines current as well as potential conservation actions that will preclude the need for State or Federal listing. *Xylorhiza cognata* was selected for a conservation plan due to the limited amount of biological information available. The purpose of this plan is to compile all available information about *X. cognata*, both from previous references and materials, and from observations and data developed for this review, in a single document useful for land managers, conservation organizations, State and Federal agencies, and other interested parties. This document synthesizes all available data and sets forth immediate conservation activities that are warranted and identifies areas where more information will be required to ensure the survival of this species.

3.0 Background

3.1 *Species Description*

Xylorhiza cognata is a woody shrub standing up to 1.5 m tall with distinctive white bark (Fig. 2–5). It branches from a thick woody tap root, with main stems to 1 cm in diameter and upper branches to 4 mm in diameter. Young stems and branches are moderately to densely covered with short glandular trichomes, but become glabrous with age. Leaves are oblanceolate to ovate (1–5 cm long, 0.3–2 cm wide) and are glabrous to moderately glandular. The apex of the leaves is obtuse or acute and the leaf base is slightly clasping around the stem. Leaves have a white mid-rib, are toothed or entire, and are not reduced toward apical portions of the plant as occurs in some other members of the genus (Watson 1977).

The inflorescence is composed of solitary radiate heads 2–4 cm wide (not including the ray flowers), each on a

peduncle 0–11 cm long (Fig. 2–3). The involucre is bell shaped or hemispheric, with phyllaries graduated in 4–7 series. The outer phyllaries are linear-lanceolate, 8–19 mm long, 0.8–2.2 mm wide, and subglabrous to densely glandular. The innermost phyllaries are shorter than the outer. There are 20–30 ray flowers per head each with 5–8 mm long corolla tubes and 1.8–2.5 cm long oblong to elliptic ligules that are generally light blue. There are 40–80 disk flowers per head, 7–9 mm in length, with yellow corollas. The style branches are linear, 1.8–2.8 mm long, with acute appendages, 0.8–1.6 mm long. The fruit is an achene that is linear to club-shaped, 3–4.5 mm long, and woolly with long, silky, appressed hairs. Achenes are topped with a pappus of 60–110 stout, unequal bristles up to 9.5 mm in length (Watson 1977).

Two other closely related species of *Xylorhiza* occur in southeastern California, but all three species have allopatric distributions. *Xylorhiza tortifolia* generally occurs to the north and east of *X. cognata*, extending from the Mojave Desert to the Chocolate Mountains in California, and in Arizona, Nevada, and Utah (Nesom 2006). *Xylorhiza tortifolia* is distinguished by being a sub-shrub or herbaceous perennial, with narrow leaves that are reduced upwards, and 8–20 cm long peduncles. *Xylorhiza orcuttii* generally occurs south of the range of *X. cognata* in Imperial, Riverside, and San Diego Counties, and in Baja California, Mexico (Nesom 2006). *Xylorhiza orcuttii* is distinguished by being a low growing sub-shrub, that lacks glandular pubescence, and by the presence of broad phyllaries, the inner of which are larger than the outer.

3.2 *Taxonomy*

Xylorhiza cognata is a member of Asteraceae, the sunflower family. Eight species of *Xylorhiza* are recognized, divided into two sections. All members of the genus are found in xeric regions of the western United States and Mexico. The genus *Xylorhiza* was established in 1840 by Thomas Nuttall, who described two species, *X. glabriuscula*, the type species for the genus, and *X. villosa* (Nuttall 1840). Torrey and Gray (1842) transferred both species of *Xylorhiza* to genus *Aster*. Later, Greene (1896) resurrected genus *Xylorhiza* to include seven species. In a latter revision, Cronquist and Keck (1957) reduced *Xylorhiza* to sectional status in genus *Machaeranthera*. The most recent treatment of the genus was done by Watson (1977), who returned to the generic circumscription of Greene (1896), including the eight species and two sections recognized today. This is the currently accepted placement of *X. cognata* (Nesom 2006).

Recent molecular phylogenetic examination of relationships among species recognized as *Machaeranthera* by Cronquist and Keck (1957) and close relatives, have shown *Xylorhiza* as having a sister relationship to the core *Machaeranthera* group (Morgan and Simpson 1992; Morgan 1997). However, the molecular phylogenetic research only included a single representative of *Xylorhiza*, *X. wrightii*, a species from Texas and adjacent Chihuahua, Mexico.

Xylorhiza cognata was first described as *Aster cognatus* in 1915 by H. M. Hall (1915), based on his collection from the “northerly side” of the Coachella Valley and specimens from Red Canyon and Shavers’s Well on the east and west ends, respectively, of the

Orocopia Mountains. In 1923, Davidson described *Aster standleyi* based on a collection by Francis Fultz from Painted Canyon in the Mecca Hills (Davidson 1923*a*). In the same year Davidson (1923*b*) transferred his species to *Xylorhiza* as *X. standleyi*. Today this is regarded as a synonym of *X. cognata.* Cronquist and Keck (1957) revised *Machaeranthera,* and the combination *M. cognata* was made. Watson's (1977) resurrection of *Xylorhiza* yielded *X. cognata* (H.M.Hall) T.J.Watson, as known today.

3.3 *Biology and Ecology*

Very little is known about the biology of *Xylorhiza cognata*. Plants are long-lived perennials that exhibit several adaptations to their arid environment. Most notably, vegetative growth occurs primarily in the spring when there is available moisture and cool temperatures (Watson 1977). As temperatures increase and soil moisture decreases, growth subsides and some leaves abscise (Watson 1977). Additional adaptations to the arid environments include a thick, woody tap root, light-colored bark, and glandular trichomes on the leaves and stems.

Flowering occurs between January and June, with an apparent peak in April and May. The means of pollination is unknown and the sunflower family contains a diverse array of pollination syndromes and breeding systems. The upper portions of the fruits are covered in a pappus of thick bristles, which may aid in animal mediated dispersal.

Very little is known about the life history or demography of this species. Seed-set seems to be high in the field (Watson 1977), but attempts by Watson to germinate seeds in the laboratory resulted in a germination rate of less than one percent (Watson 1977). Watson (1977) also noted that populations were composed predominantly of larger plants, with limited evidence of seedlings or younger plants. Both Watson's laboratory seed germination experiments and his lack of evidence of seedlings in the field may indicate that recruitment is limited (Watson 1977). However, among populations visited for this study, seedlings and younger plants were observed in all populations that had more than 50 individuals (Mitchell McGlaughlin pers. obs.). Currently, there is no information about seed dormancy, required conditions for seed germination, or seedling establishment rates. Until more information about the demography of *X. cognata* is available, it is not possible to assess conclusively the long-term prognosis for populations of the species.

3.4 *Habitat*

Xylorhiza cognata is found in a limited area of the northwestern Colorado Desert (Fig. 1). It occurs on clays, rocky sands, gravel, gypsum soils, and alluvial substrates. Plants are generally found growing in deep ravines and on the exposed slopes above (Fig. 6). Although some plants are found growing in sand and gravel in canyon bottoms, the majority of plants are generally found growing on adjacent steep slopes. Plants occur at elevations of 20–240 m (65–790 ft), most frequently on west, southwest, and northwest facing slopes.

Stewart (1992) has suggested that *X. cognata* is associated with the Palm Springs and Canebrake geologic formations, which are non-marine layers that originated during the Plio-Pleistocene

Fig. 1. Distribution map for *Xylorhiza cognata*, Riverside County, California. Extant occurrences are indicated with blue dots in the Indio Hills and green dots in the Mecca Hills. The extirpated "Palms to Pines" occurrence is indicated with a red dot. Landsat 7 satellite imagery generated in World Wind 1.4.

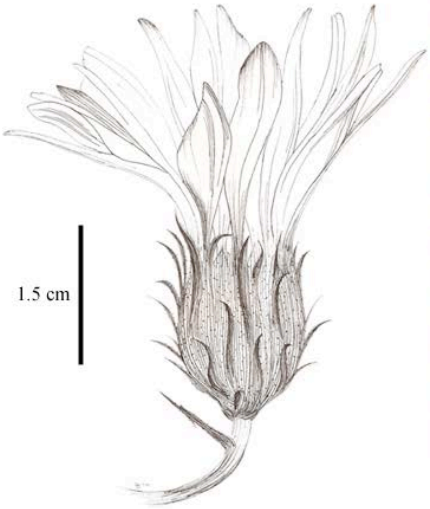

Fig. 2 (*above*). Inflorescence of *Xylorhiza cognata*. Photograph by the author.

Fig. 3 (*left*). Illustration of *Xylorhiza cognata* inflorescence. Illustration by Elisha Mistretta.

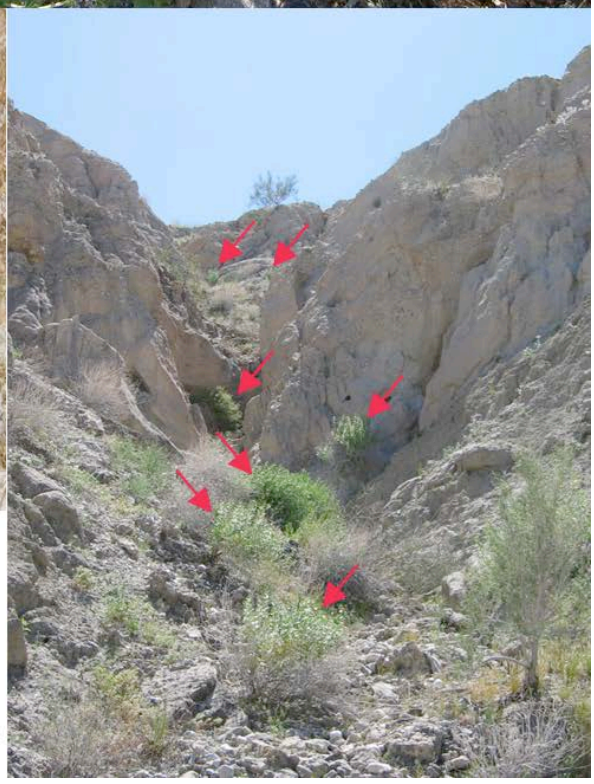

Fig. 4 (*top*). *Xylorhiza cognata* growing on a rocky slope. Photographed plant is 1.2 meters tall. Photograph by the author.

Fig. 5 (*above*). Growth habit of *Xylorhiza cognata* in alluvial substrate. Photographed plant is 0.7 meters tall. Photograph by the author.

Fig. 6 (*right*). Habitat of *Xylorhiza cognata*. Plants grow on exposed, steep slopes. Plants are indicated with red arrows. Photograph by the author.

era 0.75–1.8 million years ago (Norris and Webb 1990). These geologic formations are primarily composed of conglomerate, sandstone, and siltstone, with localized patches of gypsum. These two related formations occur throughout the western portions of the Colorado Desert and are common in the Indio Hills and Mecca Hills (Norris and Webb 1990). Despite the suggested affinity for these formations, no detailed analysis of the substrate at specific *X. cognata* occurrences has been conducted. Additionally, the formations are more widely distributed than are the known or historical populations of *X. cognata*.

Xylorhiza cognata is found in various *Larrea tridentata* (DC.) Cov. (creosote bush) dominated communities. Other associated species include: *Acacia greggii* A.Gray (catclaw acacia), *Ambrosia dumosa* (A.Gray) Payne (burrowbush), *Atriplex canescens* (Pursh) Nutt. (four-winged saltbush), *A. hymenelytra* (Torr.) S.Watson (desert holly), *A. polycarpa* (Torr.) S.Watson (cattle spinach), *Bebbia juncea* Greene (sweetbush), *Cercidium floridum* Benth. ex A.Gray (palo verde), *Chilopsis linearis* (Cav.) Sweet (desert willow), *Encelia farinosa* A.Gray ex Torr. (brittle bush), *Gilia latifolia* S.Watson (broadleaf gilia), *Hymenoclea salsola* A.Gray (cheesebush), *Olneya tesota* A.Gray (desert ironwood), *Peucephyllum schottii* A.Gray (pygmy cedar), *Phacelia crenulata* Torr. ex Watson var. *ambigua* (M.E.Jones) J.F.Macbr. (purplestem phacelia), and *Psorothamnus spinosus* (A.Gray) Barneby (smoketree).

3.5 *Distribution and Abundance*

Xylorhiza cognata is endemic to Riverside County, California. Undisputed occurrences of *Xylorhiza cognata* are limited to two main areas in Riverside County, the Indio Hills and Mecca Hills, with several occurrences in each area (Fig. 1). The California Natural Diversity Database (CNDDB 2007) recognizes 18 element occurrences (EO; see Table 1). One specimen was collected outside the Indio Hills and Mecca Hills, along the Palms to Pines Highway, by McMinn in 1935 (EO 19); this area has been converted to housing and no remaining appropriate habitat was seen in the area when the author visited it in 2005.

Little is known about the historical abundance of *Xylorhiza cognata*. Most occurrences have only been surveyed once in the last 30 years. Herbarium specimens from the early to mid 1900s exist for many general localities, but none of the collectors noted the abundance of the species. Due to the vague locality information on older herbarium sheets, it is difficult to determine if specimens were collected from the same occurrences recognized today.

Information about known population occurrences is presented in Table 1 and Fig. 1, which summarize data from the CNDDB. In addition, field surveys were conducted by the author during the spring of 2005. The Mecca Hills were visited Apr 9–10, 2005, and the number plants dispersed over 0.25 miles of canyon was counted for one occurrence in Painted Canyon and five occurrences in Box Canyon along State Highway 195. The Indio Hills were visited Apr 25, 2005, and the total number of plants at two occurrences, Malcomber Palms and Biskra Palms, was counted.

Within the Indio Hills no plants are known from west of Washington Street.

Table 1. Summary of occurrence locations, abundance, and potential threats for *Xylorhiza cognata.* NA = data not available; these sites were not visited as part of the present study.

Location/Site Name	CNDDB Element Occurrence (EO) Number[1]	# plants observed (year)[2]	# plants observed during this study[3]	Potential threats
Indio Hills				
Malcomber Palms	17	660 (1985)	300	OHV use
Biskra Palms	18	250 (1984)	170	OHV use
Gravel Pit	16	7 (1984)	NA	gravel mining, OHV use
Power Line	14, 15	200 (1984), 7 (1985)	NA	development, OHV use
Mecca Hills				
Thermal Canyon	13	134 (1995)	NA	OHV use
Painted Canyon	10, 12	25 (1976)	95[4]	OHV use
Box Canyon	3, 6, 7, 9	49 (1985), 520 (1985), 100-1000+ (1986)	15, 32, 83, 116, 220	road maintenance, OHV use
Hidden Springs Canyon	1, 4, 8	50-100 (1986), 10 (1986)	NA	OHV use
Mortmar	2, 5	10 (1986), 50 (1986)	NA	OHV use
Other Occurrences				
Palms to Pines[5]	19		0	extirpated

[1] Element Occurrence number—corresponds to California Department of Fish and Game Natural Diversity Database element occurrence number (CNDDB 2007); occurrences within the same vicinity or canyon have been grouped.
[2] # plants observed (year)—number of plants observed as recorded in the California Natural Diversity Database.
[3] # of plants observed for this study—number of plants observed by the author in 2005.
[4] Additional plants were seen in the area but detailed counts were not conducted.
[5] Plants of this species are believed to be extirpated from this site.

Within the Mecca Hills plants are most abundant in the small canyons originating from Box Canyon Road and Painted Canyon Road. The Indio Hills area appears to contain a few thousand plants, and the Mecca Hills area appears to contain more than 5000 plants.

Two occurrences of *X. cognata* from Imperial County are listed in the California Natural Diversity Database (CNDDB 2007), element occurrence

numbers 11 and 20. However, specimens upon which these occurrences were based have been redetermined. The author visited element occurrence number 11, located near Salton City, in 2005, and the plants at that site were determined to be *X. orcuttii*. The specimen that served as the basis for CNDDB element occurrence number 20, collected from the Chocolate Mountains, has been re-classified as *X. tortifolia* by the original collector (Sarah DeGroot pers. comm.).

3.6 *Population Trends*

Table 1 makes clear that occurrences with relatively large populations of *X. cognata* have existed and continue to exist in the Indio Hills and Mecca Hills. Due to the scattered nature of the occurrences and variable number of plants present, it is probable that some small or isolated occurrences have not been located. We have limited information about historical population sizes. However, the long history of collections made in Box Canyon along State Highway 195, in relatively disturbed sites, and the current large populations at those sites, suggest that no major changes in population abundance have occurred. Surveys conducted for this study generally documented fewer total plants than historical records from the mid 1980s, but populations were not small. Due to vague locality data of previous collections and unknown census methods, the idea that populations of the species are declining must be viewed with caution. It is likely that population sizes will fluctuate over time. Additionally, seedlings and juvenile plants were documented at all of the populations visited in 2005, indicating that reproduction and recruitment are occurring.

3.7 *Threats and Limiting Factors*

The major threats to *Xylorhiza cognata* relate to OHV use, its limited overall distribution, and the relative isolation among occurrences. Limited knowledge of the basic biology of plants of this species makes it difficult to identify and assess other possible threats.

Habitat degradation by OHV activity is the most immediate and significant source of threat. OHV activity impacts *X. cognata* by damaging established plants that occur in accessible areas and by disturbing soil, possibly preventing new plants from becoming established. The Mecca Hills Wilderness Area encompasses the majority of known occurrences in the Mecca Hills and is closed to OHV use. However, evidence of OHV activity was observed on the margins of the Mecca Hills Wilderness, but no direct damage to plants was observed (Mitchell McGlaughlin pers. obs.). The second major area of occurrences, the Indio Hills, faces increasing pressure from urban and commercial development and OHV activity as other local areas become closed to vehicles. Evidence of OHV use and damage to plants growing on alluvial substrates was seen at both occurrences visited in Indio Hills (EO 17 and 18) during the course of this study (Mitchell McGlaughlin pers. obs.).

Due to the limited distribution of *X. cognata*, cumulative habitat loss and degradation could have long-term impacts on its survival. We do not know the minimum population size of an occurrence for it to remain viable or the number of occurrences necessary in a region for the species to persist. Biotic

impacts, such as disease and inbreeding, or abiotic impacts, such as drought, could severely reduce the distribution of *X. cognata* if multiple occurrences were to be lost. Also, as urban development expands, even occurrences at protected sites are likely to experience more impacts from non-native species and edge effects.

Most plant species exist as assemblages of occurrences that exchange seed and pollen, and independently fluctuate in size and position over time. Some occurrences may be extirpated while new ones are established and historical occurrences repopulated, thus constituting a meta-population. Due to the subdivided nature of preserved habitat within the Indio Hills and the distance between the Mecca and Indio Hills, gene exchange among populations and re-colonization of previously inhabited areas may not be occurring. The lack of historical collections from the area between the Mecca and Indio Hills suggests that these areas have always been isolated.

The lack of information about the basic biology of *X. cognata* makes additional threats difficult to identify and evaluate. For instance, if this species relies on a specific pollinator that goes extinct then it will stop producing viable seed and occurrences will gradually go extinct. The aspects of its biology that pose the greatest potential threat if disrupted relate to its reproductive output, conditions required for seeds to germinate, and conditions required for plants to grow at a given site. Knowledge of the basic biology of this species would be advanced by field studies designed to document these aspects of plant biology.

3.8 *Conservation Status*

The CNPS has placed *X. cognata* on its inventory of rare and endangered plants, designating this species as a CNPS list 1B.2, which covers species that are "fairly endangered" in California. Such species meet the definitions of Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code and are eligible for state listing (CNPS 2007). At the present time there is no official federal or state status for this taxon.

Most populations of *X. cognata* located in the Mecca Hills are contained within the federally designated Mecca Hills Wilderness, which is managed by the Palm Springs Field Office of the Bureau of Land Management (BLM). The Mecca Hills Wilderness is closed to all OHV use.

Xylorhiza cognata is also a covered species in the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP 2007), which is expected to be finalized in 2008. *Xylorhiza cognata* has been included as a covered species in the draft Northern and Eastern Colorado Desert Coordinated Management Plan (NECO 2002). Conservation goals within the CVMSHCP that relate to *X. cognata* include:

1. Protect core habitat that includes occupied habitat in the following conservation areas: Thousand Palms Conservation Area, Indio Hills Palms Conservation Area, East Indio Hills Conservation Area, Desert Tortoise and Linkage Conservation Area, and Mecca Hills/Orocopia Mountains Conservation Area.
2. Protect other conserved habitat to provide for natural communities,

essential ecological processes, biological corridors and linkages, population fluctuations and genetic diversity in the following conservation areas: Edom Hill Conservation Area and Indio Hills/Joshua Tree National Park Linkage Conservation Area.
3. Ensure conservation of habitat quality through biological monitoring and management actions to ensure self-sustaining populations within each core habitat.

4.0 CONSERVATION

4.1 *Conservation Objectives and Criteria*

Conservation objectives for *X. cognata* developed here are as follows.
1. Determine the location, condition, and extent of population occurrences.
2. Determine if plants of this species are associated with the Palm Springs and Canebrake formations and, depending upon the degree of specificity, survey these formations for additional occurrences.
3. Protect as much habitat as possible in the Indio Hills and Mecca Hills and limit human impacts at all known occurrences.
4. Conduct research on basic biology of *X. cognata* to better understand population trends and potential threats. Specific research topics include studies of:
    a) Breeding system
    b) Seed dispersal and predation
    c) Seedling requirements and survival
    d)Distribution of genetic diversity
    e) Impact of invasive non-native plants

4.2 *General Conservation Actions Recommended*

Xylorhiza cognata appears to be regionally rare and locally abundant. Conservation actions should focus on the identification and preservation of habitat. This goal is best accomplished by supporting the activities of the CVMSHCP to secure and manage additional acreage of habitat in the region.

It is also important that OHV restrictions in Conservation Areas and the Mecca Hills Wilderness are enforced. Many occurrences of *X. cognata* are effectively protected from human impacts because plants are growing on steep, inaccessible slopes. However, it is important that OHV travel in washes is not allowed within occurrences and that care is taken with the construction of trails or other improvements in conserved areas.

The limited distribution of *X. cognata* increases the importance of protecting all known occurrences. Due to its limited distribution, surveys in a limited area could lead to a good understanding of the distribution and extent of *X. cognata* occurrences.

The two largest known *X. cognata* occurrences in the Indio Hills, Malcomber Palms and Biskra Palms, are located on land owned by the California Department of Parks and Recreation, and will be incorporated into the Indio Hills Palms Conservation Area when the CVMSHCP is completed. However, these areas are currently not effectively closed to OHV use. In the Mecca Hills the majority of habitat is protected within the Mecca Hills Wilderness, but there is adjacent habitat to the west that also warrants consideration for conservation.

Little is known about the basic biology of *X. cognata*. Conservation activities would be enhanced by research to determine pollinators, breeding system, habitat and seed germination requirements, dispersal mechanisms, frequency and scope of population fluctuations, and population demography.

4.3 *Site-Specific Actions*

Indio Hills (EO numbers 14–17; Table 1, Fig. 1).—*Xylorhiza cognata* occurrences in the Indio Hills are primarily associated with exposed slopes that have been suggested to be part of the Palm Springs and Canebrake formations. This substrate is not abundant in the area, so it is important that locations where there is similar substrate are protected. OHV activity is common in the area and should be limited. Expansion of gravel mining in the southeast section of the Indio Hills could also remove available habitat if new pits are established.

Mecca Hills (EO numbers 1–10, 12–13; Table 1, Fig. 1).—The largest known occurrences in the Mecca Hills do not require any additional immediate conservation actions due to their inclusion within the Mecca Hills Wilderness area. It is important that existing restrictions on OHV use continue to be enforced and that any recreation trails constructed avoid disturbing known occurrences.

4.4 *Conservation Tasks*

The major conservation tasks fall into three categories: determination of population location and extent, habitat conservation in the Indio Hills, and basic biological studies.

4.4.1 *Population locations and extent.*—This species has been suggested to be associated with the Palm Springs and Canebrake formations. If research confirms that these geologic associations are consistent, additional sites within the Indio Hills and Mecca Hills where these geologic formations occur should be surveyed, as well as areas outside these two regions where these formations occur. Plants have been documented from the most accessible sites within the Indio Hills and Mecca Hills but it is not known whether the less accessible areas of these regions might harbor populations of this species.

4.4.2 *Habitat conservation.*—At the present time, most of the Indio Hills are protected via a patchwork of conservation plots managed by various agencies. The activities of the CVMSHCP serve to unite the many landowners in the Indio Hills and apply unified conservation standards. These efforts should be supported as well as the acquisition of additional areas of suitable habitat. Furthermore, adequate OHV barriers should be installed in all impacted areas.

4.4.3 *Basic biological studies.*—Conservation activities could be informed by research to determine pollinators, breeding system, habitat and seed germination requirements, dispersal mechanisms, frequency and magnitude of population fluctuations, and demography. At present, *X. cognata* appears to have very limited seed production, with few filled seeds (Mitchell McGlaughlin pers. obs.). Limited seed production could be related to pollinator limitation, seed predation, or resource availability, or might be associated with breeding system, particularly self-

incompatibility. Additionally, specific occurrences within the Indio Hills and Mecca Hills should be identified for regular population censuses. This would allow land managers to better understand fluctuations in population size and to react to population declines that are outside the normal range.

4.5 *Out-of-State Considerations*

Xylorhiza cognata is endemic to Riverside County, California. Therefore, there are no out-of-state or international considerations.

4.6 *List of Likely Participants*

- Coachella Multiple Species Habitat Conservation Plan
- California Department of Fish and Game
- California Department of Parks and Recreation
- Bureau of Land Management—Palm Springs Office
- Northern and Eastern Colorado Desert Coordinate Management Plan participants
- Rancho Santa Ana Botanic Garden
- Riverside County
- California Native Plants Society

5.0 IMPLEMENTATION

5.1 *Action Assessment*

Xylorhiza cognata is regionally rare, but has large occurrences in both the Indio Hills and Mecca Hills. The conservation tasks listed above generally related to gaining a better understanding of the species' biology, determining additional occurrences, supporting the ongoing conservation activities outlined in the CVMSHCP, and limiting OHV use in the area.

5.2 *State and/or Federal Listing*

Xylorhiza cognata does not appear to warrant state or federal listing at this time. None of the large occurrences documented in 1985–86 have been extirpated. Nine of the 12 element occurrences in the Mecca Hills are contained within the Mecca Hills Wilderness. Within the Indio Hills, the two largest element occurrences will be protected under the CVMSHCP. Future documented decreases in population size or distribution, or documented increases in threats could signal that listing is warranted.

5.3 *Other Actions*

Currently, there are no species-specific management activities in place for *X. cognata*. If funding is available the following management prescriptions are recommended.

1. Continue surveys for *X. cognata* in areas within the CVMSHCP area, the Mecca Hills, and locations where the Palm Springs and Canebrake formations occur.
2. Annual or bi-annual population censuses of multiple occurrences within the Mecca Hills and Indio Hills with particular attention to recruitment of new individuals.
3. Application of unified conservation standards in the CVMSHCP area, including an enforced closure to OHVs.
4. Basic biological studies to determine pollinators, breeding system, habitat and seed germination requirements, dispersal mechanisms, frequency and

scope of population fluctuations, and population demography.

5.4 *Potential Difficulties in Implementation*

Inadequate funds may be a major impediment to implementation of the recommendations presented here. Furthermore, the CVMSHCP may not be fully implemented with respect to the needed conservation actions for *X. cognata* due to political or financial reasons.

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