STAFF SUMMARY FOR DECEMBER 7-8, 2016

26. COAST YELLOW LEPTOSIPHON

Today's Item **Information ☐** **Action ☒**

Determine whether listing coast yellow leptosiphon (*Leptosiphon croceus*) as endangered under the California Endangered Species Act (CESA), may be warranted pursuant to Section 2074.2 of the Fish and Game Code.

Summary of Previous/Future Actions

- Receive petition — May 25, 2016
- FGC transmits petition to DFW — May 27, 2016
- Publish notice of receipt of petition — Jun 10, 2016
- Approved 30-day extension — Aug 24-25, 2016; Folsom
- Received DFW evaluation of petition — Oct 19-20, 2016; Eureka
- **Today determine if petitioned action may be warranted — Dec 7-8, 2016; San Diego**

Background

On May 25, 2016, FGC received a petition from the California Native Plant Society to list the coast yellow leptosiphon as an endangered species under CESA. At its Oct 19-20, 2016, meeting in Eureka, FGC received DFW's evaluation. FGC will consider the petition, DFW's evaluation and other information submitted to FGC at today's meeting. Based upon the information contained in the petition and other relevant information, DFW has determined that there is sufficient scientific information available at this time to indicate that the petitioned action may be warranted. DFW recommends that the petition be accepted and considered.

If FGC determines that the petitioned action may be warranted, then the species is a candidate by operation of law under CESA and mandating further review of the species status.

Significant Public Comments (N/A)

Recommendation

FGC staff: Accept DFW's recommendation to accept and consider the Petition.

DFW: Accept petition to consider if listing may be warranted.

Exhibits

1. Petition
2. DFW memo, received Sep 26, 2016
3. DFW's evaluation of the petition, dated Sep 2016
4. DFW presentation

Motion/Direction

Moved by _____ and seconded by _____ that the Commission, pursuant to

Section 2074.2 of the Fish and Game Code, finds the petitioned action to list the coast yellow leptosiphon as an endangered species **may be** warranted based on the information in the record before the Commission, and therefore designates coast yellow leptosiphon as a candidate for endangered species status.

OR

Moved by _____ and seconded by _____ that the Commission, pursuant to Section 2074.2 of the Fish and Game Code, finds that the petition to designate the coast yellow leptosiphon as an endangered species and other information in the record before the Commission **does not** provide sufficient information to indicate that the petitioned action may be warranted.

CALIFORNIA
NATIVE PLANT SOCIETY

May 25, 2016

California Fish and Game Commission
P.O. Box 944209
Sacramento, CA
94244-2090

Memorandum: Evaluation of a Petition to List *Leptosiphon croceus* (coast yellow leptosiphon) under the California Endangered Species Act

Dear California Fish and Game Commission:

The California Native Plant Society (CNPS) has reviewed a petition to list *Leptosiphon croceus* (coast yellow leptosiphon) as Endangered under the California Endangered Species Act (CESA). We provide our recommendation below.

CNPS is a non-profit organization that works to protect California's native plant heritage and preserve it for future generations. CNPS' mission is to increase the understanding and appreciation of California's native plants and to preserve them in their natural habitat. Our nearly 10,000 members promote native plant appreciation, research, education, and conservation through our 5 statewide programs and 35 Chapters across the state of California, and Baja California, MX.

CNPS has completed a review of this petition for its scientific validity and conservation merits. The CNPS Rare Plant Program Committee has assessed the petition's scientific validity by evaluating the accuracy of information regarding taxonomy, ecology, life history, and demographic data presented herein. The CNPS Conservation Program Committee has assessed the petition's conservation merits by evaluating threats, stressors, and management information applicable to this species.

Based upon our review of these factors, CNPS finds the current status of *Leptosiphon croceus* to merit consideration for listing as Endangered under the California Endangered Species Act. Therefore, the California Native Plant Society endorses this petition and should be considered a co-sponsor of this effort.

Our organization looks forward to working with you to ensure *Leptosiphon croceus* is provided the protections and management requirements afforded to it through the CESA. Please do not hesitate to contact us with any questions regarding our review and endorsement.

Sincerely,

James M. André

Jim André
Rare Plant Program Senior Advisor
Rare Plant Program Committee Chair

Greg Suba

Greg Suba
Conservation Program Director

FGC - 670.1 (3/94)

A PETITION TO THE STATE OF CALIFORNIA
FISH AND GAME COMMISSION

For action pursuant to Section 670.1, Title 14, California Code of Regulations (CCR) and Sections 2072 and 2073 of the Fish and Game Code relating to listing and delisting endangered and threatened species of plants and animals.

I. SPECIES BEING PETITIONED:

Common Name: coast yellow leptosiphon

Scientific Name: *Leptosiphon croceus*

II. RECOMMENDED ACTION:

(Check appropriate categories)

a. List XX

As Endangered XX

As Threatened ___

b. Change Status

from _____

to _____

Or Delist ___

III. AUTHOR OF PETITION:

Name: Toni Corelli, Botanist (corelli@coastside.net)
former Rare Plant Chairperson, Santa Clara Valley Chapter of California Native Plant Society

Address: 250 Granelli Avenue

Half Moon Bay, California 94019

Phone Number: (650) 726-0689

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

Signature: Toni Corelli

Date: May 23, 2016

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

A PETITION TO THE STATE OF CALIFORNIA FISH AND GAME COMMISSION
SUPPORTING INFORMATION FOR

coast yellow leptosiphon	*Leptosiphon croceus*
Common Name	Scientific Name

EXECUTIVE SUMMARY

Coast yellow leptosiphon (*Leptosiphon croceus*) is a bright yellow flowered, low growing annual in the phlox family (Polemoniaceae) first described by Alice Eastwood in 1904 as a "strictly local species" (Strother & Kersh 2016). Although four Element Occurrences (EOs) are included in the California Natural Diversity Database (CDFW 2016) *Leptosiphon croceus* (LECR) is currently known from a single extant occurrence, element occurrence 2 (EO2), and is a San Mateo County endemic species (Baldwin, 2012). The colony is limited to a 60x30' area at Fitzgerald Marine Reserve, County of San Mateo Parks and Recreation Division. Located on Vallemar Bluff in Moss Beach, San Mateo County, California.

Leptosiphon croceus is listed in the California Native Plant Society's *Inventory of Rare and Endangered Plants* as a California Rare Plant Rank 1B.1 species Rare, threatened, or endangered in California and elsewhere; .1 Seriously threatened in California. (California Native Plant Society, Rare Plant Program 2016). Three historical occurrences of LECR - EO1, EO3, EO4 are now documented as extirpated making the Moss Beach, Fitzgerald Marine Reserve LECR EO2 the last remaining population. LECR occurs on the immediate coastal terrace bluff top in coastal prairie habitat. This colony has steadily been reduced by cliff erosion, encroachment of non-native plants, fragmentation and compaction of soil within and around the population. The adjacent coastal prairie habitat has been impacted in the past by heavy equipment used to drill test wells and now there is a proposed development to build houses on the lots located there (see Figure 6).

LECR should be proposed for listing under the Federal Endangered Species Act as well since the last population is on public land and the colony is endangered. Listing the coast yellow leptosiphon under the California Endangered Species Act is necessary to provide critical legal protections and habitat designations to ensure survival of this highly endangered species.

TAXONOMY AND DESCRIPTION

TAXONOMIC HISTORY

Coast yellow leptosiphon (*Leptosiphon croceus*) is now known from only one colony. That population is on Vallemar Bluff in Moss Beach, San Mateo County, California (LECR EO2). The plants were first found and named at the species rank as *Linanthus croceus* Eastwood (Botanical Gazette, vol. 37, p. 442, April 1904). Alice Eastwood collected the type specimen and in the protologue for the name wrote, "This beautiful species was collected by the author May 9, 1901, near Point San Pedro, San Mateo County, California." The Eastwood name is basionym for the currently accepted name for the species: *Leptosiphon croceus* (Eastwood) Strother & Kersh. Other synonyms of *Leptosiphon croceus* include: *Linanthus parviflorus* var. *croceus* Milliken, Univ. Calif. Publ. Bot. 2:59. 1904. *Linanthus androsaceus* var. *croceus* (Eastwood) Jepson, Man. Fl. Pl. Calif. 805. 1925. *Linanthus androsaceus* ssp. *croceus* (Milliken) Mason in Abrams, Ill. Fl. Pacific States 3:430. 1951. *Leptosiphon croceus* (Eastw.) J.M. Porter & L.A. Johnson (Baldwin 2012). Also *Linanthus croceus* has been treated as a synonym of *Linanthus parviflorus* (Bentham) Greene, e.g., in J. C. Hickman ed., The Jepson Manual. 1993.

DESCRIPTION

Coast yellow leptosiphon (*Leptosiphon croceus*, henceforth abbreviated LECR) is a low growing, hairy, annual. It is often much-branched from base and when mature grows to a height of 4-7 cm. The inflorescence is in a

dense, bracted head with a long corolla tube and bright yellow flowers. The calyx is sessile, clustered within a head of leaf-like bracts. Each of the 5 calyx lobes is densely glandular-hairy. The flowers are bright yellow with 5 corolla lobes 6-8 mm long, > 5 mm wide and generally with 2 red spots at base. Each flower has a corolla tube measuring 26-39 mm long. The stamens are exserted and the stigmas are 2-5 mm long. The leaves are thick and somewhat succulent fleshy, opposite, palmately 3-9 lobed, each lobe 4-7 mm long. (Baldwin 2012, Battaglia 2001). The fruit is a capsule. The number of seeds in each capsule for similar species when pollinated is 20-60 (Goodwillie).

Figure 1. Coast yellow leptosiphon (*Leptosiphon croceus*). Photograph by Avis Boutell

PHENOLOGY

LECR generally flowers from April-May (Baldwin 2012)

SIMILAR TAXA (similar taxa of *Leptosiphon* labeled *L.)*

LECR is extremely low growing, being the shortest of all the species (4-7 cm) and the width of corolla lobes, both at middle and tip, are the largest in the complex. LECR shares morphological characteristics with *L. androsaceus, L. parviflorus, L. latisectus, L. rosaceus* and some of the characteristics are intermediate between them. LECR can be distinguished from *L. androsaceus* and *L. rosaceus* by its calyx lobes that are densely glandular-hairy throughout the whole surface as opposed to the calyx hairs ciliate only on the margins and nonglandular in *L. androsaceus* and *L. rosaceus.* LECR is distinguished from *L. parviflorus* and *L. latisectus* by its rounded corolla lobes and short habit of <7 cm tall (Battaglia 2001). *L. latisectus* is also not known to occur in the same geographical range as LECR.

ECOLOGY

HABITAT

LECR occurs at an elevation of 14 meters atop a sea bluff at the edge of the coastline on a marine terrace supported by sedimentary sandstone derived soil. This habitat is highly influenced by wind, cool salt-laden air and fog.

Of the natural communities list the most similar association for LECR is Coastal Terrace Prairie Code CTT41100CA (California Department of Fish and Wildlife, Natural Communities - List a Hierarchical List of Natural Communities with Holland Types, Sept. 2010).

Coastal prairie along the San Mateo Coast is characterized by low growing perennial grasses and annual and perennial forbs. LECR EO2 occurs with a diverse array of perennial grasses (*Bromus maritimus, Danthonia californica, Deschampsia cespitosa* ssp*. holciformis, Hordeum brachyantherum, Agrostis blasdalei*) and other native herbaceous flowering plants (see associated species section below), but has become diminished as non-native plants have colonized the bluff top. The last population of LECR occurs with two other California Rare Plant Rank species *Agrostis blasdalei*, and *Castilleja ambigua* var*. ambigua*. LECR has been sheltered by the 2.5 acre undeveloped coastal prairie adjacent that provides a natural buffer between Highway 1 and the bluff top edge. LECR yellow mats shown below in Figure 2.

Figure 2. LECR occurrence EO2 Vallemar Bluff, Moss Beach, San Mateo County. Photograph by Avis Boutell

POLLINATION

Pollination studies have been conducted on similar species of *Leptosiphon* and have shown that they are predominantly bee fly (Bombyliidae) pollinated and wind pollinated (Goodwillie 2001). Other potential pollinators have been recently observed on LECR, such as the beetle (*Listrus* sp.) in the Melyridae (soft-wing flower beetles) see Figure 3 (Bug Guide 2013-2016).

Figure 3. Family Melyridae (soft-wing flower beetles), Genus *Listrus* on LECR, photographed on LECR by Aaron Schusteff in Moss Beach, San Mateo County, California, USA

ASSOCIATED SPECIES

LECR is associated with a number of native species including *Agrostis blasdalei, Armeria maritima, Bromus maritimus, Danthonia californica, Deschampsia cespitosa* ssp*. holciformis, Castilleja ambigua* ssp*. ambigua, Eriogonum latifolium, Eryngium armatum, Fragaria chiloensis*, *Gamochaeta ustulata, Grindelia stricta* var*. platyphylla, Hordeum brachyantherum, Zeltnera davyi.* Non-native species including *Carpobrotus edulis (*CAL-IPC category High*), Festuca myuros, Festuca perennis, Hordeum murinum* ssp*. leporinum* (CAL-IPC category Moderate), *Hypochaeris radicata* (CAL-IPC category Moderate)*, Plantago coronopus, Plantago lanceolata* (CAL-IPC category Limited).

DISTRIBUTION AND ABUNDANCE

The only known extant population of LECR is located at the Fitzgerald Marine Reserve in Moss Beach, San Mateo County element occurrence (EO2). Attempts to locate other populations and account for historical occurrences EO1, 3 and 4 are noted in the following tables.

OCCURRENCES

Table 1. LECR Element Occurrences

Element Occurrence (EO)	Quad, County, Location	Presence
EO1	Pigeon Point, San Mateo, PEBBLE BEACH	LECR is not present now or in the past at Pebble Beach, San Mateo County, see Table 2
EO2	Montara Mountain, San Mateo, VALLEMAR BLUFF MOSS BEACH	Extant, see Table 3
EO3	Montara Mountain, San Mateo, NEAR POINT SAN PEDRO	No longer a valid EO since no vouchers were collected from Point San Pedro
EO4	Bolinas, Marin, BOLINAS, NEAR RADIO STATION	LECR is not present now or in the past in Marin County, see Table 4

LECR EO1 - Pebble Beach population. Presence of this population is based on 1929 and1935 collections. After reviewing the specimens it is determined that sheets labeled LECR as occurring at Pebble Beach are *Leptosiphon parviflorus*.

Table 2. LECR EO1

Collector, Number, Date Collected	Annotation 2016	Taxon Name on Collection Sheet	County, Locality
Specimen number: POM279138			
H. E. Wieser, May 1929	*Leptosiphon parviflorus*	*Leptosiphon croceus*	San Mateo, Pebble Beach
Specimen number: RSA18361, SD244610, UC729640			
C. B. Wolf, 3727, May 25 1929	*Leptosiphon parviflorus*	*Leptosiphon croceus*	San Mateo, Pebble Beach
Specimen number: POM310909, UC964718, UC908670			
H. L. Mason, 8315, May 21 1935	*Leptosiphon parviflorus*	*Leptosiphon croceus*	San Mateo, Pebble Beach

LECR EO2 - Moss Beach (Blenheim is an older place name for Moss Beach (Morrall 2009). LECR has been collected 7 times from 1899-2015 in Moss Beach, San Mateo County. After a survey of historical documents and herbarium collections LECR EO2 was and is the only occurrence (see Table 5).

Table 3. LECR EO2

Collector, Number, Date Collected	Annotation 2016	Taxon Name on Collection Sheet	County, Locality
Specimen number: CAS394			
Alice Eastwood, May 2 1899	*Leptosiphon croceus*	*Linanthus croceus*	San Mateo, Near Pt. San Pedro (Blenheim)
Specimen number: CAS393			
Alice Eastwood, May 9 1901	*Leptosiphon croceus*	*Linanthus croceus*	San Mateo, Blenheim
Specimen number: DS133196, POM3565, GH78828, NY336940, UC106861			
Alice Eastwood, May 19 1901	*Leptosiphon croceus*	*Linanthus croceus*	San Mateo, Blenheim
Specimen number: UC106675			
Katharine Brandegee, Jun 19 1905	*Leptosiphon croceus*	*Linanthus androsaceus*	Moss Beach
Specimen number: UC176059			
Miss Kate Cole, May 1914	*Leptosiphon croceus*	*Linanthus androsaceus*	San Mateo, Moss Beach
Specimen number: SEINET3861922			
Genevieve K. Walden, 203, 2009-06-22	*Leptosiphon croceus*	*Leptosiphon croceus*	San Mateo, Moss Beach
Specimen number: SJSU15003			
Toni Corelli, 1193, 5/3/2015	*Leptosiphon croceus*	*Leptosiphon croceus*	San Mateo, Moss Beach

The Moss Beach (Blenheim) population of LECR was collected 5 times between 1899-1914, then not again until 2009 (*Walden 203*), and was last collected in 2015 (*Corelli 1193*). In May 2015, a census conducted of EO2 (Corelli 2015) estimated less than 500 individuals. Figure 4 shows the mapped location as Moss Beach, California.

Figure 4. LECR occurrence EO2 map.

LECR EO3 – Point San Pedro - Lacking any other evidence, this occurrence was likely generated because of Alice Eastwood's CAS394, May 2, 1899 collection (see Table 3). On the herbarium label it reads "Near Pt. San Pedro (Blenheim)". Pt. San Pedro is most likely the geographical area and the collection was made in Blenheim where the extant EO2 occurrence is located. EO3 should be removed as an occurrence for LECR.

LECR EO4 - Bolinas, Marin County. No herbarium sheets were found labeled LECR for Bolinas, Marin County; however two collections were found from Point Reyes, Marin County (see Table 4). These have been annotated as *Leptosiphon parviflorus*. In a personal communication with Doreen Smith, Rare Plant Chair, California Native Plant Society (CNPS) Marin Chapter on 11/11/2015 she said "I was never able to find (the) Bolinas population." LECR is not confirmed as present now or in the past in Marin County.

Table 4. LECR EO4

Collector, Number, Date Collected	Annotation 2016	Taxon Name on Collection Sheet	County, Locality
Specimen number: RSA12224			
C. B. Wolf, 5768, Jun 28 1934	*Leptosiphon parviflorus*	*Leptosiphon croceus*	Marin, Pt. Reyes
Specimen number: RSA148677			
Verne Grant, Jun 23 1961	*Leptosiphon parviflorus*	*Leptosiphon croceus*	Marin, Point Reyes

ATTEMPTS TO LOCATE ADDITIONAL POPULATIONS

There is very limited collection history of plants in general in the vicinity of Moss Beach, San Mateo County or Blenheim and most collections date from the early 1800's to the 1940's with very few recent collections.

- Katharine Brandegee in the 1880s and early 1900s - San Mateo Coast - *Leptosiphon* collections shown in Table 5
- Alice Eastwood in the 1890s and early 1900s - San Mateo Coast - *Leptosiphon* collections shown in Table 5
- Maibelle Williams in 1920s - San Mateo Coast - no *Leptosiphon* collections
- Ira L. Wiggins in the 1920s 1930s and 1940s - San Mateo Coast - *Leptosiphon* collections shown in Table 5
- Lyman Benson in the 1930s - San Mateo Coast - *Leptosiphon* collections shown in Table 5
- Lewis S. Rose in the 1930s and 1940s - San Mateo Coast - no *Leptosiphon* collections

However, botanists Robert Patterson (patters@sfsu.edu), convening editor and treatment author of the Polemoniaceae family and genus *Leptosiphon* in The Jepson Manual, Second Edition; Mike Vasey (mcvasey@gmail.com), Director of the San Francisco Bay National Estuarine Research Reserve; Robyn Battaglia (battagliabunch@sbcglobal.net), author of "A Morphometric Analysis of the *Leptosiphon androsaceus* complex (Polemoniaceae) in the Central and South Coast Ranges" (2001); Neal Kramer (kramerbotanical@yahoo.com), local environmental consult and myself, Curator Emeritus at Carl W. Sharsmith Herbarium, San Jose State University and Research Associate at the Oakmead Herbarium and Collections, Jasper Ridge Biological Preserve, Stanford University, have searched throughout the San Mateo Coast for over 15 years for LECR and have only found one colony element occurrence 2 (EO2). There are no other validated collections of coast yellow leptosiphon (*Leptosiphon croceus*) elsewhere in California.

A search for LECR in the Consortium of California Herbaria database and California herbaria throughout the State found 40 collection sheets labeled LECR or synonyms of LECR. Table 5 is a review of these collections arranged by county and date collected.

Table 5 - LECR Collection History

Collector, Number, Date Collected	Annotation 2016	Taxon Name on Collection Sheet	County, Locality
Specimen number: POM279091A			
Lyman Benson, 861, Apr 1927	*Leptosiphon parviflorus*	*Leptosiphon croceus*	Lake, Kelseyville
Specimen number: RSA93024			
Milo S. Baker, 12931, May 6 1954	*Leptosiphon parviflorus*	*Leptosiphon croceus*	Lake, Middleton
Specimen number: RSA12224			
C. B. Wolf, 5768, Jun 28 1934	*Leptosiphon parviflorus*	*Leptosiphon croceus*	Marin, Pt. Reyes
Specimen number: RSA148677			
Verne Grant, Jun 23 1961	*Leptosiphon parviflorus*	*Leptosiphon croceus*	Marin, Point Reyes
Specimen number: POM202880			
Alice Eastwood, 1311, Apr 10 1934	*Leptosiphon parviflorus*	*Leptosiphon croceus*	Mendocino, Longvale
Specimen number: POM65133, POM65135			
A. A. Heller, 6673, May 4 1903	*Leptosiphon parviflorus*	*Leptosiphon croceus*	Monterey, Pacific Grove
A. A. Heller, 6699, May 8 1903	*Leptosiphon parviflorus*	*Leptosiphon croceus*	Monterey, Del Monte
Specimen number: RSA259010			
Florence J. Youngberg, Jul 1938	*Leptosiphon androsaceus*	*Leptosiphon croceus*	Monterey, Near Monterey

Specimen number: CAS37502, POM65848, UC75210			
C. F. Baker, 706, May 2 1902	*Leptosiphon androsaceus*	*Leptosiphon croceus*	San Francisco, Presidio
Specimen number: RSA164304			
Clare B. Hardham, 6833, Apr 17 1961	*Leptosiphon parviflorus*	*Leptosiphon croceus*	San Luis Obispo, Pine Mt
Specimen number: CAS394			
Alice Eastwood, May 2 1899	*Leptosiphon croceus*	*Linanthus croceus*	San Mateo, Near Pt. San Pedro (Blenheim)
Specimen number: CAS393			
Alice Eastwood, May 9 1901	*Leptosiphon croceus*	Polemoniaceae	San Mateo, Blenheim
Specimen number: DS133196, POM3565, *GH78828, *NY336940, UC106861			
Alice Eastwood, May 19 1901	*Leptosiphon croceus*	*Linanthus croceus*	San Mateo, Blenheim
Specimen number: *GH91312, POM65887, UC133649			
E. B. Copeland, 3260, May 24 1903	*Leptosiphon rosaceus*	*Leptosiphon croceus*	San Mateo, Montara Point
Specimen number: POM65886, UC133724			
E. B. Copeland, 3300, Jun 6 1903	*Leptosiphon rosaceus*	*Leptosiphon croceus*	San Mateo, Montara Point
Specimen number: UC106675			
Katharine Brandegee, Jun 19 1905	*Leptosiphon croceus*	*Linanthus androsaceus*	San Mateo, Moss Beach
Specimen number: UC176059			
Miss Kate Cole, May 1914	*Leptosiphon croceus*	*Linanthus androsaceus*	San Mateo, Moss Beach
Specimen number: POM279138			
H. E. Wieser, May 1929	*Leptosiphon parviflorus*	*Leptosiphon croceus*	San Mateo, Pebble Beach
Specimen number: RSA18361, SD244610, UC729640			
C. B. Wolf, 3727, May 25, 1929	*Leptosiphon parviflorus*	*Leptosiphon croceus*	San Mateo, Pebble Beach
Specimen number: POM279148			
Arthur L. Cohen, 629, Apr 21 1935	*Leptosiphon parviflorus*	*Leptosiphon croceus*	San Mateo, Jasper Ridge
Specimen number: POM310909, UC964718, UC908670			
H. L. Mason, 8315, May 21 1935	*Leptosiphon parviflorus*	*Leptosiphon croceus*	San Mateo, Pebble Beach
Specimen number: RSA51347, RSA128553			
P. H. Raven, 1954, Apr 30 1950	*Leptosiphon rosaceus*	*Leptosiphon croceus*	San Mateo, Montara
Specimen number: SEINET3861922			
Genevieve K. Walden, 203, 2009-06-22	*Leptosiphon croceus*	*Leptosiphon croceus*	San Mateo, Moss Beach
Specimen number: SJSU15003			
Toni Corelli, 1193, 5/3/2015	*Leptosiphon croceus*	*Leptosiphon croceus*	San Mateo, Moss Beach
Specimen number: UCR197844, UCD38190			
Beecher Crampton, 392, Aug 3 1941	*Leptosiphon parviflorus*	*Linanthus androsaceus* subsp. *croceus*	Santa Cruz, Boulder Creek

*Collections from GH (Harvard University Herbaria) and NY (New York Botanical Garden) were not looked at but the duplicate collections were annotated.

These records indicate that LECR is restricted to one colony in Moss Beach, San Mateo County, first collected at Blenheim (Moss Beach) by Alice Eastwood and it was and is the only occurrence. There are no current or historical LECR populations in Lake, Marin, Mendocino, Monterey, San Francisco, San Luis Obispo or Santa Cruz counties. Current publications of floras and checklists show that LECR does not occur in Monterey County (Mathews 2015), Santa Cruz County (Neubauer 2013), or in San Francisco's Natural Areas (Wood 2013). One location is mentioned in San Mateo County (Corelli 2011), the Moss Beach occurrence. The collections along the San Mateo Coast at Pebble Beach (Bean Hollow State Beach) were redetermined as *L. parviflorus* and the Montara collections redetermined as *L. rosaceous* (CNPS 1B).

Table 6 - Other Collections of *Leptosiphon* from the San Mateo Coast

Collector, Number, Date Collected	Annotation 2016	Taxon Name on Collection Sheet	County, Locality
Specimen number: UC106675, UC106678			
Katharine Brandegee, Jun 19 1905	*Leptosiphon rosaceus*	*Linanthus androsaceus*	San Mateo, Moss Beach
Specimen number: DS81352, JEPS58097			
Adele Lewis Grant, 936, 5/6/1917	*Leptosiphon androsaceus*	*Linanthus parviflorus*	San Mateo, Pebble Beach
Specimen number: RSA18460			
C. B. Wolf, 547, June 29 1927	*Leptosiphon androsaceus*	*Leptosiphon androsaceus*	San Mateo, Pebble Beach
Specimen number: RSA18357, SD27819, UC729676			
C. B. Wolf, 3731, May 26 1929	*Leptosiphon androsaceus*	*Leptosiphon androsaceus*	San Mateo, N of Pigeon Pt
Specimen number: CHSC1270			
H. Pearl, 05 01 1930	*Leptosiphon rosaceus*	*Linanthus androsaceus*	San Mateo, Moss Beach
Specimen number: UC908670, UC964718			
Herbert L. Mason, 8314, 8315, May 21 1935, May 21 1936	*Leptosiphon androsaceus*	*Linanthus parviflorus*	San Mateo, near Moss Beach
Specimen number: UC727278			
Ira L. Wiggins, 10164, 4/21/1943	*Leptosiphon androsaceus*	*Linanthus parviflorus*	San Mateo, near Pescadero

At one time there were populations of *L. androsaceus* and *L. parviflorus* along the San Mateo Coast at Pebble Beach (now a part of Bean Hollow State Beach), and *L. androsaceus* and *L. rosaceus* were collected at or near Moss Beach. Currently only *L. croceus* and *L. rosaceus* occur on the San Mateo Coast (Boutell, Corelli, Frost 2013).

POPULATION TRENDS AND THREATS

The threat to the last remaining occurrence LECR EO2 is significant and immediate. The primary threats are habitat destruction through potential development that includes a plan to build 6 houses adjacent to LECR population on coastal prairie habitat (see Figure 6) (County of San Mateo, Planning and Building, Case Number PLN2015-00380). Competition from non-native plants especially the invasive Carpobrotus that is a highly ranked noxious weed, and other human-related activities (including an informal trail and park bench). Another threat is bluff top erosion, and rising ocean levels. Mean sea level along the California coast will rise from 1.0 to 1.4 meters by the year 2100. In areas where the coast erodes easily, sea-level rise will likely accelerate shoreline recession due to erosion (Heberger, et al. 2009).

When Alice Eastwood first mentioned this colony in 1904 (Eastwood 1904), she stated "It covered the ground for several acres, but was seen in no other place, and is probably a strictly local species. It is perhaps the most strikingly beautiful species of the group where it belongs, with the long threadlike tubes of the corolla supporting the wonderfully beautiful yellow disks. The great masses almost monopolized the ground." Since then, most coastal prairie habitat has been extirpated as a result of agriculture, urban development, habitat fragmentation and non-native plant encroachment (Ford and Hayes 2007).

LECR EO2 occurs in an area approximately 60'x30' at the edge of the cliff. A census was conducted in 1999 and 2015 (Corelli) utilizing the same survey technique. The area was divided into 10 sections, and individual plants were counted in each section while standing outside the edge of the colony to avoid trampling of plants. The estimated number of plants in 1999 was 400-500 plants, and in 2015 <500 plants were estimated (Corelli 1999, 2015). The earliest survey reported by R. Battaglia was done in 1998 and ~1000 plants were estimated

(Battaglia 1998).

Compared to 1998 there was a decrease in the number of plants in 1999. The decline could be explained by inherent natural demographic variation in this annual plant, and/or it could be the result of sampling error because of the two different sampling schemes. It could also be timing of surveys and variation in the environment conditions such as the amount of annual rainfall. Total amount of rainfall for nearby Half Moon Bay in 1998 was 50.2 inches and 29.59 inches in 1999 (Woyshner 2010). The survey method and number of plants for the 1999 and 2015 surveys are roughly similar.

There have been yearly field observation visits between 2000-2014 without documentation. The colony as observed is resilient, but fragile as its location makes it vulnerable and exposed to the multiple threats mentioned including development of adjacent habitat, and the number of plants and colony size compared to what was found in the early 1900's when it "covered the ground for several acres".

CURRENT MANAGEMENT ACTIVITIES

Fitzgerald Marine Reserve, a San Mateo County Park is also a part of the California Marine Protected Area (MPAs) that lies in California state waters within the Montara State Marine Reserve.

The Fitzgerald Marine Reserve encompasses approximately 35 acres of terrestrial area along the coastline. The Vallemar Bluff top where LECR occurs is the last intact coastal prairie on the reserve. At one time there was a continuous stretch of coastal prairie that extended along the bluff top throughout the preserve but much of it was planted with Monterey cypress (*Hesperocyparis macrocarpa*) more than a century ago. Monterey cypress is not native to San Mateo County and where it occurs on the reserve the understory is sparse and associated with non-native vegetation.

The County of San Mateo released a Master Plan for the Fitzgerald Marine Reserve in May 2002. The area where LECR occurs was not surveyed and none of the 3 rare plants occurring there are accounted for in the master plan. Since discovering this omission the San Mateo County Parks Department has been contacted with the information about these rare plant locations and habitat. The county will be surveying this property in 2016 (written and personal communication in 2016 with San Mateo County staff: Ramona Arechiga (trarechiga@smcgov.org), Natural Resource Manager; Senior Planners Samuel F. Herzenberg (SHerzberg@co.sanmateo.ca.us) and Dave Holbrook (dholbrook@smcgov.org) and revising the Master Plan to include management and protection of LECR and other rare plants at Fitzgerald Marine Reserve.

POTENTIAL MANAGEMENT ACTIVITIES

To assure adequate management and recovery of LECR, the species must be listed pursuant to the California Endangered Species Act (CESA) by the State of California and the last remaining population must be protected and assured of sufficient ecosystem function, adequate buffering from disturbance, appropriate ecological management, and inclusion of areas of potential, unoccupied habitat.

LISTING THE SPECIES UNDER CESA

Given the extreme rarity of the species and its current threats, listing under the CESA is an appropriate action to be undertaken by the State of California. This plant is not currently proposed for listing under the Federal Endangered Species Act (FESA), but a proposal for FESA listing should be considered given that the species is endangered to the point of potential extinction. State and Federal listing will make it possible to procure private and public funding to initiate some of the protective and research needs of the species.

ADEQUATE BUFFERING

For development projects that have the potential to occur at or near LECR EO2 adequate buffering should be delineated. Buffering for sensitive species is typically set at a minimum buffer of 100 feet (California Coastal Commission 2013) Buffering of sensitive species is theorized to provide protection from edge effects, which include invasion of non-native species, microclimate changes, and changes in hydrology.

LECR EO2 cannot be buffered where it occurs on the immediate cliff edge so can only be buffered to the north and east of the extant colony (Figure 6). A concern is that LECR is currently insufficiently buffered from direct impacts on the bluff top because of an informal trail, a park bench and proposed development on adjacent property as shown in Figure 6. There should be yearly monitoring because of the continued impacts from these activities, from non-native plants within and outside the colony, and direct and indirect impacts brought on by development.

The buffer zone should be large enough to support, in perpetuity, a biologically secure, reproducing population, of the annual LECR in the preferred coastal prairie habitat where it occurs. Little information exists regarding an accurate minimum buffering requirement for LECR. With little known about the reproductive biology of LECR, buffers need to be set at conservative distances until we understand what is the allowable minimum. Vegetation monitoring of this colony will help analyze the yearly changes that occur within and nearby on the coastal prairie that supports LECR.

PRESERVATION OF POTENTIAL HABITAT

Principles of conservation biology include an emphasis on the need for the preservation of both occupied and unoccupied, potential habitat of a given species. Currently within San Mateo County only very small remnant pockets of coastal prairie habitat occur on the San Mateo Coast. Most occur on public land owned by State Beaches and Parks, Golden Gate National Recreation Area, Land Trusts, Peninsula Open Space Preserve and other open space agencies. Other rare plants occur in the coastal prairie habitat within these public lands including *Agrostis blasdalei, Castilleja ambigua* ssp*. ambigua, Centromadia parryi* ssp*. parryi, Chorizanthe robusta* var*. robusta*, *Fritillaria liliacea*, *Hosackia gracilis, Lasthenia californica* ssp*. macrantha, Leptosiphon rosaceus, Plagiobothrys chorisianus* var*. chorisianus, Plagiobothrys diffusus*, and *Potentilla hickmanii*.

It should be noted that although protecting adjacent similar habitat for long-term viability is a viable concept, all areas mapped as similar habitat may not be suitable since much of it is occupied by other rare plants and coastal prairie associates, and it would be inadvisable to disturb those sites. There is no current evidence that LECR can survive outside its current distribution since it occurs at no other place. However there is one stretch of disturbed coastal terrace bluff top at Montara State Beach (Figure 5), about 1.3 miles north of LECR EO2. This bluff top was planted in the past with ornamental *Agapanthus africanus*, but it should be looked at to see if it can be restored to provide potential coastal prairie habitat for LECR.

Figure 5. Potential Coastal Prairie habitat at Montara State Beach.

ECOLOGICAL MANAGEMENT

A program of ecological management, including the principles of adaptive management, is required to ensure the long-term viability of LECR. LECR EO2 was not accounted for or protected by the Fitzgerald Marine Reserve Master Plan. It is now limited to a small 60'x30' area fragmented by an informal trail, park bench, non-native plant encroachment and the proposed development of the adjacent 2.5 acres of coastal prairie habitat as shown in Figure 6.

Figure 6. Proposed development on potential coastal prairie habitat on Moss Beach's Vallemar Bluffs

LECR should be protected and accounted for by the County of San Mateo, and a management plan should be written providing protection for this species and other rare plant species found at Fitzgerald Marine Reserve.

RESEARCH NEEDS

Priorities for biological and ecological research include studies that address population genetics, demographics, pollination biology, seed dispersal, seed viability, herbivory, germination and soil and other habitat requirements.

One of the greatest threats within the population and coastal prairie habitat are the invasive non-native plants. Management research should explore the best ways to control the non-native plants as well as the timing, frequency and intensity of these activities.

Seed should be collected and stored at a reputable seed bank. Research should be undertaken to see what is the best use and time to use these seeds at this location or another designated appropriate coastal prairie habitat.

MONITORING

Demographic and site monitoring of LECR EO2 should be undertaken yearly using standardized protocols that ensure the least disturbance of this population and habitat. Data obtained should be submitted to the California

Department of Fish and Wildlife Natural Diversity Database. Surveys of any additional suitable habitat should also be performed.

AGENCIES AND ORGANIZATIONS TO BE INVOLVED

Department of Interior, U.S. Fish and Wildlife Service
California Department of Fish and Wildlife
California Coastal Commission
California State Parks, San Mateo Coast Sector
Midcoast Community Council
San Mateo County Board of Supervisors
San Mateo County Parks Department
San Mateo County Planning Department

SOURCE INFORMATION

HERBARIACONTACT	
CAS/DS California Academy of Sciences	Debra Trock, Rebecca Peters
CHCS California State University, Chico	Lawrence Janeway
GH Harvard University	
NY New York Botanical Garden	
RSA/POM Rancho Santa Ana Botanic Garden & Pomona College	Mare Nazaire
SEINET Southwest Environmental Information Network	
SD San Diego Natural History Museum	Jon Rebman
SJSU San Jose State University	Lars Rosengreen
UC/JEP UC Berkeley	John Strother, Kim Kersh
UCR UC Riverside	Andrew Sanders

BIBLIOGRAPHY

Abrams, L. 1951. *Linanthus* Vol. 3, Pp. 429-430 in Abrams, L. Illustrated Flora of the Pacific States. Stanford University Press, Stanford, CA.

Baldwin, B. G. 2012. *Leptosiphon*. Pp. 1054-1058 in Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken (eds.). The Jepson Manual: Vascular Plants of California, second edition. University of California Press, Berkeley, CA.

Battaglia, R. 1998. California Native Plant Society Field Survey Report for *Leptosiphon croceus*.

Battaglia, R. and R. Patterson. 2001. A morphometric analysis of the *Leptosiphon androsaceus* complex (Polemoniaceae) in the central and south Coast Ranges. Madrono 48(2):62-78.

Boutell, A., Corelli, T., Frost, N. 2013 third edition. Plants and Plant Communities of the San Mateo Coast. Coastside State Parks Association.

Bug Guide. 2003-2016 Iowa State University. Website: http://bugguide.net/node/view/136295

California Coastal Commission, State of California - Natural Resources Agency. LCP Update Guide Section 4. Environmentally Sensitive Habitats and Other Natural Resources. 2013.

California Department of Fish and Wildlife, Biogeographic Data Branch. Vegetation Classification and Mapping Program, Natural Communities List. Hierarchical List of Natural Communities with Holland Types (PDF). September 2010.

California Department of Fish and Wildlife, California Marine Protected Areas. Website: https://www.wildlife.ca.gov/Conservation/Marine/MPAs

California Department of Fish and Wildlife (CDFW), California Natural Diversity Database. 2016. Occurrence Report for *Leptosiphon croceus*. California Department of Fish and Wildlife, Sacramento, CA. Accessed in 2015, 2016.

California Invasive Plant Council (CAL-IPC). 2016 California Invasive Plant Inventory Database, online. Website: http://www.cal-ipc.org/paf/

California Native Plant Society, Rare Plant Program. 2016. Inventory of Rare and Endangered Plants of California (online edition, v8-02). Website: http://www.rareplants.cnps.org

Coastal Commission. Nonpoint Source Watershed Assessment: James V. Fitzgerald Marine Reserve Critical Coastal Area. December 2008.

Consortium of California Herbaria, Consortium database: Data provided by the participants of the Consortium of California Herbaria. Website: ucjeps.berkeley.edu/consortium/

Corelli, Toni. 1999 and 2015. California Native Plant Society Field Survey Report for *Leptosiphon croceus*.

Corelli, Toni. 2011. Checklist of the Vascular Plants of San Mateo and Santa Clara Counties, California. California Native Plant Society, Santa Clara Valley Chapter

County of San Mateo, Planning and Building, General Plan Policies. Website: http://planning.smcgov.org/documents/general-plan-policies

County of San Mateo, Planning and Building, Local Coastal Program (LCP). 2013. Website: http://planning.smcgov.org/documents/local-coastal-program-lcp

County of San Mateo, Planning and Building. Six Residences at Juliana & Vallemar, Moss Beach. Case Number PLN2015-00380. Website: http://planning.smcgov.org/six-residences-juliana-vallemar-moss-beach

Eastwood, A. 1904. Some new species of western Polemoniaceae. Botanical Gazette 37(6):437-447.

Fitzgerald Marine Reserve Master Plan. Website: http://parks.smcgov.org/documents/fitzgerald-marine-reserve-master-plan

Ford, L. D. and G. F. Hayes. 200.. Pp. 180-207. Chapter 7 Northern Coastal Scrub and Coastal Prairie. In Stromberg, M. R., Corbin, J. D., D'Antonio, C. M. (eds.) California Grasslands: Ecology and Management. University of California Press, Berkeley.

Goodwillie, Carol. 2001. Pollen Limitation and the Evolution of Self-Compatibility in *Linanthus* (Polemoniaceae). Int. J. Plant Sci. 162(6):1283–1292. The University of Chicago.

Google Earth Pro, US Dept of State Geographer. 2016 Google.

Heberger, M., Cooley, H., Herrera, P., Gleick, P. H., Moore, E. 2009. The Impacts of Sea-Level Rise on the California Coast. A Paper From: California Climate Change Center. Pacific Institute

Hickman, J. C. (ed.). 1993. *Linanthus* Pp. 842-844 in Hickman, J.C. (ed.). The Jepson Manual: Vascular Plants of California. University of California Press. Berkeley, CA.

Jepson, Willis Linn. 1975. *Linanthus* Pp. 799-806 in Jepson, Willis Linn. A Manual of the Flowering Plants of California. University of California Press, Berkeley, CA.

Mathews, M. A. and Mitchell, M. 2015. The Plants of Monterey County, an Illustrated Field Key, Second Edition. California Native Plant Society, Monterey County

Milliken, J. 1904. A Review of Californian Polemoniaceae. University of California Publications, Botany. Vol. 2, pp. 1-71, Pls. 1-11.

Morrall, June. 2009. Pp. 49. Half Moon Bay Memories & El Granada Observer. Website: https://halfmoonbaymemories.wordpress.com/page/49/

Neubauer, Dylan. 2013, Second Edition. Annotated Checklist of the Vascular Plants of Santa Cruz County, California. California Native Plant Society, Santa Cruz Chapter

San Mateo County Parks Department. Fitzgerald Marine Reserve Master Plan, Part One: The Master Plan. May 2002.

San Mateo County Parks and Recreation Division. James V. Fitzgerald marine reserve: Resource Assessment. 2004

Strother, J. L. and K. R. Kersh. 2016. Typifications of *Linanthus parviflorus* var. *croceus* Milliken and *Linanthus croceus* Eastw. Phytoneuron 2016-21:1-2.

Wood, Mike. 2013. Annotated Checklist of the Vascular Plants of San Francisco's Natural Areas.

Woyshner, M., Hecht, B., Parke, J., and Baggett, T. 2010, Midcoast Groundwater Study Phase III, San Mateo County, California: Balance Hydrologics, Inc., project number 209093, consulting report prepared for County of San Mateo Planning and Building Department, 34 p., 6 tables, 23 fig., and 5 appendices.

State of California
Department of Fish and Wildlife

Memorandum

Date: September 26, 2016

To: Valerie Termini, Executive Director
Fish and Game Commission

From: Charlton H. Bonham
Director

Subject: **Initial Evaluation of the Petition to List Coast Yellow Leptosiphon (*Leptosiphon croceus*) as Endangered under the California Endangered Species Act**

The Department of Fish and Wildlife (Department) has completed its initial evaluation of the Petition to list coast yellow leptosiphon as an endangered species under the California Endangered Species Act, Fish and Game Code section 2050 et seq. The Fish and Game Commission (Commission) received the Petition from Ms. Toni Corelli on May 25, 2016, accompanied by a letter of endorsement from the California Native Plant Society (CNPS) stating that CNPS should be considered a co-sponsor of the Petition. Pursuant to Fish and Game Code section 2073, the Commission referred the Petition to the Department on May 27, 2016. In accordance with Fish and Game Code section 2073.5, subdivision (b), on July 29, 2016, the Department requested a 30-day extension to further analyze the Petition and complete its evaluation report.

The Department completed the attached Petition evaluation report as required by Fish and Game Code section 2073.5. (See also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1).) The Department's evaluation report delineates the categories of information required in a petition, evaluates the sufficiency of the available scientific information regarding each of the Petition components, and incorporates additional relevant information that the Department possessed or received during the review period. Based upon the information contained in the petition and other relevant information in the Department's possession, the Department has determined that there is sufficient scientific information available at this time to indicate that the petitioned action may be warranted. The Department recommends that the Petition be accepted and considered.

State of California
Natural Resources Agency
Department of Fish and Wildlife

REPORT TO THE FISH AND GAME COMMISSION

EVALUATION OF THE PETITION FROM MS. TONI CORELLI AND THE CALIFORNIA NATIVE PLANT SOCIETY TO LIST COAST YELLOW LEPTOSIPHON (*LEPTOSIPHON CROCEUS*) AS AN ENDANGERED SPECIES UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

September 2016

Leptosiphon croceus, CDFW photo by Cherilyn Burton

Charlton H. Bonham, Director
Department of Fish and Wildlife

INTRODUCTION

The subject of this evaluation report is a petition (Petition) to the California Fish and Game Commission (Commission) to list coast yellow leptosiphon (*Leptosiphon croceus*) as an endangered species under the California Endangered Species Act (Fish & G. Code, § 2050 et seq.; hereafter CESA). Ms. Toni Corelli (Petitioner) submitted the Petition, dated May 23, 2016, to the Commission on May 25, 2016. The Petition was accompanied by a letter of endorsement from the California Native Plant Society (CNPS) stating that CNPS should be considered a co-sponsor of the Petition.

The Commission referred the Petition to the California Department of Fish and Wildlife (Department) pursuant to Fish and Game Code section 2073 for the initial evaluation required by Fish and Game Code section 2073.5 (Cal. Reg. Notice Register 2014, No. 37-Z, p. 1627). In accordance with Fish and Game Code section 2073.5 and section 670.1, subdivision (d)(1), of title 14 of the California Code of Regulations, the Department has prepared this Petition evaluation report. The purpose of this report is to inform the Commission as to whether the Petition, when considered with this evaluation report, provides sufficient scientific information to indicate that the petitioned action may be warranted and to recommend to the Commission whether the Petition should be accepted and considered. In its advisory capacity to the Commission, the Department's charge and focus is scientific. Consistent with controlling law, the Department bases its recommendation to the Commission on the sufficiency of scientific information.

PETITION PROCESS AND STANDARDS

CESA sets forth a two-step process for listing a species as threatened or endangered. First, the Commission determines whether to designate a species as a candidate for listing by determining whether a petition provides "sufficient information to indicate that the petitioned action may be warranted." (Fish & G. Code, § 2074.2, subd. (e)(2).) Second, if the Commission accepts a petition for consideration, the Commission is required to determine whether or not the petitioned action to list the species as endangered or threatened is warranted. (Fish & G. Code, § 2075.5, subd. (e).)

A petition to list a species under CESA must include "information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and other factors the petitioner deems relevant." (Fish & G. Code, § 2072.3; see also Cal. Code Regs., tit. 14, § 670.1, subd. (d).) The range of a species for the Department's petition evaluation and recommendation is the species' California range. (*Cal. Forestry Assn. v. Cal. Fish and Game Com.* (2007) 156 Cal. App. 4th 1535, 1551.)

Within ten days of receipt of a petition, the Commission must refer the petition to the Department for evaluation. (Fish & G. Code, § 2073.) The Commission must also publish notice that it received a petition in the California Regulatory Notice Register. (Fish & G. Code, § 2073.3.) Within 90 days of receipt of a petition, the Department must evaluate the petition on its face and in relation to other relevant scientific information and submit to the Commission a written evaluation report with one of the following recommendations:

- Based upon the information contained in the petition, there is not sufficient information to indicate that the petitioned action may be warranted, and the petition should be rejected.
- Based upon the information contained in the petition, there is sufficient information to indicate that the petitioned action may be warranted, and the petition should be accepted and considered. (Fish & G. Code, § 2073.5, subds. (a)(1) and (2).)

The Department's recommendation to the Commission is based on an evaluation of whether or not a petition provides sufficient scientific information relevant to the petition components set forth in Fish and Game Code section 2072.3 and the California Code of Regulations, title 14, section 670.1, subdivision (d)(1).

In *Center for Biological Diversity v. California Fish and Game Commission* (2008) 166 Cal. App. 4th 597, the California Court of Appeals addressed the parameters of the Commission's discretion in its determination of whether a petitioned action should be accepted for consideration pursuant to Fish and Game Code section 2074.2, subdivision (e), resulting in the species being listed as a candidate species. The Court began its discussion by describing the standard for accepting a petition for consideration previously set forth in *Natural Resources Defense Council v. California Fish and Game Commission* (1994) 28 Cal. App.4th 1104.

> As we explained in *Natural Resources Defense Council* [citation], "the term 'sufficient information' in section 2074.2 means that amount of information, when considered with the Department's written report and the comments received, that would lead a reasonable person to conclude the petitioned action may be warranted." The phrase "may be warranted" "is appropriately characterized as a 'substantial possibility that listing could occur.'" [citation] "Substantial possibility," in turn, means something more than the one-sided "reasonable possibility" test for an environmental impact report but does not require that listing be more likely than not.

(*Center for Biological Diversity*, *supra*, 166 Cal. App. 4th at pp. 609-10.)

The Court acknowledged that "the Commission is the finder of fact in the first instance in evaluating the information in the record." (*Center for Biological Diversity*, *supra*, 166 Cal. App. 4th at p. 611.) However, the Court clarified:

> [T]he standard, at this threshold in the listing process, requires only that a substantial possibility of listing could be found by an objective, reasonable person. The Commission is not free to choose between conflicting inferences on subordinate issues and thereafter rely upon those choices in assessing how a reasonable person would view the listing decision. Its decision turns not on rationally based doubt about listing, but on the absence of any substantial possibility that the species could be listed after the requisite review of the status of the species by the Department under [Fish and Game Code] section 2074.6.

(*Ibid.*)

If the Commission accepts the petition for consideration, the second step requires the Department to produce within 12 months of the Commission's acceptance of the petition a peer-reviewed report based upon the best scientific information available that indicates whether the

petitioned action is warranted. (Fish & G. Code, § 2074.6.) The Commission, based on that report and other information in the administrative record, then determines whether listing the species as endangered or threatened is or is not warranted. (Fish & G. Code, § 2075.5.)

SUMMARY OF KEY FINDINGS

Having reviewed and evaluated the Petition on its face and in relation to other relevant information, including the material referenced in the Petition and other information possessed or received by the Department, the Department recommends that there is sufficient scientific information available at this time to indicate that the petitioned action may be warranted and the Petition should be accepted and considered. In making this recommendation to the Commission, the Department emphasizes that limited information exists within the Petition and in the Department's possession relating to coast yellow leptosiphon population trends, life history, and the kind of habitat necessary for coast yellow leptosiphon's survival. However, the Department believes there is sufficient scientific information, particularly with respect to the most biologically critical factors (i.e. limited range, distribution, ongoing and potential habitat modification and destruction, and impacts from non-native plant species) to indicate that the petitioned action may be warranted. (See Fish & G. Code, § 2073.5, subd. (a)(2); Cal. Code Regs. tit. 14, § 670.1, subd. (d)(1).)

BACKGROUND ON COAST YELLOW LEPTOSIPHON

Coast yellow leptosiphon is a low-growing plant in the Phlox family (Polemoniaceae) first described by Alice Eastwood in 1904 as a "strictly local species" (Strother and Kersh 2016). It is an annual plant, which means it completes its life cycle within one year or one growing season. It is often much-branched from the base and grows to a height of 4 to 7 centimeters (1.5 to 2.75 inches). The inflorescence is in a dense, bracted head consisting of bright yellow flowers that generally appear from April to May (Patterson and Battaglia 2012, CNPS 2016).

Coast yellow leptosiphon is only known to exist in one colony on Vallemar Bluff in Moss Beach, San Mateo County, California (CNDDB 2016; Figure 1). This location is atop a sea bluff at the edge of the coastline on a marine terrace supported by sedimentary sandstone-derived soil, and is located within the Fitzgerald Marine Reserve. This habitat is highly influenced by wind, cool salt-laden air, and fog. The only known population of coast yellow leptosiphon occupies an area approximately 18 meters by 9 meters (60 feet by 30 feet) or 167 square meters (1,800 square feet) in size and is growing in an area that supports a diverse array of perennial grasses and annual and perennial forbs, including two other rare plant species: Blasdale's bent grass (*Agrostis blasdalei*) and johnny-nip (*Castilleja ambigua* var. *ambigua*). The location of this occurrence is shown in Figure 4 of the Petition, and in Figure 2 of this evaluation report.

EVALUATION OF THE PETITION

The discussion below presents the Department's component-specific evaluation of the Petition on its face and in relation to other relevant information received or possessed by the Department. (See Fish & G. Code, §§ 2072.3, 2073.5; Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1).).

Species Occurrence Data Source: California Natural Diversity Database (July 2016)

0 1 2 4
Miles

Figure 1. Vicinity of Coast Yellow Leptosiphon

Figure 2. Coast Yellow Leptosiphon Occurrence

POPULATION TREND

The population trend of coast yellow leptosiphon is discussed in the following sections of the Petition: "Executive Summary" on page 3, "Occurrences" on pages 7 and 8, and "Population Trends and Threats" on pages 11 and 12.

The Petition states that coast yellow leptosiphon is currently known from a single, extant occurrence. The colony is limited to an 18 meter by 9 meter (60 foot by 30 foot) area located on Vallemar Bluff in Moss Beach, San Mateo County. The Petition notes that when Alice Eastwood first described this colony in 1904, she stated that "it covered the ground for several acres, but was seen in no other place...."

The Petition states that the earliest survey reported of this population was conducted in 1998 and estimated approximately 1,000 plants. The Petition also reports that a survey was conducted in 1999 and another in 2015. In 1999, the estimated number of plants was 400 to 500. In 2015, less than 500 plants were estimated. Compared to 1998, there was a decrease in the number of plants in 1999. The Petition notes that the decline could be explained by inherent natural demographic variation in this annual plant, and/or it could be the result of different sampling methods. It could also be due to the timing of surveys and variation in the environmental conditions such as the amount of antecedent rainfall.

The Petition reports yearly field observation visits were made between 2000 and 2014, but were not documented, and that the colony is observed as resilient.

The Department recognizes that annual plant population size can be highly variable depending upon environmental conditions and is thus very difficult to monitor directly to detect population trends. Annual and short-lived plant numbers can fluctuate greatly from year to year depending on seed production in previous years, germination of seedlings, and environmental conditions (e.g. timing and amount of rainfall) (Fischer and Matthies 1998; Harrison, Maron and Huxel 1999).

Scientific information on coast yellow leptosiphon's population trends is limited; however, the population that was once described as covering several acres (Corelli 2016) is now limited to an area covering approximately 167 square meters (1,800 square feet), clearly indicating a significant declining population trend. The Department concludes that the Petitioner has submitted sufficient information to demonstrate that the existing population of coast yellow leptosiphon has declined.

RANGE

Range is considered the general geographical area in which a species is found. For purposes of this petition evaluation, the range is the species' California range. (*Cal. Forestry Assn. v. Cal. Fish and Game Com., supra,* 156 Cal. App. 4th at p. 1551.) The range of coast yellow leptosiphon is discussed in the following sections of the Petition: "Executive Summary" on page 3, "Habitat" on page 5, "Distribution and Abundance" on page 6, and "Attempts to Locate Additional Populations" on pages 9 and 10.

The Petition relies on historical scientific collections and information within the California Natural Diversity Database (CNDDB), which indicate that coast yellow leptosiphon is restricted to one occurrence in Moss Beach, San Mateo County. The Petition notes that many plant specimens originally identified as coast yellow leptosiphon have been collected by botanists in Lake, Marin,

Mendocino, Monterey, San Francisco, San Luis Obispo, San Mateo, and Santa Cruz counties since as early as the 1890s, but that many of those specimens were misidentified and are actually other species of *Leptosiphon*. The Petition indicates that only the historic specimens collected from the occurrence at Moss Beach were correctly identified as coast yellow leptosiphon, and the specimens from other previously reported occurrences are of different species.

The Petition also notes that the Petitioner and other well-known botanists, including Robert Patterson and Robyn Battaglia, who are the co-authors of the treatment of the genus *Leptosiphon* in the Jepson Manual, Second Edition (Patterson and Battaglia 2012), have searched for other occurrences of coast yellow leptosiphon along the San Mateo coast for more than 15 years but have not located any additional populations. No other scientific collections of coast yellow leptosiphon exist from other locations in California. The available data indicate that coast yellow leptosiphon has always been limited in its range and restricted to one occurrence.

The Department concludes that the Petitioner has submitted sufficient information to describe coast yellow leptosiphon's current and historical geographic range, and to strongly infer that coast yellow leptosiphon's range has likely always been restricted.

DISTRIBUTION

Distribution is considered the spatial arrangement of populations or individuals within an area. The distribution of coast yellow leptosiphon is discussed in the following sections of the Petition: "Executive Summary" on page 3, "Distribution and Abundance" on pages 6 - 8, "Attempts to Locate Additional Populations" on page 10, and "Population Trends and Threats" on page 11.

The Petition specifically discusses the distribution of coast yellow leptosiphon on pages 6 and 7. The Petition relies on historical scientific collections, surveys, and other information from the CNDDB to describe the distribution of coast yellow leptosiphon. This information in the Petition indicates that the distribution of coast yellow leptosiphon is limited to one occurrence, located at Vallemar Bluff in Moss Beach, San Mateo County. The colony occupies an area approximately 18 meters by 9 meters (60 feet by 30 feet) or 167 square meters (1,800 square feet) in size at an elevation of 14 meters (46 feet) above mean sea level, atop a sea bluff at the edge of the coastline on a marine terrace supported by sedimentary sandstone-derived soil. The habitat is highly influenced by wind, cool salt-laden air, and fog. The colony is located on the Fitzgerald Marine Reserve, which is a San Mateo County park, and is also adjacent to the Montara State Marine Reserve, which is a California Marine Protected Area (MPA) that is located in California state waters below the mean high tide line. The Petition in Figure 4 on page 8 includes a detailed distribution map depicting this area and showing the location of the only known coast yellow leptosiphon population.

Department staff visited the population of coast yellow leptosiphon with the Petitioner on June 8, 2016. During the site visit, the Petitioner indicated that one individual coast yellow leptosiphon plant was identified outside of the mapped colony during a site visit on May 16, 2016, on adjacent private property proposed for development.

The Department concludes that the Petitioner has submitted sufficient information to describe coast yellow leptosiphon's current distribution, and demonstrate that it is very limited.

ABUNDANCE

The abundance of coast yellow leptosiphon is discussed in the following sections of the Petition: "Distribution and Abundance" on page 8 and "Population Trends and Threats" on pages 11 and 12.

The Petition states that a census was conducted in 1999 and in May 2015 utilizing the same survey technique. In 1999, the estimated number of plants was 400-500. In 2015, fewer than 500 plants were estimated. The Petition also states that the earliest survey reported by R. Battaglia was conducted in 1998, and approximately 1,000 plants were estimated in that survey. The Petition states that the 1999 and 2015 surveys utilized a roughly similar method, but the 1998 survey utilized a different sampling scheme. The Petition also notes that yearly field observation visits occurred between 2000 and 2014 but without formal surveys and documentation.

The Petitioner speculates that coast yellow leptosiphon may have been more abundant when it was first mentioned by Alice Eastwood in 1904. She stated "it covered the ground for several acres, but was seen in no other place, and is probably a strictly local species...The great masses almost monopolized the ground." The Petition also states that since 1904, most of California's coastal prairie habitat, which supports coast yellow leptosiphon, has been extirpated as a result of agriculture, urban development, habitat fragmentation, and non-native plant encroachment.

The Department concludes that the Petitioner has submitted sufficient information to describe the known abundance of coast yellow leptosiphon, and demonstrate that it has limited abundance at its only known occurrence.

LIFE HISTORY

The life history of coast yellow leptosiphon is discussed in the following sections of the Petition: "Executive Summary" on page 3, "Description" on pages 3 - 4, "Phenology" on page 4, and "Pollination" on page 5.

The Petition notes that coast yellow leptosiphon is an annual plant that flowers from April to May (Patterson and Battaglia 2012; CNPS 2016). The Petition states that pollination studies conducted on other species of *Leptosiphon* have shown them to be predominantly bee fly-(Bombyliidae) and wind-pollinated. The Petition indicates that other potential pollinators such as a beetle (*Listrus* sp.) in the Melydridae family (soft-wing flower beetles) have been recently observed on coast yellow leptosiphon.

While there is limited scientific information available that is specific to coast yellow leptosiphon's life history, the Department nonetheless concludes that the Petitioner has submitted sufficient information to describe the known life history of coast yellow leptosiphon.

KIND OF HABITAT NECESSARY FOR SURVIVAL

The kind of habitat necessary for coast yellow leptosiphon survival is discussed in the following sections of the Petition: "Habitat" on page 5 and "Preservation of Potential Habitat" on page 13.

The Petition includes a discussion of currently occupied coast yellow leptosiphon habitat on page 5 and potential coast yellow leptosiphon habitat on page 13. The Petition indicates that

coast yellow leptosiphon grows at the edge of the coastline on a marine terrace supported by sedimentary sandstone-derived soil, in habitat that is highly influenced by wind, cool salt-laden air, and fog. The Petition notes that of the natural communities on the California Department of Fish and Wildlife Hierarchical List of Natural Communities with Holland Types (CDFW 2010), the most similar association for coast yellow leptosiphon is Coastal Terrace Prairie. The Petition further describes coastal prairie along the San Mateo Coast as being characterized by low-growing perennial grasses and annual and perennial forbs.

While there is limited scientific information available regarding the kind of habitat necessary for coast yellow leptosiphon survival, the Department nonetheless concludes that the Petitioner has submitted sufficient information on the kind of habitat necessary for coast yellow leptosiphon survival. The Department also concludes the Petition has also demonstrated that this type of habitat has limited distribution and continues to be impacted by the invasion of non-native plant species and other habitat modification and destruction, as discussed below.

FACTORS AFFECTING THE ABILITY TO SURVIVE AND REPRODUCE

The factors affecting the ability of coast yellow leptosiphon to survive and reproduce are discussed in the following sections of the Petition: "Executive Summary" on page 3, "Habitat" on page 5, "Population Trends and Threats" on pages 11 and 12, "Adequate Buffering" on page 13, and "Research Needs" on page 15. The Petition indicates that the primary factors affecting the ability of coast yellow leptosiphon to survive and reproduce are (1) habitat destruction through potential development; (2) competition from non-native plants; and (3) other human-related activities. The Petition also lists bluff top erosion and rising ocean levels as additional threats. These factors are discussed separately under the headings below.

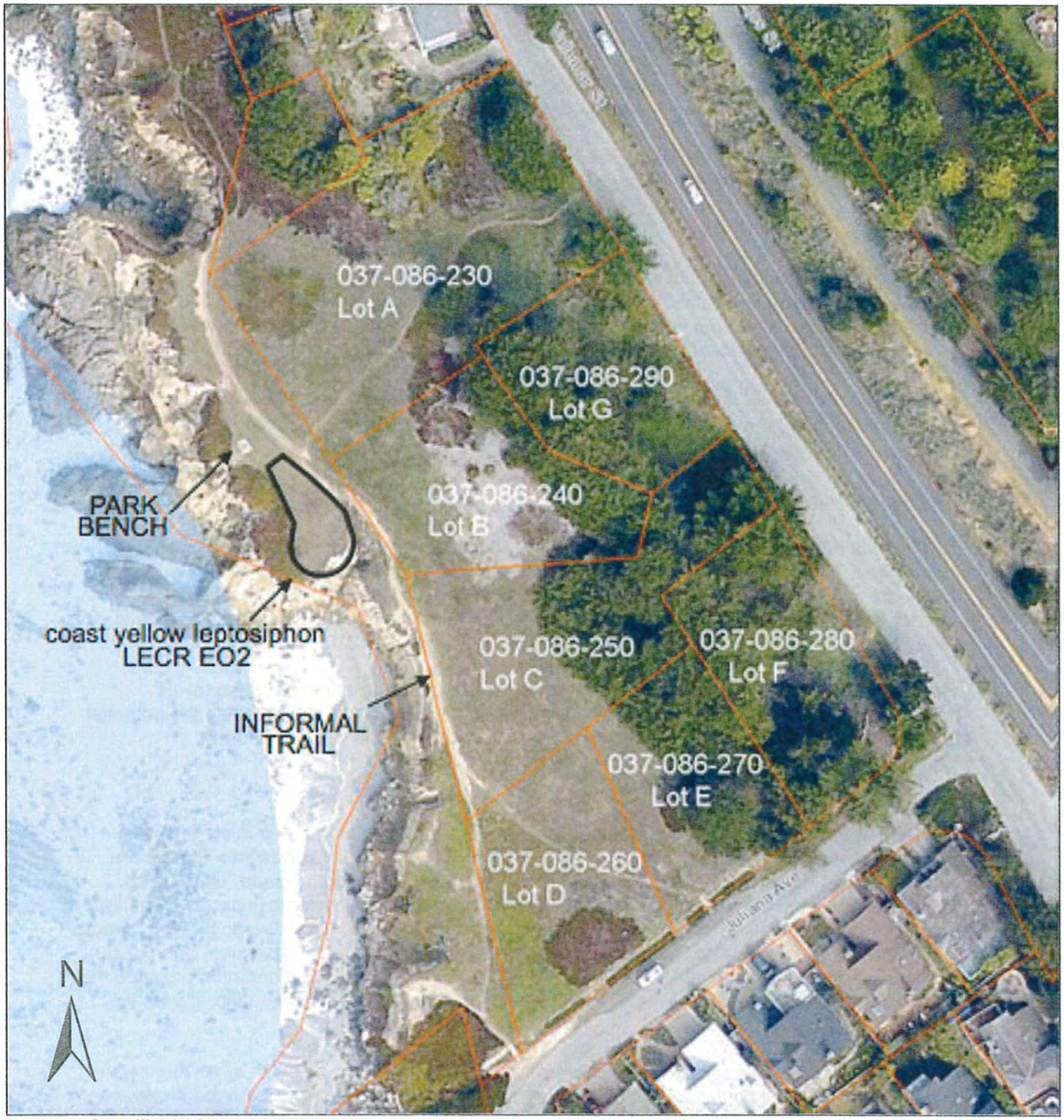
Habitat destruction through potential development:

The Petition notes that the primary threat to this species is habitat destruction through potential development. The Petition states that coast yellow leptosiphon has been buffered from impacts from the adjacent highway by the 1.0-hectare (2.5-acre) undeveloped coastal prairie that provides a natural buffer between Highway 1 and the coast yellow leptosiphon population. However, there is now a proposed development plan to build six houses on the 1.0 hectare (2.5 acres) of coastal prairie habitat immediately adjacent to the coast yellow leptosiphon population. The lot plan is shown on Figure 6 in the Petition, and on Figure 3 of this report.

The Department has also considered other information related to the threats associated with habitat modification and destruction. Department staff visited the population with the Petitioner on June 8, 2016, and observed that proposed development may cause indirect impacts such as establishing and expanding non-native plant populations, changing hydrologic conditions due to increased or altered runoff patterns, and changing soil chemistry from inadvertent or intentional application of herbicides, fertilizers, or pesticides. Additionally, one individual plant was identified on the property proposed for development on May 16, 2016. Since annual plants reproduce by seed, it can be assumed that a seed bank is present in the area where this plant was identified, and this species could be directly impacted by the proposed development.

Competition from non-native plants:

The Petition also includes a discussion of threats to coast yellow leptosiphon associated with competition from non-native plants, especially the invasive ice plant (*Carpobrotus edulis*) that is a highly ranked noxious weed (CAL-IPC 2016). The Petition notes that most coastal prairie



Source: Corelli 2016 No Scale

Figure 3. Proposed Development in Relation to the Coast Yellow Leptosiphon Occurrence

habitat has been extirpated by non-native plant encroachment, agriculture, urban development, and habitat fragmentation (Ford and Hayes 2007).

Department staff observed ice plant growing on the bluff adjacent to the coast yellow leptosiphon population and encroaching into the population (see Figure 4).

Other human related activities:

The Petition notes that other human activities threaten the population of coast yellow leptosiphon. The Petition states that the population is insufficiently buffered from direct impacts on the bluff top resulting from human use of an informal trail and a park bench. In addition, the proposed development would likely result in increased human activity in the area.

Department staff visited the population of coast yellow leptosiphon with the Petitioner on June 8, 2016, and observed the potential for impacts from human disturbance, including the trail, disturbance surrounding the park bench, and visitors walking on the trail near the population.

Bluff top erosion and rising ocean levels:

The Petition notes that bluff top erosion and rising ocean levels pose a threat to coast yellow leptosiphon. The Petition states that this colony has been steadily reduced by cliff erosion and that in areas where the coast erodes easily, sea-level rise will likely accelerate shoreline recession due to erosion. The Petition notes that mean sea level along the California coast is expected to rise from 1.0 to 1.4 meter (3.3 to 4.6 feet) by the year 2100 (Heberger et al. 2009).

The Department concludes that the Petitioner has submitted sufficient information to demonstrate that coast yellow leptosiphon is subject to numerous threats that have the potential to adversely affect its ability to maintain self-sustaining populations within California.

DEGREE AND IMMEDIACY OF THREAT

The degree and immediacy of threat to coast yellow leptosiphon is discussed in the following sections of the Petition: "Executive Summary" on page 3, "Population Trends and Threats" on pages 11 and 12, "Ecological Management" on page 14, and "Research Needs" on page 15. The discussion of the degree and immediacy of threats to coast yellow leptosiphon is primarily based on an existing proposal to develop the land immediately adjacent to the population, direct observation of destruction and degradation of existing habitat, coastal bluff erosion, and direct observation of encroachment of invasive plant species populations. The information provided in the Petition demonstrates that coast yellow leptosiphon is under an immediate threat from the factors described in the Petition.

The Department also recognizes the vulnerability of extinction for species with small numbers of populations and small population sizes, such as coast yellow leptosiphon, due to stochastic (chance) demographic and environmental and/or genetic events (Shaffer 1981, 1987; Primack 2006; Groom et al. 2006). The Department also recognizes that such species may also be subject to increased genetic drift and inbreeding (Menges 1991; Ellstrand and Elam 1993).

The Department concludes that the Petitioner has submitted sufficient information to demonstrate that the only known population of coast yellow leptosiphon faces a high degree

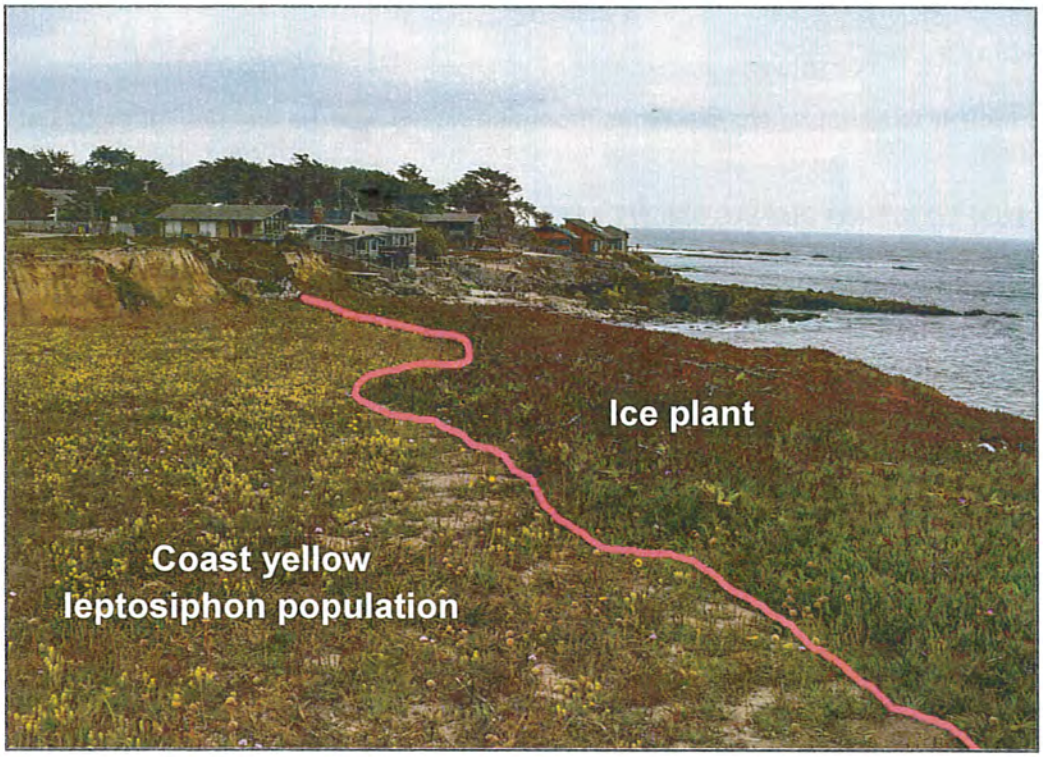


Photo 1: Ice plant encroachment into coast yellow leptosiphon population

Photo 2: Approximate extent of coast yellow leptosiphon population

Figure 4. Photos of Coast Yellow Leptosiphon Occurrence on June 8, 2016

and immediacy of threat by encroachment from non-native species and habitat modification and destruction.

IMPACT OF EXISTING MANAGEMENT EFFORTS

The impact of existing management efforts on coast yellow leptosiphon is discussed in the "Current Management Activities" section of the Petition on page 12.

The Petition includes a discussion of the County of San Mateo's Master Plan for the Fitzgerald Marine Reserve, which was released in May 2002. The Petition notes that the area where coast yellow leptosiphon occurs was not surveyed and none of the three rare plants that occur here, including coast yellow leptosiphon, are accounted for in the Master Plan. The Petition notes that the San Mateo County Parks Department has been contacted and informed about these rare plant locations and habitat, and San Mateo County will survey the property in 2016 (Corelli 2016). The Petition also indicates that the Master Plan will be revised to include management and protection of coast yellow leptosiphon and other rare plants at the Fitzgerald Marine Reserve. The Petition does not provide any information on land management activities that may be taking place or are likely to occur.

While there is limited scientific information available regarding the impact of existing management efforts on coast yellow leptosiphon, the Department nonetheless concludes that the Petitioner has submitted sufficient information to demonstrate that existing management may not be adequate to maintain self-sustaining populations of coast yellow leptosiphon in California.

SUGGESTIONS FOR FUTURE MANAGEMENT

Suggestions for future management of coast yellow leptosiphon are discussed in the following sections of the Petition: "Potential Management Activities" on pages 12 and 13 and "Ecological Management" on pages 14 and 15.

The Petition's discussion of potential management activities includes; (1) listing the species under CESA, (2) adequate buffering, (3) preservation of potential habitat, (4) ecological management, (5) research, and (6) monitoring. On page 13, the Petition notes that principles of conservation biology emphasize the need to preserve both occupied habitat and unoccupied potential habitat. The Petition also notes that there is no current evidence that coast yellow leptosiphon can survive outside of its current distribution since it occurs at no other location. However, the Petition states that an extent of disturbed coastal terrace bluff top at Montara State Beach approximately 2.1 kilometers (1.3 miles) north of the coast yellow leptosiphon population should be examined for restoration potential to provide habitat for this species. The Petition also recommends collecting and storing seed at a reputable seed bank and conducting research to determine how seeds should be used. The Department considers these suggestions to be possible valid components for the future management of coast yellow leptosiphon.

The Department concludes that the Petitioner has submitted sufficient information to demonstrate that additional management efforts may aid in maintaining self-sustaining populations of coast yellow leptosiphon in California.

AVAILABILITY AND SOURCES OF INFORMATION

The sources of information for the Petition are included in the "Source Information" section of the Petition on pages 16 through 18. The sources of information for the Petition include published literature and other sources. The sources listed in the Petition were not included with the Petition when submitted to the Commission. The Petitioner provided the Department with an electronic copy of the Fitzgerald Marine Reserve Master Plan (County of San Mateo, Parks Department 2002), a letter report from Zander Environmental Consultants to the developers of the adjacent property (Zander 2015), and a site development plan on June 8, 2016, (Pearson Design Group 2015). The availability of information was not provided in the Petition.

The Department concludes that the Petitioner has submitted sufficient information on the sources of information used in the Petition regarding coast yellow leptosiphon. Although the Petition does not include the availability of information, sources provided are available from the Petitioner or other sources.

DISTRIBUTION MAP

As described in the Distribution section of this evaluation report, Figure 4 on page 8 of the Petition includes a map showing the location of the only known coast yellow leptosiphon population. The Department concludes that the Petition includes a detailed distribution map.

RECOMMENDATION TO THE COMMISSION

Pursuant to section 2073.5 of the Fish and Game Code, the Department has evaluated the Petition on its face and in relation to other relevant information the Department possesses or received. In completing its petition evaluation, the Department finds there is sufficient scientific information to indicate that the petitioned action may be warranted, and recommends the Commission accept and consider the Petition.

REFERENCES

The following references were used during the Department's Petition evaluation presented in this report. These references include those provided by the Petitioner, and additional sources used by the Department for this report.

Bittman, R. 2001. The California Natural Diversity Database: A Natural Heritage Program for Rare Species and Vegetation. Fremontia 29: 3-4.

California Department of Fish and Wildlife, Biogeographic Data Branch. 2010. Vegetation Classification and Mapping Program, Natural Communities List. Hierarchical List of Natural Communities with Holland Types. Available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=24716&inline. [Accessed 21 July 2016].

California Department of Fish and Wildlife. 2016. San Francisco Bay Marine Protected Areas. Website: https://www.wildlife.ca.gov/Conservation/Marine/MPAs/Network/San-Francisco-Bay [accessed 20 July 2016].

California Invasive Plant Council (CAL-IPC). 2016. California Invasive Plant Inventory Database, online. Website: http://www.cal-ipc.org/paf/. [accessed 26 July 2016].

California Native Plant Society (CNPS), Rare Plant Program. 2016. Inventory of Rare and Endangered Plants (online edition, v8-02). California Native Plant Society, Sacramento, California. Website: http://www.rareplants.cnps.org. [accessed 25 July 2016].

California Natural Diversity Database (CNDDB). 2016. Rarefind 5 [Internet]. California Department of Fish and Wildlife. [2 July 2016].

Corelli, T. 2016. Coast Yellow Leptosiphon Petition to the State of California Fish and Game Commission. May 23, 2016. 18 pp.

County of San Mateo, Parks Department. 2002. Fitzgerald Marine Reserve Master Plan. Available from http://parks.smcgov.org/documents/fitzgerald-marine-reserve-master-plan.

County of San Mateo, Planning and Building. 2016. Six Residences at Juliana & Vallemar, Moss Beach. Case Number PLN2015-00380. Website: http://planning.smcgov.org/six-residences-juliana-vallemar-moss-beach. [accessed 19 July 2016].

Ellstrand, N.C., and D.R. Elam. 1993. Population genetic consequences of small population size: implications for plant conservation. Annual Review of Ecology and Systematics 24: 217-242.

Elzinga, C.L., D.W. Salzer, and J. Willoughby. 1998. Measuring and monitoring plant populations. BLM Technical Reference 1730-1. U.S. Dept. of the Interior, Bureau of Land Management, Denver, Colorado. 492 pp.

Fischer, M. and D. Matthies. 1998. Effects of population size on performance in the rare plant *Gentianella germanica*. Journal of Ecology 86: 195-204.

Ford, L. D. and G. F. Hayes. 2007. Northern Coastal Scrub and Coastal Prairie. Pages 180-207 in M.G. Barbour, T. Keeler-Wolf, and A. Schoenherr, eds. Terrestrial Vegetation of California. 3rd edition. University of California Press, Berkeley, California.

Groom, M.J., Meffe, G.K., and C.R. Carroll. 2006. Principles of conservation biology, third edition. Sinauer Associates, Inc., Sunderland, Massachusetts.

Harrison, S., J. Maron and G. Huxel. 1999. Regional turnover and fluctuation in populations of five plants confined to serpentine seeps. Conservation Biology 14(3): 769- 779.

Heberger, M., H. Cooley, P. Herrera, P.H. Gleick, and E. Moore. 2009. The Impacts of Sea-Level Rise on the California Coast. A paper from: California Climate Change Center. Pacific Institute.

Menges, E.S. 1991. The application of minimum viable population theory to plants. Pages 45-61 in D.A Falk and K.E. Holsinger, eds. Genetics and conservation of rare plants. Oxford University Press, New York, New York.

Patterson, R., and R. Battaglia. 2012. Pages 1054 – 1058 in Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, eds. The Jepson Manual: Vascular Plants of California, second edition. University of California Press, Berkeley, California.

Pearson Design Group. 2015. Moss Beach Site Development Plan. November 15, 2015.

Primack, R.B. 2006. Essentials of conservation biology, fourth edition. Sinauer Associates, Sunderland, Massachusetts.

Shaffer, M.L. 1981. Minimum population sizes for species conservation. Bioscience 31: 131-134.

Shaffer, M.L. 1987. Minimum viable populations: coping with uncertainty. Pages 69-86 in M.E. Soule (editor), Viable Populations for Conservation. Cambridge University Press, Cambridge, England.

Strother, J.L., and K.R. Kersh. 2016. Typifications of *Linanthus parviflorus* var. *croceus* Milliken and *Linanthus croceus* Eastw. Phytoneuron 2016-21:1-2.

Zander, Michael J. 2015. Vegetation Characterization and Mapping, Moss Beach Lots. Letter to Owen Lawlor, Moss Beach Associates, LLC. May 21, 2015.

PERSONAL COMMUNICATION

Corelli, Toni. 2016. Personal e-mail communication with Toni Corelli, June 8, 2016.

Coast Yellow Leptosiphon

(*Leptosiphon croceus*)

Fish and Game Commission Meeting

December 8, 2016

Cherilyn Burton
Habitat Conservation Planning Branch

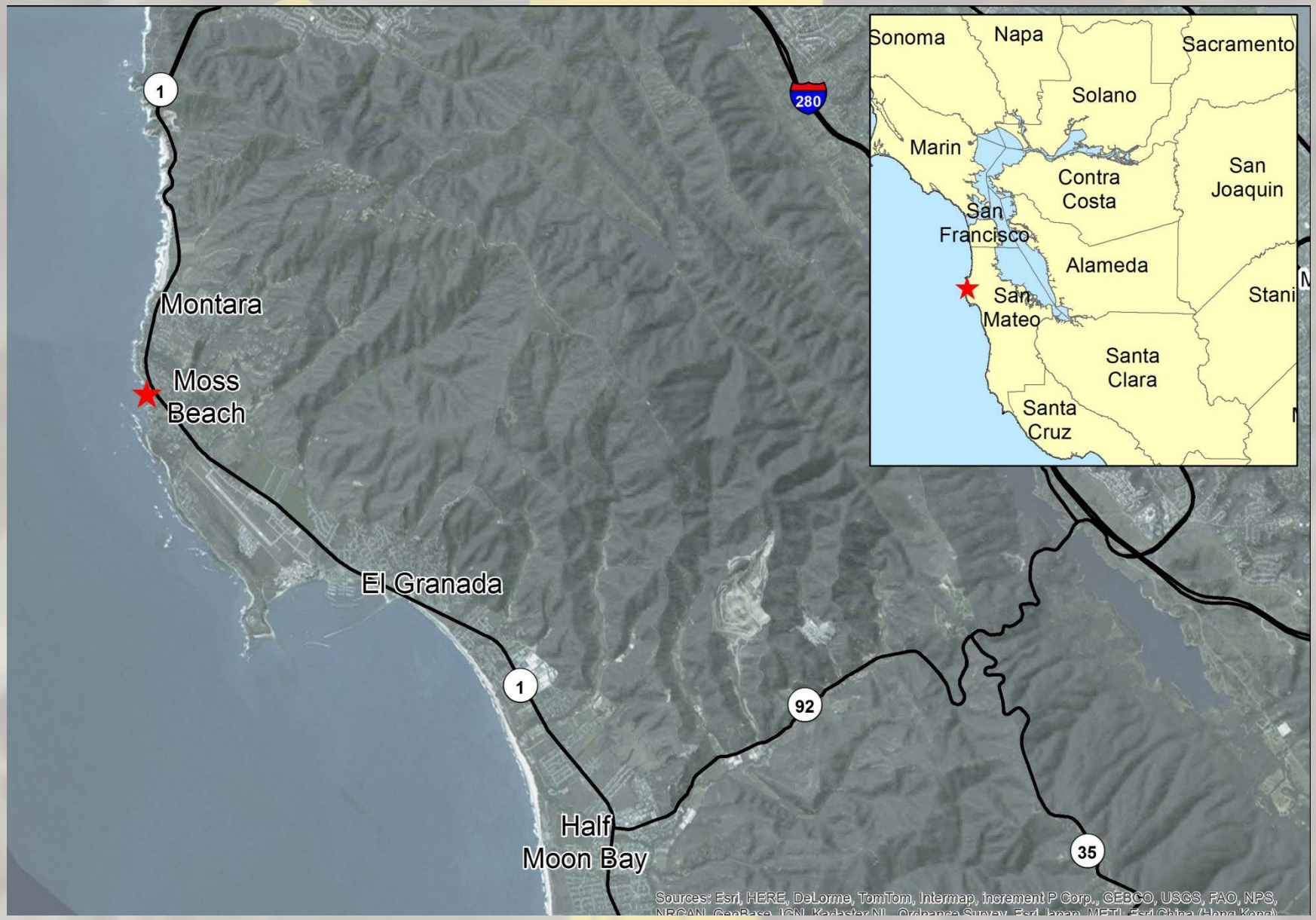
Presentation Overview

- Species Overview
- Petition Evaluation
- Department Recommendation

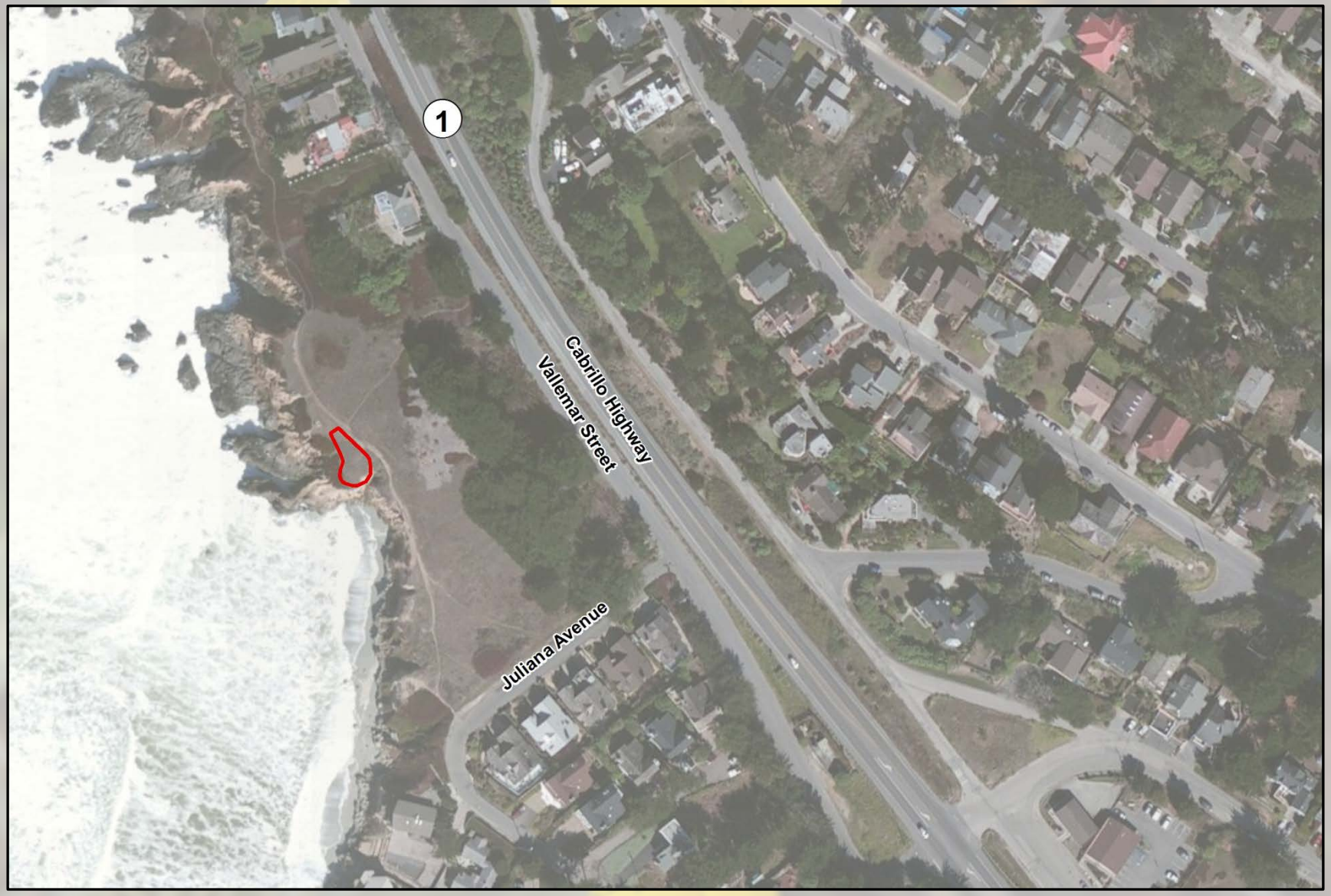
Species Overview

- Low-growing annual
- Blooms April – May
- Coastal prairie habitat

Range and Distribution



Range and Distribution



Habitat

Population Trend/Abundance

Threats Identified in the Petition

- Habitat Destruction
- Competition From Non-Native Plants
- Other Human Related Activities
- Erosion and Rising Ocean Levels

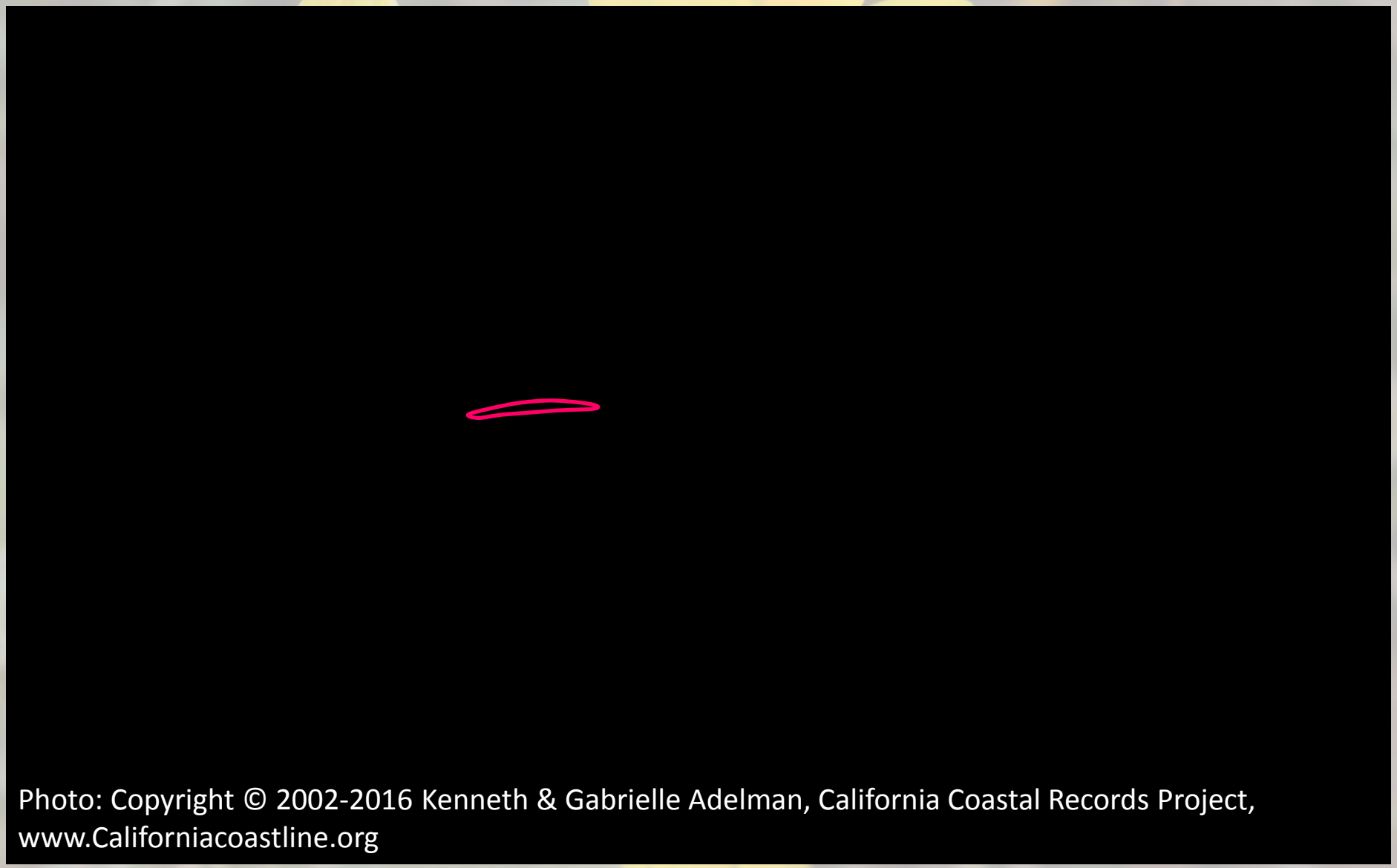
Habitat Destruction

Non-Native Plants

Non-Native Plants

Other Human-Related Activities

Erosion and Rising Ocean Levels



Conclusion

- The Department has evaluated the Petition and other relevant information.
- The Department finds there is sufficient scientific information to indicate that the petitioned action may be warranted, and recommends the Commission accept and consider the Petition.

Thank you - Questions

Cherilyn Burton
Senior Environmental Scientist
Native Plant Program
(916) 651-6508
cherilyn.burton@wildlife.ca.gov