

**San Diego Regional Invasive Plant
Early Detection and Rapid Response (EDRR) Program :**

**San Diego County, Department of Agriculture Weights
& Measures (AWM): SANDAG Transnet Funding**

1) Three new CDFA WMA Grants!

2) 2018-9 Field Work Update

Presented: June 2019

**Jason Giessow, Dendra Inc:
jgiessow@cox.net**

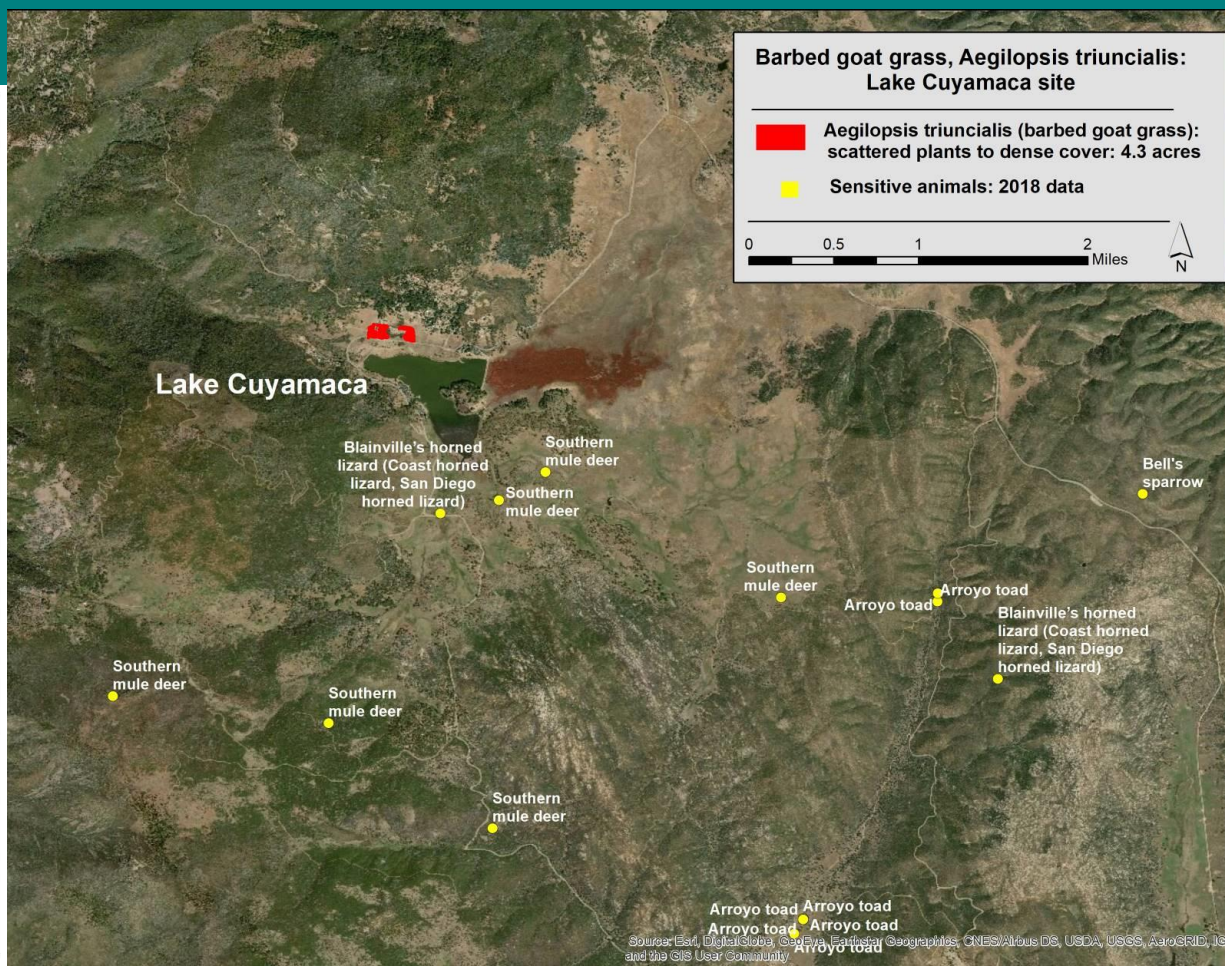
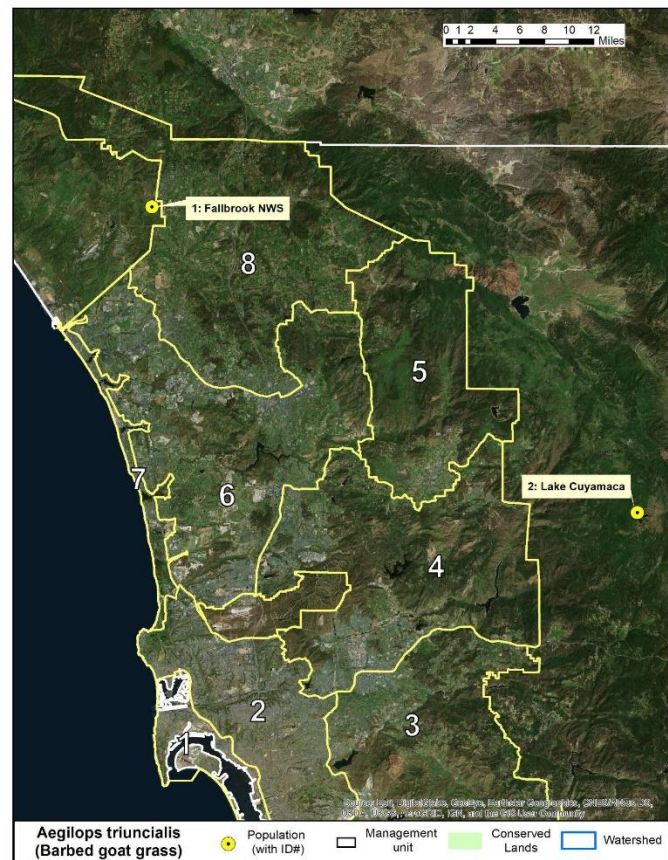
**Mark Martinez, County of San Diego AWM:
Mark.Martinez@sdcounty.ca.gov**

CDFA WMA Grants: AB2470

- **Two years of work**
 - **\$60K**
 - **First come first served (three max per county)**
 - **30 grants to 20 counties**
 - **San Diego was one of two counties to get 3 grants**
-
- 1) **Spotted knapweed and barbed goatgrass**
 - 2) **Volutaria (desert knapweed)**
 - 3) **Ward's weed**

Barbed goatgrass

Site	Size of population	Treated in:	Treated by:	Funding status
Fallbrook NWS, DoD	2.0 ac	Started in 2011, eradicated. Monitoring is ongoing	DoD	Funded: DoD
Lake Cuyamaca	4.2 ac	Untreated	-	CDFA WMA Grant



Invasive Non-Native:
Barbed goat grass
(*Aegilops triuncialis*)

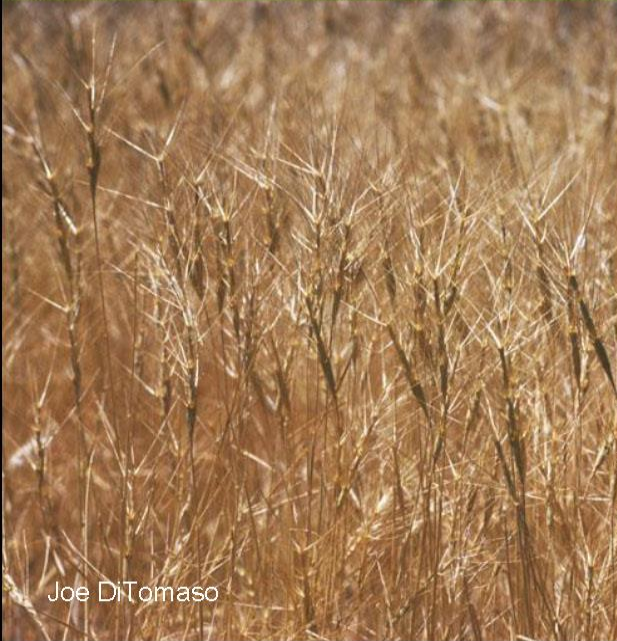
Description: annual grass, 17-45cm ht, leaf blade 1.5-7cm, 2-3mm wide; inflorescence 2-5.5cm, spike like; fertile spikelet 2-3 awned, distal spikelet 3-awned or 1-awned with 2 lateral teeth.

Ecology: rangelands, grasslands, and oak woodlands. Cattle/rangelands are areas of greatest risk for introduction/invasion.

Similar to (see back): Three-awned goat grass *Aegilops neglecta* (non-native)



Joe DiTomaso



Joe DiTomaso

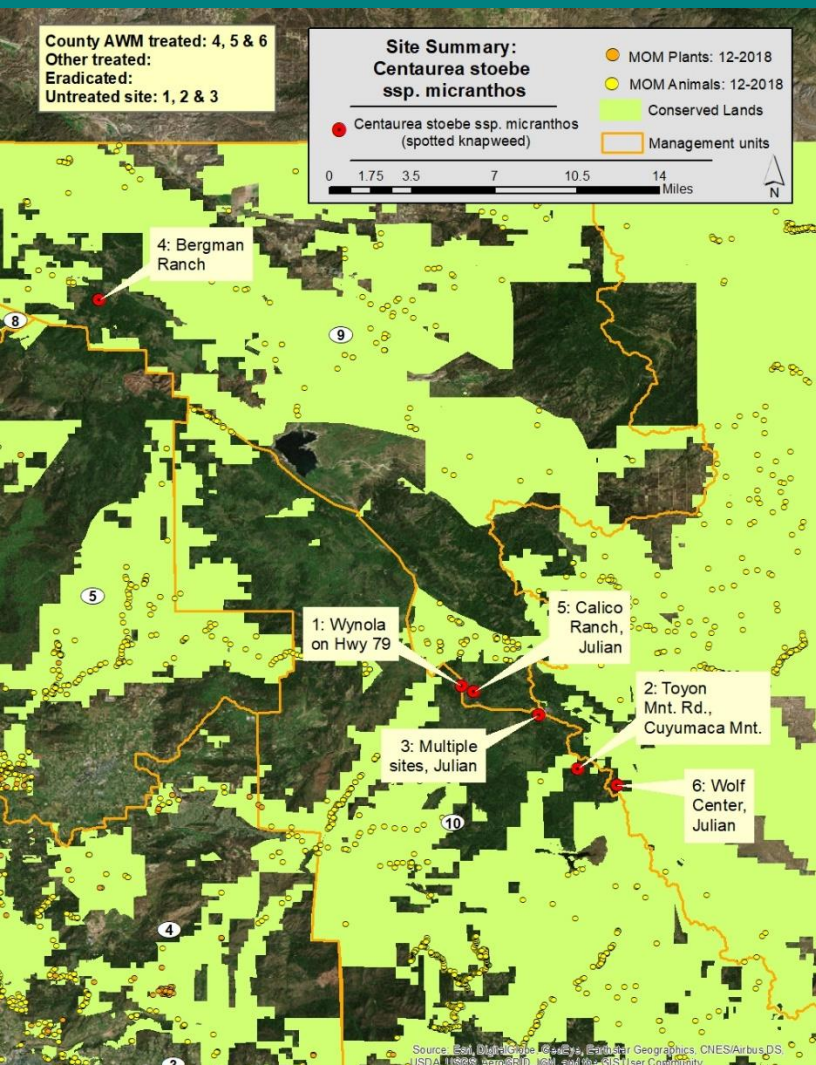


Joe DiTomaso



Spotted knapweed

Site	Size of population	Treated in:	Treated by:	Funding status
Bergman Ranch	4.2 acres	2014-2019	County AWM	CDFA WMA Grant
Calico Ranch	0.7 acres	2018-2019	County AWM	CDFA WMA Grant
Wolf Center	3.0 acres	2015-2019	County AWM	CDFA WMA Grant

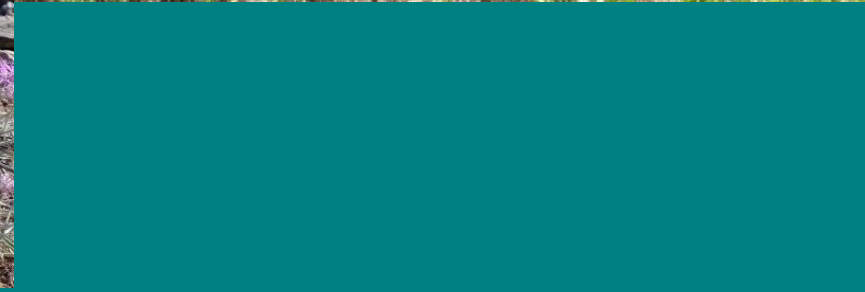


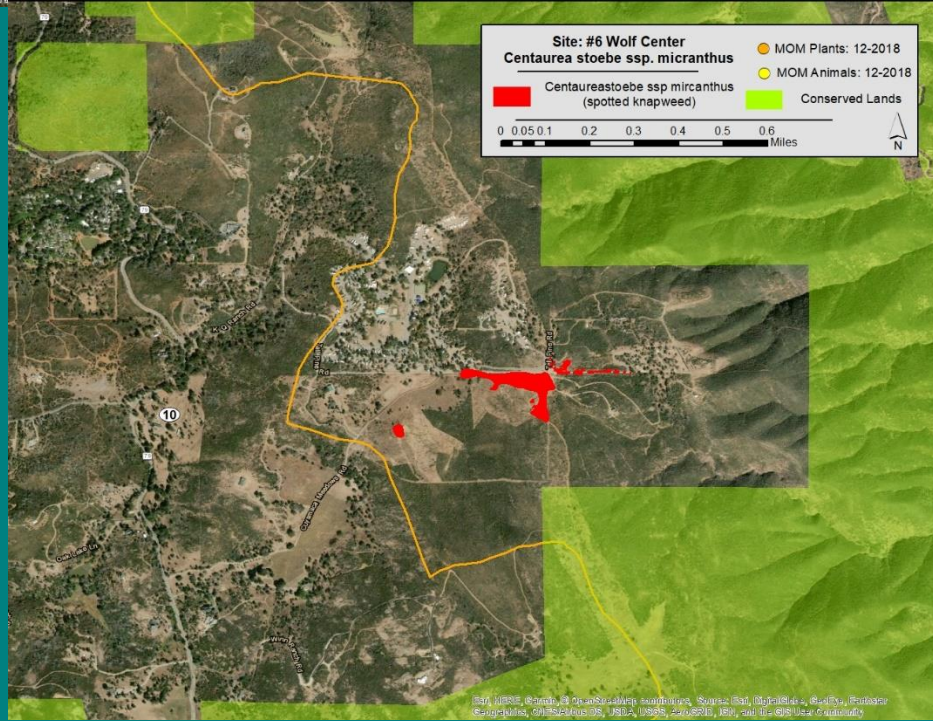
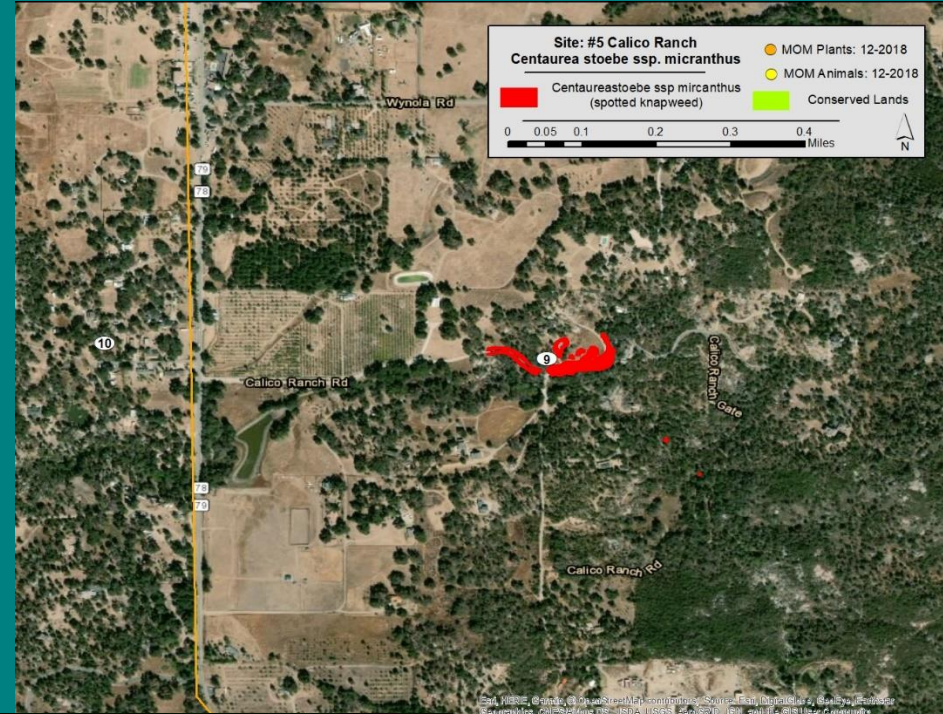
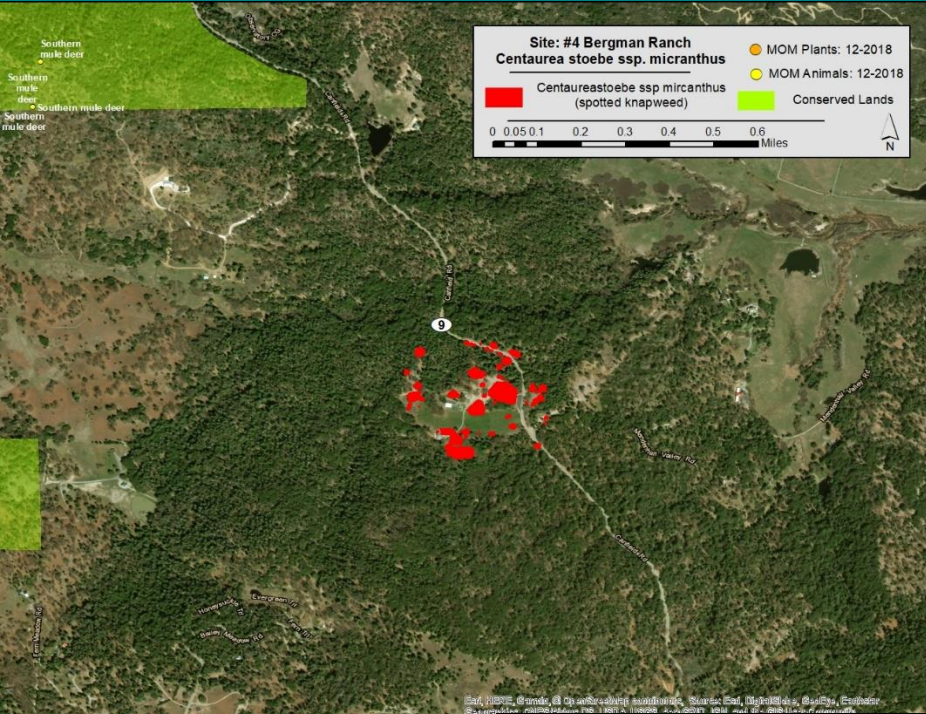
Invasive Non-Native: Spotted knapweed (*Centaurea stoebe ssp. micranthos*)

Description: Biennial/perennial, stems not winged, short –stiff hairy leaves resin-dotted, pink or purple flower, generally many in open, panicle-like clusters, phyllaries NOT spine tipped

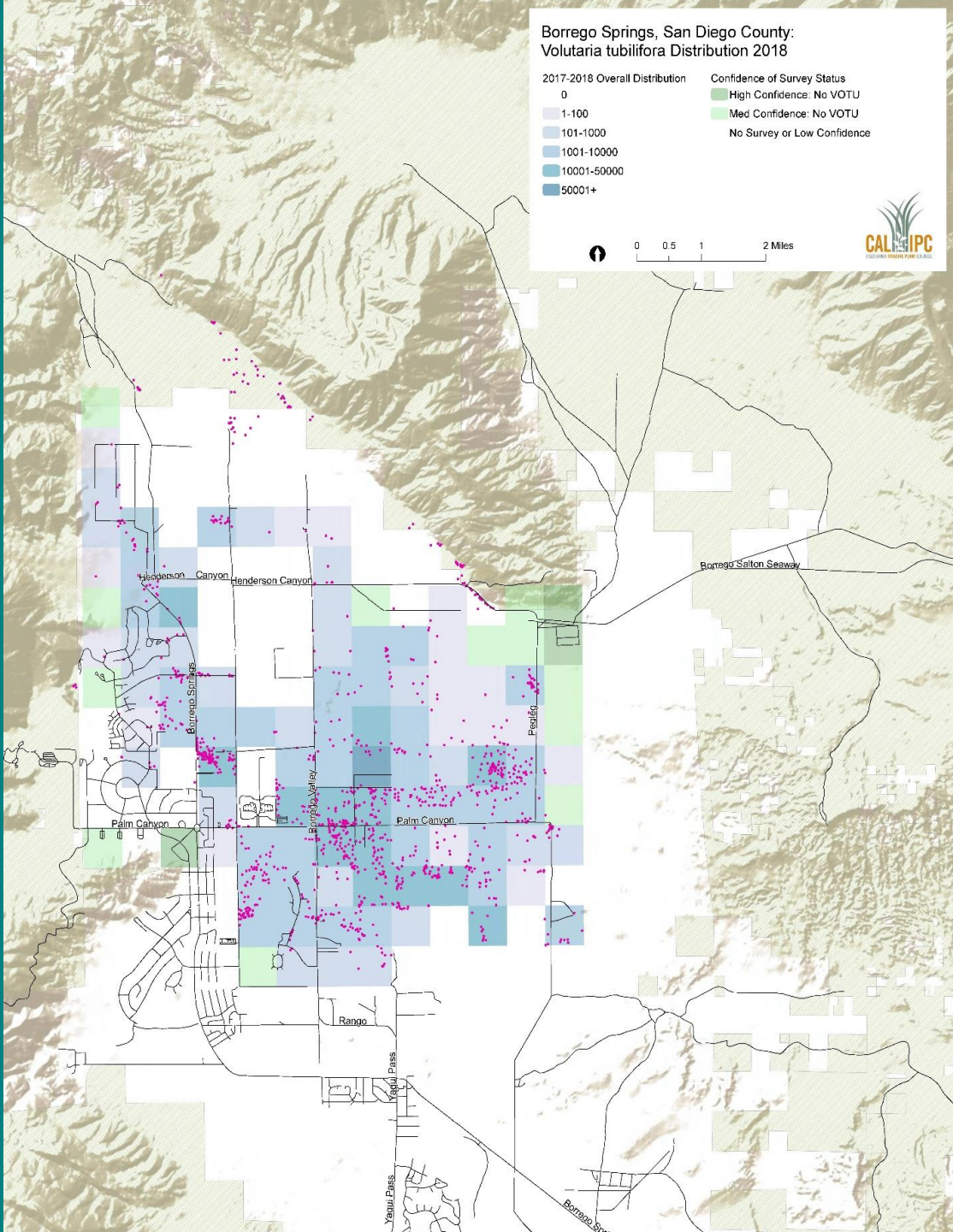
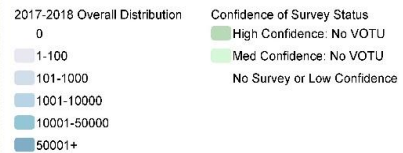
Ecology: Disturbed areas, grasslands, open sites, overgrazed rangelands, roadsides, logged areas. Crowds out native species and forage for livestock, can invade undisturbed native bunchgrass stands.

Similar to: When in flower not much else to confuse with, when dry may be similar to other *Centaurea* species, though this one has no spines.





Borrego Springs, San Diego County: Volutaria tubilifera Distribution 2018



Invasive Non-Native:
Volutaria knapweed
(*Volutaria tubuliflora*)



Photos by Tom Chester

Description: **Stem:** < 15 dm. **Leaf:** 1-2 pinnately lobed or divided, lobes +/- dentate, lobes angled forward. **Inflorescence:** heads solitary or in small clusters; phyllaries with wide flat flexible spine tips 1.5--2 mm, inner with membranous, spineless tips. **Flower:** corolla of sterile flower +/- 10 mm; corolla of fertile flower 5.5--6 mm, +/- white. **Fruit:** 3--3.5 mm, pale gray-brown, ascending-hairy, faces not pitted.

Ecology: Disturbed areas, non-native grassland, into coastal sage scrub

Similar to (see back): *Centaurea mellitensis* (tocalote), *Centaurea maculosa* (spotted knapweed)



Photo by Jason Giessow

Photo by Ron Vanderhoff



Photo by Jason Giessow



Photos by Ron Vanderhoff

Ward's weed



Site	Size of population	Treated in	Treated by	Funding status
DoD	2.0 ac	2012-ongoing	DoD	Funded: DoD
La Costa Greens	9.2 ac	2012-ongoing	CNLM and County AWM	Funded: CNLM and SANDAG
Bressi Ranch	113 ac	Untreated	-	Part: CDFA WMA
Crest Canyon, Del Mar	0.4 ac	Spring 2019	County AWM	Funded: SANDAG
Robinhood Ridge, Otay	0.4 ac	Spring 2019	City of San Diego	Funded: City of San Diego





Invasive Non-Native:
Ward's weed
(*Carrichtera annua*)

Description: Plant size varies from small to multi-branched 0.5m ht; Stems branched basally and distally; form similar to a small tumbleweed; Basal leaves: petiole 1–4.5 cm; blade 3-6 lobes each side, 1.5-4 cm, terminal lobe linear to oblong, margins entire. Flowers white or creamy yellow petals 6.5-8 x 1-2 mm ; Fruits short reflexed pods.

Ecology: Plant size varies greatly depending on environmental conditions; prefers disturbed areas, but readily invades between and under shrubs; coastal sage, maritime chaparral, grasslands



Invasive Species Alert

Common name: Ward's weed

Scientific name: *Carrichtera annua* (L.) DC.

Origin:

- Mediterranean region and Western Asia (native), invasive in Australia

Identifying Factors:

- Small bristly-haired plant, 5-40 cm
- Leaves: < 10 cm and deeply divided into multiple narrow lobes
- Flowers: pale yellow, 4 petals, 8-9 mm with purple veins
- Fruit: 6-8 mm in drooping position, topped with spoon-shaped petals



Above Photos: Bob & Fiona Richardson

Dispersal:

- Seeds dispersed via foraging animals and ants over short distances
- Long distance dispersal on vehicles, clothing, large animals, and agriculture

Impacts:

- Replaces perennial native species in some environments

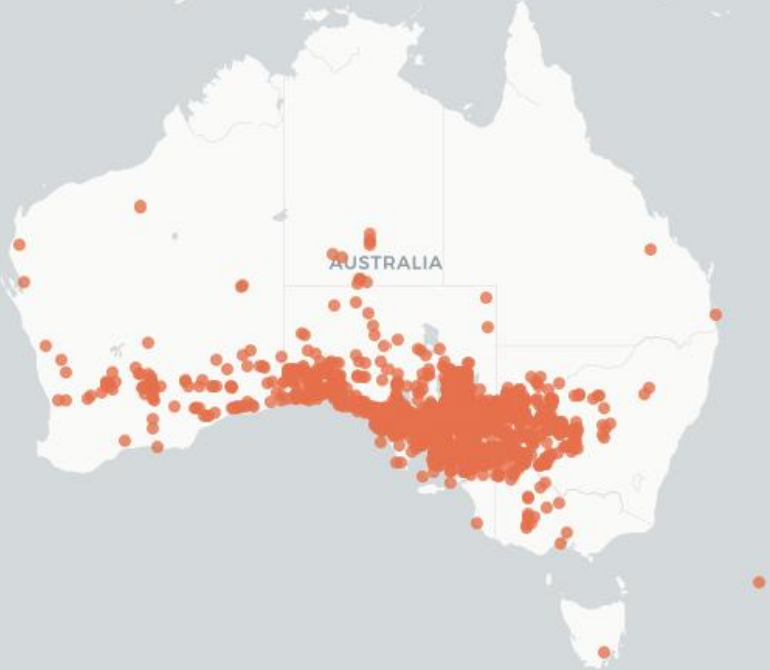
Looks Like:

- Some resemblance to western tansymustard

Management:

- If spotted please notify Sara Allen: smallen@sanidiego.gov & Victor Nava: Vnava@sanidiego.gov to schedule treatment ASAP.

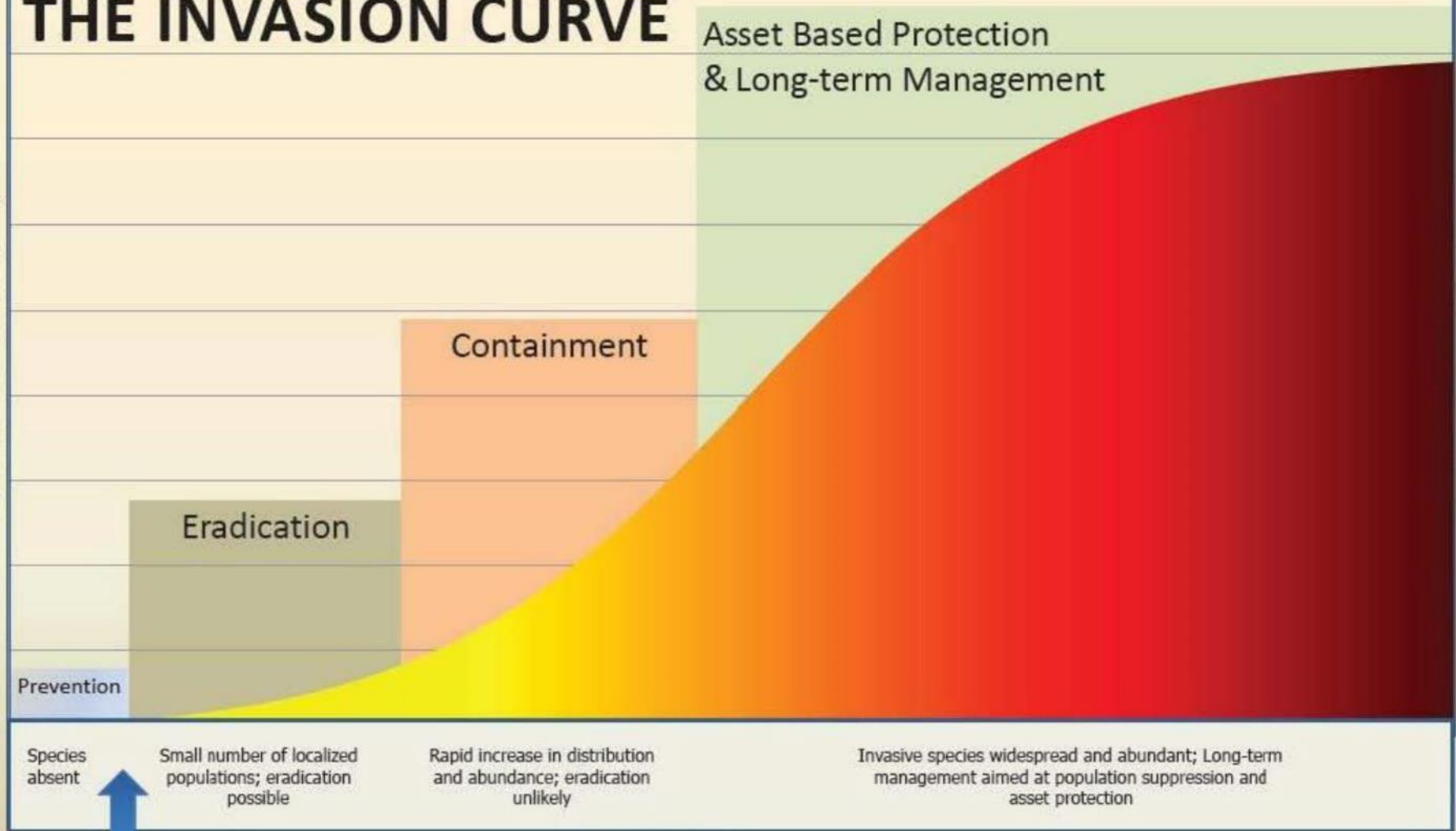
References:
https://keyserver.lucidcentral.org/weeds/data/media/Html/carrichtera_annua.htm
<https://www.calflora.org>



THE INVASION CURVE

AREA INFESTED →

CONTROL COSTS →



TIME →

Introduction

Work plan, updated Strategic Plan, 10 new SD PAFS, GIS data: SDMMP.com and SDWMA.org

Invasive non-native plant Early Detection and Rapid Response (EDRR) targets in western San Diego County

Report **new** sightings of these plants to coordinator Jason Giessow, jgiessow@cox.net or
iNaturalist.org or Calflora.org Version 2019-6-3

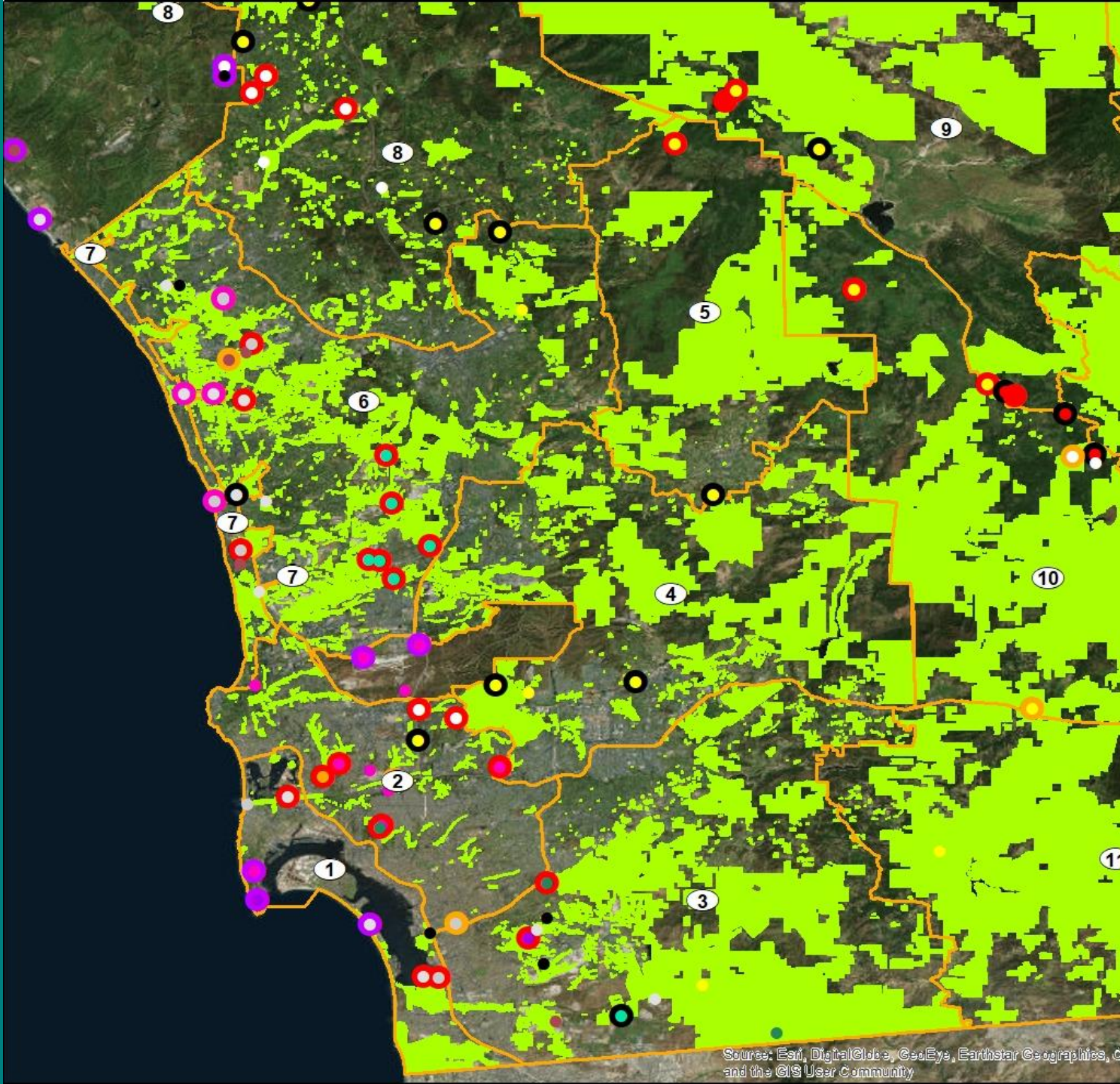
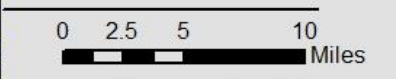
Scientific name	Common name	Growth form	CDFR	Habitat	Status	Populations (eradicated)	ID Sheet
<i>Aegilops triuncialis</i>	Barbed goat grass	Annual grass	B	Grassland	Active EDRR target	1 (1)	Yes
<i>Ageratina adenophora</i>	Eupatory	Perennial forb	Q	Riparian	Active EDRR target	4	Yes
<i>Carrichtera annua</i>	Ward's weed	Annual forb	A	Uplands (shrub & grass)	Active EDRR target	5	Yes
<i>Centaurea solstitialis</i>	Yellow star thistle	Annual forb	C	Grassland	Active EDRR target	11 (11)	Yes
<i>Centaurea stoebe</i>	Spotted knapweed	Annual forb	A	Uplands	Active EDRR target	3 (3)	Yes
<i>Cytisus scoparius</i>	Scotch broom	Perennial shrub	C	Uplands (shrub & grass)	Eradicated: monitoring	(1)	
<i>Elymus caput-medusae</i>	Medusahead	Annual grass	C	Grassland	Active EDRR target	7	Yes
<i>Enchylaena tomentosa</i>	Ruby saltbush	Perennial sub-shrub	A	Uplands (shrub & grass)	Assessing	1 (1)	Yes
<i>Euphorbia terracina</i>	Carnation spurge	Annual forb	B	Uplands	Eradicated: monitoring	8 (1)	Yes
<i>Euphorbia virgata</i>	Leafy spurge	Annual forb	A	Uplands	Active EDRR target	1 (1)	Yes (See ET)
<i>Genista monosperma</i>	Bridal broom	Perennial shrub	B	Uplands (shrub & grass)	Active EDRR target	4	Yes
<i>Genista monspessulana</i>	French broom	Perennial shrub	C	Riparian or uplands	Active EDRR target	5	Yes
<i>Hypericum canariense</i>	Canary Island St. John's wort	Perennial shrub	B	Shrublands	Active EDRR target	12	Yes
<i>Iris pseudacorus</i>	Yellow flag iris	Perennial monocot	B	Wetlands (fresh)	Assessing	9+	Yes
<i>Limonium duriusculum</i>	European sea lavender	Perennial forb	-	Wetlands (salt & fresh) & uplands	Active EDRR target	8 (1)	Yes
<i>Limonium ramosissimum</i>	Algerian sea lavender	Perennial forb	-	Wetlands (salt & fresh) & uplands	Active EDRR target	13 (1)	Yes
<i>Lythrum salicaria</i>	Purple loosestrife	Perennial forb	B	Wetlands (fresh)	Active EDRR target	2	Yes
<i>Myoporum acuminatum</i>	Waterbush	Perennial shrub	-	Riparian or uplands	Assessing	2	Yes
<i>Sesbania punicea</i>	Rattlebox	Perennial shrub	B	Wetlands (fresh)	Active EDRR target	1	Yes
<i>Volutaria tubuliflora</i>	Volutaria knapweed	Annual forb	A	Uplands (shrub & grass)	Active EDRR target	1 (1) + Borrego	Yes

**County AWM Invasives
Work: 2018-19
12 Species / 34 sites**

- ● County AWM crew work
- DoD work (+10 sites)
- Nature Collective work (4 sites)
- *Ageratina adenophora*
- *Carrichtera annua*
- *Centaurea solstitialis*
- *Centaurea stoebe*
- *Euphorbia terracina*
- *Genista monspessulana*
- *Hypericum canariense*
- *Limonium duriusculum*
- *Limonium ramosissimum*
- *Retama monosperma*
- *Sesbania punicea*
- *Volutaria tubiliflora*

Management units

Conserved lands



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Scientific Name	Common Name	Growth form	Known populations (active)	Populations worked on in 2017 by AWM	Populations worked on in 2018 early 2019 by AWM
<i>Ageratina adenophora</i>	Eupatory	Perennial forb	4	2	1
<i>Carrichtera annua</i>	Ward's weed	Annual forb	5	1	2
<i>Centaurea solstitialis</i>	Yellow star thistle	Annual forb	11	7	6
<i>Centaurea stoebe</i>	Spotted knapweed	Annual forb	3	2	3
<i>Euphorbia terracina</i>	Carnation spurge	Annual forb	8	5	7
<i>Euphorbia virgata</i>	Leafy spurge	Annual forb	1	0	0
<i>Genista monosperma</i>	Bridal broom	Perennial shrub	3	2	2
<i>Genista monspessulana</i>	French broom	Perennial shrub	5	2	2
<i>Hypericum canariense</i>	Canary Island St. John's wort	Perennial shrub	12	3	3
<i>Limonium duriusculum</i>	European sea lavender	Perennial forb	8	4	3
<i>Limonium ramosissimum</i>	Algerian sea lavender	Perennial forb	14	2	3
<i>Sesbania punicea</i>	Rattlebox	Perennial shrub	1	1	1
<i>Volutaria tubiliflora</i>	Volutaria knapweed	Annual forb	1	1	1

Centaurea solstitialis: Yellow star thistle

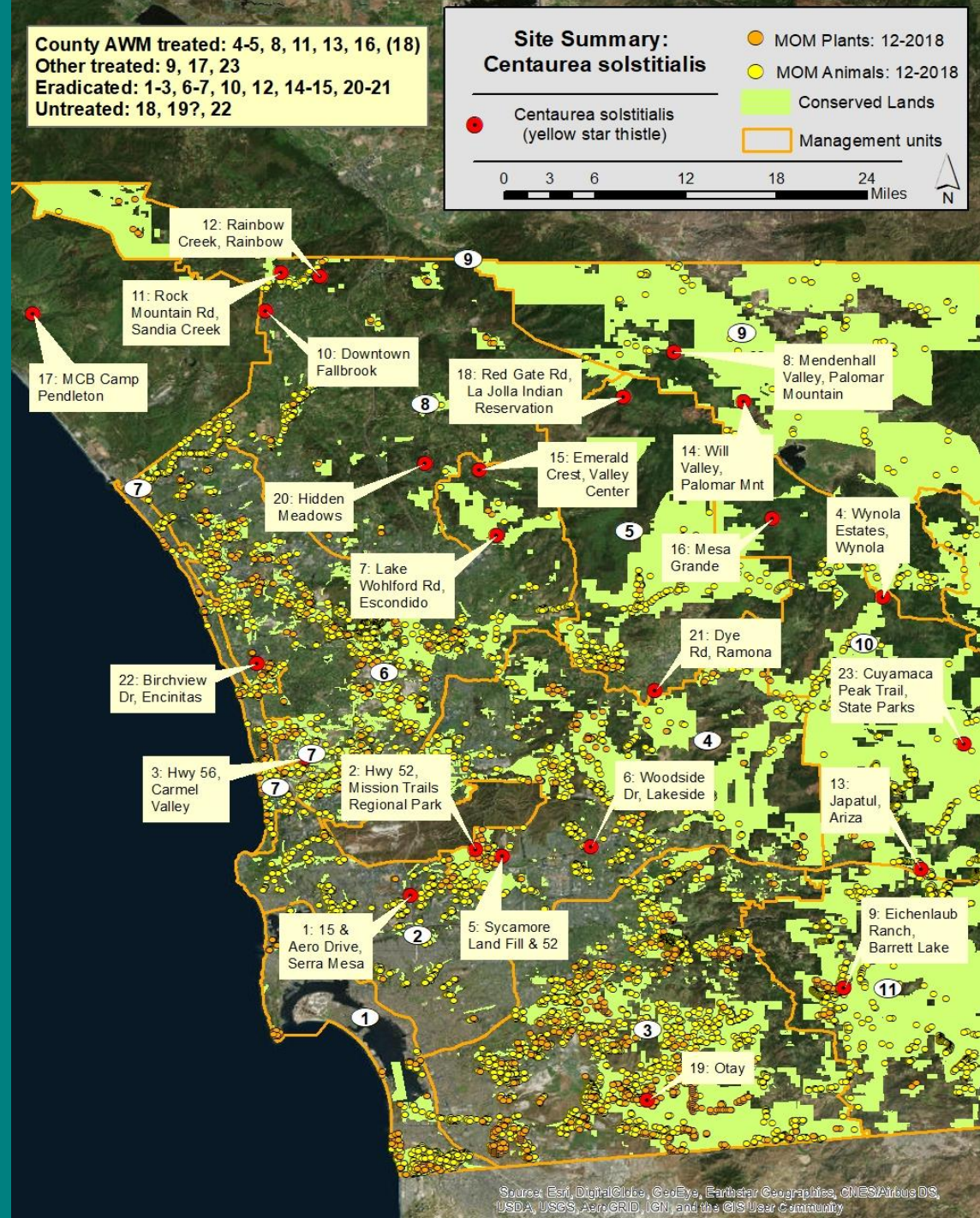
23 sites:

7 under treatment, 3 tracked
11 eradicated,
1 untreated, 1 assess

2 iNaturalist reports (22,23)

Progress being made,
many years into control
effort.

Regional control achievable,
but re-introduction likely.



Centaurea solstitialis: Yellow star thistle



Montana Weed Control Association

Invasive Non-Native: **Yellow starthistle** **(*Centaurea solstitialis*)**

Description: Generally an annual. One to many solitary, very spiny, yellow flower-heads. The main phyllaries (flowerhead bracts) are spined with a single stout, toothpick like apical spine (0.4-1") and a few smaller, lateral spines. Young plants grow as prostrate to ascending taprooted rosettes until bolting occurs in late spring or early summer. Stem leaves extend downward, giving a winged appearance. Flowering plants range from ankle to waist/chest height and change color from green to bluish green in summer. Flowers from June through September.

Ecology: Generally found in exposed areas on fertile, drier soils, including disturbed sites, grasslands, rangeland, hay fields, pastures, roadsides, and recreational areas. Distributed from coast to Mountains.

Similar to (see back): tocolote (*Centaurea mellitensis*)



Yellow star thistle

tecolote



Steve Dewey, Utah State University



Montana Weed Control Association

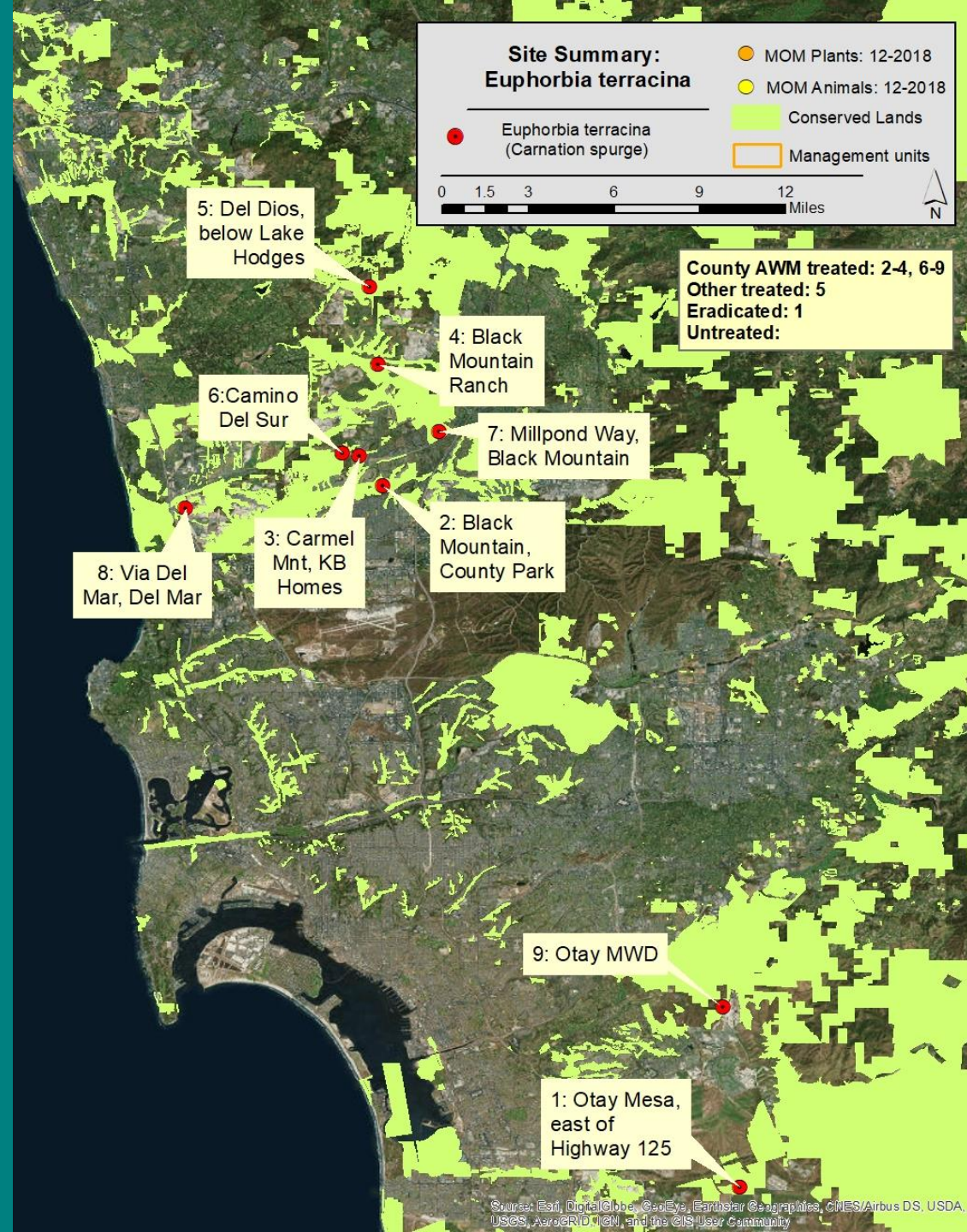
Euphorbia terracina: Carnation spurge

9 sites (with several
sub-sites):
7 under treatment,
1 tracked, 1 eradicated

2 iNaturalist reports (8,9)

Additional sites are being
found in Black Mountain
area- but seems restricted
enough to work on. Difficult
seedbank.....

Eradication still achievable.



Invasive Non-Native:
Carnation spurge
(*Euphorbia terracina*)



Description: annual or short lived perennial; upright stems several to numerous from base, up to 120cm ht, often reddish; sessile leaves 2.5-6cm, linear to narrowly lanceolate blades, leaf tip acute; at top of stem broader and yellowish green; inflorescence open, inconspicuous greenish or yellowish flowers at tips with ovary forming deeply lobed 3 sided capsule (3-5 mm long and 4-5 mm wide); milky sap (eye and skin irritant)

Ecology: disturbed areas, coastal sage scrub, grasslands, chaparral edges, salt marsh, riparian, oak woodlands; shade or sun; massive germination after fire; toxic sap

Similar to (see back): Other weedy spurge species



All photos Jason Giessow



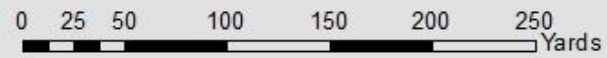
Euphorbia terracina: Site #3, Carmel Mountain



Treated: *Euphorbia terracina*
(carnation spurge)



Survey lines




Deer Canyon

Dufrense

KB Homes

Euphorbia terracina: Site #7, Mill Pond Way

 Treated: *Euphorbia terracina*
(carnation spurge)

 Survey lines

0 25 50 100
Yards



Hypericum canariense: Canary Island St John's Wort

12 sites:

3 under treatment, 4 tracked
5 sites left to start on

- control at sites appears
good to fair, many seedlings
this year, slow forward
progress

Eradication seems feasible,
but two sites very steep.



Invasive Non-Native:
Canary Island St. John's Wort
(Hypericum canariense)



Foliage bright green



Foliage going dormant



Description: multi-stemmed perennial rhizomatous shrub up to 3m ht; leaves opposite, waxy, lanceolate and bright green; terminal clusters of yellow flowers; leaves yellow early in season and generally drop in summer; capsule fruits dry and dehisce tiny seeds.

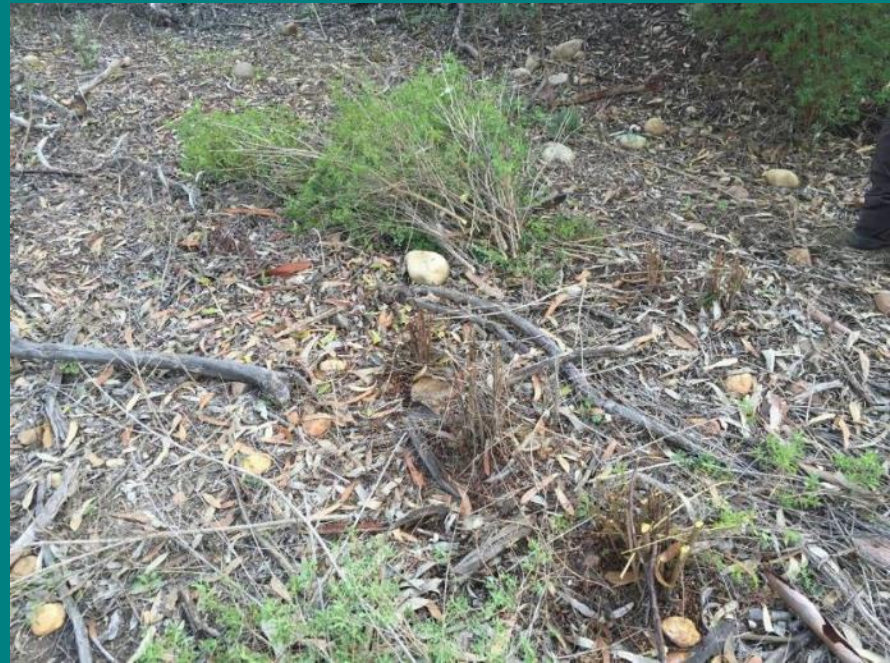
Ecology: disturbed areas, coastal sage scrub and grassland habitats. Can form dense stands that exclude native species.



All photos Jason Giessow



Balboa Park



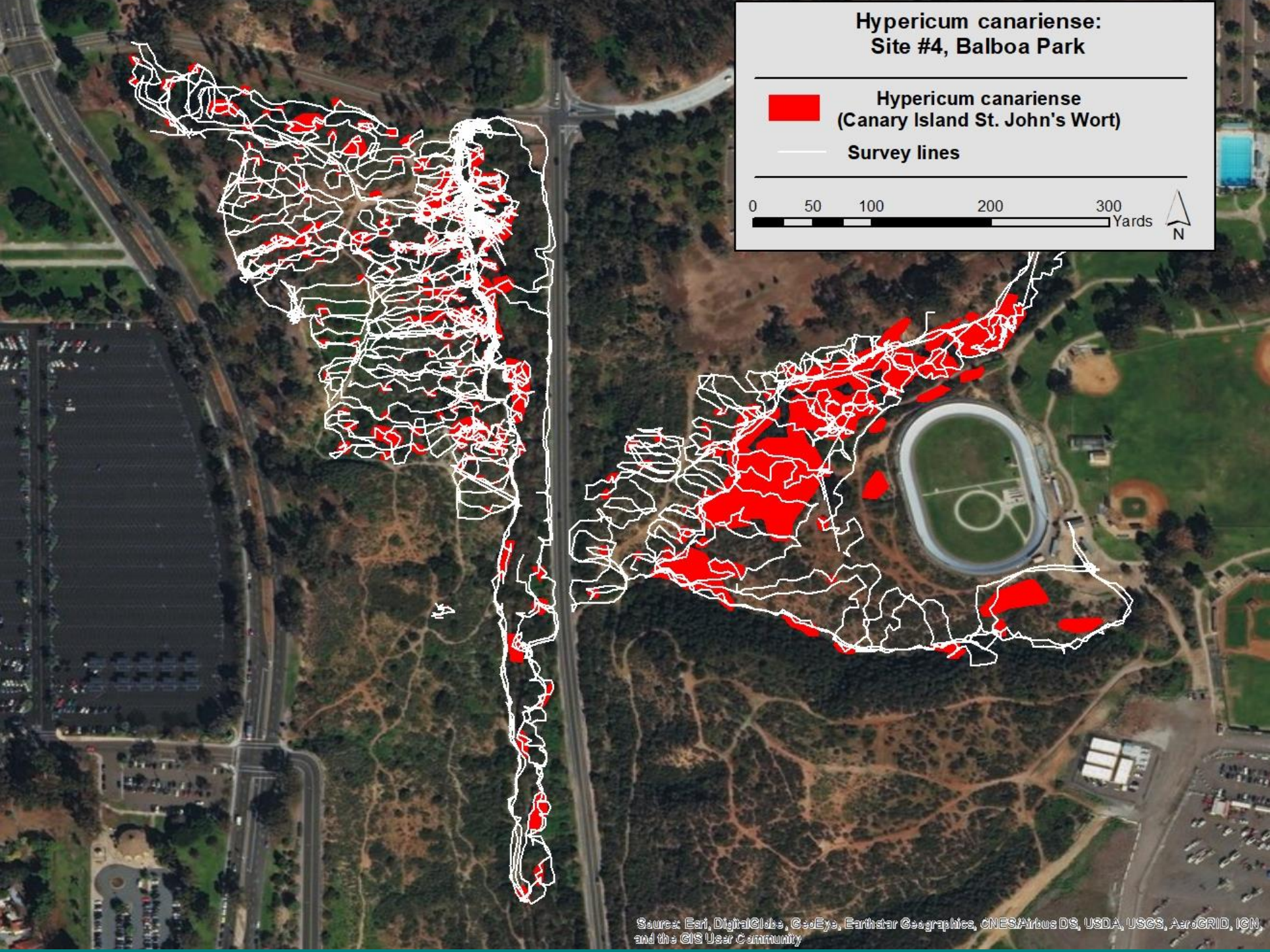
**Hypericum canariense:
Site #4, Balboa Park**



**Hypericum canariense
(Canary Island St. John's Wort)**



Survey lines



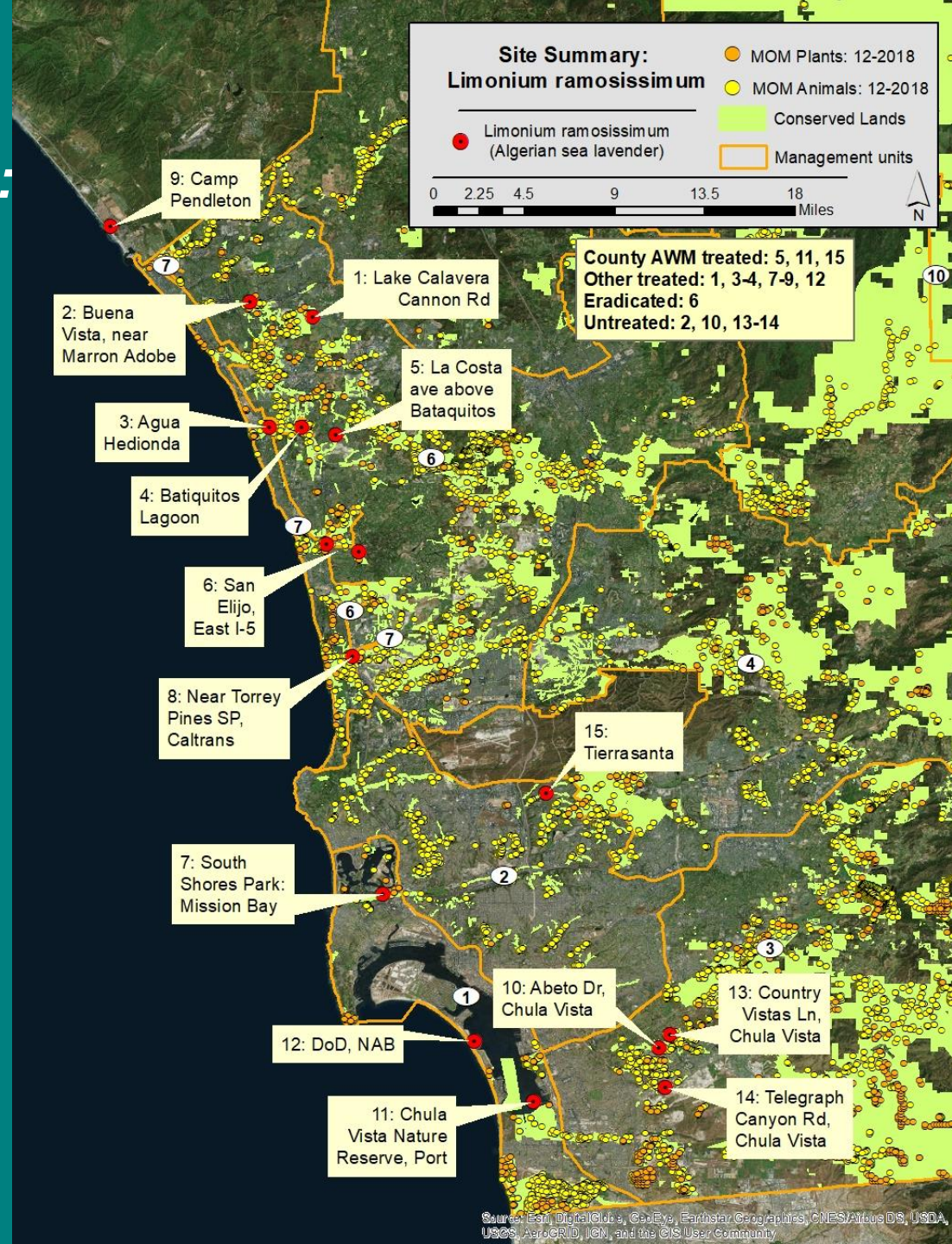
Limonium ramosissimum: Algerian sea lavender

15 sites:

3 under treatment, 7 tracked
1 eradicated,
4 untreated

Control feasible, but upland
sources likely (sources found
on four watersheds).

Eradication may not be
realistic on all watersheds





Invasive Non-Native:
Algerian Sea Lavender
(Limonium ramosissimum)

Description: perennial herb 6-12" (20-50 cm) tall in flower, lower leaves in dense rosettes 1-4" (3-10 cm) long, $\frac{1}{4}$ - $\frac{3}{4}$ " (7-20 mm) wide, spoon shaped, tip acute to rounded. Flower: delicate multi-branched, tight clusters. Flower: calyx (outer flower part) white < $\frac{1}{4}$ " (4-6mm), corolla (inner flower part) pale pink to purple < $\frac{1}{4}$ " (5-7 mm).

Ecology: salt-tolerant, coastal salt marsh as well as riparian habitat (even grassland & disturbed areas).

Similar to (see back): European sea lavender (non-native) has rounded leaves and flowers are evenly spaced. Perez's sea lavender (common non-native used in landscaping) is a larger species with wider, longer, bright green leaves. California sea lavender (native) has longer leaves and stouter taproot.



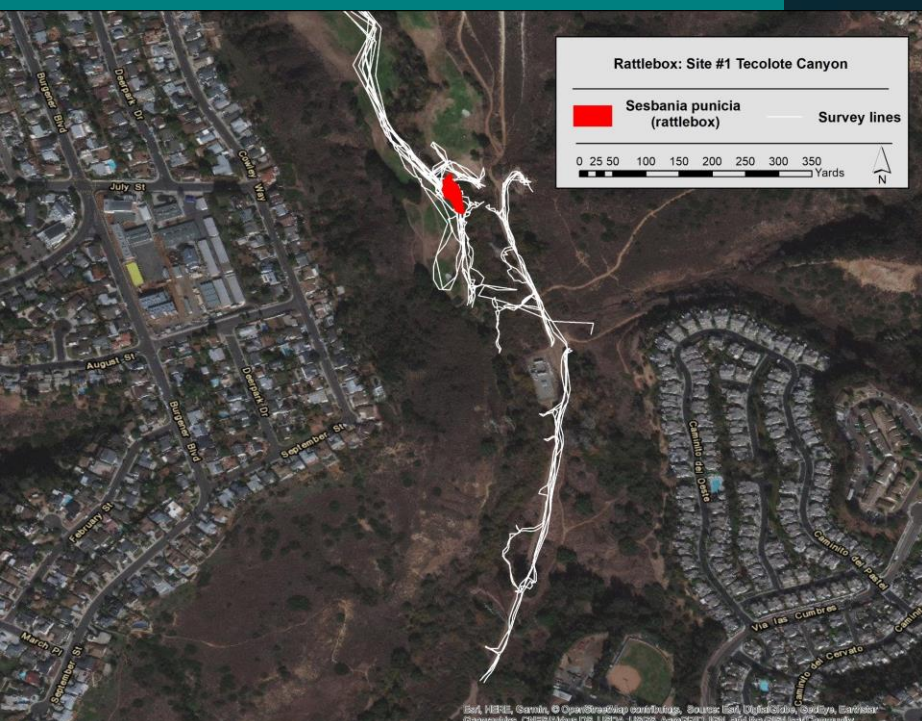
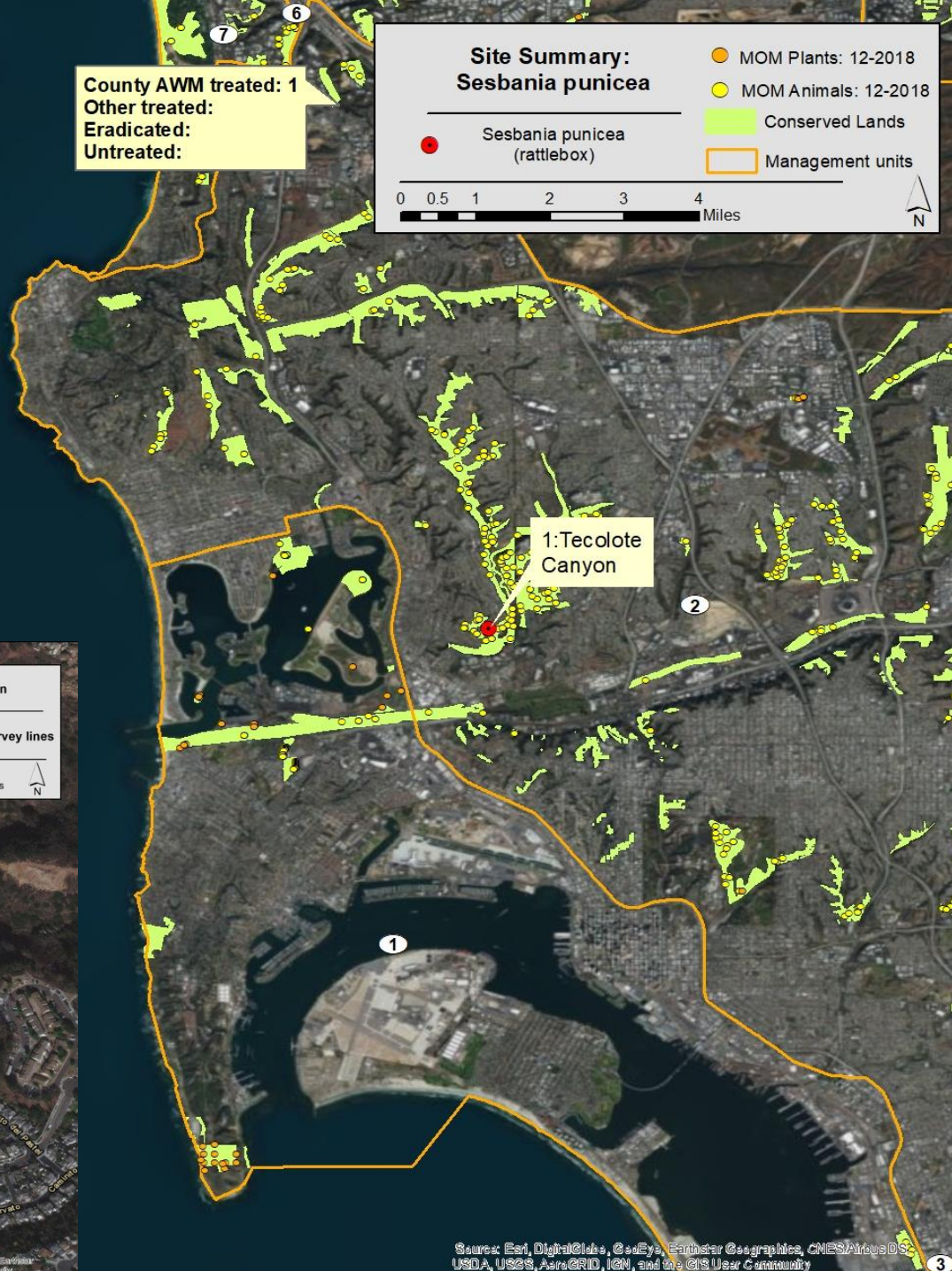




Sesbania punicea: Rattlebox

1 site:
1 under treatment

Control feasible, but lots of
poison oak.





Invasive Non-Native:
Red Sesbania, Rattlebox
(*Sesbania punicea*)

Description: shrub to small tree that can grow up to 10 ft (3 m) tall. Leaflets: 20-34 per branch (always an even number), elliptic to elliptic-oblong. Flower: Orange-red pea-like flowers, 5-15 per group. Fruits: 1-3" (2.5-7 cm) long.

Ecology: wetlands/riparian areas, other moist sites, roadsides, cultivated as an ornamental plant.

Similar: looks a bit like: black locust (*Robinia pseudoacacia*), an uncommon non-native tree with white flowers and obvious spines on the stem and *Cassia occidentalis*, yellow flowered, 8 leaflets.



All Photos © Joe DiTomasso

