Invasive Non-native Plant
Early Detection and Rapid Response (EDRR) Program:

What Plants To Be On The Look Out For

Presented: July 17 2018

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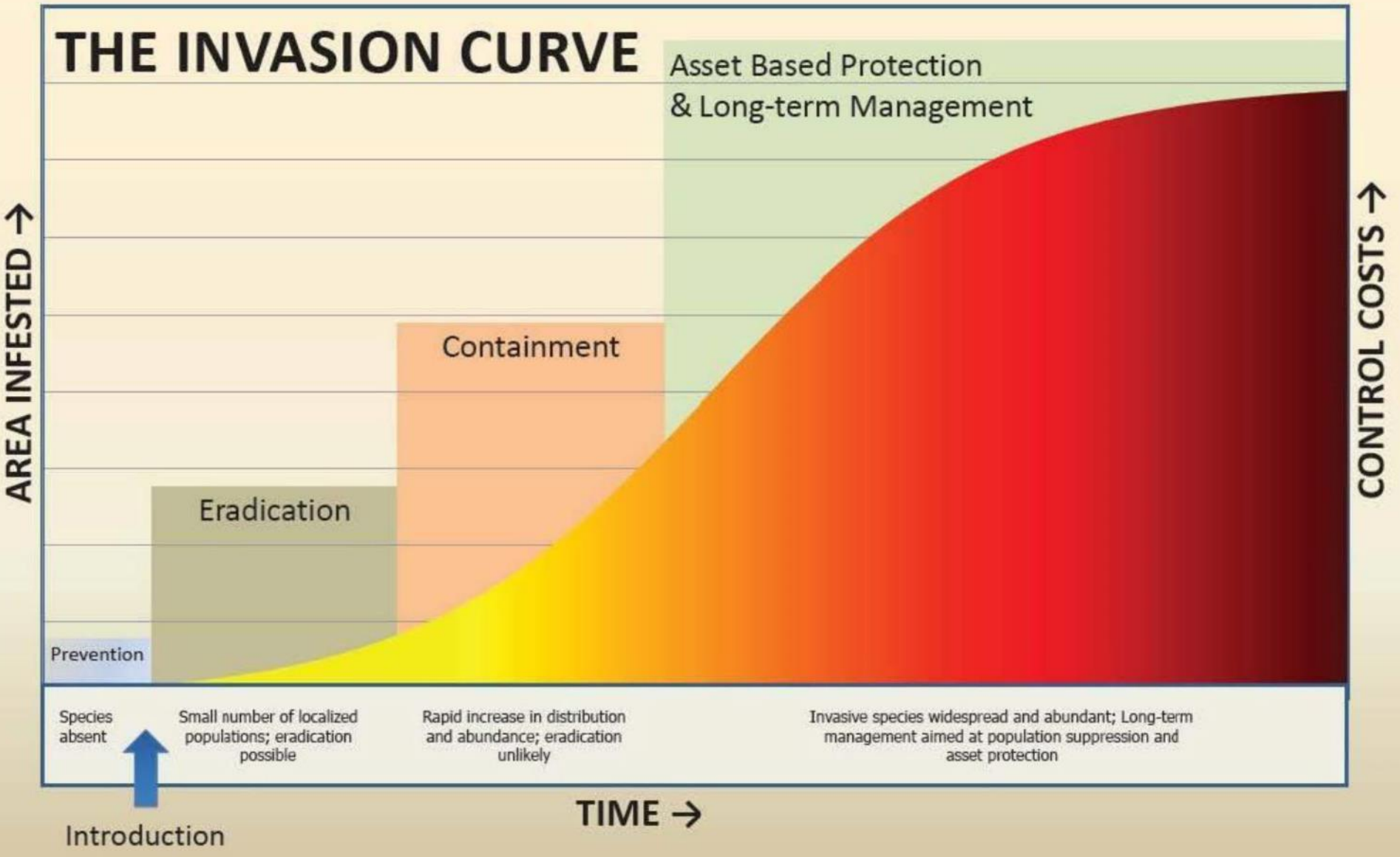

THE INVASION CURVE
Asset Based Protection
& Long-term Management
Containment
Eradication
Prevention
AREA INFESTED →
CONTROL COSTS →
Species absent
Small number of localized populations; eradication possible
Rapid increase in distribution and abundance; eradication unlikely
Invasive species widespread and abundant; Long-term management aimed at population suppression and asset protection
Introduction
TIME →

Summary of Management Levels and Goals

Level	Distribution	Scale of Management	Control Feasibility	Goal
1-Surveillance	Not present	Regionwide	High (low effort)	Early detection, rapid response
2-Eradication	Limited	Regionwide	High (mod. effort)	Regional Eradication
3-Containment	Variable	Watershed, management unit	Medium (re-treatment)	Landscape Eradication/cont.
4-Directed Management	Wide, abundant	Sub-management unit, reserve	Medium (slow re-invasion)	Control to benefit NCCP resources
5-Directed Suppression	Wide, abundant	Reserve or site	Low (rapid re-invasion)	Control to benefit NCCP resources

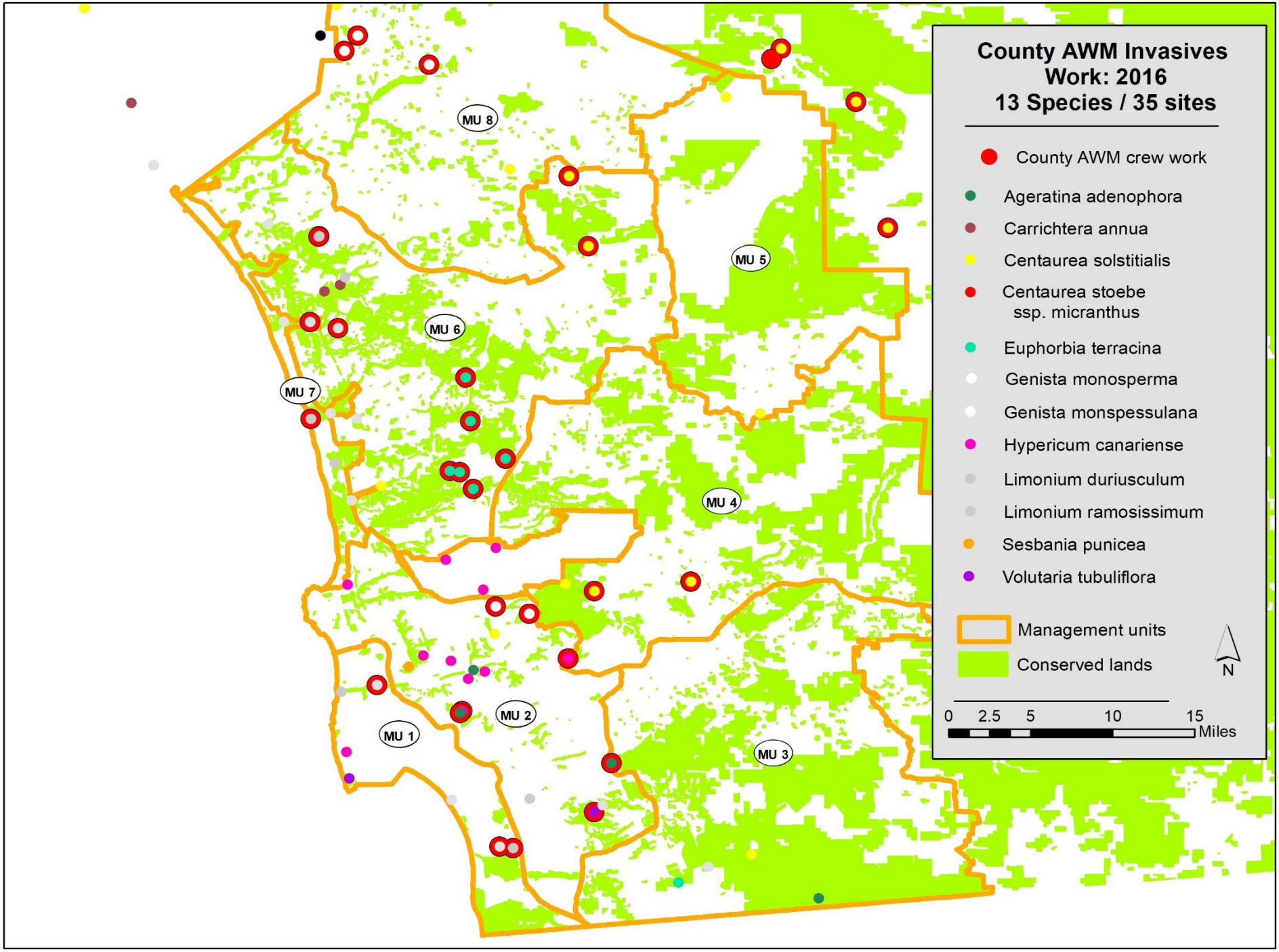
Plant Assessment Form (SDPAF)

Species name	Common name			Review Date
Foeniculum vulgare	Fennel			October 2011

Final Ranking and score (0 to 10)	6.2

Class	Subclass	Class weight	Subclass weight	Score	Weighted Score
1.0 Ecological Impacts		0.6		4.9	2.9
	1.1 Abiotic Impacts		0.3	1.2	
	1.2 Flora & Vegetation Community		0.4	3.0	
	1.3 Fauna		0.3	1.7	
2.0 Invasiveness		0.2		7.3	1.5
	2.1 Invasive Potential: Role of Natural and Anthropogenic Disturbance		0.25	2.3	
	2.2 Rate of Spread: How will it do (is it doing) in new areas?		0.25	2.0	
	2.3 Reproductive Potential		0.25	1.5	
	2.4 Human Caused Dispersal		0.10	1.2	
	2.5 Long Distance Dispersal		0.15	1.8	
3.0 Distribution and Abundance		0.2		9.2	1.8
	3.1 Distribution across vegetation classes/minor ecotypes		0.5	2.5	
	3.2 Abundance (present or potential) within invaded classes		0.5	3.0	

Reviewers: Jason Giessow, Patricia Gordon-Reedy
Reviewer comments are designated with an (R) under citations.


County AWM Invasives Work: 2016
13 Species / 35 sites
County AWM crew work
Ageratina adenophora
Carrichtera annua
Centaurea solstitialis
Centaurea stoebe ssp. micranthus
Euphorbia terracina
Genista monosperma
Genista monspessulana
Hypericum canariense
Limonium duriusculum
Limonium ramosissimum
Sesbania punicea
Volutaria tubuliflora
Management units
Conserved lands
N
0 2.5 5 10 15
Miles
MU 1
MU 2
MU 3
MU 4
MU 5
MU 6
MU 7
MU 8

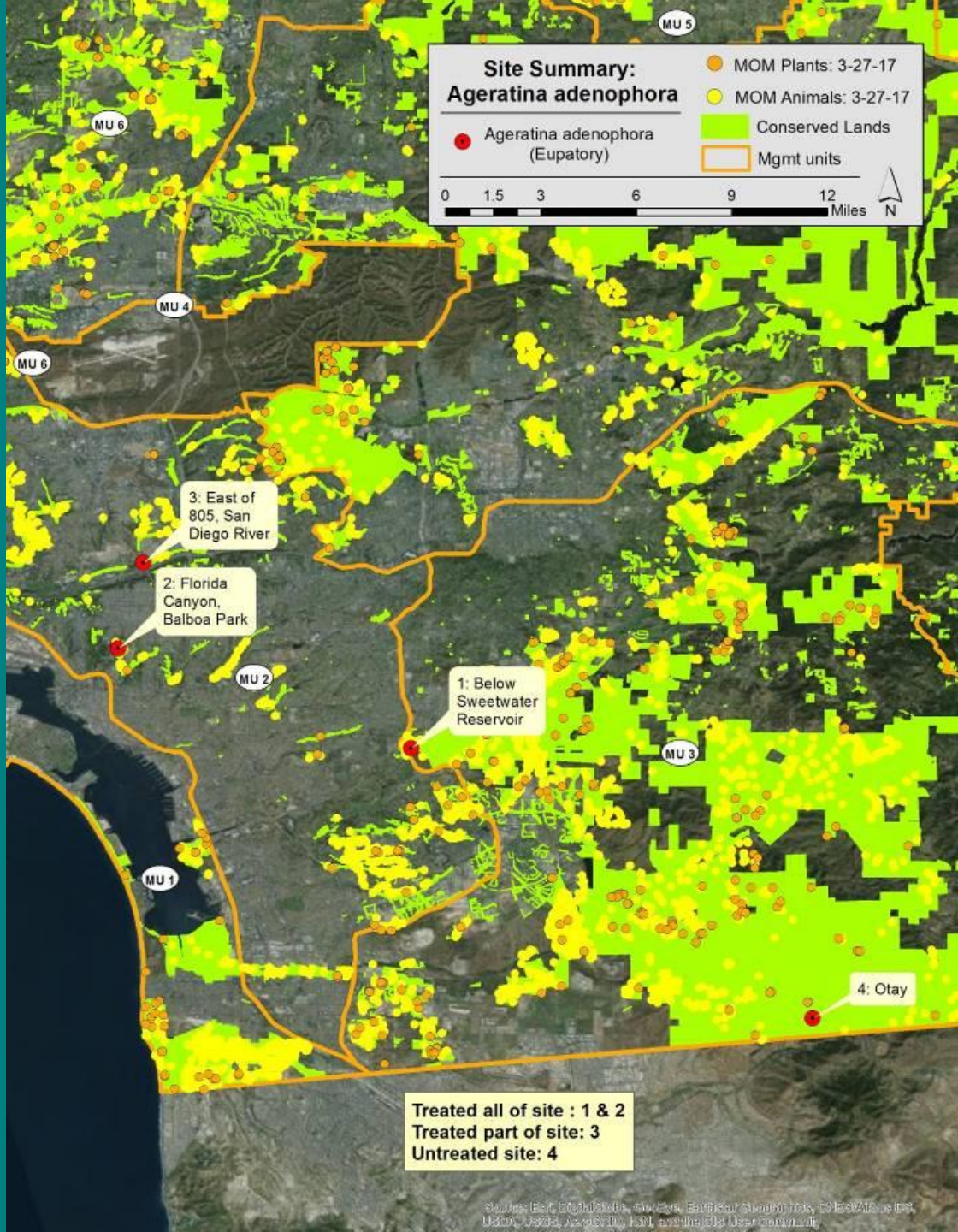
Scientific Name	Common Name	Known populations (active)	Populations worked on
Ageratina adenophora	Eupatory	4	3
Aegilops triuncialis	Barbed goat grass	2	1
Carrichtera annua	Ward's weed	3	1
Centaurea solstitialis	Yellow star thistle	7	6
Centaurea stoebe ssp. *micranthos*	Spotted knapweed	3	3
Elymus caput-medusae	Medusahead	4	2
Enchylaena tomentosa	Ruby saltbush	2	1?
Euphorbia terracina	Carnation spurge	6	6
Euphorbia virgata	Leafy spurge	1	1

Scientific Name	Common Name	Known populations (active)	Populations worked on
Genista monosperma	Bridal broom	4	3
Genista monspessulana	French broom	5	4
Hypericum canariense	Canary Island St. John's wort	12	3
Myoporum acuminatum	Strichnine bush	2	0
Parthenium hysterophorus	Santa Maria feverfew	0	0
Limonium duriusculum	European sea lavender	7	4
Limonium ramosissimum	Algerian sea lavender	14	3
Sesbania punicea	Rattlebox	1	1
Volutaria tubuliflora	Volutaria knapweed	2	1

Ageratina adenophora: Eupatory

4 sites:
3 under treatment
(one partially)

Eradication appears to be realistic

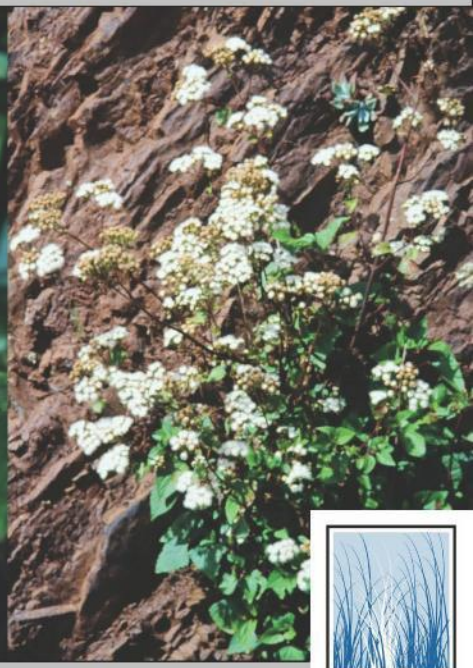


Invasive Non-Native:
Crofton Weed, Eupatory
(*Ageratina adenophora*)

Description: perennial herb or subshrub, woody base, 2-5 ft (.6-1.5m) tall. Opposite leaves 1-4" (3-10cm). Stems: purple, glandular hairy. Flowers: composite, flower head all discoid flowers (no ray flowers) ¼" (6mm) across, clustered in groups, individual flowers 1/16-1/8 " (<5mm) across, white or pink tinged.

Ecology: disturbed areas, wetland/riparian edges, canyons, hillsides.

Similar to: no common natives or non-natives. Mule-fat has discoid ray flowers, but thinner leaves.



SCWRP

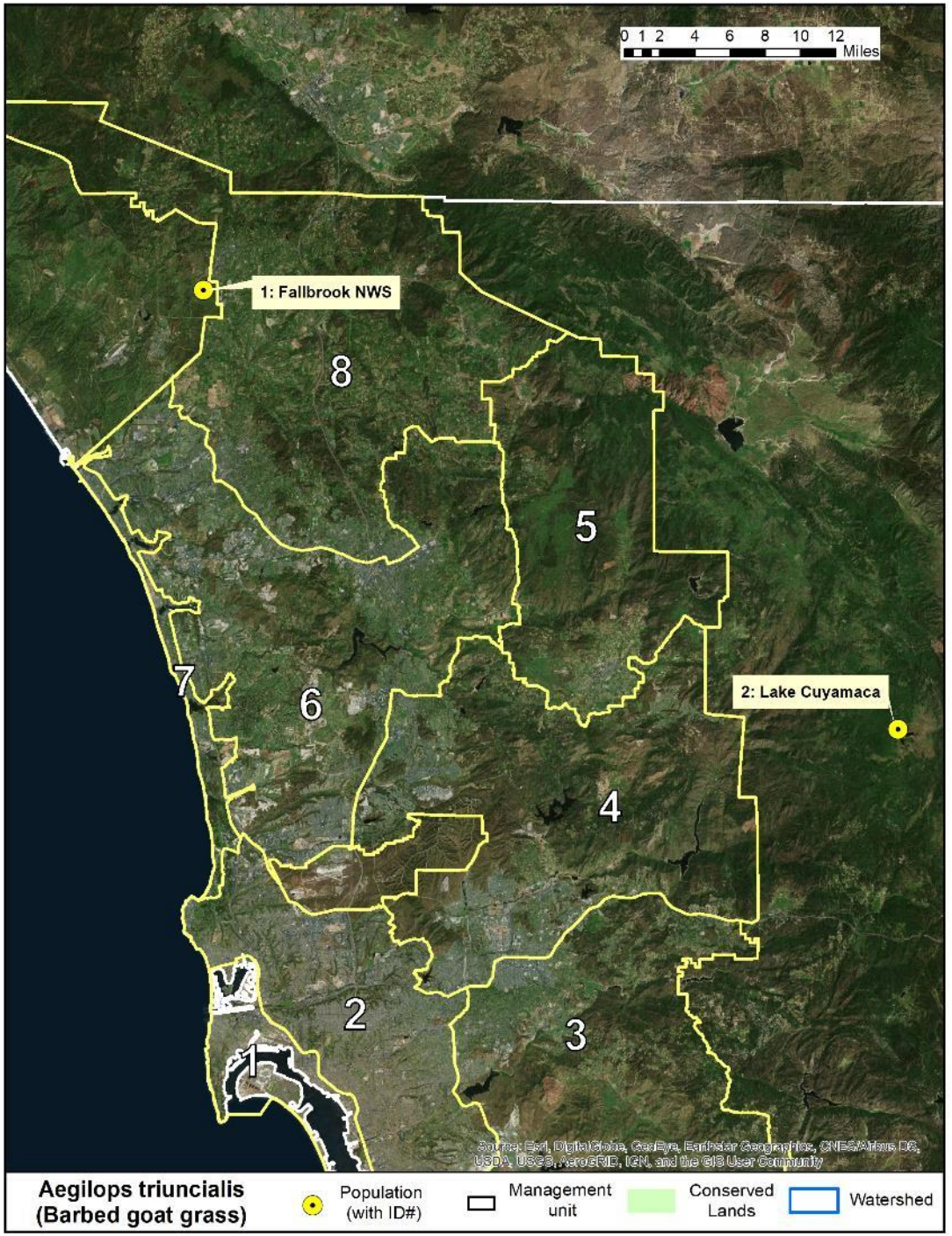
Report sightings to: edrrsd@gmail.com and database at www.Calflora.org

Cal-IPC

Aegilops triuncialis : Barbed goat grass

2 sites:

1 under treatment,
1 new site

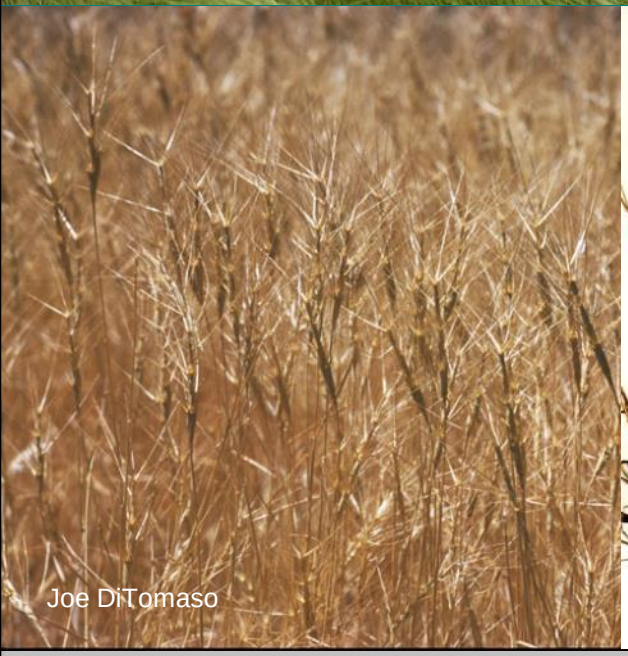


Invasive Non-Native:
Barbed goat grass
(*Aegilops triuncialis*)

Description: annual grass, 17-45cm ht, leaf blade 1.5-7cm, 2-3mm wide; infloresence 2-5.5c, spike like; fertile spikelet 2-3 awned, dital 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)



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Barbed goat grass:
Aegilops triuncialis
Report!

Medusa head:
Elymus caput-medusae
Report!

Plants **SIMILAR TO**:
Barbed goat grass (*Aegilops triuncialis*)

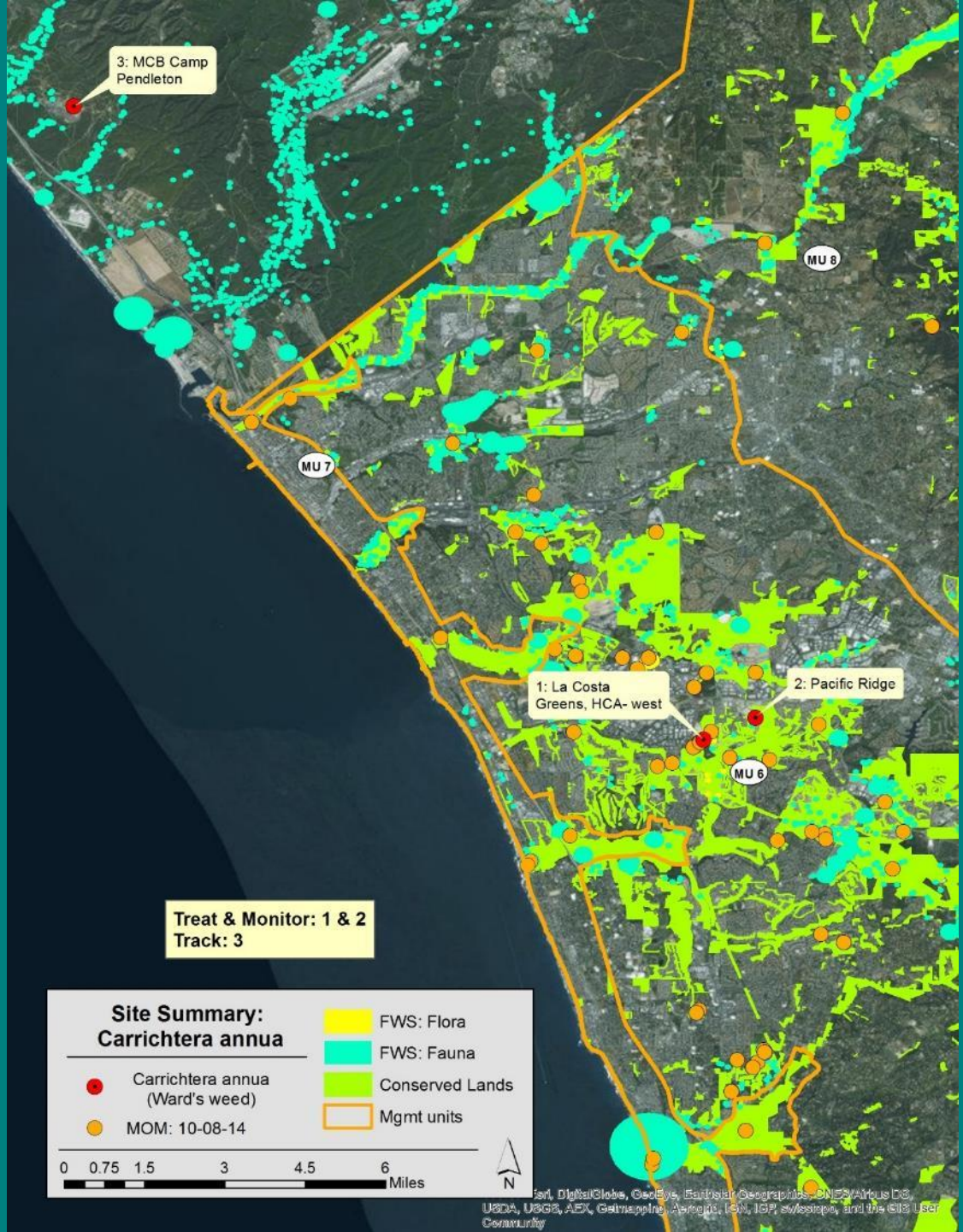
Three-awned goat grass *Aegilops neglecta* (**non-native**)
Stems 25-35 cm, infloresence 3-6cm
Distal spikelets 2-5mm (vs. >7mm), fertile lemmas with 2-3 awns to 40mm (vs. fertile lemmas 2-3 toothed with one occ extended as awn to 10mm)

Medusa head *Elymus caput-medusae* (**non-native –** see other ID sheet: PLEASE MAP).
Slender annual grass; 1-3" awns straight and compressed when green, but twist and spread when dry.

Carrichtera annua: Ward's weed

3 sites:
(for all of North America)

2 under treatment,
1 large new site



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

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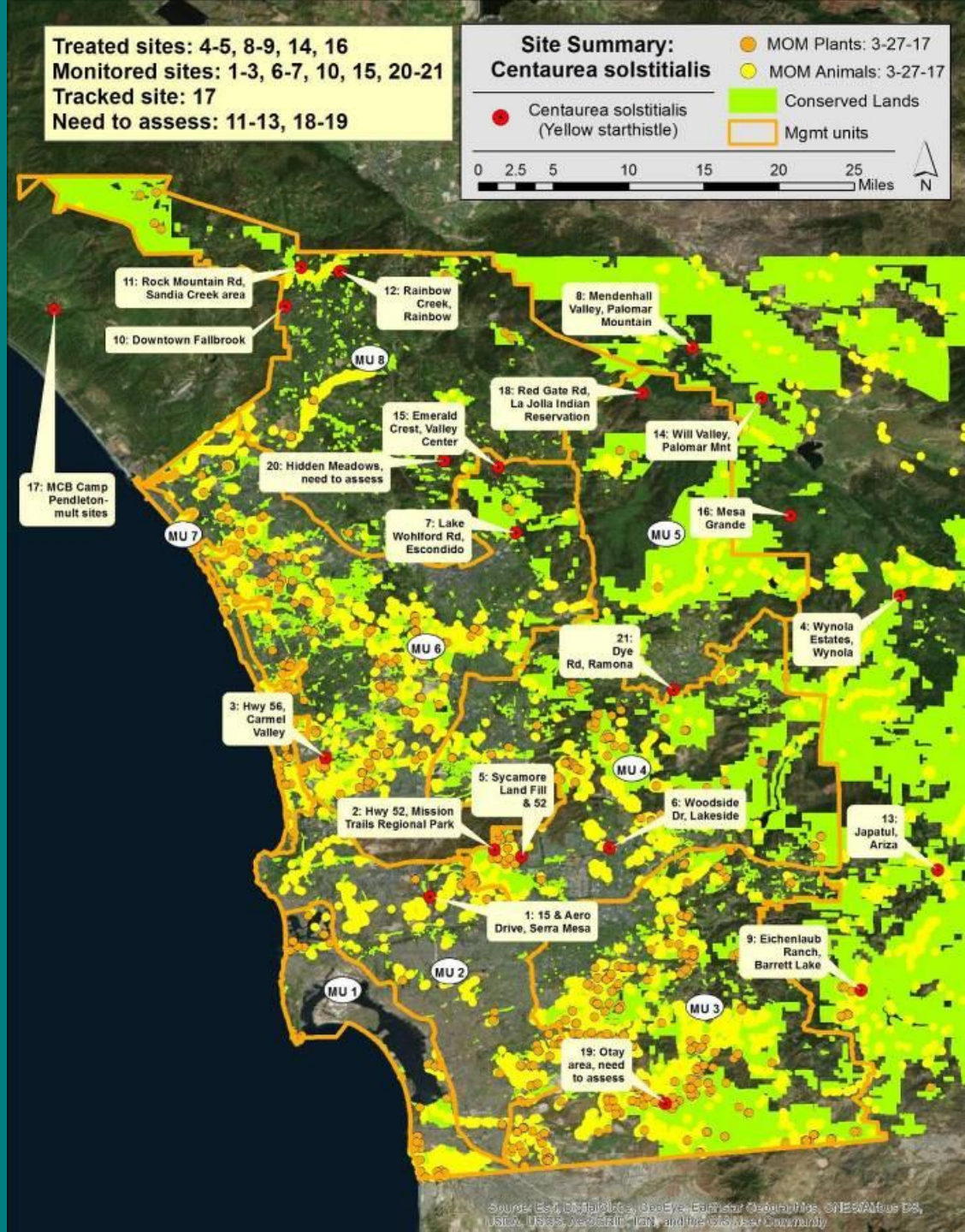
Centaurea solstitialis: Yellow star thistle

20 sites:
6 under treatment,
8 eradicated, 1 track,
5 assess

Regional control achievable, but re-introduction likely.



Centaurea solstitialis: Yellow star thistle

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): tocalote (*Centaurea mellitensis*)

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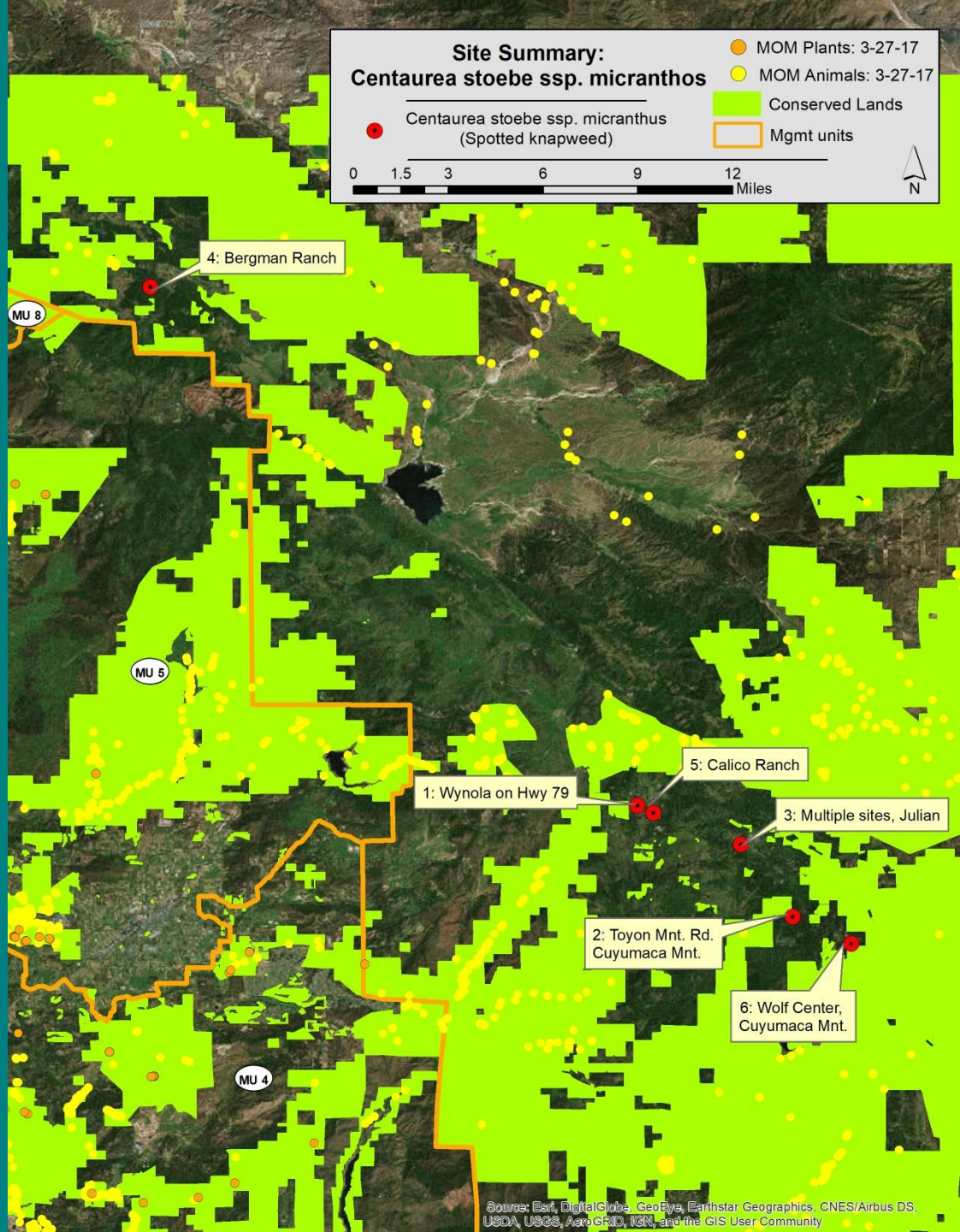
Centaurea stoebe ssp. *micranthos*: Spotted knapweed

6 sites:
3 under treatment,
3 eradicated

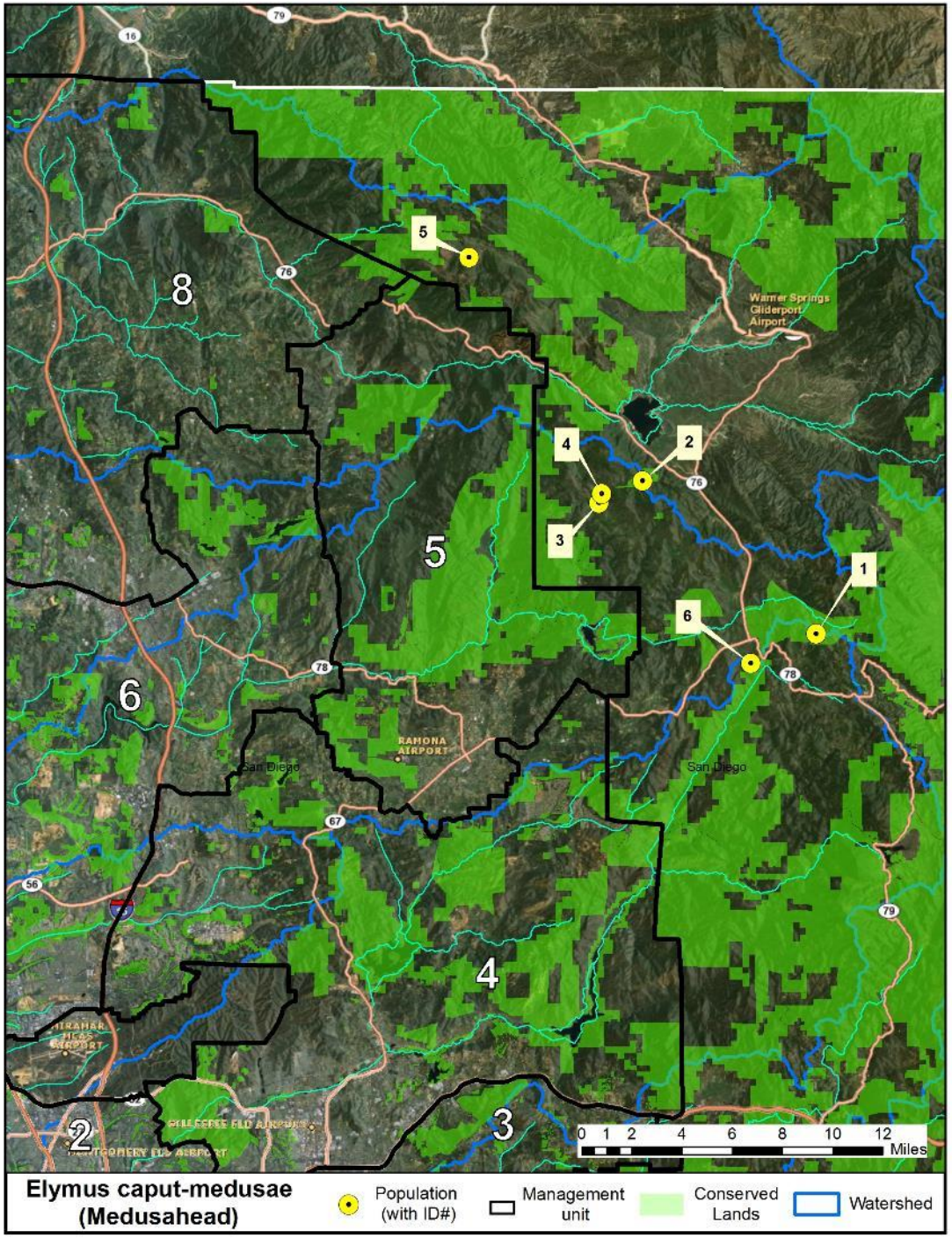
Eradication achievable



Elymus caput-medusae: Medusahead

6 sites:
3 under treatment

Eradication achievable?



Invasive Non-Native:
Medusa head
(*Elymus caput-medusae*)

Description: Annual grass, stems up to 70cm, inflorescence spike-like, dense; patches of green plants with inflorescences are 'shiny' looking, long awns, seedheads do *not* disarticulate (break apart).

Ecology: Invades disturbed sites, grasslands, openings in chaparral and oak woodlands. Persists as a dense litter layer that prevents germination and survival of native species, ties up nutrients, and contributes to fire danger.

Similar to: (see back)

Report sightings to: edrrsd@gmail.com and database at www.Calflora.org

Plants **SIMILAR TO**:
Medusa head (*Elymus caput-medusae*)

Bobtail barley (*Hordeum intercedens*) non-native

Foxtail barley (*Hordeum jubatum*) non-native

Squirrel tail grass (*Elymus elymoides*) native, *perennial*

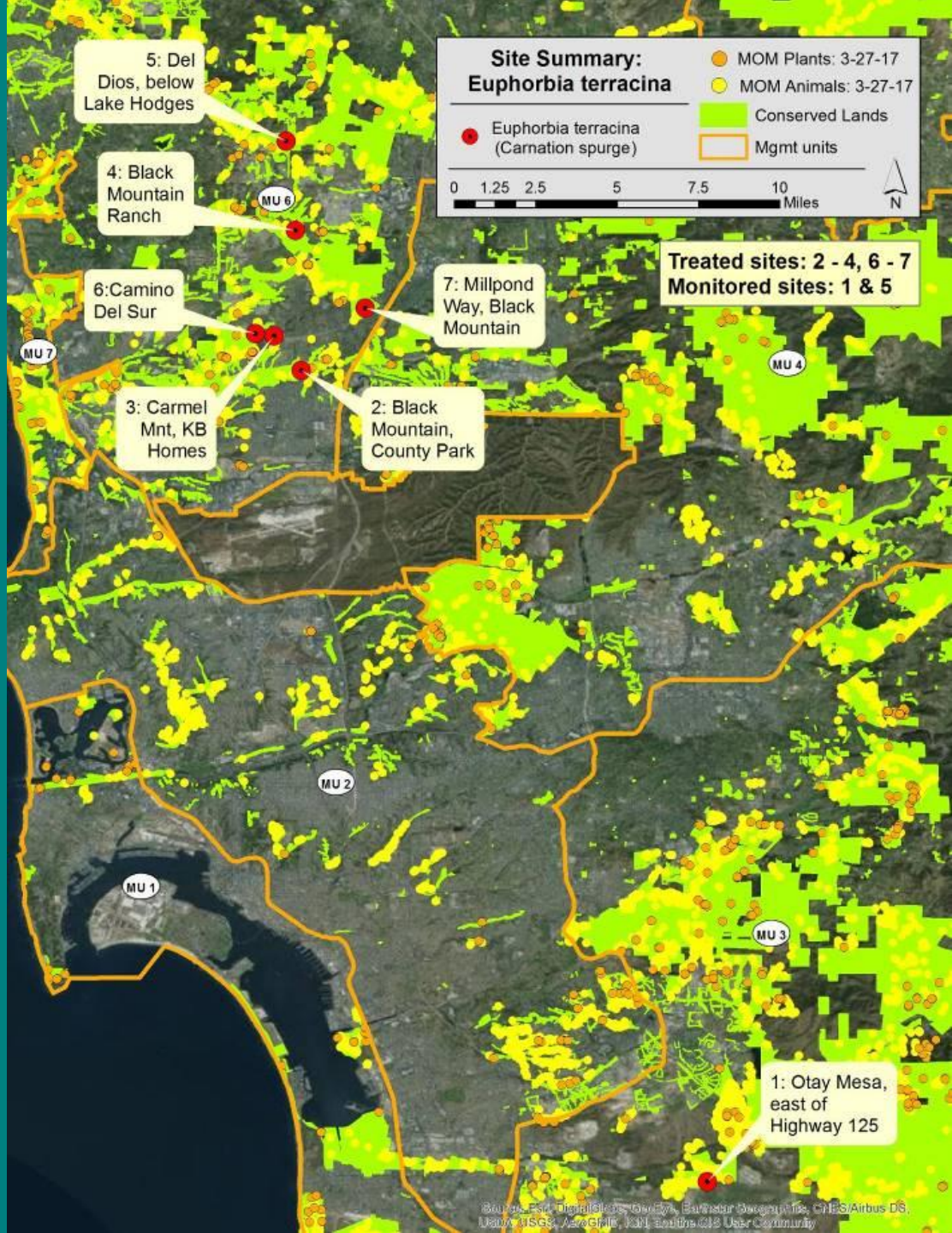
Enchylaena tomentosa; Ruby Saltbush

Two sites:
National City (large)
Lakeside (small?)

Euphorbia terracina: Carnation spurge

7 sites:
5 under treatment,
1 tracked, 1 eradicated

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

Report sightings to: edrrsd@gmail.com and database at www.Calflora.org

Plants **SIMILAR TO**:
Carnation spurge (*Euphorbia terracina*)

Leafy spurge (*Euphorbia virgata*): (**non-native** - see other ID sheet: PLEASE MAP). Erect perennial, several stems from base 3-8dm, sessile leaves 2-6cm (thinner and strap-like), fruit lobed, but not as deeply *as E. terracina.*

Caper spurge (*Euphorbia lathyris*): (**non-native**) usually has one main stem (vs. multiple), the lower parts the stem have relatively large (50-160 mm long) and narrow (i.e. linear or oblong) leaves that are oppositely arranged (vs. alternate in *E. terracina*)

Wartweed (*E. helioscopia*): (**non-native**) a relatively small and short-lived (i.e. annual) herb (up to 50 cm tall) with one or occasionally more main stems. The lower parts of these stems have relatively small (10-40 mm long) and egg-shaped (i.e. ovate) or spoon-shaped (i.e. spathulate) leaves that are alternately arranged.

Petty spurge (*E. peplus*): (**non-native**) small and annual herb (up to 40 cm tall) that usually has a single main stem. The lower parts of this stem have small (5-25 mm long) and egg-shaped (i.e. ovate) leaves that are alternately arranged.

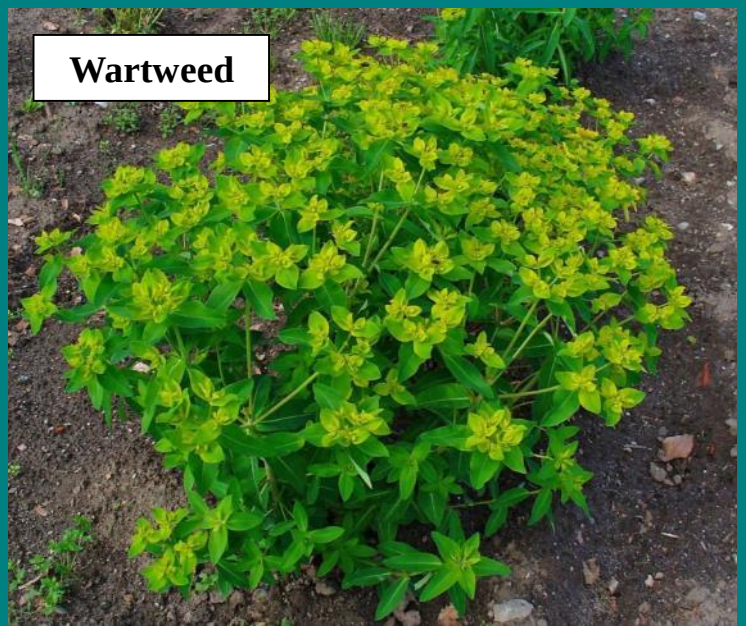
Leafy spurge

EDRR target- PLEASE MAP!

Images by Jason Giessow

Caper spurge

Images by Neal Kramer



Wartweed

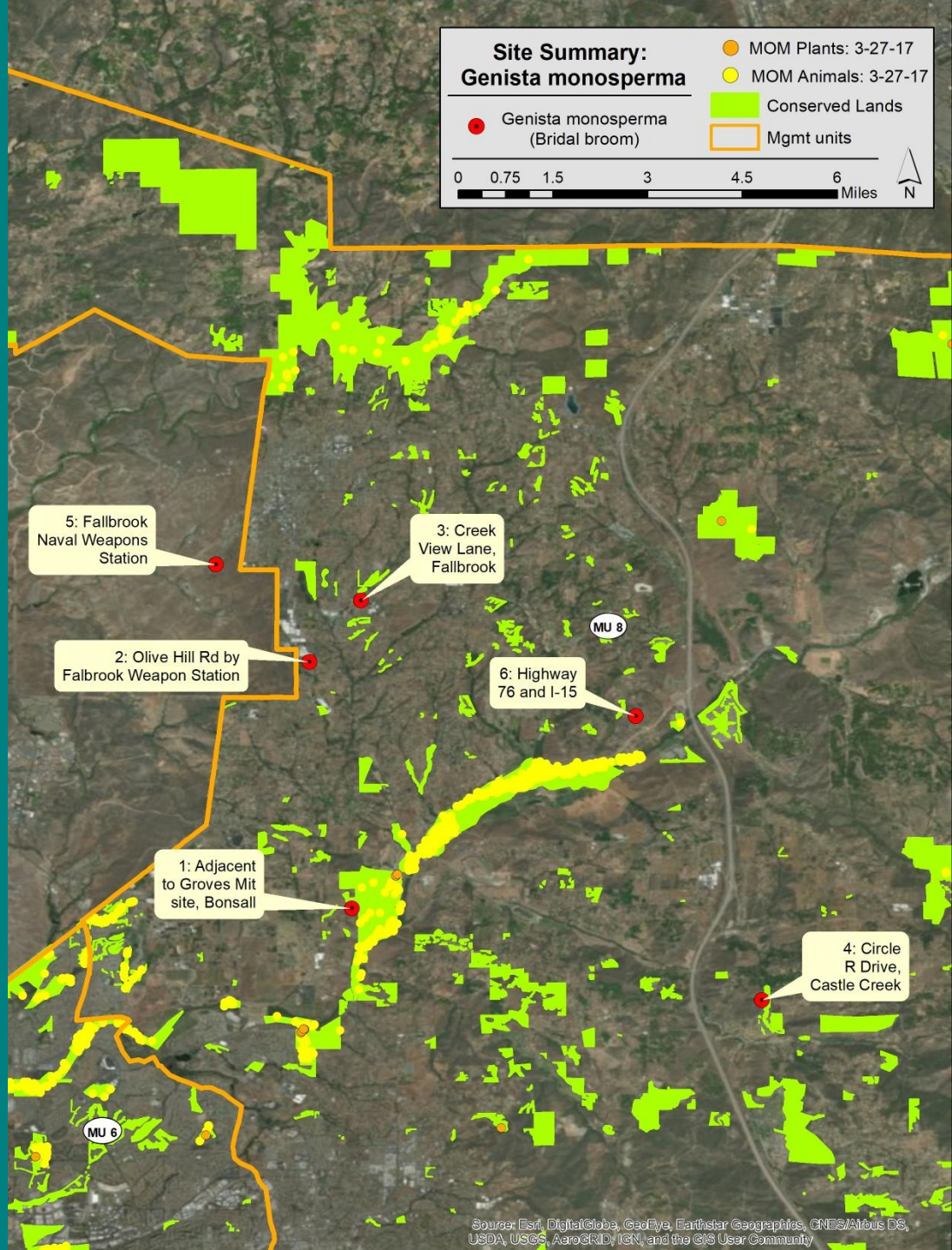
Petty spurge

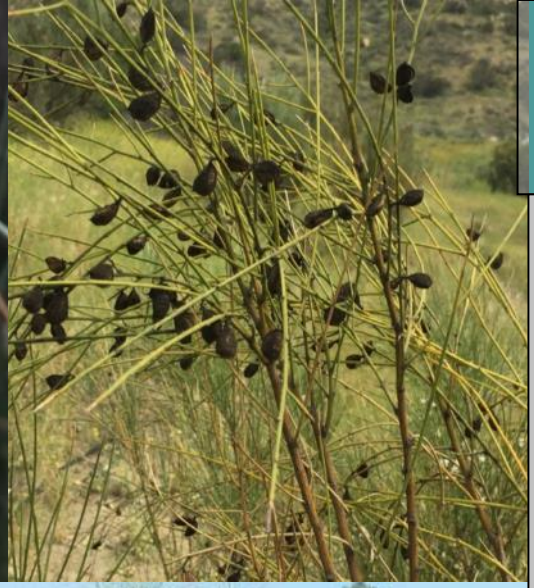
Image by Rasbak

Genista monosperma: bridal broom

7 sites:
5 under treatment,
2 sites monitored
(appear non-invasive old cut flower groves)

Eradication challenging but realistic if re-treatments continue (long lived seedbank)





Invasive Non-Native:
Bridal broom
(*Genista monosperma*)

Description: perennial shrub to 4m, stems green and silky-hairy in youth, pendent branches, leaves small, simple and ephemeral (mostly appears leafless), white flowers, 1-2 black seeds from indehiscent pod.

Ecology: Disturbed areas, grasslands, coastal sage scrub.

Similar to: yellow flowering broom species (Scotch, French) when not blooming – bridal broom is taller, more upright and with a 'cleaner' wispy look. Also Mexican palo verde (blooms yellow).

seedlings

All photos Jason Giessow

Report sightings to: edrrsd@gmail.com and database at www.Calflora.org

Hypericum canariense: Canary Island St John's Wort

13 sites:
9 under treatment

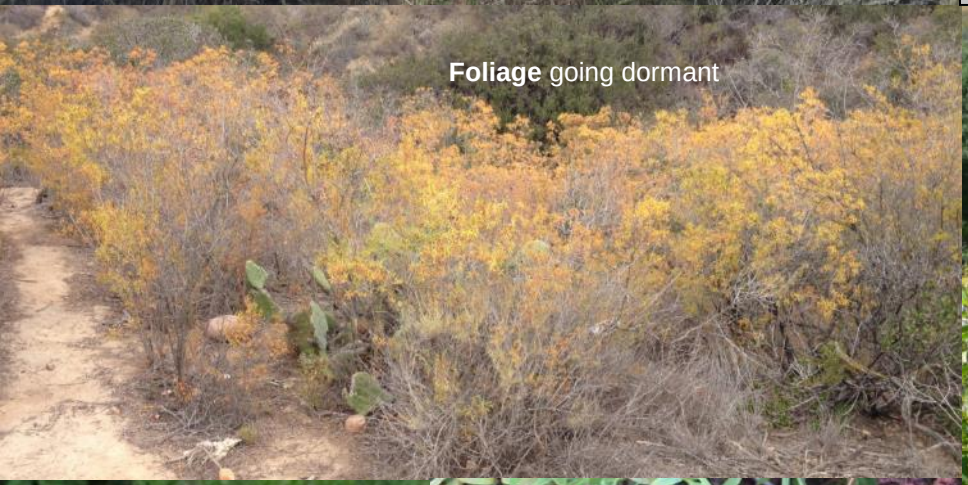
4 sites left to start on

Eradication seems feasible, but two sites very steep.

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

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.



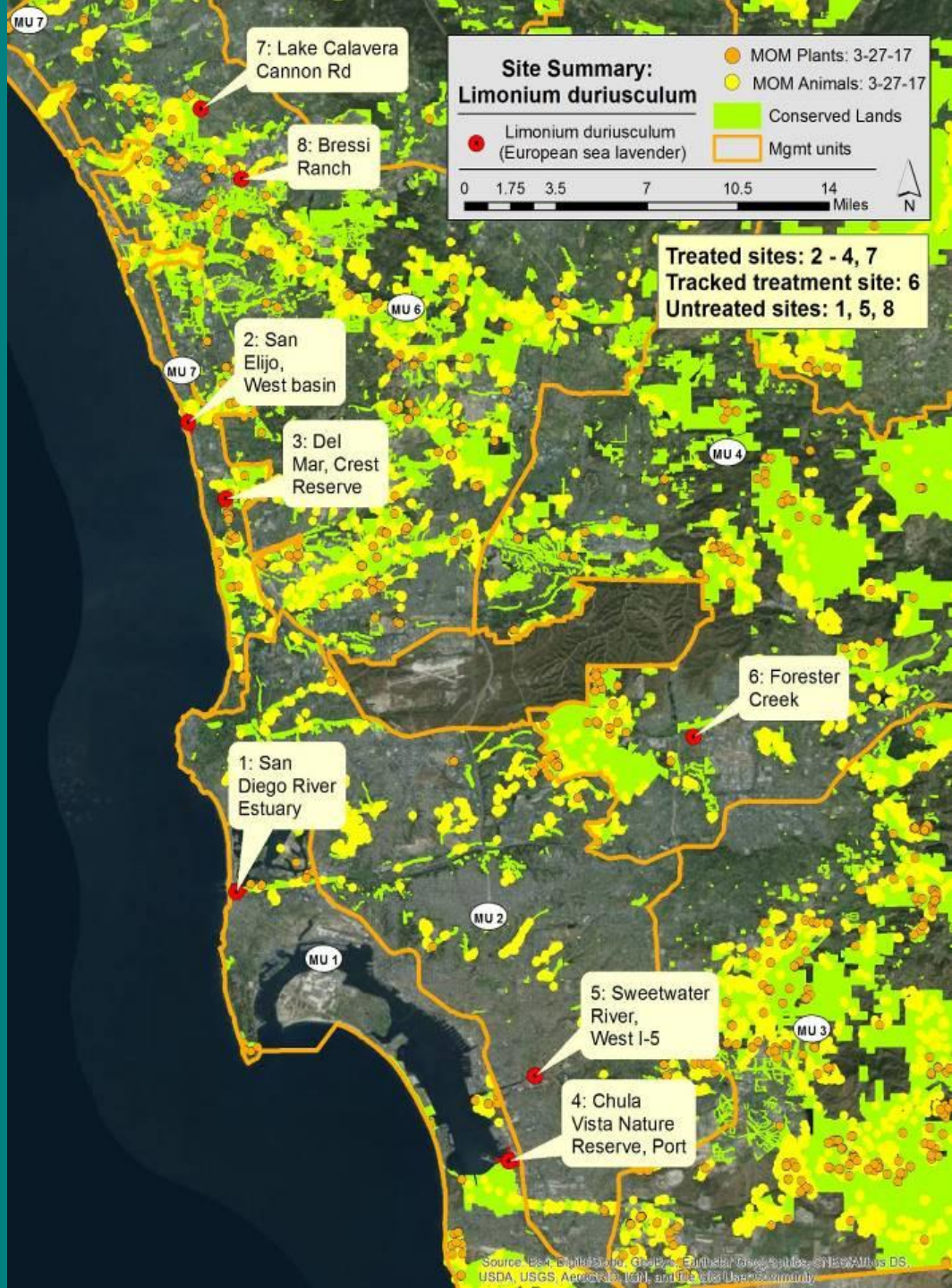
All photos Jason Giessow

Report sightings to: edrrsd@gmail.com and database at www.Calflora.org

Limonium duriusculum: European sea lavender

8 sites:
7 under treatment
(1 site partly)

Eradication may not be realistic on all watersheds (San Diego)



Invasive Non-Native:
European Sea Lavender
(*Limonium duriusculum*)

Description: perennial herb 6-12" (20-30 cm) tall in flower, lower leaves in dense rosettes ½ - 1 ½" (1-4 cm) long, 1/8 - ¼" (5-9 mm) wide, rounded. Flower: evenly distributed at branch tip, small < ¼" (7mm), pale pink .

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

Similar to (see back): Algerian sea lavender (non-native) has narrower leaves and flowers are closer together. 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.

Cal-IPC

Report sightings to: edrrsd@gmail.com and database at www.Calflora.org

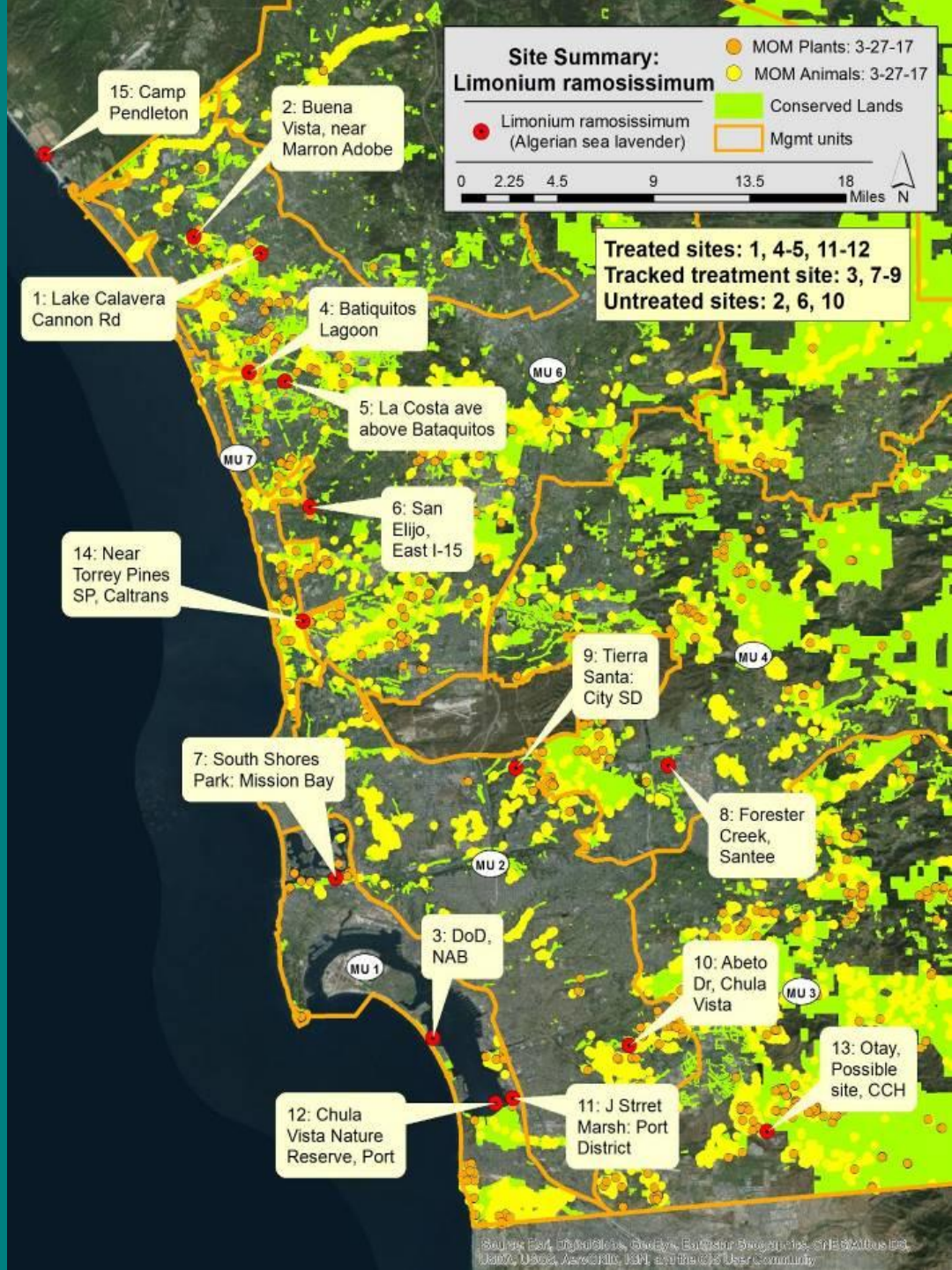
SCWRP

Chloropyron maritimum ssp. *maritimum*,
in growing with *L. duriusculum*

Limonium ramosissimum: Algerian sea lavender

15 sites:
5 under treatment, 4 tracked, 3 untreated

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, ¼–¾" (7-20 mm) wide, spoon shaped, tip acute to rounded. Flower: delicate multi-branched, tight clusters. Flower: calyx (outer flower part) white < ¼" (4-6mm), corolla (inner flower part) pale pink to purple < ¼" (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.

SCWRP

Report sightings to: eddrsd@gmail.com and database at www.Calflora.org

Cal-IPC

Found in Orange County: none known in San Diego

Santa Maria feverfew *(Parthenium hysterophorus)*

CNPS: Ron Vanderhoff

Sesbania punicea: Rattlebox

1 site:
1 under treatment,

Eradication realistic in region

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.

SCWRP

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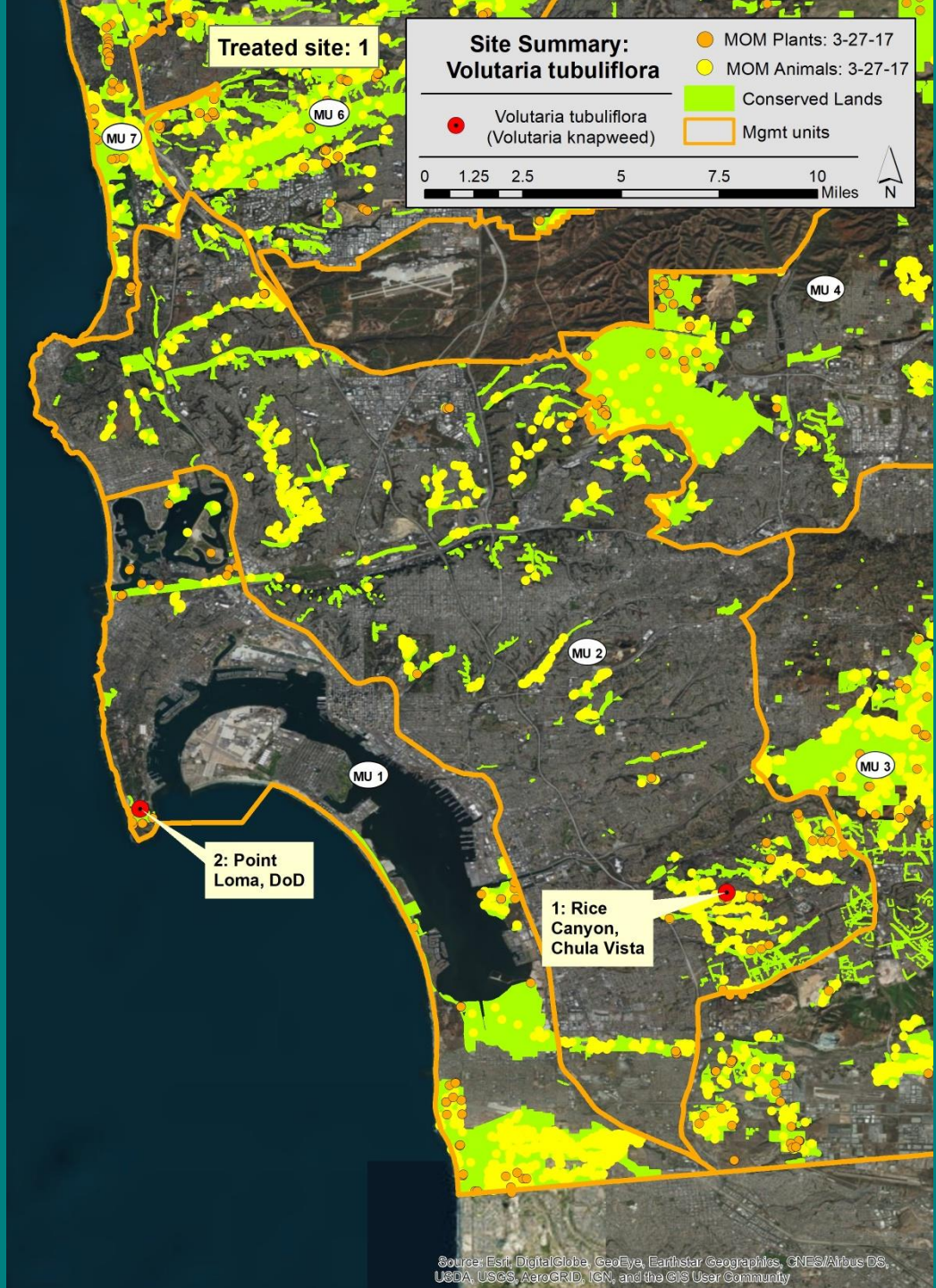
Cal-IPC

Volutaria tubuliflora: Desert knapweed

2 sites:
1 under treatment,
1 eradicated

Eradication realistic in region (Borrego Springs will be challenging)



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


Photo by Ron Vanderhoff


Photos by Tom Chester

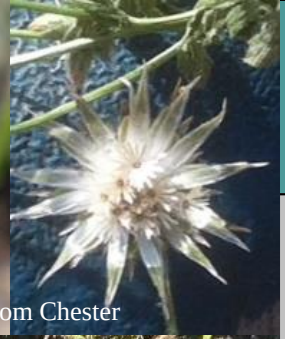



Photo by Jason Giessow

Description: Stem: < 15 dm. **Leaf:**1-2 pinnately lobed or divided, lobes +/- dentate, lobes angled forward. I**nflorescence:** 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


Photos by Ron Vanderhoff

Report sightings to: edrrsd@gmail.com and database at www.Calflora.org

Plants **SIMILAR TO**:
Volutaria knapweed (*Volutaria tubuliflora*)

Photo J. Zylstra

Tocalote

Tocalote *Centaurea melitensis* (**non-native**)
Annual 1-10dm, ± gray hairy, leaves entire to lobed, lobes perpendicular to leaf axis (not angled forward), 'winged' stems, yellow flowers, phyllaries tipped with stiff spines.

Spotted knapweed *Centaurea stoebe* (**non-native**)
Biennial 3-10dm, ± gray tomentose; leaves deeply 1-2 lobed, pink-purple flowers, NOXIOUS WEED – PLEASE REPORT

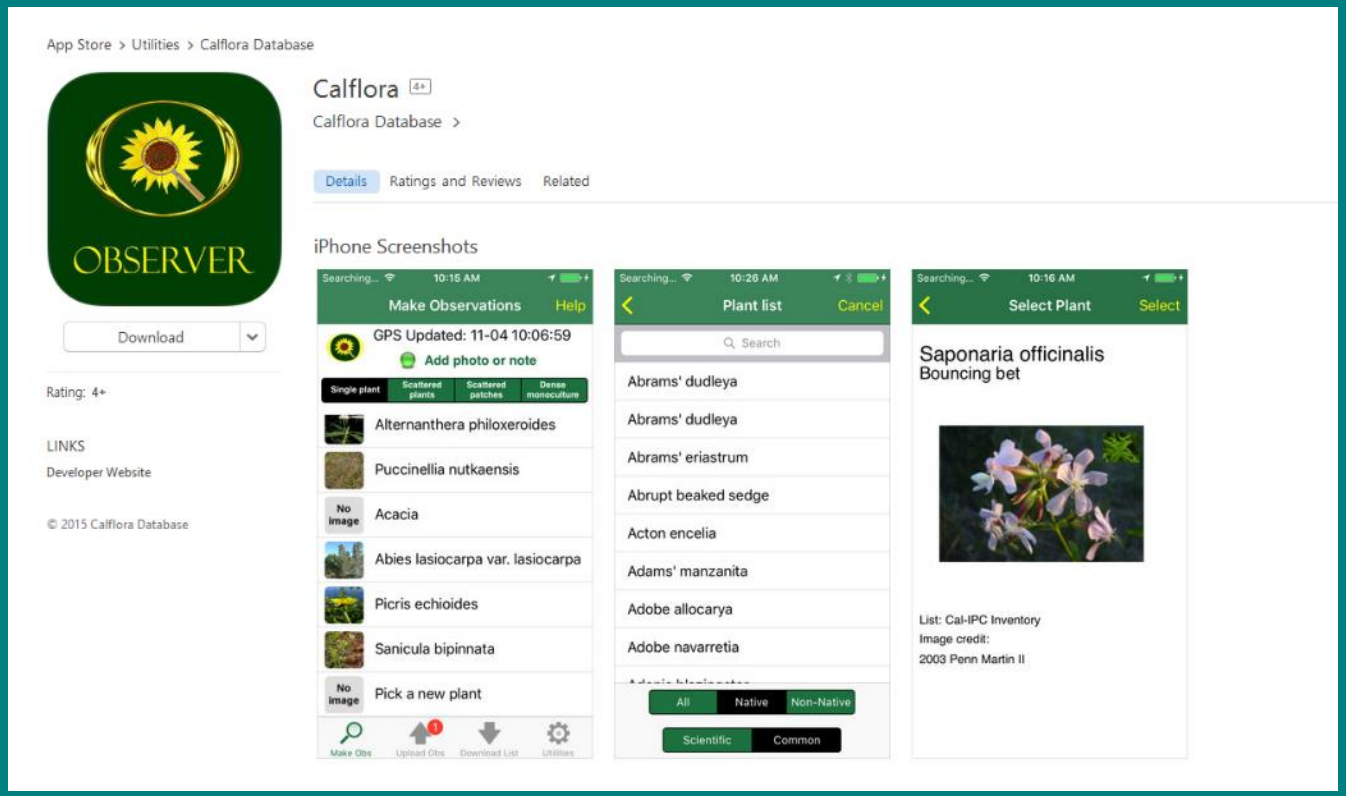
Photos Cabrillo Nat'l Monument

Spotted knapweed

Images by Neal Kramer

Reporting Weed Observations:

1) Email: jgiessow@cox.net, location and photo
2) Calflora: app or on-line
3) Submit sample to County AG or Natural History Museum
4) Soon the new SDMMP EDRR Invasive Plant Database



I don't know what this plant is- who can tell me? Drop it off at County AWM!

Plants and Insect IDs and pathogens….

COUNTY OF SAN DIEGO, DEPARTMENT OF AGRICULTURE, WEIGHTS AND MEASURES
9325 Hazard Way, Suite 100, San Diego, CA 92123-1217 www.sdcawm.org

Fee paid: $ _____

☐ Insect
☐ Nematode
☐ Plant ID
☐ Disease
☐ Other

SPECIMEN FOR DETERMINATION

- DIAGNOSIS IS BASED ON THE INFORMATION AND SAMPLE PROVIDED -

OWNER/CONSIGNEE: TELEPHONE:

MAILING ADDRESS: SAMPLE (A):

CITY, STATE, ZIP: SAMPLE (B):

EMAIL RESULTS TO: SAMPLE (C):

SAMPLE (D):

Location/Address where sample(s) found:

Please check which apply:

☐ Residential ☐ Landscape Maintenance ☐ Other:

☐ Nursery ☐ Commercial Grower

ENTOMOLOGY (INSECT):

☐ Alive ☐ Dead

Host(s)/Location found:

PLANT PATHOLOGY (DISEASE):

Grown in:

☐ Sun
☐ Shade
☐ Partial
☐ Greenhouse
☐ Shade house
☐ Indoor

Watering Schedule:

☐ Daily
☐ Weekly
☐ Monthly
☐ Only when it rains
☐ Other:

Planted on/in:

☐ Ground
☐ Container

Soil texture:

☐ Sand
☐ Loam
☐ Clay
☐ Decomposed granite
☐ Commercial soil mix

Soil drainage:

☐ Well drained
☐ Moderately drained
☐ Poorly drained
☐ Standing water
☐ Hardpan

Chemical/Fertilizers applied: Last applied: Rate/Dosage:

Describe problem/situation: