

***Phytophthora* species: life cycle, distribution, dispersal, impacts in California**



Ted Swiecki
Phytosphere Research

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 edrrsd@gmail.com and/or database at www.Calflora.org

Version 2018-11-13

Scientific name	Common name	Growth form	Habitat	Status	Populations (eradicated)	ID Sheet
<i>Ageratina adenophora</i>	Eupatory	Perennial forb	Riparian	Active EDRR target	4	Yes
<i>Aegilops triuncialis</i>	Barbed goat grass	Annual grass	Grassland	Active EDRR target	1	Yes
<i>Carrichtera annua</i>	Ward's weed	Annual forb	Uplands (shrub & grass)	Active EDRR target	3	Yes
<i>Centaurea solstitialis</i>	Yellow star thistle	Annual forb	Grassland	Active EDRR target	6 (12)	Yes
<i>Centaurea stoebe</i>	Spotted knapweed	Annual forb	Uplands	Active EDRR target	2 (3)	Yes
<i>Cytisus scoparius</i>	Scotch broom	Perennial shrub	Uplands (shrub & grass)	Eradicated: monitoring	(1)	
<i>Elymus caput-medusae</i>	Medusahead	Annual grass	Grassland	Active EDRR target	7	Yes
<i>Enchylaena tomentosa</i> *	Ruby saltbush	Perennial sub-shrub	Uplands (shrub & grass)	Assessing	3+	Yes
<i>Euphorbia terracina</i>	Carnation spurge	Annual forb	Uplands	Eradicated: monitoring	6	Yes
<i>Euphorbia virgata</i> *	Leafy spurge	Annual forb	Uplands	Active EDRR target	2	Yes (See ET)
<i>Genista monosperma</i>	Bridal broom	Perennial shrub	Uplands (shrub & grass)	Active EDRR target	4	Yes
<i>Genista monspessulana</i>	French broom	Perennial shrub	Riparian or uplands	Active EDRR target	5	Yes
<i>Hypericum canariense</i>	Canary Island St. John's wort	Perennial shrub	Shrublands	Active EDRR target	12	Yes
<i>Iris pseudacorus</i>	Yellow flag iris	Perennial monocot	Wetlands (fresh)	Assessing	9+	Yes
<i>Limonium duriusculum</i> *	European sea lavender	Perennial forb	Wetlands (salt & fresh) & uplands	Active EDRR target	8+	Yes
<i>Limonium ramosissimum</i> *	Algerian sea lavender	Perennial forb	Wetlands (salt & fresh) & uplands	Active EDRR target	14+	Yes
<i>Lythrum salicaria</i>	Purple loosestrife	Perennial forb	Wetlands (fresh)	Active EDRR target	2	Yes
<i>Myoporum acuminatum</i>	Waterbush	Perennial shrub	Riparian or uplands	Assessing	2	Yes
<i>Pentameris airoides</i> *	Annual pentaschistis	Annual grass	Grasslands?	Active EDRR target (DoD)	1	
<i>Senecio quadridentatus</i> *	Cotton burnweed	Annual forb	Grasslands	Active EDRR target (DoD)	1	
<i>Sesbania punicea</i> *	Rattlebox	Perennial shrub	Wetlands (fresh)	Active EDRR target	1	Yes
<i>Volutaria tubuliflora</i> *	Volutaria knapweed	Annual forb	Uplands (shrub & grass)	Active EDRR target	2	Yes

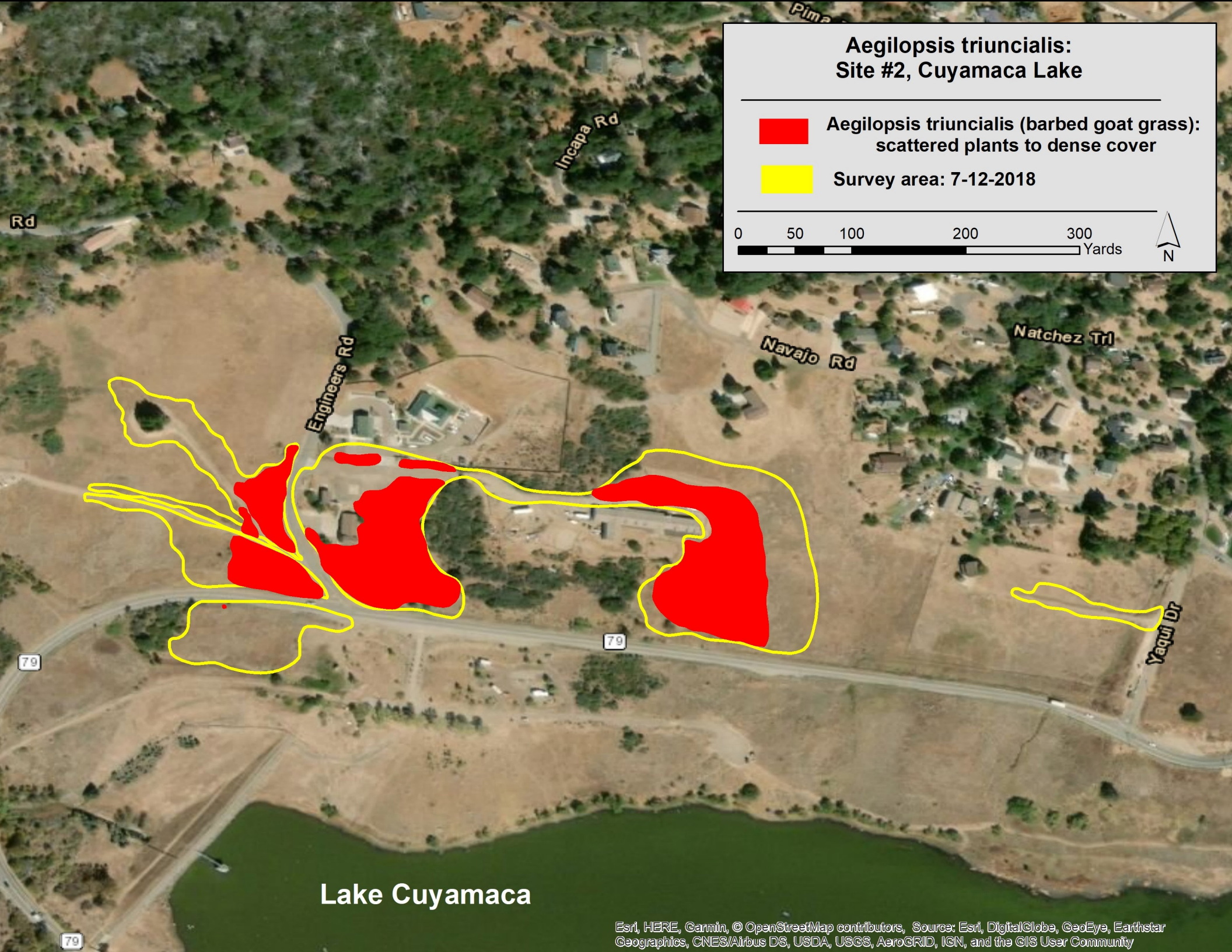
* Species is being reviewed and added to SDMMP program or being assessed.

**Aegilopsis triuncialis:
Site #2, Cuyamaca Lake**

 **Aegilopsis triuncialis (barbed goat grass):
scattered plants to dense cover**

 **Survey area: 7-12-2018**

0 50 100 200 300
Yards



Lake Cuyamaca

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



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, inflorescence 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.



Three-awned goat grass

© Biopix: JC Schou



Joanna Clines

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)



CDFA



Joanna Clines



CDFA



Medusa head



Squirrel tail grass

Matt Below

Keir Morse

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**



Foxtail barley

Jean Pawek

Louis Landry



Bobtail barley

Neil Kramer

Gary Monroe



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

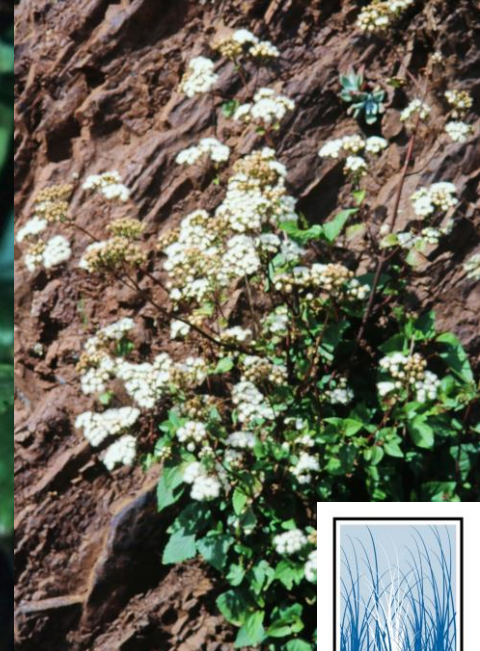
Description: perennial herb or subshrub, woody base, 2-5 ft (.6-1.5m) tall. Opposite leaves 1-4" (3-10cm). Stems: purple, glandular hairy. Flowers: composite, flower head all discoid flowers (no ray flowers) ¼" (6mm) across, clustered in groups, individual flowers 1/16-1/8" (<5mm) across, white or pink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



Photos © Joe DiTomaso



Cal-IPC

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

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 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*)



Montana Weed Control Association



Steve Dewey, Utah State University



Montana Weed Control Association



Yellow star thistle

Tocalote

Plants **SIMILAR TO:**
 Yellow star thistle (*Centaurea solstitialis*)

Tocalote *Centaurea mellitensis* (non-native)

Annual 1-10dm, \pm gray hairy, leaves entire to lobed, lobes perpendicular to leaf axis, 'winged' stems, yellow flowers, phyllaries tipped with stiff spines that are much shorter than yellow star thistle. **Spines are flat and do not look like toothpicks.**



Tocalote



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.



Jean Pawek



Zoya Aculova



Jean Pawek




Richard Spellenberg





Site: #1, Euclid Ave, National City
Enchylaena tomentosa glabra

 *Enchylaena tomentosa glabra*
(Ruby salt bush)

 MOM: 10-08-14

 FWS: Flora

 FWS: Fauna

 Conserved Lands

 Parcels (58)

0 0.05 0.1 0.2 0.3 0.4 0.5 0.6
Miles



Invasive Non-Native:
Ruby saltbush
(*Encchylaena tomentosa*)



Description: Sub-shrub with procumbent or ascending pubescent, trailing branches which may grow to 1m long. Up to 1m height. Evergreen leaves are cylindrical, semi-succulent, up to 2 cm long, and covered with fine white hairs - giving an overall grey appearance. Flowers green and insignificant. Showy, small (5mm diameter) fruits are red when ripe.

Ecology: Disturbed areas

Similar to: Possibly some *Atriplex* species, but succulent-like leaves with fruits are quite distinctive



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

Leafy spurge



EDRR target- PLEASE MAP!



Images by Jason Giessow

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. spatulate) 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.



Caper spurge



Images by Neal Kramer

Wartweed



Petty spurge

Image by Rasbak

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).



All photos Jason Giessow

Invasive Non-Native:
French Broom
(*Genista monspessulana*)

Description: large, evergreen, woody shrub up to 9 feet (3m) tall.
Leaves: small < ½" (1cm), compound leaflets in groups of three.
Flower: small, < ¼" (6mm), yellow, 1-2 per axil.

Ecology: occurs in a variety of habitats from disturbed to undisturbed areas, coastal scrub, oak woodlands, riparian corridors and open forests.

Similar to (see back): Spanish broom (non-native) large shrub with deciduous leaves and 1" (3cm) yellow flowers. Scotch broom (non-native) large shrub with deciduous leaves and 1" (3cm) yellow flowers. Deerweed (native) short-lived perennial < 2 ft (.6m) tall with smaller yellow-orange-red flowers.



All Photos © Joe DiTomaso



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





Foliage bright green



Foliage going dormant



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



12: DoD, NAB

10: Abeto Dr, Chula Vista

Country Vistas Ln, Chula Vista

11: Chula Vista Nature Reserve, Port

Telegraph Canyon Rd, Chula Vista

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

Algerian sea lavender



Plants **SIMILAR TO:**
European Sea Lavender (*Limonium duriusculum*)

Algerian sea lavender (*L. ramosissimum*): (**non-native**) has spoon shaped leaves and flowers are tightly clustered along inflorescence tip (see other ID sheet: PLEASE MAP).

Perez's sea lavender or statice (*L. perezii*): (common **non-native** used in landscaping) large plants with longer, wider, & bright green leaves 1½–6" (4–15 cm) long, 1–3" (2.5–7 cm) wide, large showy flower clusters.

California sea lavender (*L. californicum*): (native) overall about twice the size of Algerian SL, has larger longer leaves, blade 2–6" (5–15 cm) long, ½–2" (1.5–6 cm) wide, and very spatulate (narrow then abruptly wider). Flowers small and delicate like Algerian sea lavender, but corolla blue.



Perez's sea lavender or statice



California sea lavender (native)





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.

Photo • Gavin Archibald





European sea lavender



Plants **SIMILAR TO:**
Algerian Sea Lavender (*Limonium ramosissimum*)

European sea lavender (*L. duriusculum*): (**non-native**) has smaller more rounded leaves and flowers are evenly spaced along branch (see other ID sheet: PLEASE MAP).

Perez's sea lavender or statice (*L. perezii*): (common **non-native** used in landscaping) large plants with longer, wider, & bright green leaves 1½–6" (4–15 cm) long, 1–3" (2.5–7 cm) wide, large showy flower clusters.

California sea lavender (*L. californicum*): (native) overall about twice the size of Algerian sea lavender, has larger longer leaves, blade 2–6" (5–15 cm) long, ½–2" (1.5–6 cm) wide, and very spatulate (narrow then abruptly wider). Flowers small and delicate like Algerian sea lavender, but corolla blue.



Perez's sea lavender or statice



California sea lavender (native)





Anne Jones

Invasive Non-Native:
Waterbush, boobialla
(Myoporum acuminatum)

Description: Shrub or small tree, 3-4m ht, 2-3m spread; coarsely fissured bark; Leaves alternate, 3 to 14 cm long with a fine point; Flowers with five white petals and some purple dots, in clusters from the leaf axils; Fruit is a roughened, wrinkled globular drupe, around 5 mm in diameter, blue or purple in color.

Ecology: Riparian and upland habitat

Similar: Ngaio tree (*Myoporum lateum*), See back.



Ramona Robison



Yonatan Matalon



Consulta Planta



Neil Kramer

Myoporum laetum, Ngaio tree



Plants **SIMILAR TO:**
Strichnine bush (*Myoporum acuminatum*)

Ngaio tree (*Myoporum laetum*) (non-native) shrub/small tree 3-10m, leaves <10cm, bright green; very similar in flower and fruit but leaves are wider and not as finely pointed



James Bailey



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 DiTomaso

False indigo (native)



Will Cook

Plants **SIMILAR TO:**

Red Sesbania, rattlebox (*Sesbania punicea*)

False indigo (*Amorpha fruticosa*) (native) shrub, strong smelling foliage, dark purple flowers, deciduous

Cassia/senna (*Cassia & Senna* spp.): (non-native) yellow flowered trees and shrub, generally with long seed pods

Black locust (*Robinia pseudoacacia*): (non-native) tree with white flowers and obvious spines on stem



Cassia/Senna

Black locust



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

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 Ron Vanderhoff



Photos by Tom Chester



Photo by Jason Giessow



Photo by Jason Giessow



Photos by Ron Vanderhoff



Tocalote



Photo J. Zylstra

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

Tocalote *Centaurea melitensis* (non-native)

Annual 1-10dm, \pm 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 maculosa* (non-native)

Biennial 3-10dm, \pm gray tomentose; leaves deeply 1-2 lobed, pink-purple flowers, **NOXIOUS WEED – PLEASE REPORT**



Spotted knapweed

