

# OVERCOMING CHALLENGES: MANAGING THE HIGHLY INVASIVE VOLUTARIA ACROSS CALIFORNIA



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Photo: Ron Vanderhoff

# VOLUTARIA

- First known contact:
- In February 2010, two botanists on a hike notice an unusual plant growing in Alcoholic Pass in ABDSP
- Returning later in the season the plant was missing
  - RT Hawke, Tom Chester



# TROUBLE BREWING

- April 2011 Anza Borrego Desert State Park field call to see an unusual plant
- Sparse abundance, spread out over few hundred acres, growing like a weed
- Asteraceae, likely centaurea group (Star thistles), none of us could ID it
- Our assessment “get rid of it”

# VOUCHERED LOCATIONS 2011



Over 1 mile apart

# GETTING OUT OF HAND

- Additional locations found in 2013



# NOMENCLATURE

- New to North America, how to correctly identify the species?
- Gerhard Wegenitz revised the genus *Volutaria*
- Photographs sent to him
- ID came back as *Volutaria canariensis*
- Canary Island Knapweed

RIP Dr. Wegenitz



# NOMENCLATURE

- Canary Island Knapweed
- Endemic to Canary Islands



# NOMENCLATURE

- In winter 2015, colleagues in Spain suggested our identification was incorrect



California



Tom Chester  
Ron Vanderhoff



Canary Islands



Jesús Palenzuela Borges  
<http://www.herbariumvirtual.com>



# NOMENCLATURE

Alfredo Reyes

Alfredo Reyes



Tom Chester  
Ron Vanderhoff

# NOMENCLATURE

- *Volutaria tubuliflora*
- Few people in the western hemisphere have ever seen this plant, how are we supposed to know the correct ID?



# VOLUTARIA



# SCATTERED POPULATIONS

Low density populations



# SEEDLINGS AT IRRIGATED SITE

High density populations



# ROSETTE











# FLOWERS



# *V. TUBULIFLORA* RANGE



# V. TUBULIFLORA LITERATURE

- In home range common along roadsides and dryland and irrigated agriculture
- Found in chaparral to deserts 4 to 16 in. precip.
- Recently arrived in Saudi Arabia, likely due to contaminated farming equipment
- From 6 in. to 5 ft. tall.
- It is a colonizer!



# *V. TUBULIFLORA* INVASION

- Invading Atacama Desert in Chile



# CHILE

- Spread 80 miles in approx. 30 years
- Hyper arid desert
- Vallenar 30 mm precip.
- Copiapo 20 mm



# NOMENCLATURE



White flowered forms match!

California



Chile



Sebastian Tellier

# RAPID ASSESSMENT

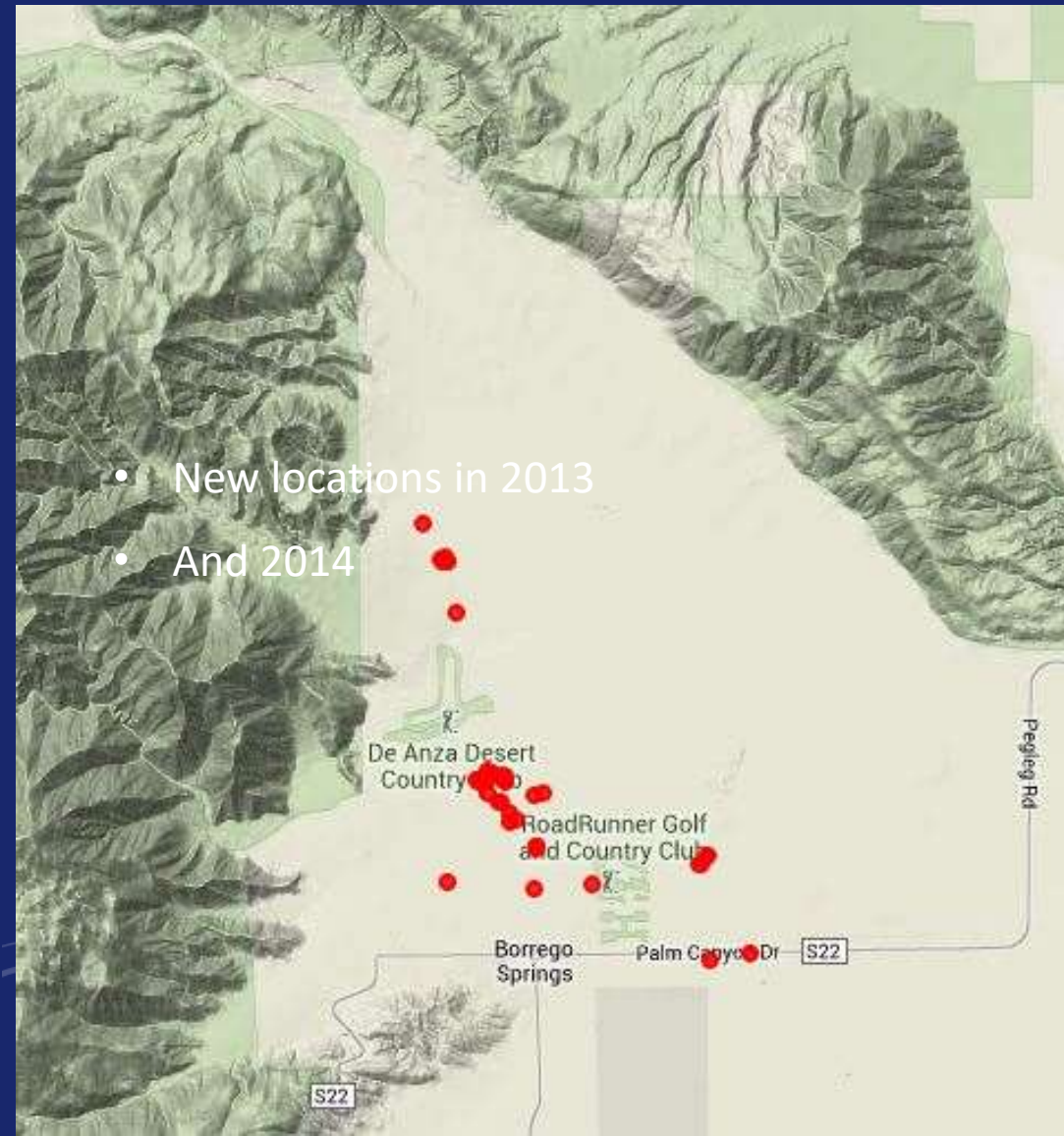
- Its spreading in Borrego Springs
- 6 miles from initial sighting to second infestation
- New infestations in 2013





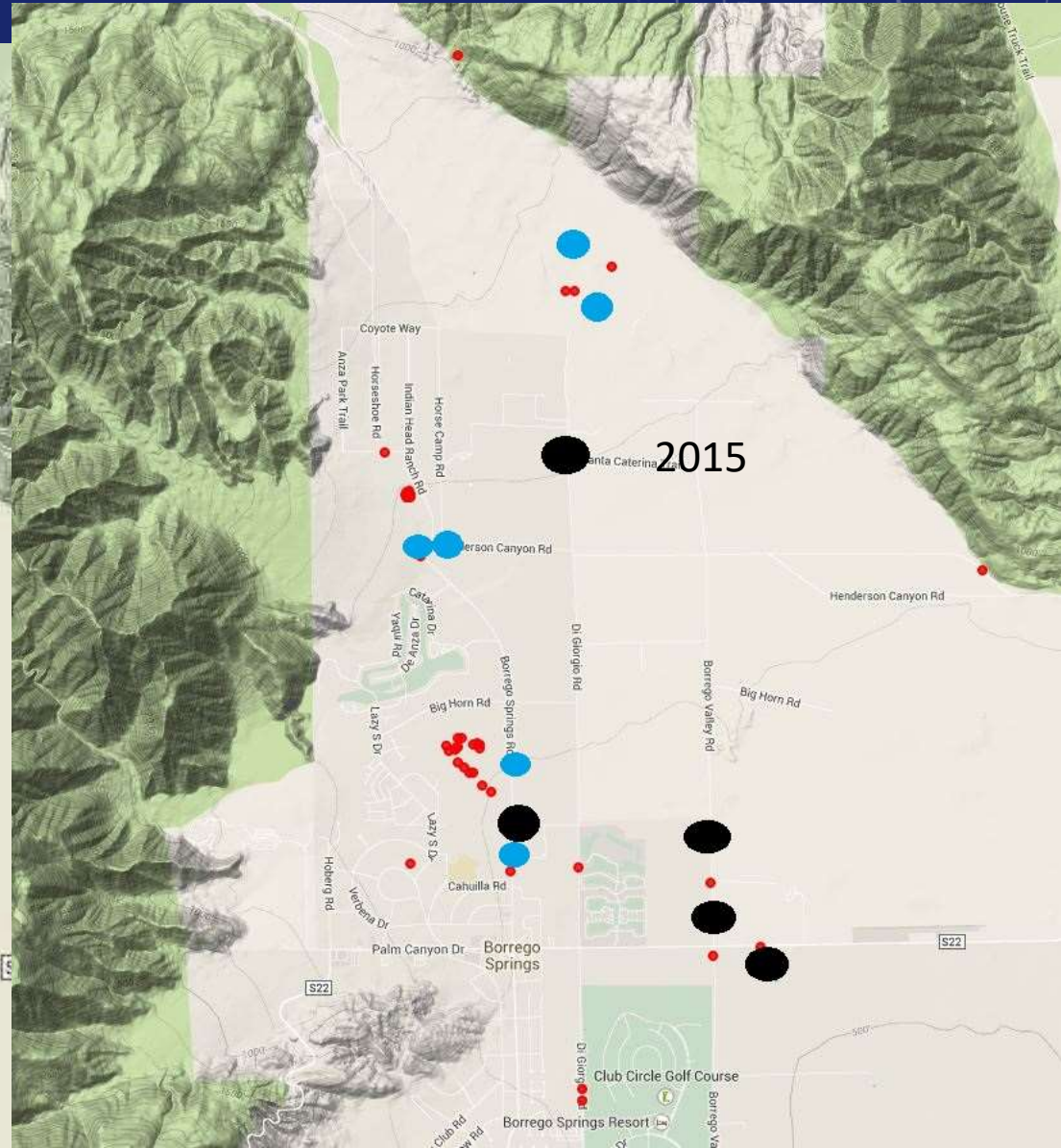
# DISTRIBUTION

- New locations in 2013
- And 2014

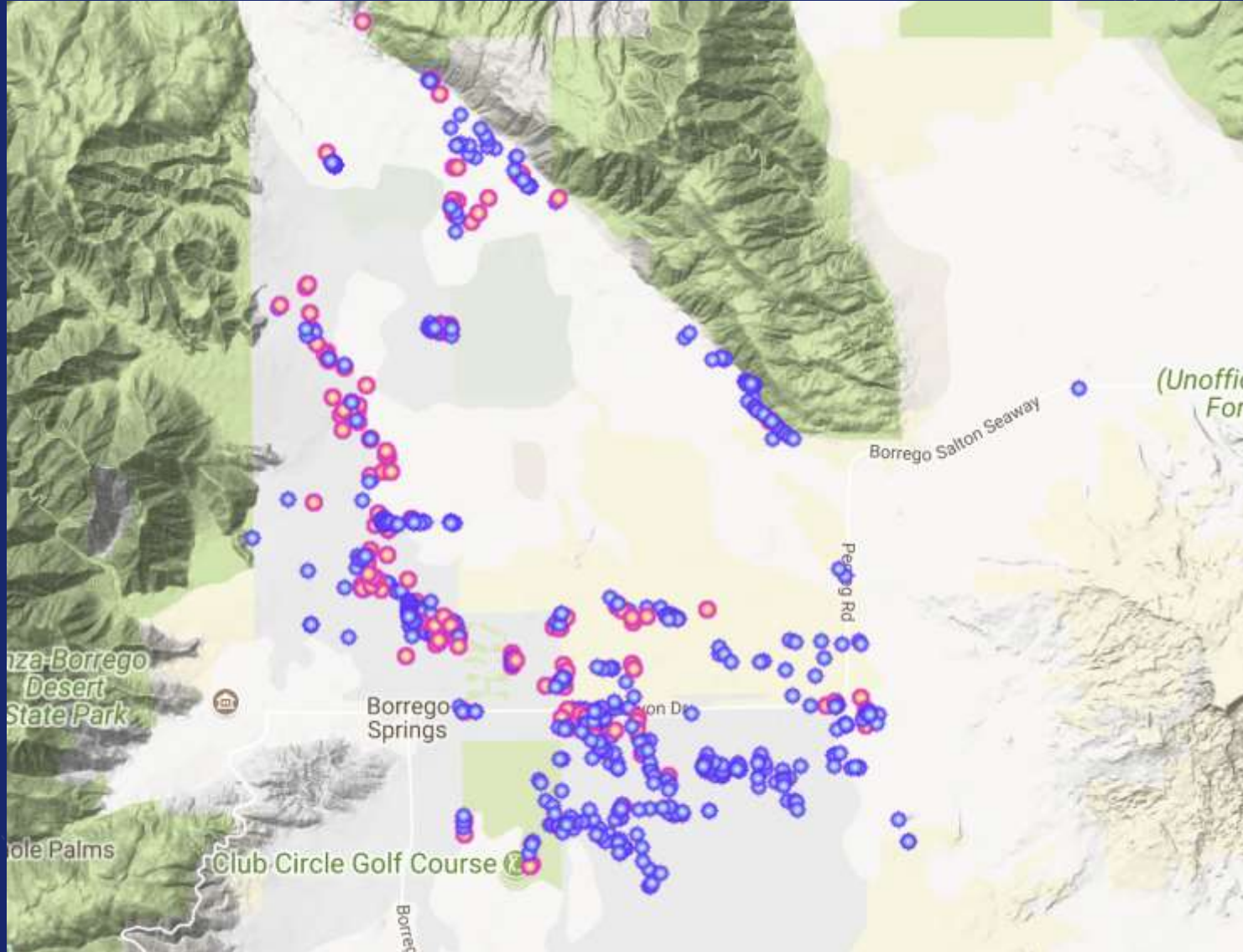


# DISTRIBUTION

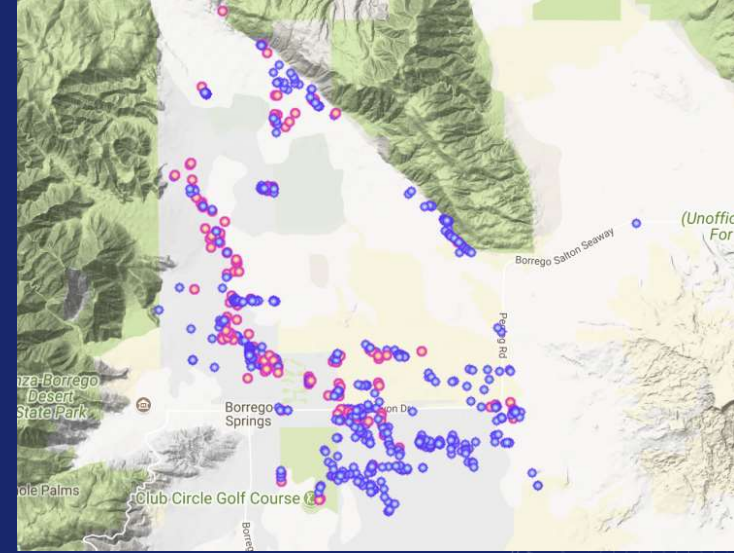
- New locations in 2013
- And 2014



# 2017 DISTRIBUTION



# LIMITATIONS



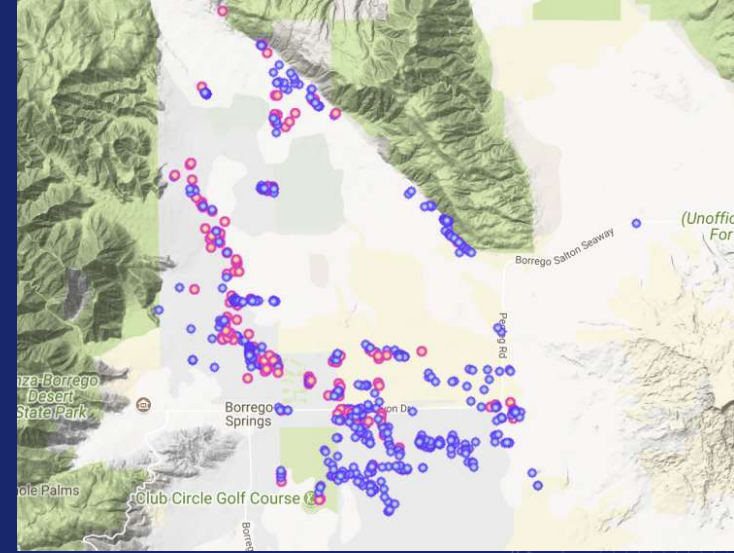
- Agencies cannot easily work across jurisdictions or private property
  - In Borrego Springs Sahara mustard and Volutaria Task Force
  - Volunteer run group interested in managing weeds in Borrego Springs

# PARTNERS

- Anza Borrego Desert State Park and ABF
- San Diego County Agricultural Commissioner
- Ca Dept. Food and Agriculture
- Borrego Springs Sahara Mustard and Volutaria Task Force
- Anza Borrego Desert Natural History Assn.
- UC Irvine
- UC Cooperative Extension
- BLM
- Local Landfill, nurseries, ag.
- And YOU!!??



# LIMITATIONS



- How to organize volunteers when working outside your property?
- Removals from private property?
  - Especially vacant landowners
- Funding removals from private property?

# FUNDING



- Cal-IPC led a team that applied for and received an \$80k grant from National Fish and Wildlife Foundation
- Funds go to:
  - Community outreach
  - Mapping the spread
  - Removal efforts (even on private property!)

# OUTREACH

## VOLUTARIA

A New and Noxious  
Plant Threatens  
Southern California

Volutaria (*Volutaria tubuliflora*) was first discovered in Borrego Springs in 2011. This is its first introduction to North America and Volutaria is spreading rapidly. A second population was found in 2014 in Newport Beach where it is also spreading quickly. If we want to protect native plants, wildlife, rangelands and agricultural areas in Southern California, then eradicating Volutaria from these two areas and locating any additional populations is a top priority.

In its native range in North Africa and the Mediterranean, Volutaria grows in disturbed areas, along roadsides, and in a variety of habitats from deserts, to coastal areas to shrub-dominated vegetation. In its home range it can also be a weed in agricultural areas. Volutaria was accidentally introduced to the Atacama Desert in Chile where it is also spreading. The Atacama Desert receives less rainfall than the California deserts, so it should spread well in our deserts too. If left unchecked, it is expected that Volutaria can invade a variety of plant communities in California and potentially move across the Southwest U.S.



A typical Volutaria flower, (about 1/2 in. wide) and a large Volutaria plant



A young Volutaria plant



Volutaria leaves

## VOLUTARIA

A New and Highly  
Invasive Plant in  
Borrego Springs

Volutaria (*Volutaria tubuliflora*) is a recently introduced and highly invasive

**Do not let this plant go to seed.** Remove any and all plants immediately and before they produce flowers. If the plant has produced flowers, securely place the plant in two trash bags (one bag inside the other) to prevent the seeds from spilling.

Increasing numbers of Volutaria plants have been found each year since its discovery. In 2015, 10,000 Volutaria plants were removed from Borrego Springs and 4,000 were removed from Newport Beach. If this invasive plant is not controlled it will continue to quickly spread.

Volutaria can germinate after it rains and during most of the year. Volutaria has germinated after monsoon rains or in irrigated areas in the summer. In coastal areas Volutaria can germinate during the fall and bloom from the winter to the spring. It typically germinates in winter and flowers 2-3 months after germination. It dies during the driest part of summer, surviving as seed in the soil continuing the cycle next year.

It has been observed that wildlife species do not eat this plant in large quantities. Several closely related species have low palatability, can cause allergic reactions or are toxic, particularly to horses. Be cautious with animals foraging on this species.

The seeds of Volutaria can remain dormant in the soil for several years, thus all infestations will need to be monitored for several years. Some seeds will remain dormant in the soil and can germinate throughout the winter and spring, and also in later years.

It was first reported in 2011 in Borrego Springs. It is a highly invasive plant that can germinate after it rains and during most of the year. Volutaria has germinated after monsoon rains or in irrigated areas in the summer. In coastal areas Volutaria can germinate during the fall and bloom from the winter to the spring. It typically germinates in winter and flowers 2-3 months after germination. It dies during the driest part of summer, surviving as seed in the soil continuing the cycle next year.

Report an infestation to the local land manager. If you report an infestation, you may be eligible for a reward. Report an infestation to the local land manager. If you report an infestation, you may be eligible for a reward.

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Volutaria plants can appear quite thick and round (far left); other individuals can be skinny and sparse (left).

Volutaria is in the sunflower family; however, the flowers do not look like daisies or sunflowers (below).

The top of the flower will have short white flower parts and only occasionally will long white petals be visible (see back page). It blooms from February to June.



Volutaria can produce several thousand highly mobile seeds per plant. While there is still time to eradicate this species from North America, without additional effort this may become a pest that reduces wildflowers, infests backyards, and could become a problem for tourism, growers and homeowners.



Volutaria plants are variable in size. They can grow to a mature plant that is 6 in. to over 5 ft. tall. Plants are usually 1-4 ft. tall.



Seedlings of this species are very small



# OUTREACH

ORANGE COUNTY CHAPTER OCCNPS.ORG CALIFORNIA NATIVE PLANT SOCIETY

## HAVE YOU SEEN THIS PLANT?

It is an Emergent Invasive in Orange County

### EGYPTIAN KNAPWEED

aka Moroccan or Mediterranean Desert Knapweed

### *Volularia tubulliflora*

[Known OC Sites & Status Updates](#)

**Distribution map & info:**

- [calflora.org/cgi-bin/species\\_query.cgi?where=calreconum=13055](http://calflora.org/cgi-bin/species_query.cgi?where=calreconum=13055)

**Can be confused with** *Volularia canariensis*, Canary Island Knapweed

Egyptian knapweed is an erect, openly branched, robust annual that grows from a soon-deciduous basal rosette. It grows best in disturbed ground & seasonally flooded sites, where it can grow to 3+ ft. high & wide. It forms a stout deep taproot & many fine, water-absorbing, surface roots.

It has become widespread in the Anza-Borrego area, & has recently been added to California's Noxious Weed List.




ORANGE COUNTY CHAPTER OCCNPS.ORG CALIFORNIA NATIVE PLANT SOCIETY

## EGYPTIAN KNAPWEED, P. 2

**IF YOU SEE THIS PLANT AT A SITE THAT'S NOT ON THE LIST:**

- Record the plant's location as exactly as you can (GPS coordinates if possible), the date you saw it, and an estimate of how many there were. Include the site's landowner or manager, if known.
- Take identifying photos: the whole plant & its surroundings, closeups of leaves, flowers & fruits/pods.
- If you take a sample, place it immediately into a sealed bag.
- To avoid spreading the plant, check your clothing and shoes thoroughly before leaving the area, and remove and bag all traces of seeds.
- Report the find immediately to [Invasives@occnps.org](mailto:Invasives@occnps.org).

Each plant produces roughly 2500 seeds. Seed are minute, barrel-shaped, with a crown of fine hairs that acts as a parachute for wind dispersal—allowing the plants to spread at a very high rate.



# TRAININGS

## Adding Volutaria Observations To CalFlora

Chris McDonald

[cjmcdonald@ucanr.edu](mailto:cjmcdonald@ucanr.edu)

Mason Hyland

[Mason.Hyland@parks.ca.gov](mailto:Mason.Hyland@parks.ca.gov)

Fill in Observation, type in name

Adding a new record

Organization:  Project:

Access by others:  History:  Date:

Plant Location:

MAP Layers

MAP

Scientific Name \*

Common Name

OR

Number of Photos:

Photos:

Add a photo

Scientific name Volutaria tubuliflora

Volutaria will bring up scientific name as well

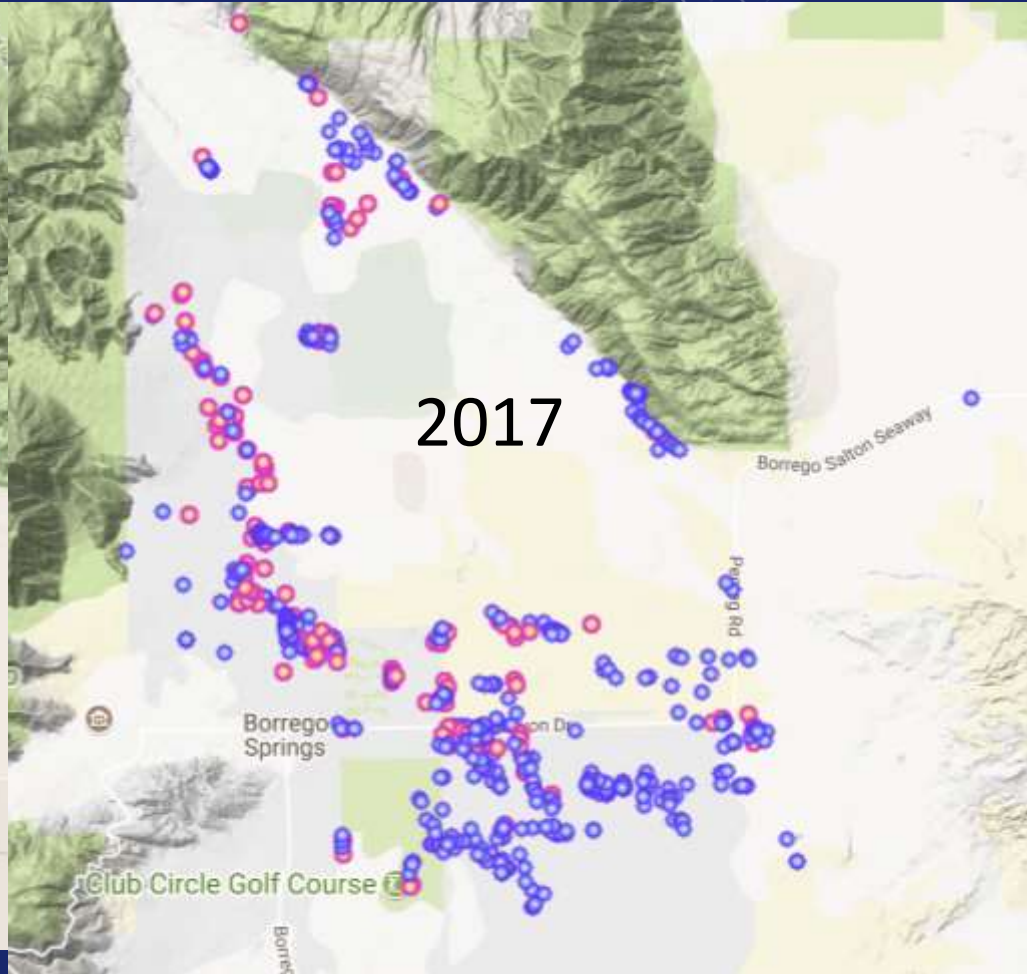
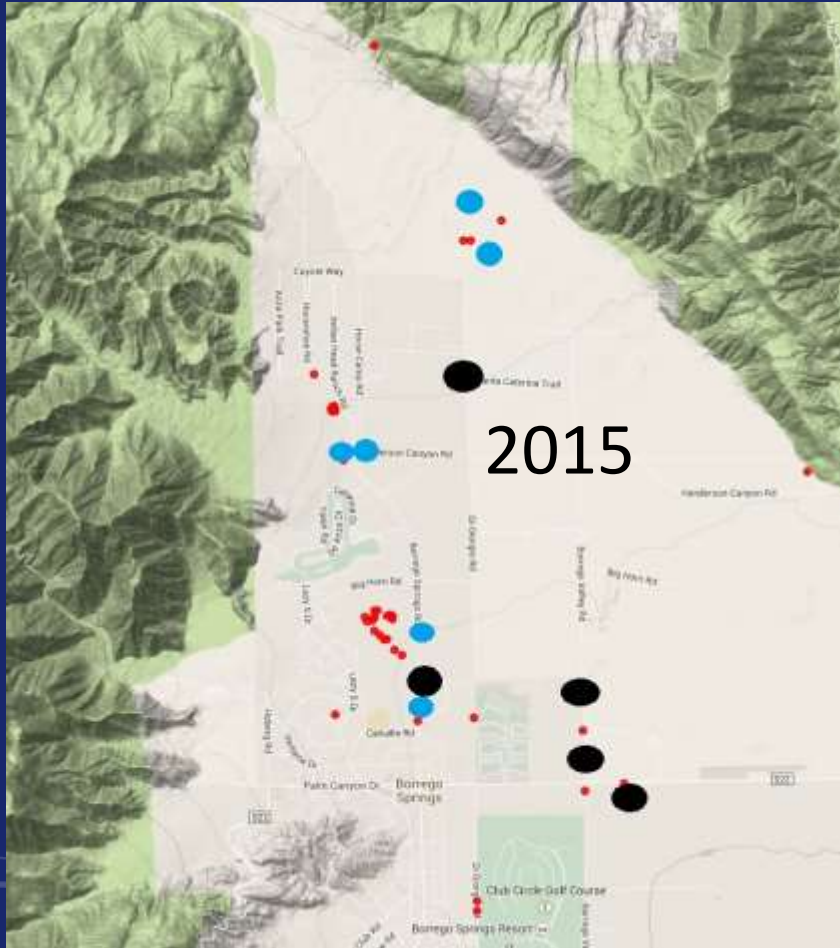
Common name Egyptian Knapweed, (but its from more places than just Egypt)

# OUTREACH

- Talks to the community in Borrego Springs
- Volunteer pulling days, Wednesdays and Thursdays

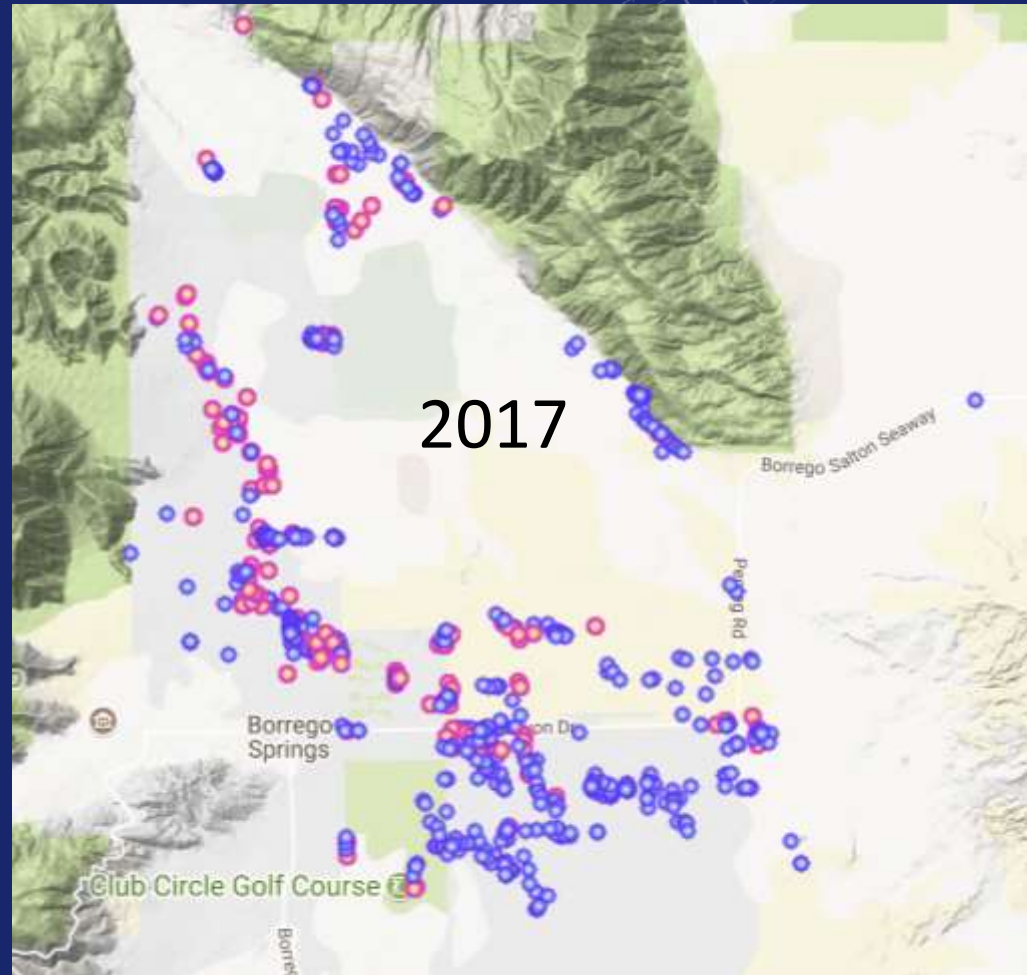


# INCREASED MAPPING EFFORTS



# INCREASED MAPPING EFFORTS

- Are we finding too many plants to be able to stop the spread?
- How do we decide?
- Who decides?



# FUTURE OF VOLUTARIA SPREAD



# FUTURE OF VOLUTARIA SPREAD

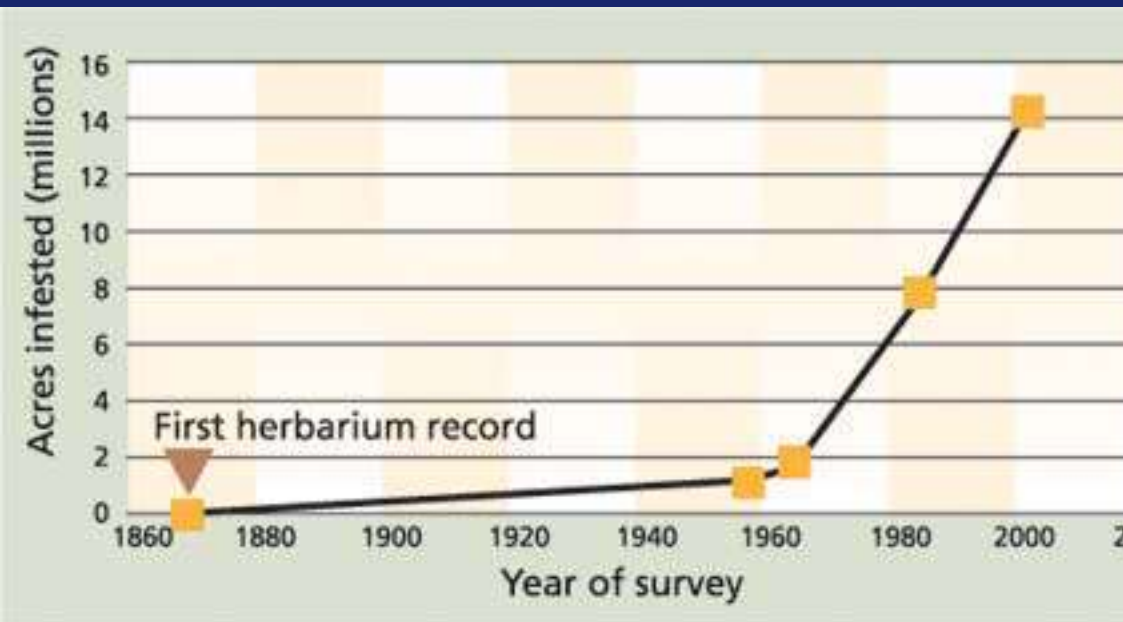
- Newport to Borrego Springs 3.9 miles a year
- Newport to Chula Vista 3.0 miles a year
- Chile 80 miles in 30 years 2.6 miles a year
- Sahara mustard Palm Springs to Yuma 130mi/30yr
  - 4.3 miles a year



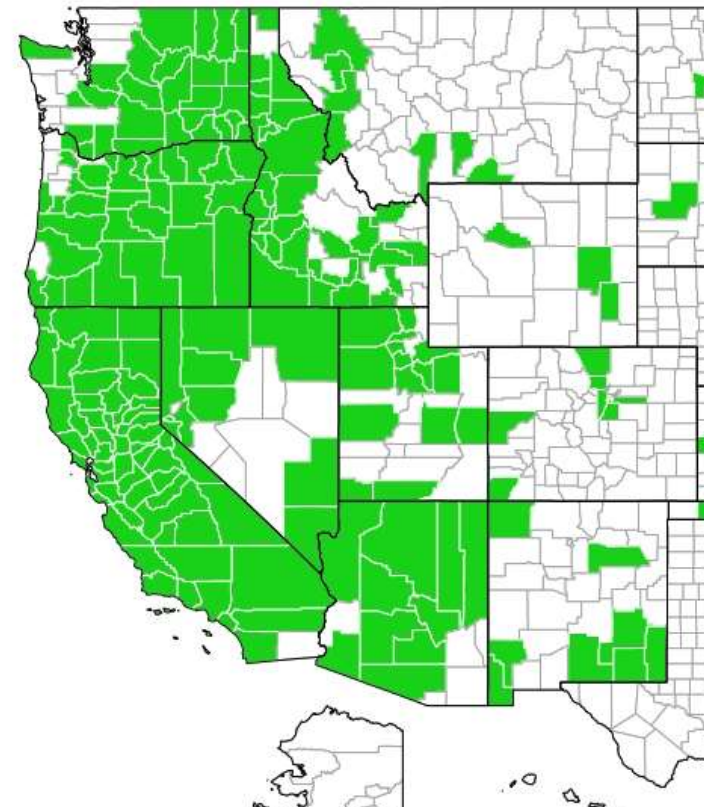
Sahara mustard  
400 miles in 40 years  
10 miles a year!

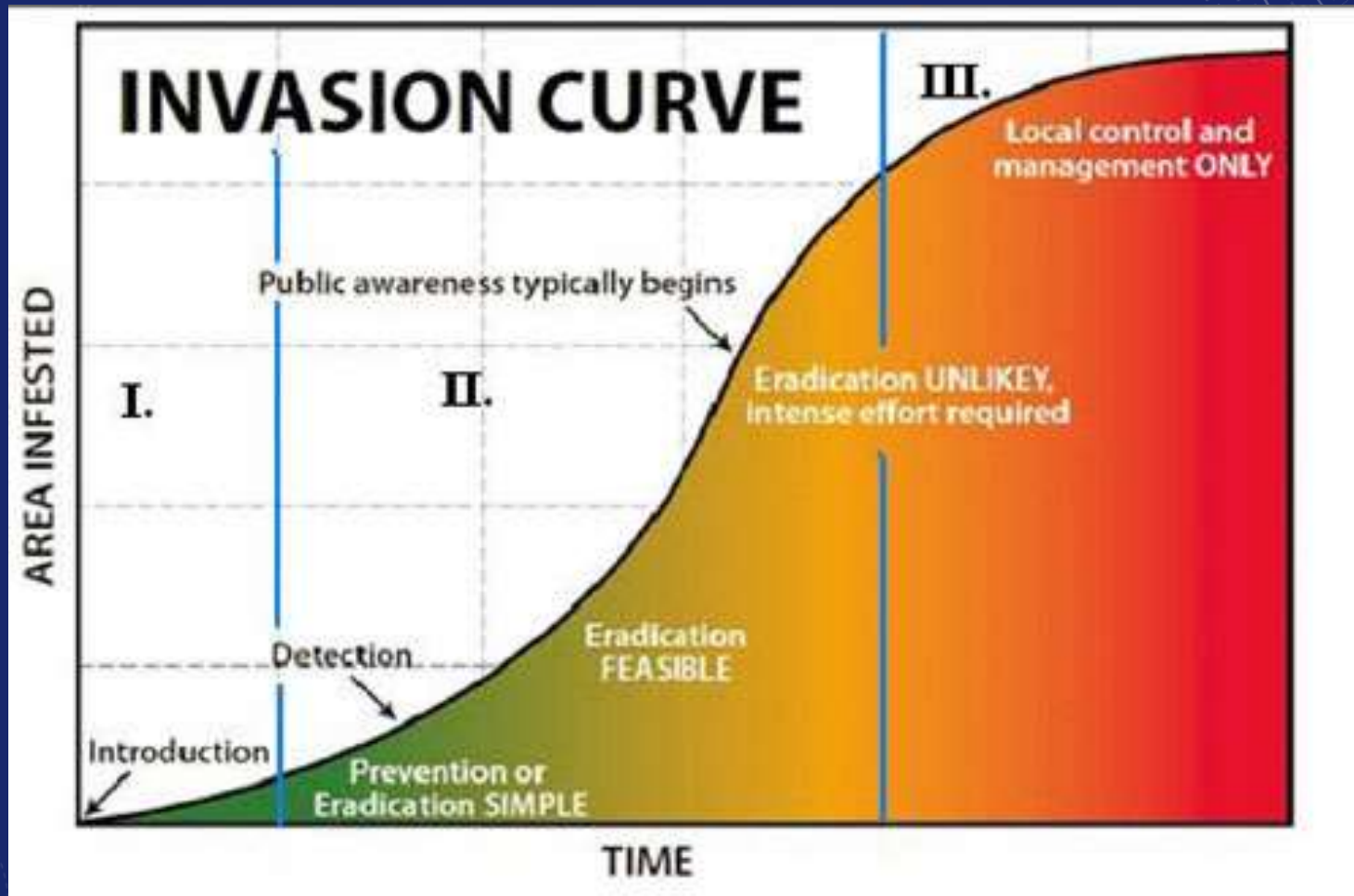


# EXPONENTIAL GROWTH



*Centaurea solstitialis*



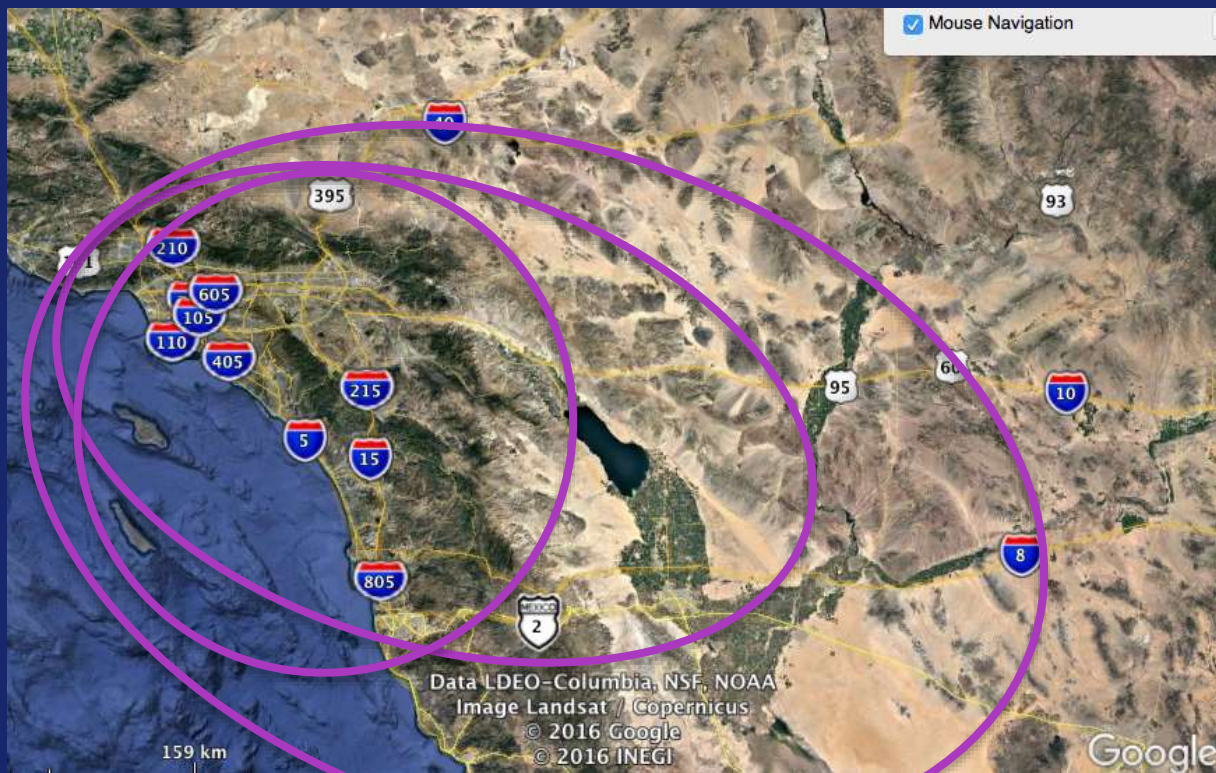


# JUST THE FACTS

- Lets assume 3.5 miles a year
- Spread moves into preferred habitat, semi-arid and arid landscapes
- No exponential growth
- Then in next decade...



# 2037



QUESTIONS?



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Frank Harris