Drone Imagery and a Simple Spatial Analysis Technique for Long-term Mapping of Stinknet (Oncosiphon pilulifer)

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Stinknet (*Oncosiphon pilulifer*)



- Annual weed native to South Africa
- Invades Coastal Sage Scrub in Southern California

IMPACTS

- On sensitive species: degraded habitat
 - Cactus wren, California gnatcatcher, rare snakes and lizards
- On fire: adds fine fuels to system

A very distinct color signature





Digitized stinknet polygons – 2017 aerial basemap



Treatment prioritization



0	0.25		0.5			1 Miles
	 1	1	1	1	1	

Ground truthing









Drone flights – April 2021



- Drone imagery gauges success of weed management work
- Re-digitizing imagery from year to year





Digitized stinknet polygons – 2021



Stinknet seed bank expression, size, and phenology changes year to year



Data: McClellan – Palomar Airport Station, Carlsbad, CA

How to compare the change in area between 2017 and 2021?



Data summary

- Overall in the flyover area, stinknet went from covering 154.3 acres in 2017 to 33.2 acres in 2021, a decrease of **121.08 acres**
 - In Control grid squares, stinknet decreased by 75%
 - In Treatment grid squares, stinknet decreased by **95%**
- Stinknet only increased in 63 of 1269 grid squares, all in Control (untreated) areas

Preliminary results



Challenges

Oncosiphon Polygons 2017-2020
Oncosiphon Polygons 2021
Area Treated
2021 Flyover Boundary
Bioreserve Boundary Layer

Resolution of images – are they comparable?

- 2017: 6 inch
- 2021: .39 inch

Phenology: how to be sure it's peak flowering time? Other spatial tools that might be better?

- Other spectral bands?
- Machine learning classification?



