


# ADAPTIVE MANAGEMENT OF STINKNET (*Oncosiphon piluliferum*) IN COASTAL SAGE SCRUB

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December 11<sup>th</sup>, 2019





# The Biodiversity Reserve is home to many important species

- 900 acres
- Coastal Sage Scrub Habitat
- Located adjacent to San Diego Zoo Safari Park





# Stinknet: Invasive and prolific

- AKA globe chamomile
- Annual Aster
- Flowers March-June, produces hundreds of tiny seeds
- Native to South Africa
- Problem in Australia
- In US, invasions in Arizona and southern California



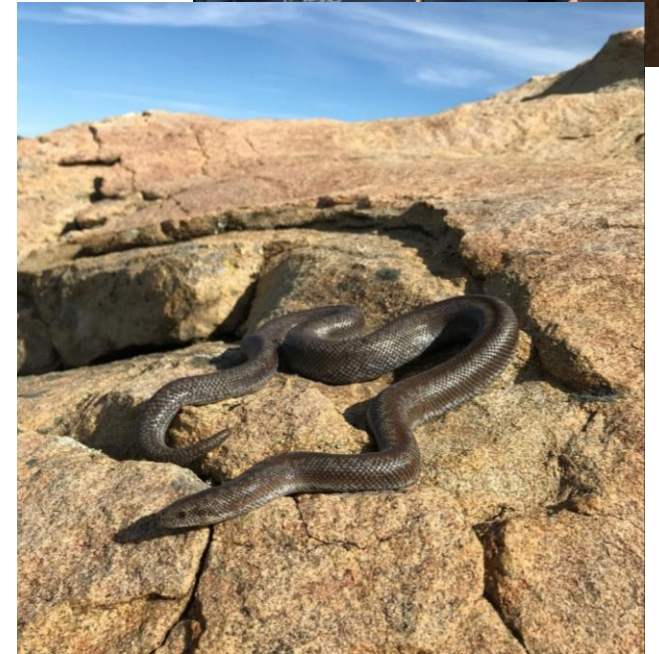


# Stinknet distribution

- ~200 out of 900 acres
- Mixed densities
- Favors south facing slopes
- First record – 1997
- Stinknet boom – 2017



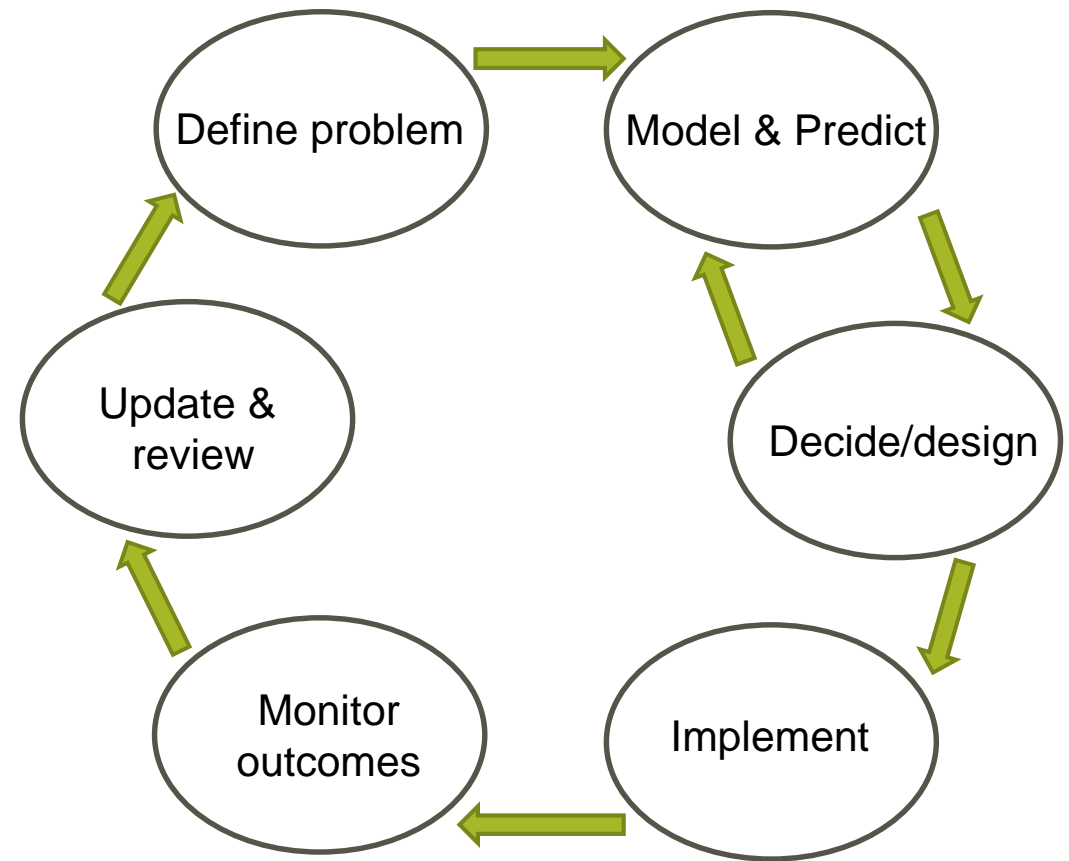






# Adaptive management approach

- Began in Fall 2018 planning landscape level treatment
- Priority areas
- Budget, feasibility and logistics
- Execution
- Monitoring
- Interpret results
- Adapt management

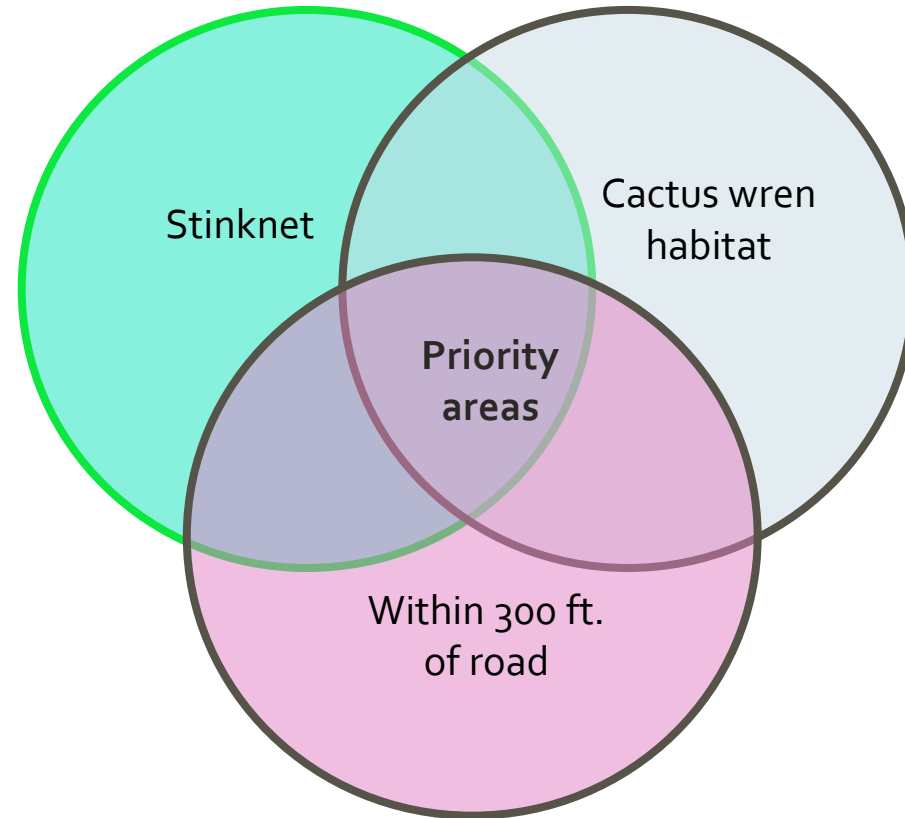


*McCarthy et al (2012, Reintroduction Biology)*

# Prioritization

Decide/design

- Previously managed areas
- Critical habitat
- Most likely to spread
- Ease of access
- Where do these places intersect?

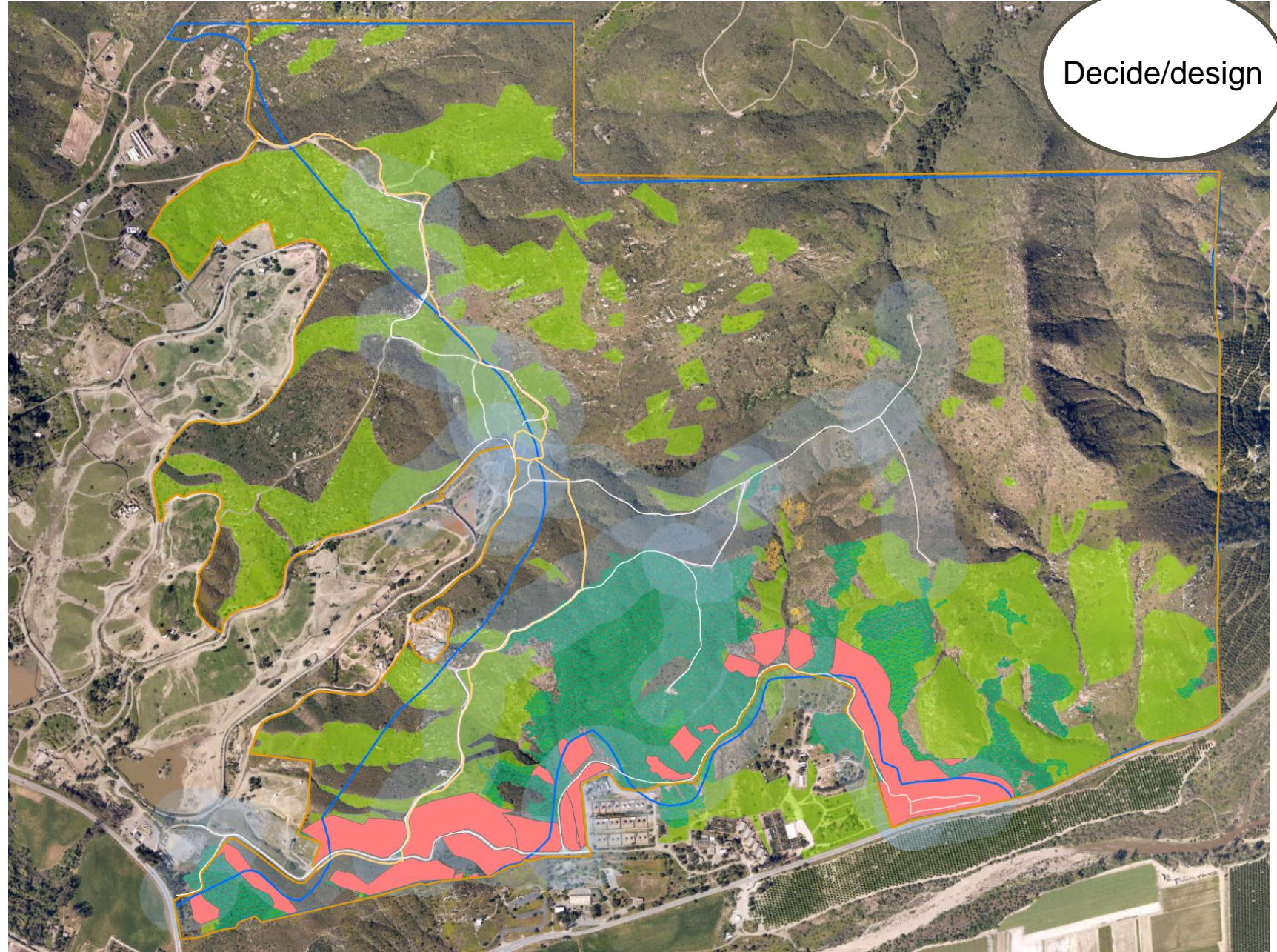




# Prioritization Map

- Cactus Extent
- Stinknet
- Roadside Buffer
- Intersection
- MHPA boundary

\*The southernmost road served as our first area of focus





# Treatment Execution

- Hired 9 ACE crew and 2 crew leaders, plus me
- 10 with backpack sprayers, 2 operating spray rig
- Herbicide mixture: max rate Transline and Gallery, 2% MSO
- Late February to early March with rain days rescheduled
- Plants were in pre-bud to bud stage
- Treated a little over 19 acres plus a re-treat of one area.

Implement





# Acres Treated 2019

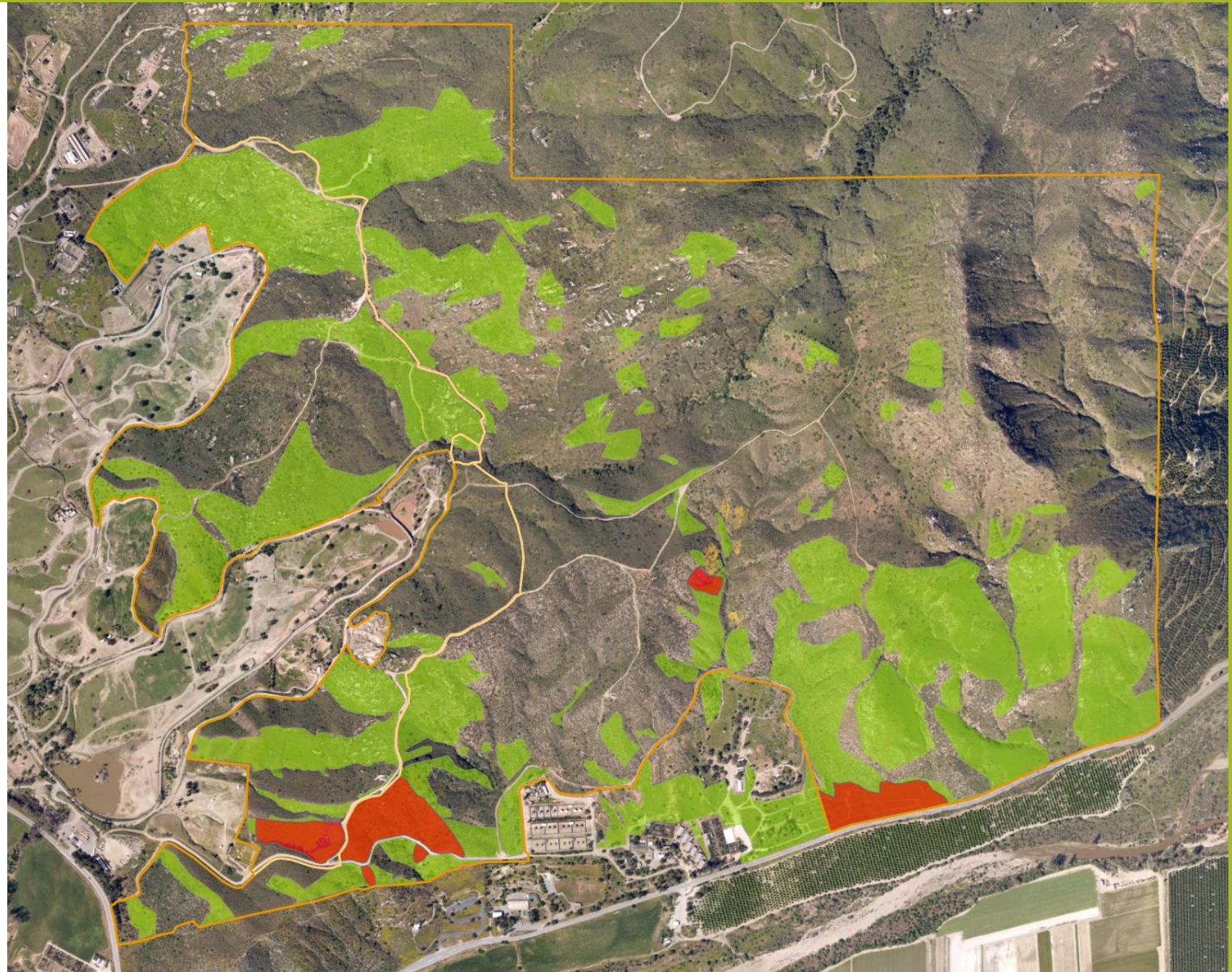


➤ Stinknet



➤ Area Treated

- 19.5 acres

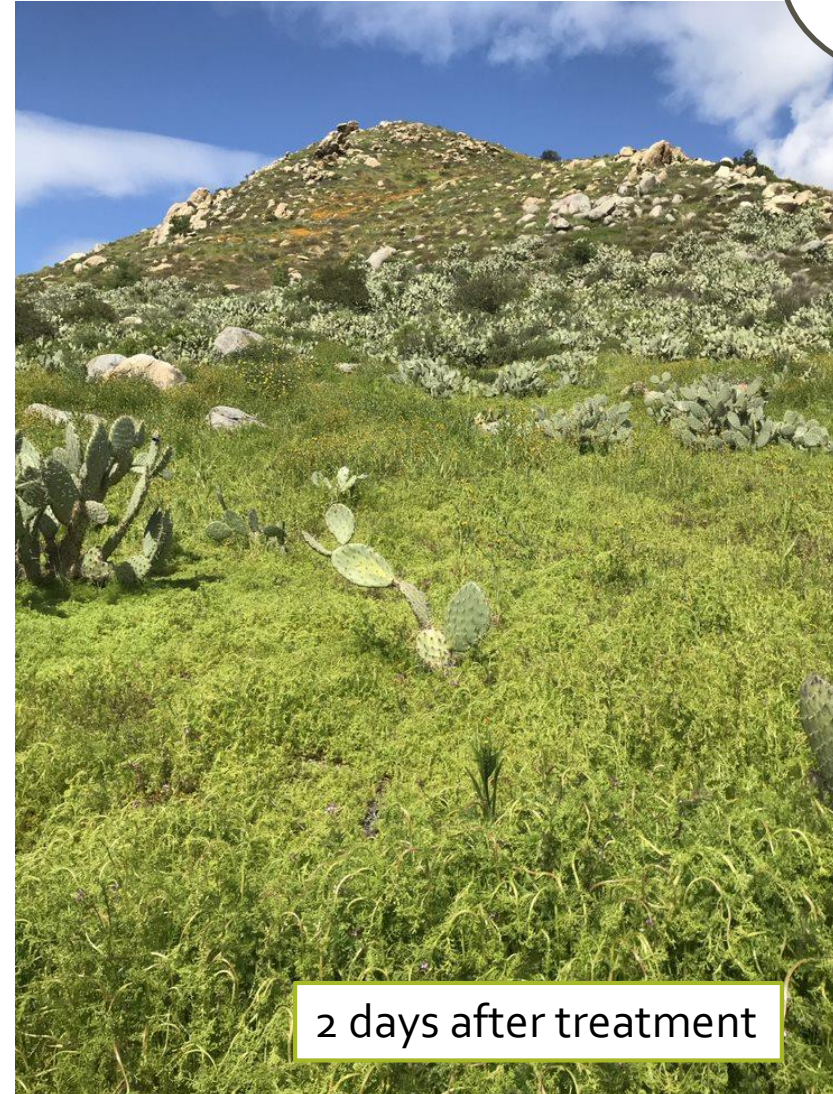




# Monitoring and Results

- 2 days after treatment, plants were wilted
- 2 weeks after treatment, about half appeared dead and half made a comeback and flowered with slight differences in morphology
- Re-treated first area treated and that second treatment had no effect (plants had flowers)
- Overall, maybe about 50% success rate

Monitor  
outcomes



2 days after treatment





2 weeks after treatment



1 month after treatment



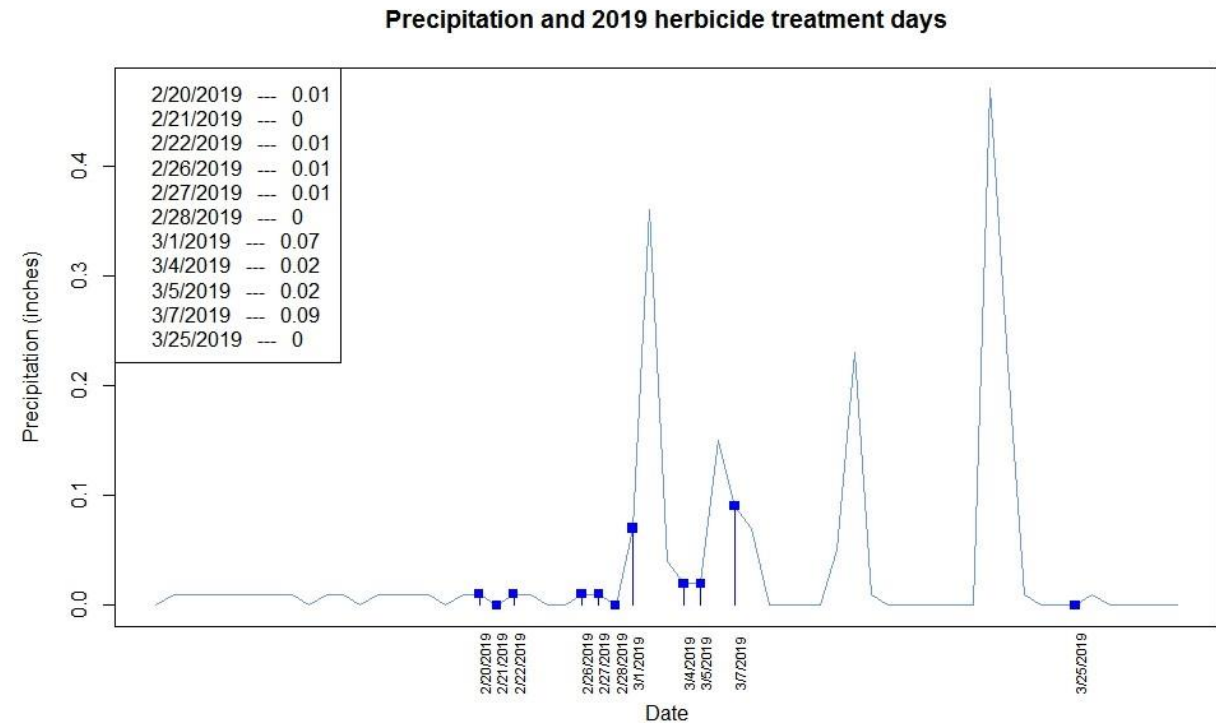
Monitor  
outcomes



# Brainstorm – What Went Wrong?

Update &  
review

- Faulty application
- Timing of treatment
- Wrong choice of herbicide or surfactant
- Weird reaction in mixture
  - Jar test
- Heavy rains may have diluted or washed away herbicide





# Management Adaptations

- How do we achieve a more reliable treatment method?

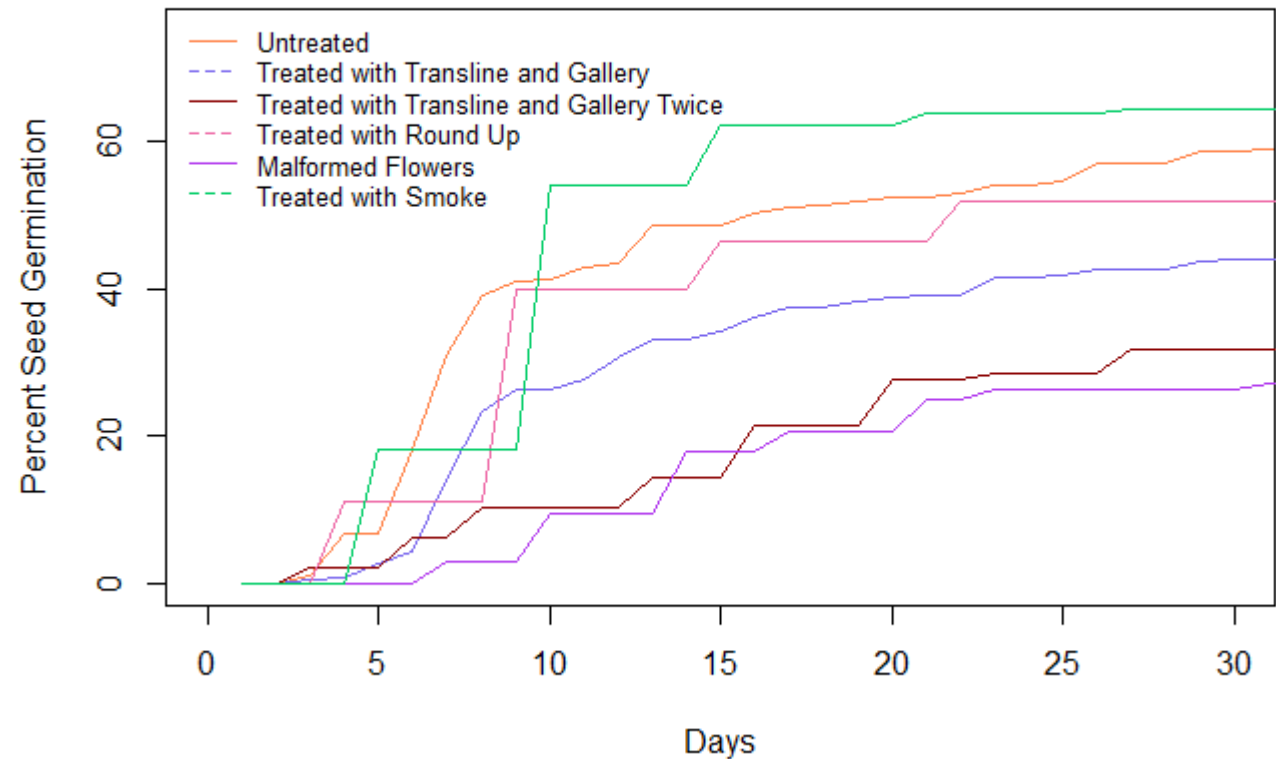


# Germination Trials

Update &  
review

- Collected seeds from different sites
  - Sprayed once with Transline and Gallery 44.72%
  - Never sprayed 59.35%
  - Imbibed in smoke water 64.5%
- Monitored in germination chamber
- From this, we saw a bigger picture of our treatment
- Future germination trials in store\*
  - Seed longevity
  - Rain events
  - Wildfire

**Percent Germination of Stinket over 30 days**





# Work in progress: what else do we need to know?

Update &  
review

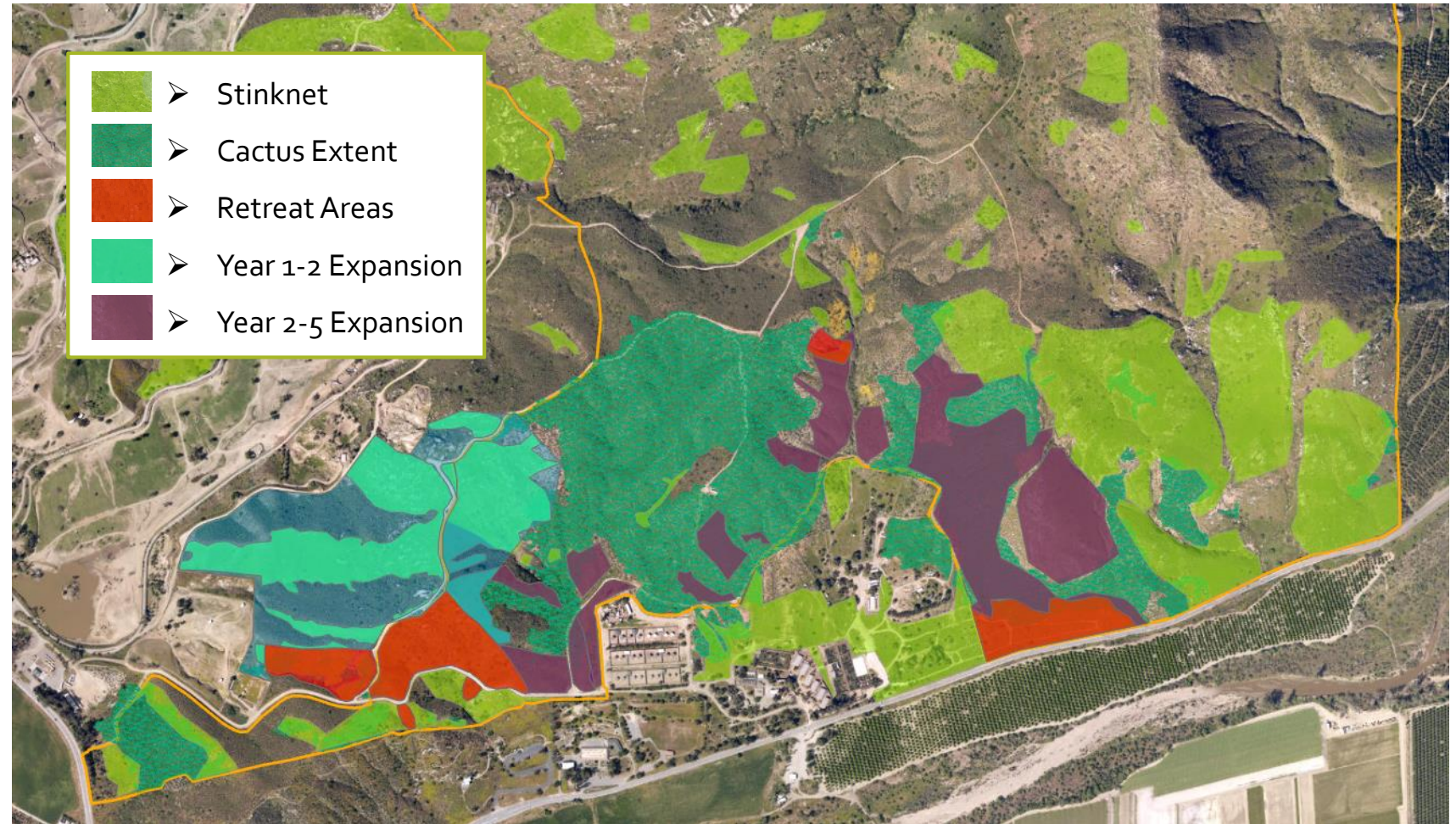
- Testing post-emergent herbicides
  - Transline, Milestone & Princep
- $\frac{1}{4}$  acre area to house 5 x 5 m plots
- After natural germination, during landscape treatment
- Monitor and record results
- Collaborate





# Future treatments over next 5 years

- February 2020, earlier than 2019, using milestone and adjusting as necessary
- Retreat previously treated areas and expand acreage with more crews and \$



Thank You!