Grassland Restoration and Invasive Weed Management in Southern California: Medusahead as a Case Study

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Medusahead

- First introduced to Western US, Oregon in 1887
  - Contaminated grain or accidental introduction on livestock
- Poor forage, plants have a high silica content
- Plants mature later than other common grasses
- *Taeniatherium caput-medusae*, *Elymus caput-medusae*

Identification

- Seeds have a long awn that twists when dry

Identification

- Patches of medusahead are relatively easy to ID
- Stays green later in the season
- Patches have a silvery sheen

Identification

- Can easily survey for Medusahead
  - Spring, when flowering
  - Summer and Fall when inflorescence has dried out

- Difficult to survey for individual plants

Identification

- Challenging to survey in Winter and early Spring
  - Vegetative characteristics difficult to use

Look a likes

Medusahead

Hordeum murinum
Foxtail

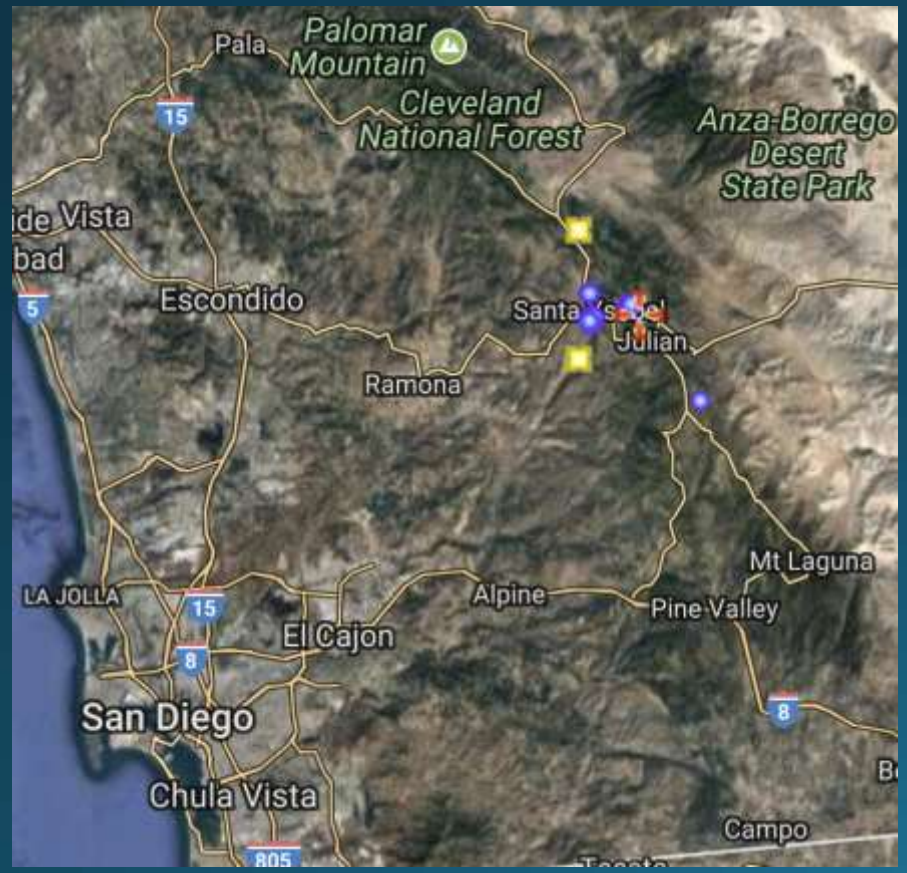
Elymus elymoides
Squirrel tail

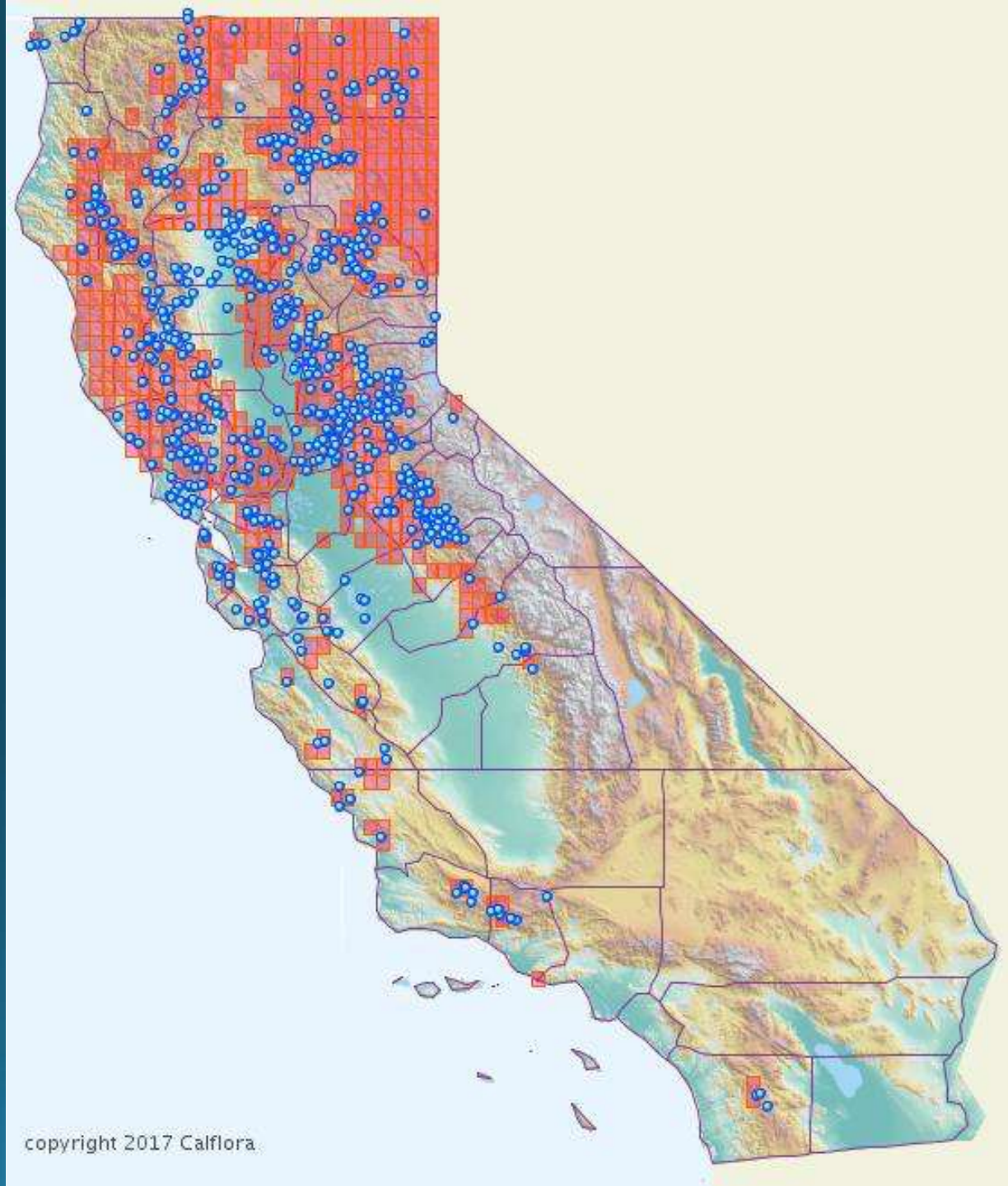
Effects

- Because mature plants have high silica content and are poor forage
- And dead skeletons create a persistent litter layer
- And other grass species have poor germination though this thatch
- And medusahead germinates well under its own litter
- Creates a positive feedback cycle
  - Small patches can quickly become large patches

San Diego County

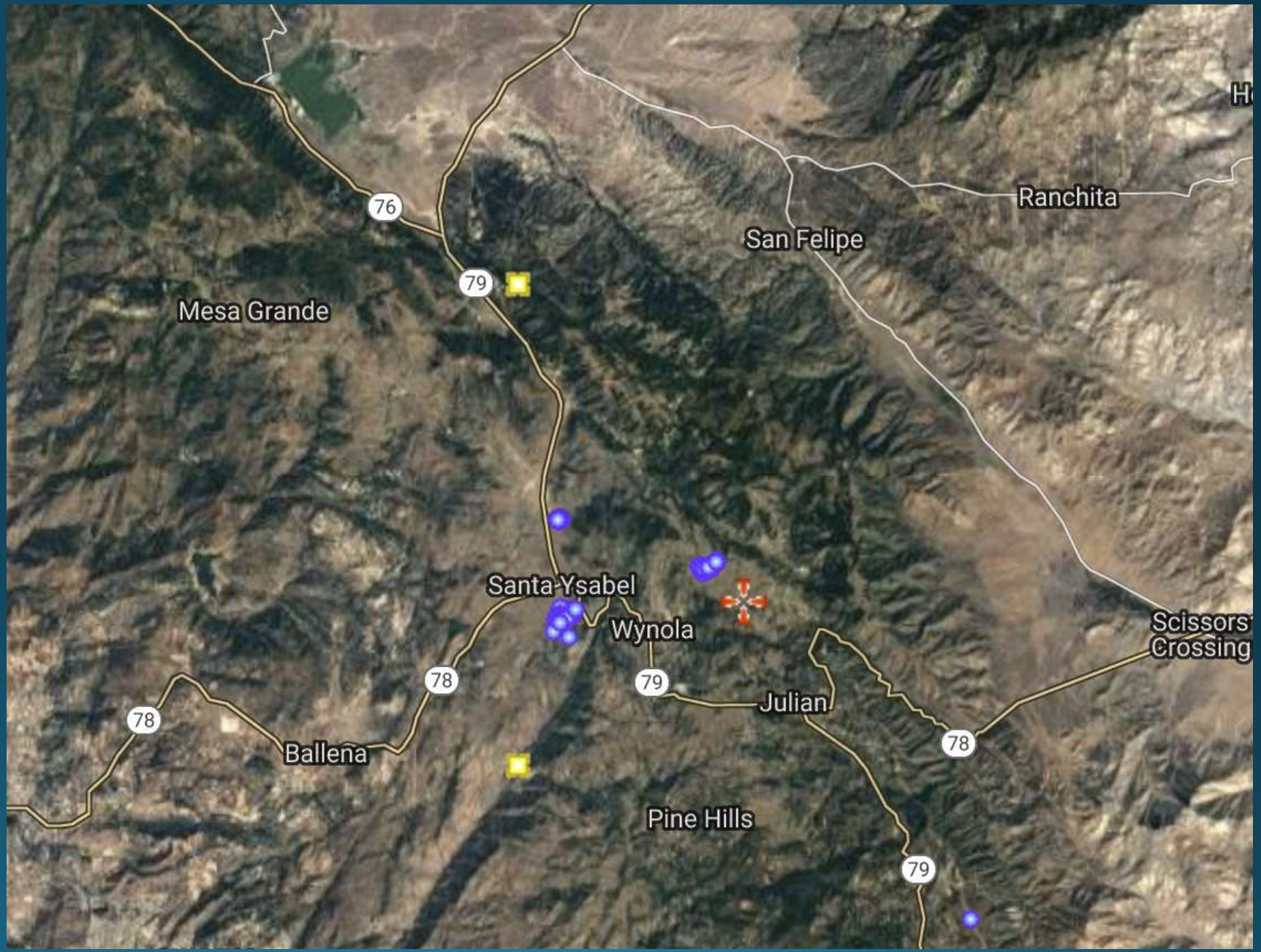
- Isolated Infestation!





San Diego County

- First reported in the county in 2004
- By 2007 other populations ¼ mile away
- By 2014 about 15 miles across
- Most likely result of better surveys



San Diego County

- Large acreage of conserved and open space

Priscilla Lister

Differences in medusahead in San Diego?

- Santa Ysabel region receives about 20-24 in. of precipitation
- Medusahead thrives in 12-24 in. precipitation, up to 40 in.
- Often significant late spring storms reinvigorate dying annual grasses
  - Occasionally lead to a late spring cohort and green up

Research Questions

- Can we extirpate isolated patches of medusahead from a property?
- Can we reduce medusahead on an infested property?
  - What is reinvasion rate after controlling medusahead?
- Can we restore native perennial grasslands at a large scale?

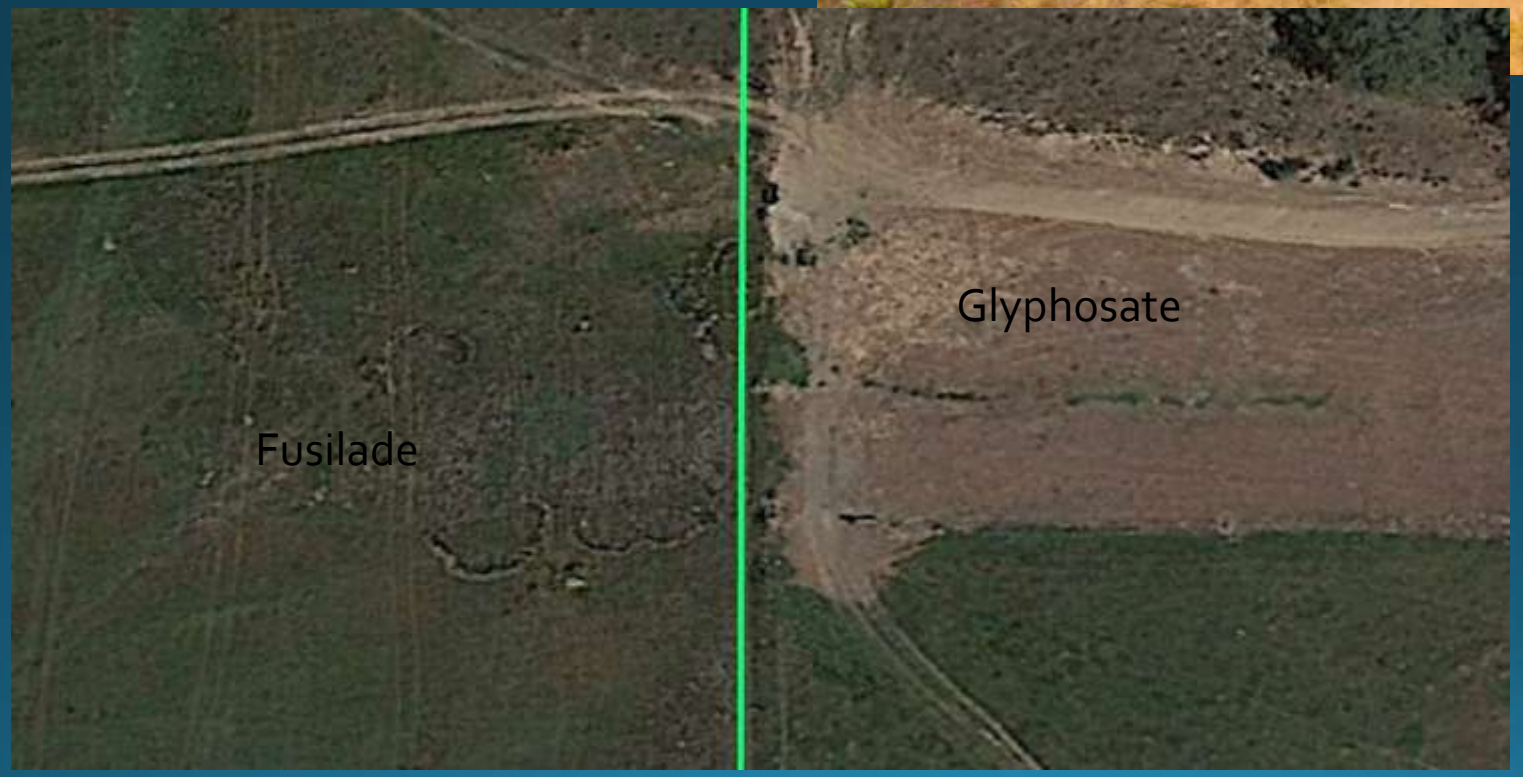
Lake Henshaw

- Can we extirpate isolated medusahead patches from a property?

- Medusahead discovered on a private ranch near Lake Henshaw in 2010
- After 3 years landowner was unable to contain it themselves
- Began experiment to extirpate medusahead from the ranch in 2013
- Several net ac. infested

Steps to Extirpation

- Broadcast spray for two years (20 ac.)
  - Glyphosate (2 qts./ac.) grazed areas
  - Fusilade (16 ozs./ac.) ungrazed areas



Results

- Multiple sprays each year
  - Fusilade and Glyphosate applied mid-late spring
  - Often late season rainfall create a new cohort of plants
  - Sprayed again following label instructions

Results

- 2015-found a few patches of medusahead, all were easily hand pulled
  - New patches discovered outside spray area
  - One newly discovered patch was successfully mowed when flowering
- 2016-found 10 patches of medusahead, all were spot sprayed (Glyphosate)
  - More patches discovered outside of sprayed area and on adjacent property
- 2017-after more intense surveys found 32 patches
  - All spot sprayed with tank mix of Glyphosate (2 qts./ac.) and Milestone (7 ozs./ac.)
  - Several hundred square feet of medusahead in total

Population distribution

- Long-tailed awns on seeds
- Facilitates long-distance dispersal

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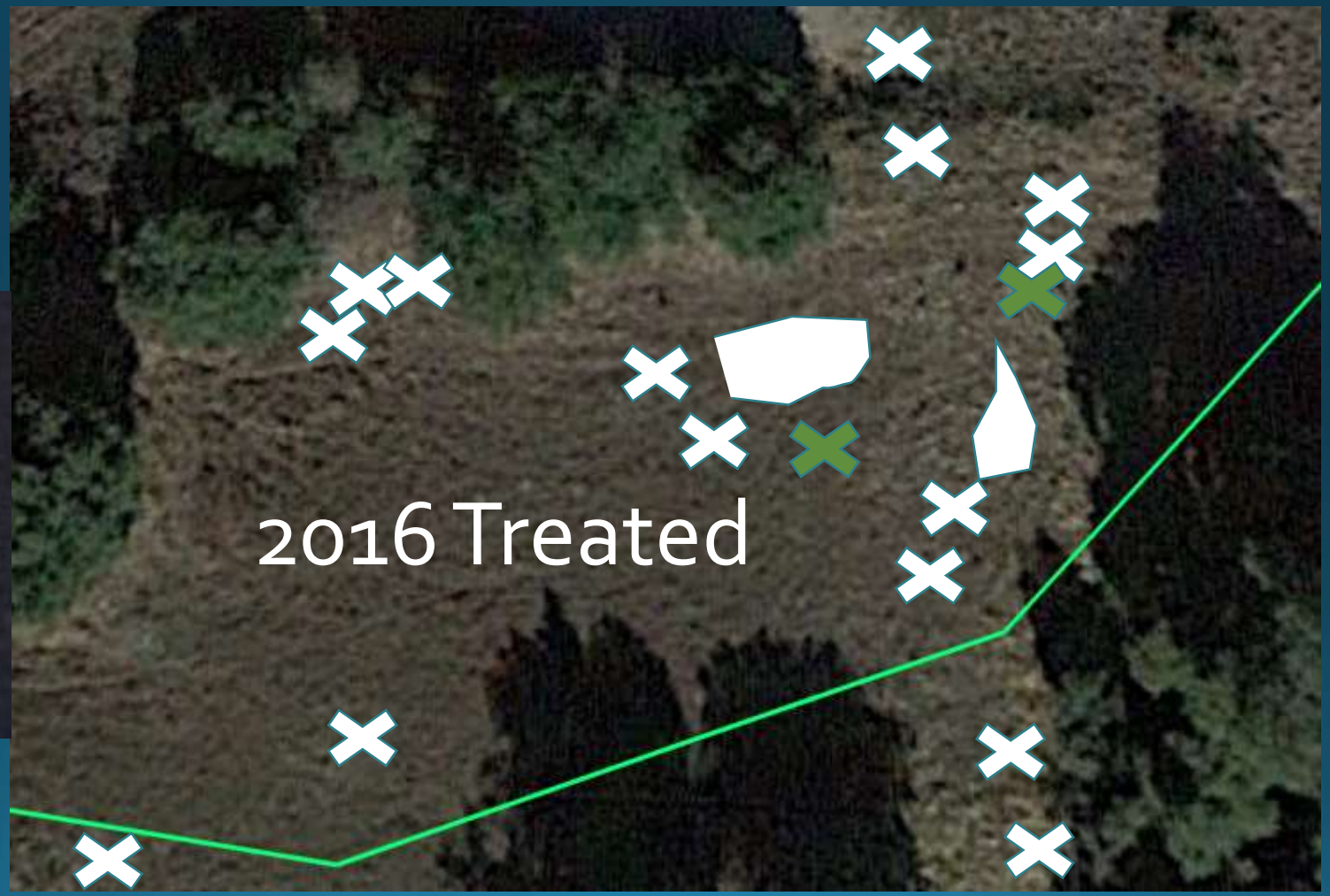

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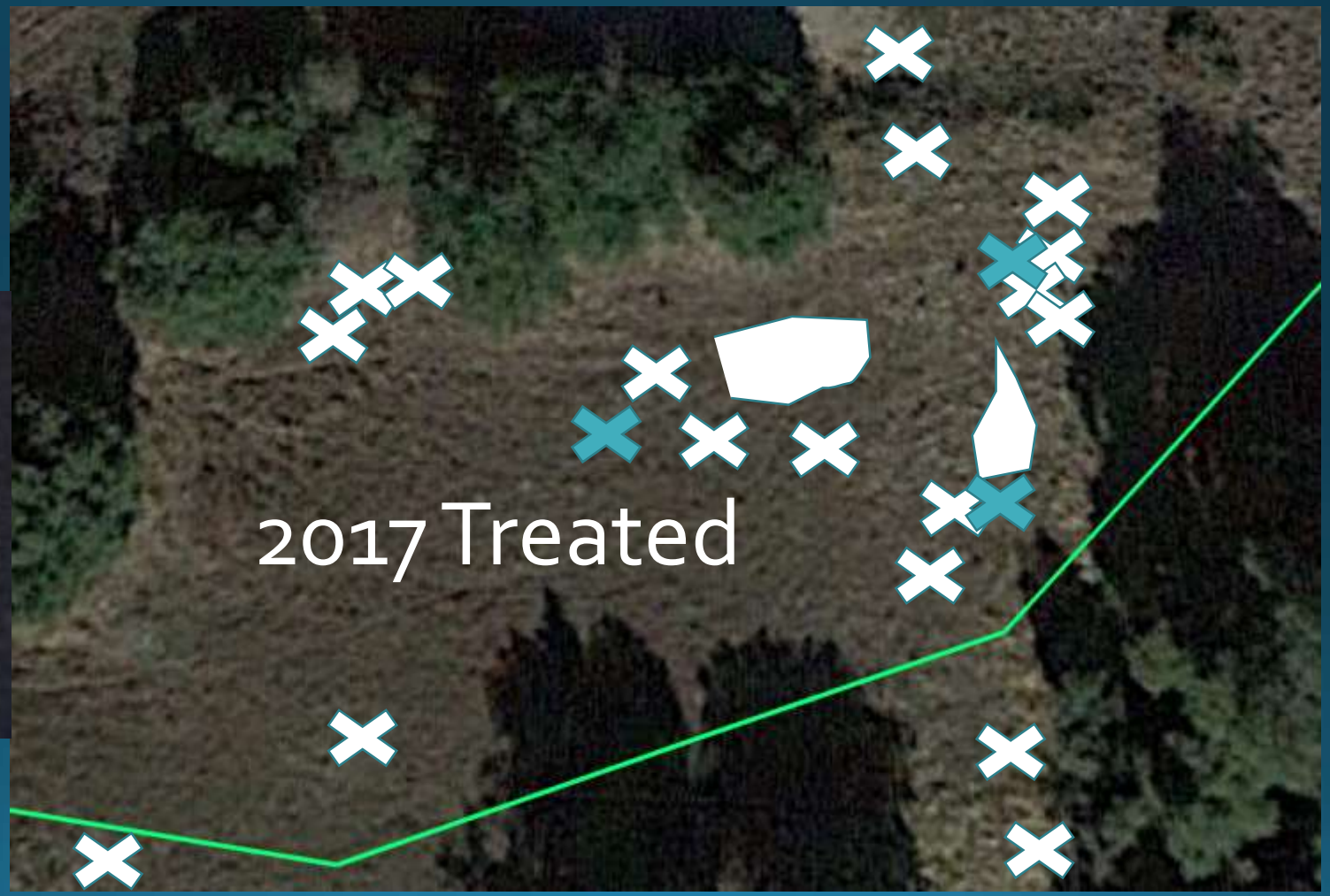

Population distribution

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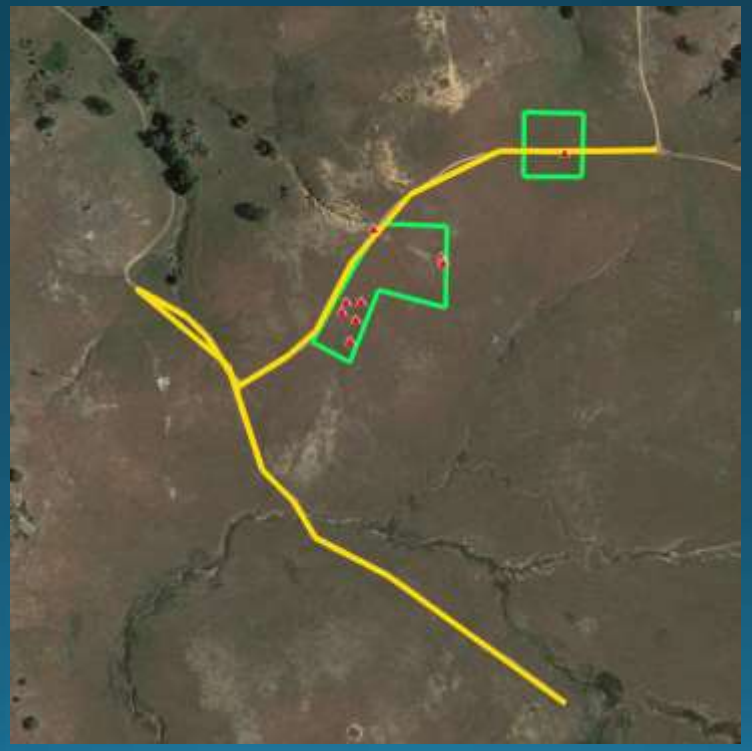
- Facilitates long-distance dispersal

Infested site management, Santa Ysabel

- Managing medusahead in an infested area
- Broadcast spray with Milestone in mid-spring at 7 ozs./ac.
- About 15 ac. sprayed



Infested site management, Santa Ysabel

- Similar results to Lake Henshaw study
- In two years medusahead populations go from being conspicuous patches to isolated individuals
- Areas adjacent to plots are infested by large medusahead patches
  - Livestock are moving seed into plots during summer and fall

Confounding issues on both properties

- Cannot tell if newly discovered patches inside treated areas are a result of:
- Livestock or wildlife dispersing seed into treated areas
- Dispersal by very strong winds from adjacent infested properties
- People, pets or equipment carrying seeds into treatment areas
- Or a few scattered individuals randomly went to seed in a single treatment year
- Or a combination of these factors

Grassland Restoration

- Can we restore native perennial grasslands at a large scale?

Methods

- Conducted smaller herbicide trials to determine most effective treatment
- Glyphosate
- Glyphosate + Triclopyr
- Glyphosate + Milestone
- Mowing

Results

- Milestone (7 ozs./ac.) + Glyphosate (0.5 qts./ac.) provided best control of annual grasses, did not harm perennial bunchgrasses
- Applied in winter-early spring, before green up of purple needle grass (*Stipa pulchra*)

Results

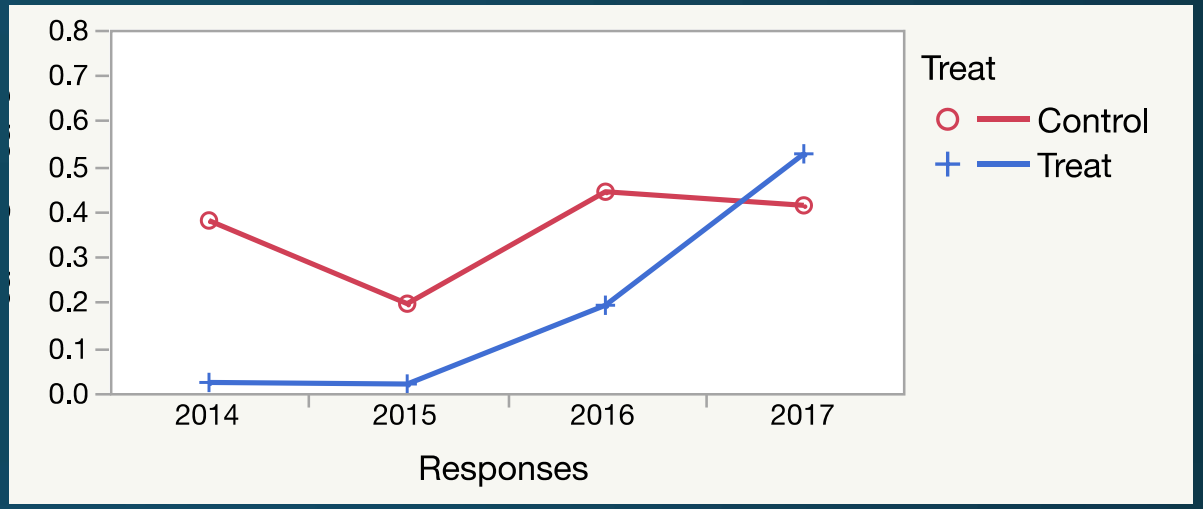
- Expanded to entire 10 ac. Grassland,
- Treated 2014, 2015
- Rested 2016, 2017

Results

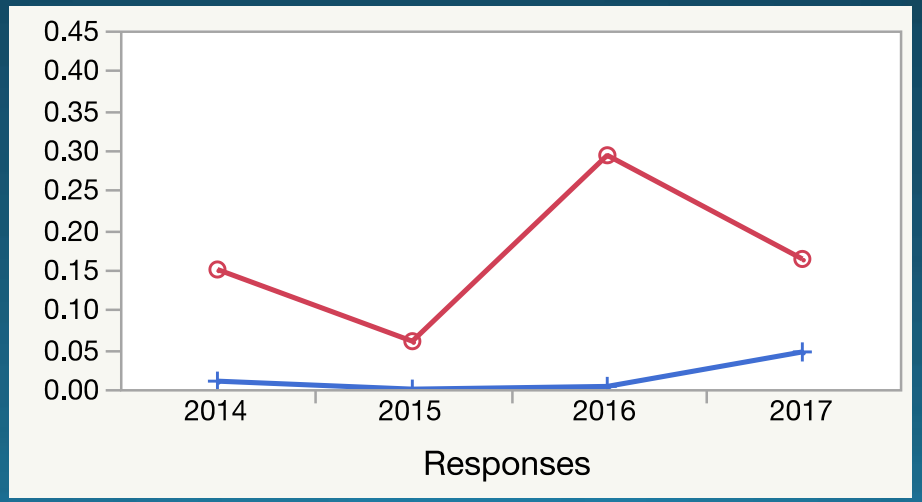
- Reduced cover of annual grasses for 3 years (2 treat plus 1 post treat)

- Reduced cover of ripgut brome for 4 years (2 +2)

Annual Grasses



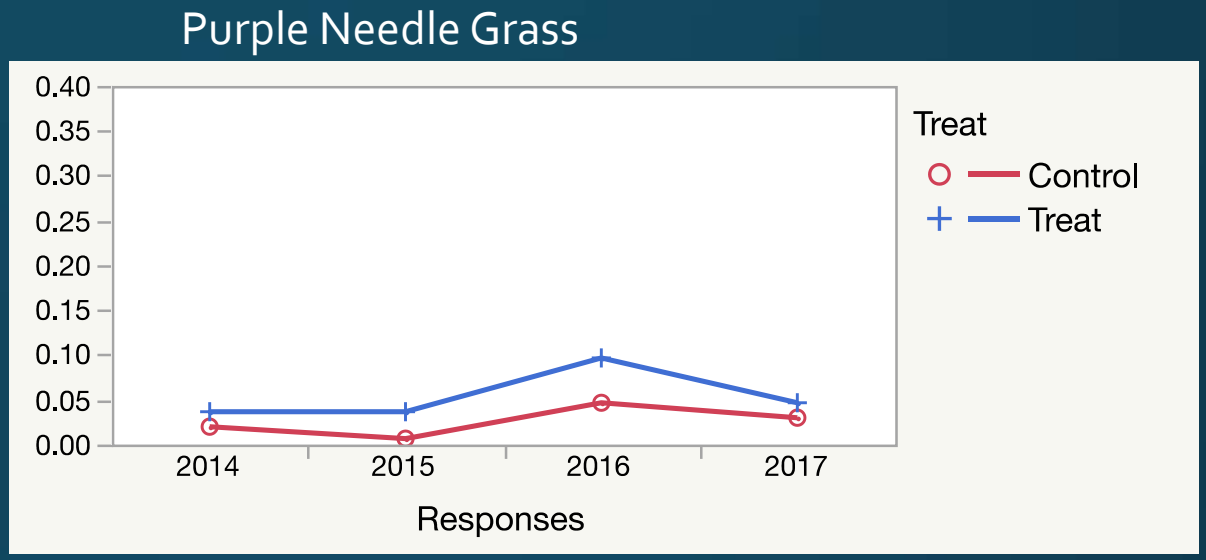
Ripgut Brome

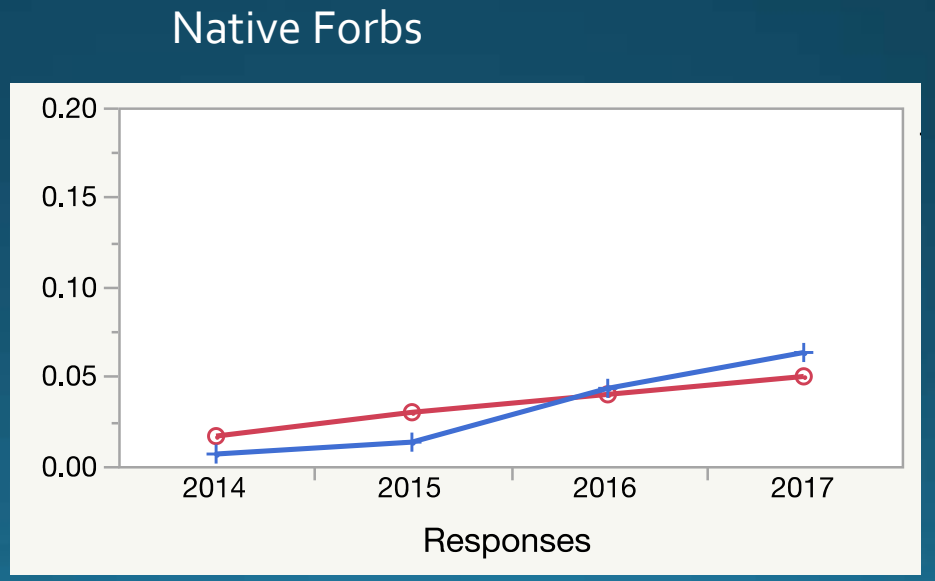


Results

- Did not harm purple needle grass

- Did not harm native forbs



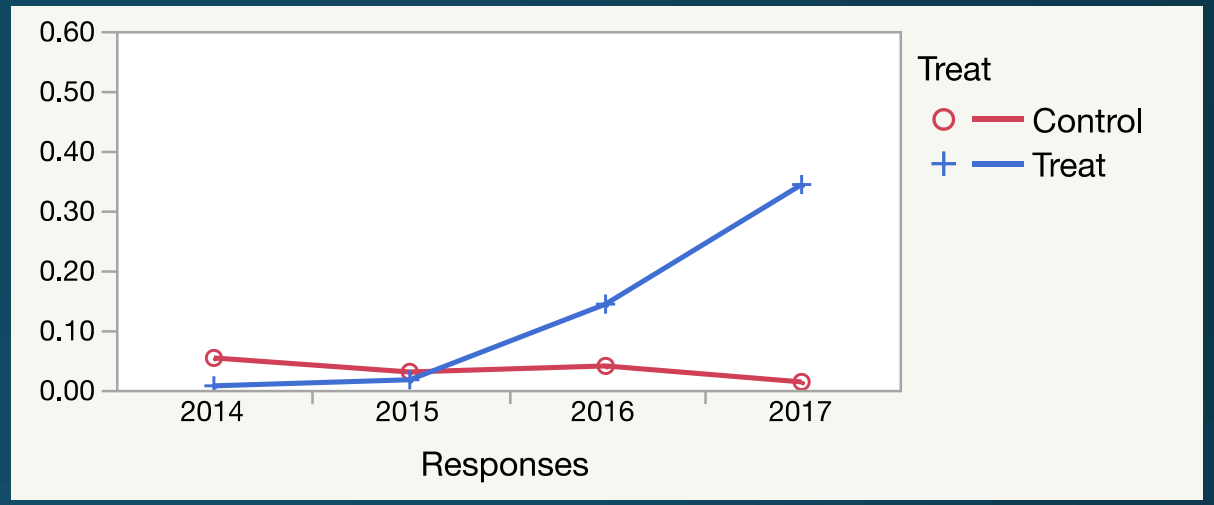


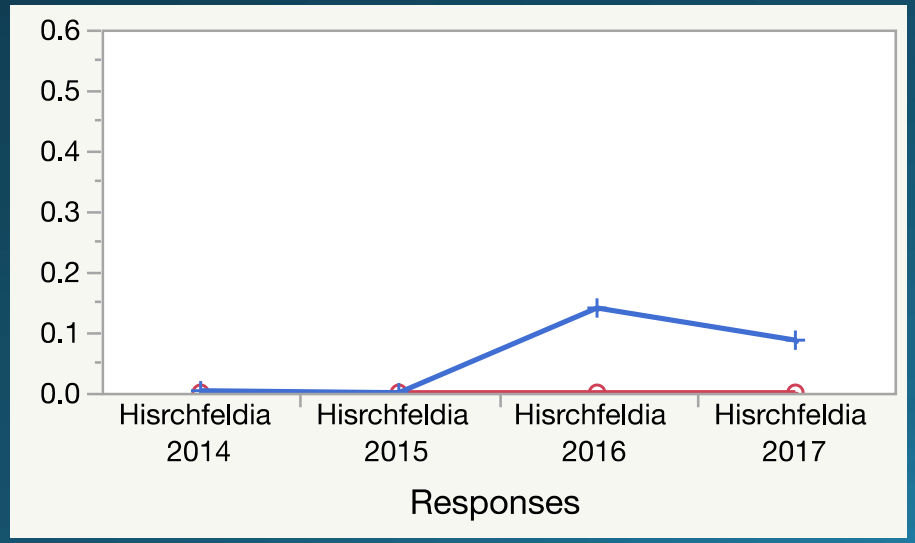
Results (less than stellar)

- Two weed shifts:
- Increase in Rat tailed fescue

- Increase in short pod mustard

Rat- tailed fescue





Short pod mustard

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- Can we reduce medusahead on an infested property?
  - What is reinvasion rate after controlling medusahead?
- Can we restore native perennial grasslands at a large scale?

Research Questions Answered (Partly)

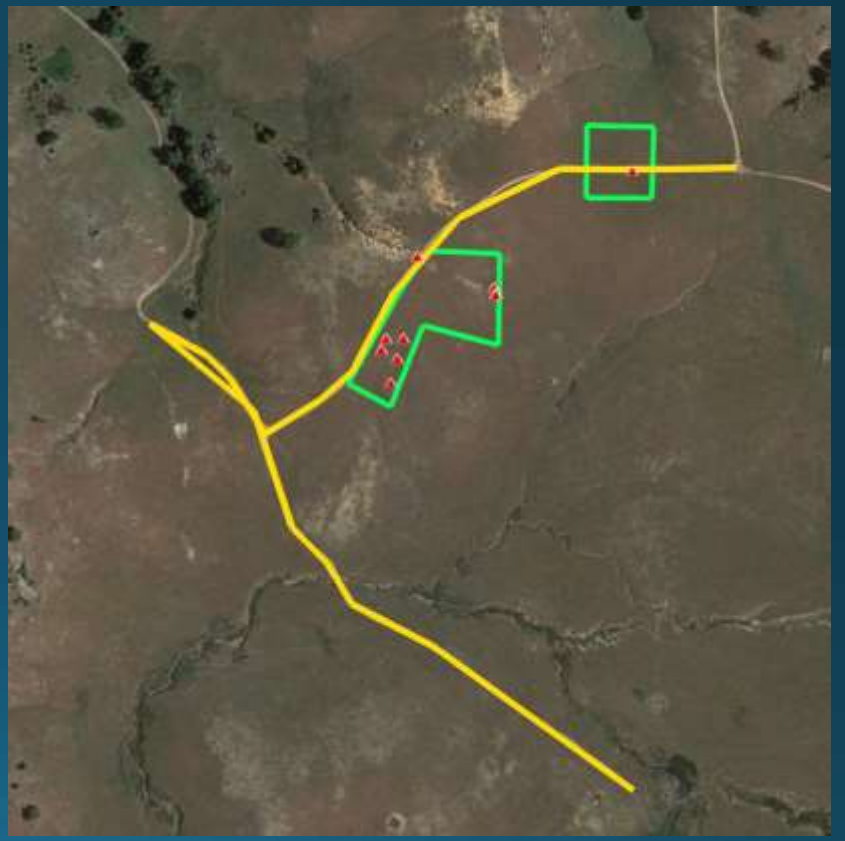
- Can we extirpate medusahead from an isolated property?
  - Yes, most likely, work ongoing after 4 years!
  - Certainly reduce it from large patches to small isolated pockets or individuals

Detection, detection, detection!!

"The world is full of obvious things which nobody by any chance ever observes"

Research Questions Answered (Partly)

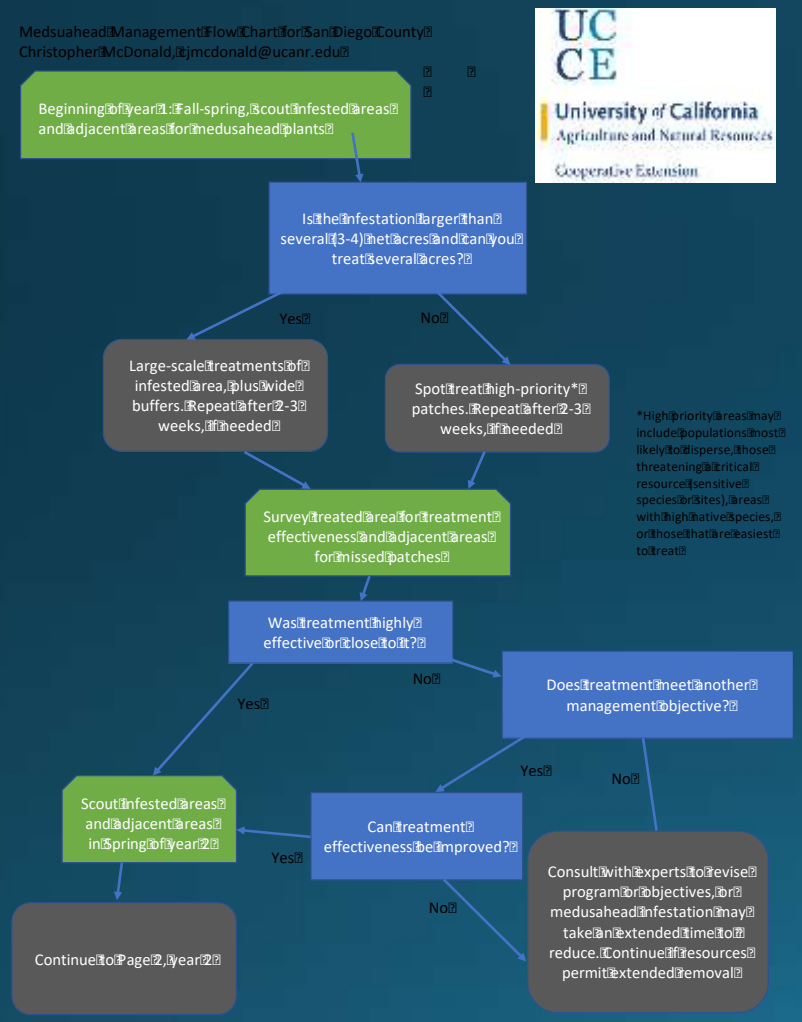
- Can we reduce medusahead on an infested property?
  - What is reinvasion rate after controlling medusahead?
- Yes, we can. Reinvasion rate in short term does not add too many seeds to treated area to lose ground
- Long-term data still pending!



Research Questions Answered (Partly)

- Can we restore native perennial grasslands at a large scale?
- Yes, large-scale treatments can be effective at reducing the most invasive grasses for at least 2 years post-treatment.
- Does not reduce native perennial bunchgrasses
- Especially useful on areas with low slope

Medusahead management flow chart



Questions?

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