Using public domain remotely sensed data to predict *Taeniatherum caput-medusae* (Medusahead) infestations, a case study from the central California foothills

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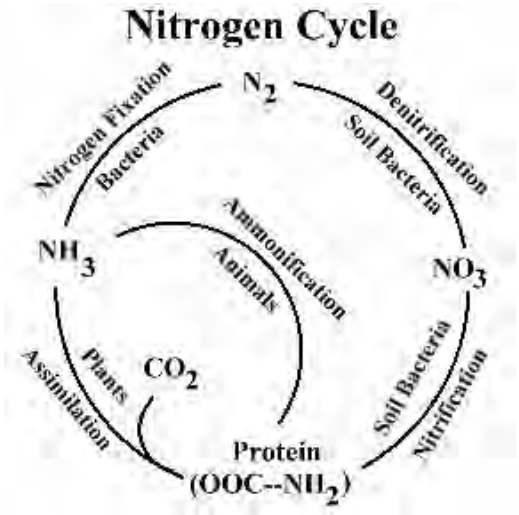
Medusahead transforms ecosystems

- Heavy thatch
- High silica
- Resists decay

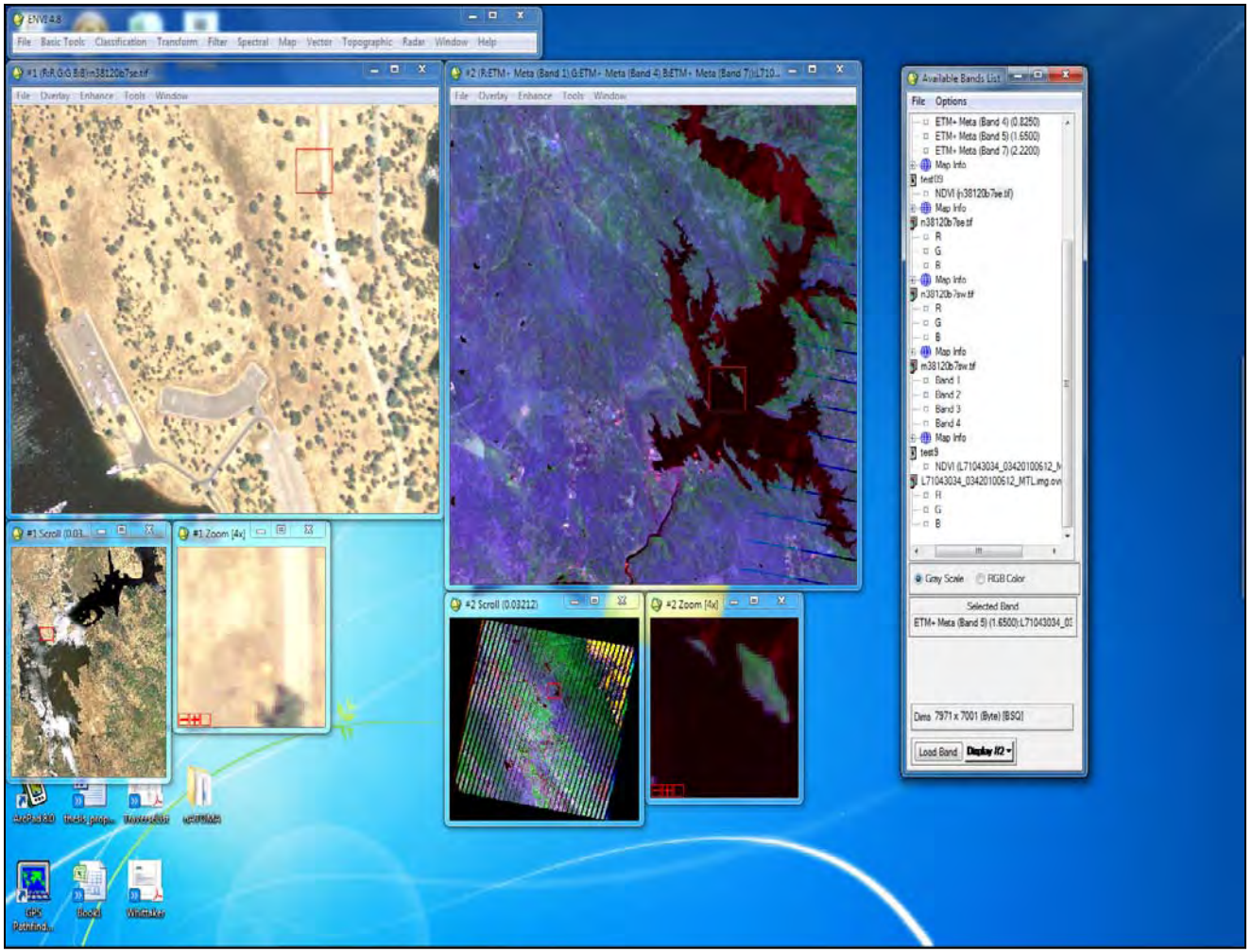


- Ties up nitrogen
- Increases fire risk

Study site
New Hogan Lake, Calaveras County

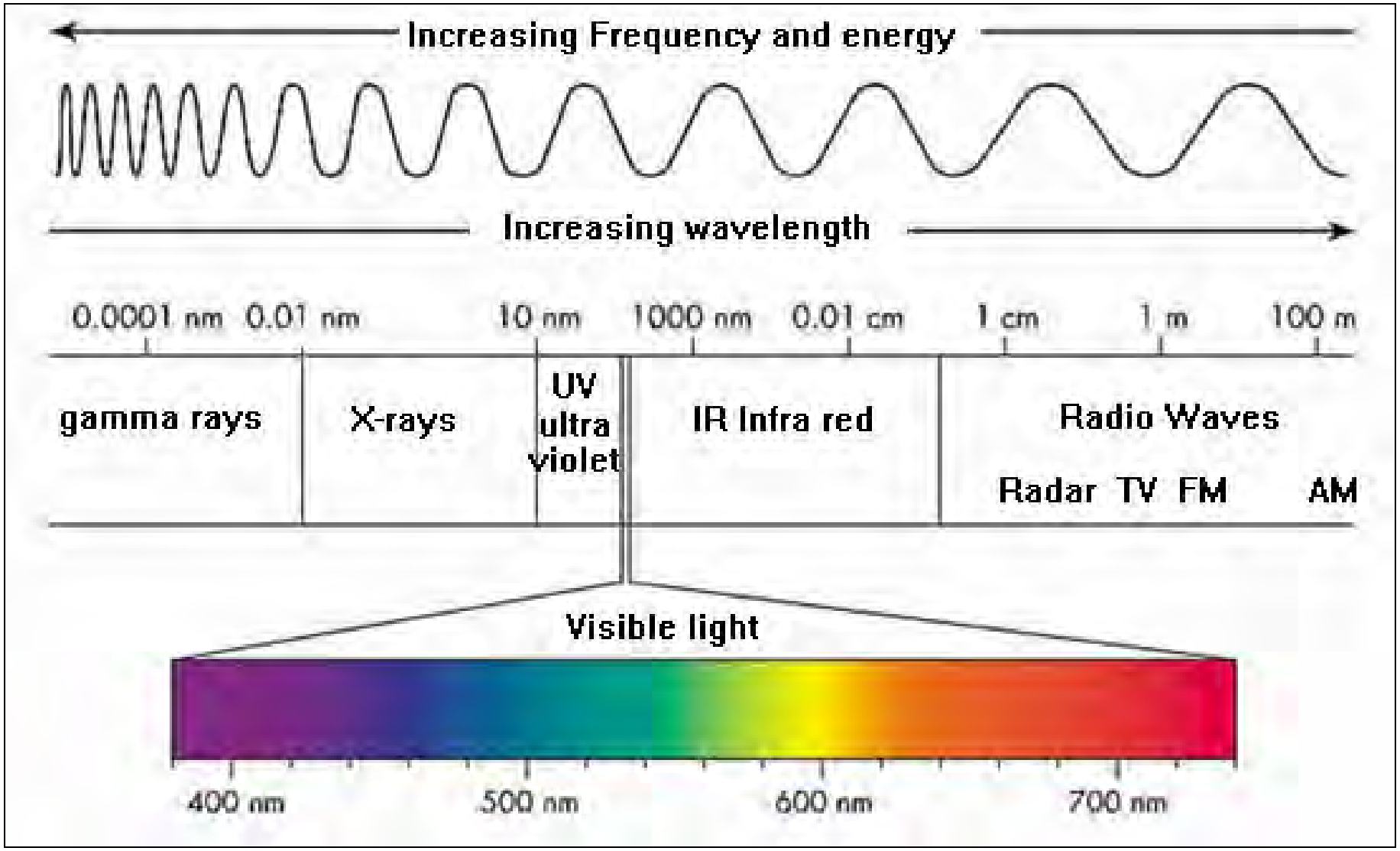
Methods

ENVI 4.8
ArcGIS 10
Plant surveys



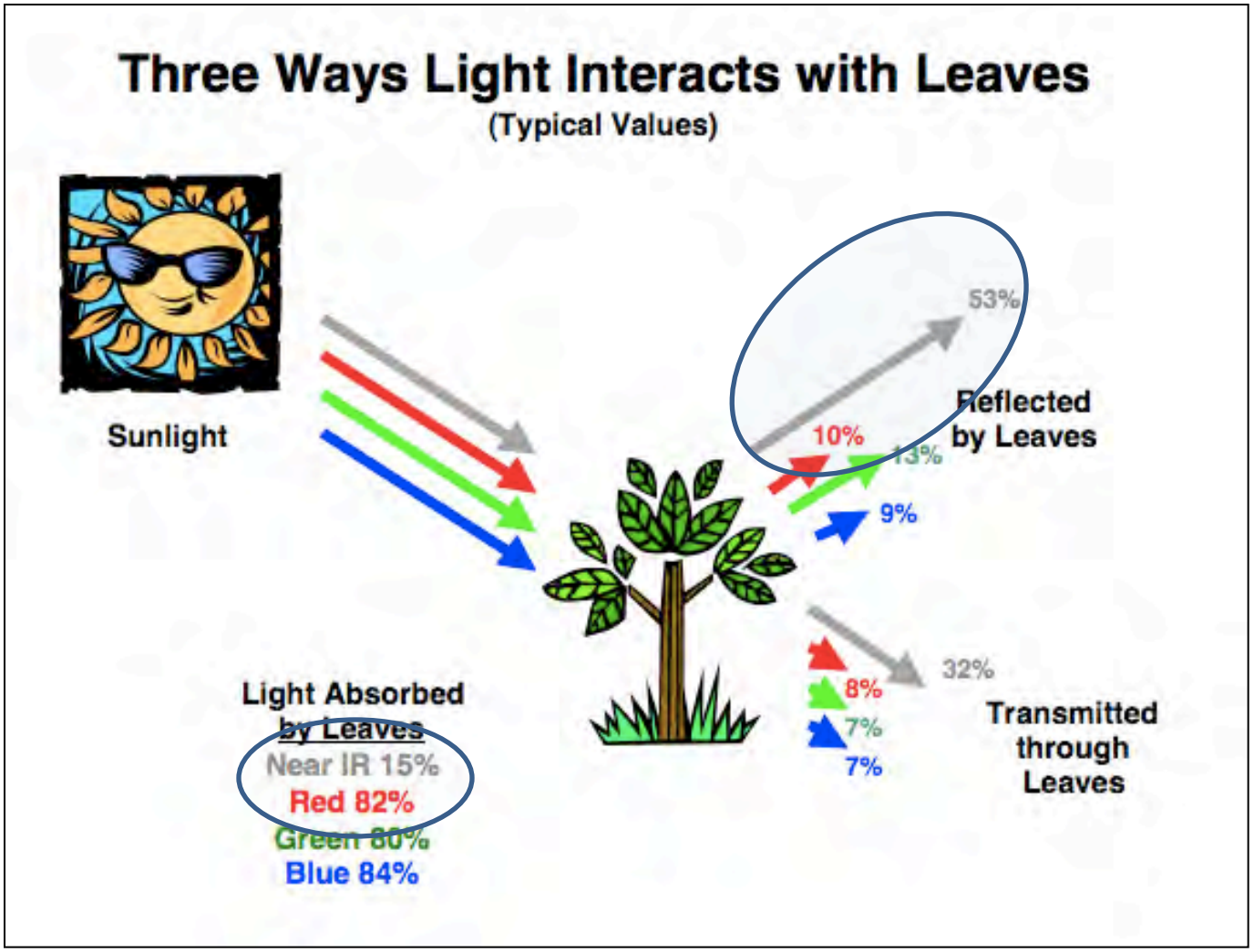
National Agricultural Information Program
NAIP

- Aircraft
- 4 band- RGB +IR
- Assess agriculture
- Flown during growth
- 1 meter resolution



http://danielharvey9.edublogs.org/files/2009/10/em_spectrum2.jpg

Plants reflect IR more than red



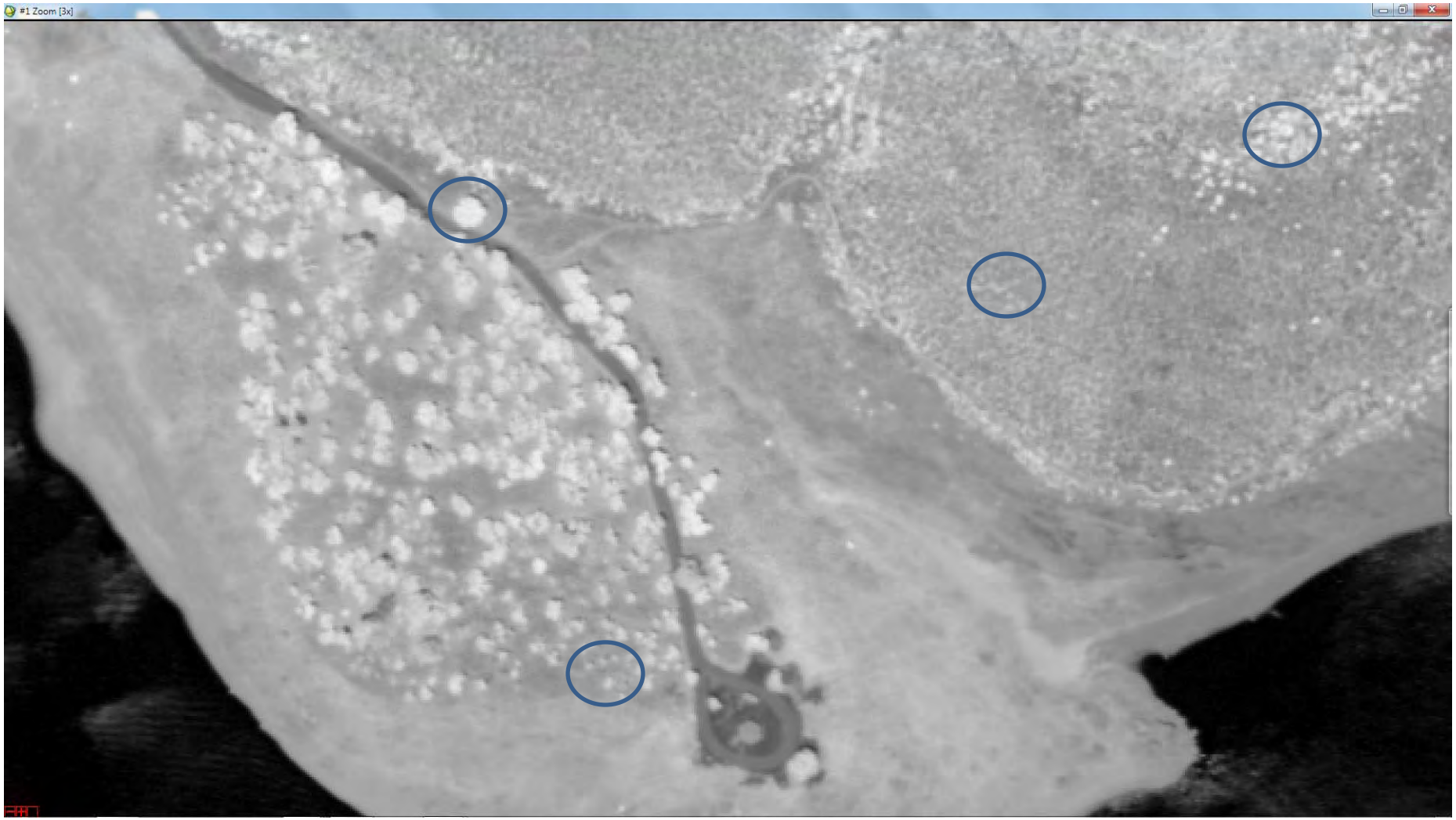
http://mvh.sr.unh.edu/resources/images/lightandleaves.png

Algorithms aren't that bad once you get to know them

$$NDVI = \frac{IR - red}{IR + red}$$

Normalized Difference Vegetative Index

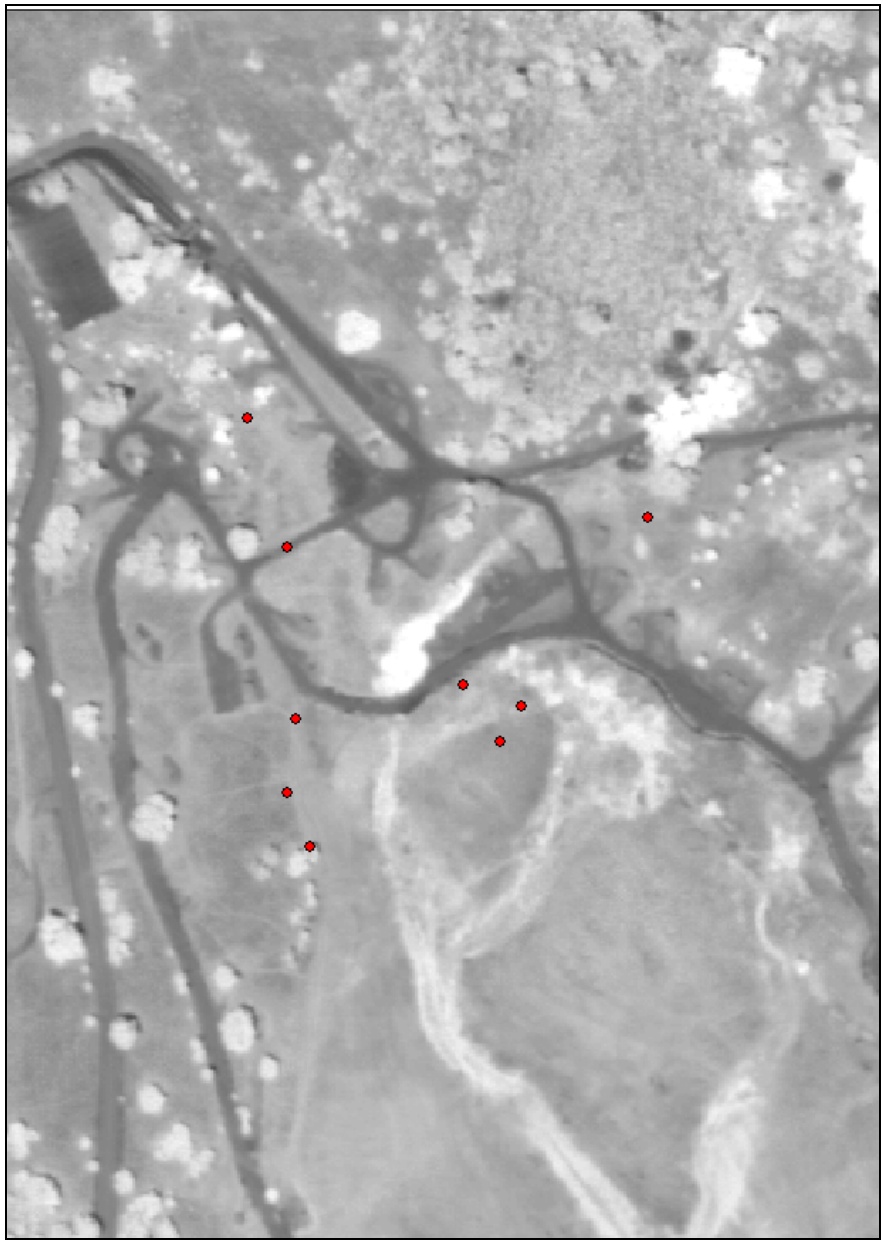
My epiphany



Woody species ID is possible

Prediction is possible

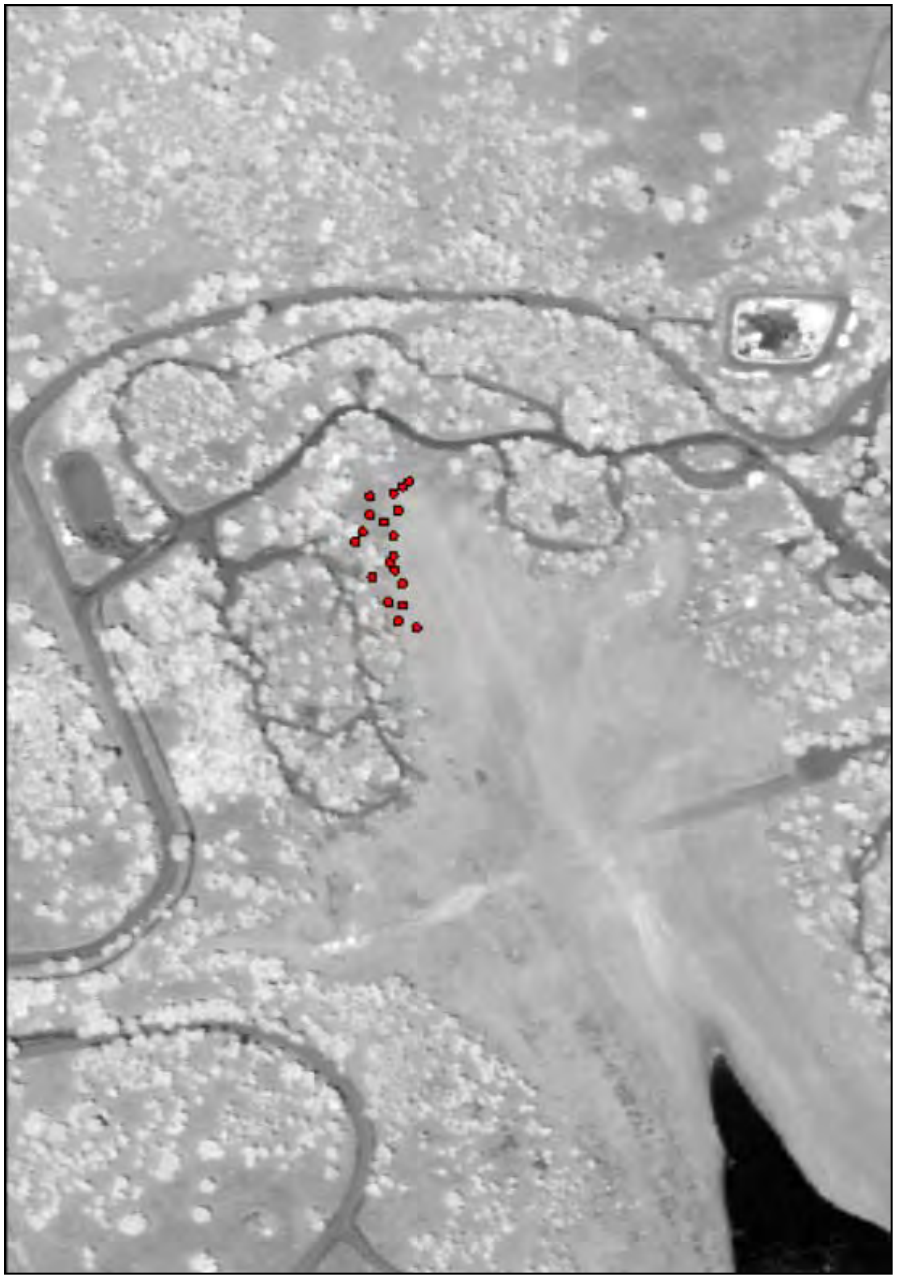
Mow watercourses in Oak Knoll and Acorn campgrounds



Prediction is possible

Mow banks subject to flooding

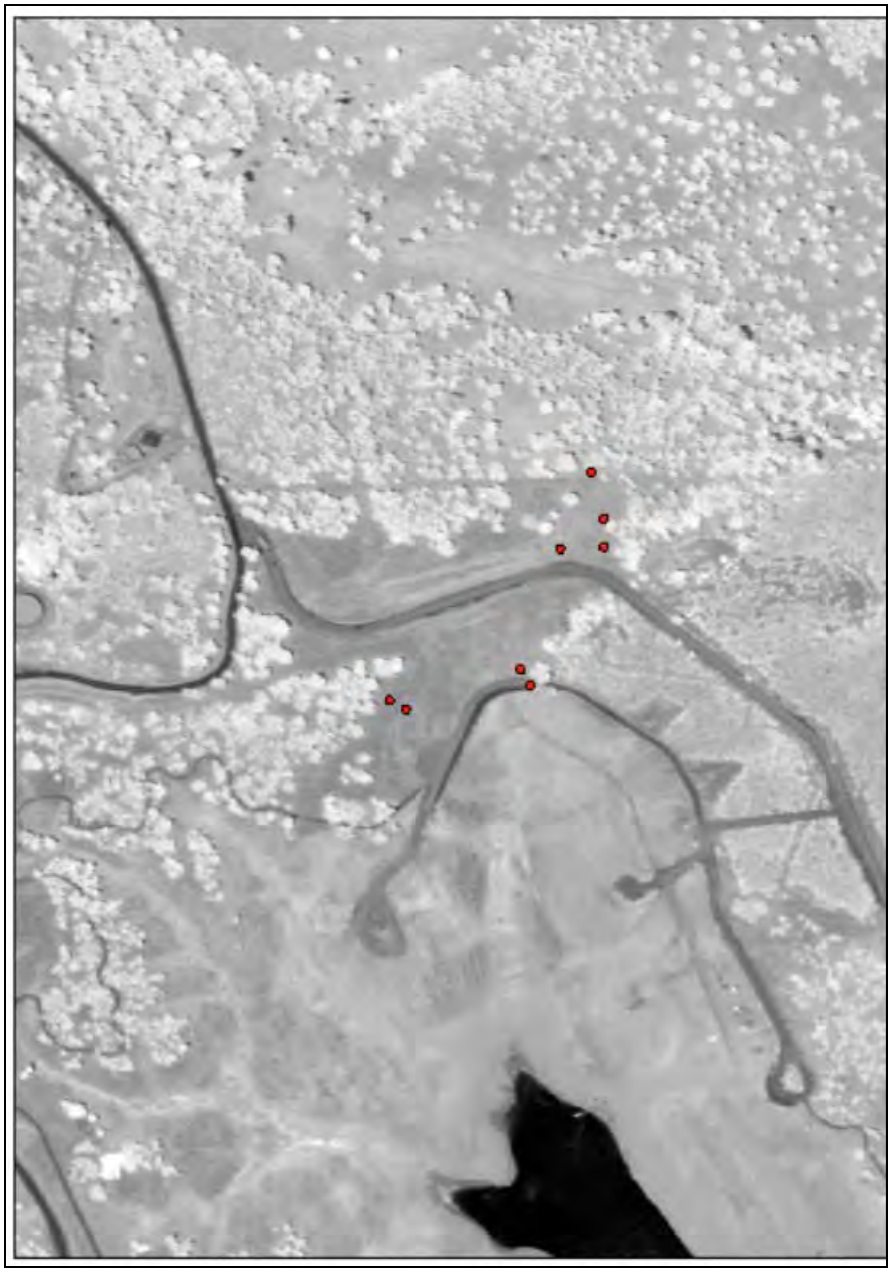
The disturbance of variable water levels facilitates infestation



Prediction is possible

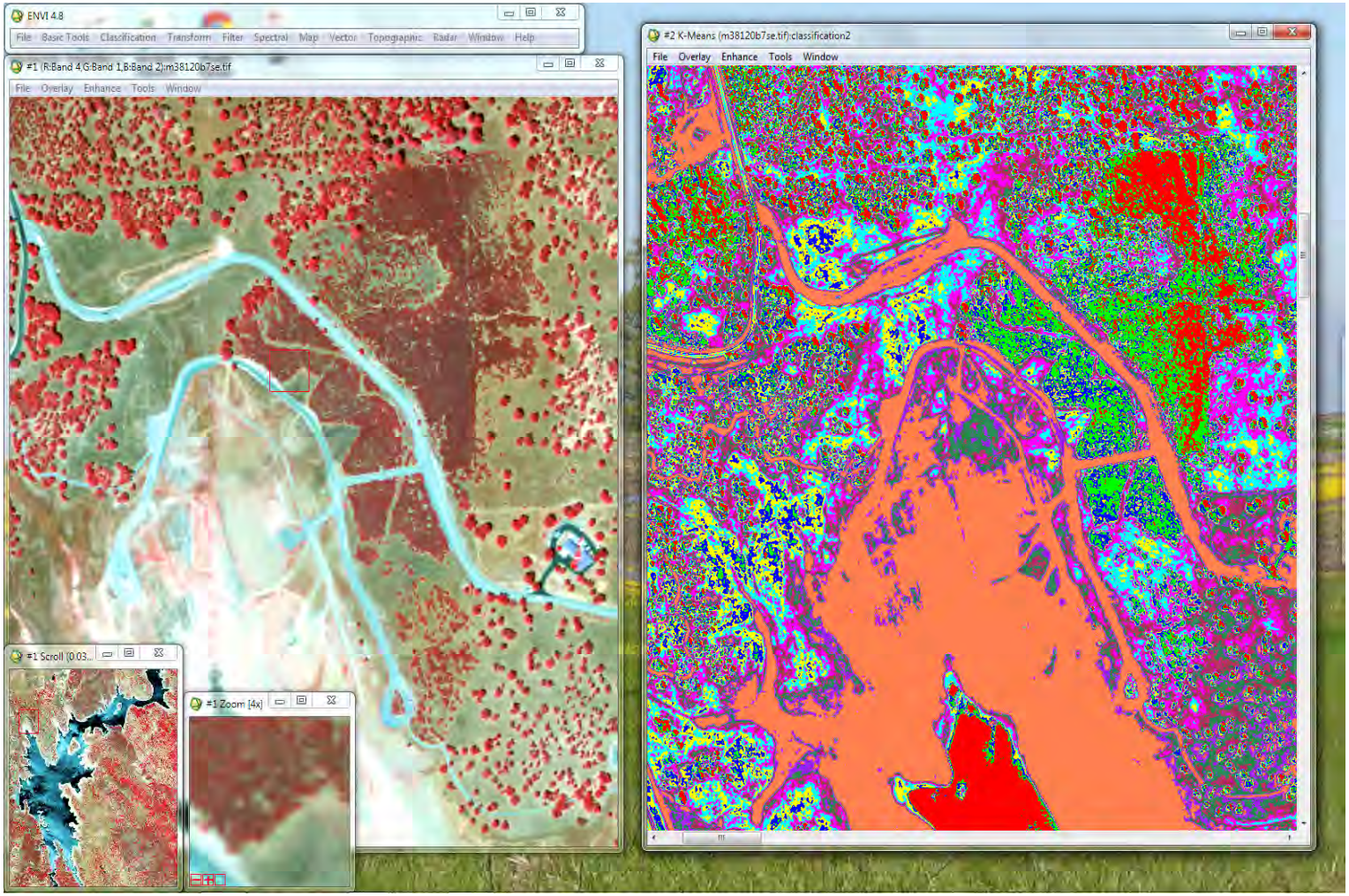
Mow this field as experiment

It may take several years to reduce population



K- means unsupervised classification

Suggests saturated soils in June are key predictor for medusa head presence



Conclusions

1. Adding remote sensing to a field program increases its power

2. Actively recruit GIS student interns

3. Software cost for this project - $195