

A photograph of a desert landscape with a dirt path, sparse vegetation, and a research plot sign. The sign is a white rectangular plate with a black border, mounted on a wooden stake. It contains the following text: "ALLOT June Tank", "PAST Findlay", "PLOT NO. 8", and "DATE 8-2-06". The background shows a wide expanse of dry, scrubby vegetation under a blue sky with scattered white clouds.

Monitoring Protocols and Tools
From Sky Down and Ground Up

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Introduction

- Traditional methods
 - Brush
 - Herbaceous
- Newer technology and methods
 - Can capitalize on the huge amount of remote sensed data available



Brush monitoring methods

- Density
 - Belt transects
- Cover
 - Line intercept



Herbaceous monitoring methods

- Point
 - Ground cover
- Dry-weight rank
 - Species composition
 - Estimate by relative dry-weight of aboveground biomass
- Comparative Yield
 - Estimate yearly total production by weight



Density

- Number of individuals per given area
- Sensitive to changes in population caused by climatic conditions or resource uses
- Provides useful information on seedling emergence, survival, and mortality



NO. 1000
ALLOT *Siha Tank*
PAST *Indian*
PLOT NO. *7*
DATE *8-2-06*



ALLOT *June Tank*
PAST *Findlay*
PLOT NO. *8*
DATE *8-2-06*

Plant cover

- Percent cover
 - By species
 - Total cover
- Line intercept
 - Canopy and basal cover along a line (tape)
 - Species composition (by cover)
- Point methods
 - Foliar cover
 - Ground cover







Dry Weight Rank (DWR)

- DWR is a “quick and dirty” method to estimate species composition based on dry weight of above-ground biomass.
- The first 3 species in a quadrat in terms of dry weight are ranked.
- A weighting procedure is used to estimate percent composition.
- DWR is easily combined with frequency and provides additional information useful for estimating range condition or ecological status.



Comparative Yield

- CY estimates total current year's production.
- Reference quadrats (5) selected to represent range of production for vegetation type.
- Quadrats in larger sample rated on a 1-5 scale.
- Clipped weights in reference quadrats used to convert average rank to pounds per acre.
- Easily combined with both frequency and DWR if production data are needed.



Rank 1



Rank 2



Rank 3



Rank 4



Rank 5

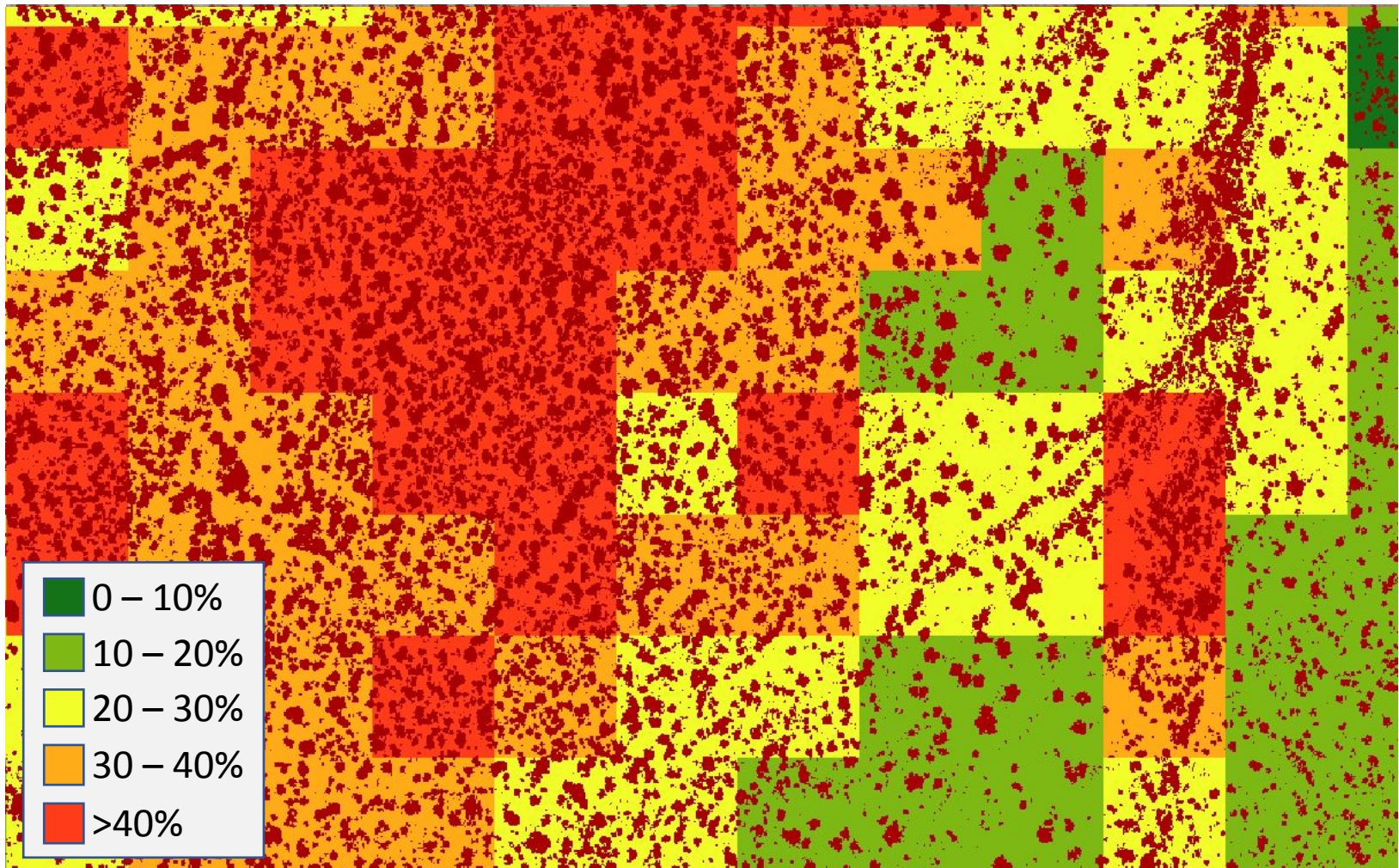
Aerial Imagery

- Aerial imagery is now routinely captured at 3-7 cm (by either manned or unmanned)
- 1-cm is quite possible
- In Arizona, NAIP is released to the public at 60 cm
- This is orthoimagery useful for top down analysis
 - Distortion of a common photograph is eliminated



NAIP,
2017

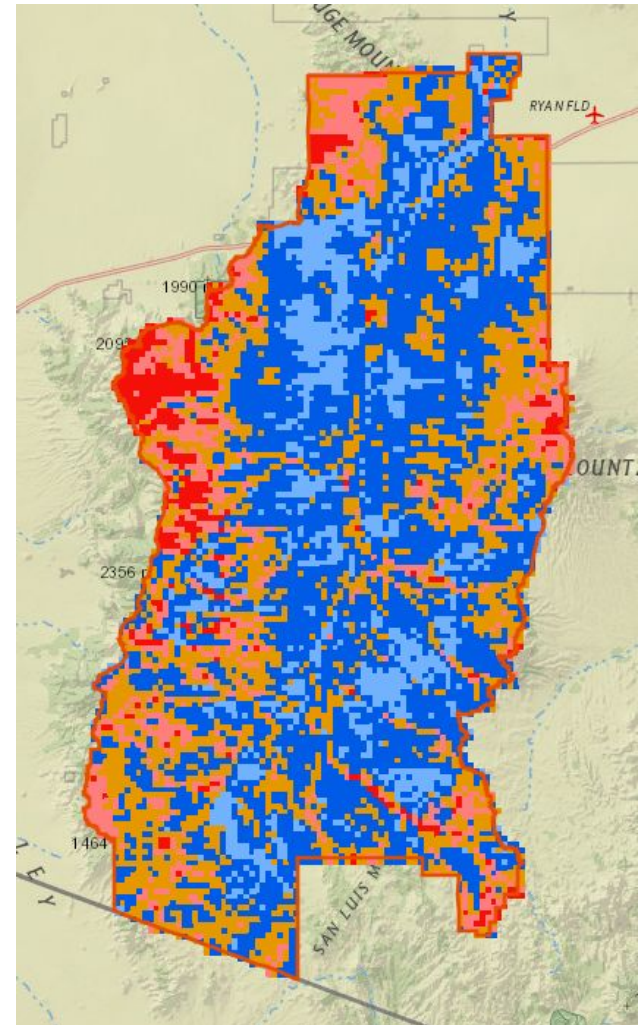
Landscape analysis



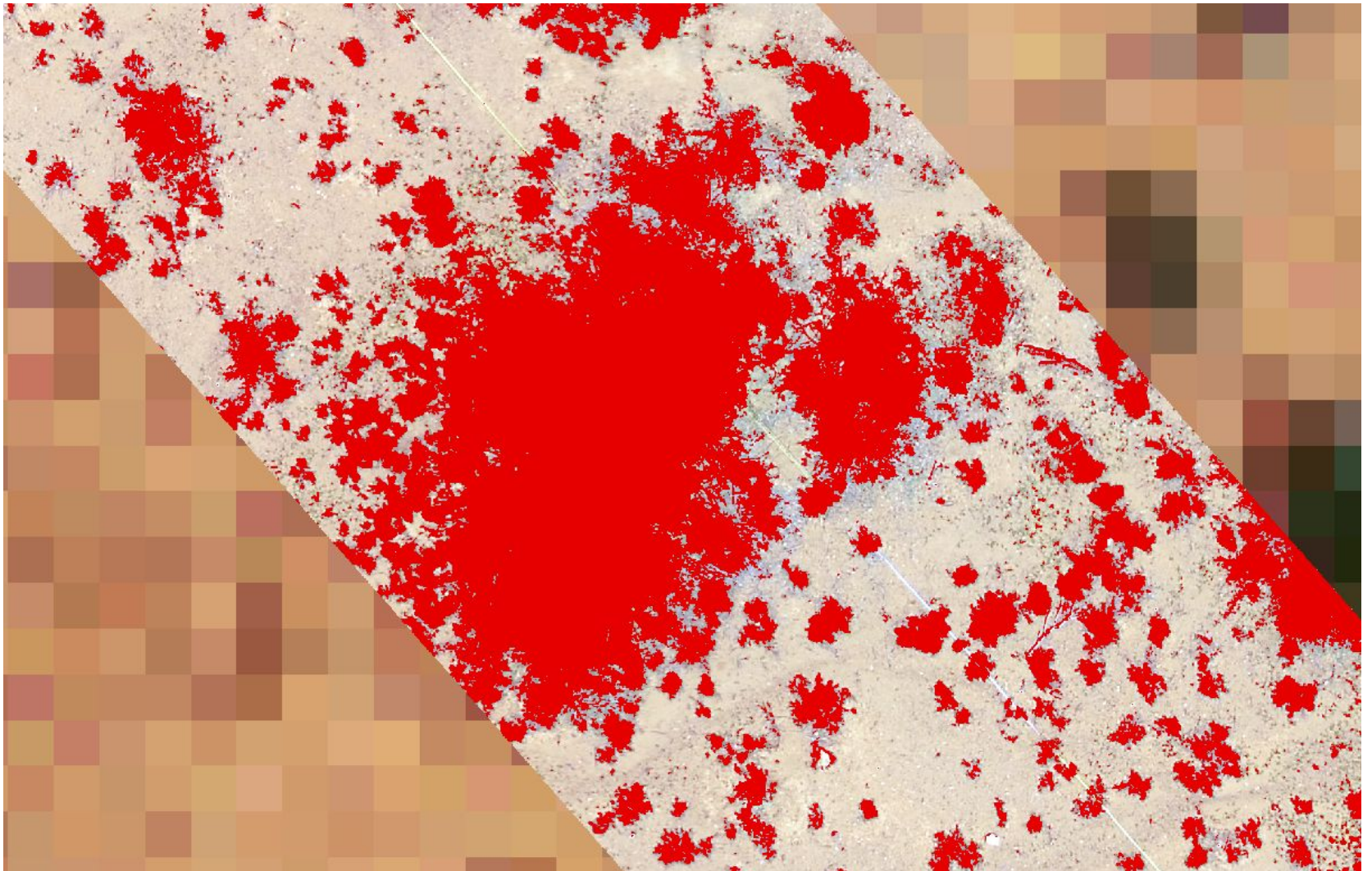
100 m

Advantages / Disadvantages

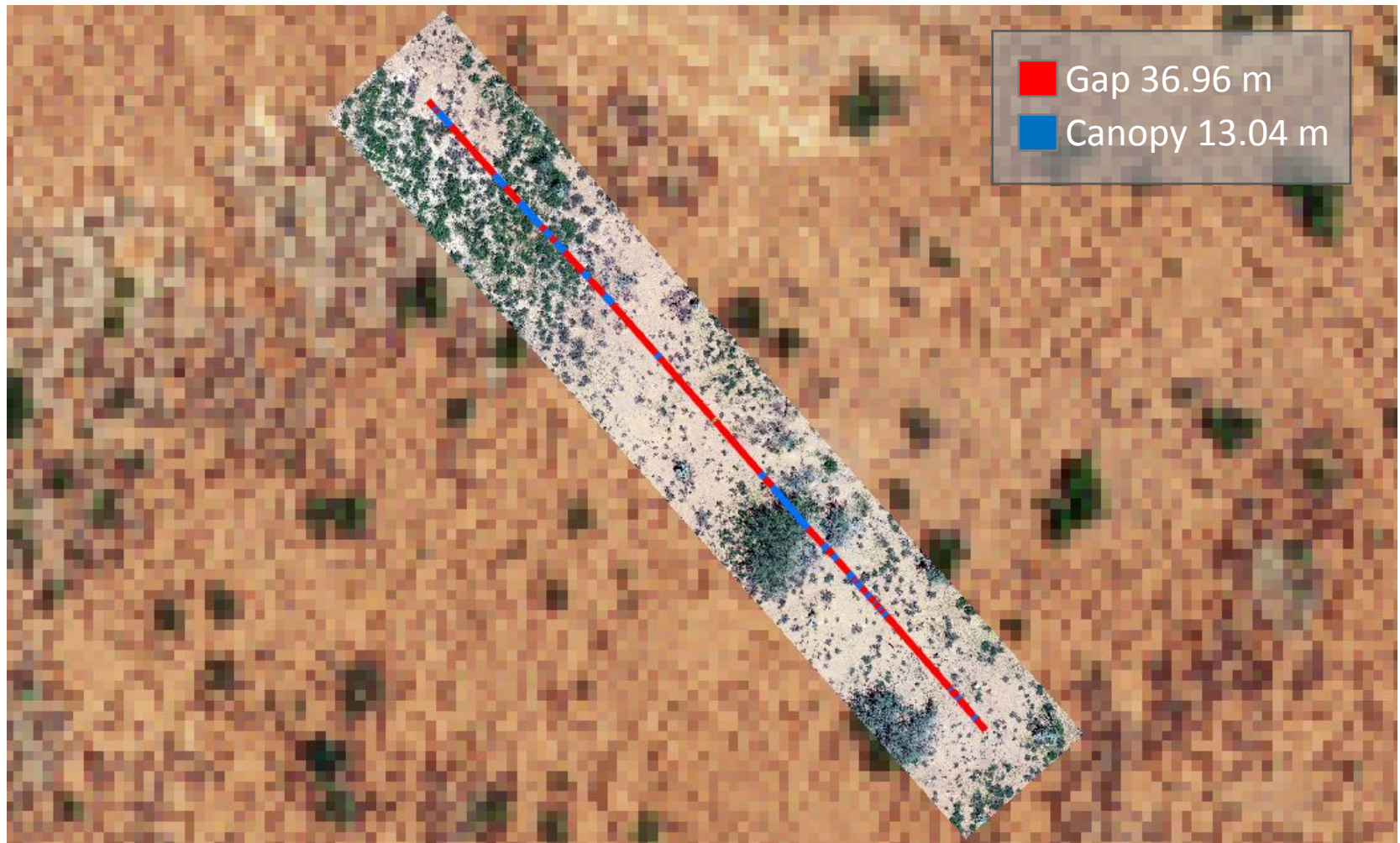
- **Advantages:**
 - If 60 cm resolution is acceptable, a census is possible
 - A suite of geospatial statistics tools are available
 - At least four bands
 - Cost effective
 - Analysis is available anywhere there is imagery
- **Disadvantages**
 - Many standard monitoring techniques not supported
 - Top layer only
 - What do we miss at 60 cm?
 - Dependent on others' plans
 - Difficult to determine species



Plot analysis

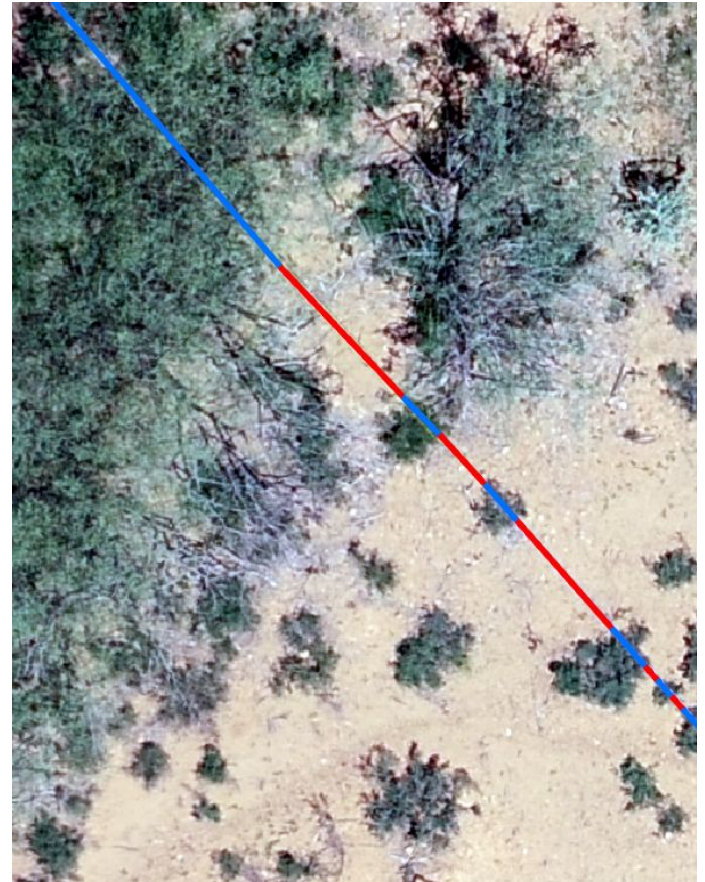


Analysis



Advantages / Disadvantages

- Advantages:
 - On demand
 - 1-2 cm resolution census is possible over a *plot*
 - At least four bands
 - A suite of geospatial statistics tools are available
 - Can areas in remote, difficult to reach places
 - Transect lines are straight and people aren't stomping around the transect
- Disadvantages
 - Many standard monitoring techniques not supported
 - We gain information only about the top layer
 - With public imagery, only the analysis incurred a cost, with aviation, the flights incur a cost as well
 - Difficult to determine species



Wrap up

- Rich collection of standard and aerial techniques available
- Management and monitoring objectives influence the method
- It's not a competition between technologies
- Questions