

Watching grass grow: Mapping dryland vegetation communities with phenology

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Grass is not always greener...

- In drylands, vegetation is highly variable across space and time
- Vegetation productivity is driven by rainfall, but direct observation is complicated by remoteness and access difficulties
- Remote sensing methods can assist in mapping spatial and temporal variation

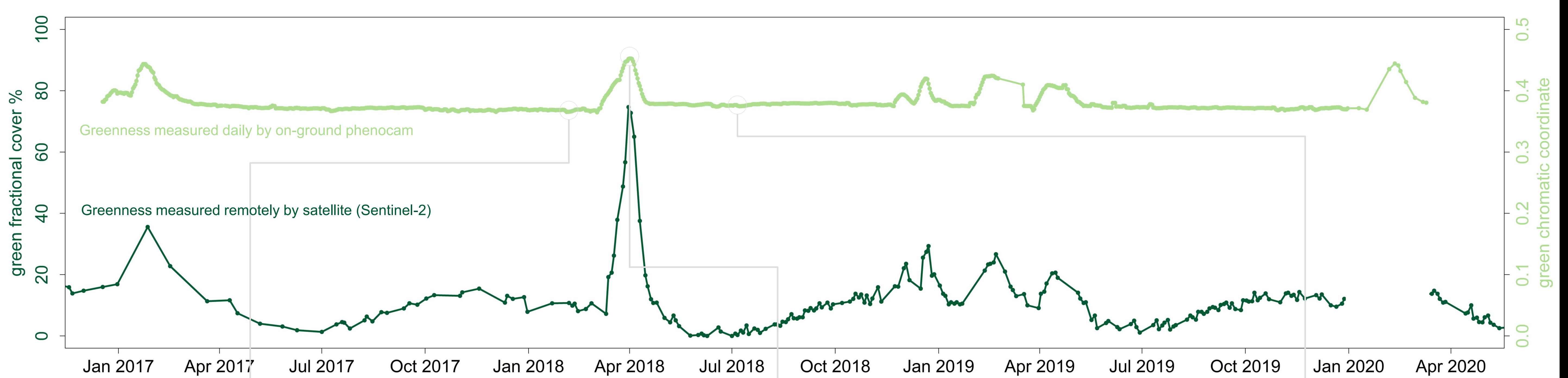
Finding food for endangered species

- The endangered Night Parrot (*Pezoporus occidentalis*) feeds on grass seeds, which grow in higher productivity patches
- These patches are too small or dynamic to be mapped by existing methods
- Fine scale mapping using remote sensing and phenology may help find resource patches for this extremely rare species

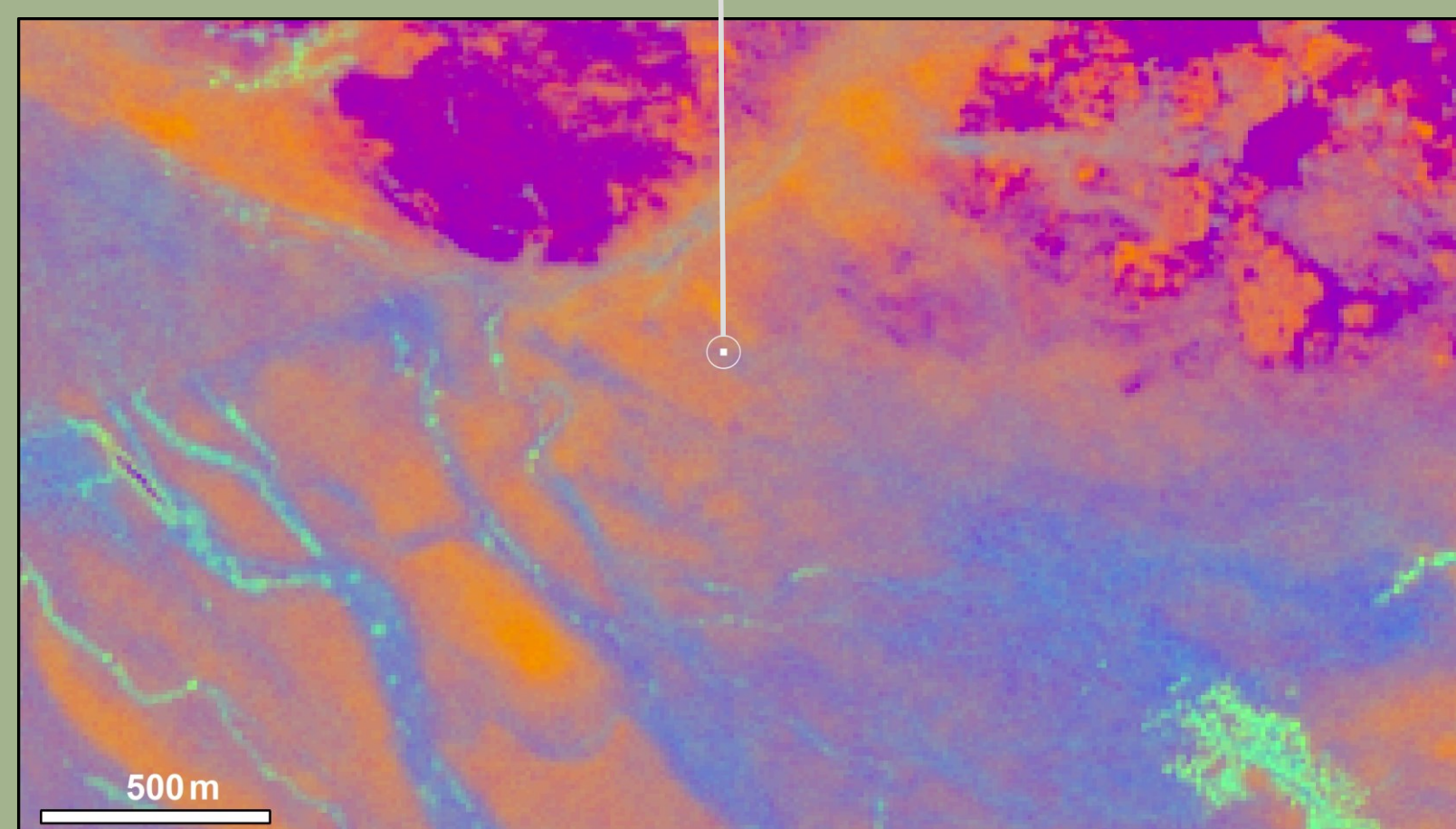


Phenocams and satellites

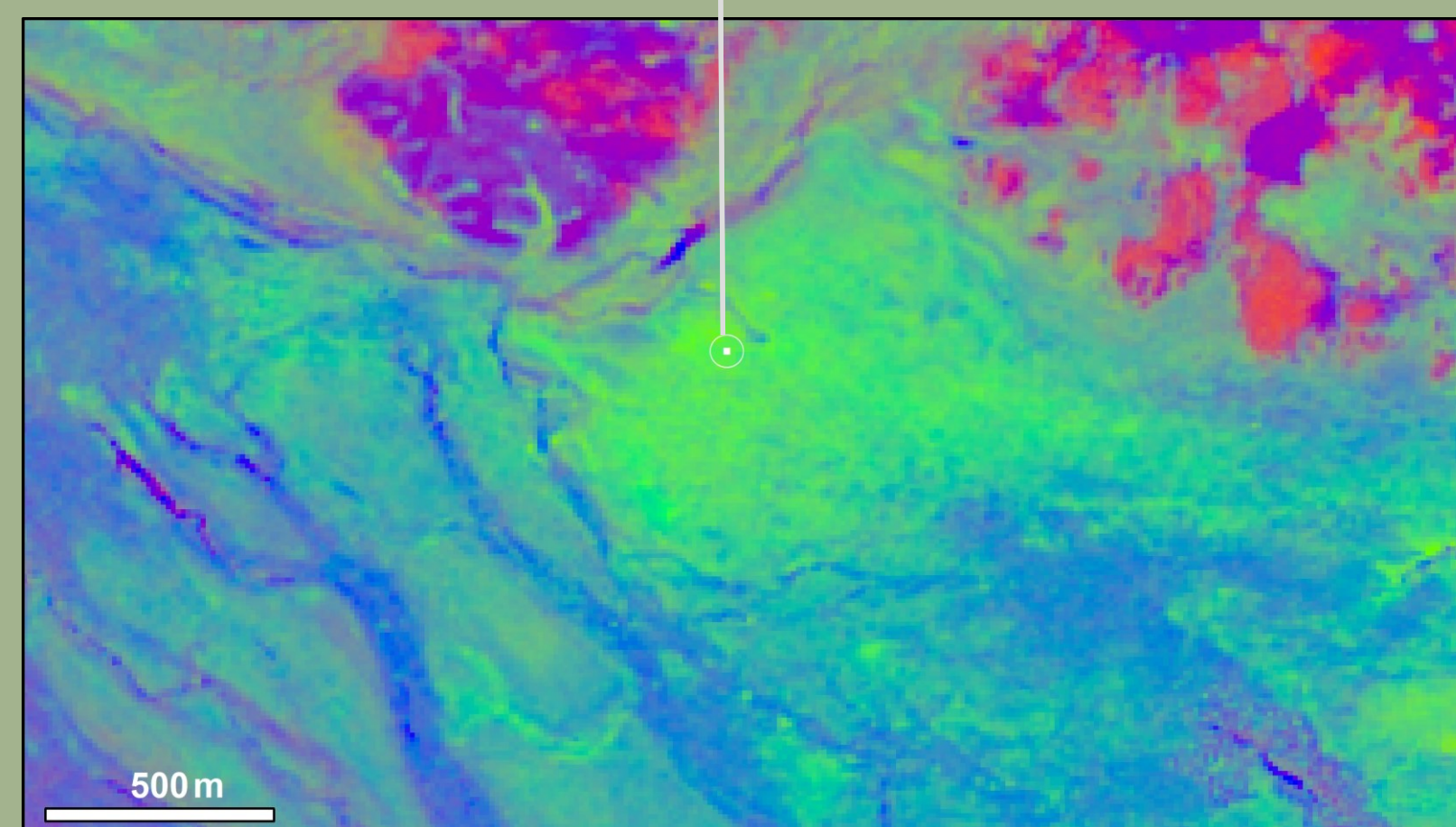
- We use a network of cameras (phenocams) to monitor changes in greenness from the ground
- We use satellite-derived fractional cover data to monitor greenness from space
- We combine these datasets to analyse vegetation dynamics in the Channel Country grasslands of Queensland



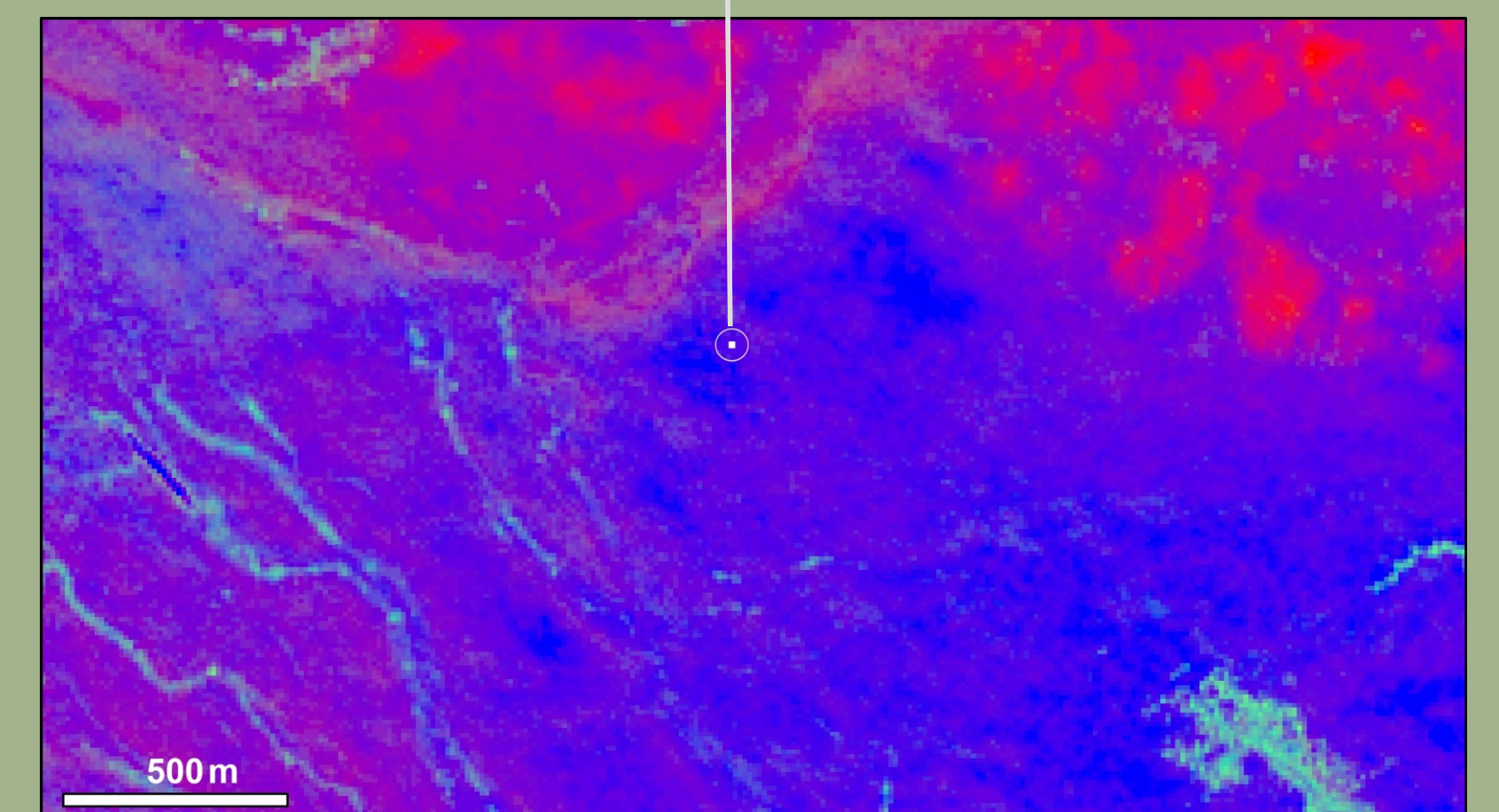
Bare ground and dry cover following dry summer



Peak greenness 9 days after 50mm rainfall event



High levels of dry cover following April growth period

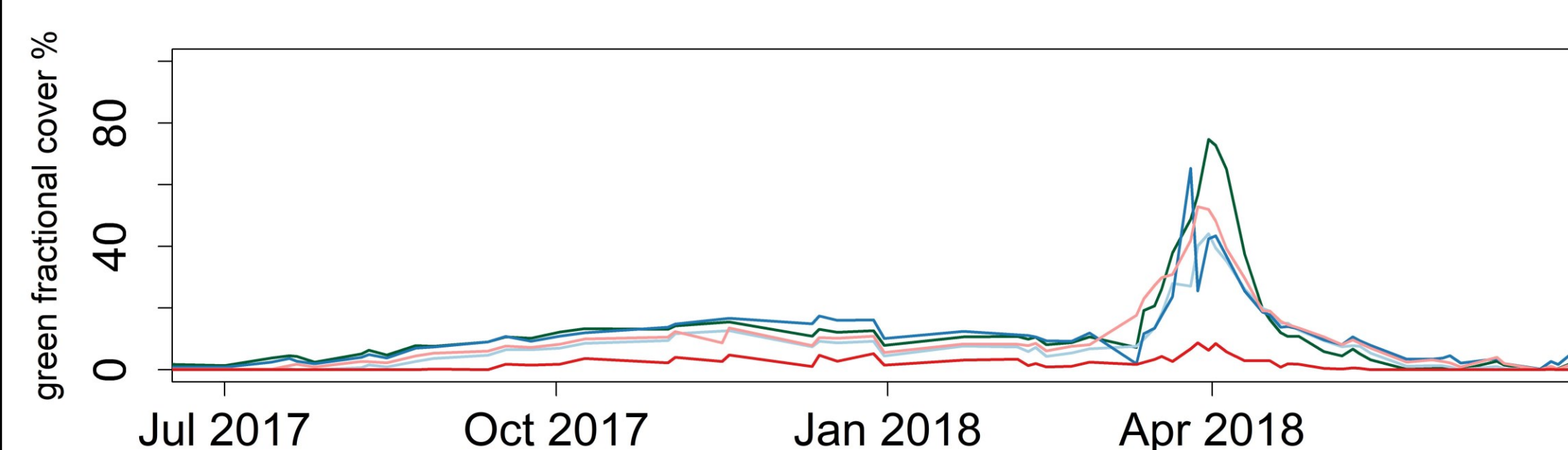


Rapid greening in run-on area

- Over three years of detailed phenological data has been captured for 10 phenocam sites.
- Imagery and greenness data is shown above for one of these sites, a major feeding resource for the Night Parrot.
- Interannual variability in greenness is high, due to the unpredictable amount and timing of rainfall.
- Large rainfall events (50mm) can lead to extremely rapid greening, and an abundant seed resource.

Changes in relative greenness between sites

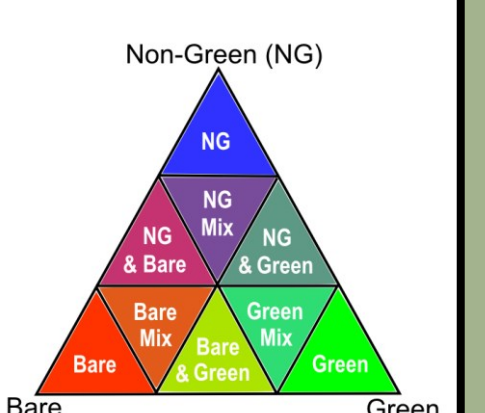
- Different vegetation communities respond at different speeds and intensities to rainfall.
- The plot below shows the increase and decrease in relative greenness over time for five grassland sites. There is little difference between sites until major rainfall in late March 2018.



- These differences in the timing and magnitude of peak productivity can be used to create fine scale vegetation resource maps.

Data types

- Green chromatic coordinate is a greenness index derived from the phenocam RGB values.
- Fractional cover shows the proportion of bare ground, green and non-green cover per pixel



Acknowledgements

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