

AusPlots

Plot-based surveillance monitoring program, undertaking consistent and ongoing ecological assessment of Australian ecosystems. The data collected can be integrated with existing knowledge and additional data to help scientists and land managers better monitor, understand, and manage Australian ecosystems.

AusPlots: Rangelands

Baseline surveys of vegetation and soils in Australian rangelands bioregions at 1ha permanent plots using consistent standardised methodology. Data collected include measurements, samples, and photopoints.

Box 1. AusPlots: Rangelands - Collection Methodology.

A PDA/Smartphone application designed by AusPlots Rangelands facilitates field data entry, data storage, sample tracking through their identification, vouchering, and analyses along with sharing of data with the wider community.

Summary of Collection Methodology:

1. *Plot description:* Use 'Yellow Book*' for physiography.
2. *Plot layout:* Grid with 10 transects of 100m. DGPS grid corners and centre & start and end of transects. Dropper at each corner and centre. Transects: Tape with marker pegs at start and at end. Color coded.
3. *Photo panoramas:* 360⁰ panoramas from 3 points (with DGPS locations) around the central peg.
4. *Vascular plant voucher samples:* Collected for each species, barcoded, scanned with app, and pressed. Create a species list for the plot.
5. *Genetic and isotope samples:* Sub-samples from vouchers collected; replicates for dominant perennial species (foliage protective cover >2%). Placed in tea bags, barcoded,

scanned with app, and placed in plastic box with silica gel.

6. *Point Intercept*: At 1m intervals along 5 E/W and 5N/S transects (1010 points) record plant species cover/growth form, height, and stratum at the vertical projection (above and below). A laser pointer is used to ascertain vertical projections. A densitometer is used to view the canopy recording hits or 'in-canopy sky'.
7. *Basal Area*: At 9 locations throughout the plot determine the basal area (m²/ha) of trees and shrubs at 1.3m using a basal wedge.
8. *Structural summary*: For upper, middle and lower strata nominate the 3 dominant species in descending order. This methodology is used to characterize level V (i.e. Association) in the National Vegetation Information Survey (ESCAVI, 2003) framework for describing and representing vegetation types. Complete at end of plot survey.
9. *Leaf Area Index (LAI)*: If canopy height is >2m, LAIs calculated at 50 points in quadrat along N/S transect.
10. *Soils*:
 - a. *Plot description*: Following Yellow book.
 - b. *Soil characterization* at SW corner: 500g samples collected at 10cm increments to 1m. Horizon boundaries and depths recorded, pit/site photographed, collected and barcoded.
 - c. *Soil cores* taken at 3 depths (0-10, 10-20, 20-30cm) in 9 locations using a corers or shovel. Pit photographed, GPS, collected, and barcoded.
 - d. *Soil bulk density*: Samples taken at 0-10, 10-20, and 20-30 cm from pit.
 - e. *Soil samples* to CSIRO National Soils Archive.
11. *Soil metagenomics*: At 9 locations surface soil samples (200g to 3cm) collected, barcoded, and bagged with silica gel.

* "Yellow Book" = The National Committee on Soil and Terrain (2009). Australian Soil and Land Survey Field Handbook. (It is colloquially referred to as the "Yellow Book" because of the color of its cover).

AusPlots: Forests

Repeated measurements taken in a continental-scale monitoring network of plots in tall eucalypt forests ecosystems. The attributes measured allow the tracking of tree growth, forest productivity, and carbon dynamics.

Box 2. AusPlots: Tall Eucalyptus Forests - Collection Methodology.

Live stems $\geq 10\text{cm}$ diameter:

- (a) identified to species level
- (b) diameter measured at 1.3m, unless buttressed or deformed where strict rules determine an alternative point of measurement
- (c) tagged with a permanent unique identifier
- (d) assigned a stem form (e.g. broken top, double leader, etc.)
- (e) assigned a position in the canopy (e.g. suppressed, dominant, co-dominant, emergent) and a growth stage (e.g. regrowth, regenerating, mature, senescent)
- (f) attributed X and Y coordinates (between 0 and 100) in relation to a georeferenced corner of the plot (0,0).

Dead trees: Measured and assigned codes describing the physical mechanism for mortality according to RAINFOR coding (Malhi et al., 2002; Phillips et al., 2009).

Overstorey and understorey: Height measured for a tree subset across the observed diameter range using a rangefinding digital hypsometer.

Canopy: Hemispherical photographs collected at 16 internal fixed posts at intervals of 20m within the plot.