

TERN's Data Types Overview

Description of the main types of data available at TERN.

<i>Data Type</i>	<i>Data Sub-type</i>	<i>Data Description</i>
Landscape Assessment	Remote Sensing (AusCover)	<p>Remotely-sensed validated geodata from satellite and airborne platforms such as aircraft and drones. Results from the collaboration of over 12 Australian government and academic institutions. This collaboration provides a nationally consistent methodology for the calibration of instruments, as well as the collection, validation, and delivery of geodata products (in fact this data is also the basis for calibration of numerous global earth observation data products). The resulting geodata products enable researches and resource managers to assess and investigate the state and dynamics of Australian environments.</p> <p><i>AusCover</i> data products can be classified in the 8 Themes below (in brackets the number of data product types per theme). Some data products can be ascribed to more than one Theme.</p> <ol style="list-style-type: none"> 1. <i>Land Cover Dynamics & Phenology</i> (24): datasets characterise the changes in vegetation cover due to seasonal (phenological) or long term (climatic) influences. 2. <i>Vegetation Structural Properties & Biomass</i> (36): data sets that describe a range of structural properties of vegetation communities, including measures of cover, height, and biomass. 3. <i>Vegetation Composition & Diversity</i> (12): respectively data that identify the dominant species and characterised the variety of species of trees and/or shrubs in an area. 4. <i>Field Survey Datasets</i> (11): field data for remote sensing calibration and validation (cal/val) at selected sites located within representative and/or conservation significant biomes of Australia. 5. <i>Fire Dynamics & Impact</i> (10): bushfire-related data of two main categories: burnt area mapping (scars), and active fire fronts (hot spots). 6. <i>Airborne Datasets</i> (4): LiDAR and Hyperspectral data collected over the primary TERN AusCover field sites.

		<p>7. <i>Corrected Surface Reflectance Products</i> (6): Base data from which many of the terrestrial biophysical parameters are derived.</p> <p>8. <i>Other Environmental Data</i> (8): Data products not directly derived from, or that do not provide validation for remote sensing products, but are available through the TERN AusCover systems.</p> <p><i>Landscape Assessment</i> (AusCover) Themes are described in detail in <i>Appendix I., Table App.I.1.</i>, The data product types included in each Theme are enumerated in <i>Appendix I, Table App.I.2.</i> All <i>AusCover</i> data product types are described in detail in <i>Appendix I, Table App.I.3.</i></p>
	Soil and Landscape Grid of Australia	<p>Nationally-consistent and comprehensive soil and landscape attribute data at a fine resolution (3 arc-seconds ~ 90x90m pixels; finer than ever before). Draws together historical data and new data generated from sampling, laboratory sensing, modelling and remote sensing. These data has a wide range of applications and users including urban and regional planners, land managers, farming groups, scientists and engineers.</p> <p>The grid is an essential piece of national information infrastructure that allows view and access the best available information about Australian soils and landscapes. It is the result of a significant national collaborative effort bringing together researchers from the CSIRO, the University of Sydney, Geoscience Australia and federal, state and territory government agencies.</p>
Ecosystem Surveillance Monitoring (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.
	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.
	Forest	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.
Ecosystem Process Monitoring (OzFlux)		Measurements of flux (i.e. exchange) of CO ₂ , water vapour, and energy between a terrestrial ecosystem and atmosphere, as well as meteorological data (wind, precipitation, temperature, solar radiation, humidity) collected by a micrometeorological flux tower station. A network of towers around Australia provide a common set of core measurements at different ecosystems and multiple times. These measurements can improve understanding of Ecosystem Functioning, Biogeochemical Cycles, and Climate Adaptation, as well supply valuable information for land management and mitigation policies.
BioAcoustics		Recordings captured using acoustic sensors placed in the Australian SuperSites Network (SuperSites). These recordings provide an effective means for monitoring biodiversity at large temporal scales in significant Australian biomes.

BiolImages	Provide visual records of state and changes over time in archetypical and important ecosystem types.	
	Leaf Area Index (LAI) images	Canopy images used to calculate LAIs. LAI is the preferred measure of cover for vegetation. It relates to the total one sided area of leaf tissue per unit area of ground. This is a key derived parameter that is associated with vegetation water and light interception, radiation transfer, water and carbon exchange. It is used in total vegetation biomass estimation and in carbon cycling prediction models. An alternative proxy measure (less preferred) for actual canopy leaf area is <i>Canopy Cover</i> . Canopy Cover can be defined as the fraction of ground shaded by the vertical projection of tree crowns.
	Phenocam images	Time-lapse photographs taken by fixed digital cameras. They enable cost-effective long-term record of vegetation structure and condition in diverse and sometimes remote Australian biome. Thus, they allow the tracking of seasonal and unseasonal changes in vegetation and ground cover. Thus, they constitute crucial tools to: (1) monitor ecosystems; (2) record and analyse ecological responses to climate variability and extreme weather events; (3) in combination with OzFlux data study surface-atmosphere exchanges of carbon and water; and (4) calibrate and validate satellite-derived remote sensing data (<i>AusCover</i> facility links ground-based phenocam images with airborne and satellite data to effectively scale up from intensively monitored sites to larger spatial domains up to the continental scale).
	Photopoint images	High quality digital photos taken from five set points in 1 hectare plots to create reference images. Photos are taken annually to record natural phenomena and how sites changes over time.
Australian Transect Network (ATN)	<p>The ATNs is a network of large-scale transect infrastructure that focus primarily on field observations and monitoring of natural and semi-natural terrestrial ecosystems. It delivers composition, structure, function and landscape data to the research community at two scales:</p> <ul style="list-style-type: none"> - <i>Regional to national</i>: Transect envelope, plot stratification and observations are tailored to the target landscape for maximum relevance to regional planning, management and policy setting. - <i>National to international</i>: a layer of standardised observations of vegetation and soil attributes and samples, achieved through co-location with TERN AusPlots, enables consistent ecological assessment and ongoing monitoring within a transect science framework across the entire network. <p>The ATN provides access not only to transect data, but also to plant vouchers, plant genetic samples, invertebrate genetic samples and soil samples for research use, as well as participation in annual workshops for scientists and managers. Transects are laid out across all Australian states and territories and traverse major biomes, land tenures (including agricultural landscapes), and bioclimatic gradients (Figure X). Along the transects facilities from other data TERN collecting programs can also be found (e.g. AusPlots, Australian Supersite Network, LTERN, OzFlux).</p>	

The ATN facilitates the investigation across Australia's major terrestrial biomes of: patterns of spatial and temporal change in ecological communities, processes driving these changes (including climate change), species' and communities' adaptation, and ecosystem resilience. These findings in turn support natural resource management projects, policy settings, and conservation planning.

Each of the 7 transects in the ATN are described in detail in Appendix II. (Tables App.II.1. to App.II.7.).

Figure 1. Data collection scales at TERN.

