

## **Supplementary Material**

### **A history of CSIRO'S Central Australian Laboratory, 1: 1953–80: pastoral land research**

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## Supplementary Material 1

Italicised text refers to terms that are defined elsewhere in the glossary.

Term	Definition
Alice Springs region	<i>Arid land systems</i> within the Northern Territory borders including all pastoral grazing lands.
Arid and semi-arid rangelands	<i>Rangelands</i> that are specifically arid or semi-arid.
Arid lands	Equivalent to <i>arid zone</i> .
Arid zone	Technically, <i>drylands</i> where the Aridity Index (the ratio of rainfall to potential evapotranspiration) is between 0.05 and 0.20; semi-arid lands fall between 0.20 and 0.50; arid Australia is also often more loosely defined as lands bounded by the 250mm rainfall isohyet, and the semi-arid from 250-350mm in the south, 800mm in the north and 500mm in the east.
AridNet network	Global research network established under the auspices of the Global Land Project and leadership of James Reynolds after the Dahlem desertification conference in 2002, focused on applying the Drylands Development Paradigm in drylands socio-ecological systems.
Biodiversity	Variability among living organisms (including terrestrial, marine and other ecosystems and ecological complexes in which they are part) which includes diversity within species and between species and diversity of ecosystems.
Central Australia	<i>Arid land systems</i> occurring across the central portion of Australia (not confined to the Northern Territory).
Desert Australia	A popular term to describe areas of Australia that might otherwise more technically be called arid and semi-arid, particularly focusing on regions having an ARIA (accessibility/remoteness index of Australia) of 'very remote' and embedded major service centres; <sup>1</sup> 'Outback' is also used as an overlapping popular term.

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<sup>1</sup> M. Stafford Smith (2008) The 'desert syndrome'—causally-linked factors that characterise outback Australia, *The Rangeland Journal*, **30**, 3–14.

Desert Knowledge	Neologism introduced around 1998 by Bruce Walker, Centre for Appropriate Technology, to describe knowledge that comes from living successfully in desert Australia that could be leveraged to create new (or improve old) livelihoods for its inhabitants, and hence a 'Desert Knowledge economy'.
Desert Knowledge Precinct	Area just south of Alice Springs designated as a knowledge precinct by the Northern Territory Government to co-locate various knowledge organisations, including Desert Knowledge Australia, Batchelor Institute for Indigenous Tertiary Education and Centre for Appropriate Technology, where the Desert Knowledge Cooperative Research Centre and its successor were also located from 2007 and the Commonwealth Scientific and Industrial Research Organisation's Central Australian laboratory from 2009. The site hosts various other trials and programs including those established through the Solar Cities program in central Australia.
Desert system	Term introduced by Stafford Smith and Huigen in 2009 to extend the idea of the 'desert syndrome' as a description of key ways in which remote <i>dryland</i> social-ecological systems function, emphasising differences from more densely settled regions. <sup>2</sup>
Detritivore pathway	That part of the food-chain in which dead organic material is decomposed by insects and microorganisms.
Drylands	Lands where the Aridity Index (the ratio of rainfall to potential evapotranspiration) is less than 0.65, subdivided to dry sub-humid, semi-arid, arid and hyperarid in decreasing level of index (see also <i>arid zone</i> ).
El Niño-Southern Oscillation	An irregular periodic variation in winds and sea surface temperatures over the tropical eastern Pacific Ocean, affecting the climate of much of the tropics and subtropics. The warming phase of the sea temperature is known as El Niño and the cooling phase as La Niña. The Southern Oscillation is the accompanying atmospheric component, coupled with the sea temperature change: El Niño is accompanied by high air surface pressure in the tropical western Pacific and La Niña with low air surface pressure

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<sup>2</sup> As above. M. Stafford Smith and J. Huigen (2009) From Desert Syndrome to Desert System: developing a science of desert living, *Dialogue*, **28**(2), 8–18.

there. The two periods last several months each and typically occur every few years with varying intensity per period.

Exclosure	An area from which grazing animals are excluded for experimental purposes.
Farm Management Deposits	Financial instrument introduced by the Commonwealth Government in 1999 to allow eligible primary producers to set aside pre-tax income from their primary production activities during years of high income, to draw on in future years as needed as part of their risk-management strategy; the detailed implementation has been modified over the years.
Fire regime	The pattern, frequency, and intensity of wildfires that prevail in an area over an extended period of time.
Fractional ground cover	The proportions (fractions) of photosynthetic (green) and non-photosynthetic (inert) vegetation, and bare soil within each remotely-sensed pixel.
GRASP	Name of the Grass Production Model developed by a group led by Greg McKeon in the Queensland government, originally aimed at simulating pasture growth for tropical and sub-tropical grasses in the state, but subsequently extended across Australia; the Commonwealth Scientific and Industrial Research Organisation collaborated with the group extensively from the early 1990s.
Grazing gradient	Observed gradient of impact of grazing associated with the generally decreasing density of stock activity with distance from waterpoints in large rangelands paddocks.
Grazing lands	Country used for grazing animals.
Grazing pressure	Forage demand from grazing animals relative to forage supply.
Homelands	Small settlements established at the initiative of Aboriginal people from the late 1970s to re-establish their occupation of traditional lands. Typically, one family group with one to several houses and simple infrastructure.
Indigenous Protected Area	Areas of land managed by Indigenous groups in accordance

with Traditional Owners' objectives and for biodiversity conservation.

Landscape Function Analysis	A field procedure using readily observed indicators to assess and monitor soil properties as they affect plant growth at the hillslope scale. The indicators represent physical, chemical and biological soil properties in terms of dynamic processes rather than static properties such as colour.
Land system	Mapping units defined by recurring patterns of topography, soils and vegetation, which could be expected to share ecological and geomorphological characteristics and, potentially, usefulness as a resource.
Leakiness index	An index which combines remotely sensed vegetation patchiness data with a digital elevation model (DEM) to derive a quantitative metric on the potential for landscapes to lose or 'leak' soil sediments.
Northern Australia	An unofficial geographic term including all of the Northern Territory and those parts of Queensland and Western Australia north of latitude 26°.
Pastoral industry	The livestock sector in the rangelands based on the grazing of cattle and sheep.
Poverty traps	Self-reinforcing mechanisms whereby a person or a community starts poor and remains poor often as a result of structural factors such as discrimination and lack of access to opportunity, such that poverty begets poverty.
Radiometry	Techniques for measuring electromagnetic radiation, including visible light, with significant applications in remote sensing.
Range assessment	Ecological techniques that inventory country (landscapes) for their suitability and value under a particular land use, then assesses (or monitors) its condition (ecological health) according to that land use and finally, communicates this information to land managers.
Rangelands	Native grasslands, shrublands and woodlands that cover a large proportion of the arid and semiarid zones. Regular cropping is not practised and the predominant agricultural

use, if any, is grazing by sheep and cattle on native vegetation.

Resilience	As defined by the Resilience Alliance, <sup>3</sup> the capacity of an ecosystem to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes. A resilient system can withstand shocks and rebuild itself when necessary. Resilience in social systems has the added capacity of humans to anticipate and plan for the future.
Runoff	The portion of rainfall not immediately absorbed into the soil and which becomes surface flow.
Runon	The flow of runoff to a lower gathering point in the landscape.
Scalds	Places where surface soil has eroded, leaving behind a heavier textured subsoil devoid of vegetation and relatively impermeable to water.
Semi-arid rangelands	Remote and sparsely populated areas of Australia in which median rainfall varies from about 350 mm up to 800 mm in the north and about 500 mm in the east. The variability of annual rainfall is moderate to high. In the north, annual evaporation rates are high. Northern vegetation is typically savanna.
Settler science	Scientific practices developed to serve the purposes of colonial land use.
Shrub thickening	An increase in density of woody shrubs at the expense of herbs and grasses, due to over-grazing and/or the absence of fire.
Social network analysis	A method for investigating social structures through the use of graph theory and networks that are characterised by nodes (individuals or things within the network) and the relationships or interactions that connect them.
Social-ecological systems	Systems encompassing people, nature and biophysical factors, and the interactions among them.

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<sup>3</sup> 'Resilience Alliance', <https://www.resalliance.org/>), viewed July 2022.

Soil productive potential	An estimate of how well a disturbed soil will grow appropriately selected plants (germinate, establish and grow biomass), relative to an undisturbed site.
Spinifex grasslands	Hummock-grass ecosystems characterised by <i>Triodia</i> species and growing on arid sand dunes and sandplains throughout the Northern Territory, Queensland, South Australia and Western Australia.
Sustainable habitation	Settlements capable of persisting by using resources—natural, financial and human—efficiently and sustainably.
Sustainable livelihoods framework	A holistic conceptualisation of people's livelihoods, encompassing the assets people have available to them, together with the constraints and opportunities that determine outcomes for their lives.
Traditional knowledge	Knowledge, know-how, skills and practices that are developed, sustained and passed on from generation to generation within a community.