Title	Landscape Resilience Data

Abstract

These data were collected as part of the NSW Grazing Study. This study investigates how past grazing pressure has influenced the resilience of all three vegetation communities. We assessed three key ecosystem processes or components that provide important information on the likely resilience of reserves following removal, or reduction in the densities of, domestic stock. These processes are 1) soil nutrient cycling, 2) soil hydrology and 3) seed bank dynamics.

For each community, we examined 18 individual sites scattered widely across the full range of the vegetation community, in three distinct groups (n = 54). In Cypress pine, the groups were selected along a gradient from north to south i.e. Cobar/Yathong (northern group), Griffith/Merriwagga (central group) and Narrandera/ Buckingbong (southern group). Similarly, Black box sites spanned a north-south gradient from Hillston (northern group), Griffith (central group) to Edwards River (southern group). River red gum sites were located along a gradient from east to west: Corowa (eastern group), Millewa (central group) and Deniliquin (western group). Each group contained three pairs of sites, with each pair corresponding to one of three different levels of grazing intensity; undisturbed (good condition), moderately disturbed (average condition) and highly disturbed (poor condition) by herbivore grazing. The assignment was based on attributes such as erosion extent, presence of exotic plants, groundstorey vegetation cover, the number of livestock and native herbivores (kangaroos, *Macropus spp*). For example, undisturbed (high condition) sites had an extensive cover of biocrusts, extensive litter cover, a plant community composition dominated by native species with a good mixture of annuals and perennials, abundant large grass butts, little evidence of erosion, high scores for the stability index and little evidence of grazing by livestock (based on dung counts and stock tracks). Highly disturbed sites were characterised by opposite levels of these attributes, and moderately disturbed sites intermediate between the two.

Floristic sampling - At each of the 54 sites we established a 100 m transect, perpendicular to the main watering point, along which we positioned three large quadrats (5 m x 5 m) at 0 m, 50 m and 100 m. Within these plots we centrally located a smaller (0.5 m x 0.5 m) quadrat. Within the large quadrats we conducted a full floristic survey (scoring the cover and abundance of all vascular plants).

Grazing Intensity - To assess recent grazing intensity, we identified and counted the dung or pellets of all herbivores (cattle, sheep/goat, kangaroo) within the large (5m x 5m) and small (0.5m x 0.5m) (kangaroo, rabbit, sheep/goat) quadrats. For cattle, the count of dung events from three 5m x 5m quadrats. For sheep, goat, deer, kangaroo, rabbit the count of pellets from three 5m x 5m quadrats and three 0.5m x 0.5m quadrats.

Soil chemical and biological assessment - At each of the 0m, 50m and 100m positions along the site transect we collected two samples of the top 5 cm of soil with a soil corer. Samples were placed into one bag and a subsample of about 100 g taken for microbial and soil chemical analyses. Soil enzyme concentrations and soil nutrient pools were analysed at UNSW. Gene sequencing, using the Illumina MiSeq platform for bacteria and fungi, were carried out using the Next Generation Genome Sequencing Facility at the University of Western Sydney.

Soil infiltration measurements - We measured infiltration at the Black box and Cypress pine sites only, i.e. 36 of the 54 Stage III sites. At each microsite we used two disk permeameters, simultaneously, to measure sorptivity and steady-state infiltration under ponding (+ 10 mm) and under tension (- 40 mm). Disk permeameters were placed within 30 cm of each other, or as close as possible for measurements over grass butts. The tension permeameter was placed on a thin bed of sand to provide a uniform contact with the soil surface, and the ponded permeameter on a steel ring above a pond of water about 5 cm deep. For shrubs and trees, the permeameters were placed in the centre of the canopy. For grass microsites, the above-ground material was clipped and the permeameters placed directly over the grass butt. The permeameters were run for at least 12 minutes to ensure that they had achieved steady-state infiltration. This method allowed us to calculate values for both stages of infiltration: sorptivity, the early stage, and steady-state infiltration, the final stage of infiltration. River red gum sites were excluded from soil infiltration measures because their heavy textured soils are prone to developing deep cracks, making the assessment of infiltration technically very difficult.

Seedbank dynamics - At each site (54) all three communities (Redgum, black box and cypress pine) two core samples were collected at 5 points to 5cm deep (0m, 50m, 100m, 150m 200m) at four patch types (tree, shrub, grass, open) along a 200m transect.
Seedling emergence experiments were conducted to determine the composition of the germinable soil seed bank (Thompson & Grime, 1979). The sieved soil was

spread evenly (~5 mm deep) over sterilised sand in commercial germination trays (35 cm × 14 cm) and placed in an unheated greenhouse. The trays were watered regularly to keep the soil moist or at field capacity and the position of all trays was randomly allocated to account for a possible bias associated with tray position. Ten control trays, i.e. trays containing only sterilised sand, were evenly distributed in the greenhouse to control for glasshouse weeds and seeds within the sterilised sand. Emerging plants were counted and removed following identification,or representative samples re-potted to grow on to confirm sample identification. The seedling emergent trial ran from spring 2016 to late autumn (242 days).

Resource locator

Data Quality Statement	Name: Data Quality Statement Protocol: WWW:DOWNLOAD-1.0-http--download Description: Data quality statement for Plant Species Cover and Abundance Function: download
Landscape Resilience data	Name: Landscape Resilience data Protocol: WWW:DOWNLOAD-1.0-http--download Description: Spreadsheet detailing location(s), plant cover abundance, soil surface condition, infiltration, dung, soil chemical assessment, microbes, enzymes and seedbank data. Function: download

Unique resource identifier

Code	fe9648f9-3fbd-42d9-b88c-ed9e8caad655

Presentation form	Table digital
Edition	Original (raw data)
Dataset language	English

Metadata standard

Name	ISO 19115
Edition	2016

Dataset URI	https://datasets.seed.nsw.gov.au/dataset/fe9648f9-3fbd-42d9-b88c-ed9e8caad655
Purpose	Decision support
Status	Completed
Spatial representation type	None

Spatial reference system

Code identifying the spatial reference system	4283

Topic category

Keyword set

keyword value	FLORA VEGETATION ECOLOGY SOIL
Originating controlled vocabulary	
Title	ANZLIC Search Words
Reference date	2008-05-16

Geographic location

West bounding longitude	141.064453
East bounding longitude	148.139648
North bounding latitude	-35.995785
South bounding latitude	-31.802893
NSW Place Name	Central West, Riverina and Western NSW

Vertical extent information

Minimum value	-100
Maximum value	2228
Coordinate reference system	
Authority code	urn:ogc:def:cs:EPSG::
Code identifying the coordinate reference system	5711

Temporal extent

Begin position	2013-07-01
End position	N/A

Dataset reference date

Resource maintenance

Maintenance and update frequency	Not planned
Contact info	
Contact position	Data Broker
Organisation name	NSW Department of Climate Change, Energy, the Environment and Water
Telephone number	131555
Email address	data.broker@environment.nsw.gov.au
Web address	https://www.nsw.gov.au/departments-and-agencies/dcceew
Responsible party role	pointOfContact

Limitations on public access

Responsible party

Contact position	Data Broker
Organisation name	NSW Department of Climate Change, Energy, the Environment and Water
Telephone number	131555
Email address	data.broker@environment.nsw.gov.au
Web address	https://www.nsw.gov.au/departments-and-agencies/dcceew
Responsible party role	pointOfContact

Metadata point of contact

Contact position	Data Broker
Organisation name	NSW Department of Climate Change, Energy, the Environment and Water
Telephone number	131555
Email address	data.broker@environment.nsw.gov.au
Web address	https://www.nsw.gov.au/departments-and-agencies/dcceew
Responsible party role	pointOfContact

Metadata date

2024-02-26T13:49:51.781621

Metadata language