Name of dataset or data source:	Landscape Resilience Data

Custodian of the dataset or data source:	ED Science (E&H)

Description:

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).

Data quality rating:

★Institutional Environment - 5
★Accuracy - 5
★Coherence - 5
☆Interpretability - 2
★Accessibility - 5

INSTITUTIONAL ENVIRONMENT	Excellent	★

✔ Does the information have the potential to enhance services or service delivery?

✔ The data aligns with the Data Quality Framework, including:

- Legislation
- Policies
- Information Asset Governance
- Standards
- Data Management Plans

✔ The following governance roles and responsibilities for this asset are clearly assigned:

- Information Asset Owner
- Information Asset Custodian
- Information Steward

✔ Data collection is authorised by law, regulation or agreement

✔ The Custodial agency has no commercial interest or conflict of interest in the data

ACCURACY	Excellent	★

✔ Data has been subject to a data assurance process (for example: Checking for errors at each stage of data collection and processing, or verifying data entry and making corrections if necessary.)

✔ Data is revised and the revision is published if errors are identified

✔ There are no known gaps in the data or if there are gaps (for example: non-responses, missing records, data not collected), they have been identified in caveats attached to the dataset.

✔ No changes have been made or other factors identified (for example: weighting, rounding, de-identification of data, changes or flaws in data collection or verification methods) that could affect the validity of the data; or any changes/factors have been identified in caveats attached to the asset.

✔ The data collection met the objectives of the primary user. The data correctly represents what it was designed to measure, monitor or report.

COHERENCE	Excellent	★

✔ Standard definitions, common concepts, classifications and data recording practices have been used.

✔ Elements within the data can be meaningfully compared.

✔ This data is generally consistent with similar or related data sources from the same discipline

✔ The data can be analysed over time (for example, there have not been any significant changes in the way items are defined, classified or counted over time).

✔ The data does not form part of a collection or, if it is the latest in a series of data releases, there have not been any changes in methodology or external impacts since the last data release.

INTERPRETABILITY	Fair	☆

✔ Information is available about the primary data sources and methods of data collection (e.g. instruments, forms, instructions).

✔ Information is available to help users evaluate the accuracy of the data and any level of error

✗ A data dictionary is available to explain the meaning of data elements, their origin, format and relationships

✗ Information is available to explain concepts, help users correctly interpret the data and understand how it can be used

✗ Information is available to explain ambiguous or technical terms used in the data

ⓘ Find out more about the data dictionary from the Custodian (contact details below).

ⓘ Find out more about the primary data sources and methods of data collection from the Custodian (contact details below).

Find out more about concepts used in this dataset and how to understand or interpret the data from the Custodian (contact details below).

i Find out more about ambiguous or technical terms used in the data from the Custodian (contact details below).

ACCESSIBILITY	Excellent	★

✔ Data is available online with an open licence

✔ Data is available in machine-processable, structured form (e.g. CSV format instead of an image scan of a table)

✔ Data is available in a non-proprietary format (e.g. CSV, XML)

✔ Data is described using open standards (e.g. RDF, SPARQL) and persistent identifiers (URIs or DOIs)

✔ Data is linked to other data, to provide context (e.g. employee ID is linked to employee name or species name is linked to genus)

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For more information about this dataset or data source, contact:	NSW Department of Climate Change, Energy, the Environment and Water
Data Broker email:	data.broker@environment.nsw.gov.au
Data Broker phone:	131555

Understanding the Data Quality Statement

The data quality statement aims to help you understand how a particular dataset could be used and whether it can be compared with other, similar datasets. It provides a description of the characteristics of the data to help you decide whether the data will be fit for your specific purpose.

The Data Quality statement is prepared by the data custodian (provider of the dataset), using a questionnaire that has been developed in accordance with the NSW Government Standard for Data Quality Reporting.

About the quality rating:

The reporting questionnaire asks five questions for each of these data quality dimensions:

- Institutional Environment

- Accuracy
- Coherence
- Interpretability
- Accessibility

For each question: "yes" = 1 point; "no" = 0 points
The number of points determines the Quality Level for each dimension (high, medium, low).
Only dimensions with four or five points receive a star.

Points	Quality Level	Star / No Star
0	Poor	No Star
1	Poor	No Star
2	Fair	No Star
3	Good	No Star
4	Very Good	Star
5	Excellent	Star

Evaluating data quality

Quality relates to the data's "fitness for purpose". Users can make different assessments about the dataquality of the same data, depending on their "purpose" or the way they plan to use the data.
The following questions may help you evaluate data quality for your requirements. This list is not exhaustive.Generate your own questions to assess data quality according to your specific needs and environment.

- What was the primary purpose or aim for collecting the data?
- How well does the coverage (and exclusions) match your needs?
- How useful are these data at small levels of geography?
- Does the population presented by the data match your needs?
- To what extent does the method of data collection seem appropriate for the information being gathered?
- Have standard classifications (eg industry or occupation classifications) been used in the collection of the data?If not, why? Does this affect the ability to compare or bring together data from different sources?
- Have rates and percentages been calculated consistently throughout the data?
- Is there a time difference between your reference period, and the reference period of the data?
- What is the gap of time between the reference period (when the data were collected) and the release date of thedata?
- Will there be subsequent surveys or data collection exercises for this topic?
- Are there likely to be updates or revisions to the data after official release?