Report card on sustainable natural resource use in the rangelands
Status and trend in the pastoral rangelands of Western Australia
Supporting your success
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Cover: Cattle grazing on rangeland pasture in the Pilbara

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<td>Annual Return of Livestock and Improvements</td>
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<td>CC</td>
<td>carrying capacity</td>
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<td>Commissioner</td>
<td>Commissioner of Soil and Land Conservation</td>
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<td>CU</td>
<td>cattle unit (see Glossary)</td>
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<td>DSE</td>
<td>dry sheep equivalent (see Glossary)</td>
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<tr>
<td>ha</td>
<td>hectare; 100ha = 1km²</td>
</tr>
<tr>
<td>ha/CU</td>
<td>hectares per cattle unit</td>
</tr>
<tr>
<td>km²</td>
<td>square kilometres; 1km² = 100ha</td>
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<td>LCD, LCDC</td>
<td>land conservation district, land conservation district committee (see Glossary)</td>
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<td>MODIS</td>
<td>Moderate Resolution Imaging Spectroradiometer</td>
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<td>RVCI</td>
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<td>WARMS</td>
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Glossary
Glossary

Words used in definitions that are themselves defined in the glossary are printed in bold.

**Abundance:** the total number of individuals of a species in an area, population or plant community

**Annual:** a plant which grows from seed and completes its life cycle, including flowering and seeding, within one year or less; some annuals can live longer than one year when growing conditions are favourable; see also **short-lived perennial**

**Arid:** a region or climate where lack of sufficient moisture severely limits growth and production of vegetation; the actual limit of sufficient moisture varies according to temperature in the specific location

**Available forage:** the proportion of forage production that is accessible for use by a specified kind or class of grazing animal

**Bioregion:** a large, geographically distinct area of land with common characteristics, such as geology, landform patterns, climate, ecological features and plant and animal communities; see Department of the Environment

**Canopy:** the vertical projection downward of the aerial portion of vegetation, usually expressed as a percentage of the ground occupied

**Canopy cover:** the percentage of ground covered by a vertical projection of the outermost perimeter of the natural spread of plant foliage; small openings within the canopy are generally included

**Carrying capacity:** the number of livestock units a paddock or management area can carry over the long term, while maintaining or improving land condition

**Cattle unit (CU):** a standard unit used (1) to compare the feed requirements of different classes of livestock; (2) to assess the carrying capacity and potential productivity of a given area of grazing land; a CU is generally accepted as a full grown steer or dry cow of about 450 kilograms liveweight. One CU equals seven **dry sheep equivalents** (DSE)

**Continuous grazing:** the grazing of a specific area (station, paddock) by livestock throughout the year

**Decreaser:** a plant species, often of the original (pristine) vegetation, which will decrease in relative amount with continued disturbance, such as grazing; see also **increaser**

**Density:** the number of individuals of a certain species per unit area; it is not a measure of cover

**Desirables or desirable species:** those species in a given pasture type that are usually productive, highly palatable and perennial; generally decrease in frequency as grazing pressure increases because they are preferentially grazed by cattle; also called **decreasers**

**Driver:** an aspect of a system that causes or contributes to a change on another aspect of the system

**Drought:** a prolonged period without rain, compared to the norm, leading to a shortage of water for vegetation or livestock

**Dry sheep equivalent (DSE):** a standard unit used to compare the feed requirements of different classes of stock; based on the feed energy required to maintain a 45 kilogram Merino wether

**Effective rainfall:** rainfall that infiltrates the soil and is available to plant roots (that is, it is not lost to evaporation, run-off or deep drainage); in its simplest form, effective rainfall is precipitation above a threshold of a fixed event size (for example, 50mm), below which plants stop growing; it is not the same everywhere or all the time because factors, such as rainfall sequence and timing, temperature, soil type and slope, affect how much rain must be received before plants can take it up

**Erosion:** detachment and movement of soil or rock fragments by water or wind

**Forage:** browse and herbage which is available as food for grazing animals or for harvesting for feed (that is, hay or silage)
**Forage supply:** the amount of forage available to grazing animals in a given area in a given period. Dry forage is a static quantity, and green, growing forage is a dynamic quantity.

**Frequency:** the ratio between the number of sample units containing a species and the total number of sampling units; expressed as a percentage.

**Functional group:** an aggregation of land systems, based on similar landform, dominant land unit or pasture type, and underlying vegetation; a primary functional group can be split according to the overstorey; the 110 land systems in the Kimberley are classified into 10 functional groups; south of the Kimberley, the 444 land systems are classified into 50 functional groups; for example, see table below.

<table>
<thead>
<tr>
<th>Functional group</th>
<th>Functional group description</th>
<th>Land system</th>
<th>Area (km²)</th>
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</thead>
<tbody>
<tr>
<td>1a</td>
<td>Hills and ranges with open woodland</td>
<td>Burramundi, Clifton, Elder, Forrest, Headley, Looingnin, Lubbock, Pompey, Precipice, St George, Wickham</td>
<td>22 732</td>
</tr>
<tr>
<td>1b</td>
<td>Hills and ranges woodland</td>
<td>Buldiva, Dockrell, Pinkerton, Weaber</td>
<td>26 784</td>
</tr>
<tr>
<td>2a</td>
<td>Hills – lowlands – undulating plains – woodlands spinifex grass</td>
<td>Fork, Foster, Franklin, Karunjie, Macphee, Pago, Ruby 2</td>
<td>17 998</td>
</tr>
</tbody>
</table>

**Grassland:** a vegetation community dominated by grasses, grass-like plants or forbs; characterised by perennial *tussock* and *hummock grasses*, occurring primarily in the Kimberley and Pilbara; in the Pilbara, there is a gradual change from tussock or hummock grass understoreys in northern pastures to predominantly shrub understoreys in southern pastures.

**Grazing intensity:** the cumulative impact of grazing animals on rangeland vegetation in a given period.

**Grazing pressure:** the demand–supply ratio between dry matter requirements of herbivores (livestock, and native and introduced herbivores) and the forage supply in a pasture at a specific time. Where grazing pressure is high for sustained periods (forage removal is greater than forage production), the population size, diversity and distribution of desirable perennials can be decreased and the ability to regenerate may also be reduced.

**Grazing system:** a specialised form of grazing management which defines the periods of grazing and nongrazing (rest). The usual systems are set-stocking, cell (rotational) grazing and seasonal spelling.

**Hummock grass:** spinifexes that grow together as large rounded mounds or ‘hummocks’ that can be up to several metres across; often form a ring around a central dead or decaying patch.

**Increaser:** plant species, often of the original (pristine) vegetation, which will increase in relative amount, at least for a time, with continued disturbance, such as grazing; see also *decreaser*.

**Intermediates or intermediate species:** those species in a given pasture type that include moderately or slightly palatable perennial grasses, shrubs and trees and palatable annuals; may increase under heavy grazing at first because livestock concentrate on the more *desirable species* but if the desirable species are grazed out, intermediate species will also start to decline.

**Land conservation district (LCD):** community groups constituted under section 22(1) of the *Soil and Land Conservation Act 1945*; comprise pastoral leasehold land, defined conservation areas, which may have formed part of the pastoral estate prior to declaration as conservation areas, and unallocated Crown land (UCL).

**Landscape function:** the way in which landscapes acquire, use, cycle and lose physical and biological resources.
**Land system:** a recurring pattern of vegetation, topography and soils in the landscape

**Monitoring:** the process of making repeated observations, assessments or measurements in the same area, and analysing and interpreting data to judge progress towards meeting management objectives; observations can be direct, for example, by measuring attributes at fixed sites in the field, or indirect, for example, by acquiring data from remotely sensed images

**Pastoral value:** the value of a pasture or an individual species for *pastoralism*, based on the quality and quantity of livestock forage it provides

**Pastoralism:** the husbandry of domesticated grazing animals on native or introduced pasture

**Pasture type:** a distinct mix of plant species, soil type and landscape position

**Perennial:** a plant which lives for three or more years; see also *short-lived perennial*

**Potential Carrying Capacity (Potential CC):** the estimated long-term carrying capacity for a paddock or station if all *pasture types* are in good *rangeland vegetation condition* and the area is fully developed (particularly with respect to water point distribution and placement) and available to livestock

**Preferential grazing:** where livestock selectively graze more-palatable species before less-palatable species; may lead to the more-palatable species being grazed out of a pasture

**Preferred species:** plant species that are preferred by all (or a group of) animals and are grazed by first choice; preference can vary between cattle and sheep

**Present Carrying Capacity (Present CC):** the Potential CC discounted for an assessed decline in *rangeland vegetation condition*, based on defined ‘discount factors’ for each *land system*

**Rangeland:** the internationally recognised term for land supporting vegetation suitable for grazing; where livestock are grazed extensively on native vegetation; where rainfall is considered to be too low or erratic for agricultural cropping or for improved pastures

**Rangeland vegetation condition:** the present status of an area of rangeland in terms of specific values or potentials; the current status of the vegetation compared to the optimal status which could be expected given the potential of the area; rangeland vegetation condition is assessed as:

- good: perennials present include all or most of the palatable plant species expected; some less-palatable species may be present; total perennial groundcover is close to optimal for the site
- fair: moderate loss of palatable perennials or increases in unpalatable species, but most palatable species are still present; foliar cover is below optimal for the site unless palatable species have increased, in which case foliar cover is similar to good condition rangeland
- poor: conspicuous loss of palatable perennials; foliar cover has either decreased through loss of perennials (common in grasslands), or is stable or increased because of an invasion of unpalatable species

**Rangeland plant population change:** the change in direction of health or condition of plant populations, described by changes in the frequency or density of indicator plant species; not an absolute measure of rangeland vegetation condition; usually expressed as increased, stable or decreased

**Resilience:** the ability of a plant, pasture or ecosystem to withstand disturbance

**Resource capability:** the capability of a resource, such as land or vegetation, to sustain a particular use without degradation

**Rotational grazing:** a grazing scheme where livestock are moved from one grazing unit (paddock) on the same station to another
**Savanna**: area of **grassland** (generally tropical or subtropical) with scattered trees; a dry climate, punctuated by a distinct summer wet season, encourages the growth of grasses and discourages the growth of trees

**Short-lived perennial: annual** species able to live for more than one year when growing conditions are favourable

**Shrubland**: a vegetation community characterised by shrubs with a variable mulga or eucalypt overstorey; occur primarily in the Gascoyne, Murchison, Goldfields and Nullarbor; in the Pilbara, there is a gradual change from **tussock or hummock grass** understoreys in northern pastures to predominantly shrub understoreys in southern pastures

**Soil surface condition**: the soil's capacity to retain water and ensure soil stability

**Stocking rate**: the number of specific kinds and classes of animals utilising a unit of area for a specific time period; normally expressed as animal type per unit area, for example, five wethers per hectare, two steers per hectare

**Total grazing pressure**: the ratio of the total demand for forage by all herbivores (livestock, and native and introduced herbivores) to the forage supply; it is low in periods when forage is abundant, and vice versa

**Trend**: the direction of change in health or condition of a base resource

**Tussock grass**: a grass that has stems bunched together forming a grass clump or ‘tussock’

**Undesirable species**: those species in a pasture type that are generally unpalatable, including woody weeds and other weedy, prickly or toxic species which invade overgrazed pasture; largely ignored by livestock, undesirable species tend to increase under prolonged heavy grazing and in large numbers, indicate poor **rangeland condition**; also called **increasers**

**Utilisation**: the percentage of pasture grown in a year that is consumed or destroyed by livestock; may refer to a single plant species or a whole vegetation community

**WARMS**: Western Australian Rangeland Monitoring System; a set of permanent rangeland monitoring sites in pastoral Western Australia; established by the then Department of Agriculture Western Australia in the early 1990s

**Woodlands**: a vegetation ecosystem that contains widely spaced trees with their crowns not touching; in the Western Australian rangelands, woodlands support an understorey of shrubs and herbaceous plants including grasses