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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### Shortened forms

<table>
<thead>
<tr>
<th>Short form</th>
<th>Long form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARLI</td>
<td>Annual Return of Livestock and Improvements</td>
</tr>
<tr>
<td>CC</td>
<td>carrying capacity</td>
</tr>
<tr>
<td>Commissioner</td>
<td>Commissioner of Soil and Land Conservation</td>
</tr>
<tr>
<td>CU</td>
<td>cattle unit (see Glossary)</td>
</tr>
<tr>
<td>DSE</td>
<td>dry sheep equivalent (see Glossary)</td>
</tr>
<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>
</tr>
<tr>
<td>LCD, LCDC</td>
<td>land conservation district, land conservation district committee (see Glossary)</td>
</tr>
<tr>
<td>MODIS</td>
<td>Moderate Resolution Imaging Spectroradiometer</td>
</tr>
<tr>
<td>NAFI</td>
<td>North Australian Fire Information (firenorth.org.au)</td>
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<tr>
<td>Potential CC</td>
<td>Potential Carrying Capacity (see Glossary)</td>
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<tr>
<td>Present CC</td>
<td>Present Carrying Capacity (see Glossary)</td>
</tr>
<tr>
<td>RVCI</td>
<td>Rangeland Vegetation Condition Index</td>
</tr>
<tr>
<td>t/ha/y</td>
<td>tonnes per hectare per year</td>
</tr>
<tr>
<td>UCL</td>
<td>unallocated Crown land</td>
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<tr>
<td>WARMS</td>
<td>Western Australian Rangeland Monitoring System (see Glossary)</td>
</tr>
</tbody>
</table>
Summary

This report card provides a regional overview of the status and trend of the natural resource base of the pastoral rangelands in Western Australia (WA).

The overview information is intended for the use of pastoral lessees, other rangeland and pastoral managers, and industry and government decision-makers with an interest in pastoral areas.

This report is focused on the pastoral lease areas of WA (857,833 square kilometres, based on active leases as at June 2016), which covers 40% of the rangelands (2.2 million square kilometres, or 87% of the state). The rangelands and lease areas cover 20 Australian bioregions with a wide diversity of vegetation types, seasonal conditions and topography. The Kimberley and Pilbara regions comprise the Northern Rangelands and the Gascoyne, Murchison and Goldfields–Nullarbor regions comprise the Southern Rangelands.

The drivers of change in the rangelands — seasonal quality, grazing pressure and fire (particularly in the Northern Rangelands) — interact and their effect is expressed in the condition and trends of natural resources used in pastoralism.

The status and trend of these resources in the pastoral areas are described in the following themes:

- **rangeland vegetation condition**: from pastoral station assessments
- **plant population change**: using data from the Western Australian Rangeland Monitoring System (WARMS)
- **vegetation cover**: from remotely sensed data
- **soil erosion**: from pastoral station assessments
- **soil organic carbon**: using modelled data.

The information is presented at the land conservation district (LCD) or regional scale, not at the pastoral lease scale.

The condition and trend for the rangeland's natural resources was mixed (Table 1, Figures 1 and 2). The important findings are:

- In the Northern Rangelands, rangeland vegetation condition at the aggregate LCD scale was 57% good, 29% fair and 14% poor at the last assessment.
- In the Northern Rangelands, WARMS monitoring sites indicate the assessed vegetation condition was stable since the last station inspections (2002–09), except in the Ashburton and De Grey LCDs where condition declined.
- In the Southern Rangelands, rangeland vegetation condition at the aggregate LCD scale was 36% good, 39% fair and 25% poor at the last assessment.
- In the Southern Rangelands, WARMS monitoring sites indicate the assessed vegetation condition was stable since the last station inspections (2002–09).
- There were large variations in condition and trend of the pastoral resource themes, at the paddock, station, LCD and regional scales.
The global demand for food and fibre brings many opportunities and challenges for the agrifood sector. One of these challenges is to achieve productivity growth while ensuring we use our natural resources in a sustainable way.

Opportunities and challenges in the rangelands need to consider the principles of sustainable rangeland management:

- stewardship of natural resources in pastoral rangelands is critical
- managing for longer-term climate variability and trends is important
- current evidence-based resource information is important
- management practice will determine sustainability of resource use
- viable pastoral businesses are needed for sustainable resource management
- innovation for sustainable resource use is important
- pastoral participants need to work together.
### Table 1: Resource status and trend summary for the WA pastoral rangelands

<table>
<thead>
<tr>
<th>Theme</th>
<th>Summary</th>
<th>Condition and trend</th>
<th>Confidence</th>
<th></th>
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</thead>
</table>
| **Rangeland vegetation condition** | **Northern Rangelands**  
Most of the area was in good (57%) to fair (29%) condition and this condition has been stable in recent times in all LCDs, except the Ashburton and De Grey, where it has decreased.  
There was considerable variation in condition and trend within the region. | Poor:  | Fair:  | Good:  | In condition | In trend |
| **Southern Rangelands**      | Most of the area was in fair (39%) to good (36%) condition and this condition has been stable in recent times.  
There was considerable variation in condition and trend within the region. | Poor:  | Fair:  | Good:  | In condition | In trend |
| **Plant population change (desirable perennials)** | **Northern Rangelands**  
The average frequency of desirable perennial grasses was good to fair and has increased (3%) in the most recent completed assessment (2012–14), except in the Ashburton (–5%) and North Kimberley (–4%) LCDs.  
The long-term (21 years) population was stable or increased in all LCDS, except the Ashburton LCD where it decreased. | Poor:  | Fair:  | Good:  | In condition | In trend |
| **Southern Rangelands**      | Desirable shrub and tree density decreased (–12%) from 2005–10 to 2010–15. Since 1994, when most WARMS sites were installed, the density of desirable shrubs and trees decreased in 11 LCDs and increased in 4 of the 19 LCDs. | Poor:  | Fair:  | Good:  | In condition | In trend |
### Table 1 continued

<table>
<thead>
<tr>
<th>Theme</th>
<th>Summary</th>
<th>Condition and trend</th>
<th>Confidence</th>
</tr>
</thead>
</table>
| **Plant population change (all perennials)** | **Northern Rangelands**  
Perennial grass frequency increased (4%) from 2009–11 to 2012–14. The average perennial grass frequency decreased in the Ashburton LCD.  
The long-term (21 years) population change was variable, with increased or stable populations in Kimberley LCDs and stable or decreased populations in Pilbara LCDs. | Poor:  
Fair:  
Good:  
In condition:  
In trend: |          |          |
| **Southern Rangelands** | Perennial shrub and tree density decreased (–10%) from 2005–10 to 2010–15. The largest decreases were in the Gascoyne–Wooramel, Meekatharra and Wiluna LCDs, with increases in the Mount Magnet (18%) and Cue (10%) LCDs.  
The long-term (18 years) population change decreased in 11 LCDs and increased in 5 of the 19 LCDs. Since 1994, when the WARMS sites were installed, plant density has decreased (–10%) across the Southern Rangelands. | Poor:  
Fair:  
Good:  
In condition:  
In trend: |          |          |
| **Vegetation cover** | **Northern Rangelands**  
In the Kimberley, average vegetation cover between 2006 and 2015 was stable to slightly decreased. Cover in the Halls Creek – East Kimberley LCD decreased significantly and there are some large areas of decreased cover in other LCDs.  
In the Pilbara, average cover was stable. However, there were large areas of decreased cover in all LCDs. Cover increased in the East Pilbara LCD. | Poor:  
Fair:  
Good:  
In condition:  
In trend: |          |          |
| **Southern Rangelands** | The average vegetation cover was stable between 2006 and 2015. However, there were large areas of decreased cover. Cover increased in the Nullarbor – Eyre Highway, Kalgoorlie and, to a lesser extent, Shark Bay LCDs. | Poor:  
Fair:  
Good:  
In condition:  
In trend: |          |          |
### Soil erosion

**Northern Rangelands**
Overall, the amount of soil erosion was minor to moderate. Soil erosion decreased slightly in recent assessments, particularly in the Halls Creek – East Kimberley and Roebourne – Port Hedland LCDs. There was a slight increase in soil erosion in the Derby – West Kimberley LCD. Other LCDs have been stable.

**Southern Rangelands**
Overall, the amount of soil erosion was minor to moderate. The recent trend for the region was stable. However, soil erosion increased in one-third of the LCDs assessed.

### Soil organic carbon

**Northern Rangelands**
All LCDs have low (3–15t/ha) soil organic carbon, which is considered normal in this environment. No trend data were available.

**Southern Rangelands**
Most LCDs have low (3–15t/ha) soil organic carbon, except for the four LCDs that abut the agricultural region that have moderate (15–40t/ha) soil organic carbon. These levels are considered normal. No trend data were available.
To show the variability between LCDs within regions, the trend for four natural resource themes — rangeland vegetation condition, plant population change in desirable perennials, vegetation cover and soil erosion — are summarised for each LCD (Figures 1 and 2).
Figure 1  Summary of trends in natural resources in the Northern Rangelands. The trend in vegetation cover was based on data in 2006–15 and the trends in rangeland vegetation condition, soil erosion and desirable plant populations are based on the WARMS assessments since the last station inspection.
Figure 2  Summary of trends in natural resources in the Southern Rangelands. The trend in vegetation cover was based on data in 2006–15 and the trends in rangeland vegetation condition, soil erosion and desirable plant populations are based on the WARMS assessments since the last station inspection. There are insufficient spatial data for some attributes to confidently determine trends for LCDs 21, 22, 23 and 26.